



SAPIENZA
UNIVERSITÀ DI ROMA

XX CONFERENCE OF ITALIAN RESEARCHERS IN THE WORLD
THURSDAY, JUNE 18TH 2026
PRESIDENZA DEL CONSIGLIO DEI MINISTRI
SALA POLIFUNZIONALE, ROMA





Message from the Conference Chairman

Buongiorno a tutti, desidero esprimere il saluto più sentito a nome di tutto il Comitato Organizzatore.

Un ringraziamento speciale va al Presidente del Consiglio dei ministri On. Giorgia Meloni, al Vice Ministro Valentino Valentini delegato della Presidenza del Consiglio, al Dr. Savarino e al suo staff, per la generosa ospitalità offerta in questa occasione. Rivolgo un vivo ringraziamento alla Magnifica Rettrice della Sapienza Università di Roma Prof.ssa Polimeni, al Vice Rettore Prof. Ciccarone, a Francesca Pariti del Cerimoniale della Sapienza, e Incoronata Boccia per la concreta e preziosa collaborazione che ha reso possibile questo evento.

Desidero inoltre evidenziare con piacere la presenza del Prof. Garaci, già Presidente dell'Istituto Superiore di Sanità.

Un pensiero commosso e il più alto riconoscimento vanno ai caduti del personale militare e civile che hanno sacrificato con la propria vita nelle missioni di ricerca, test e sperimentazione in volo, in mare e sulla terra: il loro sacrificio resta esempio di dedizione al servizio del progresso scientifico e del Paese, resta per tutti noi un faro indelebile.

Cari amici, colleghi e partecipanti alla Conferenza dei Ricercatori Italiani nel Mondo, oggi celebriamo con orgoglio e gratitudine un percorso straordinario: vent'anni di impegno, passione e visione condivisa. In questi due decenni la Conferenza è diventata un punto di riferimento essenziale per migliaia di menti italiane che, pur operando oltre i confini nazionali, hanno continuato a sentirsi parte integrante della comunità scientifica e culturale della nostra Nazione.

In vent'anni avete costruito ponti invisibili ma solidissimi tra l'Italia e il mondo. Avete trasformato la distanza geografica in ricchezza di prospettive, la diaspora in rete di eccellenza, la lontananza in occasione di crescita collettiva. Ogni edizione ha rappresentato un momento di incontro autentico, di scambio fecondo, di riconoscimento reciproco e di rinnovato amore per la ricerca, l'innovazione e la cultura italiana.

Grazie al vostro lavoro instancabile, tante storie personali si sono intrecciate in una storia comune: quella di un'Italia che non si ferma ai suoi confini, ma che vive e brilla ovunque ci siano intelligenza, curiosità e dedizione al sapere. Avete dimostrato che essere italiani nel mondo non significa solo portare competenze, ma valori, creatività e quel particolare genio che da sempre caratterizza il nostro contributo alla conoscenza umana.

Oggi vogliamo dirvi grazie:

per aver tenuto alta la bandiera della ricerca italiana all'estero; per aver creato uno spazio di dialogo aperto e inclusivo; per aver investito il vostro talento nel costruire un futuro migliore per l'Italia e per il mondo intero.

Che i prossimi vent'anni siano ancora più luminosi, ricchi di nuove sfide, di collaborazioni internazionali sempre più ambiziose e di risultati che riempiano di orgoglio le generazioni future.

Un ringraziamento particolare all'Associazione Donatori Sangue Presidenza del Consiglio ODV , a Roberto Ciofi e alla sua squadra per la costruzione ed il supporto dell'ospedale in Makelle in Etiopia, progetto di solidarietà che sosteniamo con profonda convinzione.

Inoltre, bisogna continuare a sensibilizzare la collettività al valore della donazione degli organi, simbolo di amore per la vita.

Infine, con Veronica Baldini lavoreremo al ripristino del Premio Italiani nel Mondo, per valorizzare e premiare chi ogni giorno rende grande la nostra Nazione. E voglio ricordare a tutti che ovunque nel mondo vi sia un Italiano, lì c'è il tricolore d'Italia!

Grazie a tutti per la vostra partecipazione e Auguri di cuore per questo importante anniversario e per tutto il cammino che ancora ci attende insieme.

Con stima e affetto,



Vincenzo Arcobelli
Chairman



Ministero delle Imprese e del Made in Italy

VICE MINISTRO VALENTINO VALENTINI

Buongiorno a tutti.

"La scienza non ha patria, ma lo scienziato ne ha una." Louis Pasteur lo disse quasi due secoli fa, e oggi quelle parole risuonano in questa sala con una forza particolare. Perché voi siete esattamente questo: scienziati con una patria, che hanno scelto di portare quella patria con sé, ovunque siano andati.

Sono davvero felice di essere qui oggi per aprire la XX Conferenza dei Ricercatori Italiani nel Mondo. Vent'anni di storia. Vent'anni di incontri, di idee, di persone che hanno scelto di portare il nome dell'Italia in ogni angolo del pianeta attraverso il lavoro più prezioso che esista: la ricerca scientifica.

Quando parliamo di Made in Italy, pensiamo subito alla moda, al design, all'enogastronomia. Ma il Made in Italy più autentico non sta soltanto nei prodotti: sta nelle persone. Sta in un modo di essere, in un approccio al lavoro fatto di cura, di rigore, di creatività, di quella passione silenziosa che trasforma un compito in un'opera.

Voi siete Made in Italy. Nei vostri laboratori, nelle vostre pubblicazioni, nel modo in cui affrontate un problema scientifico, portate qualcosa di riconoscibilmente italiano — quella combinazione di intuizione e metodo, di bellezza e precisione che il mondo ci riconosce da secoli.

Siete i nostri ambasciatori più credibili, i nostri testimonial più autorevoli. Non perché lo abbiate scelto come ruolo, ma perché lo incarnate ogni giorno con il vostro lavoro.

Questa non è una ricorrenza qualunque. È un traguardo che merita di essere riconosciuto per quello che è: la prova concreta che una comunità scientifica dispersa geograficamente può restare unita nel senso di appartenenza, nei valori, e nella volontà di costruire qualcosa insieme.

Molti di voi hanno lasciato l'Italia per necessità, altri per scelta, tutti per opportunità. Quella parola, opportunità, è importante. Non voglio raccontarvi una storia diversa dalla realtà. Le ragioni per cui i nostri migliori ricercatori si sono trasferiti all'estero sono note, e parte del mio lavoro, del lavoro del Governo, è affrontarle con serietà. Ma oggi non sono qui per fare un discorso di autocritica. Sono qui per guardare avanti, con voi.

Perché quello che vedo in questa sala è qualcosa di straordinario: ricercatori italiani che lavorano nelle migliori università del mondo, in laboratori d'eccellenza, nei centri dove si decide il futuro della medicina, dell'intelligenza artificiale, dell'energia, della difesa. E che oggi scelgono di essere qui, a Roma, per confrontarsi, per costruire reti, per aprire porte.

Via Veneto, 33 - 00187 Roma
Tel. +39 06 42043 4400 – 4114 – 4806
e-mail: segreteria.valentini@mise.gov.it



Questo è esattamente il tipo di connessione che l'Italia ha bisogno di coltivare. Le sinergie tra la vostra esperienza internazionale e le università, le imprese, le istituzioni italiane vanno aldilà degli slogan: sono una leva reale di sviluppo. Ogni collaborazione che nasce da un incontro come questo vale più di molti programmi scritti su carta.

Il patrocinio che questa Conferenza ha ricevuto — dalla Presidenza del Consiglio, dal Parlamento, dai Ministeri, dalla Commissione Europea — È il riconoscimento istituzionale che la diaspora scientifica italiana è una risorsa strategica per il Paese.

E voglio che questo riconoscimento si traduca in azioni concrete, non resti una firma su un documento.

Il ritorno a Roma, dopo l'edizione di Bruxelles, ha per me un significato particolare. Roma non è solo la capitale: è il luogo dove si prendono le decisioni, dove si incontrano la politica e la scienza, dove — spero — i ponti che costruirete oggi troveranno il terreno giusto per diventare strutture permanenti.

A ciascuno di voi chiedo una cosa sola: portate con voi, oltre alle vostre competenze, anche la vostra franchezza. Diteci cosa funziona, cosa non funziona, cosa vi aspettate dal Paese e cosa siete disposti a dargli. Il dialogo che voglio costruire con voi è un dialogo tra pari, non una cerimonia.

Buon lavoro a tutti, e benvenuti alla XX Conferenza.

Valentino Valentini

Saluti istituzionali

*Magnifica Rettrice della Sapienza Università di Roma
Prof.ssa Antonella Polimeni*

XX Conferenza dei Ricercatori Italiani nel mondo

18 giugno 2026 ore 09:30

Presidenza del Consiglio dei Ministri, Sala Polifunzionale

Via Santa Maria in Via 37A, Roma

Autorità,

Colleghe e Colleghi,

Signore e Signori,

È per me un grande privilegio e un sincero onore porgere i saluti istituzionali di Sapienza Università di Roma in occasione dell'apertura della XX Conferenza dei Ricercatori Italiani nel Mondo, che quest'anno si svolge nella prestigiosa cornice della Sala Polifunzionale della Presidenza del Consiglio dei Ministri. Desidero esprimere il più vivo apprezzamento per un'iniziativa di così alto profilo, che rappresenta un appuntamento di straordinaria rilevanza per il sistema della ricerca nazionale e un momento imprescindibile di incontro e confronto per la comunità scientifica italiana attiva nei contesti internazionali.

Rivolgo un sentito ringraziamento al Professor Andrea Giuffrida, Presidente della Texas Scientific Italian Community, e al Dottor Vincenzo Arcobelli, Fondatore e Rappresentante del Consiglio Generale degli Italiani all'Estero, per l'organizzazione di questo importante evento e per il costante e prezioso impegno profuso nella valorizzazione del patrimonio di competenze e conoscenze espresso dai ricercatori italiani nel mondo.

La Conferenza gode del patrocinio delle più alte cariche dello Stato, delle principali istituzioni europee e di primarie istituzioni scientifiche, tra cui la Presidenza del Consiglio dei Ministri, il Senato della Repubblica, la Camera dei Deputati, la Commissione Europea, il Ministero dell'Università e della Ricerca, il Ministero degli Affari Esteri e della Cooperazione Internazionale, il Ministero della Difesa, l'Istituto Superiore di Sanità e l'ENEA.

L'iniziativa nasce con l'obiettivo di valorizzare l'eccellenza italiana nei diversi ambiti della ricerca, rafforzare le reti di collaborazione internazionale e favorire sinergie strategiche tra università, imprese e istituzioni, offrendo uno spazio qualificato di dialogo tra studiosi, istituzioni e mondo produttivo.

Anche questa XX edizione si conferma come uno dei principali appuntamenti dedicati alla valorizzazione del contributo scientifico degli italiani all'estero e al rafforzamento del legame tra il nostro Paese e la comunità scientifica internazionale.

Attraverso sessioni plenarie e panel tematici, la giornata odierna offrirà un'ampia panoramica sulle più recenti attività scientifiche condotte dai nostri ricercatori nel mondo, stimolando una riflessione sul ruolo strategico che l'Italia può e deve svolgere nel contesto globale della conoscenza.

La presenza di ricercatori italiani attivi nei principali centri di ricerca internazionali contribuisce in modo significativo a rafforzare la competitività del nostro Paese, favorendo collaborazioni, scambi di competenze e progetti congiunti ad alto valore aggiunto, nonché sostenendo concretamente la mobilità scientifica, il rientro dei talenti e l'attrazione di investimenti in ricerca e tecnologia. Si tratta di pilastri fondamentali per la crescita e lo sviluppo del sistema Paese.

In questo quadro, il ruolo delle università italiane assume un'importanza decisiva, in un contesto caratterizzato da profonde trasformazioni economiche, sociali, tecnologiche e ambientali, che richiedono conoscenze sempre più avanzate, capacità di innovazione e una forte responsabilità istituzionale.

Le università sono chiamate non solo a produrre e diffondere conoscenza, ma anche a formare le nuove generazioni e le future classi dirigenti, fornendo gli strumenti necessari per affrontare le grandi sfide del nostro tempo. Esse rappresentano un presidio fondamentale per lo sviluppo culturale, sociale ed economico, e svolgono una funzione essenziale nel promuovere la competitività e la coesione sociale.

Il ruolo delle università pubbliche, in particolare, è oggi tanto autorevole quanto complesso. Una delle responsabilità più importanti che sentiamo è quella di garantire il diritto allo studio e sostenere gli studenti meritevoli che non dispongono delle risorse economiche necessarie per intraprendere o completare il proprio percorso universitario. Non consentire a questi giovani di esprimere pienamente il proprio talento significherebbe privare il Paese e la comunità scientifica internazionale di energie, competenze e capacità innovative indispensabili per il futuro.

Le università pubbliche sono inoltre chiamate a promuovere modelli di sviluppo sostenibili e orientati al bene comune, contribuendo alla costruzione di una società più equa e inclusiva. In questa prospettiva, ricerca, formazione e responsabilità sociale costituiscono dimensioni inseparabili di una missione unitaria.

È all'interno di questa visione che si colloca l'impegno di Sapienza. In quanto Ateneo pubblico e generalista, la nostra Università non è soltanto un luogo di alta formazione e ricerca, ma una comunità accademica che promuove un'idea di società fondata sui principi di uguaglianza, inclusione e pari opportunità.

Il nostro obiettivo è coniugare eccellenza scientifica e responsabilità sociale, contribuendo quotidianamente all'avanzamento della conoscenza, della cultura e del sapere. Crediamo fermamente nella valorizzazione del merito all'interno di un quadro di piena parità di diritti, nella convinzione che solo una società capace di offrire opportunità a tutte e a tutti possa esprimere appieno il proprio potenziale di crescita e innovazione.

Per questo Sapienza investe nella qualità della ricerca, nell'internazionalizzazione e nella formazione delle nuove generazioni, con la consapevolezza che il capitale umano rappresenti la risorsa più preziosa per costruire il futuro del Paese.

In conclusione, l'impegno a costruire e consolidare reti solide tra i ricercatori che danno lustro all'Italia nel mondo, le università, le istituzioni e il tessuto produttivo rappresenta una condizione essenziale per promuovere il progresso scientifico, economico e sociale.

Sono certa che il confronto odierno contribuirà a generare nuove opportunità di collaborazione e a rafforzare quel patrimonio di relazioni che costituisce uno dei principali fattori di successo della ricerca contemporanea.

Auguro a tutti voi una giornata di proficuo lavoro e di stimolante confronto, nella convinzione che le idee, le esperienze e le sinergie che nasceranno da questo incontro offriranno un contributo significativo all'avanzamento della conoscenza e al rafforzamento della presenza scientifica italiana nel mondo.

Vi ringrazio per l'attenzione.



Dear Colleagues and Distinguished Guests,

On behalf of the Texas Scientific Italian Community and the organizing committee, it is my great pleasure to welcome you to the XX Conference of Italian Researchers in the World.

This twentieth edition brings together an extraordinary community of scientists, scholars, innovators, and institutional leaders united by a shared commitment to advancing knowledge, fostering international collaboration, and celebrating the global contributions of Italian research excellence.

We are especially honored to host this year's conference in Rome, a city that symbolizes the rich intellectual, cultural, and scientific heritage of Italy. Throughout the program, distinguished speakers from Europe, North America, Latin America, Asia, and Australia will showcase their groundbreaking research work across various disciplines.

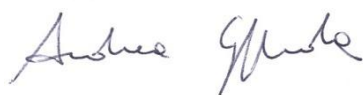
The conference highlights the essential role of global partnerships in addressing today's most pressing challenges and creating opportunities for innovation, education, and societal impact.

Although I deeply regret that conflicting professional commitments prevent me from being with you in person for this important occasion, I am certainly with you in spirit. Please accept my warmest greetings and sincere best wishes for a successful and inspiring conference.

I extend my sincere gratitude to all participating institutions, research associations, universities, governmental representatives, moderators, and speakers whose dedication and expertise make this event possible. In particular, I would like to thank Conference Chairman Vincenzo Arcobelli and the many international associations of Italian researchers abroad for their continued leadership and commitment to strengthening our global scientific network.

I wish you an inspiring and productive conference filled with meaningful discussions, new collaborations, and lasting friendships.

Warm regards,



Andrea Giuffrida

President, Texas Scientific Italian Community (TSIC)

Senior Vice President for Research & Biotechnology

Western University of Health Sciences, Pomona, California USA



Il Presidente della Camera dei Deputati

Dott. Andrea Giuffrida
Presidente
Texas Scientific Italian Community

Messaggio

Desidero rivolgere i miei saluti più cordiali ai partecipanti alla XX Conferenza dei Ricercatori Italiani nel Mondo, organizzata dalla *Texas Scientific Italian Community* in collaborazione con l'Università degli Studi di Roma "La-Sapienza".

La vostra iniziativa intende anche quest'anno rendere il giusto riconoscimento ai nostri connazionali che, ciascuno nel proprio campo, sono motivo di orgoglio per l'Italia e concorrono alla crescita delle comunità che li hanno accolti.

L'attività dei nostri ricercatori all'estero non costituisce soltanto la manifestazione tangibile delle loro capacità, ma rappresenta soprattutto una fonte di ispirazione per chiunque voglia contribuire a promuovere la diffusione della conoscenza, la circolazione dei saperi e lo sviluppo di progetti innovativi.

Sono lieto, dunque, di unirmi idealmente a Voi in questa giornata, che offre un insegnamento di grande valore: il merito non si ottiene attraverso espedienti o scorciatoie, ma deve essere guadagnato con i sacrifici e il duro lavoro.

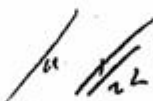


Il Presidente della Camera dei Deputati

Nel rinnovare il mio apprezzamento nei confronti dell'evento odierno, auspico che occasioni come questa permettano a tutti di comprendere quale inestimabile ricchezza sia poter impegnarsi, giorno dopo giorno, a beneficio della ricerca e del progresso.

Vi giunga, quindi, il mio sincero augurio per il miglior esito dei lavori.

Lorenzo Fontana





Ministero degli Affari Esteri
e della Cooperazione Internazionale

**SALUTO ISTITUZIONALE DEL SOTTOSEGRETARIO DI STATO AL
MINISTERO DEGLI AFFARI ESTERI E DELLA COOPERAZIONE
INTERNAZIONALE, AVV. MASSIMO DELL'UTRI**

**IN OCCASIONE DELLA "XX CONFERENCE OF ITALIAN
RESEARCHERS IN THE WORLD"**

(ROMA, 18 GIUGNO 2026)

È con grande piacere che rivolgo il mio saluto a questa prestigiosa Conferenza, giunta alla sua XX edizione. Si tratta di un'iniziativa particolarmente lodevole che, anno dopo anno, continua a crescere e a consolidarsi come punto di riferimento per la comunità scientifica italiana nel mondo.

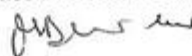
Questa edizione assume un significato ancora più speciale, poiché si svolge in Italia, confermando il ruolo centrale che il nostro Paese continua a ricoprire nei grandi scenari internazionali della ricerca, dell'innovazione e della diplomazia scientifica.

Desidero rivolgere un particolare saluto ai ricercatori italiani all'estero, protagonisti di una produzione scientifica di altissimo livello e autentici ambasciatori del talento, della creatività e della competenza italiana nel mondo. Il vostro lavoro rappresenta una risorsa preziosa non soltanto per l'Italia, ma anche per l'Europa e per il rafforzamento della cooperazione scientifica internazionale.

Siamo convinti che scienza, ricerca e innovazione, sostenute da una visione politica lungimirante, costituiscano strumenti essenziali per affrontare le grandi sfide globali del nostro tempo e promuovere un progresso sempre più sostenibile, inclusivo e condiviso.

Rinnovo quindi il mio ringraziamento a tutti voi che, con spirito di servizio, dedizione e passione, contribuite ogni giorno a tenere alto il nome dell'Italia nei più prestigiosi contesti internazionali.

Massimo Dell'Utri



*Ambasciata d' Italia
Washington*Prot: 6894-P
17 giugno 2026

Gentile Consigliere,

È con grande piacere che rivolgo il mio saluto ai partecipanti alla XX Conferenza dei Ricercatori Italiani nel Mondo.

Questa importante iniziativa rappresenta, da ormai vent'anni, un punto di riferimento per la valorizzazione della straordinaria comunità dei ricercatori italiani attivi all'estero e per il rafforzamento dei legami tra il nostro Paese e le reti internazionali della conoscenza, dell'innovazione e della ricerca.

Gli scienziati, i ricercatori e gli innovatori italiani offrono un contributo straordinario al progresso scientifico e tecnologico nei settori più strategici del nostro tempo: dall'intelligenza artificiale alle tecnologie quantistiche, dalle scienze della vita all'energia, fino all'esplorazione spaziale. La loro presenza rappresenta un patrimonio prezioso per l'Italia e per i Paesi che li ospitano.

In un contesto globale caratterizzato da sfide sempre più complesse e interconnesse, la diplomazia scientifica assume un ruolo strategico crescente. La ricerca e l'innovazione costituiscono infatti strumenti essenziali per rafforzare il dialogo tra i Paesi, favorire la crescita economica, affrontare le grandi sfide globali e contribuire alla costruzione di società più prospere, sostenibili e resilienti.

Desidero pertanto esprimere il mio apprezzamento agli organizzatori della Conferenza e a tutti coloro che, con passione, competenza e spirito di servizio, contribuiscono a mantenere viva e dinamica questa straordinaria comunità globale.

Con i miei più sinceri auguri di buon lavoro,


Marco Peronaci

Dott. Vincenzo Arcobelli
Consigliere
Consiglio Generale degli Italiani all'Estero - CGIE
DALLAS

La Presidente

Conferenza dei Ricercatori Italiani nel Mondo

Roma, 18 giugno 2026

Gentili ospiti, care ricercatrici e cari ricercatori,

è con grande piacere che mi rivolgo a voi, anche se a distanza, in occasione della XX Conferenza dei Ricercatori Italiani nel Mondo per celebrare un traguardo importante, che merita di essere sottolineato: vent'anni di incontri, di ricerche condivise, di reti costruite, di relazioni.

Da Houston a Dallas, da Miami a Vancouver, da Bruxelles fino a qui, a Roma, un percorso lungo, fatto di scienza e di comunità, che continua a crescere grazie alla passione e alla determinazione di chi porta l'Italia nel mondo attraverso il proprio lavoro.

Soprattutto un percorso, che l'ENEA ha avuto il privilegio di accompagnare nel tempo, e al quale siamo lieti di contribuire anche in questa edizione.

Questa conferenza rappresenta qualcosa di raro: uno spazio in cui eccellenze disperse nei cinque continenti si ritrovano, si riconoscono e si parlano.

Non è un esercizio celebrativo o retorico ma un'occasione concreta per costruire e rafforzare una comunità scientifica.

L'ENEA crede profondamente in questo dialogo.

La ricerca, infatti, non avanza nei silos, avanza nelle connessioni, nei confronti, nelle collaborazioni che nascono quando le istituzioni sanno farsi trovare presenti.

Avanza quando un laboratorio in Texas dialoga con un istituto a Bologna, quando una scoperta fatta a Singapore trova applicazione a Napoli, quando le istituzioni sanno ascoltare chi, pur da lontano, ha continuato a guardare all'Italia come interlocutore, come partner, come casa.

Questa conferenza ne è la prova più concreta. Il vostro contributo — fatto di competenze, visione internazionale e relazioni costruite nel tempo — è una risorsa preziosa, che il Paese deve saper riconoscere e valorizzare.



In questo contesto, ENEA è impegnata a rafforzare il proprio ruolo quale attore di riferimento sui grandi temi della transizione energetica, della sostenibilità ambientale e delle tecnologie avanzate.

Si tratta di ambiti strategici che richiedono competenze multidisciplinari e, soprattutto, una forte collaborazione internazionale.

L'ENEA vuole essere un interlocutore affidabile in questo percorso: un ponte tra la comunità scientifica globale e le istituzioni nazionali, nella convinzione che il futuro della ricerca italiana si costruisca anche — e soprattutto — attraverso chi ha scelto di confrontarsi con il mondo.

Auguro a tutti voi una conferenza ricca di scambi, di idee e di incontri stimolanti, e di quelle conversazioni informali che spesso, più di qualsiasi tavola rotonda, danno vita alle idee migliori.

Con stima e riconoscenza per il vostro impegno,

Francesca Mariotti

Firmato digitalmente da: Francesca Mariotti
Organizzazione: ENEA/01320740580
Data: 26/06/2026 15:38:49

PROGRAM

XX Conference of Italian Researchers in the World

Thursday, June 18th, 2026

Presidenza del Consiglio dei Ministri, Sala Polifunzionale, Via Santa Maria in Via 37A, Roma

09:30 – 13:00 (Local Time)

Moderated by

Incoronata Boccia

Journalist RAI, Director of the Press Office

09:45 Welcome/National Anthem

Institutional Greetings of the Government Representative Delegate

Valentino Valentini

Deputy Minister for Enterprise and Made in Italy

Antonella Polimeni

Rector, Sapienza Università di Roma

Andrea Giuffrida

President, Texas Scientific Italian Community (TSIC)

10:15 Opening Remarks

Vincenzo Arcobelli

Founder & Conference Chairman
Rep. General Council Italians Abroad

Ignazio La Russa

President of the Senate of Italian Republic

Anna Maria Bernini (videomessage)

Minister of University and Research

Francesca Mariotti

Presidente ENEA

10:45 Associations of Italian Researchers Abroad - "Their Role"

Introduction

Simone Lucatello

Ph.D., Member of the CRIM Scientific Committee, Senior Researcher at

Instituto Mora, Mexican Ministry for Humanities, Science and Technology

Carla Molteni

Association of Italian Scientists in the UK (AISUK)

Fernando Ciaramitaro

Associazione Ricercatori Italiani in Messico (ARIM)

Ignazio Scimemi

Association of Italian Researchers in Spain (ARIS)

Vincenzo Di Bartolo

Rete dei Ricercatori Italiani in Francia (RÉCIF)

Chiara Saracini

Associazione Ricercatori e Studiosi Italiani in Cile (ARSIC)

11:20 Sessions Presentation

AEROSPACE

Moderators

Veronica Bindi

Ph.D., Chair of Physics and Astronomy Department, University of Hawaii

Francesco Fusco

FISE- Executive Director Foundation for International Space Education-USA

Walter Villadei

ITAF Colonel Walter Villadei, Astronaut, Head of ITAF Representative Office for commercial spaceflight and access to space at Axiom, Houston, Texas

"Commercial Spaceflight in the New Space Economy. Opportunities and Challenges. The Ax-3 Mission Case"

Gabriele Carugati

Station Leader Glaciologist

Erika Rea

Astronomer

Andrea Galletto

ICT Manager

Andrea Traverso

Scientific Electronics

Concordia Station, Antarctica

"Enabling Science at the Edge of Human Exploration: Over Twenty Years of Italian Antarctic Logistics at Concordia Station"

Maria Giovanna Dainotti

Ph.D., National Astronomical Observatory of Japan

"Gamma-Ray Bursts as An Independent High-Redshift Probe of Dark Energy"

AI/INNOVATION

Giuseppe Loianno

Ph.D., Department of Electrical Engineering and Computer Sciences (EECS), University of California, Berkeley

"AI-Driven Super Autonomous Flying Robots"

Luca Tagliaretti

Executive Director of the European Cybersecurity Competence Centre, Romania

"The ECCC Role in Promoting Research and Innovation"

STEAM

Moderator

Stefano Boccaletti

Ph.D., Director of Research at the Institute of Complex Systems of the Italian CNR, Florence.

Member of the *Accademia Europea*
Fellow of the *American Physical Society*

PROGRAM

XX Conference of Italian Researchers in the World

Thursday, June 18th, 2026

Presidenza del Consiglio dei Ministri, Sala Polifunzionale, Via Santa Maria in Via 37A, Roma

Simone Napolitano

Ph.D., Polymer and Soft Matter Dynamics, Université libre de Bruxelles, Belgium

"Tiny Movements, Big Changes:

A New Route to Predicting Material Performance and Lifetime"

Ludovico Minati

Ph.D., Director of the Interdisciplinary Nonlinear Dynamics Laboratory (INDLab), School of Life Science and Technology, University of Electronic Science and Technology of China, Chengdu, China

"Chaos and Synchronization: Possible Bases for Innovation in Analog Design and Computing"

Charo del Genio

Ph.D., Trakia University, Stara Zagora, Bulgaria
Editor in Chief of *Chaos Solitons and Fractals*

"Intrinsic Disorder and Isomerization Control in Auxin Co-Receptors"

Paola Comparin

Ph.D., Researcher at Universidad de la Frontera, Temuco, Chile
"Symmetry and connections: a geometric journey from Italy to Chile"

13:15-13:55 Lunch Break

14:00 Sessions Presentation

MEDICINE

Moderators

Antonella Fioravanti

Ph.D, Université libre de Bruxelles, and Expert Evaluator for European agencies, Belgium

Graziano Pinna

Ph.D., The Psychiatric Institute, Department of Psychiatry, UI Center

on Depression and Resilience (UICDR), Center for Alcohol Research in Epigenetics (CARE), Department of Psychiatry, College of Medicine, University of Illinois, Chicago

Alessandro Frigiola

Ph.D., Pediatric Cardiac Surgery Director of International Cooperation -Training Center, Pres. Gruppo San Donato East Europe

"Corsi di Simulazione Chirurgica Razionale"

Andrea Natale

Ph.D., Executive Medical Director of the Texas Cardiac Arrhythmia Institute, Austin, Texas, USA, Director Cardiovascular Diseases Residency Program, Università degli Studi di Roma Tor Vergata

"A Journey to Improve the Management of Cardiac Arrhythmias"

Valeria Ricotti

University College London
CEO & Co-Founder Vesalic Limited London UK

"Redefining Neurodegenerative Disease: From Systemic Biology to Transformative Therapeutics"

Camillo Ricordi

Ph.D., Director Emeritus of the Cell Transplant Center and Diabetes Research Institute, University of Miami.

"40 Years of Global Impact

The Ricordi Chamber and Automated Method for Human Islet Isolation and Transplantation"

HUMANITIES

Moderator

Georgia Cardosi

Ph.D., researcher at RESAUD-Alioune Badiane (Réseau d'échange Stratégique pour une Afrique Urbaine

Durable), Faculty of Environmental Design and Planning, University of Montréal (UdeM), Canada.

Simona Martorana

Ph.D., Australian National University, (Canberra), Australia

"Dante's Vergil: Classical Poetry and Its Afterlife in the *Divina Commedia*"

15:15 International research excellence agreements and opportunities

Moderator

Giuseppe Ciccarone

Vice-Rector, Deputy Rector for Internationalization Policies, Sapienza Università di Roma

Antonio Giordano

Ph.D., Founder and Director of Sbarro Institute for Cancer Research and Molecular Medicine at Temple University, Philadelphia.

"SHRO: Over Twenty Years of Science, Solidarity and Breakthroughs"

Angela Lombardi

Ph.D., Director of the Center for Cultural Sustainability at the University of Texas at San Antonio.

Anna Irene Del Monaco

Ph.D., Faculty of Architecture, Sapienza Università di Roma.

"International Agreement between University of Texas at San Antonio and Sapienza Università di Roma"

Dario Crosetto

Inventor, President of the Crosetto Foundation to defeat Premature Mortality from Cancer, TX (USA)

"Oncological Diagnostics: Limits of PET and Prospects of 3D-CBS"

PROGRAM

XX Conference of Italian Researchers in the World

Thursday, June 18th, 2026

Presidenza del Consiglio dei Ministri, Sala Polifunzionale, Via Santa Maria in Via 37A, Roma

Discussion About Projects, Investments, Incentives and Opportunities for the Scientific Research and Italian Researchers

David Della Morte Canosci

Ph.D., Personal Adviser to the
Minister for University and Research
(MUR), Direttore UOC Epatologia,
Nutrizione Clinica e Geriatria,
Policlinico Universitario di Tor
Vergata, Roma

Flavia Riccardo

Ph.D., Coordinator External Relations
Office and Centre for International
Affairs, Istituto Superiore di Sanità

Marco Silvi

Cons. Amb., Head of Bilateral
Scientific Cooperation Office (MAECI)

Q&A Session

17:30 Conclusion

Vincenzo Arcobelli

Founder & Conference Chairman

MODERATOR



Incoronata Boccia

Direttore dell'Ufficio Stampa Rai, è nata in Provincia di Oristano. Laureata con lode in Scienze della Comunicazione alla Sapienza di Roma, ha intrapreso giovanissima la carriera giornalistica, prima nel Tg5 diretto da Enrico Mentana, poi alla Rai, dove è stata inviata della popolare trasmissione la Vita in Diretta.

Ha lavorato nella redazione Sardegna della Testata Giornalistica Regionale della Rai, e al Tg1, testata ammiraglia della Rai, in qualità di vicedirettore.

Ha condotto su Isoradio Rai uno spazio di approfondimento giornalistico per la trasmissione "Ben detto!", su Rai1 il programma di attualità "Weekly" e su Rai3 ha condotto e firmato come autrice i programmi "Cento anni di notizie" e "Spes".

Docente del master "La comunicazione nella Pubblica Amministrazione" presso l'Università Niccolò Cusano. È componente dell'Osservatorio nazionale per l'Integrazione delle politiche per la parità di genere.

ASSOCIATIONS OF ITALIAN RESEARCHERS ABROAD “THEIR ROLE”

**Simone Lucatello, Ph.D.**

Member of the CRIM Scientific Committee, Senior Researcher at Instituto Mora, Mexican Ministry for Humanities, Science and Technology

Simone Lucatello is Senior Researcher at Instituto Mora, a public research centre based in Mexico City, Mexico. He holds a joint BA in History from the University of Venice Cà Foscari, Italy, and University College London (UCL), an MA in International Relations from the London School of Economics and Political Science (LSE) and a PhD in Governance for Sustainable Development from Venice International University (VIU), Italy. His research interests deal with disaster relief, climate change, humanitarian action and sustainability.

Lucatello has worked as consultant to many United Nations agencies, including UNEP, UNODC, UNIC and OCHA, as well as the Inter-American Development Bank (IADB). He is author of more than ten books and many articles published in English, Spanish, and Italian. He is an IPCC (intergovernmental Panel for Climate change), leading author for the Ar7 and coordinating author for the North American Chapter.



Carla Molteni

President, Association of Italian Scientists in the United Kingdom (AISUK)

AISUK, the Association of Italian Scientists in the UK, founded in 2015, is a network of over 700 researchers active across Physical Sciences and Engineering, Life Sciences, and Social Sciences and Humanities. The association serves as a hub for Italian scientists based in the United Kingdom, promoting interdisciplinary exchange and strengthening connections within the Italian scientific diaspora.

AISUK's core mission is to facilitate networking and collaboration among Italian researchers while fostering partnerships between UK and Italian institutions. It actively enhances the international visibility of Italian research and supports the mobility of scientists between Italy, the UK, and Europe.

The association operates through a Board of Directors and a distributed network of local representatives, enabling the delivery of activities at both national and regional levels. AISUK collaborates closely with institutional stakeholders, including the Scientific Office of the Italian Embassy in London, and is a founding member of CONNECTS-UK, a platform that promotes scientific collaboration between the EU and the UK through the community of EU researchers working in the UK.

AISUK activities include networking initiatives such as AperiRicerca, public engagement seminars, and events supporting researcher mobility between Italy, the UK, and the EU. The association is also actively engaged in science outreach, including educational initiatives in Italian for children in collaboration with Native Scientists.

BIOGRAPHY

Carla Molteni is Professor of Physics at King's College London and co-Director of the London Thomas Young Centre for the Theory and Simulation of Materials and Molecules. Her research focuses on electronic structure and atomistic simulations of materials and biological systems, at the interface of physics, chemistry, materials science, and biology.

**Fernando Ciaramitaro**

Associazione Ricercatori Italiani in Messico (ARIM)

Fernando Ciaramitaro is a professor of history at the Autonomous University of Mexico City and a research associate at the Center for Historical Studies at Bernardo O'Higgins University (Chile). His main lines of research are: empires and government, the Inquisition, viceregal systems, foreign affairs, convents, race, caste and slavery, and iconography. He has been a visiting and contracted professor at several European and American academic centers, including: the University of Valencia, the University of Catania, the Pontifical Catholic University of Peru in Lima, the School of Advanced Hispanic and Iberian Studies-Casa de Velázquez in Madrid, the University of Palermo, the University of Chicago, the Mora Institute, and the National University of Mar del Plata (Argentina), among others. He is a member of seminars, research groups, and associations, including: the Latin American Studies Association; and the Seminario di Studi Italiani (SSI) of the Associazione Ricercatori Italiani in Messico (ARIM). "Interinstitutional Seminar on Economic History," Colmex-UNAM-Instituto Mora; he is an advisor to several international editorial boards and scientific committees of journals, publishing series, etc. He has participated as a speaker in more than 400 congresses, colloquia, seminars, book presentations, etc. Among his latest publications: *Screens and Castes: Profane Painting in New Spain* (2nd edition, 2025; 1st edition, 2020), awarded the "García Cubas Prize" by the National Institute of Anthropology and History (2025); *Imperial History of the Holy Office (15th-19th Centuries)* (edited with M. R. Lourenço) (2024); *Antonio Caso, The Philosophy of Culture and Historical Materialism* (2024) (edited with C. Giarratana); *Imperial Holy Office: Global Dynamics and the Sicilian Case* (2022); *Dante 700 years later: some glimpses from Mexico* (monographic dossier in *History and Writing*, 2024); *History, philosophy and sciences between Italy and Mexico* (monographic dossier in *History and Space*, 2023); etc.



Ignazio Scimemi, Ph.D.

Association of Italian Researchers in Spain (ARIS)

Italian Researchers in Spain: Current Challenges, Networks, and Opportunities

The Italian scientific community in Spain represents today a dynamic, inter/multidisciplinary, and internationally connected network of Italian researchers abroad. Distributed across universities, research centres, technological infrastructures, cultural institutions, and innovation hubs, Italian researchers in Spain actively contribute to scientific production, international collaboration, higher education, technological development, and public engagement across a wide range of disciplines — from the natural sciences and engineering to the humanities and social sciences.

Over recent decades, Spain has consolidated its position as a strategic destination for Italian researchers within European and international mobility frameworks, fostering long-term collaborations and the emergence of highly integrated transnational scientific networks. This community constitutes an important bridge between Italy and Spain, strengthening institutional dialogue, knowledge circulation, scientific diplomacy, and collaborative research initiatives between the two countries.

This contribution reflects on the current role, visibility, and potential of the Italian scientific community in Spain within a rapidly evolving international research landscape. Particular attention will be devoted to the strategic lines of scientific and institutional collaboration between Italy and Spain, including mobility, interdisciplinary research, technological innovation, public dissemination of science, and the development of shared scientific infrastructures and cultural initiatives.

Within this renewed context, the recent reactivation of the Associazione dei Ricercatori Italiani in Spagna (ARIS) represents an important opportunity to reconnect and give visibility to the Italian research community across Spain. After a period of reduced activity, ARIS has recently resumed its activities with the aim of strengthening networks among researchers, promoting collaboration between institutions, supporting scientific outreach initiatives, supporting younger generations of scholars, fostering scientific relationships between Spain and Italy and cultural diplomacy.

BIOGRAPHY

Ignazio Scimemi, Full Professor (Catedrático) | Theoretical Physics Universidad Complutense de Madrid (UCM) & IPARCOS

Email: ignazios@ucm.es

ORCID: [0000-0001-5598-5810](https://orcid.org/0000-0001-5598-5810) | Web: [UCM Scientific Profile](#)

Expert in Quantum Chromodynamics (QCD) and Effective Field Theories (EFTs), specializing in the development of factorization theorems and high-order perturbative calculations. Notable leadership as Director of IPARCOS-UCM, a recently created institute inside UCM with ~100 members with a strong expertise in astrophysics, astroparticle, nuclear and particle physics. Principal Investigator for multiple national and European grants, including significant funding from the Horizon Europe and PNRR programs. His research has particularly focused on the comprehension of the movement of quarks and gluons inside hadrons in 3D, also co-creating codes like ArTeMiDe library, a vital tool for Transverse-Momentum-Dependent (TMD) distributions used by the LHC and EIC (Electron Ion Collider) communities.

Professional Experience

- **Universidad Complutense de Madrid:** Full Professor (2007–Present).
- **Research Leadership:** former Ramon y Cajal and Marie Curie Fellow (MIT, USA).
- **Prior Roles:** Postdoctoral positions at the University of Barcelona, University of Bern, and IFIC/University of Valencia. Scientific Associate at CERN.

Education PhD in Physics: Roma I, La Sapienza (1998). Advisor: Prof. G. Martinelli. **Laurea in Fisica:** Pisa, Italy (1994). Advisor: Prof. R. Barbieri



Vincenzo Di Bartolo

Rete dei Ricercatori Italiani in Francia

RéCIF is a nonprofit association under the French law of 1901 and operates on a volunteer basis. It was founded in 2014.

RéCIF is a network of people, ideas, and projects, created to bring together Italian researchers and professionals working in France in the fields of research, business and culture. The association's main goals are the following:

- Enhancing the role of the Italian researcher abroad as a professional figure embedded in a well-defined social and economic environment.
- Creating a network of Italian researchers and professionals working in France and around the world to promote mutual understanding, exchange, and collaboration.
- Developing connections among professional associations and public and private entities operating in France and around the world in the fields of research, business, and culture.
- Assisting young Italian researchers in integrating into France society by providing information on how to access research support and find internships and opportunities at public and private institutions.
- Organizing events for discussion, exchange, and guidance on topics related to the worlds of research, business, and culture.

BIOGRAPHY

Vincenzo Di Bartolo is a senior researcher at the Institut Pasteur, Paris, France. He studied biology and biochemistry at the University of Pisa, in Italy. He received his *Habilitation à Diriger des Recherches* (HDR) in Immunology from Université Paris Descartes. In 1995, he joined the Molecular Immunology Unit at the Institut Pasteur (Paris, France) to study TCR signaling. He has worked in the Molecular Immunology Unit, the Lymphocyte Cell Biology Unit and currently, the Immunoregulation Unit. He investigated the roles and the regulation of protein tyrosine kinases ZAP-70 and Lck. He also studied molecular dynamics and cytoskeletal organization at T-cell immunological synapse and regulation of T-cell functional responses in anti-tumor immunity. Currently, he is investigating the role of immune cells in the pathogenesis of chronic inflammatory diseases.

Vincenzo Di Bartolo is member of RéCIF – Réseau des Chercheurs Italiens en France since 2016, and he is currently the association's vice-president.



Chiara Saracini, Ph.D.

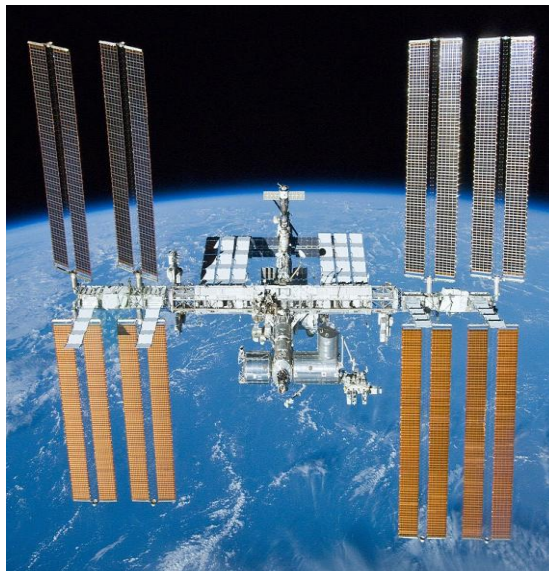
Associazione Ricercatori e Studiosi Italiani in Cile (ARSIC)

Chiara Saracini (PhD) is an Italian assistant professor and researcher currently living and working in Chile.

She obtained her Bachelor's, Master's and PhD degrees from Sapienza University in Rome. She is currently affiliated with the Neuropsychology and Cognitive Neuroscience Research Center (CINPSI Neurocog) at the Catholic University of the Maule Region in Talca, Chile, where she specializes in cognitive psychology and neuroscience. Her research focuses on perceptual awareness, cognition, personality and theoretical approaches to cognition. She has expanded her educational training in bioethics and is now part of the Directives of the local University IrB (Research Ethics Committee). She has also contributed to discussions on the Neurorights law proposal in the Chilean Senate.

She is exploring the ethics of AI, particularly the emerging relationship between humans and generative AI (genAI), from psychological (cognitive and emotional) perspectives.

BIOS AND ABSTRACTS



AEROSPACE

MODERATORS



Veronica Bindi

Ph.D., Physics & Astronomy Department, The University of Hawaii at Manoa, USA

Veronica Bindi is Professor and Chair of the Department of Physics and Astronomy at the University of Hawaii at Manoa. Her research focuses on cosmic rays, space radiation, and space weather, with major contributions to the AMS experiment on the International Space Station. She leads efforts on radiation environment modeling and the development of operational space weather capabilities.

**Francesco Fusco**

FISE – Executive Director Foundation for International Space Education - USA

Francesco Fusco is a rocket propulsion engineer with significant experience in international space and aeronautics programs. After completing his thesis during an internship at NASA Johnson Space Center, Mr. Fusco was awarded the Laurea in Ingegneria Aerospaziale by the Politecnico di Torino. He joined Alenia Flight Test in Caselle Torinese and supported Eurofighter (EF2000) flight test activities as propulsion, avionics and weapon systems specialist. During Space Shuttle Return to Flight he joined the Boeing Company as the Responsible Engineer for the RCS (Reaction Control System) thrusters. As Technical Lead Engineer he supported a variety of programs, such as Space Launch System (SLS), 777-X, KC-135, KC-46A, B-52 and B1B. He was Test Conductor for the CST-100 Starliner Service Module Hot-Fire testing and he is part of the Boeing Engineering Support Team (EST) for ARTEMIS Day of Launch. Mr. Fusco is the Executive Director of the Foundation for International Space Education (FISE), which provides access and exposure of the space industry to students from around the world. FISE mission is to promote STEM studies and international collaborations by providing space-based, academic instruction in a collaborative environment to international, pre-collegiate students while offering an introduction to the aerospace industry.

COMMERCIAL SPACEFLIGHT IN THE NEW SPACE ECONOMY. OPPORTUNITIES AND CHALLENGES. THE AX-3 MISSION CASE

Walter Villadei

Astronaut, Head of ITAF Representative Office for commercial spaceflight and access to space at Axiom



ABSTRACT

Durante la breve relazione saranno presentati in modo sintetico i trend e le caratteristiche della trasformazione in atto nel settore spaziale, grazie proprio anche al cambio di strategia degli USA. Con riferimento al Commercial Spaceflight saranno illustrate le opportunità per l'Italia, in termini di ricerca, innovazione, rafforzamento del posizionamento strategico del Paese ma anche alcune delle sfide a queste associate. La missione Ax-3, Voluntas, sarà lo strumento attraverso il quale sviluppare gli argomenti ipotizzati.

BIOGRAPHY

Colonel Walter Villadei joined the Italian Air Force (ItAF) in 1993, beginning his career as a cadet at the Air Force Academy in Pozzuoli. He pursued his studies in Aeronautical Engineering with a specialization in space (becoming the first ItAF officer to attend such a course). In February 1999, he was assigned as a Lieutenant to the 46th Air Brigade in Pisa with the role of Technical Officer on various fleets (G-222 and C-130J), participating in numerous operational activities abroad (United Nations Mission in Eritrea and Ethiopia, International Security Assistance Force, Enduring Freedom, Antica Babilonia, Kosovo, former Yugoslavia), as well as numerous training missions in Europe and the United States.

Early Career and Education

Transferred to the Air Staff in October 2003, he attended an advanced specialization course until May 2005, obtaining a second-level Master's degree from the University of Rome La Sapienza, followed by a six-month period at the European Space Agency and initial study on air-launched vehicles in collaboration with the national industry. In 2006, he graduated with honors in Astronautical Engineering from the School of Aerospace Engineering, founded by Luigi Crocco and directed for many years by Luigi Broglio.

Space Policy and Program Leadership

From 2009, he held various positions in the ItAF dealing with military and dual-use space programs, both at the Air Force Space Policy Office and at the General Office for Space, where he operated until mid-March 2022 as Head of the "Space Policy and Operations Office". Among other activities in his career: from 2018 to 2022, he was the national representative at NATO's Science and Technology Office (STO) for collaborative activities in the space domain; from 2017 to 2021, he was National Representative at the EU-SST Consortium Steering Committee and IT-MOD Representative in the National Coordination Committee (OCIS) for governance of the Space Surveillance and Tracking (SST) capability development program; from 2014 to 2021, he was National Delegate to the European Commission, appointed by the Presidency of the Council of Ministers, for the European Committee relating to the Space Surveillance and Tracking Support Framework. Additionally, during the period 2014-2018, he was a Member of the Scientific Technical Committee of the Italian Space Agency; during the period 2014-2018, he was a Member of the Coordination Committee established by the Framework Agreement between the ItAF and the University of Rome Tor Vergata "for collaboration in the field of advanced training, applied research and experimentation in the aerospace sector and human spaceflight". He is a member of the Scientific Technical Committee of the Veneto Space Meeting,

ENABLING SCIENCE AT THE EDGE OF HUMAN EXPLORATION: OVER TWENTY YEARS OF ITALIAN ANTARCTIC LOGISTICS AT CONCORDIA STATION

Gabriele Carugati, Station Leader Glaciologist

Andrea Galletto, ICT Manager

Erika Rea, Astronomer

Andrea Traverso, Scientific Electronics

Concordia Station, Antartica

ABSTRACT

ENEA has played a pivotal role in supporting the Italian Antarctic Program through the logistical implementation and operational management of scientific campaigns in Antarctica for more than two decades. Among the most significant achievements of this long-term commitment is the continuous support to Concordia Station, one of the most isolated, inhospitable, and scientifically valuable research stations in the world. Located at over 3,000 meters above sea level on the Antarctic Plateau and jointly operated by Italy and France, Concordia represents a unique platform for frontier research in climate science, atmospheric physics, glaciology, human physiology, astrobiology, and space analog studies. Operating in such an extreme environment requires far more than scientific excellence alone: it demands highly specialized logistics, long-term operational resilience, technical reliability, and the capability to sustain human activity under conditions of prolonged isolation and severe environmental stress.

Drawing on over twenty years of field experience, this contribution highlights the strategic role of logistical and operational infrastructures as enabling factors for scientific research in extreme environments. Particular attention will be given to the coordination of Antarctic campaigns, remote station operations, safety and sustainability challenges, and the human dimension of working in one of the harshest environments on Earth.

Beyond Antarctica itself, the experience developed through Italian operations at Concordia offers valuable insights for future international initiatives involving remote infrastructures, high-risk environments, and long-duration human missions, including prospective applications in space exploration and planetary habitats. This contribution aims to underline how operational expertise and scientific ambition must evolve together to enable the next generation of global research challenges.

BIOGRAPHIES



Gabriele Carugati is currently serving as Station Leader at Concordia Research Station in Antarctica, one of the most remote and challenging scientific stations in the world, jointly operated by Italy and France within the framework of international polar research programs. His professional background combines scientific research, field operations, and leadership in remote and extreme environments.

He holds an MSc in Environmental Sciences and a PhD in Chemical Sciences, followed by four years of postdoctoral research focused on environmental sampling and trace/ultra-trace analysis of contaminants in environmental matrices. Throughout his career, he has conducted environmental research across a wide range of ecosystems, including lakes, marine environments, volcanic areas, forests, mountain regions, glaciers, and Antarctica.

Alongside his scientific activity, he has developed extensive experience in mountain field operations and expedition coordination. For more than twenty years, he coordinated multidisciplinary high-altitude field activities within Environmental Chemistry courses, leading university student groups during summer and winter expeditions focused on environmental sampling, mountain safety, and scientific research. He has also supervised and co-advised numerous environmental science thesis projects.

At Concordia Station, he contributes to the operational and logistical coordination of the base, personnel safety management, and support for international scientific activities in one of the harshest environments on Earth. His research activities focus on atmospheric chemistry, glaciology, and polar climate studies, with particular attention to environmental monitoring in polar regions and the investigation of processes related to global climate change.



Andrea Galletto is currently serving as ICT Manager and Network Administrator at Concordia Station, the Italian–French joined research base on the high Antarctic plateau Dome C.

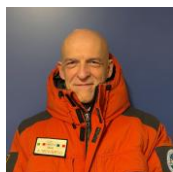
As ICT Manager role, in Concordia he's in charge of the all ICT infrastructures, maintaining the station's intranet network, servers, radio systems, satellite links, and data systems for numerous international research projects.

He earned his MSc in Computer Science Engineer from Politecnico di Torino, where in normal life he currently serves as a Network and System Engineer within Department of Control and Computer Engineering. Here he is in charge of maintaining the department's teaching laboratories, HPC and virtualization clusters and infrastructure servers, with a particular interest on Open Source solutions.



Erika Rea (Sora, 1998) is currently based in Antarctica, at Concordia Station, where she is spending a year as a winterover astrophysicist. Her research interests include exoplanets, on which she worked during her internship at the European Space Agency (ESTEC) using data from the ASTEP telescope, leading to Rea et al. (2026) published in *Astronomy & Astrophysics* on the validation of three exoplanets; and radio astronomy, in particular the search for extraterrestrial life, which she explored within the UC Berkeley SETI program using data from the Green Bank Telescope, alongside her contribution to the paper “The First High Frequency Technosignature Search Survey with the Sardinia Radio Telescope”. She also worked on numerical simulations of the Local Bubble and its X-ray emission at Heidelberg University, leading to Girichidis, Rea et al. (2026).

At Concordia Station, she works as part of the ASTEP collaboration, contributing to telescope operations and long-term observations aimed at the detection and characterization of transiting exoplanets during the Antarctic polar night. She is also involved in several other scientific activities carried out at the station, including measurements of cosmic rays, monitoring of solar radiation and atmospheric studies using LIDAR instrumentation, taking advantage of the unique atmospheric and environmental conditions of the Antarctic plateau.



Andrea Traverso (Genoa, 1968) is currently serving his third winterover at Concordia Station, the Italian–French research base on the high Antarctic Plateau. In the current campaign, DC22, he holds the role of Electronics for Science.

Trained as an industrial electronics technician, he built a career of more than thirty years in information and communication technology: first as a network and systems engineer for Italian technology companies, then in academic IT at the universities of Bologna and Genoa, where he still manages the information systems of the Department of Experimental Medicine.

In 2022 he joined the Italian National Antarctic Research Programme (PNRA) for the first of his three winterovers at Concordia. During his first two campaigns (DC19 and DC20) he served as ICT Manager and Network Administrator, keeping the station’s intranet, satellite links and data communications running for dozens of international research projects; he now returns for a third winter in the role of Electronics for Science.

Each winter means some nine months of isolation, polar night and temperatures below -80°C — a challenge he meets as one of the Italian technicians who quietly make science possible at the ends of the Earth.

GAMMA-RAY BURSTS AS AN INDEPENDENT HIGH-REDSHIFT PROBE OF DARK ENERGY

Maria Giovanna Dainotti

Ph.D., National Astronomical Observatory of Japan



ABSTRACT

Testing the Λ CDM model requires cosmological probes spanning the wide redshift interval between Type Ia Supernovae (SNe Ia, $z \lesssim 2.9$) and the Cosmic Microwave Background (CMB, $z \approx 1100$). Gamma-Ray Bursts (GRBs), observed up to redshift $z = 9.2$, offer the opportunity to explore this regime. Here, we investigate how many GRBs are needed to become a useful cosmological probe capable of independently testing deviations from Λ CDM suggested by the recent DESI BAO observations. We develop forecasts based on the two-dimensional X-ray and optical Dainotti relations, between the luminosity at the end of the plateau phase and its rest-frame duration. Using simulated GRB samples constructed from the observed population, we evaluate the constraining power of GRBs on cosmological parameters within the w CDM and w_0w_a CDM models, both independently and in combination with CMB observations. Our results show that GRB samples containing several tens to hundreds of well-characterized plateau can already approach the precision currently achieved by CMB measurements on the Dark Energy (DE) equation-of-state parameter w . Particularly, a sample of ~ 66 optical GRBs can reach a precision $\sigma_w \approx 0.47$, comparable to that obtained from Planck within the w CDM framework. Such sample sizes are already attainable through Machine Learning techniques that double the number of GRBs using inferred redshifts. These forecasts indicate that future GRB observations, when combined with next-generation transient missions and improved statistical techniques, will provide an independent high-redshift probe of cosmic expansion and will play an important role in testing the robustness of potential Dynamical DE signals suggested by other cosmological datasets.

BIOGRAPHY

Education:

Dec 2008: International Ph.D. in Astrophysics; University of La Sapienza, Rome, Italy.

July 2005: Master's degree in physics, University of Salerno, Salerno, Italy. Earned with full marks: **Magna cum laude**.

Professional Positions held (minimum 1 month):

1. Research Visiting Assistant Professor, University of Nevada, Las Vegas, since April 2023
2. Affiliated Senior scientist at BAERI since 2016.
3. Affiliated Senior Research Scientist, Space Science Institute since February 2020.
4. Mentor for the SULI program at SLAC and Stanford University since 2016.
5. Assistant Professor at National Astronomical Observatory of Japan, Tokyo since 01/2021.
6. Senior Research Fellow at Riken, Japan, 10/2020-12/2020.
7. Visiting Scholar at Stanford University, 06/2019-09/2019.
8. Riken Pioneer Research Fellow, January-February 2019 in Riken, Tokyo, Japan.
9. American Astronomical Society Chretienne Fellow, 08/2018-01/2019 at Stanford, US.
10. Marie Curie Global Fellow at Stanford, CA, US, and INAF Bologna 02/2015- 01/2018.
11. Japan Society for Promotion of Science Fellow, Riken, Japan, 11/2013-01/2015.
12. Fulbright Fellow at Stanford University, Stanford, CA, USA, 10/2012-09/2013.
13. Mobilnosc Plus Fellowship at Stanford University, US, October 2011-March 2012.
14. L'Oreal Italia Scholar at "La Scuola Normale", Pisa, Italy, 05/2012-09/2012.
15. Assistant Professor at Jagiellonian University, Krakow, Poland, 04/2012 to 12/2020.
16. Research Assistant at Jagiellonian University, Krakow, Poland, 01/02/2009-31/03/2012
17. Visiting Scientist at Leicester University, Leicester, UK, 06-07 2011.
18. Visiting Scientist at Harvard University, Cambridge, MA, USA, 09/2009.

PI of Fellowships and granted projects:

Awards, fellowships, and scholarships won from US funding, and international funding including grants won by my current two PhD students and two undergraduates: >\$1 M.

Awards, Prizes and Recognitions:

1. **Knight of the Italian Republic**, Order of Merit of the Italian Republic, honor awarded by the Italian President for the excellence of the work developed in astrophysics, March 2013.
2. **International Prize "Principessa Sichelgaita"**, 4 June 2018, Salerno, Italy, sponsored by the Italian Presidency, the Senate, and Chamber of the Deputy of the Italian Republic.
3. **RIKEN Fellow of the Week**, Japan, 2014.
4. **Marie Curie Fellow of the Week** 26th of April 2019 from Marie Curie Program.
5. **Project chosen as "Success Stories" by the Marie Curie Media** in February 2019.

Professional Achievements:

Expert in a) data analysis of Gamma-Ray Bursts (GRBs), discoverer of several GRB correlation which are named the Dainotti relations, b) statistical methods to overcome selection biases c) machine learning methods applied to GRBs and Active Galactic Nuclei for the redshift inference. Publications: 140.

Sole author of IOP book: "Gamma-ray Burst Correlations Current status and open questions" editor of one special issue; 91 papers published or accepted in refereed journals, served as first author in 42; Conf. Proc.: 89. Citations: 4452. H-index: 37; Results are from Google Scholar. 108 invited and contributed talks at conferences and colloquia.

Professional and Outreach activities:

1. **Local Organizing Committee** of the conferences 'Understanding Relativistic Jets', Krakow, Poland (06/2011), 'Relativistic Jets: Creation, Dynamics & Internal Physics', Krakow (04/ 2015); on "GRB-SNe" at Riken, 08/2015 and 09/2015; "GRB-SNe", Kyoto, 11/2013.
2. **Scientific Organizing Committee** of "Statistical Studies and Machine Learning in the Space Sciences", at Space Science Institute 06/2020 and NAOJ mini workshop on GRBs.
3. **Open House** celebrating 10th Anniversary of KIPAC, Stanford University, 03/2013, Riken (Japan) Open House, 04/2014 and at NAOJ, Japan in 2021, 2022 and 2023.
4. **Referee** of Nature, Nature Astronomy, ApJ, MNRAS, , Physical Review, Physics of the Dark Universe, Journal of High Energy Astrophysics, International Journal, Frontiers, Advances in Astronomy, Galaxies.
5. **Selected reviewer** of NSF Astronomy Program 2022, Swift cycles XX, XIX, XV, XIV, XII, XI, 12/2018, 12/2017, 12/2015, 11/2014; NASA Postdoctoral Fellowship 2015, 2016, 2017;2018, 2019; 2023. NASA Astrophysical Data Analysis Panel (ADAP), 2015, 2019; for Icelandic Centre for Research; from the University of the Kingdom of Bahrain for promotion of Academic Staff.

Students Supervising: 140 students

The breakdown is PhDs:13; master students:12; undergraduates: 101; high school:14. Out of these students supervised I have published so far papers with 30 undergraduates (30%), 7 with high school (50%), 4 master students (30%), and 13 PhD (100%).

Professional memberships and Major Collaborations:

American Astronomical Society (AAS), 2012, and since 2016; American Association University Women 2017-2018; affiliated Member of the Fermi-LAT collaboration from 03/2016; Member of the Theseus collaboration from 2016; The American Physical Society (APS), 2005-2008; Member of the Astronomical Japanese Society since 2021.

Data analysis and Programming abilities:

Software for astronomical data analysis: XSPEC, Qdp, FTOOLS, Swift analysis and Fermi LAT analysis with GTI, the standard tool and ThreeML.

Software for general data analysis: phyton,Mathematica, IDL, R.

ADVANCING SPACE WEATHER FORECASTING THROUGH INTEGRATED RADIATION MONITORING AND MODELING AT THE UNIVERSITY OF HAWAII

Veronica Bindi

Ph.D., Physics & Astronomy Department, The University of Hawaii at Manoa, USA



ABSTRACT

Space weather represents a critical challenge for modern technological systems and space exploration, with impacts ranging from satellite operations to human spaceflight and aviation. At the University of Hawaii, we are developing an integrated framework that combines ground-based observations, advanced modeling, and operational capabilities to improve the understanding and forecasting of the space radiation environment.

A central component of this effort is the newly deployed neutron monitor station at the summit of Haleakalā (Maui), which provides continuous, high-quality measurements of secondary cosmic rays. These observations are essential for tracking solar energetic particle events and galactic cosmic ray modulation, offering real-time insight into radiation conditions near Earth. The neutron monitor operates as part of a broader initiative: the Space Weather Monitoring and Coordination Center (SWMCC), currently being established at the University of Hawaii.

The SWMCC is designed as both a scientific and operational hub. It integrates observational data streams with state-of-the-art physics-based and data-driven models to deliver actionable space weather information. Our modeling efforts focus on radiation environment prediction, including the propagation of charged particles in the heliosphere and their interaction with Earth's magnetosphere and atmosphere. These capabilities are informed by extensive experience from the Alpha Magnetic Spectrometer (AMS) experiment on the International Space Station, which provides high-precision measurements of cosmic radiation.

Beyond research, the SWMCC supports mission readiness by offering radiation awareness and operational services to space missions, including satellites and upcoming lunar payloads. The center also serves as a training environment for students and early-career researchers, bridging fundamental science with real-world applications.

This work demonstrates how coordinated observational infrastructure, modeling, and operational integration can enhance global space weather forecasting capabilities. It also highlights the strategic role of Hawaii as a node for space science, international collaboration, and support for emerging space missions.



SAPIENZA
UNIVERSITÀ DI ROMA

BIOGRAPHY

Veronica Bindi is Professor and Chair of the Department of Physics and Astronomy at the University of Hawaii at Manoa. Her research focuses on cosmic rays, space radiation, and space weather, with major contributions to the AMS experiment on the International Space Station. She leads efforts on radiation environment modeling and the development of operational space weather capabilities.

SECULAR VARIATIONS OF THE SOLAR DIAMETER: MEASURES WITH TRANSITS AND ECLIPSES, THE STATUS OF ART AT 2026

Costantino Sigismondi

Ph.D., Icranet, Pescara

ABSTRACT

The solar diameter is a primary index of the solar activity, along with the sunspot number and the total solar irradiation, but it is the most difficult to be measured better than one part over 100.000. The timing of eclipses and transits (meridian and planetary) to this level of accuracy makes possible the task of measuring the solar diameter much below the diffraction limit of all optical instruments involved.

The timing of the Venus transits and total solar eclipses have been analyzed for assessing the solar diameter then, along with the meridian transits at the Clementine Gnomon in Rome, a 50-m pinhole meridian line realized in 1702, to better understand the measures made in the Maunder Minimum (1645-1715).

Research outline: the solar diameter was a traditional measure performed in Rome Observatories (Collegio Romano 1852-1878, Campidoglio 1877-1937 with Greenwich 1858-1952) through meridian transits, continued by modified astrolabes in Nice, Rio de Janeiro, Spain and Turkey (1975-2010) and the reflecting heliometer (2012-2020). The balloon-borne Solar-Disk-Sextant (Yale-NASA 1992-2011, 6 flights) and the space French mission PICARD (2013-2015) monitored the diameter above the atmosphere. The demanding measure is repeated at each total eclipse through the Baily's beads produced by the photosphere appearing through the lunar valleys. The appearance of superflaring active regions, or the periodical activation of quiescent complex regions, could be explained as global responses to the solar diameter's variations, occurring in the most superficial layers of the Sun. Monitoring the solar diameter on timescales of one day and below can be a relevant task for the modern spaceweather network, either from satellite and from ground.

BIOGRAPHY

Costantino Sigismondi (Rome, 1969) is dedicated to the Solar Astrometry. Graduated in Physics at Sapienza University of Rome in 1994 earned a PhD in 1998, and a second PhD in Relativistic Astrophysics in 2011 at Nice-Sophia Antipolis. Worked in Yale/NASA in 2000-2002, Nice 2007-2011 and Rio de Janeiro Observatorio Nacional (2011-2014) on the historical and modern measures of the solar diameter. He is member of the International Center for Relativistic Astrophysics and ICRANet Adjunct Professor. He is serving IAU International Astronomical Union as secretary (elected member) of the Commission of History of Astronomy (2024-2027).

References: [Solar Astrometry in Rome at the End of the Maunder Minimum \(Universe, 2025\)](#)
[Modern View of the Sun \(Histories, 2025\)](#)



AI/CYBER/INNOVATION

AI-DRIVEN SUPER AUTONOMOUS ROBOTS

Giuseppe Loianno

Ph.D., Department of Electrical Engineering and Computer Sciences (EECS), University of California, Berkely

ABSTRACT

Autonomous aerial robots will play a critical role in addressing diverse time-sensitive and hazardous tasks, including logistics, reconnaissance, search and rescue missions, indoor and outdoor monitoring, transportation, and construction. Future smart cities will need to reconsider their current transportation and delivery systems. Small-scale aerial robots will navigate in dense urban environments to deliver in a timely manner various items, ranging from medical supplies to fresh groceries. To handle these challenges effectively, robots must be Super Autonomous or USARC: Unmanned, Small, Agile, Resilient, and Collaborative in complex, cluttered, unknown, and dynamic environments. In this talk, I will discuss recent research results on developing super autonomous robots. Achieving this goal requires evolving the autonomy system through a principled integration of physics-based and data-driven techniques that explicitly captures the interplay between perception and action. As a result, small-scale robots achieve greater agility and resilience, with improved decision-making both individually and in collaborative settings.

BIOGRAPHY

Giuseppe Loianno (<https://vcresearch.berkeley.edu/faculty/giuseppe-loianno>) is an Associate Professor at UC Berkeley and director of the Agile Robotics and Perception Lab (<https://arplaboratory.github.io/>). Prior to joining UC Berkeley in 2025, he was an associate professor at NYU and prior to that a research scientist and team leader at the GRASP Lab at the University of Pennsylvania in Philadelphia. He has co-authored over 100 publications. He is recipient of the NSF CAREER Award 2022; the DARPA Young Faculty Award 2022; the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022 Toshio Fukuda Young Professional Award in recognition of contributions to perception-based navigation for agile autonomous aerial and ground robots; the Goddard Junior Faculty Fellowship 2022; and the Best Associate Editor Award Conference Editorial Board (CEB) at the IEEE/ICRA International Conference on Robotics and Automation 2022. He is senior editor for the IROS conference 2023-2025 and IEEE Robotics and Automation Letters as well as an associate editor for multiple other prominent robotics journals including IEEE Transactions on Robotics, International Journal of Robotics Research, Field Robotics, and Frontiers in Robotics and AI. He is the chair of the IEEE RAS Robotics Foundations cluster and IEEE RAS TC on Aerial Robotics and Unmanned Aerial Systems. His work has been featured in a large number of renowned international news and magazines such as The Wall Street Journal, IEEE Spectrum, Quartz, and Popular Science.

THE ECCC ROLE IN PROMOTING RESEARCH AND INNOVATION

Luca Tagliaretti

Executive Director of the European Cybersecurity Competence Centre (ECCC), Romania



ABSTRACT

The European Cybersecurity Competence Centre (ECCC), together with the Network of National Coordination Centres (NCCs), is Europe's new framework to support innovation and industrial policy in cybersecurity. This ecosystem will strengthen the capacities of the cybersecurity technology Community, shield our economy and society from cyberattacks, maintain research excellence and reinforce the competitiveness of EU industry in this field.

The ECCC, which will be located in Bucharest, will develop and implement, with Member States, industry and the cybersecurity technology Community, a common agenda for technology development and for its wide deployment in areas of public interest and in businesses, in particular SMEs.

The Centre and the Network together will enhance our technological sovereignty through joint investment in strategic cybersecurity projects.

BIOGRAPHY

Luca has more than 20 years of experience working with European Institutions and International Organizations, specializing in the domains of digital transformation, cybersecurity, and research and development.

Before joining the ECCC as Executive Director in 2024, he held the roles of Deputy Executive Director and Interim Executive Director of eu-LISA, the European Union Agency for the management of large-scale IT systems. Prior to that he served as head of the Global Technical Centre of the Central Bank Counterfeit Deterrence Group at the European Central Bank.



SAPIENZA
UNIVERSITÀ DI ROMA

Luca's academic achievements include an Engineering Degree from the Polytechnic University of Milan, a Master's Degree from the School of Management of the Polytechnic of Milan (MIP), and an MBA from Oxford Brookes University. He has completed the Advanced Leadership and Management Programme (OALMP) at Saïd Business School, Oxford University, as well as the Program on Negotiation (PON) at Harvard University.

ADAPTIVE AND REACTIVE AUTONOMY FOR ROBOTS OPERATING BEYOND GPS AND MAPS

Alessandro Saviolo

Ph.D., Senior Autonomy Engineer, PlusAI

ABSTRACT

Autonomous robots are typically built on a modular pipeline: estimate global position, construct a map, plan a trajectory, and track it using a fixed dynamics model. While effective in structured settings, this architecture becomes fragile in real-world environments where localization drifts, maps become inconsistent, and system dynamics change due to disturbances, payload variations, or actuator wear. In safety-critical applications such as disaster response, infrastructure inspection, and autonomous transportation, these failures are operational risks.

My research addresses a central question: how can autonomy remain reliable when both the model of the robot and the representation of the environment are uncertain and evolving? I propose an alternative formulation grounded in adaptation and reactivity rather than global consistency. Instead of assuming a fixed vehicle model and a stable world representation, the system continuously refines its internal dynamics model using onboard data and integrates safety constraints into the control optimization. Navigation is performed relative to local observations rather than a persistent global frame, enabling stability even when GPS is unavailable and mapping becomes unreliable.

This integrated design transforms autonomy from a sequential pipeline into a coupled real-time system. Learning improves prediction accuracy, control accounts for uncertainty, and perception feeds safety constraints at control-loop timescales. The framework enables aerial robots to sustain agile, collision-free flight in unknown and cluttered environments.

The approach has been validated through real-world experiments, including high-speed flights in dense forest trails and navigation within urban compounds under degraded GPS conditions. Results show stable tracking under disturbances, rapid avoidance of unforeseen obstacles, and consistent performance without prior maps.

More broadly, this work contributes to a shift in autonomy design: from globally dependent architectures toward systems that maintain local reliability under uncertainty. These principles extend beyond aerial robotics and inform the development of autonomous platforms in transportation and other safety-critical domains.

BIOGRAPHY

Alessandro Saviolo is a Senior Autonomy Engineer at PlusAI, working on autonomous driving systems. He received his Ph.D. in Electrical and Computer Engineering from New York University, where he developed adaptive and reactive autonomy frameworks for aerial robots operating in complex, GPS-denied environments. His work bridges academic research and industrial deployment, integrating machine learning and control to build autonomous systems. He has authored peer-reviewed publications in international robotics venues and collaborated on projects supported by U.S. federal agencies and industry partners.



STEAM

MODERATOR



Stefano Boccaletti

Ph.D., Director of Research at the Institute of Complex Systems of the Italian CNR, Florence

Member of the *Accademia Europea* Fellow of the *American Physical Society*

Editor in Chief of *Chaos Solitons and Fractals*

Stefano Boccaletti received the PhD in Physics at the University of Florence in 1995, and a PhD honoris causa at the University Rey Juan Carlos of Madrid in 2015. He was Scientific Attache' of the Italian Embassy in Israel during the years 2007-2011 and 2014-2018. He is currently Director of Research at the Institute of Complex Systems of the Italian CNR, in Florence. His major scientific interests are i) pattern formation and competition in extended media, ii) control and synchronization of chaos, and iii) the structure and dynamics of complex networks. He is Editor of the Journal "Physics Reports" (Elsevier) and, from 2013 to 2025, he has been Editor in Chief of the Journal "Chaos, Solitons and Fractals" (Elsevier). He is member of the Accademia Europaea since 2016, and Fellow of the American Physical Society from 2024. He was elected a member of the Florence City Council from 1995 to 1999.

Boccaletti has published 352 papers in peer-reviewed international Journals, which received more than 41,000 citations (Google Scholar). His h factor is 76 and his i-10 index is 241. With more than 13,500 citations, the monograph "Complex Networks: Structure and Dynamics", published by Boccaletti in Physics Reports in 2006 converted into the most quoted paper ever appeared in the Annals of that Journal.

TINY MOVEMENTS, BIG CHANGES: A NEW ROUTE TO PREDICTING MATERIAL PERFORMANCE AND LIFETIME

Simone Napolitano

Ph.D., Polymer and Soft Matter Dynamics, Université libre de Bruxelles, Belgium

ABSTRACT

At thermodynamic equilibrium, the properties of a system remain constant in time. Yet most processes in nature occur far from equilibrium: buds transform into flowers, tectonic plates rearrange, and living organisms evolve over decades. In all these cases, the gradual relaxation of materials ultimately determines their lifetime and stability. At the molecular level, equilibration kinetics, the evolution of a system toward lower-energy states, are governed by molecular motion. This establishes a direct link between equilibrium properties and nonequilibrium dynamics, enabling predictions of how materials evolve over time based on equilibrium measurements.

In liquids and soft materials, equilibration is commonly associated with structural relaxation, which underlies glass formation and slows dramatically upon cooling. However, growing evidence shows that many processes follow a markedly weaker temperature dependence. We attribute this behavior to the slow Arrhenius process (SAP), the experimental signature of a distinct mode of molecular motion driven by collective small displacements (CSD). In this picture, equilibration proceeds through localized, coordinated motions of limited amplitude rather than large-scale structural rearrangements.

By combining this mechanism with a statistical-mechanical description of intermolecular interactions, we obtain a predictive framework that quantitatively links molecular-scale dynamics to macroscopic relaxation rates. This approach has been successfully employed to predict crystal growth in compounds relevant to pharmaceutical and electronic applications, molecular exchange times in biological membranes, and the adsorption kinetics of polymers on semiconductor surfaces, demonstrating its broad applicability across complex material systems.

BIOGRAPHY

Simone Napolitano was born in Cosenza and is currently Professor of Experimental Soft Matter Physics at the Université libre de Bruxelles (ULB), Belgium. He obtained his Master's degree in Materials Science from the University of Pisa in 2005, and completed his PhD in Polymer Physics at KU Leuven in 2007. Following early postdoctoral training, he joined ULB in 2011 as a faculty member, where he established the Laboratory of Polymer and Soft Matter Dynamics and later co-founded the Laboratory of Experimental Soft Matter and Thermal Physics (EST). His research focuses on molecular mobility in polymers and small organic molecules, with the aim of understanding how microscopic motion—spanning a wide range of length and time scales—translates into macroscopic relaxation and nonequilibrium behavior.

Through this approach, his work provides direct experimental tests of theoretical frameworks for the glass transition and the liquid state. Beyond these fundamental questions, his group also investigates how purely physical factors, such as processing history and confinement, can be harnessed to tailor material properties. This strategy offers routes to enhance performance and stability without altering chemical composition, bridging fundamental insights with practical applications in advanced materials.

CHAOS AND SYNCHRONIZATION: POSSIBLE BASES FOR INNOVATION IN ANALOG DESIGN AND COMPUTING

Ludovico Minatti

Ph.D., Director of the Interdisciplinary Nonlinear Dynamics Laboratory (INDLab), School of Life Science and Technology of China, Chengdu, China



ABSTRACT

Recent years have seen a general resurgence of interest in analog signal processing and computing architecture. In addition, extensive theoretical and experimental literature on chaos and analog chaotic oscillators exists. One peculiarity of these circuits is the ability to generate, despite their structural simplicity, complex spatiotemporal patterns when several of them are brought towards synchronization via coupling mechanisms. While by no means a systematic survey, this paper provides a personal perspective on this area. After briefly covering design aspects and the synchronization phenomena that can arise, a selection of results exemplifying potential applications is presented, including in robot control, distributed sensing, reservoir computing, and data augmentation. Despite their interesting properties, the industrial applications of these circuits remain largely to be realized, seemingly due to a variety of technical and organizational factors including a paucity of design and optimization techniques. Some reflections are given regarding this situation, the potential relevance to discontinuous innovation in analog circuit design of chaotic oscillators taken both individually and as synchronized networks, and the factors holding back the transition to higher levels of technology readiness.

BIOGRAPHY

LUDOVICO MINATI (Senior Member, IEEE) received the Ph.D. degree in neuroscience from the Brighton and Sussex Medical School, Falmer, U.K., in 2012, the D.Sc. (Doktor Habilitowany) degree in physics from the Institute of Nuclear Physics, Polish Academy of Sciences, Kraków, Poland, in 2017, and the M.B.A. degree in technology management from The Open University, Milton Keynes, U.K., in 2021. Until 2023, he was a Specially Appointed Associate Professor with the Institute of Innovative Research, Tokyo Institute of Technology, Tokyo; an Affiliate Research Fellow with the Center for Mind/Brain Sciences, University of Trento, Trento, Italy; and a Freelance Research and Development Consultant. He is currently a Professor, an Outstanding Young Talent, and the Director of the Interdisciplinary Nonlinear Dynamics Laboratory,

School of Life Science and Technology, University of Electronic Science and Technology of China, Sichuan, China. He is also a Visiting Professor with the Institute of Science Tokyo. He has authored more than 200 articles and several patents. His research interests include nonlinear dynamical systems, chaotic oscillators, reconfigurable analog and digital computing, analog integrated circuits, advanced techniques for biosignal analysis, brain– machine/computer interfaces, robotics, and distributed sensor networks. He is a European Engineer (Eur. Ing.), a Chartered Engineer (C.Eng.), and a member of the Institution of Engineering and Technology, U.K. He is also a member of the Institute of Electronics, Information, and Communication Engineers (IEICE), the Institute of Electrical Engineers (IEE) of Japan, and the Sigma Xi and Eta Kappa Nu; and a Liveryman of the Company of Scientific Instrument Makers.

INTRINSIC DISORDER AND ISOMERIZATION CONTROL IN AUXIN CO-RECEPTORS

Charo del Genio

Ph.D., Trakia University, Stara Zagora, Bulgaria

ABSTRACT

The proteins in the Aux/IAA family of auxin co-receptors bind the auxin-TIR1 complex to start the signalling cascade needed for every process of growth and development in plants. We showed that the probability of finding a *cis* solid angle between two residues of fundamental importance for binding is 50%, which is a much higher value than would be classically expected. Moreover, only the *cis* isomer is active. I will discuss our current investigation into how the environment surrounding these amino acids affects their isomerism and how we aim to exploit this to optimize the efficiency of herbicides and improve crop security.

BIOGRAPHY

Charo del Genio obtained his Laurea degree in Physics in 2004 from the University of Naples “Federico II”, with a work in biophysics, modelling the interactions of cosmic rays with different materials to identify the best approach to shield astronauts from space radiation and minimize the DNA damage from incoming fragmented heavy ions. He then moved to the University of Houston, where he finished a PhD in statistical physics, providing a theoretical explanation for the anomalous phase transitions observed in a family of defected materials, most notably Perovskites and high- T_c superconductors. During his PhD, he became interested in complex networks and algorithmic graph theory, developing the first exact polynomial-time algorithm for degree-based graph sampling. Subsequently, he extended his method to the case of directed networks and networks with prescribed correlations, solving a problem that had been left open and without progress for 40 years. He also extended the Master Stability Function formalism for the assessment of synchronization stability to networks whose structure changes in time, as well as to networks with multiple layers of interaction. Additionally, he investigates the biophysics of molecular recognition processes. His main results in this area include the development of a tomographic molecular docking algorithm and the determination of a genetic mechanism that plants use to protect themselves from heat stress. He has also revealed that intrinsically disordered proteins, which are approximately 40% of all known proteins, do not necessarily consist exclusively of random coils, as previously believed, and that, instead, they can be found in an ensemble of co-existing folded structures. His current interests are the study of dynamical systems on networks, the development of algorithms for higher-order networks, and investigating how the local environment affects the properties of intrinsic disorder in proteins.

SYMMETRY AND CONNECTIONS: A GEOMETRIC JOURNEY FROM ITALY TO CHILE

Paola Comparin

Ph.D., Researcher at Universidad de la Frontera, Temuco, Chile



ABSTRACT

Dr. Paola Comparin is an Italian mathematician currently based in Chile, at Universidad de La Frontera. She earned her Ph.D. in Mathematics from the Université de Poitiers, France, specializing in algebraic geometry, with a focus on complex geometric structures such as K3 surfaces and hyperkähler manifolds. Her research explores geometric objects and their symmetries. This is a very active branch of algebraic geometry, also having strong connections with theoretical physics.

Dr. Paola Comparin has participated in several national and international research projects, including competitive grants, and actively collaborates with research networks across Latin America and Europe. She was awarded the “Adelina Gutiérrez Prize for Scientific Excellence” by the Chilean Academy of Sciences in 2024, and was also selected as a member of the Ciencia de Frontera program, an initiative of the Academy that brings together outstanding early-career researchers in Chile.

Beyond her research activity, Dr. Paola Comparin is strongly engaged in academic leadership and scientific outreach. She plays an active role in initiatives aimed at promoting STEM education, particularly encouraging the participation of young women in mathematics and science. Her work includes mentoring programs, public lectures, and the development of educational activities designed to reduce the gap between advanced mathematics and broader audiences.

BIOGRAPHY

Geometry offers a way of seeing the world not only through shapes, but through the relationships that define them. Among these, symmetry plays a central role: it captures what remains invariant when an object is transformed, and reveals its structure in a simple and powerful way. In this presentation, we will explore how symmetries help us describe and understand geometric objects by focusing on what stays unchanged, rather than on every detail. As an example, in the study of geometric objects such as surfaces and higher-dimensional varieties, a well known phenomenon called mirror symmetry gives a surprising correspondence between different geometric spaces that, despite looking unrelated,

share deep structural properties. This viewpoint not only illustrates the power of symmetry in modern geometry, but also reflects the idea that the understanding might comes from looking at the same object from a different perspective. Symmetry is a way of seeing how geometry naturally leads to interaction with other researchers and to shared ways of thinking.

TOWARDS SUSTAINABLE BUILDING RENOVATION: A WHOLE-LIFE ENVIRONMENTAL AND ECONOMIC ASSESSMENT FOR LOW-CARBON RESIDENTIAL BUILDINGS

Aurora Bertini

Ph.D. Student, Dept. UEE, Faculty of Applied Sciences, University of Liege, Belgium

Aurora Bertini^{a,b}

^a Sustainable Building Design Lab, Dept. UEE, Faculty of Applied Sciences, Université de Liège, Belgium

^b Louvain Research Institute for Landscape, Architecture, Built Environment (LAB), Faculty of Architecture, Architectural Engineering, and Urban Planning (LOCI), UCLouvain, Belgium

ABSTRACT

The European Renovation Wave strategy aims to accelerate building renovation by improving heating, cooling, and envelope performance, while promoting a life-cycle approach. Yet current efforts largely focus on operational energy use, overlooking the whole-life environmental performance of buildings — an omission that can increase life-cycle greenhouse gas (GHG) emissions and broaden the environmental footprint of renovation works. A life-cycle approach is therefore essential.

This research presents a parametric, dynamic life-cycle assessment (LCA) model for residential renovation, integrating operational and embodied GHG emissions to rank renovation strategies by their energy and environmental performance. Multi-objective optimization then evaluates renovation alternatives against cost and whole-life environmental impact, while uncertainty analysis quantifies how building characteristics, occupant behavior, and future climatic and energy conditions influence the outcomes.

Results indicate that, although substantial energy savings and emissions reductions are technically achievable, the current policy context favors either no intervention or system-only upgrades. Deep retrofit strategies exhibit payback periods exceeding 50 years, driven by unfavorable energy market conditions and insufficient carbon taxation. As a result, financial feasibility emerges as a major barrier to large-scale action.

These findings highlight the need for a revised policy framework that enhances economic viability and accelerates the transition toward cost-effective, low-carbon renovation pathways — ensuring that climate neutrality becomes not only a technical ambition, but a socially and economically attainable goal.

Aurora Bertini holds a BSc in Building and Construction Engineering and an MSc in Building and Architectural Engineering from Politecnico di Milano, Italy. She completed a Double Degree program, earning a second MSc in Engineering from CentraleSupélec, France.

Aurora is currently pursuing a joint PhD at the University of Liège and UCLouvain, Belgium. Her research, funded by the National Fund for Research (F.R.S.-FNRS), focuses on dynamic energy simulation and life cycle assessment of residential building renovation. She has authored and co-authored papers in leading journals in the field, including Energy and Buildings, Building and Environment, and Journal of Energy Storage.

Since 2023, Aurora has been contributing to the International Energy Agency's Energy in Buildings and Communities Program (IEA-EBC) Annex 89, "Ways to Implement Net-zero Whole Life Carbon Buildings".

OPTIMIZATION OF AN IMAGING-COMPATIBLE ORAL RETRACTOR SYSTEM FOR IMAGE-GUIDED TRANSORAL ROBOTIC SURGERY

Flavia Bottai

Biomedical Engineering BS Student, Columbia University (NY)

ABSTRACT

Transoral robotic surgery (TORS) is a minimally invasive approach to treat oral and oropharyngeal cancers, but its effectiveness is limited by metallic oral retractors that create artifacts in CT imaging, are unsafe for MRI, and are cumbersome to set up. The lack of an imaging-compatible retractor poses a major barrier to achieving intraoperative CT/MRI guidance, which could substantially improve surgical precision in locating and removing tumors and ultimately enhance patient outcomes.

This project aimed to redesign an oral retractor and suspension system to be fully imaging-compatible while remaining practical for use with the da Vinci robotic platform. Building on prior prototypes, the team addressed issues surgeons encountered in the operating room, including CT interference, limited adjustability, and difficulty accommodating different patient anatomies. Using SolidWorks, a new design was modeled, 3D printed, and iteratively refined through cadaver head testing with direct surgeon feedback. Final versions were manufactured using sterilizable resin, carbon fiber, and nylon composites to balance strength, durability, and clinical compatibility.

Bench-top, cadaveric, and early patient studies showed that the polymer retractor enabled artifact-free CT and MRI imaging while maintaining functionality for robotic procedures. The system proved intuitive to set up, compatible with da Vinci platforms, and durable under surgical loads. Patient trials are now underway, marking the first clinical use of an imaging-compatible retractor for TORS. This innovation represents a critical step toward enabling intraoperative image-guided robotic surgery, with the potential to transform surgical navigation, improve outcomes, and enhance quality of life.

BIOGRAPHY

Flavia Bottai is a Biomedical Engineering student at Columbia University passionate about medical technology, imaging, and human-centered healthcare innovation. Her experience spans research, device design, and clinical engineering environments, including work at NewYork-Presbyterian/Weill Cornell, Dartmouth Hitchcock Medical Center, and a surgical device startup in NYC. She has contributed to projects involving stretchable MRI coils, surgical device prototyping, image-guided workflows, and accessible



SAPIENZA
UNIVERSITÀ DI ROMA

respiratory support technologies. Next year, Flavia will join Siemens Healthineers as an R&D Engineer, where she will continue developing technologies that improve healthcare delivery. Beyond research, she is involved in leadership and community-building through the Biomedical Engineering Society, the Society of Women Engineers, and United Italian Societies. Originally from Rome and now based in New York, Flavia brings an international perspective to her work and hopes to contribute to the future of medtech through engineering, entrepreneurship, and equitable healthcare solutions.

LABEL-FREE ELECTROCHEMICAL FINGERPRINTING COMBINED WITH MACHINE LEARNING FOR MULTICLASS CANCER CELL LINE CLASSIFICATION

Wanda Cimmino

Ph.D. Student, Pharmaceutical Sciences at the Department of Pharmacy, University of Naples Federico II,
Visiting Student at Sbarro Health Research Organization (S.H.R.O.), Temple University, Philadelphia, USA

ABSTRACT

Current cancer monitoring relies on centralized laboratory infrastructure and intermittent testing, limiting temporal resolution and accessibility. While liquid biopsy has reduced invasiveness, it still requires complex analytical workflows. Here, we propose a label-free sensing strategy based on electrochemical profiling of cancer-associated metabolic signatures, enabling rapid and deployable analysis. Nine human cell lines, including non-tumorigenic (MCF10A, SV-HUC-1) and malignant (MDA-MB-231, MDA-MB-468, T24, OVCAR-3, SK-OV-3, Caov-3, HeLa) models from multiple tissues, were analyzed using differential pulse voltammetry (DPV) on low-cost disposable paper-based electrodes. A total of 924 measurements were collected across biological replicates. Machine learning models (Support Vector Machines and Random Forests) were implemented within a hierarchical classification framework, ranging from binary detection of malignancy to the discrimination of the nine classes. Model performance was evaluated using stratified 5-fold cross-validation and repeated validation across 10 random seeds. Binary classification achieved near-perfect discrimination between non-tumorigenic and malignant cell lines ($\text{ROC-AUC} \geq 0.983$). Principal component analysis confirmed intrinsic separation prior to supervised learning. Random Forest models applied to supernatant samples achieved strong multiclass performance (balanced accuracy = 0.875, macro F1 = 0.886, $\text{ROC-AUC} = 0.989$). Within-tissue classification showed excellent resolution, including perfect breast cancer discrimination and high accuracy for bladder (0.960) and ovarian subtypes (0.938). Supernatant analysis outperformed cell suspensions, highlighting the relevance of extracellular metabolic signatures. The T24 cell line represented the main classification challenge due to overlapping electrochemical profiles. This study demonstrates that low-cost electrochemical sensing combined with machine learning enables accurate, label-free discrimination of cancer phenotypes. The superior performance observed in supernatant samples supports the potential of this approach for minimally invasive clinical applications. These findings lay the groundwork for scalable and deployable cancer monitoring systems, with future validation in patient-derived biological fluids as a key next step.

BIOGRAPHY

Dr. Wanda Cimmino is a Ph.D. student in Pharmaceutical Sciences at the Department of Pharmacy, University of Naples Federico II. She is currently a visiting student at the Sbarro Health Research Organization (S.H.R.O.), Temple University, Philadelphia, PA, USA. She graduated in environmental and chemical toxicology at University of Naples Federico II. Her research focuses on the development of electrochemical biosensors, with particular attention to innovative platforms for the detection of circulating microRNAs as disease biomarkers. Her work also integrates chemometric and machine learning approaches to enhance analytical performance, data interpretation, and diagnostic applications in biomedical and pharmaceutical fields.

Dr. Giulio Mazzarotti is a molecular researcher visiting fellow at Sbarro Health Research Organization (S.H.R.O.), Temple University in Philadelphia, PA, USA. Currently he is a Ph.D. student at Medical Biotechnology University of Siena. He graduated in Biology at University of Sannio in Benevento. His main topics of researcher are DNA damage, application of CRISPER Cas 9 technology and identification of multiomics patterns for diagnosis and clinical prediction of disease and drug response.

MULTI-OMICS PROFILING OF PEDIATRIC CANCERS IDENTIFIES MOLECULAR AND IMMUNOLOGICAL BIOMARKERS ASSOCIATED WITH RELAPSE: INSIGHTS FROM THE MICCHADO STUDY

Antonio Colaprico

Ph.D., Translational Research Department at Institut Curie, PSL Research University, Paris, France

Authors: [Antonio Colaprico](#) (1), Alexandra Saint-Charles (1), Stelly Ballet (2), Charles Bobin (1), Joffrey Alves-Gasnier (1), Valery Attignon (1), Nathalie Droin (1), Ludovic Lacroix (4), Ana Lalanne (5), Doriane Gorret (5), Lydie Cassard (6), Imène Hezam (7), Yasmine Iddir (1), Anthony Ferrari (8), Elnaz Saberi Ansari (1), Gaëlle Pierron (2), Julien Masliah-Planchon (2), Angela Bellini (1), Charlotte Butterworth (1), Benoit Dumont (3), Olivier Lantz (5), Olivier Delattre (1), Nadège Corradini (3), Claudia Pasqualini (7), Gudrun Schleiermacher (1)

(1) SiRC RTOP, Translational Research Department, Institut Curie, PSL Research University, Paris, France; SIREDO Oncology Center (Care, Innovation and Research for Children and AYA with Cancer), Institut Curie, PSL Research University, Paris, France; INSERM U830, Laboratoire de Génétique et Biologie des Cancers, Research Center, PSL Research University, Institut Curie, Paris, France.

(2) Unité de Génétique Somatique, Department of Genetics, Institut Curie Hospital, Paris, France.

(3) Department of Pediatric Oncology, Institut d'Hématologie et d'Oncologie Pédiatrique/Centre Léon Bérard, Lyon, France; Platform of Cancer Genomics, Centre Léon Bérard, Lyon, France.

(4) AMMiCa Platform, INSERM US23, CNRS UAR 3655, AMMiCa, Villejuif, France; Department of Medical Biology and Pathology, Gustave Roussy, Villejuif, France.

(5) Laboratory of Clinical Immunology, Department of Diagnostic and Theranostic Medicine, Institut Curie, Paris, France; Centre d'investigation Clinique en Biothérapie Gustave-Roussy Institut Curie (CIC-BT1428).

(6) Laboratoire d'Immunomonitoring en Oncologie, Gustave Roussy, Villejuif, France.

(7) INSERM US23, CNRS UMS 3655, Gustave Roussy, Villejuif, France; Department of Pediatric and Adolescent Oncology, Gustave Roussy Cancer Campus, Université Paris-Saclay, Villejuif, France.

(8) Synergie Lyon Cancer, Gilles Thomas Bioinformatics Platform, Centre Léon Bérard, Lyon, France.

ABSTRACT

Pediatric cancers encompass diverse tumor types with limited robust biomarkers to predict disease progression and relapse. The MICCHADO program (NCT03496402), a registered clinical trial integrating a pancancer cohort of ~600 pediatric patients, aims to characterize molecular and immunological features at diagnosis, during treatment, and at relapse. We performed integrative multi-omics analyses combining tumor and germline whole-exome sequencing (WES), plasma cell-free DNA (cfDNA), bulk RNA sequencing, and immune profiling by flow cytometry (FACS) across multiple tumor types, including neuroblastoma, osteosarcoma, rhabdomyosarcoma, Ewing sarcoma, brain and other solid tumors. Genomic analyses confirmed known alterations (e.g., MYCN amplification, copy number changes) and identified hypermutated profiles. Longitudinal cfDNA analyses revealed dynamic clonal evolution and emergence of relapse-specific alterations, particularly in RAS/MAPK-related pathways, highlighting the potential of liquid biopsy for disease monitoring. Transcriptomic analyses showed that a higher stemness index (mRNAsi) is associated with high-risk disease and relapse, suggesting a role for dedifferentiation in tumor aggressiveness. Immune deconvolution revealed heterogeneous tumor microenvironments, including immune-hot and immune-cold phenotypes, while peripheral blood analyses showed dynamic changes in T-cell and NK-cell populations over time. Integrative modeling combining genomic, transcriptomic, cfDNA, and immune features identified key predictors of relapse, including stemness and

immune-related signals. Overall, MICCHADO provides a comprehensive framework for multi-omics characterization of pediatric cancers, supporting the identification of clinically relevant biomarkers for risk stratification and precision medicine.

BIOGRAPHY

Antonio Colaprico, Eng., Ph.D., is a postdoctoral researcher in the Translational Research Department at Institut Curie, PSL Research University, Paris, France. Dr. Colaprico holds a Bachelor's and Master's degree in Telecommunication Engineering and a Ph.D. in Bioinformatics, all from the University of Sannio, Benevento, Italy. He previously worked as an associate scientist at the Sylvester Comprehensive Cancer Center, University of Miami Miller School of Medicine, Miami, USA. He develops machine learning methods for integrative analysis of cancer proteogenomics data, collaborating with international teams of interdisciplinary experts in basic and applied sciences. Dr. Colaprico has authored over 50 scientific articles, with a current h-index of 38 and 24632 citations, and a total impact factor of 1800. His research has been published as a first and co-author in high-impact journals, including Nature Communications, Nucleic Acids Research, Cell, Cancer Cell, and Immunity. His findings have been presented at major international conferences and meetings across the U.S., Europe, and beyond.

PHYTOTHERAPEUTIC STRATEGIES IN THE NUTRITIONAL MANAGEMENT OF CANCERS: BETWEEN TRADITION AND INNOVATION

Sara Damiano

Ph.D., Veterinary Pharmacology and Toxicology at the University of Naples Federico II



Sara Damiano ^{1*}, Consiglia Longobardi¹, Valeria Iervolino¹, Maria Laura Internato¹, Roberto Ciarcia¹.

¹Department of Veterinary Medicine and Animal Production, Naples, Italy

ABSTRACT

Phytotherapeutic and nutraceutical strategies are gaining increasing relevance as complementary approaches in cancer management, acting through mechanisms such as redox modulation, cell-cycle regulation, induction of apoptosis, and interference with key proliferative pathways (1). This report integrates evidence on natural marine, plant, and fungal compounds, together with emerging biotechnological platforms such as oncolytic virotherapy, and highlights their potential connections with anti-cancer nutritional approaches (2). The findings presented here were generated in our laboratory, contributing to the development of new experimental insights and applied perspectives.

Fucoxanthin, a xanthophyll derived from brown algae, exhibits both antioxidant and pro-apoptotic properties. It suppresses the PI3K/Akt/mTOR signaling axis in chronic myeloid leukemia cells, suggesting promising applications as a nutraceutical, particularly when used in combination with targeted therapies.

Similarly, Epipyron A—an orange polyketide pigment produced by *Epicoccum nigrum*—demonstrates antiproliferative and anti-migratory effects in canine mammary tumor models. Its activity involves modulation of redox homeostasis and context-dependent regulation of the PI3K/Akt/mTOR network.

In parallel, capsaicin, a dietary alkaloid abundant in chili peppers and widely studied in nutritional sciences, reduces proliferation, migration, and invasion in various mesothelioma cell lines. It inhibits AKT and ERK1/2 signaling and retains activity even in chemoresistant phenotypes.

Complementing these natural compounds, an oncolytic virotherapy platform based on Caprine herpesvirus 1 (CpHV-1) shows selective cytotoxicity toward breast cancer and mesothelioma cells and displays synergistic interactions with targeted agents across tumor subtypes.

Collectively, the convergence of nutraceutical compounds with advanced biotechnological interventions supports the concept of functional nutrition as a bridge between traditional knowledge and innovative oncology. These findings open

new perspectives for rational and personalized combination strategies aimed at enhancing treatment sensitivity and overcoming resistance in challenging oncological settings.

- (1) Thomas R. et al. (2015) – *Phytochemicals in cancer prevention and management?*, British Journal of Medical Practitioners.
- (2) Monica S.J. et al. (2025) – *Phytochemicals as Anticancer Agents: Investigating Molecular Pathways*, Current Research in Nutrition and Food Science Journal.

BIOGRAPHY

Sara has been an Associate Professor of Veterinary Pharmacology and Toxicology at the University of Naples Federico II since 2022. A biotechnologist (2005) with a PhD in Nephrological Sciences (2010), she is skilled in renal microsurgery and molecular biology. She also earned a Level II Master in Veterinary Phytotherapy (2024), the National Scientific Qualification as Full Professor (2023), and a specialization in laboratory animal science (2009). Her scientific output includes numerous international publications and conference contributions. Her research focuses on environmental contaminants, innovative anticancer therapies, diabetic nephropathy, immunosuppressant-induced nephrotoxicity, and essential hypertension in animal models.

MICROBIAL SYSTEMS IN A CHANGING PLANET: ENVIRONMENTAL AND GEOPOLITICAL PRESSURES ON GLOBAL HEALTH AND STABILITY

Antonella Fioravanti

Ph.D., Prof., Knight, Université Libre de Bruxelles, Faculté des Sciences, Belgium



ABSTRACT

Environmental and geopolitical pressures (climate change, pollution, resource overexploitation, and armed conflict) are reshaping global health and systemic stability through their impact on microbial systems at a planetary scale. Recent global assessments, including those from the Copernicus Climate Change Service, indicate accelerating, interconnected transformations of the Earth system with direct biological consequences.

Microbial communities underpin essential functions including soil fertility, biogeochemical cycling, water quality, and oxygen production, linking microbial dynamics to ecosystem integrity and human health. Environmental disruption alters microbial diversity, distribution, and function across ecosystems, intensifying selective pressures that favor stress-tolerant and antimicrobial-resistant phenotypes while disrupting functionally important microbiomes. These changes already affect infectious disease emergence and health system resilience.

This perspective highlights how global change is redefining the microbial foundations of health and stability. Addressing this challenge requires coordinated action among researchers, health and environmental institutions, and policy-makers, integrating surveillance, investment in microbial science, and international cooperation within a One Health framework.

BIOGRAPHY

Professor Antonella Fioravanti is a molecular biologist specialized in pathogenic bacteria, antimicrobial resistance, and the impact of environmental change on microbial ecosystems. Her work integrates structural microbiology and translational approaches to understand how bacteria survive and evolve, with the aim of developing next-generation therapeutic strategies against major global health threats. She is internationally recognized for her pioneering studies on *Bacillus anthracis*, demonstrating that its protein shell functions as a bacterial exoskeleton and identifying strategies to dismantle it, opening new therapeutic avenues against antibiotic-resistant infections (published in *Nature Microbiology*).

and PNAS Nexus). Her research now extends to the impact of climate change on microbial ecosystems and pathogen emergence, linking environmental transformation to human health. She leads multidisciplinary international projects and collaborates with research institutions, policy-makers, and public agencies. She is Guest Professor at the Université libre de Bruxelles, and serves as expert evaluator for the European Innovation Council, the European Research Executive Agency, and the European Health and Digital Executive Agency. She is also President of the Parsec Foundation in Italy, where she promotes research, public engagement, and science communication initiatives. Her outreach activities include science communication projects and public dissemination of microbiology, including *Viaggio nel mondo invisibile* (Aboca, 2025), aimed at bridging science, institutions, and society. She also contributes to strengthening cooperation between scientific communities, public institutions, and citizens. She was awarded the EOS Pipet Award (2020) and appointed Knight of the Order of the Star of Italy (2023) for scientific leadership, outreach, and promotion of women in STEM.

ALLA CONSAPEVOLEZZA ALL'AZIONE: CO-PROGETTARE TRAIETTORIE DI DECARBONIZZAZIONE IN COMUNITÀ VULNERABILI MESSICANE

Emanuele Giorgi

Ph.D., Direttore Nazionale della Ricerca, Scuola di Architettura, Arte e Design del Tecnológico de Monterrey,
Mexico

ABSTRACT

La decarbonizzazione dell'ambiente costruito rappresenta oggi una delle principali sfide globali, particolarmente nei contesti vulnerabili, dove coesistono incertezze socio-economiche, accesso limitato alle tecnologie e crescenti rischi ambientali. Questa ricerca indaga il ruolo dei processi di sensibilizzazione partecipativa come catalizzatori per l'attivazione di strategie di decarbonizzazione contestualizzate in tre comunità degli stati messicani di Chiapas, Chihuahua e Puebla, caratterizzate da condizioni climatiche, cultural, produttive e socio-ecologiche differenziate.

Andando oltre una visione puramente tecnica, questo studio considera la decarbonizzazione come una transizione socio-ecologica complessa che richiede l'integrazione tra conoscenze locali, cambiamenti comportamentali e strategie progettuali contestuali. La metodologia combina strumenti qualitativi e quantitativi per coinvolgere attivamente le comunità nei processi decisionali relativi al proprio contesto.

Attraverso workshop partecipativi, strumenti di alfabetizzazione ambientale e simulazioni energetiche, vengono identificate le possibili fonti di emissione (nella attualità e nel futuro), analizzate le pratiche esistenti e valutati scenari di intervento realistici. Il processo consente inoltre di individuare fattori sociali chiave, barriere e condizioni abilitanti che influenzano l'adozione di pratiche a basse emissioni, tra cui percezioni culturali, disponibilità di materiali, vincoli economici e trasformazioni nei sistemi costruttivi.

La ricerca integra modelli di simulazione digitale e di digital twin per valutare l'impatto degli interventi proposti su consumo energetico ed emissioni di gas serra, in scenari presenti e futuri. I risultati preliminari evidenziano come approcci basati sulla consapevolezza rafforzino il coinvolgimento comunitario e facilitino la co-costruzione di traiettorie di decarbonizzazione praticabili.

Il progetto vuole contribuire alla definizione di un riferimento scalabile che connette partecipazione sociale e valutazione tecnologica, sottolineando il ruolo centrale delle dinamiche sociali nel rendere possibili transizioni sostenibili, efficaci ed eque.

BIOGRAPHY

Direttore nazionale della ricerca presso la Scuola di Architettura, Arte e Design del Tecnológico de Monterrey, insegna e svolge attività di ricerca nel campo dell'architettura sociale. Nel 2020 ha pubblicato il libro " The Co-Housing



SAPIENZA
UNIVERSITÀ DI ROMA

Phenomenon", vincitore del Premio Rómulo Garza per la ricerca e l'innovazione. Tra il 2022 e il 2025 ha pubblicato i libri " Design for Vulnerable Communities", " Intersections", " Laboratorio Regenerativos Vivos" e " Regenerative Design". Attualmente coordina quattro progetti di ricerca, tra cui " Design for Vulnerables", incentrato sull'introduzione di tecnologie in tali comunità. Ha esposto alla XIX Biennale di Architettura di Venezia nel 2025 ed è membro del Sistema Nazionale dei Ricercatori del Messico.

TRULY A ‘MARE NOSTRUM’? ITALIAN MARITIME STRATEGY AND POLICY IN THE ‘ENLARGED MEDITERRANEAN’, 2020-2026

Giovanni Parente

Ph.D., University College, Dublin, Republic of Ireland

ABSTRACT

This research article examines the evolution of Italian maritime strategy and policy in the Mediterranean over the past twenty-five years. Despite Italy's heavy economic and security dependence on the sea, exemplified by extensive coastlines and significant maritime trade, the country has yet to articulate a comprehensive maritime security strategy. Instead, its strategic thinking has developed in a fragmented and reactive manner. This study investigates how and why Italian maritime thinking has evolved, advancing the hypothesis that it has changed not linearly but in response to emerging regional threats. Particular attention is given to the concept of the “*Mediterraneo allargato*” (translated as “Enlarged Mediterranean” in English), which has progressively expanded to encompass regions beyond the traditional Mediterranean basin. Using a qualitative methodology, the article analyses Italian-language primary and secondary sources and draws on over twenty-five elite interviews with policymakers, naval officers, and security practitioners. This research offers the first systematic English-language assessment of Italy's contemporary maritime strategic culture. An earlier version of the article was presented at the “Beyond the Anglosphere” Conference held on 30-31 October 2025 at Maynooth University. This study will appear, in July 2026, in the “Beyond the Anglosphere: Maritime strategy and policy outside the English-speaking world” special edition of the “*Revista da Escola de Guerra Naval*” (Journal of the Brazilian Naval College) in Rio de Janeiro, edited by Professor William Moreira (Brazilian Naval College) and Professor Ian Speller (Maynooth University).

BIOGRAPHY

Dr Giovanni Parente is a “Research Ireland” Postdoctoral Research Fellow at the University College Dublin for his project on the European Union's maritime security strategy, mentored by Professor Ben Tonra, and an Adjunct Assistant Professor in the Department of Political Science at Trinity College Dublin. Previously, he was an Adjunct Lecturer in the School of Law and Government at Dublin City University, an Adjunct Lecturer for the Irish Department of Defence, the Irish Military College, and the Irish Naval Service, and an Adjunct Professor for the Armed Forces of Malta. Dr Parente holds a PhD in History from Maynooth University, where he was an Irish Research Council/Research Ireland's “Government of Ireland” scholar and was supervised by Professor Ian Speller. His doctoral thesis, “*The European Union at Sea: A Historical and Geopolitical Analysis of EU Maritime Operations and Their Impact on Maritime Governance and Security, 2008-2024*”, was shortlisted for the “Global Strategy PhD Prize” by the European Security and Defence College and the Egmont Institute in 2025. Dr Parente is the author of “*Rethinking Naval Diplomacy: Roles and Impacts of Smaller Member States on the European Union's Maritime Security Strategy*” (Palgrave Macmillan, 2027). He is currently working on his second manuscript, “*The Making of Maritime Security in the European Union*”, for Routledge (2028). His research interests include the European Union's Common Security and Defence Policy, maritime security, and naval strategy.

TINY MOVEMENTS, BIG CHANGES: A NEW ROUTE TO PREDICTING MATERIAL PERFORMANCE AND LIFETIME

Simone Napolitano

Laboratory of Polymer and Soft Matter Dynamics, Experimental Soft Matter and Thermal Physics (EST), Université libre de Bruxelles (ULB), Brussels, Belgium

ABSTRACT

At thermodynamic equilibrium, the properties of a system remain constant in time. Yet most processes in nature occur far from equilibrium: buds transform into flowers, tectonic plates rearrange, and living organisms evolve over decades. In all these cases, the gradual relaxation of materials ultimately determines their lifetime and stability. At the molecular level, equilibration kinetics, the evolution of a system toward lower-energy states, are governed by molecular motion. This establishes a direct link between equilibrium properties and nonequilibrium dynamics, enabling predictions of how materials evolve over time based on equilibrium measurements.

In liquids and soft materials, equilibration is commonly associated with structural relaxation, which underlies glass formation and slows dramatically upon cooling. However, growing evidence shows that many processes follow a markedly weaker temperature dependence. We attribute this behavior to the slow Arrhenius process (SAP), the experimental signature of a distinct mode of molecular motion driven by collective small displacements (CSD). In this picture, equilibration proceeds through localized, coordinated motions of limited amplitude rather than large-scale structural rearrangements.

By combining this mechanism with a statistical-mechanical description of intermolecular interactions, we obtain a predictive framework that quantitatively links molecular-scale dynamics to macroscopic relaxation rates. This approach has been successfully employed to predict crystal growth in compounds relevant to pharmaceutical and electronic applications, molecular exchange times in biological membranes, and the adsorption kinetics of polymers on semiconductor surfaces, demonstrating its broad applicability across complex material systems.

BIOGRAPHY

Simone Napolitano was born in Cosenza and is currently Professor of Experimental Soft Matter Physics at the Université libre de Bruxelles (ULB), Belgium. He obtained his Master's degree in Materials Science from the University of Pisa in 2005, and completed his PhD in Polymer Physics at KU Leuven in 2007. Following early postdoctoral training, he joined ULB in 2011 as a faculty member, where he established the Laboratory of Polymer and Soft Matter Dynamics and later co-founded the Laboratory of Experimental Soft Matter and Thermal Physics (EST). His research focuses on molecular mobility in polymers and small organic molecules, with the aim of understanding how microscopic motion—spanning a wide range of length and time scales—translates into macroscopic relaxation and nonequilibrium behavior.

Through this approach, his work provides direct experimental tests of theoretical frameworks for the glass transition and the liquid state. Beyond these fundamental questions, his group also investigates how purely physical factors, such as processing history and confinement, can be harnessed to tailor material properties. This strategy offers routes to enhance performance and stability without altering chemical composition, bridging fundamental insights with practical applications in advanced materials.

RILEGGERE LA MODERNITÀ ARCHITETTONICA IN QUÉBEC. CONOSCENZA, INTERPRETAZIONE E PROGETTO TRA CONSERVAZIONE E RIUSO ADATTIVO

Fabio Sedia

Ph.D., École d'architecture, Faculté d'aménagement, d'architecture, d'art et de design, Université Laval,
Québec, Canada

ABSTRACT

Il contributo propone una rilettura critica della modernità architettonica in Québec a partire da una constatazione: l'ampliamento del campo del restauro verso la conservazione attiva, la trasformazione e il riuso adattivo del patrimonio moderno ha esteso il campo del progetto più rapidamente di quanto non si siano rinnovati gli strumenti interpretativi necessari a comprenderne l'oggetto. Ne deriva l'urgenza di ridefinire il significato stesso della modernità québécoise, non come repertorio stilistico o successione lineare di episodi, ma come costruzione complessa che investe il territorio, le infrastrutture, il progetto urbano, l'architettura, gli spazi interni e le forme dell'abitare.

In questa prospettiva, la ricerca sposta il fuoco dell'indagine da Montréal, a lungo assunta come luogo quasi esclusivo della modernità in Québec, verso la città di Québec e verso altri contesti della provincia. Tale spostamento non mira a riequilibrare una geografia storiografica incompleta, ma a sottoporre a verifica critica le categorie stesse attraverso cui quel moderno è stato definito. Emergono così temporalità differenti, mediazioni molteplici e rapporti più complessi tra modernismo europeo, americano e locale.

La ricerca procede attraverso una costruzione comparata del campo, nella quale il lavoro d'archivio, il ridisegno analitico, la lettura degli spazi interni, il confronto tra casi e la verifica progettuale operano congiuntamente. Anche le esperienze di workshop internazionale sul patrimonio moderno sono assunte non come semplici applicazioni, ma come momenti di controllo del rapporto tra conoscenza, interpretazione e trasformazione. A diverse scale, da quella territoriale e urbana fino a quella architettonica e domestica, questi strumenti consentono di rendere leggibili permanenze, discontinuità, trasferimenti e adattamenti.

Il contributo sostiene, in conclusione, che ridefinire criticamente la modernità architettonica in Québec significhi ridefinire anche il campo entro cui oggi possiamo conservarla, trasformarla e riusarla, fondando il progetto non su un'immagine ricevuta del moderno, ma su una conoscenza costruita, verificata e interpretata.

BIOGRAPHY

Fabio Sedia è architetto e professore presso l'École d'architecture dell'Université Laval, a Québec. La sua ricerca si concentra sul progetto di architettura sul patrimonio costruito, con particolare attenzione al patrimonio moderno, ai processi di conoscenza e interpretazione dell'esistente, e al rapporto tra conservazione, trasformazione e riuso adattivo. Il suo lavoro indaga le diverse scale del progetto, dal territorio e dalla città fino all'architettura e agli spazi dell'abitare, mettendo in relazione storia, rappresentazione e intervento contemporaneo.

COGNITIVE NEUROSCIENCE, NEUROETHICS, AND THE ETHICAL GOVERNANCE OF ARTIFICIAL INTELLIGENCE AND EMERGING NEUROTECHNOLOGIES

Chiara Saracini

Ph.D., Catholic University of the Maule Region, Talca, Chile



ABSTRACT

How does a conscious percept emerge from the continuous flow of ambiguous sensory information reaching our brain, and what is it made of? How does our brain infer the *meaning* of incoming information and have a subjective point of view about both the object and the process of interpreting the object? Is it possible for non-biological systems to develop a consciousness? These are the kinds of questions I am trying to answer through a scientific approach that follows many directions.

My research is primarily situated within cognitive neuroscience, focusing on the neural mechanisms underlying complex cognitive processes such as perception, decision-making, learning and the interaction between cognitive and emotional systems. Through a combination of experimental and theoretical approaches, I aim to contribute to a better understanding of how these functions emerge from the dynamic organization of neural networks by combining behavioral evidence with contemporary neurocognitive frameworks such as predictive processing. Techniques include electroencephalography (EEG) and transcranial magnetic stimulation (TMS).

Alongside this established line of research, in recent years my work has expanded to include an interdisciplinary investigation of the relationship between neuroscience, emerging digital technologies and artificial intelligence, paying particular attention to their psychological and bioethical implications. This shift reflects the growing impact of intelligent systems on human cognition and behavior, and the need to critically examine how such technologies (including neurotechnologies) influence autonomy, agency and decision-

making. A central aspect of my recent research is the analysis of the ethical and responsible use of AI, informed by neuroscientific evidence about human cognitive limitations, biases and vulnerabilities.

By integrating insights from cognitive neuroscience with ethical theory and technology studies, my work seeks to bridge empirical neuroscience and ethical-normative reflection, contributing to international debates on how intelligent technologies can be designed and governed in ways that enhance human cognitive capacities without undermining individual autonomy or ethical responsibility.

More broadly, this line of research supports a vision of sustainable, epistemologically and socially responsible scientific and technological innovation that is grounded in respect for human and environmental dignity.

BIOGRAPHY

Chiara Saracini (PhD) is an Italian assistant professor and researcher currently living and working in Chile.

She obtained her Bachelor's, Master's and PhD degrees from Sapienza University in Rome. She is currently affiliated with the Neuropsychology and Cognitive Neuroscience Research Center (CINPSI Neurocog) at the Catholic University of the Maule Region in Talca, Chile, where she specializes in cognitive psychology and neuroscience. Her research focuses on perceptual awareness, cognition, personality and theoretical approaches to cognition. She has expanded her educational training in bioethics and is now part of the Directives of the local University IrB (Research Ethics Committee). She has also contributed to discussions on the Neurorights law proposal in the Chilean Senate. She is exploring the ethics of AI, particularly the emerging relationship between humans and generative AI (genAI), from psychological (cognitive and emotional) perspectives.

FOOD, HEALTH AND DESIGN: A SYSTEMIC APPROACH TO REFRAMING AGRI-FOOD SYSTEMS IN A CHANGING WORLD

Alessandra Savina

Ph.D., Research Professor at Tecnológico de Monterrey, School of Architecture, Art and Design (EAAD)
Campus, Ciudad de México

ABSTRACT

Agri-food systems have undergone profound transformations in response to global production demands, changing consumption patterns, and increasingly complex lifestyles. However, these adaptations have often generated unintended environmental and social consequences, significantly impacting both human and planetary health. Today, food systems are deeply implicated in the rise of non-communicable diseases, while remaining largely disconnected from healthcare systems, which continue to address symptoms rather than root causes.

Despite their intrinsic interdependence, food and health are still treated as separate domains, resulting in fragmented approaches that fail to address the complexity of contemporary challenges. Within this context, design has historically played a marginal role, often confined to product, communication, or service development, without fully engaging with the systemic nature of these issues.

This paper positions systemic design as a strategic approach to bridge the gap between agri-food and healthcare systems, adopting a holistic and transdisciplinary perspective aligned with the One Health approach. Rather than focusing on isolated interventions, systemic design enables the analysis of relationships, interdependencies, and emergent properties within complex socio-ecological systems, supporting the development of more integrated and resilient solutions.

This perspective has been explored through research and design activities conducted across diverse territorial contexts, including a first project developed in 41 municipalities in the Piedmont region (Italy) during the COVID-19 period, and ongoing research in Mexico City, a markedly different socio-cultural and environmental context, where systemic design is being applied to rethink obesogenic food environments and promote healthier consumption practices, highlighting its adaptability across heterogeneous conditions.

By repositioning design as a mediator between knowledge systems and stakeholders, this work contributes to redefining its role in addressing global challenges, supporting the transition towards more sustainable, health-oriented, and territorially grounded food systems.

BIOGRAPHY

Alessandra Savina is a systemic designer and Research Professor at Tecnológico de Monterrey (Mexico City), within



SAPIENZA
UNIVERSITÀ DI ROMA

the Escuela de Arquitectura, Arte y Diseño. She holds a PhD in Management, Production and Design from Politecnico di Torino (Italy). Her research focuses on systemic approaches to agri-food systems, health, and sustainability, addressing complex socio-ecological challenges through transdisciplinary design practices developed across European and international contexts.

ENGINEERING THE FUTURE OF PRECISION MEDICINE: BIOMIMETIC NANOTECHNOLOGIES AND IMMUNE-INSTRUCTIVE REGENERATIVE BIOMATERIALS

Ennio Tasciotti

Ph.D., Director of the Human Longevity Program
IRCCS San Raffaele, Roma, Italy

ABSTRACT

Chronic inflammation, cancer progression, and neurodegenerative disorders remain leading causes of disability worldwide, largely because biological barriers, dysregulated immune responses, and impaired tissue regeneration limit the effectiveness of conventional therapies. Addressing these challenges requires integrative strategies capable of navigating complex pathophysiological environments, selectively targeting diseased tissues, and actively instructing host immune and stem cell responses. In this context, research at the interface of nanotechnology, biomaterials science, and regenerative medicine is urgently needed to design delivery systems and scaffolds that do not merely replace damaged tissues, but dynamically interact with the host to restore function.

Ennio Tasciotti has contributed to this field by pioneering biomimetic and multistage therapeutic platforms designed to overcome systemic and cellular barriers to drug delivery. His early work introduced the multistage vector concept, later expanded into leukocyte-mimetic vesicles, exosome-inspired carriers, and porous silicon nanoneedles capable of enhancing tissue homing, immune evasion, and intracellular accumulation of therapeutics in oncology and inflammatory diseases. In parallel, his laboratory has developed nano- and micro-engineered scaffolds that recapitulate key structural and biochemical features of the extracellular matrix to direct macrophage polarization toward pro-regenerative phenotypes and to recruit endogenous progenitor cells. By integrating immune-instructive materials with platelet-rich plasma-based matrices, repurposed decellularized tissues, and advanced imaging modalities such as ultrasound elastography to monitor healing dynamics, his work converges on clinically translatable strategies for musculoskeletal regeneration. A central theme across these programs is the minimization of ex vivo cell manipulation in favor of harnessing endogenous repair mechanisms, thereby accelerating regulatory translation and broadening therapeutic applicability.

BIOGRAPHY

Ennio Tasciotti received his M.S. degrees from the University of Pisa and the Scuola Normale Superiore, and a Ph.D. in Molecular Biology through the Scuola Normale/ICGEB program. He currently serves as Director of the Human Longevity Program at IRCCS San Raffaele and Full Professor in Applied Medical Sciences and Technologies at San Raffaele University. He previously held senior academic and leadership appointments at Houston Methodist Hospital,

where he founded centers dedicated to biomimetic medicine and musculoskeletal regeneration. Author of hundreds of peer-reviewed publications and inventor on multiple patents in nanomedicine and regenerative technologies, he has received sustained international recognition, including inclusion among the top 1% most influential scientists in the 2023 Stanford ranking. His career is characterized by the integration of fundamental biological insight with translational development and clinical implementation.



MEDICINE

MODERATOR

Antonella Fioravanti

Ph.D., Université Libre de Bruxelles, and Expert Evaluator for European Agencies, Belgium



Professor Antonella Fioravanti is a molecular biologist specialized in pathogenic bacteria, antimicrobial resistance, and the impact of environmental change on microbial ecosystems. Her work integrates structural microbiology and translational approaches to understand how bacteria survive and evolve, with the aim of developing next-generation therapeutic strategies against major global health threats. She is internationally recognized for her pioneering studies on *Bacillus anthracis*, demonstrating that its protein shell functions as a bacterial exoskeleton and identifying strategies to dismantle it, opening new therapeutic avenues against antibiotic-resistant infections (published in *Nature Microbiology* and *PNAS Nexus*). Her research now extends to the impact of climate change on microbial ecosystems and pathogen emergence, linking environmental transformation to human health. She leads multidisciplinary international projects and collaborates with research institutions, policy-makers, and public agencies. She is Guest Professor at the Université libre de Bruxelles, and serves as expert evaluator for the European Innovation Council, the European Research Executive Agency, and the European Health and Digital Executive Agency. She is also President of the Parsec Foundation in Italy, where she promotes research, public engagement, and science communication initiatives. Her outreach activities include science communication projects and public dissemination of microbiology, including *Viaggio nel mondo invisibile* (Aboca, 2025), aimed at bridging science, institutions, and society. She also contributes to strengthening cooperation between scientific communities, public institutions, and citizens. She was awarded the EOS Pipet Award (2020) and appointed Knight of the Order of the Star of Italy (2023) for scientific leadership, outreach, and promotion of women in STEM.

MODERATOR

Graziano Pinna

Ph.D., The Psychiatric Institute, Department of Psychiatry, UI Center on Depression and Resilience (UICDR), Center for Alcohol Research in Epigenetics (CARE), Department of Psychiatry, College of Medicine, University of Illinois, Chicago



Dr. Pinna is a full professor in the Department of Psychiatry at UIC. His research focuses on the neurobiology of stress and addiction-related neuropsychiatric disorders, with particular emphasis on conditions that affect women, including premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD), postpartum depression (PPD), posttraumatic stress disorder (PTSD), major depression, and anxiety. Using a translational framework that integrates preclinical models and clinical studies his research focus on establishing neurosteroids and endocannabinoids biomarkers—endogenous modulators that play a key role in regulating neuronal excitability and emotional behavior and influence stress responsivity and neuroimmune signaling. Dr. Pinna's work has had direct translational impact. His studies on allopregnanolone contributed to the development of brexanolone (Zulresso™) and zuranolone (Zurzuvae™), two neurosteroid-based therapies approved for postpartum depression. In addition, he has contributed to the development of biomarker strategies to predict treatment response, including clinical trials of ganaxolone (Ztalmy®) for pediatric epilepsy. He has published over 140 peer-reviewed articles, edited multiple books and special issues, holds two patents, and currently leads several major federally funded research projects, including NIH R01, VA, and Department of Defense grants.

CORSI DI SIMULAZIONE CHIRURGICA RAZIONALE

Alessandro Frigiola

Ph.D., Pediatric Cardiac Surgery Director of International Cooperation Training Center, Pres. Gruppo San Donato East Europe

ABSTRACT

2014 TIMOTHY J. EBERLEIN (PRESIDENTE SOUTHERN SURGICAL ASSOCIATION)

“Oggi voglio parlarvi di un argomento che attualmente è diventato critico e parte integrante di tutto quello che facciamo. Io credo che, come chirurghi, il nostro ruolo più importante, accanto alla cura dei pazienti, è la formazione della nuova generazione di chirurghi. Per tutti noi questo impegno rappresenta veramente la nostra eredità. Spero proprio di riuscire a convincervi che è arrivato il tempo di cambiare ed adottare un nuovo modello nella formazione dei chirurghi ed alcuni dei miei suggerimenti siano un motivo di riflessione tra voi” Questo diceva Timothy Eberlein nel 2014.

I motivi per cui è necessario cambiare modello di formazione sono i seguenti:

- 1 – I pazienti con patologie semplici, sui quali il giovane chirurgo imparava le varie tecniche, sono sempre meno frequenti in quanto vengono prevalentemente trattati e risolti con le procedure di cardiologia interventistica.
- 2 – Sono aumentati i casi complessi ed i re-interventi ed entrambi non possono essere trattati dai giovani chirurghi che quindi hanno meno possibilità di imparare.
- 3 – Un medico che affida il suo paziente al chirurgo sceglie quasi sempre il chirurgo senior che ovviamente non può affidare il caso ad un giovane meno esperto.
- 4 – C'è un netto aumento dei contenziosi medico legali dopo un intervento e di conseguenza il chirurgo senior non è disposto ad assumersi la responsabilità di eventuali complicanze dell'intervento qualora decidesse di farlo eseguire ad un giovane chirurgo.

Per tutta questa serie di motivazioni è evidente che il metodo di insegnamento utilizzato negli anni passati non è più valido perché il giovane chirurgo ha molte meno possibilità di imparare ed i tempi necessari per raggiungere un'autonomia chirurgica sono molto lunghi.

Sulla base di tali premesse risulta evidente che è necessario lavorare per avere una classe medica più preparata e per ottenere questo dobbiamo utilizzare oggi uno strumento importante che è la simulazione.

La simulazione non può più essere un'opzione, ma dovrebbe essere una parte obbligatoria nel percorso formativo dei chirurghi ed essere inserita ufficialmente come nuova materia (es. tecnica chirurgica) nel piano di studi delle specialità chirurgiche ed eventualmente nell'ultimo anno delle specialità mediche perché qualunque medico dovrebbe anche saper fare una sutura.

Nella presentazione verranno illustrati i vari metodi di simulazione.

A JOURNEY TO IMPROVE THE MANAGEMENT OF CARDIAC ARRHYTHMIAS

Andrea Natale

Ph.D., Executive Medical Director of the Texas Cardiac Arrhythmia Institute, Austin, Texas, USA, Director
Cardiovascular Diseases Residency Program, Università degli Studi di Roma Tor Vergata



ABSTRACT



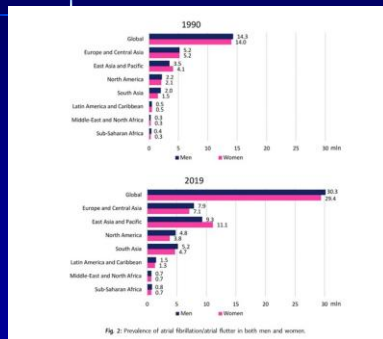
**My journey to improve ablation outcome in
arrhythmia management**

Andrea Natale, MD FACC FHRS FESC

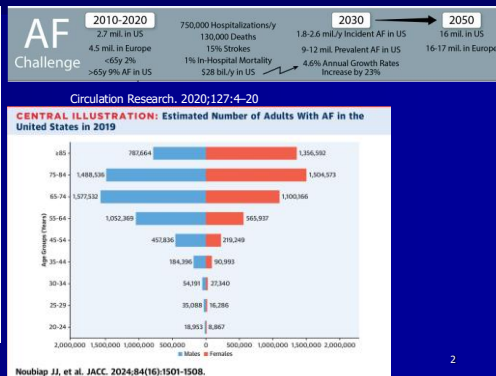
Executive Medical Director, Texas Cardiac Arrhythmia Institute, St. David's Medical Center,
Austin, TX
HCA National Medical Director, Cardiac Electrophysiology
Professor, Department of Biomedicine and Prevention, Division of Cardiology, University of Tor
Vergata, Rome, Italy
Adjunct Professor of Medicine, Case Western Reserve University, Cleveland, Ohio



Prevalence of Atrial Fibrillation:



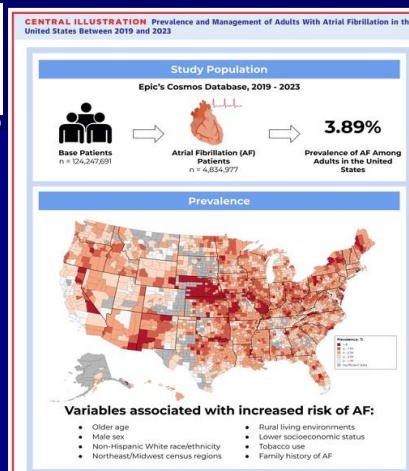
The Lancet Regional Health- Europe 2024;37: 100786



Prevalence, Management, and Comorbidities of Adults With Atrial Fibrillation in the United States, 2019 to 2023

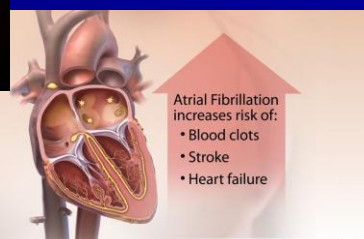
Carter G, O'Brien, BE, Taylor P, Kim, MD, James W, Lee, BA, John D, Lugo, BS, Wang, Z, Pab, M, Isom D, Mossa, MD, MBA

JACC Adv. 2024;3:101330



Why Atrial Fibrillation matters?

Cardiac Arrhythmia



AF-Related Stroke:

Global Survey of the Frequency of Atrial Fibrillation-Associated Stroke Embolic Stroke of Undetermined Source Global Registry

Kanjana S. Peters, MBBS; Thomas Vassallo, MD; Jackie Bosch, PhD; Balakumar Swaminathan, MSc; Harsh Mundil, MD; Mohana Gopinath, BSc; Miguel A. Barboza, MD; Martin J. O'Donnell, MBBS; Maria Gomez-Sanchez, MD; Graeme J. Hanley, MD; Byung-Woo Yoon, MD; Artemio Roman, Jr, MD; Philippe Lavallée, MD; Jose Sargento-Freitas, MD; Nikolay Shumakov, MD; Raf Brochez, MD; Barbara J. Gagliardi, MD; Scott E. Kanter, MD; Alessio Peroni, MD; Philipp Vermeulen, MD; Kazuo Kitagawa, MD; Yanguan Wang, MD; Keith Muir, MD; Jonathan M. Connolly, MD, PhD; Stuart J. Connolly, MD; Robert G. Hart, MD, on behalf of the ESUS Global Registry Investigators*

Background and Purpose—Atrial fibrillation (AF) is increasingly recognized as the single most important cause of disabling ischemic stroke in the elderly. We undertook an international survey to characterize the frequency of AF-associated stroke, methods of AF detection, and patient features.

Methods—Consecutive patients hospitalized for ischemic stroke in 2013 to 2014 were surveyed from 19 stroke research centers in 19 different countries. Data were analyzed by global region and World Bank income level.

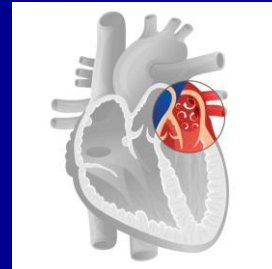
	Overall			Europe (5 Sites)			North America (2 Sites)			Latin America (3 Sites)			East Asia and Pacific (5 Sites)		
	n (%)	Men, n (%)	Mean Age, y	n (%)	Men, n (%)	Mean Age, y	n (%)	Men, n (%)	Mean Age, y	n (%)	Men, n (%)	Mean Age, y	n (%)	Men, n (%)	Mean Age, y
Ischemic stroke—all	100 (28)	205 (50)	75	208 (33)	151 (51)	77	103 (35)	49 (45)	77	67 (17)	30 (45)	67	122 (23)	65 (53)	74
Ischemic stroke with AF*	28 (28)	55 (50)	75	28 (33)	15 (51)	77	10 (35)	4 (45)	77	6 (17)	3 (45)	67	12 (23)	6 (53)	74

Stroke. 2016;47:2197-2202



Critical factors impacting ablation outcome in AF:

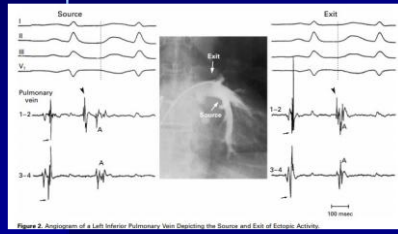
- **Ablation Targets**
 - Pulmonary Veins (PV)
 - Extra-PV triggers
- **New Tools and Technologies**



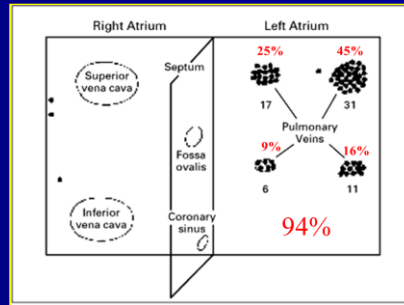
PV Isolation:

SPONTANEOUS INITIATION OF ATRIAL FIBRILLATION BY ECTOPIC BEATS ORIGINATING IN THE PULMONARY VEINS

MICHEL HAISSAGUERRE, M.D., PIERRE JAIS, M.D., DIPEN C. SHAH, M.D., ATSUSHI TAKAHASHI, M.D., MELEZE HOCINI, M.D., GILLES QUINIOL, M.D., STEPHANE GARRIGUE, M.D., ALAIN LE MOURIOUX, M.D., PHILIPPE LE METAYER, M.D., AND JACQUES CLEMENTY, M.D.



Conclusions The pulmonary veins are an important source of ectopic beats, initiating frequent paroxysms of atrial fibrillation. These foci respond to treatment with radio-frequency ablation. (N Engl J Med 1998;339:659-66.)



Catheter Ablation Approach on the Right Side Only for Paroxysmal Atrial Fibrillation Therapy:

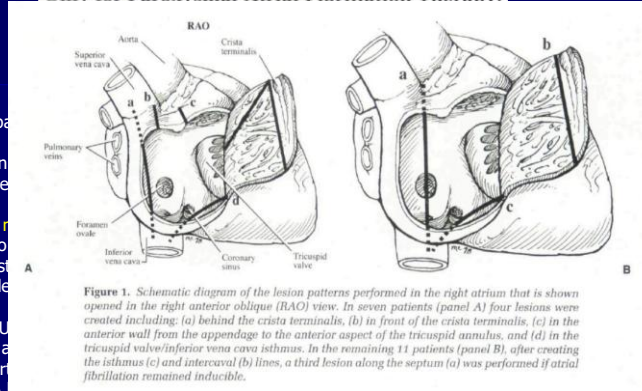
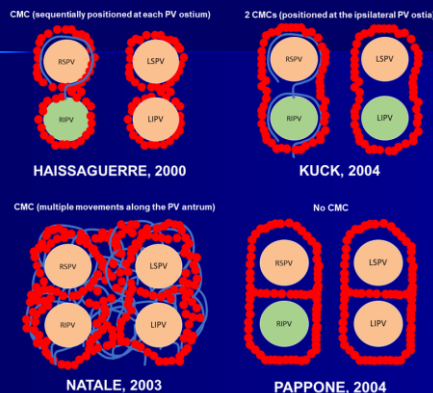


Figure 1. Schematic diagram of the lesion patterns performed in the right atrium that is shown opened in the right anterior oblique (RAO) view. In seven patients (panel A) four lesions were created including: (a) behind the crista terminalis, (b) in front of the crista terminalis, (c) in the anterior wall from the appendage to the anterior aspect of the tricuspid annulus, and (d) in the tricuspid valve/inferior vena cava isthmus. In the remaining 11 patients (panel B), after creating the isthmus (c) and interval (b) lines, a third lesion along the septum (a) was performed if atrial fibrillation remained inducible.

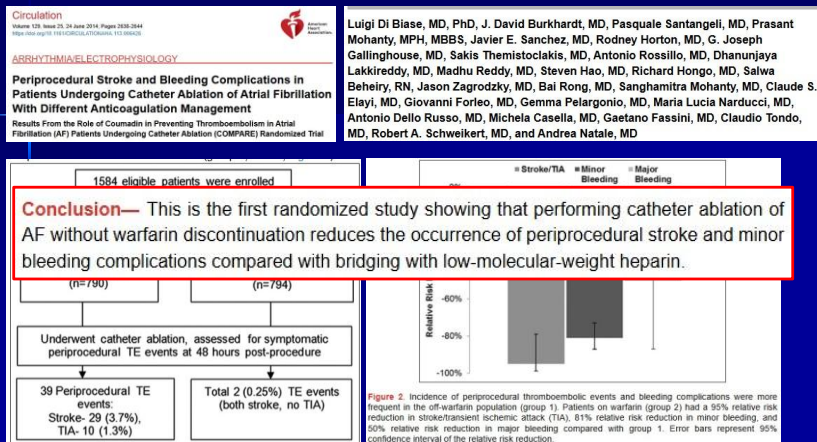
PACE 2000; 23:224-233
Preliminary results were presented in AHA 1996

Different approaches for PVI:



Uninterrupted periprocedural anticoagulation:

11



12

Beyond PVs:



13

Efficacy of Ablation Lesion Sets in Addition to Pulmonary Vein Isolation for Paroxysmal Atrial Fibrillation: Findings From the SMASH-AF Meta-Analysis Study Cohort

Andrew Cluckey MD; Alexander C. Petino, MD; Fahd N. Yunus, MD; George C. Leef, MD; Mariam Askari, BS; Paul A. Heidenreich, MD, MS; Sanjay M. Narayan, MD, PhD; Paul J. Wang, MD; Mintu P. Turakhia MD, MAS

N= 145 studies (23,263 patients)

PVI only: 16,500

PVI Plus: 6,763

Demographics: PVI Plus compared to PVI-only

-Younger patients (56.7 vs 58.8 years, $p=0.001$)

-Fewer women (27.2% vs 32%, $p=0.002$)

-Methodologically rigorous with longer FU (29.5 vs 17.1 months)

-More randomization (19.4% vs 11.8%, $p<0.001$)

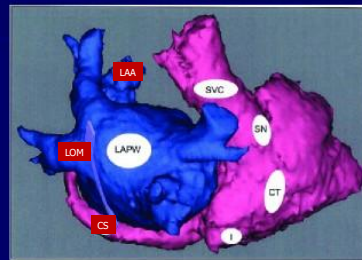
In multivariable meta-regression, PVI Plus was associated with improved success (7.6% absolute improvement (95% CI, 2.6-12.5%), $p<0.01$, $I^2: 88\%$)

Conclusions—Across the paroxysmal atrial fibrillation ablation literature, PVI plus ablation strategies were associated with incremental improvements in success rate. However, large residual heterogeneity complicates evidence synthesis. (*J Am Heart Assoc.* 2019;8:e009976. DOI: 10.1161/JAHA.118.009976.)

CFAE
Ectopic foci
Ganglionated plexi
Box lesion
Mitral line
Roof line
Coronary sinus isolation
SVC isolation, all ^{1,2}
SVC isolation, triggered ^{1,3}

Common sites of origin of extra-PV triggers:

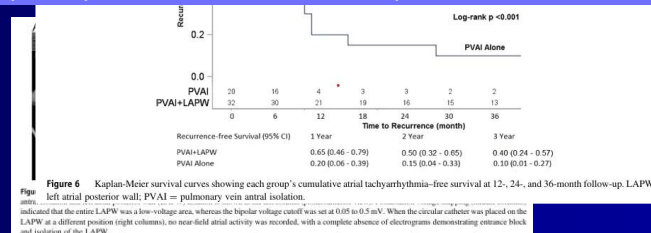
- Left atrial posterior wall
- Coronary sinus
- Left atrial appendage
- Superior vena cava
- Inter-atrial septum
- Crista terminalis
- Mitral valve annulus



Ching CK, Patel D and Natale A. *J Arrhythmia* 2007; 23: 85–101

Proven isolation of the pulmonary vein antrum with or without left atrial posterior wall isolation in patients with persistent atrial fibrillation

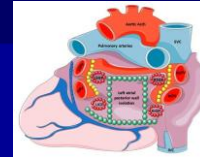
CONCLUSION: Proven isolation of the LAPW provides additional benefits over PVAI alone in the treatment of persistent AF and improves procedural outcome at follow-up.



(Heart Rhythm 2016;13:132–140)

The efficacy of posterior wall isolation in atrial fibrillation ablation: A systematic review and meta-analysis of randomized controlled trials

- **8 RCTs from 2009-2020**
N=1024 patients
- Pooled analysis showed a significant decrease in AF recurrence in PWI compared to controlled approaches
RR: 0.88, 95% CI: 0.81-0.96, p=0.004
- Subgroup analysis: PWI significantly decreased AF recurrence in persistent AF patients
RR: 0.89, 95% CI: 0.80-0.98, p=0.014
- PWI significantly decreased AF recurrence when compared to PVI with roof line
RR: 0.84, 95% CI: 0.74-0.95, p=0.008



CONCLUSION: Adding PWI significantly decreased AF recurrence in patients with persistent AF

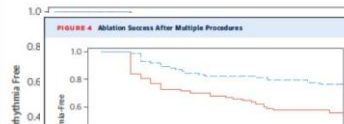
Journal of Arrhythmia 2022;38:275-286

17

Left Atrial Appendage Isolation in Patients With Longstanding Persistent AF Undergoing Catheter Ablation

BELIEF Trial

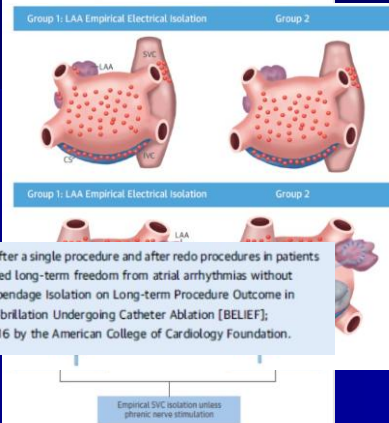
FIGURE 3 Cumulative Freedom From Recurrence Off AADs After First Procedure



CONCLUSIONS This randomized study showed that both after a single procedure and after redo procedures in patients with LSPAF, empirical electrical isolation of the LAA improved long-term freedom from atrial arrhythmias without increasing complications. (Effect of Empirical Left Atrial Appendage Isolation on Long-term Procedure Outcome in Patients With Persistent or Longstanding Persistent Atrial Fibrillation Undergoing Catheter Ablation [BELIEF]; NCT01362738) (J Am Coll Cardiol 2016;68:1929-40) © 2016 by the American College of Cardiology Foundation.

At 12-month recurrence standard AADs =

FIGURE 2 Ablation Procedure Steps



(J Am Coll Cardiol 2016;68:1929-40)

Natural History of Arrhythmia After Successful Isolation of Pulmonary Veins, Left Atrial Posterior Wall, and Superior Vena Cava in Patients With Paroxysmal Atrial Fibrillation: A Multi-Center Experience

Singaraman Mohan, MD, MSc, Christian Tzou, MD, MPH, Pamela Horton, MD, Domenico G. Della Rocca, MD, Carlos G. Diaz, MD, PhD, Bryan McDonald, MD, Angel M. Alvarado, MD, Javier Sanchez, MD, Sc, Joseph G. Kottmann, MD, Aron R. Kessel, MD, Charles D. Tzou, MD, David B. Berkman, MD, Antonio Della Rocca, MD, Michele Cavalli, MD, Claudio Tzou, MD, Saba Therasakul, MD, Giovanni Forini, MD, Luigi Di Biase, MD, PhD, Andrew Natale, MD

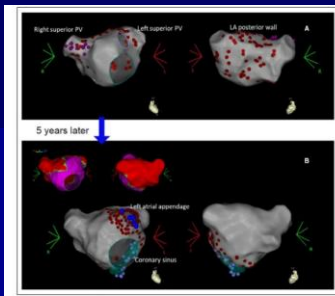
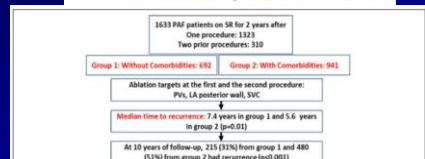


Figure 1. Representative images showing lesion sets during the index and repeat procedures. A, Index procedure included isolation of pulmonary veins (PVs), left atrial posterior wall (LAPW), and superior vena cava (SVC). B, The same patient underwent repeat procedure after 5 years, during which ablation was extended anteriorly and inferiorly to left atrial appendage and coronary sinus. The red areas in the voltage map show electrically isolated PVs and LAPW from the index ablation.

What Is New?

- Despite permanent pulmonary vein isolation, patients with paroxysmal atrial fibrillation experienced very late recurrences that were mainly driven by non-pulmonary vein triggers, especially from the left atrial appendage and coronary sinus.
- The median time to recurrence was significantly shorter in patients with cardiovascular comorbidities.

Median time to recurrence was 7.4 (IQR 4.3-8.5) and 5.6 (IQR 3.8-8.3) years in group 1 and 2 respectively (P=0.01).

- Repeat procedure was performed in 201/215 (gr. 1) and 456/480 (gr. 2)
- Re-isolation of PVs: 4 (2%) group 1 and 5 (1.3%) group 2
- No PV reconnection in patients with two prior procedures
- No SVC reconnection in 642 (97.7%)
- Reconnection of LAPW: 46 (7%)
- LAA & CS isolation with detectable triggers: 106 (52.7%) and 378 (82.9%) in group 1 and 2 respectively

(J Am Heart Assoc. 2021;10:e020568)

Ventricular Arrhythmia:

WE
GOT
THIS

21

Endo-Epicardial Homogenization of the Scar Versus Limited Substrate Ablation for the Treatment of Patients With Ventricular Arrhythmia



Conclusions

Our study demonstrates that ablation using endo-epicardial homogenization of the scar significantly increases freedom from VTs in patients with ischemic cardiomyopathy and electrical storm. Further randomized trials are warranted to confirm the clinical relevance of our study.

performed in 3

During a mean 47% (23 of 49, 0.006)

Figure 4 Ventricular Arrhythmia/ICD Therapy-Free Survival by the Ablation Approach

The Kaplan-Meier curve shows a statistically significant difference between Group 1 (standard ablation approach) and Group 2 (endo-epicardial homogenization approach) at 25 ± 10 months follow-up. ICD = implantable cardioverter-defibrillator.

(J Am Coll Cardiol 2012;60:132-41)

23

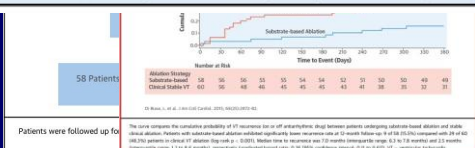
Ablation of Stable VTs Versus Substrate Ablation: The VISTA Study

Luigi Di Biase
Sergio Santoro
Pasquale Santoro
Javier Sanchez
Gemma Pappalardo
Antonio Rossi
Claudio Tondo



TABLE 2 Summary of Outcomes by Study Groups

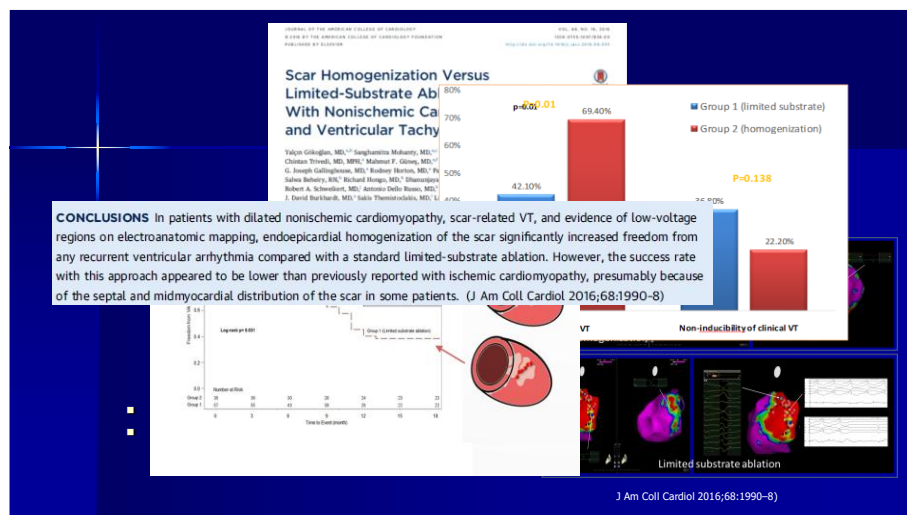
CONCLUSIONS An extensive substrate-based ablation approach is superior to ablation targeting only clinical and stable VTs in patients with ischemic cardiomyopathy presenting with tolerated VT. (Ablation of Clinical Ventricular Tachycardia Versus Addition of Substrate Ablation on the Long Term Success Rate of VT Ablation (VISTA); NCT01045668) (J Am Coll Cardiol 2015;66:2872-82) © 2015 by the American College of Cardiology Foundation.



Patients were followed up for

myocardia.

(JAmColl Cardiol 2015;66:2872-82)



Ventricular Fibrillation: Ablation of a Trigger?

WALID SALIBA, M.D., AHMAD ABDUL KARIM, M.D., PATRICK TCHOU, M.D.,
and ANDREA NATALE, M.D.

Conclusion

Suppression of VF arising from focal triggers in patients with frequent ventricular ectopy and normal heart can be achieved with catheter ablation. Further studies and longer follow-up are needed to evaluate the long-term curative effect and prevalence of such a mechanism.

Figure
prema-
ring da
morphe
N = n
contrac

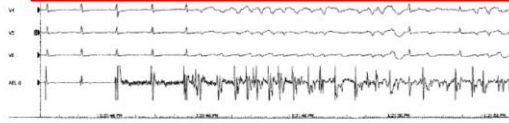


Figure 4. Increased frequency and acceleration of the ventricular ectopy that occurred during radiofrequency application. Note the polymorphic pattern obtained with the acceleration. Ventricular ectopy subsided during ablation.

Mode of Initiation and Ablation of Ventricular Fibrillation Storms in Patients With Ischemic Cor

Nasser F. Marrouche,
David O. Martin, M.D.,
J. David Burkhardt, D.
Jens Guenther, M.D.,
Sakis Themistoclakis.

29 patients with ischemic
VF storm were included

28/29 had ICDs

CONCLUSIONS Ventricular fibrillation in ICM is triggered by monomorphic PVCs originating from the scar border zone with preceding PLPs; targeting these PVCs may prevent VF recurrence. In the absence of PVCs, both substrate mapping and ablation appear to be equally effective. (J Am Coll Cardiol 2004;43:1715-20) © 2004 by the American College of Cardiology Foundation

8/29 received ablation
5/8 had frequent
3/8 had no PVCs

During FU (10±6 months)
recurrence

Successful
ablation site

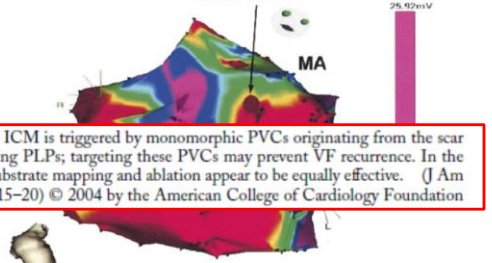


Figure 2. Three-dimensional voltage CARTO (Biosense-Webster Inc.) map of the left ventricle in a patient who underwent ablation for ventricular fibrillation storm and also had a left ventricular assist device (LVAD). Red regions on the map represent scar, whereas green and blue regions represent abnormal tissue in the scar border zone. Purple indicates normal voltage >1.5 mV. The red circle indicates the site where premature ventricular contractions preceded by high frequency Purkinje-like potentials were mapped and successfully ablated. The ablation site is located along the edge of the scar region in the border zone. MA = mitral annulus.

CENTRAL ILLUSTRATION Fascicular Substrate Modification as a Strategy for VF Ablation

JACC: CLINI
© 2024 BY T
PUBLISHED

Patients With Ventricular
Arrhythmia Undergoing Ablation
n = 2,212



VOL. 10, NO. 6

Catheter ablation of human VF and PMVT with distal fascicular substrate modification is feasible and safe and appears highly effective, with high rates of acute VF noninducibility and long-term freedom from recurrent VF.

Weeranun
Carola Gia
G. Joseph
Fengwei Z

No Recurrence
n = 16

Recurrence
n = 2



Torlapati, MD,^b
d Bassiouny, MD,^b
ang, MD,^c
ID^b

Bode WD, et al. JACC Clin Electrophysiol. 2024;10(6):1781-1790.

30

Pulsed-Field Ablation:

Dual-energy lattice-tip ablation system

Table 3 | Primary safety endpoint summary

Primary safety event	Investigational (n=202)	Control (n=208)
Patients with any primary safety event, n (%)	3 (1.4%)	2 (1.0%)
Within 7d		
Death	0	0
Myocardial infarction	0	0
Phrenic nerve paralysis	0	0
Transient ischemic attack	0	0
Stroke/cerebrovascular accident	0	0
Thromboembolism	0	0
Major vascular access complications/bleeding	0	0
Heart block	0	0

Elad Anter^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124,125,126,127,128,129,130,131,132,133,134,135,136,137,138,139,140,141,142,143,144,145,146,147,148,149,150,151,152,153,154,155,156,157,158,159,160,161,162,163,164,165,166,167,168,169,170,171,172,173,174,175,176,177,178,179,180,181,182,183,184,185,186,187,188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224,225,226,227,228,229,230,231,232,233,234,235,236,237,238,239,240,241,242,243,244,245,246,247,248,249,250,251,252,253,254,255,256,257,258,259,260,261,262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,297,298,299,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,319,320,321,322,323,324,325,326,327,328,329,330,331,332,333,334,335,336,337,338,339,340,341,342,343,344,345,346,347,348,349,350,351,352,353,354,355,356,357,358,359,360,361,362,363,364,365,366,367,368,369,370,371,372,373,374,375,376,377,378,379,380,381,382,383,384,385,386,387,388,389,390,391,392,393,394,395,396,397,398,399,400,401,402,403,404,405,406,407,408,409,410,411,412,413,414,415,416,417,418,419,420,421,422,423,424,425,426,427,428,429,430,431,432,433,434,435,436,437,438,439,440,441,442,443,444,445,446,447,448,449,450,451,452,453,454,455,456,457,458,459,460,461,462,463,464,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560,561,562,563,564,565,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,582,583,584,585,586,587,588,589,590,591,592,593,594,595,596,597,598,599,600,601,602,603,604,605,606,607,608,609,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,651,652,653,654,655,656,657,658,659,660,661,662,663,664,665,666,667,668,669,670,671,672,673,674,675,676,677,678,679,680,681,682,683,684,685,686,687,688,689,690,691,692,693,694,695,696,697,698,699,700,701,702,703,704,705,706,707,708,709,710,711,712,713,714,715,716,717,718,719,720,721,722,723,724,725,726,727,728,729,730,731,732,733,734,735,736,737,738,739,740,741,742,743,744,745,746,747,748,749,750,751,752,753,754,755,756,757,758,759,760,761,762,763,764,765,766,767,768,769,770,771,772,773,774,775,776,777,778,779,780,781,782,783,784,785,786,787,788,789,790,791,792,793,794,795,796,797,798,799,800,801,802,803,804,805,806,807,808,809,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,850,851,852,853,854,855,856,857,858,859,860,861,862,863,864,865,866,867,868,869,870,871,872,873,874,875,876,877,878,879,880,881,882,883,884,885,886,887,888,889,890,891,892,893,894,895,896,897,898,899,900,901,902,903,904,905,906,907,908,909,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926,927,928,929,930,931,932,933,934,935,936,937,938,939,940,941,942,943,944,945,946,947,948,949,950,951,952,953,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,973,974,975,976,977,978,979,980,981,982,983,984,985,986,987,988,989,990,991,992,993,994,995,996,997,998,999,1000}

SPHERE Per-AF (investigational)

N=432 (Investigational)

Primary safety

In 3 and 2

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

Primary safety

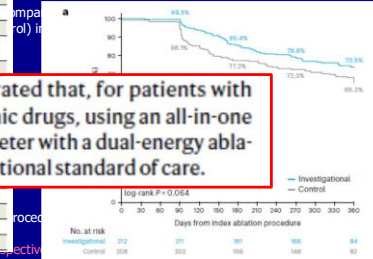
Primary safety

Primary safety

Primary safety

Primary safety

The SPHERE Per-AF trial demonstrated that, for patients with persistent AF resistant to anti-arrhythmic drugs, using an all-in-one high-density mapping and ablation catheter with a dual-energy ablation system is non-inferior to the conventional standard of care.



LONG-TERM SAFETY AND EFFECTIVENESS AFTER PAROXYSMAL ATRIAL FIBRILLATION PULSED FIELD ABLATION FROM THE U.S. MULTICENTER ADMIRE STUDY

Vivek Y. Reddy; Hugh Calkins; Moussa Mansour; Oussama M. Wazni; Luigi Di Biase; Marwan M. Bahu; David W. Newton; Christopher F. Liu; William H. Sauer; Sandeep Goyal; Vivek Iyer; Devi G. Nair; Charles A. Athill; Ayman A. Hussein; S. Patrick Whalen; Daniel P. Melby and Andrea Natale

PFA catheter (Varipulse) with a compatible EAM system (Carto, Biosense Webster) was used for catheter ablation in patients with paroxysmal AF (N=277; 33 centers)

Primary safety endpoints: AEs within 7 days of ablation

Primary efficacy endpoints:

12-mo freedom from AF/AT/AFL post 3-mo blanking period

Failure to

Use of a

Repeat pr

new or pr

DCCV pos

Acute first-pass PVI was successful in 100%

AE rate was 2.9% (8/275) of which 3 were cardiac tamponade

12-mo primary efficacy rate: 74.6%

Freedom from any arrhythmia: 76.2%

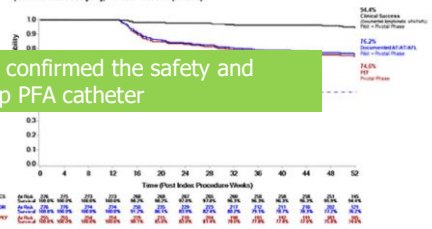
Clinical success rate: 94.4%

Freedom from repeat ablation at 12-mo: 90.6%

12-mo single-procedure success rate: 86.1%

Conclusion: AdmIRE study confirmed the safety and efficacy of the variable loop PFA catheter

Figure 1. Kaplan-Meier Curve of 12-Month Freedom from Primary Effectiveness Failure (PEF) – Pivotal (N=255); 12-Month Freedom from Documented AF/AT/AFL Recurrence (DR) – Pilot + Pivotal (N=276); 12-Month Freedom from Documented Symptomatic AF/AT/AFL Recurrence (Clinical Success [CS]) – Pilot + Pivotal (N=276)



LB trial: HRS 2024

Pulsed Field or Conventional Thermal Ablation for Paroxysmal Atrial Fibrillation

Vivek Y. Reddy, M.D., Edward P. Gerstenfeld, M.D., Andrea Natale, M.D.,
William Whang, M.D., Frank A. Cuoco, M.D., Chinmay Patel, M.D.,
Stavros E. Mountantonakis, M.D., Douglas N. Gibson, M.D.,
John D. Harding, M.D., Christopher R. Ellis, M.D., Kenneth A. Ellenbogen, M.D.,
David B. DeLurgio, M.D., Jose Osorio, M.D., Anitha B. Achyutha, M.Tech., M.S.E.,
Christopher W. Schneider, M.Eng., Andrew S. Mugglin, Ph.D.,
Elizabeth M. Albrecht, Ph.D., Kenneth M. Stein, M.D.,
John W. Lehmann, M.D., M.P.H., and Moussa Mansour, M.D.,
for the ADVENT Investigators*

N Engl J Med 2023;389:1660-1671

Table 1. Primary, Secondary, and Other

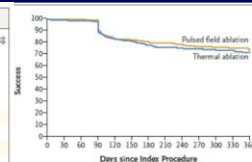
End Point
Primary and secondary efficacy end point
Treatment success — no. (%)
Reason for treatment failure — no. (%)
Initial procedure of failure within 30 days
Recurrent atrial arrhythmia during blanking period
Cardioversion after the 3-month blanking period
Use of class I or III antiarrhythmic drugs at any time
Repeat ablation at any time
Other prepecified efficacy end points
Treatment success allowing repeat ablation
Treatment success allowing the use of class I or III antiarrhythmic drugs
Change from baseline to 1 or in the blanking period
Change from baseline to 1 or in the blanking period
Primary safety end point: death or stroke — no. (%)
Secondary safety end point: change in the blanking period
Mean absolute difference (95% CI) —
Mean relative difference (95% CI) —
95% CI for MMR of treatment — no. (%)
Data as adjudicated by the centers
Data as adjudicated by the core lab

Table 3. Serious and Nonserious Adverse Events.*

Event	Serious Adverse Events†		Serious or Nonserious Adverse Events‡	
	Pulsed Field Ablation (N=305)	Thermal Ablation (N=302)	Pulsed Field Ablation (N=305)	Thermal Ablation (N=302)
	number of patients (percent)			
Any event	6 (2.0)	4 (1.3)	7 (2.3)	6 (2.0)
Death	1 (0.3)	0	1 (0.3)	0
Myocardial infarction	0	0	0	0
Persistent phrenic nerve palsy	0	0	0	2 (0.7)
Stroke	0	1 (0.3)	0	1 (0.3)
TIA	1 (0.3)	0	1 (0.3)	0
Systemic thromboembolism	0	0	0	0
Cardiac tamponade or perforation	2 (0.7)	0	2 (0.7)	0
Pericarditis	1 (0.3)	0	2 (0.7)	0
Pulmonary edema	1 (0.3)	1 (0.3)	1 (0.3)	1 (0.3)
Major adverse cardiovascular events	1 (0.3)	1 (0.3)	1 (0.3)	1 (0.3)

CONCLUSIONS

Among patients with paroxysmal atrial fibrillation receiving a catheter-based therapy, pulsed field ablation was noninferior to conventional thermal ablation with respect to freedom from a composite of initial procedural failure, documented atrial tachyarrhythmia after a 3-month blanking period, antiarrhythmic drug use, cardioversion, or repeat ablation and with respect to device- and procedure-related serious adverse events at 1 year. (Funded by Farapulse–Boston Scientific; ADVENT ClinicalTrials.gov number, NCT04612244.)



ablation	301	298	298	298	176
ation	296	292	228	219	150
Success (%)					
ablation	99.3	99.0	98.7	96.4	91.1
ation	98.7	98.3	97.3	94.4	88.4

Efficacy Outcomes of Pulsed Field Ablation as Compared with Thermal Ablation.

from a composite of initial procedural failure, documented atrial tachyarrhythmia (atrial tachycardia or atrial fibrillation) lasting 30 seconds or more, use of class I or III antiarrhythmic drugs, the use of amiodarone, the use of two or more antiarrhythmic drugs, and those who underwent repeat ablation.



KEEP
GOING

BIOGRAPHY

Dr. Andrea Natale is the Executive Medical Director of the Texas Cardiac Arrhythmia Institute (TCAI) at St. David's Medical Center in Austin, Texas, and serves as the EP National Medical Director for HCA. He is also Full Professor and Chief of the Cardiology Residency Program at the University of Tor Vergata in Rome, Italy. A globally recognized leader in cardiac electrophysiology, Dr. Natale is an undisputed pioneer in this ever evolving field.

A prolific author and international lecturer, Dr. Natale has contributed hundreds of publications to the fields of pacing and electrophysiology and has spoken at more than 900 conferences worldwide. He previously served as Editor in Chief of JICE and currently holds leadership roles as Chief Editor of JAFIB, Deputy Editor of Europace, and President of Venice Arrhythmia. He also directs several premier educational programs, and created the EPLive global series held in Austin, Latin America, Europe, Middle East, and India.

Before joining TCAI, Dr. Natale served at the Cleveland Clinic as Section Head of Cardiac Pacing and Electrophysiology and Medical Director of the Center of Excellence for Atrial Fibrillation, where he was bestowed upon twice the Innovator Award for Innovation by the Cleveland Clinic Bakken Heart-Brain Institute.

Dr. Natale's groundbreaking work includes developing a circumferential ultrasound veinablation system for AF and performing this procedure on the world's first five patients. He also introduced some of today's most widely adopted catheterbased treatments for AF and was the first electrophysiologist in the nation to perform percutaneous epicardial radiofrequency ablation for patients who had not responded to conventional therapies.

A dedicated innovator and researcher, Dr. Natale continues to advance the treatment of atrial fibrillation through emerging technologies, including robotics and highly specialized ablation systems—all with the goal of restoring patients to lives free of arrhythmia.

REDEFINING NEURODEGENERATIVE DISEASES: FROM SYSTEMIC BIOLOGY TO TRANSFORMATIVE THERAPEUTICS

Valeria Ricotti

CEO & Co-Founder Vesalic Limited, London, United Kingdom

Clinical Lecturer: University College London (UCL)

ABSTRACT

The lack of early detection methods and disease-modifying therapies for neurodegenerative diseases (NDDs) remains a major barrier to extending both healthspan and longevity. A longstanding focus on these conditions as disorders confined to the central nervous system may, in part, explain the limited progress achieved to date.

Recent findings from Vesalic's work in Amyotrophic Lateral Sclerosis (ALS) support a paradigm shift: systemic metabolic dysfunction may drive the generation of toxic extracellular vesicle cargo that circulates in the bloodstream and contributes to neuronal injury.

This model suggests that ALS, and potentially other neurodegenerative diseases such as Alzheimer's and Parkinson's, may share common systemic drivers rather than being purely brain-centric conditions.

Within this framework, targeting circulating pathogenic factors offers a novel route towards disease-modifying therapies. In parallel, the development of blood-based biomarker platforms may enable earlier and more accurate diagnosis.

Together, these approaches aim to reshape both the scientific understanding and clinical management of neurodegeneration, positioning these diseases within a broader context of systemic ageing and longevity biology.

Website: <https://vesalic.com>

BIOGRAPHY

Dr Valeria Ricotti is a clinical scientist and biotech entrepreneur based in London. She is the Founder and CEO of Vesalic, a company developing innovative diagnostic and therapeutic approaches for neurodegenerative diseases, and collaborates with leading academic institutions including University College London (UCL) and Imperial College London (ICL).

She trained in paediatric neurology and has worked across clinical medicine, research, and biotechnology. In addition to Vesalic, she has co-founded two other biotechnology companies, DinAQOR and Parterra. She is co-inventor of several patents and her work focuses on translating scientific discoveries into meaningful clinical impact for patients, including the application of artificial intelligence and machine learning in healthcare.

In recognition of her contributions to science and innovation, she was awarded by the Italian Senate as part of the initiative *"Italiane eccellenti: il Senato celebra il talento femminile"*.



SAPIENZA
UNIVERSITÀ DI ROMA

Alongside her scientific career, she is also the founder of an editorial platform and the author of her debut novel, *Il ponte vermiglio*, reflecting a broader interest in the intersection between science and spirituality.

LinkedIn: <https://www.linkedin.com/in/valeria-ricotti-a0195436/>

Website: <https://valeriaricotti.com/en/homepage/>

40 YEARS OF GLOBAL IMPACT THE RICORDI CHAMBER AND AUTOMATED METHOD FOR HUMAN ISLET LOCATION AND TRANSPLANTATION

Camilo Ricordi

Ph.D., Director Emeritus of the Cell Transplant Center and Diabetes Research Institute, University of Miami



ABSTRACT

The Ricordi Chamber and Automated method for Human Islet isolation and Transplantation

On the occasion of the 40th Anniversary of the Invention (1985–2025)

1964–1985 | **The Challenge.** The first report of islet isolation was by micro-dissecting them one by one (C. Hellerstrom, 1964). During the following two decades (1964–1984), before the Automated Method for Islet Isolation and its core element, the Ricordi Chamber were developed, isolating insulin-producing islet cells from a donor pancreas was extremely difficult. Methods were quite traumatic to the islets, including blenders, sieves, meat grinders, passage through needles of decreasing sizes, chopping the pancreas with scissors, resulting in low yield of damaged islets that would make it difficult to use them for clinical transplantation.

1985 | **After Medical School** at the University of Milan, Dr. Camillo Ricordi, studied at length all existing methods for islet isolation and thought it could be possible to improve outcomes by developing a novel method. The concept of the invention included distending the donor pancreas through the exocrine ductal tree (not connected to the islets) with an enzyme solution to progressively and gently disassemble of the organ, within a digestion chamber in a full immersion process where a solution continuously passed through the chamber, progressively freeing the islets that would flow out of the chamber to be saved from further enzymatic digestion by cooling and dilution. The islets would then be purified in a subsequent step making it possible to use them for diabetes research and transplant applications. However, the University of Milan did not have the resources required for product development. Ricordi did not give up and moved to Washington University in St. Louis, to work with islet transplant pioneer Dr. Paul E. Lacy. Initially, the Washington University team did not believe that it could be possible to load a human pancreas in a chamber, to

obtain large numbers of intact islets at the outlet, and Ricordi's invention was put on hold for over one year, while he worked on pre-clinical model systems.

1986 | **The First Opportunity** to test his invention on a human pancreas. One Friday evening a poor-quality donor human pancreas arrived in Dr. Lacy's lab and was determined to be unsuitable for islet isolation. The organ was discarded and Ricordi patiently waited for everyone to leave, to then retrieve the organ and tested his method overnight. The breakthrough results became evident the subsequent morning, when Dr. Lacy was called by Ricordi to the lab, to see the results of the secret night work. Visibly excited, Dr. Lacy started calling collaborators from different departments to see the isolated human islets at the microscope.

1987–1988 | **The Patent and First Publication of the Ricordi Chamber and Automated Method for Human Islet Isolation.** A patent application was filed on June 1987 and the first paper was published in the journal *Diabetes* in 1988, introducing the revolutionary continuous processing system that minimized tissue damage, dramatically improving the number and quality of the islets that could be obtained from a human pancreas. The invention became known as the Ricordi Chamber, later recognized as the gold standard in islet isolation and adopted worldwide.

1989-90| **Unprecedented Results** in human islet isolation outcomes were obtained with the Automated Method, allowing to consider its use in the first human clinical transplant trials. Research groups in North America, Europe, Asia, and Australia began using the Ricordi Chamber, while Ricordi returned to Milan to transfer the technology back and start a clinical proof of concept trial. However, the leadership of his hospital was afraid of possible failures and preferred to wait for U.S. centers to take the lead in the initial clinical testing. It was transplant legend Dr. Thomas E. Starzl who gave Ricordi the unprecedented opportunity to perform the first successful islet allotransplants of pancreatic islets at the University of Pittsburgh, recruiting him in consultation with Prof. Carl Gustav Groth, Chair of the Nobel Assembly in Stockholm, with a 6-month contract on December 1989.

1990 | **First Successful Series of Human Islet Allografts.** The first successful series of islet transplants was performed at the University of Pittsburgh Transplant Institute, representing an international collaboration between San Raffaele Institute in Milan (C. Ricordi), the University of Pittsburgh (A. Tzakis, P. Carroll, Y. Zeng, J. Fung, S. Todo, A. Demetris, T. Starzl), and the University of Miami Diabetes Research Institute (R. Alejandro, D. Mintz). On January 10, 1990, the Ricordi Chamber and islet isolation method were used to obtain purified human islets that were infused into the liver of a 15-year-old girl, engineering the liver to become a double organ: an hepato-pancreas. This first patient and several others who were transplanted in this initial series resulted in prolonged insulin independence following intrahepatic human islet infusion. The results were published on August 18, 1990, in the prestigious journal *The Lancet*.

1993 | **Ricordi is recruited to the University of Miami, Diabetes Research Institute** by Dr. Daniel Mintz and the DRIF, to lead the Cell Transplant Center, and subsequently the entire institute for three decades. The Ricordi Chamber enabled the Diabetes Research Institute at the University of Miami and collaborative centers worldwide to refine protocols and improve patient outcomes, helping to build the scientific foundation for modern islet transplantation. Ricordi launched the Diabetes Research Institute Federation promoting open access to the technology and international collaborations of cure-focused research. The Human Islet Distribution Program was started together with the Human Islet Isolation and Transplantation Workshop series.

2000 | **The Edmonton Protocol.** The Edmonton team, like many others worldwide, was trained in islet isolation by Dr. Ricordi, who renounced to the commercial rights of his islet isolation and transplantation inventions. Ricordi's decision was inspired by Banting, Collip and Best, who were awarded the US patents for insulin and the method used to make it on January 23, 1923, and then sold these patent rights to the University of Toronto for \$1 each. Banting famous quote: "Insulin does not belong to me, it belongs to the world" inspired Ricordi to follow their example, convinced that everyone who needed to use his inventions to produce and transplant islets, should have been able to access them, to work collaboratively on the path of a cure for diabetes. The Edmonton team led by Dr. James Shapiro obtained unprecedented results in subjects with Type 1 Diabetes consistently achieving insulin independence with an improved transplant immunosuppression protocol and infusions from as many organ donors as needed to achieve insulin independence (using islets obtained from up to 4 donor pancreases). This created global excitement and renewed optimism for the potential of curing type 1 diabetes.

2000-2025 | **Expansion to Islet Transplant Trials and Human Islet Distribution for research applications.** Edmonton protocol results were replicated in a multicenter trial led by Shapiro, Hering and Ricordi, with variable results among centers (100-0% success rate) underlying the importance of extensive training and the development of pre-transplant quality controls and potency tests, to minimize the risk of primary non function of the transplanted islets. In 2016 the first FDA Phase III trials sponsored by the NIH were completed and in 2017 the first successful islet transplants in an extra-hepatic site were performed at the DRI, by bioengineering of an intra-abdominal endocrine pancreas (omentum transplant). In 2021, the DRI published 20-year patient survival after islet transplantation in type 1 diabetes demonstrating superiority compared to historical controls in the same age range who were treated with exogenous insulin alone. The Ricordi Chamber continues to be used towards the next quantum leaps in islet transplantation, from the clinical trial using anti-CD40L (Eledon) to replace toxic immunosuppressive drugs (University of Chicago and University of Miami DRI), and bioengineered local immunosuppression devices (NICHE, Continuity Biosciences) and tolerance inducing strategies like the FasL microgels co-transplanted with islets (iTolerance), and gene editing to generate hypoimmune "stealth" islets that could evade the recipient immune system preventing rejection and autoimmune recurrence (Evade), towards complete elimination of chronic recipient immunosuppression.

2025-26 | **40 Years of Global Impact**

The Ricordi Chamber has been used in more than 50 countries and stands as one of the most influential inventions in the history of diabetes research. Ricordi's contributions to cure-focused research have changed scientific understanding, inspired generations of researchers, and brought the world closer to a cure. Over four decades, the Ricordi Chamber enabled distribution of thousands of islet preparations, accelerating the development of new treatment strategies, and shaping the entire field of cellular therapy for diabetes. It remains today the universal gold standard for islet product manufacturing, for both research and clinical applications. As advances in local immunomodulation, immune tolerance, and immunoisolating devices (scaffolds, conformal coating, micro and macro-encapsulation) accelerate, the Ricordi Chamber continues to serve as the foundational technology enabling these breakthroughs, until hopefully one day stem cell-derived islets may provide better scalable sources of insulin producing cells for transplant applications, allowing the Ricordi Chamber to "retire".

Concluding Remarks and Acknowledgments

Throughout my 40 years of academic work, I have consistently remained faithful to the core pillars of my thinking and strategic vision - principles that have guided my efforts along the path toward cures and disease prevention:

1. The recognition of individual achievements, always within the context of teamwork. Team science has been - and will continue to be - central to our efforts and to our likelihood of success.
2. The determination to never stop at third base, to celebrate past achievements or research progress, but instead maintain focus, determination, and momentum toward the ultimate goal: the home run - a cure.
3. A relentless commitment to freely share my inventions worldwide, training anyone willing to join the fight on the path to a cure.

In fact, when I was inducted into the National Academy of Inventors in 2018, I was asked what I considered my greatest achievement as an inventor. I replied that my greatest achievement was not any single invention, but rather making my inventions available to the world while training anyone willing to join our cure-focused mission. This philosophy was humbly inspired by the historic decision to release the rights to the insulin patent for the nominal sum of one dollar, and by Banting's enduring words: *"Insulin belongs to the world, not to us."*

I would also like to acknowledge the hundreds of key collaborators who have made my discoveries and the progress of our research possible. I have had the honor and privilege of working alongside extraordinary collaborators and supporters, without whom none of what I have described would have been achievable including the continuous evolution and refinement of methods for pancreatic islet isolation and purification. My sincere thanks go to all of them, to the co-authors of our more than 1,200 scientific publications, and to the foundations, federal agencies, private investors, and companies whose support made this progress possible.

A special thanks go to:

1. Ramon Poo and Felipe Echeverry (Biorep Technologies), my close collaborators in the engineering, production and distribution of the Ricordi Chamber and other key equipment used worldwide in islet isolation, diabetes research and clinical application.
2. Breakthrough T1D (formerly JD RF), for contributing to fund my research efforts continuously, since 1985.
3. The Diabetes Research Institute Foundation (DRIF), for supporting our shared mission, as I am entering my 33rd year of tenure at the DRI, funding also young investigators and collaborators of mine at the institute, during the long years when they needed critical help in this direction. The DRIF support has been critically important also for maintaining state-of-the-art shared resources, from the clinical cell transplant program (CCTP), the cGMP cell manufacturing facility (NABTU Regenerative Medicine and cGMP Center), and Fast Track Center for Testing that allowed us to assist in the hands-on due diligence and testing of new potential breakthroughs emerging from cure-focused efforts of the DRI Federation and other collaborators worldwide. Support of such advanced infrastructure that have been critically important to our progress in clinical translation of our advancements.
4. The North America's Building Trades Unions (NABTU) and their President, Sean McGarvey, for building the Diabetes Research Institute, for donating the Institute to the University of Miami, and for steadfastly supporting our research efforts for decades—consistently stepping up in response to emerging threats, including during the COVID-

19 pandemic, when they supported our life-saving umbilical cord-derived mesenchymal stromal cell (UC-MSc) infusions in critically ill patients.

5. To the patients who have voluntarily participated in experimental clinical trials, often before the safety and efficacy of new treatments had been fully established through large-scale, rigorous scientific validation. They are the true heroes behind every potentially revolutionary new therapy.
6. Last but not least, to my family, for the many sacrifices they have endured due to my limited time and attention at home, despite my unconditional love for them.

As I mentioned before, we cannot stop at third base, and we'll continue to express our gratitude towards our funding agencies and foundations, for their renewed support to our relentless efforts towards the home run: a Cure.

BIOGRAPHY

Camillo Ricordi was born in New York, NY, and completed all his studies in Milan, Italy, with the highest scores and honors, starting from high school. After military service in the Italian Air Force as a Medical Officer, he worked at Washington University in St. Louis and at the University of Pittsburgh before moving to the University of Miami in 1993, where he served as Professor of Surgery, Medicine, Biomedical Engineering, Microbiology-Immunology, and Director of the Diabetes Research Institute (DRI) for three decades. He currently serves as Chief of the Division of Cellular Transplantation, Department of Surgery, Director of the Cell Transplant Center, and Director Emeritus of the DRI.

Since 1993, he has been Medical Director of the NIH-funded DRI cGMP (current Good Manufacturing Practices) Advanced Human Cell and Biologic Product Manufacturing Facility, which has provided an invaluable service to centers throughout the United States and worldwide by offering training programs and distributing human tissues, cells, and other biologic products for research and clinical applications.

Acknowledged by his peers as one of the world's leading scientists in diabetes cure-focused research, cell transplantation, and regenerative medicine, Ricordi is well known for inventing the technology (the Ricordi Chamber and Automated Method for Islet Isolation) that made it possible to isolate large numbers of islet cells (insulin-producing cells) from the human pancreas. The method was eventually validated at Washington University in St. Louis, MO, where he served as an NIH Trainee. Recruited to the University of Pittsburgh Transplant Institute in 1989, he led the team that performed the first series of successful clinical islet transplants of donor pancreatic islets, reversing diabetes after their intrahepatic infusion. The procedure is now used worldwide by centers performing clinical islet transplantation.

Ricordi renounced to the commercial rights of his inventions on islet cell processing and transplantation, convinced that everyone who needed to use his inventions to produce and transplant islets, should have been able to access them, to work collaboratively on the path of a cure for diabetes. His decision was also inspired by Banting, Collip and Best, who were awarded the US patents for insulin and the method used to make it on January 23, 1923, and then sold these patent

rights to the University of Toronto for \$1 each. Banting famous quote: “Insulin does not belong to me, it belongs to the world” was an additional inspiration motivating Ricordi to follow their example.

Ricordi led the team that performed the first successful transplants of a bioengineered endocrine pancreas implanted within a 3D bioactive resorbable scaffold in the abdominal cavity of recipients with a severe form of Type 1 Diabetes. He also served for over a decade as Principal Investigator and Chair of the Steering Committee of the first NIH-funded, FDA Phase 3 multicenter trial on islet transplantation in Type 1 Diabetes that was successfully completed in 2016. He has worked for decades to develop strategies for transplantation without chronic recipient immunosuppression and for the reversal of autoimmune disease conditions, and is currently serving as Chairperson of the International Steering Committee and UM-DRI Principal Investigator of the Vertex international clinical trial of stem cell-derived islet transplantation (VX 880). Ricordi is also co-leading a major collaborative islet transplant trial, at the DRI and the University of Chicago, to modulate the immune system without the toxicity associated with conventional immunosuppression, by replacing Tacrolimus with an anti-CD40L monoclonal antibody (Tegoprubart, Eledon Pharmaceuticals). In addition, as Director of the Cell Transplant Center at the DRI, he is overseeing IND-enabling studies toward the first trial of islet transplantation combined with a tolerance-inducing microgel (iTolerance, Inc.) to avoid chronic recipient immunosuppression.

In addition to diabetes cure-focused research, Ricordi’s interests include Healthspan Medicine and regenerative biotherapeutic strategies to prevent or treat chronic degenerative disease conditions and to prolong healthy lifespan (Healthspan). In 2021, Ricordi led an international team that successfully completed the first FDA-approved trial to treat severe cases of COVID-19 ARDS with a cell therapy delivered to the lungs, resulting in 91% patient survival at one month post treatment (100% in subjects younger than 85 years), compared to 42% survival in the control group. During the COVID-19 pandemic, he also launched a program to help the general population become resistant to severe viral infections through nutrition, fitness, and selected protective molecules. These strategies are now also being studied to prevent or halt the progression of autoimmune diseases (e.g., Type 1 Diabetes) and age-related chronic degenerative conditions (www.Fit4Healthspan.org). Ricordi also co-founded AION Healthspan, Inc., a University of Miami start-up regenerative medicine company whose first clinical trial to reverse diabetic nephropathy and other forms of chronic kidney disease is currently in progress.

Ricordi was the founding President of the Cell Transplant Society, President of the International Association for Pancreas and Islet Transplantation (IPITA), and he served on the Board of The Transplantation Society, the Board of the American Society of Transplant Surgeons, the FDA Biologic Response Modifiers Advisory Committee, and several NIH study sections, in addition to acting as an advisor/reviewer for several international funding agencies.

Ricordi received numerous honors and awards, including the 2001 World Prize in Surgery (University of Geneva) for developing a technology that significantly contributed to the advancement of a surgical field. He was awarded the 2002 Outstanding Scientific Achievement Award by the American Diabetes Association, and in 2009 he was knighted by the President of the Republic of Italy. In 2010, he was the only surgeon and one of the few ever inducted into the Association of American Physicians (AAP), and in 2018 he was inducted into the National Academy of Inventors (USA) for contributing outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society. When inducted into the National Academy of Inventors he was asked what he considered his greatest

achievement as an inventor. He replied that his greatest achievement was not any single invention, but rather making his inventions available to the world while training anyone willing to join our cure-focused mission.

The Camillo Ricordi Humanitarian Award was established in 2015 by the Diabetes Research Institute Foundation to honor the selected annual recipient at the Empire Ball, the most important annual event of the foundation.

Ricordi ranked as the #1 world expert in transplantation of insulin-producing cells for the treatment of diabetes for the decade 2008–2018 (Expertscape), among over 4,000 surgeons, physicians, and scientists evaluated, and was appointed to the Supreme Council of Health (Consiglio Superiore di Sanità) by the Ministry of Health of Italy.

In 2023, he was awarded the Leonardo da Vinci Award (co-shared with Nobel Prize laureates Yamanaka and Semenza at Taormina TaoBuk) and the Venice Golden Lion Award.

In 2025, he received the PAIR Prize for American-Italian Relations, which recognizes individuals or institutions that have significantly contributed to strengthening the cultural, scientific, economic, or diplomatic ties between Italy and the United States. It honors leaders, innovators, and visionaries from diverse fields such as science, diplomacy, business, and philanthropy who have made impactful efforts to promote collaboration between the two nations.

Since 2004, Ricordi has served as President of the Board of ISMETT (Mediterranean Institute of Transplantation and Advanced Therapies), a joint venture between the University of Pittsburgh Medical Center and the Italian Government, and was appointed President of Fondazione Ri.MED by the Italian Prime Minister for the 2013–2017 term, successfully completing the partnership with ISMETT for the creation of an unprecedented biotechnology center linked to ISMETT to foster clinical translation of novel therapeutics.

Ricordi was the founding President of The Cure Alliance and Chairman of the Diabetes Research Institute Federation, coordinating and promoting cure-focused research at leading institutions worldwide. He also serves as a consultant and/or member of the board of advisors for several non-profit foundations, government and federal agencies.

He was recently appointed by the Welfare Leadership of the Lombardy Region to assist in the establishment of a collaborative network between Italy and the US, to improve lifespan in physical, mental, and cognitive health by (1) preventing people from becoming patients, (2) reversing early disease progression, (3) treating those already affected, and (4) preventing disease recurrence after an initially successful intervention.

Ricordi also served as Editor-in-Chief and on several editorial boards of scientific journals, has contributed 1,250 publications, which have received over 64,000 citations (h-index 122), and has been awarded 28 patents. In 2023, he published The Healthspan Code, and in 2025, Therapeutic Revolution (Amazon.com).

INTEGRATED PATIENT-DERIVED MODELS TO IDENTIFY DETERMINANTS OF IMMUNE CHECKPOINT INHIBITOR RESISTANCE

Maria Francesca Baietti

Ph.D., Department of Oncology, KU Leuven, Belgium

ABSTRACT

Despite the transformative impact of immune checkpoint inhibitors (ICIs) in the treatment of several cancers, a substantial proportion of patients fail to respond or eventually develop resistance. Accumulating clinical and experimental evidence indicates that immunotherapy (IT) failure arises from a complex interplay of tumour-intrinsic and microenvironmental factors, resulting in pronounced inter- and intra-patient heterogeneity. Consequently, the development and evaluation of rational combinatorial treatment strategies, together with robust biomarkers of response and resistance, represents a critical unmet need in oncology. Patient-derived xenograft (PDX) models are considered the gold standard for preclinical validation of novel anticancer therapies. The TRACE PDX platform, embedded within the Oncology Department at KU Leuven and the Leuven Cancer Institute (LKI), represents a leading infrastructure for ethical and standardized preclinical testing and comprises a biobank of over 180 well-annotated PDX models spanning ten tumour types. TRACE successfully established unique PDX models (including immunotherapy-resistant melanoma, metastatic breast cancer, pancreatic adenocarcinomas and also rare malignancies) thereby allowing to uncover novel therapeutic vulnerabilities (Rambow et al., 2018; Marin-Bejar et al., 2021). PDX models however have a limited scalability, and the loss of the human tumour microenvironment (TME) during engraftment restrict their use for high-throughput screening and for the evaluation of TME-targeted immunotherapies. To overcome these limitations, we complement our PDX models with establishment of in vivo humanized PDX models and the integration of patient-derived tumour fragment (PDTF) ex vivo models that enable the functional testing of immune-oncology agents and systematic correlation of treatment responses with molecular and cellular biomarkers of resistance. Recent work identified long non coding RNAs that promote drug-tolerant cell states, affecting the response to ICI (Cinque et al., 2026). Overall, we make accessible a clinically relevant repository of in vivo PDX models and an ex vivo expertise to dissect mechanisms of resistance and accelerate the development of effective immunotherapies, ultimately improving patient outcomes.

BIOGRAPHY

Dr. Baietti has extensive expertise in molecular cell biology, with a strong commitment to oncology. During her doctoral research in the lab of Prof. G. David at KU Leuven, she has pursued highly competitive research on the role of syndecan trafficking in exosome biogenesis (Nat Cell Biol 2012). As a postdoctoral scientist at VIB, funded by two FWO fellowships, she focused on the mechanisms of cell transformation related to chromosomal deletions and post-translational modifications (EMBO Mol Med 2016; Science 2018, Mol Can Res 2021).

Currently, as the Manager TRACE PDX platform at KU Leuven, I have as major focus the development and use of advanced clinically relevant in vivo models in oncology (EMBO Mol Med 2022, Eur Urol Focus 2022, JEM 2025).

WEST NILE FEVER AND EASTERN EQUINE ENCEPHALITIS

Fabio Del Piero

DVM, PhD, DACVP, Professor – Pathology and Microbiology, Louisiana State University
Baton Rouge - USA

ABSTRACT

West Nile flavivirus (WNV) and Eastern equine encephalitis alphavirus (EEEV) can induce fatal encephalomyelitis in humans, horses and sporadically in other domestic and wild species. West Nile Fever is distributed worldwide and transmitted by several species of mosquitoes (e.g. *Culex*), whereas EEE is limited to specific parts of the Americas and the distribution is conditioned by the localization of the black tail mosquito (*Curliest melanura*). Clinical presentations, lesions and virus distribution in humans and horses are very similar. We extensively studied both WNV and EEE in hundreds of horses performing very detailed postmortem examinations, histopathology, indirect immunohistochemistry, and PCR. WNV induces mainly meningoencephalitis associated with small quantity of virus, whereas EEEV produces systemic lesions including a severe meningoencephalitis with more encephalic necrosis, myocarditis, intestinal wall necrosis, interstitial nephritis with abundant virus within the nervous system, heart, kidney and intestinal muscular wall. Both viruses intracellular localization is within the cytoplasm. Both infections start with viremia leading to the passage of these viruses through the hematoencephalic barrier (rabies rhabdoviruses follow the nerves instead). The study of zoonotic diseases in animals is very practical, inexpensive, allows the immediate and complete autopsy and prompt collection of high-quality specimens, often shortly after death or euthanasia, procedures that are not possible in human cases, revealing important details about the lesions and pathogenesis of these very important zoonotic fatal viral diseases. West Nile flavivirus and other important zoonotic flavivirid disease are seasonally affecting also European patients and patients from the other continents, and these types of studies performed in the USA, have been benefiting the control and prevention of this disease in the rest of the world. Vaccination is available for horses and birds but not for humans. The elderly population is much more at risk of severe infections and death. Preventative measures include physical and chemical protection from the mosquitoes, aquatic larvicides (e.g. *Bacillus turingiensis*). Differential diagnoses in animals and humans include rabies, other arboviral encephalitides, influenza, morbilliviruses, bacterial, protozoal, parasitic and mycotic infections, intoxications, degenerative diseases, parasites and tumors.

BIOGRAPHY

Fabio Del Piero graduated from University of Milan Italy where he spent additional time studying in the Department of Anatomic and Avian Pathology. Following a period as a veterinary practitioner and food inspector in Italy he moved abroad in 1991. He spent two years in the British islands studying pathology and infectious diseases, in the department of infectious diseases of The Animal Health Trust in Newmarket, England. In 1996 he completed a residency program in anatomic pathology in the Department of Pathology of the College of Veterinary Medicine of Cornell University and Ithaca, New York. Then he spent 2 years as postdoctoral associate in the Cornell University New York State Diagnostic laboratory as a pathologist supervising the immunohistochemistry laboratory. In 1997 he became a Diplomate of

American College of Veterinary Pathologists and was elected an honorary member of Phi-Zeta, the Veterinary Honor Society in the United States. He is a member of three chapters, Cornell University (alfa), Penn Vet (beta), LSU (tau). Following a brief period as a faculty in veterinary pathology in Italy, he was faculty in the Department of Pathobiology of the School of Veterinary Medicine of University of Pennsylvania from 1999 until 2011, with an affiliate appointment in the Department of Clinical Studies-New Bolton Center. His appointment included diagnostic, teaching and research activity for both University of Pennsylvania and the Pennsylvania Animal Diagnostic Laboratories (PADLS). In January 2012 he joined the faculty at Louisiana State University as full professor of pathology tenure track and chief of the molecular pathology laboratory. He obtained his PhD in the pathogenesis of zoonotic arboviruses in 2003. Research activity includes the study of the pathogenesis of infectious diseases, systemic and comparative pathology and has more than 35 years expertise in these fields. Professor Del Piero investigated and published on several important diffusive and zoonotic diseases including West Nile Fever, Eastern equine encephalitis, Zika virus disease, Equine herpesvirus 1 and 4 and their four forms, Equine herpesvirus 5 pulmonary fibrosis, Equine Viral Arteritis, Canine parvovirus, Yersinia pestis associated plague, Bacillus cereus anthrax- like disease, Chlamydiosis, Salmonellosis and numerous natural diseases outbreaks identified during the daily service routine. He is author and coauthor of more than 170 peer reviewed publications. He is also author and coauthor of numerous abstracts and published proceedings, four books, and several book chapters. The four books include Diseases of Horses, Diseases of Cattle, Ruminant Abortions and Perinatal Losses and Small Animal Oncology. In 2003 he received the international Ljudevit Jurak Award for his studies and teaching in the field of comparative pathology and in 2026 he received the extremely prestigious Rainmaker Senior Scholar Award in the areas Science, Technology, Engineering, and Mathematics. This award is a tremendous honor and recognizes excellence and outstanding achievement in research and creative activity by LSU faculty, with nominations reviewed and awardees selected by the Council on Research. He received more than 130 invitations as a speaker at meetings and at numerous national and international institutions. He is member of the board of directors and Vice-president Senior of the Davis-Thompson foundation for the study, practice and teaching of comparative pathology and veterinary medicine and overseas member of the British Veterinary Research Club.

THE ROLE OF NEUROSTEROIDS IN ALCOHOL USE DISORDER: A POTENTIAL THERAPEUTIC STRATEGY

Fabiana Filogamo

Ph.D. Student in Pharmaceutical Sciences at the University of Naples Federico II



Fabiana Filogamo^{1,2}, Majd Aljurdi¹, Nichole Payne¹,
Elizabeth Glover^{1,3}, Graziano Pinna^{1,3,4}

1. The Psychiatric Institute, Department of Psychiatry, College of Medicine, University of Illinois Chicago, IL, USA
2. PhD Program in Pharmaceutical Sciences, Department of Pharmacy, School of Medicine, University of Naples Federico II, Italy
3. Center for Alcohol Research in Epigenetics (CARE), Department of Psychiatry, College of Medicine, University of Illinois Chicago, IL, USA
4. UI Center on Depression and Resilience (UICDR), Department of Psychiatry, College of Medicine, University of Illinois Chicago, IL, USA

ABSTRACT

Alcohol use disorder (AUD) is a chronic, undertreated, and debilitating condition often comorbid with mood disorders and cognitive impairment. Individuals with AUD show a dysfunction in neurosteroid biosynthesis, including allopregnanolone, a potent positive modulator of GABA-A receptors that regulate inhibitory neurotransmission and induce anxiolytic effects. Specifically, allopregnanolone levels are decreased in blood and post-mortem brain suggesting that decreased allopregnanolone levels and impaired GABAergic function may constitute a mechanism underlying chronic alcohol exposure-induced anxiety, which constitutes an important trigger for relapse. Thus, pharmacologically increasing allopregnanolone levels may represent a potentially promising therapeutic strategy for AUD treatment. The current study investigated the effects of chronic intermittent ethanol vapor exposure on the production of neurosteroids in several brain areas of female rats. Rats were exposed to 14-day chronic intermittent ethanol vapor exposure (CIE), which included the following groups: air-exposed controls, ethanol-intoxicated animals (14-day exposure), and animals undergoing acute withdrawal (24 hours). Before killing, vaginal smears were collected from each rat to determine the estrous cycle phase. We studied transcription factors, including PPAR- α that regulates the expression of enzymes that produce allopregnanolone and congeners, 5 α -RI and 3 β -HSD. Our results show that in striatum, including the nucleus accumbens, involved in reward processing, there is a significant reduction in PPAR- α expression at 24 hours of withdrawal compared to air-exposed controls. Consistently,

5 α -RI showed a decreasing trend in striatum and a significant reduction in ventral hippocampus in the ethanol group. After separating data from rats in proestrus (corresponding to peak hormone levels), we observed an increase of 3 β -HSD expression in the withdrawal group in striatum, cerebellum, and ventral hippocampus. In the prefrontal cortex, there is a robust reduction of PPAR- α , 5 α -RI, and 3 α -HSD in the 24h withdrawal group. In contrast, we observed no changes in the dorsal hippocampus. Neurosteroid levels were quantified in cerebellum and striatum. In the cerebellum, allopregnanolone and pregnanolone levels showed a marginally significant decrease, whereas epiallopregnanolone levels significantly increased. In the striatum, allopregnanolone levels showed a marginally significant decrease and returned to control levels at proestrus, suggesting an estrous cycle-dependent protection. These results support the potential role of neurosteroid signaling as predictive biomarkers and therapeutic targets in AUD. Supported by NIH-NIAAA R01AA030292 (G. Pinna).

BIOGRAPHY

Fabiana Filogamo is a second-year PhD student at the Department of Pharmacy, School of Medicine, University of Naples Federico II, working in the field of central nervous system (CNS) disorders. During her first year of doctoral training, she investigated the role of biological mediators such as palmitoylethanolamide (PEA) and neurosteroids in an animal model of PTSD and autism. Consistently, she recently completed a study investigating the role of PEA in the regulation of pregnenolone and allopregnanolone levels in an animal model of autism, the BTBR mouse. Currently, she is enrolled in a research period abroad, at PinnaLab in the Department of Psychiatry, College of Medicine, University of Illinois Chicago. This training experience will be pivotal in expanding her methodological and research skill set and gain new insights that will refine and advance her research interests in the field of neuropsychopharmacology.

ELIMINATING SENESCENT CELLS TO PREVENT KIDNEY SCARRING - TARGETING MCL-1 IN REPAIR AND DISEASE

Casimiro Gerarduzzi

Ph.D., University of Montreal, Canada

ABSTRACT

Chronic Kidney Disease (CKD) affects 1 in 10 people worldwide and often develops following unresolved acute kidney injury (AKI), leading to kidney fibrosis—a harmful scarring process driven by dysregulated repair. A key but debated contributor to this transition is cellular senescence, particularly in tubular epithelial cells (TEC), which can promote inflammation and fibrosis through the secretion of pro-inflammatory and pro-fibrotic factors.

Using an aristolochic acid-induced model of kidney injury, our work identifies TEC senescence as an early and critical event in the progression from AKI to CKD. We show that DNA damage in TEC drives a senescent phenotype characterized by resistance to apoptosis and activation of inflammatory signaling pathways. Through transcriptomic and functional analyses, we identify a distinct population of senescent TEC that rely on the pro-survival protein MCL-1.

Importantly, we demonstrate that pharmacological inhibition of MCL-1 selectively eliminates senescent TEC, reduces inflammation, and significantly mitigates kidney fibrosis when applied during the early phase of injury. In contrast, targeting alternative pro-survival pathways fails to confer protection and may worsen disease progression, highlighting the specificity of this mechanism.

By uncovering a central role for MCL-1-dependent senescent cells in kidney injury, this work provides a new framework for understanding disease progression and identifies a targeted strategy to prevent fibrosis before irreversible damage occurs.

BIOGRAPHY

Dr. Casimiro Gerarduzzi obtained his MSc and PhD in Experimental Medicine from McGill University, followed by postdoctoral training at the Harvard School of Public Health and Harvard Medical School. He is currently an Associate Professor of Medicine at the University of Montreal and a researcher within the Nephrology Axis at Hôpital Maisonneuve-Rosemont Research Center.

His research focuses on the molecular mechanisms driving kidney disease progression, with an emphasis on cellular stress responses such as senescence, inflammation, and extracellular matrix remodeling in Acute Kidney Injury, Chronic Kidney Disease as well as Renal Cell Carcinoma. Particular research themes that his laboratory studies include those

throughout the kidney disease continuum, starting from an injury-induced inflammation and senescence reprogramming that results in the initiation of repair, further progressing to its development into fibrosis. His laboratory integrates cellular systems, mouse models, and human biospecimens, and applies methodologies at the interface of cellular and molecular biology and translational science in understanding kidney disease.

AN ETHNOCULTURAL AND INFRASTRUCTURE-SENSITIVE FRAMEWORK FOR DEMENTIA RESEARCH: A CROSS-CULTURAL COMPARATIVE MODEL BETWEEN INDIA AND ITALY

Aditi Kaushik

MS, Ph.D. Scholar at the department of Biotechnology, NIILM University, India

ABSTRACT

Western biomarker-driven paradigms have largely impacted dementia research, with key emphasis on cerebrospinal fluid tests, PET amyloid imaging, and high-field MRI infrastructure. While such models are scientifically relevant, their widespread use ignores significant ethnocultural, linguistic, and infrastructure differences between regions. We offer a cross-cultural dementia research approach using India and Italy as examples of low-middle resource heterogeneity and high-income European healthcare systems, respectively. This paradigm combines culturally adaptive workflows to produce consistent but context-sensitive datasets. India and Italy offer distinct yet complementary research environments. Italy has excellent neuroimaging equipment, an aging population, and established Alzheimer's disease registries. In contrast, India is experiencing increasing demographic aging, high rural population density, linguistic variety, and restricted access to high-cost biomarker platforms. Cognitive testing methods developed for European populations may not apply directly to multilingual Indian cohorts due to disparities in literacy levels, educational exposure and culturally memory storage processes. While Italy can use traditional plasma and imaging biomarkers, India needs scalable, non-invasive alternatives. We propose salivary inflammatory markers, cortisol, oxidative stress indices, and exploratory salivary tau assays as potential community-level screening techniques. A comparison of biomarker profiles from Italian plasma and Indian saliva will allow us to assess concordance, sensitivity, and cost-effectiveness. Rather than reproducing large-scale ADNI-style datasets, this strategy encourages region-specific 'Prevent-AD' repositories while allowing for cross-site meta-analytic compatibility. The project's methodology includes linguistic validation & normative dataset generation, parallel biomarker acquisition in saliva (India) & blood (Italy), standardized structural MRI processing, and multimodal risk modeling with computationally efficient statistical approaches such as logistic regression and shallow ensemble models. This cross-cultural approach seeks to redefine translational dementia research through contextual feasibility, rather than technology replication.

BIOGRAPHY

Aditi Kaushik is a doctoral researcher at the department of Biotechnology, NIILM University, India, specializing in Alzheimer's disease therapeutics development, nanotechnology, and translational biomarker discovery. She has worked on blood biomarker studies for Alzheimer's disease and has expertise in MRI-based neuroanatomic segmentation, community-relevant screening techniques, and low-cost analytical workflows. Her research interests include ethnocultural determinants of cognitive evaluation, scalable biomarker platforms, and multimodal risk modelling in resource-variable situations. She is dedicated to creating internationally harmonized but locally sustainable dementia research frameworks, particularly through cross-cultural interactions.

PROCESS MINING FOR THE ANALYSIS AND OPTIMIZATION OF CLINICAL PATHWAYS IN RESPIRATORY CARE

Paolo Landa

Ph.D., Director of Department of Operations and Decision Systems, Laval University, Quebec, Canada

Authors: Paolo Landa^{1,2,3,4}, Luca Murazzano^{1,2,3,4}, Mohammed Hakim Raki^{3,5}, Jean-Baptiste Gartner^{3,5}, André Côté^{3,5}

Affiliation:

¹ Department of Operations and Decision Systems, Laval University

² Centre interuniversitaire de recherche sur les réseaux d'entreprise, la logistique et le transport (CIRRELT)

³ Axe Santé des Populations et Pratiques Optimales en Santé – Centre de Recherche du CHU de Québec, Laval University

⁴ Groupe de Recherche en Écologie Buccale, Laval University

⁵ Department of Management, Laval University

ABSTRACT

Health systems worldwide face increasing pressure to deliver coordinated, efficient, and patient-centred care. Clinical pathways, especially for chronic and high-burden conditions such as respiratory diseases, are often fragmented across services, generating delays, variability, and avoidable inefficiencies. Process mining offers a powerful data-driven approach to make these pathways visible, measurable, and actionable. By reconstructing real-world trajectories from routinely collected event logs, it enables health organizations to move from intuition-based to evidence-based pathway management. This work presents a comprehensive application of process mining to respiratory care at the Institut universitaire de cardiologie et de pneumologie de Québec (IUCPQ-UL). Using data from more than 4,700 patients and approximately 100,000 clinical episodes across emergency care, hospitalizations, ambulatory visits, and medical imaging, we developed an integrated analytical pipeline to extract, clean, merge, and model patient trajectories. The resulting macro- and micro-level pathway maps provided unprecedented transparency on how care is delivered, revealing bottlenecks, deviations from expected protocols, and opportunities to improve coordination and resource allocation. Beyond methodological innovation, the project fostered a structured dialogue between clinicians, data managers, and hospital leadership. Process mining outputs served as a common language to align perspectives, validate assumptions, and support shared decision-making. This collaborative dimension proved essential for translating analytical insights into operational improvements. A complementary analysis examined how the COVID-19 pandemic reshaped respiratory care pathways. Comparing pre-pandemic (2018–2019) and pandemic (2020–2022) periods, process mining revealed shorter emergency and hospitalization episodes, accelerated diagnostic workflows, and shifts in ambulatory care patterns. Statistical validation confirmed significant reductions in emergency episode duration for COPD, lung cancer, and pneumonia. These findings illustrate both the adaptive capacity of the system and the need to critically assess whether rapid changes preserve or compromise care quality. Overall, this work demonstrates that process mining is not merely a technical tool but a strategic enabler for learning health systems. It supports performance evaluation, pathway redesign, and value creation by transforming complex clinical data into actionable knowledge. Future developments will integrate artificial intelligence to enhance predictive capabilities and support proactive and resilient pathway optimization.

OXYRESVERATROL (OXY) AS POTENTIAL ANTIVIRAL AGENT AGAINST FELINE HERPESVIRUS TYPE-1 (FHV-1) *IN VITRO*

Consiglia Longobardi

Ph.D., University of Naples Federico II

Consiglia Longobardi¹, Valeria Iervolino¹, Carmen Formisano², Serena Montagnaro¹, Sara Damiano¹, Roberto Ciarcia¹

¹ Department of Veterinary Medicine and Animal Production, University of Naples Federico II

² Department of Pharmacy, University of Naples Federico II

ABSTRACT

Feline herpesvirus type 1 (FHV-1), the primary cause of rhinotracheitis and ocular disease, can affect cats of all ages, although young, elderly, and immunocompromised ones are more susceptible [1]. Severe cases may require systemic antiviral treatment with famciclovir, while recurrent ocular manifestations are managed with topical antiviral therapies to prevent complications such as permanent corneal damage [2].

Phytotherapeutic approaches are currently a comparatively unexplored strategy for the management of FHV-1 infections and reactivations, with potential advantages including low toxicity, fewer side effects, and novel antiviral mechanisms of action.

The current study aimed to evaluate the antiviral *in vitro* efficacy of Oxyresveratrol (Oxy) from *Morus alba* branches, coming from the 2022 winter pruning campaign against FHV-1. After its isolation and identification, different doses of Oxy (10-400 ug/mL) were used on CRFK cells during the viral adsorption and for 24 hours post-infection. Based on MTT, TCID₅₀, and PFU assays, the EC₅₀ was estimated at approximately 70 ug/mL. Therefore, the subsequent experiments were conducted at higher concentrations. Oxy treatment induced a dose-dependent reduction in viral glycoproteins (gB and gI) and p-Akt levels, indicating inhibition of viral entry and replication. This effect was accompanied by increased cell survival, as supported by the upregulation of the anti-apoptotic markers Bcl-2 and Bcl-xL. Notably, Oxy significantly increased eIF2 α phosphorylation while slightly reducing PERK expression, suggesting activation of a translational stress response that contributes to the suppression of viral protein synthesis.

In addition, FHV-1 infection increased intracellular ROS levels, whereas Oxy treatment significantly reduced their accumulation in a dose-dependent manner and enhanced antioxidant capacity, as demonstrated by Trolox-equivalent activity.

Overall, these findings demonstrate that Oxy exerts antiviral activity against FHV-1 through a multifaceted mechanism and highlight its potential as a promising candidate for the development of novel therapeutic strategies against FHV-1 infection.

-
- [1] Gaskell et al. Feline herpesvirus. *Veterinary Research*, 38(2): 337-54, 2007.
- [2] Gould D. Feline herpesvirus-1: ocular manifestations, diagnosis and treatment options. *Journal of Feline Medicine and Surgery*, 13(5): 333-462011, 2011.

BIOGRAPHY

Dr Consiglia Longobardi is a Ph.D. in Medical Clinical and Experimental Sciences and has a Postdoctoral position at the Department of Veterinary Medicine and Animal Production.

ARTIFICIAL INTELLIGENCE FOR INDIVIDUALIZED DIAGNOSTICS OF INFECTION

Enkelejda Miho

Ph.D., Digital Life Sciences Head of the Laboratory of Artificial Intelligence for Health Group Leader Swiss Institute of Bioinformatics

ABSTRACT

Precision diagnostics has evolved with the advent of novel technologies that generate large-scale data. Immunity profiles have the potential to redefine health status and predict health-disease continuum based on the individual's baseline. Artificial intelligence (AI) holds the promise to detect patterns in complex data and across data modalities. However, the clinical use of these methods is hindered from the intricate evaluation and validation necessary to access clinical practice.

The implementation of AI models in healthcare must navigate a traditionally conservative regulatory landscape, while addressing the specific demands of medical software development through software engineering. Combined, technologies allow to read the immune state at the single cell level, thus enable the discovery of molecular biomarkers for the diagnosis of infection, autoimmunity and rare diseases in parallel to identifying patterns of response to treatment. At last, we will explore the advancements of artificial intelligence in medicine. These insights will be applied to the case of individualized diagnostics for infectious diseases, elaborating on the steps required to bring medical software devices into clinics.

BIOGRAPHY

Prof. Dr. Enkelejda Miho is a full Professor of Digital Life Sciences at the Institute of Medical Engineering and Medical Informatics, School of Life Sciences, University of Applied Sciences and Arts Northwestern Switzerland. She is a group leader at Swiss Bioinformatics Institute and head of the Laboratory of Artificial Intelligence in Health. Her research focuses on the emerging field of artificial intelligence applied to health, with a primary focus in adaptive immunity. Her group develops and applies artificial intelligence methods for (i) clinical support decision systems for precision diagnostics of infection, autoimmunity, rare diseases and cancer, and (ii) therapeutics discovery antibody and nanobody. She collaborates with hospitals in CH and EU to integrate different data into AI-supported medical software. Prof. Miho holds a M. Sc. in Pharmaceutical Chemistry and Technology from the University of Bologna, a DAS in Pharmaceutical Medicine from the European Center of Pharmaceutical Medicine (ECPM), Faculty of Medicine, University of Basel and a Ph. D. from ETH Zurich at Biosystems Science and Engineering. She is the founder of the ETH spin-off aiNET.

ANTICANCER EFFECTS OF ANTIMONY IN BREAST CANCER CELL MODELS

Francesco Pagano

University of Campania “Luigi Vanvitelli”

Francesco Pagano¹, Marianna Tomeo², Anna Sfera³, Carmen Colucci⁴, Michelino De Laurentiis⁵, Antonio Giordano⁶ and Carmelina Antonella Iannuzzi⁵

1_ Department of Mental and Physical Health and Preventive Medicine, Università degli Studi della Campania “Luigi Vanvitelli”, 80131 Naples, Italy.

2_ Clinical and Translational Oncology Program, Scuola Superiore Meridionale (SSM, School of Advanced Studies), University of Naples Federico II, 80131 Naples, Italy.

3_ Department of Medical Biotechnologies, University of Siena, Siena, Italy

4_ Università degli Studi di Napoli Federico II, Napoli, Italy.

5_ Experimental Clinical Oncology of Breast Unit, Department of Breast and Thoracic Oncology, Istituto Nazionale Tumori IRCCS “Fondazione G. Pascale”, Naples, Italy

6_ Sbarro Institute for Cancer Research and Molecular Medicine, Center for Biotechnology, Department of Biology, College of Science and Technology, Temple University, Philadelphia, PA, United States

ABSTRACT

Antimony is a compound of growing interest for its potential anticancer activity, although the cellular mechanisms underlying its effects remain to be fully clarified. In this study, we evaluated the response of different breast cancer cell lines to antimony treatment, focusing on cell viability, activation of the DNA damage response, and potential interaction with ribociclib. Cell viability assays showed a dose-dependent reduction in proliferation across multiple breast cancer models, with greater sensitivity observed in T47D and MDA-MB-231 cells. The calculated IC₅₀ values were 313.3 μ M for T47D and 318.2 μ M for MDA-MB-231, indicating comparable sensitivity between these two cell lines. In contrast, MCF7, MDA-MB-468 and SKBR3 cells displayed a less pronounced response, suggesting that sensitivity to antimony may depend on the molecular features of each cellular model. To investigate the mechanisms associated with reduced viability, activation of the DNA damage response was assessed by western blotting and immunofluorescence. Western blot analyses showed a time-dependent modulation of phosphorylated checkpoint proteins CHK1 and CHK2 following antimony treatment in MDA-MB-231 and T47D cells. These findings suggest activation of pathways related to replication stress or genomic damage. Consistently, immunofluorescence analyses revealed an increase in γ H2AX foci after antimony exposure, both in terms of intensity and number, supporting the hypothesis that antimony induces DNA damage or DNA damage-associated signaling. The long-term impact of antimony was also evaluated using clonogenic assays, which indicated a reduction in colony-forming capacity following treatment. Since antimony is known to exert cytotoxic effects, its combination with ribociclib was explored to determine whether this toxicity could be exploited to enhance cancer cell death while potentially reducing reliance on high-dose single-agent exposure. The rationale behind this approach is that ribociclib-induced cell cycle modulation may increase cellular vulnerability to antimony-mediated stress and DNA damage-associated pathways. In this context, the combined treatment produced a stronger reduction in cell viability compared with either single treatment, particularly at higher concentrations. Overall, these preliminary results indicate that antimony reduces breast cancer cell viability, activates DNA damage response markers, and may

enhance the antiproliferative activity of ribociclib. Further studies will be required to define the molecular mechanisms involved and assess the therapeutic relevance of this combination strategy.

BIOGRAPHY

Francesco Pagano is a PhD student at the University of Campania “Luigi Vanvitelli” in the doctoral programme *Public Administration and Innovation for Disability and Social Inclusion*. He conducts his doctoral research at CROM, Avellino, focusing on breast cancer biology and potential therapeutic strategies. He has an academic background in biology and holds a degree in Pharmaceutical Biotechnology.

SINGLE-NUCLEUS AND SPATIALLY RESOLVED TRANSCRIPTOMICS OF THE OBJECTIVELY IDENTIFIED INFILTRATIVE MARGIN IN GLIOBLASTOMA

Sara G.M. Piccirillo

Ph.D., The Robert M. Faxon Jr. Endowed Professor in Neuro-Oncology, The Brain Tumor Translational Laboratory,
University of New Mexico Health Sciences Center Albuquerque, NM, USA



Authors: Yamhilette Licón-Muñoz^{1,2,†}, Suganya Subramanian^{3,4,†}, Bryan Granger^{3,4,†}, Danielle Borys⁵, Eddie Perkins⁶, Michael Kogan⁷, Christian A. Bowers^{7,‡}, Muhammad O. Chohan⁶, Stefano Berto^{3,4}, Sara G.M. Piccirillo^{1,2,*}

Affiliations:

1 The Brain Tumor Translational Laboratory, Department of Cell Biology and Physiology, University of New Mexico Health Sciences Center, Albuquerque, NM, 87131, USA

2 University of New Mexico Comprehensive Cancer Center, Albuquerque, NM, 87131, USA

3 Bioinformatics Core, Department of Neuroscience, Medical University of South Carolina, Charleston, SC, 29425, USA

4 Neurogenomics Laboratory, Department of Neuroscience, Medical University of South Carolina, Charleston, SC, 29425, USA

5 Bruker Cellular Analysis, Emeryville, CA, 94608, USA

6 Department of Neurosurgery, University of Mississippi Medical Center, Jackson, MS, 39216, USA

7 Department of Neurosurgery, University of New Mexico Hospital, Albuquerque, NM, 87131, USA

[†]These authors contributed equally to this work

[‡]Present address: Hurley Neurological Center & Hurley Medical Center, Flint, MI, 48503, USA & Michigan State University College of Human Medicine, East Lansing, MI, 48824, USA

ABSTRACT

The infiltrative margin (IM) of glioblastoma (GBM) harbors sparse, residual tumor cells that are responsible for the emergence of the recurrence. The identification and targeting of these cells are challenged by the ability to objectively identify the IM and sample an area representing the interface with the normal brain parenchyma. Moreover, the scarcity of tumor cells in the IM further makes it difficult to comprehensively study this microenvironment. To overcome these challenges, we previously developed a fluorescence-guided multiple sampling scheme allowing objective identification of the IM and a real-time sample collection during surgery. Here, we present a single-nucleus and spatially resolved transcriptomic characterization of the IM in 9 GBM patients. Employing bioinformatics tools and in vitro functional

work, we provide a unique dataset to identify interactions in the IM between tumor and non-tumor cells, tumor-supportive mechanisms, and novel targets for the development of IM-directed therapies.

BIOGRAPHY

Dr. Sara G.M. Piccirillo is an Assistant Professor in the Department of Cell Biology & Physiology at the University of New Mexico (UNM) Health Sciences Center and a Full Member of the UNM Comprehensive Cancer Center. Dr. Piccirillo graduated from the University of Milan (Italy) in Medical Biotechnology in 2003 and gained a Ph.D. in Translational and Molecular Medicine in 2008 at the University of Milan-Bicocca. For her post-doctoral training, Dr. Piccirillo was awarded a Marie Curie Intra-European Fellowship in 2010 and worked as a Research Associate in the Department of Clinical Neurosciences of Cambridge University (UK). In February 2011, she was elected as a Research Fellow of Hughes Hall, one of the 31 colleges in Cambridge. In 2013, Dr. Piccirillo started a collaboration with the University of Texas Southwestern Medical Center (UTSW) in Dallas (USA) and visited the institution between 2014 and 2016 as a Senior Scientist. In 2016, she was recruited to UTSW as a Faculty Member of Internal Medicine, and in 2018, she was promoted to Research Assistant Professor. In 2019, Dr. Piccirillo joined UNM Health Sciences Center as a Tenure-Track Assistant Professor. Since 2007, Dr. Piccirillo has received numerous awards and grants including the 2007 Best Young Italian Researcher (Premio Sapi Award), the 2010 Young Investigator Award from the British Neuro-Oncology Society and Brain Tumour Research UK, the 2019 Gianni Bonadonna Prize for New Drug Development in Oncology, the 2021 Independent Investigator Research Grant from the AACR and Novocure and the 2021 Translational Adult Glioma Award from The Ben and Catherine Ivy Foundation. In October 2021, Dr. Piccirillo was awarded the Robert M. Faxon Jr. Endowed Professorship in Neuro-Oncology. She has been invited to speak at several international conferences. In 2024, Dr. Piccirillo was one of the Keynote Speakers at the 5th Annual Neuro-Oncology Symposium organized by the Pakistan Society of Neuro-Oncology, the Pakistan Academy of Neurological Surgery, and the Brain Tumour Foundation of Pakistan.

EUROSTEROID THERAPEUTICS: BRIDGING TRANSLATIONAL SCIENCE, INDUSTRY, AND INNOVATION

Graziano Pinna

The Psychiatric Institute, Department of Psychiatry, UI Center on Depression and Resilience (UICDR), Center for Alcohol Research in Epigenetics (CARE), Department of Psychiatry, College of Medicine, University of Illinois Chicago, Chicago, IL, USA.



ABSTRACT

Stress-related neuropsychiatric disorders, including postpartum depression (PPD), post-traumatic stress disorder (PTSD), alcohol use disorder (AUD) and major depression, remain major sources of global disability, with limited efficacy of current treatments. Converging evidence from preclinical and clinical research has identified neurosteroid dysregulation—particularly deficits in allopregnanolone—as a core pathophysiological mechanism underlying affective and stress-related disorders. This translational research that integrates mechanistic studies in animal models with biomarker-driven investigations in humans, has elucidated how stress disrupts neurosteroid synthesis and signaling resulting in deficits in affective behavior. Targeting these mechanisms with new molecules has directly enabled the development of a new class of neurosteroid-based antidepressants, including brexanolone (Zulresso™) and zuranolone (Zurzuva™), which represent the first clinically approved treatments for PPD. In addition, our lab has also identified biomarkers to predict efficacy of ganaxolone (Ztalmy®), a synthetic neurosteroid, in pediatric epilepsy. Furthermore, accumulating translational and early clinical evidence from our lab indicates that brexanolone may be beneficial in PTSD treatment by improving hyperarousal and affective dysregulation. In parallel, our preclinical evidence showing that palmitoylethanolamine (PEA) potently rescues depressive and PTSD-like behavior has been recently translated by clinical trials showing PEA's benefits in major depression and PTSD. By stimulating endogenous neurosteroid synthesis acting through PPAR- α -dependent mechanisms, PEA attenuates neuroinflammatory signaling and normalizes corticolimbic circuit connectivity. This presentation will illustrate how basic neuroscience, clinical biomarker discovery validation, and industry collaboration have accelerated therapeutic development and innovation. By leveraging neurosteroid and endocannabinoid signatures for patient stratification and treatment prediction, our studies foster a precision medicine platform for a new class of antidepressant therapeutics. Supported by R01AA030292, R01MH134904, R01AA031965.

BIOGRAPHY

Dr. Pinna is a full professor in the Department of Psychiatry at UIC. His research focuses on the neurobiology of stress and addiction-related neuropsychiatric disorders, with particular emphasis on conditions that affect women, including premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD), postpartum depression (PPD), posttraumatic stress disorder (PTSD), major depression, and anxiety. Using a translational framework that integrates preclinical models and clinical studies his research focus on establishing neurosteroids and endocannabinoids biomarkers—endogenous modulators that play a key role in regulating neuronal excitability and emotional behavior and influence stress responsivity and neuroimmune signaling. Dr. Pinna's work has had direct translational impact. His studies on allopregnanolone contributed to the development of brexanolone (Zulresso™) and zuranolone (Zurzuvae™), two neurosteroid-based therapies approved for postpartum depression. In addition, he has contributed to the development of biomarker strategies to predict treatment response, including clinical trials of ganaxolone (Ztalmy®) for pediatric epilepsy. He has published over 140 peer-reviewed articles, edited multiple books and special issues, holds two patents, and currently leads several major federally funded research projects, including NIH R01, VA, and Department of Defense grants.

CONTRIBUTION OF RNF113A TO BREAST CANCER CELL PROLIFERATION AND MIGRATION

Anna Sfera

Ph.D. Candidate in Medical Biotechnology at the University of Siena



Anna Sfera¹, Marianna Tomeo², Francesco Pagano³, Carmen Colucci⁴, Michelino De Laurentiis⁵, Antonio Giordano⁶ and Carmelina Antonella Iannuzzi⁵

1_ Department of Medical Biotechnologies, University of Siena, Siena, Italy

2_ Clinical and Translational Oncology Program, Scuola Superiore Meridionale (SSM, School of Advanced Studies), University of Naples Federico II, 80131 Naples, Italy.

3_ Department of Mental and Physical Health and Preventive Medicine, Università degli Studi della Campania "Luigi Vanvitelli", 80131 Naples, Italy.

4_ Università degli Studi di Napoli Federico II, Napoli, Italy.

5_ Experimental Clinical Oncology of Breast Unit, Department of Breast and Thoracic Oncology, Istituto Nazionale Tumori IRCCS "Fondazione G. Pascale", Naples, Italy

6_ Sbarro Institute for Cancer Research and Molecular Medicine, Center for Biotechnology, Department of Biology, College of Science and Technology, Temple University, Philadelphia, PA, United States

ABSTRACT

Breast cancer remains one of the leading causes of cancer-related death among women worldwide and is characterized by marked biological and clinical heterogeneity, which is reflected in differences in aggressiveness, metastatic potential, and therapeutic response. In this context, the identification of novel molecular determinants involved in tumor progression is essential to improve disease stratification and uncover new therapeutic vulnerabilities. RNF113A is a RING finger protein implicated in RNA processing and cellular stress-related pathways, suggesting a potential role in the regulation of fundamental processes required for tumor cell survival. Preliminary evidence from public databases indicates that RNF113A is overexpressed in breast tumor tissue compared with normal breast tissue, with detectable differences across clinical stages, molecular subtypes, and metastatic samples. Consistently, we observed RNF113A expression in a panel of breast cell lines representative of the major molecular subtypes, including MCF7 and T47D (HR+/HER2-), SKBR3 (HER2+), and MDA-MB-231 (TNBC), together with the non-tumorigenic breast epithelial cell line MCF10A, further supporting the biological relevance of this gene in breast cancer. In addition to its expression profile, our preliminary functional data suggest that RNF113A may contribute to aggressive tumor cell behavior. Indeed, RNF113A silencing reduced migratory capacity in MDA-MB-231 cells, as shown by wound-healing assays, and impaired colony formation in both MDA-MB-231 and T47D cells. Moreover, cell-cycle analyses performed in MDA-

MB-231, MCF7, and T47D cells indicate that RNF113A depletion alters cell-cycle distribution, supporting a possible role in the regulation of breast cancer cell proliferation and survival.

Overall, these preliminary findings suggest that RNF113A may function as a pro-tumorigenic factor in breast cancer, contributing to key processes involved in tumor progression, including proliferation, clonogenic potential, and migration. Taken together, these data provide a strong rationale for further investigation of the molecular mechanisms controlled by RNF113A and their relevance across different breast cancer subtypes. In the longer term, a better understanding of RNF113A biology may support the development of more effective therapeutic strategies and highlight RNF113A as a potential biomarker and candidate therapeutic target in breast cancer.

BIOGRAPHY

Anna Sfera is a second-year PhD candidate in Medical Biotechnology at the University of Siena. She is currently conducting her research at the Pascale Institute in Naples. She obtained her degree in Medical Biotechnology from the University of Naples Federico II in 2022. Her research interests span both molecular and translational cancer research. She is currently undertaking the international research period of her PhD at Temple University in Philadelphia, PA.

NONO (P54) DRIVES CDK2-MEDIATED CELL CYCLE BYPASS IN CDK4/6 INHIBITOR-RESISTANT HR+/HER2- BREAST CANCER

Marianna Tomeo

Ph.D. Student in Clinical and Translational Oncology at the Scuola Superiore Meridionale, Naples



Marianna Tomeo¹, Anna Sfera², Francesco Pagano³, Carmen Colucci⁴, Antonio Giordano⁵, Michelino De Laurentiis⁶, and Carmelina Antonella Iannuzzi⁶

1 Clinical and Translational Oncology Program, Scuola Superiore Meridionale (SSM, School of Advanced Studies), University of Naples Federico II, 80131 Naples, Italy.

2 Department of Medical Biotechnologies, University of Siena, Siena, Italy

3 Department of Mental and Physical Health and Preventive Medicine, Università degli Studi della Campania "Luigi Vanvitelli", 80131 Naples, Italy.

4 Università degli Studi di Napoli Federico II, Napoli, Italy.

5 Sbarro Institute for Cancer Research and Molecular Medicine, Center for Biotechnology, Department of Biology, College of Science and Technology, Temple University, Philadelphia, PA, United States

6 Experimental Clinical Oncology of Breast Unit, Department of Breast and Thoracic Oncology, Istituto Nazionale Tumori IRCCS "Fondazione G. Pascale", Naples, Italy

ABSTRACT

Hormone receptor-positive/HER2-negative (HR+/HER2-) breast cancer is the most common breast cancer subtype. The introduction of endocrine therapy combined with CDK4/6 inhibitors, including palbociclib, ribociclib, and abemaciclib, has significantly improved patient outcomes by inducing G1 cell-cycle arrest through inhibition of the CDK4/6-RB-E2F axis. However, the development of acquired resistance remains a major clinical challenge. Resistant tumor cells can restore cell-cycle progression by activating bypass pathways, most notably the cyclin E/A-CDK2 axis and its associated regulators, including SKP2. We investigated the role of the RNA-binding protein NONO (p54), a key component of paraspeckles involved in post-transcriptional regulation and mRNA stabilization, as a regulator of this adaptive mechanism. We hypothesized that NONO contributes to the stabilization of transcripts involved in CDK2-dependent proliferation, including CDK2, cyclin A, and SKP2, thereby supporting resistance to CDK4/6 inhibition. T47D breast cancer cells were analyzed under four conditions: wild-type, wild-type treated with the NONO inhibitor SKBG1, ribociclib-resistant cells, and resistant cells treated with SKBG1. Western blot and RT-qPCR analyses showed that resistant cells display rewiring of cell-cycle control, characterized by increased CDK2 levels, altered RB family balance, and changes in proliferation-associated markers. Pharmacological inhibition of NONO with SKBG1 reduced CDK2, cyclin A, and SKP2 levels, along with induction of p21 and modulation of E2F4, supporting restoration of cell-cycle control. Similar effects were observed following NONO silencing by siRNA, strengthening the evidence that

these changes are mechanistically linked to NONO inhibition. Cell-cycle analysis confirmed a functional consequence of NONO targeting. In wild-type cells, SKBG1 induced accumulation in G0/G1 and a reduction in the G2/M fraction, consistent with inhibition of cell-cycle progression. In ribociclib-resistant cells, SKBG1 did not induce a classical G1 arrest but instead reshaped cell-cycle distribution, reducing the G2/M population and revealing a persistent vulnerability. Overall, our findings support a model in which NONO/paraspeckle complexes act as nuclear integrators of CDK2-driven proliferative and adaptive stress programs, promoting bypass of CDK4/6 inhibition in HR+/HER2- breast cancer.

BIOGRAPHY

Marianna Tomeo is a second-year PhD student in Clinical and Translational Oncology at the Scuola Superiore Meridionale, Naples, and conducts her research at the Istituto Nazionale Tumori IRCCS “Fondazione G. Pascale”. She graduated in Medical Biotechnology from the University of Naples Federico II. Her research focuses on hormone receptor-positive breast cancer and the molecular mechanisms controlling cell-cycle progression, with particular interest in resistance to CDK4/6 inhibitors.



HUMANITIES

MODERATOR

Georgia Cardosi

Ph.D., Researcher at RESAUD-Alioune Badiane (Réseau d'échange Stratégique pour une Afrique Urbaine Durable),
Faculty of Environmental Design and Planning, University of Montreal (UdeM), Canada

Georgia Cardosi is an adjunct professor in architecture at the University of Montreal (UdeM) and an affiliated researcher at RÉSAUD–Alioune Badiane (joint programme UdeM/UN-Habitat). A licensed Italian architect (OAPPC), she holds a Ph.D. in Environmental Design and Planning (UdeM), a Master's in Urban Design and Housing (McGill), a Master's in Architecture (Polytechnic of Milan), and a Laurea Magistrale in Architecture (La Sapienza, Rome). For her PhD research she obtained the Observatoire Ivanhoe Cambridge Bourse d'excellence doctorale. Her research focuses on organic architecture, informal settlements and non-professional design, new urban transformations and urban design, low- and minimal-cost housing, sustainable construction technologies, and project management. She trained at the Luigi Pellegrin studio in Rome; since 2004, she has worked on various projects in Africa and Canada. As a professor, she is engaged in internationalization of academic teaching.

DANTE'S VERGIL: CLASSICAL POETRY AND ITS AFTERLIFE IN THE *DIVINA COMMEDIA*

Simona Martorana

Ph.D., Australian National University, Canberra, Australia

ABSTRACT

This paper explores diverse aspects of the relationship between Dante as a poet and character and Vergil as his guide through the *Inferno* and (most of) the *Purgatorio*. After a short introduction to the allegorical and poetic significance of Vergil in the *Divina Commedia*, I will be focusing on *Purgatorio* XXII, where Dante and Vergil meet another prominent Roman poet, Publius Papinius Statius. Alongside underlining the role of Vergil as a prophet of Christianity, the meeting with Statius allows Dante to display his appreciation for classical literature and articulate the strength of poetry through different cultures, ages, and religious beliefs.

BIOGRAPHY

Simona Martorana is a Lecturer in Classics at the Australian National University. After completing her two degrees (B.A. and M.A.) at the University of Trento (Italy), she moved to Durham (UK), where she was awarded her Ph.D. in July 2021. She spent the following two years working as an Alexander Von Humboldt Postdoctoral Fellow at CAU Kiel and the University of Hamburg. Her main research focus on Latin verse combines philological rigor in attention to the detail of the texts with contemporary theoretical and interdisciplinary approaches to antiquity (gender; posthumanism; environmental and medical humanities; reception studies). Her publications include a monograph on Ovid's *Heroides* (*Seeking the Mothers in Ovid's Heroides*, Cornell UP, 2024), a critical edition of a collection of Medieval fables (*Il Romulus della Recensio Gallicana*, Sismel, 2024), as well as a number of articles and book chapters focusing mainly on Latin authors from the late-republican and early imperial age.

Links:

- <https://researchportalplus.anu.edu.au/en/persons/simona-martorana>
- <https://www.simonamartorana.com/>
- <https://anu-au.academia.edu/SimonaMartorana>

WRITING QUESTIONS FOR HUMANITY'S LAST EXAM

Cesare Giulio Ardito

Ph.D., SFHEA MIMA, University of Manchester

ABSTRACT

Humanity's Last Exam (HLE) is a benchmark of 2500 expert-level questions spanning mathematics, natural sciences, and humanities, published in *Nature* in 2026 (<https://www.nature.com/articles/s41586-025-09962-4>).

To build HLE, the organisers ran an open global call attracting nearly 1,000 subject-matter experts from over 500 institutions across 50 countries, with a \$500,000 prize pool for accepted submissions. Contributors used a dedicated portal where each submitted question was tested live against five models in sequence: three standard models first, then two frontier ones. A question entered the dataset only if every model failed it. Any question a model answered correctly was discarded on the spot.

As one of the few successful Italian contributors to the dataset, I submitted questions drawn from modular representation theory, a corner of algebra with a small specialist literature and limited presence in AI training data. When HLE launched at the end of 2024, frontier systems scored below 10% despite exceeding 80% on conventional benchmarks. The top-ranked models today sit just below 40%.

This talk has two parts. The first gives a brief account of HLE: its construction pipeline, the submission portal, and what current scores tell us about where frontier models stand.

The second is personal. I trace the decisions I made while designing questions, learning from each interaction with the models and trying to find their weak points. I discuss what it means for a question to be hard for a model rather than hard for a person, and why in my experience those two things diverged more than I expected. I also reflect on moments where models surprised me in both directions, and what both outcomes suggest about how we read benchmark results.

The talk is aimed at researchers across disciplines. No prior knowledge of representation theory or AI benchmarking is assumed.

BIOGRAPHY

Cesare Giulio Ardito is a Lecturer in Mathematics at the University of Manchester, where he received his PhD in 2020. He received his MSc in Mathematics *cum laude* at Sapienza University of Rome in 2016. His mathematical research focuses on modular representation theory and the theory of blocks of finite groups. He held a postdoctoral position at City University of London, supported by an Early Career Fellowship from the London Mathematical Society, and is a Senior Fellow of the Higher Education Academy. His work in higher education research centres on the impact of generative AI on teaching and assessment.

COME RIGENERARE UNA CITTÀ SENZA GENTRIFICARLA? UNA PROPOSTA TEORICA E METODOLOGICA

Michaela De Marco

Ph.D., Facoltà di Architettura dell'Universidad Nacional Autónoma de México

ABSTRACT

In questa presentazione si propone un quadro teorico e metodologico per progetti di rigenerazione degli spazi pubblici delle attuali città neoliberali, capaci di contrastare la gentrificazione dei quartieri che li ospitano: la “rigenerazione urbana riconoscitiva e integrale”. La “rigenerazione riconoscitiva e integrale” degli spazi pubblici opera in modo olistico sulle tre dimensioni dello spazio urbano (la dimensione naturale, architettonica e socio-umana), nonché sulle tre dimensioni del *dire* e del *fare sociale* (immaginari sociali e socio-urbani, pratiche sociali e “strutture” sociali), per mezzo di progetti di architettura urbana eco-rigenerativi, comunitari, cooperativi ed inclusivi. Tali progetti associano il “benessere in città” a livelli più elevati di giustizia sociale ed ecologica, associati, a loro volta, al “riconoscimento interpersonale, sociale e interorganismico”. In questo ordine di idee, il “riconoscimento” dell'altro (umano e non umano) si propone come un imperativo morale (e politico) alla base di qualsiasi intervento socio-eco-spaziale. Si illustreranno strategie affinché la trasformazione degli spazi pubblici urbani contribuisca alla rigenerazione degli ecosistemi locali, alla creazione di tessuti sociali più coesi e politicamente attivi, alla costruzione di una *governance* autenticamente “democratica” e alla creazione di spazi urbani più sostenibili dal punto di vista ecologico, sociale e psicologico. I contenuti di questa presentazione sono stati pubblicati nel libro “*Counteracting the Neoliberal City. Towards the Integral and Recognitive Regeneration of Public Spaces*” editato da Springer (The Urban Book Series) nel 2025.

BIOGRAPHY

Michaela De Marco, italiana, ha conseguito la Laurea di primo livello in “Lingue, Culture e Istituzioni dell'Asia e dell'Africa” presso l'Università l'Orientale di Napoli (Italia), la laurea di secondo livello in “Studi Islamici” presso la stessa università e il Dottorato in “Scienze dell'Architettura e Urbanismo” presso l'Istituto Politecnico Nazionale in Messico. Per 5 anni, ha lavorato come reporter e giornalista *free-lance* in Medioriente. Ha studiato cinema a Barcellona (Spagna) e lavorato come regista nel film documentario “Traffic Jam between Revolution”. Da 11 anni lavora come insegnante e ricercatrice in Messico presso l'Università Anahuac e l'Università Nazionale Autonoma del Messico (UNAM). Le sue principali linee di ricerca sono le seguenti: gli Immaginari Sociali, la Teoria del Riconoscimento, la Rigenerazione Urbana, il Progetto Urbano, la Sostenibilità Urbana, la Città Neoliberale, la Democrazia e i Processi Partecipativi.

Giuseppina di Bartolo

Ph.D., Senior Researcher, Glottologia e Linguistica Department of Humanities, University of Salento

ABSTRACT

Italy has a long tradition of studies that address ancient language from a linguistic perspective. However, the analysis of clause combination in ancient languages remains strongly oriented toward traditional categories inherited from the grammatical tradition of the 19th century.

My research deals with clause linkage strategies by combining historical-comparative and typological approaches. It investigates how clauses are combined in both written and spoken discourse, with a particular focus on the parts of speech traditionally referred to as *conjunctions*.

The primary aim of my research project is to propose a framework for analyzing clause combining beyond a coordinate-subordinate dichotomy. To this end, data from ancient languages are examined through the lens of modern linguistic theories and compared with evidence from modern Indo-European languages and spoken varieties.

A further goal is to make findings from ancient languages accessible to a broader scholarly community by integrating them into wider linguistic research on clause combining and linguistic change.

My research interests encompass historical and general linguistics, clause linkage strategies, conjunctions, discourse particles, language change, and discourse analysis.

BIOGRAPHY

Since March 2025, I am senior researcher (RTDb) at the Department of Humanities at the University of Salento in Lecce (Italy) within the *Rita Levi Montalcini* program. This program, funded by the Italian Ministry of University and Research (MUR), enabled me to return to Italy after an extended period of research and teaching abroad and to establish a new line of research and teaching at the University of Salento.

Previously (2018–2025), I worked as lecturer at the Department of Linguistics of the University of Cologne (Germany), where I also completed my PhD with the additional *Doctor Europaeus* qualification (Cologne–Liège–Sapienza Rome). At the postdoctoral stage of my career (2023–2024), I was awarded a *Feodor Lynen* Fellowship by the *Alexander von Humboldt* Foundation, which supported a one-year research stay at the University of Pavia (Italy).



SAPIENZA
UNIVERSITÀ DI ROMA

I am a member of several academic associations, including, among others, the *Deutsches Humboldt Netzwerk*, the *Alexander von Humboldt Italia*, and the *Forum Accademico Italiano*. I am also actively involved in a range of academic activities such as the DFG-funded Postclassical Greek Network, which I founded and coordinate, the CE.S.M.I.L. (Centro Studi sulle Minoranze Linguistiche Storiche di Puglia at the University of Salento), and the editorial board of the academic journal *Folia Linguistica*.

THE ROLE OF DESIGN IN ADAPTATION: UNDERSTANDING URBAN EVOLUTIONS THROUGH NON-PROFESSIONAL DESIGN

Georgia Cardosi

Ph.D., Adjunct Professor in Architecture, University of Montreal, Canada

ABSTRACT

Design is not a practice confined to professionals. Indeed, it is inherent to all human beings and is critical to the development of individual and collective adaptive capacities. Investigating design practices and processes within communities living in slums has allowed us to understand how design interrelates with adaptation and the evolutionary trajectories of human settlements emerging through non-conventional planning.

By engaging with literature on design theory (Herbert Simon, 1996) and adaptation theory (Norris, 2011), and by developing a longitudinal study in an informal market community in Nairobi (Kenya), we understood that vulnerable communities can develop different levels of design. In particular, we identified three levels: Development Design, Consolidation Design, and Evolutionary Design. It also became clear that design plays a role as a connector between adaptive capacities such as economic development, community competence, and social capital.

Our research unveils two additional aspects: (1) that design can be studied among non-professional actors through a problem-solving and decision-making perspective; and (2) that design plays a fundamental role in shaping evolutionary environmental behaviour beyond the professional dimension.

Italy contains many ancient spontaneous settlements whose formation, consolidation, and evolutionary processes can be analysed from an adaptation perspective. This perspective may contribute to design theory by including the non-professional dimension, which is still underexplored in the literature.

BIOGRAPHY

Georgia Cardosi is an adjunct professor in architecture at the University of Montreal (UdeM) and an affiliated researcher at RÉSAUD–Alioune Badiane (joint programme UdeM/UN-Habitat). A licensed Italian architect (OAPPC), she holds a Ph.D. in Environmental Design and Planning (UdeM), a Master's in Urban Design and Housing (McGill), a Master's in Architecture (Polytechnic of Milan), and a Laurea Magistrale in Architecture (La Sapienza, Rome). For her PhD research she obtained the Observatoire Ivanhoe Cambridge Bourse d'excellence doctorale.

Her research focuses on organic architecture, informal settlements and non-professional design, new urban transformations and urban design, low- and minimal-cost housing, sustainable construction technologies, and project management. She trained at the Luigi Pellegrin studio in Rome; since 2004, she has worked on various projects in Africa and Canada. As a professor, she is engaged in internationalization of academic teaching.

ECONOMIC SECURITY AS EXISTENTIAL CONDITION: AN ANTHROPOLOGICAL RESEARCH

Giacomo Caruso

Ph.D., Culture and Economics Department, Tea Research Institute, Chinese Academy of Agricultural Sciences

ABSTRACT

Socioeconomic security (or “securitization”, for the Copenhagen School of Security Studies) is often treated as a monolithic, fixed, standardized condition in established formalist political economy, political narratives, and neoliberal market economy. It is often configured as a mandatory condition that people ought to achieve in a lifetime, or within a reasonable age (in China, for example, doctoral, post-doctoral, University admissions and certain professions pose strict limits to access and “elevate” careers). These narratives are common in both Confucian and Keynesian socioeconomic systems. But as we can consider after a pause of reflection, socioeconomic security is always embedded in dialectic processes across cultures, local value paradigms and livelihoods. During this symposium, I will introduce a few anthropological case studies in which economic and social security become shifting conditions measured against sometime fictitious and sometime very material needs.

The normalization of economic and social uplifting or contentment then, becomes a matter of political interest once again in full force, in which representative democratic or state power is once again compelled to satisfy and work for real people’s values, needs and perspectives, leaving aside the trivialization of political language or alleged issues of “national political security” as static phenomena not contextualized enough.

BIOGRAPHY

Giacomo Caruso was born in Liguria thirty-five years ago. He graduated in Genoa with a degree in Geography and in Bologna with a degree in Cultural Anthropology with a thesis on an Orbie ceramics master and his family. He writes short stories, essays and poems for the magazine Segnali di Confine.

Since 2018, he has been living in south-east China and, after completing a PhD in Anthropology, he worked at Hubei University for Nationalities and currently at the Tea Research Institute of the Chinese Academy of Agricultural Sciences. In 2025, together with a few friends, he started a natural and community agriculture project, aimed at returning to the land and natural cycles.

He has published several articles in academic journals on traditional crafts and the transmission of knowledge, popular religion, and alternative economics, as well as a collection of poetry, *Nella Corrente* (Transeuropa Edizioni 2020).

FROM BRAIN DRAIN TO DISTRIBUTED SCIENCE: AN OPEN SCIENCE PERSPECTIVE

Eleonora Colangelo

Ph.D., Head of Policy - External Affairs, Frontiers

ABSTRACT

Italy's research system exhibits a structural tension between talent outflow and distributed scientific output. Bibliometric and human capital indicators converge on a critical signal: 13 of 21 Italian NUTS-2 regions are classified in a net talent development deficit, researcher density has contracted by 2.82% per million inhabitants since 2020 (Dimensions/OECD, 2024), and tertiary attainment remains among the lowest in the EU-27. This contribution, grounded in an in-house report – first presented at the 2026 Times Higher Education European Universities Summit, during the [Frontiers-hosted panel](#) – proposes open science indicators as a methodological framework to reinterpret brain drain as a distributed science system, in which outward researcher mobility produces measurable and recoverable knowledge externalities.

Co-authorship network analysis provides the primary methodological lens. Italy's international co-authorship rate exceeds 27% – surpassing the OECD mean and approaching levels associated with economies investing 0.5-0.8 GDP points more in R&D. Field-normalised citation impact (FNCI) of internationally co-authored papers registers approximately 2× that of purely domestic output, a differential consistent with diaspora-mediated access to complementary knowledge bases and high-impact venues. This network effect is structurally enabled by Italy's open access trajectory, grown 12.6% since 2018 and now constituting the modal publishing format across Italian institutional output.

The open science infrastructure underpinning these flows, however, presents critical vulnerabilities. Italy's gross domestic expenditure on R&D (GERD) stands at 1.37% of GDP against an EU-27 average of 2.14%. More acutely, 51% of Italian open publication output is attributable to European Commission-funded projects – indicating that compliance is externally induced rather than institutionally embedded. The scheduled expiry of NRRP-linked instruments in 2026 introduces a measurable regression risk precisely when diaspora network density is highest.

On this basis, the paper operationalises three policy instruments: (i) diaspora-targeted co-funding mechanisms for bilateral grants between Italian institutions and foreign-affiliated Italian researchers, conditioned on immediate-access OA deposit and persistent identifier assignment; (ii) integration of affiliation-disambiguated co-authorship network mapping into the monitoring framework of Italy's National Research Programme (PNR) 2021-2027; and (iii) a national diaspora science observatory, operationalised through Italy's EOSC Node, to generate longitudinal, FAIR-compliant indicators of distributed research capacity.

Collectively, these instruments reframe brain drain from a net loss metric into a distributed capacity variable — observable and policy-responsive. When open science infrastructure is treated not as a transparency obligation but as the interoperability protocol of a distributed national research system, it becomes the most scalable mechanism to ensure that scientific knowledge flows remain measurable as researcher mobility continues.

BIOGRAPHY

Dr Eleonora Colangelo is Head of Policy at Frontiers, one of the world's leading Gold Open Access publishers. In this role, she provides strategic guidance on science, technology and innovation (STI) policies, with work spanning scholarly communication, research integrity, and science diplomacy.

Before transitioning to science policy, Dr Colangelo held research and teaching positions at the École Française d'Athènes, Oxford University, Fondation Hardt, and Université Paris Cité – Sorbonne. She holds a PhD in Classics and Anthropology from Université Paris Cité and the University of Pisa, and a Master of Laws in Lobbying and Advocacy from Sapienza Università di Roma.

Dr Colangelo is a member of the UNESCO Open Science Monitoring Initiative (OSMI), a Fellow of the UN SDG Publishers Compact, and a member of both the Society for Scholarly Publishing and the Council of Science Editors. In 2025, she was awarded the Association of Learned and Professional Society Publishers (ALPSP) Award in recognition of her contributions to scholarly publishing and science policy.

MASSIMO BOTTURA'S REFETTORIO REMAKES THE FUTURE THROUGH STORIES OF FOOD, PEOPLE, AND PLACES

Rosetta Giuliani Caponetto

Ph.D., Auburn University, USA

ABSTRACT

There is an immediate reaction to food waste, degraded suburban areas, and vulnerable people exemplified in derogatory expressions (“white trash,” “piece of trash,” and “trailer trash”) that equate disposed materials with communities and places (Vaughn 2018, 44). Chef Massimo Bottura has parlayed his celebrity status into a movement to reverse the bias against food waste, neglected places, and vulnerable communities. He turned his crown jewel, Osteria Francescana, a three-Michelin star restaurant located in Modena, Italy, into an incubator of ideas for his Refettorio, an upscale, no-waste soup kitchen that has opened over thirteen branches across the world. Bottura believes that the principle of never wasting anything in commercial kitchens is not only applicable to food, but to people and places (2017, 7-8). Caring for the lives of the vulnerable people served at the Refettorio begins with breadcrumbs turned into gourmet desserts and neglected buildings revamped and filled with artwork. This presentation makes its start by asking why Bottura’s elevated soup kitchen gained global traction and whether its success depends solely on his celebrity status. The presentation brings to the forefront three key concepts built into the Refettorio: “the quality of ideas,” “the power of beauty,” and “the value of hospitality,” and makes the argument that the Refettorio’s success lies in the ways it lets us imagine a future of reduced waste not by way of dire statistics, but through stories of food recovery and communities’ rescue told around these three core tenets.

Keywords: food waste, vulnerable people, future, imagination, philanthropy

BIOGRAPHY

Rosetta Giuliani Caponetto is Associate Professor at Auburn University. Her research interests include Italy’s colonialism in East Africa, studies on nostalgia and the future, the Italian American diaspora, edible gardens, food movements and activism, philanthropy studies.

ARCHITECTURES OF SYNCRETISM. THE SAN ANTONIO MISSIONS AND THE MAKING OF THE EIGHTEENTH- CENTURY BORDERLANDS

Angela Lombardi

Ph.D., University of Texas at San Antonio

Iacopo Benincampi

Ph.D., Sapienza University of Rome

ABSTRACT

The San Antonio Missions (Texas) were inscribed on the UNESCO World Heritage List in 2015 as a significant example of cultural syncretism between European (Spanish) and Indigenous traditions. Founded in the first half of the eighteenth century, the site consists of five settlements that embody a dynamic intercultural encounter between Indigenous communities—most associated with the Coahuiltecan cultural and linguistic tradition—and the Franciscan Alcantarine missionaries, generating new social, spatial, and symbolic forms. The missions' surviving fabric stands as tangible evidence of this complex dialogue.

Located at the crossroads of routes connecting Mexico with the largely unknown regions of eastern North America, the San Antonio River valley became a strategic frontier zone of New Spain. Yet geographically marginal and materially constrained, the area led the Franciscans to establish settlements complex in meaning and articulated in layout, capable of sustaining stable Indigenous communities. The missions—San Antonio de Valero (1718), San José y San Miguel de Aguayo (1720), Nuestra Señora de la Purísima Concepción, San Juan Capistrano, and San Francisco de la Espada (1731)—formed an interconnected territorial system of exceptional historical, architectural and cultural significance.

To ensure self-sufficiency in a remote and vulnerable territory, the Franciscans adapted the model of medieval European abbeys, integrating religious, residential, and productive functions. Agricultural fields and irrigation networks (*acequias*) transformed the surrounding Indigenous landscape, generating a territorial morphology that later shaped the historic core of present-day San Antonio. Defensive needs further influenced the missions' layout, drawing on Roman military *castra* and Renaissance planning principles and reinforcing their role as fortified nodes along the northern frontier. At the same time, Indigenous inhabitants collectively shaped these settlements through their environmental knowledge, acquired technical skills, and direct participation in their construction.

Over the past seven years, our multidisciplinary research activity have progressively expanded the existing studies on the San Antonio Missions, through a multidisciplinary research program examining cultural landscapes, irrigation systems, agricultural infrastructure, construction materials and techniques, settlement typologies, and symbolic dimensions. Particular attention has been devoted to the ways in which European worldviews were imposed, negotiated, and integrated with Indigenous cosmologies through symbolic meanings embedded in the architecture and ritual spaces of the missions. Evidence of cross-cultural exchange emerges in the orientation of buildings, the integration of solar phenomena, and the celebration of cyclical natural rhythms, revealing layered meanings in which Indigenous cosmologies intersected with Christian ritual practices and European traditions.

Published in English, Spanish, and Italian, this research reinterprets the San Antonio Missions as dynamic cultural landscapes shaped by the convergence of European models, New Spanish traditions, and Indigenous knowledge. Today, the San Antonio Missions endure as outstanding monuments of Indigenous–European cultural syncretism and cultural resilience, having survived successive shifts in sovereignty and cultural values, erasure and reinvention, yet retaining significant aspects of their authenticity.

BIOGRAPHY

Dr. Lombardi is Full Professor, Director of the Center for Cultural Sustainability, and Coordinator of the Graduate Program in Historic Preservation at the University of Texas at San Antonio. Her research focuses on historic preservation, urban regeneration, and materials conservation within contemporary urban contexts. Since 2009, she has studied Latin American urban heritage, employing advanced documentation tools such as GIS, photogrammetry, and 3D modeling at architectural, urban, and territorial scales. Dr. Lombardi has 20 years of experience in traditional construction techniques, stone conservation, and on earthen material conservation. Her expertise involves documentation standards applied to cultural heritage. Since 2013 she has been investigating cultural landscape conservation issues, with an advanced study of San Antonio Spanish Colonial cultural landscape within the broader cultural *continuum* of the *Camino Real de los Tejas*. She was Co-principal Investigator for the implementation of two Historic Structure Reports for Mission San José Convento and Mission Concepcion Convento, for the National Park Service. After working in 2010 for the conservation master plan of the archaeological sites of Baalbek and Tyre in Lebanon, her research focused on management and conservation issues of some historic sites in the Middle Eastern region, such as the ones in the Antalya region, Turkey, and Akre citadel and hill town, Iraq. As an instructor, she provides undergraduate and graduate coursework and research about architecture history, historic preservation and architectural design. Dr. Lombardi's education took place predominantly in Italy, where she was trained by renowned scholars in the field of historic preservation such as Giovanni Carbonara and Giorgio Torraca, internationally known expert in materials' conservation. In 2020, together with Dr. Benincampi, Dr. Lombardi was awarded of a grant from the Conservation Society of San Antonio on the 'Sacred and Solar Geometries in the Churches of the San Antonio Missions, Texas'.

Dr. Iacopo Benincampi graduated in architecture at the Sapienza University of Rome in 2014 and went on to complete his PhD program in History of Architecture at the same institution. He was a Postdoctoral Researcher at the University of Parma in 2018, and then moved in 2019 to the University of Texas at San Antonio as visiting professor. In November 2020 Benincampi became a qualified associate professor. Between 2021 and 2023 he was a Research fellow at Sapienza, publishing scientific papers in academic journals and joining national and international conferences. Dr. Benincampi currently works at Sapienza as Assistant Professor (Tenure Track) in the Department of History, Representation and Restoration of Architecture. His expertise is in late baroque and contemporary architecture.

CROSS-VIEWS BETWEEN FIGURES, PERCENTAGES, TRENDS AND CONTRASTS: DATA THAT REVEAL THE ECHOES OF MEXICO'S REALITY IN A COMPARATIVE READING WITH ITALY

Massimiliano Solazzi

Ph.D., Faculty of Political and Social Sciences of the National Autonomous University of Mexico (UNAM)

ABSTRACT

This research aims to analyze the social and economic reality of Mexico, situating its performance within the international context through a systematic comparison with Italy. These two countries have distinct historical trajectories but are connected by processes of globalization, human mobility, and sociocultural transformations. This comparison seeks to broaden academic analysis and the possibilities for transferring lessons, models, and strategies between international contexts. In addition to the comparative method, quantitative analysis is employed as a central tool to reduce interpretations based on subjective perceptions and strengthen an objective understanding of the main results, trends, and structural gaps that characterize both countries in the current situation.

The study contrasts key indicators such as population, migration, economic development, education, well-being, employment, and unemployment, among others. This allows for a broader, more contextualized, and rigorous view of Mexican socioeconomic, demographic, and political dynamics, as well as the identification of specific opportunities and challenges within the national context.

The methodological approach is based on the comparative method between countries, considered a fundamental explanatory tool within the social sciences. It should be clarified that comparing does not imply ranking or classifying countries, but rather explaining the observed differences and similarities, identifying patterns, causal relationships, and underlying structures. In this sense, the comparison between Mexico and Italy is presented as an analytical exercise aimed at understanding in depth the convergences and divergences in key indicators, using data as instruments of scientific control.

Quantitative analysis allows for contrasting official discourse with empirical reality, since the data are measurable, verifiable, and comparable, which reduces the scope for subjective interpretations and limits the influence of political or personal biases. Thus, the use of figures and trends becomes an essential element for producing rigorous and empirically supported knowledge. Finally, this research is justified by its social and academic utility. Understanding the reality of Mexico through a comparative analysis using a multifaceted set of variables from different indicators (more than 40 variables, with 8 global indices) compared to Italy contributes to evaluating public policies, identifying areas of opportunity, and generating

robust evidence for decision-making. Furthermore, it offers an important empirical basis for researchers from diverse disciplines, providing valuable data for theses and articles, as well as fostering an informed citizenry and thus strengthening critical thinking.

BIOGRAPHY

Massimiliano Solazzi holds a Bachelor's degree in Public Administration, a Master's degree in Public Administration, and a Doctorate in Public Administration and Policy, with postdoctoral studies in Law. He is a professor at the Faculty of Political and Social Sciences of the National Autonomous University of Mexico (UNAM), as well as at the National Institute of Public Administration (INAP), with extensive experience as a public servant at the federal and state levels, member of the Association of Italian Researchers in Mexico (ARIM). He is the author of publications and a speaker at national and international

seminars, courses, and diploma programs. His research interests include public administration, human rights, transparency and accountability, open government, and personal data protection.

THE “AUTHOR IN MOTION”: TEXTUAL FLUIDITY AND PHILOSOPHICAL INNOVATION IN DURAND OF SAINT-POURÇAIN

Federica Ventola

Ph.D., Thomas-Institut, University of Cologne

ABSTRACT

This research explores how philosophical ideas take shape through the writing, revision, and transmission of texts in the Middle Ages, focusing on Durand of Saint-Pourçain (ca. 1270/75–1334), one of the most original thinkers of his time. His *Sentences Commentary* has traditionally been interpreted as a work transmitted in three distinct versions, each reflecting a different stage of his thought.

Recent work within the “Durandus Project” at the University of Cologne suggests a more complex picture. The analysis of manuscript traditions shows that elements attributed to different versions often overlap. Rather than clearly separated stages, the text appears as the result of continuous revision, leading to the idea of an “author in motion.”

This philological perspective is closely connected to the philosophical content of Durand’s work. His Commentary addresses key medieval debates such as divine foreknowledge and human freedom, proposing a solution that reconciles certainty with contingency. He also examines divine omnipotence and the limits of possibility of an actual infinite. In addition, he contributes to ethical and theological discussions on sexuality, marriage, and virginity, often diverging from Thomas Aquinas. Rather than merely opposing Thomism, Durand develops an independent framework, using authorities as a starting point for innovation.

By combining philological and philosophical analysis, this research highlights the connection between textual transmission and conceptual development and points to the need for flexible editorial models. In this context, the project is also developing the *Digital Durandus Research Portal*, an essential tool for managing the complexity of the manuscript tradition. The platform enables the organization, comparison, and visualization of textual variants, supports the identification of revision processes, and ensures broader access to otherwise dispersed materials.

BIOGRAPHY

Federica Ventola is a researcher (Wissenschaftliche Mitarbeiterin) at the Thomas-Institut, University of Cologne, where she works on the DFG-funded “Durandus Project.” She holds a PhD in History of Medieval Philosophy (summa cum laude) from the University of Cologne.

Her research focuses on medieval philosophy, manuscript studies, and the critical edition of unpublished philosophical texts. She investigates topics such as divine foreknowledge, contingency, omnipotence, infinity, and broader

metaphysical and ethical questions. She has published in international journals and regularly presents her work at international conferences. She is a member of the *Société Internationale pour l'Étude de la Philosophie Médiévale* (SIEPM) and the *Società Italiana per lo Studio del Pensiero Medievale* (SISPM).

IL DESIGN ITALIANO OLTRE L'ITALIA MEDIAZIONE CULTURALE, COLLABORAZIONE INDUSTRIALE E INNOVAZIONE GLOBALE

Maurizio Vrenna

Ph.D., Wenzhou-Kean University, Wenzhou (Cina)

ABSTRACT

Il contributo riflette sul ruolo del designer e ricercatore italiano all'estero come mediatore culturale tra ricerca, pratica professionale e collaborazione industriale. In un contesto internazionale, il design italiano può essere interpretato non solo come tradizione estetica o come espressione del Made in Italy, ma come un approccio progettuale capace di connettere cultura, impresa, educazione, innovazione e mercati globali.

Storicamente, il design italiano si è sviluppato attraverso una relazione stretta tra imprese, designer, artigianato, territori e cultura materiale. Questa tradizione ha dimostrato come il prodotto possa diventare non soltanto una soluzione funzionale, ma anche un veicolo di identità, qualità, significato e valore culturale. Tuttavia, in un mercato sempre più globale, l'esperienza del design italiano non può essere semplicemente esportata come stile riconoscibile. Deve invece essere reinterpretata attraverso una comprensione profonda dei diversi contesti culturali, produttivi e sociali. A partire dall'esperienza dell'autore in un'università americana in Cina, il contributo discute di come una figura a cavallo tra ricerca e pratica possa supportare le imprese italiane nel ripensare il proprio ruolo nei mercati internazionali. Il contatto con sistemi educativi, produttivi e culturali differenti permette infatti di riportare verso l'Italia nuove conoscenze, metodi e prospettive utili all'innovazione, ma anche di aiutare le aziende italiane a progettare prodotti, servizi e narrazioni più adatti a contesti culturali diversi. In questo senso, il design diventa uno strumento di traduzione culturale e strategica. Il designer-ricercatore italiano all'estero può facilitare il dialogo tra imprese, università, designer e nuovi mercati; interpretare bisogni locali; favorire collaborazioni internazionali; e trasformare il know-how italiano in soluzioni capaci di mantenere una forte identità, ma anche di adattarsi a scenari globali in continua trasformazione.

BIOGRAPHY

Maurizio Vrenna è Professore Assistente di Design e Direttore del Design Innovation and Sustainability Center presso la Wenzhou-Kean University. Ha conseguito un Ph.D. al Politecnico di Torino e ha studiato presso KTH, Tsinghua University e Tongji University. Designer, ricercatore e inventore, ha collaborato con Ferrari, Ducati, Alessi e Juventus. La sua ricerca riguarda design sostenibile, product-service system design e patrimonio culturale immateriale. È board member di AAIIIC (Associazione Accademici Italiani in Cina) e IDA (Italian Design Association), advisor per Climate-KIC e giudice in premi internazionali. Tra i suoi riconoscimenti figurano il Global Grad Show 2021, la China Industrial Design Competition 2023 e il prestigioso iF Design Award 2026. Recentemente è stato riconosciuto in Cina come "Friendly Messenger in Poetry and Painting" per il suo contributo agli scambi culturali internazionali.

INTERNATIONAL RESEARCH EXCELLENCE AGREEMENTS AND OPPORTUNITIES

MODERATOR



Giuseppe Ciccarone

Vice-Rector, Deputy Rector for Internationalization Policies, Sapienza Università di Roma

Giuseppe Ciccarone is the Vice Rector, Deputy Rector for Internationalization Policies and the Third Mission, and Full Professor of Economic Policy, Dept. of Economics and Law, Sapienza University, Rome.

After graduating in Economics at Sapienza University of Rome, he was awarded the M.Phil. in Economics and the Ph.D. in Economics at the University of Cambridge. He was then Post-Doctoral Fellow at the Department of Economics of Harvard University.

Starting at Sapienza University as an Assistant Professor in 1991, he became Full Professor in 2001. From 2011-2017 he was the Dean of the Faculty of Economics and from 2018-2021 he was the Director of the Sapienza School for Advanced Studies.

He is the Editor in Chief of *Economia & Lavoro* – Interdisciplinary review of economic policy, sociology and industrial relations, a member of the Advisory Board of *Labour – Review of labour economics and industrial relations* – and a member of the Editorial Boards of the *Eurasian Economic Review*, of the *Bulletin of the North Caucasus Federal University* and of the *Central Asian Review of Economics and Policy*.

His main research interests are in labor economics and in monetary economics and policy, with particular attention to dynamic stochastic general equilibrium models. His recent work has focused on the ability of financial imperfections to modify the effects of monetary policy on rational asset price bubbles and the role of undeclared work in affecting labor market dynamics. He also devoted substantial research effort to behavioral economics and its applications, pioneering the introduction of imperfect rationality into macroeconomic general equilibrium models. He is also interested in experimental economics and is a co-founder of the CIMEO Lab (Center for Investigation and Modelling of Economic Observations) at Sapienza University.

He presented his work and delivered keynote speeches at many international conferences. He is the author of several books and his articles have been published in important Italian and international scientific journals like: *Economic Theory*, *Journal of Economic Behavior and Organization*, *Public Choice*, *Macroeconomic Dynamics*, *Economics Letters*, *Journal of Macroeconomics*, *Economic Modelling*, *B.E. Journal of Macroeconomics*, *Review of Political Economy*, *Journal of Modern Italian Studies*.

**Antonio Giordano**

Ph.D., Founder and Director of Sbarro Institute for Cancer Research and Molecular Medicine at Temple University, Philadelphia

SHRO: Over Twenty Years of Science, Solidarity and Breakthroughs

SHRO ORG

The Sbarro Health Research Organization (SHRO) is a nonprofit research organization committed to supporting excellence in scientific research in the fields of regenerative medicine, oncology, and chronic diseases. Our goal is to improve quality of life through scientific innovation and the discovery of new therapies.

SHRO's mission is dedicated to supporting scientific research aimed at finding cures for cancer, cardiovascular diseases, and other illnesses by identifying their underlying molecular mechanisms. SHRO includes the Sbarro Institute for Cancer Research and Molecular Medicine, located at Temple University in Philadelphia, Pennsylvania, and an affiliated laboratory at the University of Siena in Italy.

More than 200 molecular biologists, geneticists, physicists, and chemists collaborate with SHRO to develop new methods to understand, diagnose, and treat disease.

SHRO ITALIA

SHRO Italia Foundation ETS, established in June 2023, is the Italian division of the international research organization SHRO (Sbarro Health Research Organization). As a nonprofit organization, SHRO Italia is committed to promoting scientific research, innovation in regenerative medicine, and the training of young physicians and researchers.

SHRO Italia is dedicated to supporting and advancing scientific research with the goal of discovering new therapies for complex diseases such as cancer, cardiovascular diseases, and other chronic conditions. The organization focuses on identifying the molecular mechanisms underlying these diseases in order to develop innovative and personalized treatments.

The SHRO Italia team is composed of highly qualified and passionate researchers, scientists, and medical professionals. Their expertise and dedication are essential to achieving the organization's objectives.

SHRO Italia firmly believes that collaboration is the key to scientific progress. We work side by side with academic institutions, healthcare organizations, and biotechnology companies to accelerate the discovery and dissemination of new therapies. These global partnerships enable SHRO Italia to share knowledge, resources, and technologies, fostering a dynamic and innovative research environment.

PROF. GIORDANO BIOGRAPHY

Professor Antonio Giordano is an internationally renowned oncologist and molecular geneticist from Naples. In 1993, he founded the Sbarro Health Research Organization (SHRO), a nonprofit organization headquartered in Philadelphia and dedicated to advancing cancer research and promoting public health.

Internationally recognized for his groundbreaking contributions to cancer genetics, particularly his studies on the tumor suppressor gene RB2/p130, Professor Giordano serves as Director of the Sbarro Institute for Cancer Research and Molecular Medicine at Temple University. He is also Full Professor of Anatomy and Pathological Histology in the Department of Medical Biotechnology at the University of Siena, Professor of Molecular Biology at Temple University in Philadelphia, and a member of the Istituto Superiore di Sanità (ISS).

Author of more than 750 peer-reviewed scientific publications and holder of numerous patents, Professor Giordano has devoted his career to translational research, the training of young scientists, and the development of global initiatives aimed at improving cancer prevention, early diagnosis, and innovative therapeutic strategies.



Angela Lombardi

Ph.D., Director of the Center for Cultural Sustainability at the University of Texas at San Antonio

Dr. Lombardi is Full Professor, Director of the Center for Cultural Sustainability, and Coordinator of the Graduate Program in Historic Preservation at the University of Texas at San Antonio. Her research focuses on historic preservation, urban regeneration, and materials conservation within contemporary urban contexts. Since 2009, she has studied Latin American urban heritage, employing advanced documentation tools such as GIS, photogrammetry, and 3D modeling at architectural, urban, and territorial scales. Dr. Lombardi has 20 years of experience in traditional construction techniques, stone conservation, and on earthen material conservation. Her expertise involves documentation standards applied to cultural heritage. Since 2013 she has been investigating cultural landscape conservation issues, with an advanced study of San Antonio Spanish Colonial cultural landscape within the broader cultural *continuum* of the *Camino Real de los Tejas*. She was Co-principal Investigator for the implementation of two Historic Structure Reports for Mission San José Convento and Mission Concepcion Convento, for the National Park Service. After working in 2010 for the conservation master plan of the archaeological sites of Baalbek and Tyre in Lebanon, her research focused on management and conservation issues of some historic sites in the Middle Eastern region, such as the ones in the Antalya region, Turkey, and Akre citadel and hill town, Iraq. As an instructor, she provides undergraduate and graduate coursework and research about architecture history, historic preservation and architectural design. Dr. Lombardi's education took place predominantly in Italy, where she was trained by renowned scholars in the field of historic preservation such as Giovanni Carbonara and Giorgio Torraca, internationally known expert in materials' conservation. In 2020, together with Dr. Benincampi, Dr. Lombardi was awarded of a grant from the Conservation Society of San Antonio on the 'Sacred and Solar Geometries in the Churches of the San Antonio Missions, Texas'.



Anna Irene Del Monaco

Ph.D., Faculty of Architecture, Sapienza Università di Roma

Anna Irene Del Monaco, Ph.D., è professore associato in Composizione architettonica e urbana presso la Facoltà di Architettura della Sapienza Università di Roma, dove è inoltre componente del collegio docenti del Dottorato DRACo. È autrice di saggi e volumi sull'opera di maestri dell'architettura moderna e contemporanea, sulla didattica dell'architettura, sul progetto d'architettura sperimentato in alcune città storiche e contemporanee in Occidente, Africa e Oriente.

Education in Architecture:

2006-2003: Doctorate in Composition and Theories of Architecture (Composizione – Teorie dell'Architettura), University of Rome "La Sapienza".

2001: Post-Graduate Course in Architectural Theories, University of Rome "La Sapienza".

1995-2000: Diploma *Summa cum laude* in Architecture, University of Rome "La Sapienza". Thesis: *Design project of a Church in Rome at Selva Candida; with the integrated application of the Software CATIA and material mock-ups*. Advisor: Prof. Lucio Valerio Barbera.

Academic Positions:

2019: Associate Professor with tenure in Architectural and Urban Design at Faculty of Architecture, Sapienza University of Rome.

2016: Junior Fellow, Scuola Superiore Studi Avanzati Sapienza SSAS

2010-: Teaching Board Doctorate in Architecture and Construction, Sapienza University of Rome.

2008 -: Assistant Professor with tenure (Ricercatore Universitario confermato). Adjunct Professor in Architectural and Urban Design at Faculty of Architecture, Sapienza University of Rome.

2007-8: Post-Doc Scholarship (biannual – Assegno di Ricerca) at DiAR Department of Architecture, Sapienza University of Rome.

2005-6: Visiting Scholar (Oct05-Apr06) at GSAPP Columbia University in the City of New York.

2004: Visiting Scholar (Fall 2004) at School of Architecture Tsinghua University, Beijing P.R. China.

Academic Qualifications:

ASN 2014 Qualified as Associate Professor – ASN 2012 (Abilitazione Scientifica Nazionale – National Scientific Qualification).

Others:

2005 Aug: Short-Term Chinese Language Program BLCU (Beijing Language and Culture University).

1982-1994: Piano Student, performing international and national competitions and intermediate [Esami Musica](#) in National Music Conservatories up to 7th year level course.

1995: High School Diploma Liceo Scientifico sperimentale (P.N.I.) “Giuseppe Moscati”, Grottaglie (TA), Grade achieved: 60/60

2009-up to now: Bottega Del Monaco Srl: www.bottegadelmonaco.it

from 2010 July: Aspen Junior Fellow; **from 2013 Jan:** Former Aspen Junior Fellow

INTERNATIONAL SCIENTIFIC EXCHANGE:

2008- Promoter and Scientific Responsible of the Research Executive protocols and Student Mobility Exchange between Department of Architecture DiAP/Faculty of Architecture Sapienza and: Tsinghua University of Beijing (P.R.CHINA), Zhejiang University-Zhejiang University of Technology (P.R.CHINA), South China University of Technology (P.R.CHINA), Sooreh University of Teheran (IRAN), University of Florida (USA), Durban University of Technology (SOUTH AFRICA), Dalian University of Technology (P.R.CHINA), Manipal University (INDIA).

2013- Secretary-General of the [UNESCO Chair in “Sustainable Urban Quality and Urban Culture”](#), notably in Africa, Chair-Holder (direttore) prof. Lucio Valerio Barbera.

EDITORIAL ACTIVITY:

2013- Editor and founder of [L’ADC “L’architettura delle città – The Journal of the Scientific Society Ludovico Quaroni”](#), Nuova Cultura.

TEST DEL DATO NOTO: IL VERO GIUDICE NELLA SCIENZA *L'ASSENZA DI VERIFICA COSTA MILIARDI DI EURO AL CERN E MILIONI DI VITE PERSE INUTILMENTE*

Dario B. Crosetto^{1*}

Già ricercatore al CERN, Svizzera e al Superconducting Super Collider, Texas, membro IEEE

¹Crosetto Foundation for the Reduction of Cancer Deaths, DeSoto, Texas, 75115, USA - *crosettodario@gmail.com

ABSTRACT

Sintesi per decisori politici e amministratori di fondi pubblici

Il Principio: Verità Scientifica vs. Autorità del Revisore

Nella scienza, il vero arbitro di una controversia non è la revisione tra pari (*peer-review*), bensì il “**Test del Dato Noto**”. Questo test è l'unico strumento in grado di risolvere oggettivamente il disaccordo tra inventore e revisore. Sottoporsi a tale verifica è un dovere etico per gli scienziati, necessario per non sprecare il denaro dei contribuenti e, soprattutto, per evitare la perdita di milioni di vite che potrebbero essere salvate grazie a una diagnosi oncologica precoce.

L'Invenzione: L'Architettura 3D-Flow

Trentatré anni fa, una commissione internazionale al **Fermilab** riconobbe come "rivoluzionaria" l'architettura **3D-Flow** sviluppata dal ricercatore Dario Crosetto. Questa tecnologia permette di identificare oggetti ad altissima velocità (oltre **8 miliardi al secondo**), ad esempio, a partire dalla radiazione emessa, siano essi particelle in esperimenti di fisica o marcatori tumorali in ambito medico. Il sistema esegue algoritmi programmabili (migliaia di operazioni come addizioni e moltiplicazioni) su ciascun pacchetto di dati in arrivo ogni **25 nanosecondi (ns)**, garantendo la **zero loss** (nessuna perdita di dati in ingresso).

Per queste scoperte, nel 1994 il Governo USA ha concesso a Crosetto la Green Card per "Abilità Eccezionali" in sole 24 ore (<https://bit.ly/4c6q9cn>). Nel 1995, il Dipartimento dell'Energia (DOE) gli ha finanziato con un milione di dollari (<https://bit.ly/3Pszu1y>) uno studio di fattibilità, conclusosi con successo nel 1999 e pubblicato su *Nuclear Instruments and Methods in Physics Research* (<https://bit.ly/45Mw6pM>).

Evoluzione Tecnica e Vantaggio Economico

L'architettura 3D-Flow è indipendente dalla tecnologia costruttiva:

- **1996:** Realizzazione e test del 3D-Flow in circuiti FPGA con 4 processori (PE) (\$500/PE)

- **1997:** Progettazione ASIC con 16 processori (PE) in tecnologia 300 nm (\$100/PE).
- **2015:** Preventivo per ASIC con 64-PE in tecnologia 40 nm (\$1/PE).
- **2025:** Aggiornamento ASIC con 128-PE in tecnologia 20 nm a 620 MHz, riducendo il costo a **\$0,5 per processore**.

Nel brevetto del 13 aprile 2026 (<https://bit.ly/4cm3NDm>), viene descritto un sistema per il **Trigger di Livello-1 al CERN** capace di gestire 4.096 canali in un singolo chassis ATCA, eseguendo oltre **2.800 operazioni programmabili** su ciascun pacchetto di dati in arrivo ogni 25 ns, al costo contenuto di **\$13 per canale**.

Il Problema: Inefficienza dei sistemi attuali al CERN

Per decenni il CERN ha utilizzato sistemi basati su circuiti FPGA limitati a meno di **100 operazioni** per pacchetto di dati. Questa potenza di calcolo è insufficiente per identificare particelle rare. I risultati sperimentali confermano l'inadeguatezza:

1. **Bassa efficienza:** Solo 40 eventi di Higgs registrati su 1.000 trilioni di collisioni (2012).
2. **Sprechi:** Nel 2016, gli autori dell'esperimento CMS hanno ammesso lo smaltimento di 4.000 schede elettroniche inefficienti (https://cds.cern.ch/record/2194548/files/CR2016_121.pdf).
3. **Costi HL-LHC (2026-2036):** I nuovi sistemi (650 kW di consumo) presentano lo stesso limite delle 100 operazioni. Si stima uno spreco di oltre **12 miliardi di dollari** in costi operativi e stipendi per scienziati costretti ad analizzare dati irrilevanti registrati casualmente (<https://cds.cern.ch/record/2759072/files/CMS-TDR-022.pdf>).

Applicazione Medica: Il sistema 3D-CBS

Nel 2000, Crosetto ha trasposto questa tecnologia nella diagnostica medica inventando il **3D-CBS (3-D Complete Body Screening)** (<https://bit.ly/45U2Wqv>). Sfruttando la velocità del 3D-Flow e un rivelatore lungo, il sistema offre:

- **Diagnosi precoce:** Capacità di identificare tumori in stadio iniziale.
- **Bassa radiazione:** Sicurezza per il paziente.
- **Riduzione costi:** Utilizzo di cristalli più economici e spessi (30 mm per uno *stopping power* del 98%).

Nonostante il consenso ricevuto durante seminari al CERN e nei principali istituti oncologici italiani (Milano, Aviano, Roma, Reggio Emilia), e un rapporto di 42 pagine pubblicato nel 2009 (<https://bit.ly/4aQyDmU>), che spiega i vantaggi del 3D-CBS, le autorità sanitarie italiane hanno recentemente acquistato per **42 milioni di euro** due sistemi cinesi (EXPLORER), meno efficienti e molto più costosi della proposta 3D-CBS.

La Richiesta: Trasparenza e Test Comparativo

È dovere dei politici e degli amministratori di fondi pubblici imporre il “**Test del Dato Noto**” per validare le tecnologie prima di investire miliardi:

1. **Per la Fisica:** Il CERN deve dimostrare quanti "dati noti" inviati a 8 miliardi di oggetti al secondo il loro sistema attuale è in grado di riconoscere rispetto al 3D-Flow.
2. **Per la Sanità:** Confrontare l'efficacia del sistema cinese EXPLORER (21 milioni €/unità) con il 3D-CBS (costo stimato in produzione: 3,5 milioni €/unità).

Se la comunità scientifica non può confutare analiticamente i vantaggi del 3D-CBS — capace di salvare potenzialmente oltre **260 vite per apparecchiatura ogni anno** — è imperativo che il Governo finanzi immediatamente l'inventore la costruzione di due prototipi 3D-CBS con un investimento di **20 milioni di euro**. Solo un test comparativo sui risultati reali (mortalità oncologica) potrà stabilire quale tecnologia serva davvero il bene comune.

Una Proposta per la Scienza e l'Umanità

La sincerità dell'intento di Crosetto — volto a potenziare il CERN e proteggerlo da inefficienze miliardarie — è confermata da un'offerta senza precedenti: **la concessione al CERN di una licenza gratuita e permanente** del suo brevetto (<https://bit.ly/4cm3NDm>). L'unica condizione richiesta è l'organizzazione di un incontro pubblico e trasparente per far emergere la verità scientifica.

In una prospettiva di lungo termine, Crosetto offre inoltre la **cessione della proprietà del brevetto allo Stato Italiano e all'Unione Europea**. Pur rimettendosi alla valutazione congiunta delle istituzioni, egli esprime la sua **ferma preferenza affinché sia l'Italia a farsi carico della titolarità**.

L'offerta include un'unica clausola etica: destinare una parte dei proventi, per la durata della sua vita, al finanziamento di nuove invenzioni e al sostegno dello **screening oncologico per le persone meno abbienti**.

Questo gesto di rara generosità testimonia in modo inequivocabile che l'obiettivo finale non è il profitto personale, ma il progresso scientifico e la salvezza di vite umane.

BIOGRAPHY

Scienziato e inventore, **Dario Crosetto** ha sviluppato l'architettura **3D-Flow** (8 miliardi di oggetti/sec) e il sistema **3D-CBS** per la diagnosi oncologica precoce. Già ricercatore presso il CERN e il Supercollider (Texas), ha ricevuto prestigiosi riconoscimenti: una borsa di ricerca da un milione di dollari dal DOE e la Green Card USA per "*Abilità Eccezionali*" concessa in 24 ore. Vincitore del premio "Leonardo da Vinci" (Univ. Pavia), è autore di 6 libri e oltre 100 articoli. Recentemente ha offerto la licenza del suo nuovo brevetto (400 pagine) al CERN e la proprietà istituzionale a Italia e UE, a beneficio della ricerca e della salute pubblica.

DISCUSSIONS ABOUT PROJECTS, INVESTMENTS, INCENTIVES AND OPPORTUNITIES FOR THE SCIENTIFIC RESEARCH AND ITALIAN RESEARCHERS



David Della Morte Canosci

Ph.D., Personal Adviser to the Minister for University and Research (MUR), Direttore UOC Epatologia, Nutrizione Clinica e Geriatria, Policlinico Universitario di Tor Vergata, Roma

David Della Morte Canosci è Professore Associato di Medicina Interna presso il Dipartimento di Medicina dei Sistemi dell'Università degli Studi di Roma Tor Vergata e Responsabile dell'Ambulatorio di Geriatria del Policlinico Tor Vergata. Dal 2009 è anche Professore Associato di Neurologia presso l'Università di Miami, USA. Il Prof. Della Morte Canosci si occupa di ricerca di base e di ricerca clinica nel campo dell'invecchiamento, delle malattie metaboliche, genetiche, e cerebrovascolari. Il suo obiettivo principale di ricerca è quello di chiarire i meccanismi patologici alla base dell'associazione tra malattie metaboliche e deterioramento cognitivo, tipico dei pazienti anziani. E' autore di oltre 200 articoli scientifici pubblicati su riviste peer-reviewed internazionali e diversi capitoli di libri. È inventore di 3 brevetti e ha ricevuto numerosi grant internazionali, compreso American Heart Association e NIH ed è stato premiato da numerose società scientifiche. È Editor in Chief della rivista European Review for Medical and Pharmacological Sciences ed è membro di importanti organizzazioni scientifiche internazionali. Nel 2020 ha ricevuto il premio Internazionale Cicerone per la disseminazione scientifica. Dal 2013 è stato onorato del O1 (US visa) per eccezionali capacità scientifiche dagli Stati Uniti di America.



Biosketch

Dr Flavia Riccardo, MD, PhD

Istituto Superiore di Sanità

<https://www.linkedin.com/in/flavia-riccardo-92a67925/?originalSubdomain=it>

[ORCID: orcid.org/0000-0002-1582-6329](https://orcid.org/0000-0002-1582-6329); Scopus [ID Autore Scopus: 22956431200](#);

https://www.researchgate.net/profile/Flavia_Riccardo

Istituto Superiore di Sanità (ISS) — The Istituto Superiore di Sanità (ISS) is Italy's National Institute of Health and the country's main public centre for research, control and technical-scientific advice in public health. Working alongside the Ministry of Health, the Regions and the National Health Service, ISS contributes to evidence-informed health policies through research, surveillance, laboratory activities and technical support across a wide range of health areas. Linking the work of ISS with international partners in the fields of research and public health is a strategic priority. ISS promotes exchange visits and partnerships through bilateral framework agreements and through the ISS Visiting Scientist programme. ISS also delivers and hosts training and scientific dissemination activities—including events and coordination meetings for national and international projects—supporting collaboration on public health research and capacity building with partners in Italy and abroad.

Biography Flavia Riccardo is an infectious diseases physician and epidemiologist at the Istituto Superiore di Sanità (ISS) in Rome, where she serves as Dirigente di Ricerca. Since July 2025, she coordinates the External Relations Service and International Relations Centre of the ISS, supporting institutional partnerships and international scientific exchange.

Before joining ISS, Dr Riccardo worked in humanitarian and health-system-strengthening roles including in rural Cameroon with the University "Sapienza" Rome in 2004 and in post-tsunami Sri Lanka with the Italian Red Cross in 2005. From 2007 to 2009 she was Associate Expert Epidemiologist at UNRWA HQ in Amman, working across five fields of operations (Jordan, Lebanon, Syria, West Bank and Gaza). In the same period, as a WHO SEARO/CSR consultant,

developed disease-specific alert thresholds and a WHO training package on EWARN/epidemic intelligence.

Since joining ISS in 2009, Dr Riccardo has developed extensive expertise in infectious disease surveillance and response, has guided the establishment of the Italian Network for epidemic intelligence, and has focused her work on preparedness and response to public health emergencies, with a strong focus on emerging and re-emerging infections in a One Health perspective.

At European level, Dr Riccardo has served as national focal point for several disciplines within the European Centre for Disease Prevention and Control (ECDC) including for emerging and vector-borne diseases and for respiratory viruses. She is also an elected member of the ECDC coordination committee for preparedness, threat detection and response.

Internationally, Dr Riccardo collaborates with expert networks of the World Health Organization (WHO), contributing to epidemic intelligence, collaborative surveillance and preparedness initiatives. She is Co-leader of the Working Group on Collaborative Surveillance within the WHO Pan-European Network for Disease Control and participates in technical working groups at both the WHO Regional Office for Europe and WHO Headquarters.

Dr Riccardo is co-author of over 140 peer-reviewed publications indexed in Scopus, with over 4,000 citations.

Marco Silvi

Cons. Amb., Head of Bilateral Scientific Cooperation Office (MAECI)

American University of Beirut, BA in Political science and Public administration, 1999. University of Cambridge, Master of Philosophy in International Relations, 2000. University of Trieste, Degree in International and Diplomatic Sciences, 2001.

Following a competitive examination, admitted to the diplomatic career in 2004. At General Directorate for Mediterranean and Middle Eastern Countries and at the Press and Information Service between December 2004 and September 2005. Confirmed in his role on September 2005 and appointed Secretary of Legation at the Press and Information Service.

Second Commercial Secretary in Baghdad, 2007.

First Secretary for Emigration and Social Affairs in London, United Kingdom, 2009.

First Secretary in Nairobi, Kenya, 2013.

Promoted Counsellor and appointed Head of the International Treaties office at the Service for Legal Affairs, Diplomatic Disputes and Treaties of the Ministry of Foreign Affairs, 2015.

Counsellor in Santiago, Chile, 2017.

Consul General in Casablanca, Morocco, 2021.

Promoted First Counsellor in 2022.

At the Director General for the Promotion of Italy at the Ministry of Foreign Affairs, 2024.

Head of bilateral scientific cooperation office, from August 2025.

Speaks fluently Italian, English, French and Spanish. Working knowledge of Arabic.

USEFUL LINKS

XX Conference Video Registrazione Completa

<https://www.youtube.com/watch?v=GasucQ-IWPA>

XX Conference Video Messaggio Presidente del Senato della Repubblica Ignazio La Russa

<https://www.youtube.com/watch?v=Dj0JhV02Qyg>

XX Conference Video Messaggio del Ministro dell'Università e della Ricerca Sen. Anna Maria Bernini

<https://www.youtube.com/watch?v=GasucQ-IWPA> (dal trentacinquesimo minuto al 36.45)

XX Conference Messaggio del Presidente dell'Enea Dott.ssa Francesca Mariotti

<https://www.youtube.com/watch?v=GasucQ-IWPA> (dal 37 minuto al 41.15)

From the Press:

Video from RAI

<https://m.youtube.com/watch?v=1smbS7uRWuE>

Video da Rete Sole Lazio TV

<https://m.youtube.com/watch?v=2A4RXrh2z0c&pp=iggUQAFKEG8zOUYwZkFRdndQVkp0ZWw%3D>

Video Interviste

<https://www.9colonne.it/616806/roma-xx-conferenza-dei-ricercatori-italiani-nel-mondo>

Dalle Agenzie di Stampa

<https://innovitalia.esteri.it/notizia/xx-conferenza-dei-ricercatori-italiani-nel-mondo>

<https://gazzettadiplomantica.it/la-xx-conferenza-dei-ricercatori-italiani-nel-mondo-celebra-ventanni-di-dialogo-e-cooperazione/>

<https://messaggerosantantonio.it/content/i-ricercatori-italiani-nel-mondo-roma>

<https://messaggerosantantonio.it/content/geni-senza-frontiere-0>

<https://www.italiansnews.it/xx-conferenza-dei-ricercatori-italiani-nel-mondo/>

<https://www.corriere.ca/ricercatori-italiani-nel-mondo-riuniti-a-roma-con-la-xx-conferenza-organizzata-dalla-texas-scientific-italian-community/>

https://www.ilmessaggero.it/AMP/italia/brexit_studenti_italiani_dimezzati-9602762.html

<https://www.cnmng.ca/corriere-canadese-ricercatori-italiani-nel-mondo-riuniti-a-roma-con-la-xx-conferenza-organizzata-dalla-texas-scientific-italian-community-con-la-sapienza-universita/language/italian/worldwide/>

<https://www.aise.it/primo-piano/diaspora-scientifica-italiana-come-ponte-invisibile-ma-solido-fra-il-mondo-e-litalia/233982/1/1/14084>

<https://thedailycases.com/roma-ha-accolto-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>

<https://www.quotidiano.net/speciali/universita/ricercatori-allestero-il-meeting-nella-fbe58f46>

<https://comunicazioneinform.it/a-roma-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>

<https://alloraneews.com/italiani-nel-mondo/ventanni-di-ricercatori-italiani-nel-mondo-a-roma-il-ponte-tra-italia-scienza-e-futuro/>

<https://www.ilfattoquotidiano.it/in-edicola/articoli/2026/07/07/investire-sulla-ricerca-e-investire-sul-futuro/8441236/>

<https://www.genteditalia.org/2026/06/20/a-roma-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/amp/>

<https://agenparl.eu/2026/06/17/si-svolgera-il-18-giugno-2026-a-roma-presso-la-sala-polifunzionale-della-presidenza-del-consiglio-dei-ministri-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>

<https://tremamunno.es/i-ricercatori-italiani-nel-mondo-a-roma/>

<https://gazzettadiplomantica.it/xx-conferenza-dei-ricercatori-italiani-nel-mondo-aperta-la-call-for-abstract/>

<https://www.aise.it/primo-piano/i-ricercatori-italiani-nel-mondo-si-incontrano-a-roma-domani-la-xx-conferenza/233925/142>

<https://www.patrimoniointalianotv.com/italia-video-integrale-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>

<https://www.italiannetwork.it/news.aspx?id=85508>
<https://www.msn.com/it-it/notizie/politica/il-18-giugno-a-roma-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/ar-AA25EcLe>
<https://thedailycases.com/al-via-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://www.aise.it/primo-piano/i-ricercatori-italiani-nel-mondo-si-incontrano-a-roma-domani-la-xx-conferenza/233925/160>
<https://ilmarcopolo.ca/xx-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://www.newmediaeuropeanpress.eu/2026/02/18/xx-edizione-della-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://www.italiachiamaitalia.it/a-roma-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo-scienza-innovazione-e-networking-internazionale/>
<https://www.quotidiano.net/speciali/universita/ricercatori-allestero-il-meeting-nella-fbe58f46>
<https://comunicazioneinform.it/ricercatori-italiani-nel-mondo-xx-conferenza-il-18-giugno-presso-la-presidenza-del-consiglio-dei-ministri/>
<https://www.italiareportusa.com/ultimissime/domani-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://www.aise.it/anno/online-la-registrazione-della-xx-conferenza-dei-ricercatori-italiani-nel-mondo/234440/1>
<https://www.quotidianolavoce.it/2026/06/17/il-18-giugno-a-roma-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://www.giornalediplomatico.it/a-roma-xx-conferenza-dei-ricercatori-italiani-nel-mondo.htm>
<https://www.eventi.enea.it/patrocini-e-contributi/conferenza-dei-ricercatori-italiani-nel-mondo-xx-edizione.html>
<https://italplanet.it/a-roma-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://italplanet.it/i-ricercatori-italiani-nel-mondo-si-incontrano-a-roma-domani-la-xx-conferenza/>
<https://www.quotidiano.net/speciali/universita/pianeta-universita-unifi-rinnova-lofferta-e134cc76>
<https://comunicazioneinform.it/a-roma-la-xx-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://puntodincontro.mx/2026/02/18/vertice-dei-ricercatori-italiani-nel-mondo-a-roma-ci-sara-anche-il-messico/>
<https://www.corrierenazionale.net/2026/06/18/i-ricercatori-italiani-nel-mondo-si-incontrano-a-roma-oggi-la-xx-conferenza/>
<https://www.progetto-radici.it/2026/02/18/xx-edizione-della-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://www.italiansnews.it/xx-edizione-della-conferenza-dei-ricercatori-italiani-nel-mondo/>
<https://www.gruppodonatorisangue.it/xx-edizione-della-conferenza-dei-ricercatori-italiani-nel-mondo/>

***Special Thank You to the Organizing Committee,
Moderators and Speakers,***

***al Dr. Pompeo Savarino e al personale del Dipartimento
dei Servizi Strumentali presso la Presidenza del Consiglio
dei Ministri,***

***al Prof Ciccarone, e a Francesca Pariti
dell'Ufficio Cerimoniale della Sapienza Università di
Roma,***

***a Roberto Ciofi, Fabrizio Marinelli, e al gruppo volontari
dell'Associazione Donatori di Sangue presso la
Presidenza del Consiglio dei Ministri***

***Our appreciation to the Presidenza del Consiglio dei
Ministri for hosting the event, and to all participants at the
XX Conference of Italian Researchers in the World***