INTERDISCIPLINARY SCHOOL

FAPESP 2026

EXACT AND NATURAL SCIENCES,
ENGINEERING AND MEDICINE

MINI BIOS



MARCO ANTONIO ZAGO

President of FAPESP

Graduate from the Medical School of Ribeirão Preto, University of São Paulo (USP), where he obtained the doctoral degree, followed by a postdoctoral training at Oxford University, UK. He was the President of the University of S. Paulo, Dean of Research of the same university, President of the National Council for Scientific and Technological Development (CNPq), and the Health Secretary of the State of Sao Paulo (2018). He is a member of the Brazilian Academy of Sciences, the Academy of Sciences of the State of S. Paulo and the World Academy of Sciences (TWAS). He was the coordinator of a Cell Therapy Center, supported by FAPESP (2001 to 2015), the Clinical Director of the University Hospital of Ribeirão Preto and a member of the National Biosafety Commission (CTNBio).

His main research interests are the hereditary anemias, human population genetics, the molecular bases of malignancies and adult stem cells, especially hematopoietic and mesenchymal stem cells. He mentored more than 30 PhDs, masters and postdocs and edited the most widely used textbook of hematology in teaching health professions and specialists in Brazil. He has published more than 300 scientific articles referred in Web of Science. Research ID E-9442-2017.



ANTONIO JOSÉ DE ALMEIDA MEIRELLES

Administrative diretor of FAPESP

Full Professor at the School of Food Engineering (FEA) of the University of Campinas (UNICAMP). He served as Rector of UNICAMP from April 2021 to April 2025, having previously held the positions of Graduate Studies Coordinator and Director of the School of Food Engineering.

He holds a bachelor's and a master's degree in Food Engineering from Unicamp, a Ph.D. in Process Engineering from the Technische Hochschule Merseburg (now part of Martin-Luther-Universität Halle-Wittenberg-MLU, Germany), and a Ph.D. in Economic Science from the Institute of Economics at UNICAMP.

He is a member of the International Academy of Food Science and Technology (IAFoST) and serves on the Board of Trustees of the Center for Research and Development in Telecommunications (CPQD). Before assuming the position of Administrative Director, he was a member of FAPESP's Board of Trustees.

His research focuses on process engineering, food science and technology, biofuels, bioenergy, and innovation.



SPEAKERS



ALVARO PENTEADO CRÓSTA

University of Campinas (Brazil)

Alvaro Penteado Crósta is Professor Emeritus at the University of Campinas (UNICAMP) and Senior Full Professor at the Institute of Geosciences. He is a Full Member of the Brazilian Academy of Sciences and the São Paulo State Academy of Sciences and holds a Research Productivity Fellowship from CNPq. He served as General Coordinator (Vice-Dean) of UNICAMP from 2013 to 2017. He is a member of the CT-MINERAL Steering Committee (2026–2028), an elected member of the Meteoritical Society Council (2023–2026), a member of the Society of Economic Geologists (SEG) Nominating Committee (2023–2024), and a member of the Scientific and Cultural Council of the UNICAMP Institute of Advanced Studies (IdEA – 2022). He earned his degree in Geology from USP in 1977, completed his master's degree at the National Institute for Space Research (INPE) in 1982, and obtained his doctorate from Imperial College London in 1990. He held visiting researcher positions at the Desert Research Institute (University of Nevada, Reno) from 1995 to 1996; the University of Vienna (Austria) in 2011; Humboldt University (Berlin, Germany) in 2011; and the Jet Propulsion Laboratory (NASA/CalTech) in Pasadena, California, USA, from 2018 to 2019. At UNICAMP's Institute of Geosciences, he served as Department Head, Coordinator of the Graduate Program in Geosciences, Graduate Studies Coordinator, and Director. In UNICAMP's senior administration, he served as Deputy Chief of the Rector's Cabinet and Dean of University Development. His academic fields of expertise are Remote Sensing, Mineral Exploration, and Planetary Geology/Meteorite Craters. He is a member of the Geotechnologies Research Group at UNICAMP. He served on the CAPES Geosciences Area Committee from 2002 to 2013, acting as Deputy Coordinator (2008–2010) and Area Coordinator (2011–2013). He was a member of the Executive Committee for the IODP Brazil Program (International Ocean Discovery Program), appointed by the CAPES presidency (2015–2019). He has served on the CNPq Geosciences Advisory Committee (CA-GC) during the 2015–2018 and 2021–2024 terms. He was elected a Fellow of the Society of Economic Geologists (SEG) in 2010 and received the SEG Regional Vice President Lectureship award that same year. He also served on the SEG Distinguished Lecturer Committee (2011–2013) and was the SEG Regional Vice President for South America (2011–2013). He is currently an Associate Editor for Economic Geology (SEG) and the Brazilian Journal of Geology. He served as an Associate Editor for the Geological Society of America Bulletin (2010–2016) and was a member of the Meteoritical Society's Barringer Medal and Award Selection Committee (2012–2016). He represented Brazil (via CAPES) on the JOIDES Resolution Facility Board of the International Ocean Discovery Program (IODP) (2016–2017). He twice received the Zeferino Vaz Academic Recognition Award from UNICAMP (1994 and 2019). In 2010, he was honored with the Diploma of Merit by the Regional Council of Engineering, Architecture, and Agronomy of the State of São Paulo (CREA-SP). As an academic advisor, he received an Honorable Mention for the CAPES Award in the Geosciences field in 2008 and the CAPES Award in the same field in 2013. He was named an Honorary Citizen of two Brazilian cities—Coronel Vivida (PR) and Vargeão (SC)—in recognition of research conducted on meteorite impact craters located in those municipalities.

EARTH'S OTHER STORY: COSMIC CATASTROPHES THAT SHAPED OUR PLANET

Despite current concerns regarding climate change and its impact on Earth and its life, one must remember that our planet has gone through countless catastrophic events throughout its 4.54 billion years of history. This talk explores some of these events, with particular emphasis on those triggered by extraterrestrial—or cosmic—phenomena. Earth's evolution, and that of the life it supports today, has been shaped by the interplay of endogenous and exogenous processes. These interactions continue to influence our planet and will remain fundamental drivers of its evolution for billions of years to come.



ANDRÉ C. PONCE DE LEON F. DE CARVALHO

University of São Paulo (Brazil)

Professor André CP de Leon F Carvalho holds a PhD in Electronic Engineering from the University of Kent, England. He is a Full Professor and current Director of the Institute of Mathematical and Computer Sciences (ICMC) at the University of São Paulo (USP). He serves as the Coordinator of USP's Office for Digital Transformation and Artificial Intelligence, Vice Coordinator of USP's Center for Artificial Intelligence and Machine Learning (CIAAM), and is a Full Member of the Brazilian Academy of Sciences (ABC). He served two terms as Vice President of the Brazilian Computing Society (SBC). Since 1987, his research has focused on Artificial Intelligence, specifically Machine Learning and Data Science, with applications across various fields. He coordinates the IARA Applied Research Center in Artificial Intelligence (CPAIA) for Smart and Sustainable Cities, one of the 12 Brazilian AI Research Centers supported by the Ministry of Science and Technology, FAPESP, and CGI.br. Additionally, he coordinates the National Institute of Science and Technology (INCT) for AI for Social Good and the Embrapii Unit in Data Science, Computing, and Applied Mathematics at ICMC-USP. A three-time Jabuti Prize finalist (winning in 2012 for the book Artificial Intelligence: A Machine Learning Approach), he has supervised three CAPES award-winning doctoral theses (two for Best Thesis in Computer Science and one Honorable Mention) and four doctoral theses that were finalists in the SBC Thesis and Dissertation Competition (winning two for Best Thesis). In 2025, one of his supervised theses received the awards for Best Doctoral Thesis in Exact and Earth Sciences defended at USP, as well as the UNICAMP - Vladimir Herzog Institute 2025 Academic Recognition in Human Rights in the category of Doctoral Thesis in Exact Sciences, Engineering, and Technology. He served twice as a member of the CNPq Advisory Committee for Computer Science. He participates in several international committees, including the UK Expert Advisory Panel for the AI Safety Report, supported by the UN and OECD. He is the current coordinator of the Working Group on Machine Learning and Data Mining of the International Federation for Information Processing (IFIP).

ARTIFICIAL INTELLIGENCE: WHEN, WHAT, HOW AND WHY

With all the attention it has received in recent years and its widespread use across several application domains, artificial intelligence is in its golden age. In this talk, after briefly presenting the origins of the field and introducing the main basic aspects of artificial intelligence, with a focus on machine learning, I will discuss how the area has evolved, its successes and pitfalls, where artificial intelligence has been successfully used, the international scenario, the situation of artificial intelligence in Brazil, and the main risks and opportunities. During the talk, I will briefly show some applications of artificial intelligence in different areas



BRUNO GUALANO

University of São Paulo (Brazil)

He is a Full Professor in the Department of Internal Medicine at the University of São Paulo Medical School (FMUSP) and President of the FMUSP Lifestyle Medicine Center. He holds a degree in Physical Education from the USP School of Physical Education and Sport (2006); is pursuing a degree in Philosophy at PUC-SP; holds a PhD in Sciences from the USP School of Physical Education and Sport (2010); completed a postdoctoral fellowship in Internal Medicine at FMUSP (2010–2011); completed a postdoctoral fellowship in Philosophy (Theory of Knowledge) at PUC-SP (2024–2025); and is currently completing a postdoctoral fellowship in Philosophy (Ethics and Political Philosophy) at PUCSP. He obtained his "Livre-docência" (Habilitation) from USP (2014). He coordinates the Rheumatology Assessment and Conditioning Laboratory (HCFMUSP) and the Applied Physiology and Nutrition Research Group at FMUSP. He heads the Medical Investigation Laboratory in Rheumatology (LIM17). He previously served as an Associate Professor in the Department of Human Movement Biodynamics at the USP School of Physical Education and Sport (2010–2018) and as an Associate Professor in the Department of Internal Medicine at FMUSP (2018–2026). He has been a visiting professor at Nottingham Trent University (UK) and the Waikato Institute of Technology (NZ). He is an Affiliate Member of the Brazilian Academy of Sciences (ABC) for the 2025–2029 term and an Associate Editor of the British Journal of Sports Medicine. He is a co-creator of the science communication channel "Ciência inForma" and a columnist for "Folha de S.Paulo". He is a member of the Science and Society Coalition and the author of the children's book series "Bel | Ciência para Crianças". His research interests focus on integrative and exercise physiology and lifestyle medicine.

EXERCISE AS THERAPY: YESTERDAY, TODAY, AND TOMORROW

The idea that movement heals is one of medicine's oldest intuitions. As early as Hippocrates, exercise—in the right dosage—was seen as a remedy against illness; it later took on a mechanistic dimension with Descartes, whose "animal spirits" (1649) traveled along the nerves to set the body-machine in motion. It was not until 1953, with Jerry Morris's study of London bus workers, that this age-old perception was transformed into epidemiological evidence. What Descartes had conjectured was finally measured: exercise operates through a systemic molecular repertoire, likely inherited from an evolutionary history that shaped us for movement. Today, there is robust evidence of the therapeutic effects of exercise on conditions as diverse as obesity, cardiovascular disease, autoimmune disorders, and COVID-19. From clinical practice to public health, the contemporary challenge has shifted from the "efficacy" of exercise—which has been amply demonstrated—to its "effectiveness," a matter that remains open to question. Answering what makes someone physically active requires viewing movement not merely as an individual behavior to be corrected through counseling and awareness-raising, but as a health practice shaped by embodied dispositions, unequally distributed resources, and the social fields in which bodies live and work. This shift in perspective has profound implications: the question "how do we convince this person to change?" is joined by another, equally decisive one—what conditions make such a change possible for them? It is this question that should drive the field forward.



CARLOS AUGUSTO MONTEIRO

University of São Paulo (Brazil)

Professor Monteiro earned his medical degree, completed a residency and a master's in Preventive Medicine, and received a doctorate in Public Health from USP. He also completed postdoctoral studies at Columbia University's Institute of Human Nutrition. He built his research and advising career in USP's Department of Nutrition within the Faculty of Public Health, training dozens of graduate students.

A full professor since 1989, he became Professor Emeritus in 2023. From 1990 to 1992, he worked in WHO's Nutrition Unit in Geneva and served as a visiting professor at the universities of Bonn and Geneva. He led NUPENS/USP from 1992 to 2023 and has served as its honorary coordinator since 2023. His research in nutrition and public health has produced several books and more than 300 Web of Science-indexed publications, with over 28,000 citations (H-index: 78). A CNPq scientific productivity fellow since 1981, he has been a level IA researcher since 1989. His Brazil-focused work includes studies of child health and nutrition surveys in São Paulo from the 1970s to the 1990s, which helped reshape nutrition programs in local health units and nationwide. A FAPESP project tracing changes in Brazilians' health and nutrition in the second half of the 20th century led to a book that won the Jabuti Award for Best Natural Sciences and Medicine. His analyses of IBGE Family Budget Surveys offered a new, critical perspective on food security. He also developed and validated a national telephone-survey system for monitoring chronic-disease risk factors. The system won the 2005 SUS Science and Technology Incentive Award and inspired VIGITEL, launched by the Ministry of Health in 2006 across Brazil's 26 state capitals and the Federal District.

Other studies documented Brazil's sharp decline in child malnutrition from 1996 to 2007 and assessed the contributions of poverty reduction and expanded access to essential public services. His research on Brazilian diets and health informed the 2014 Food Guide for the Brazilian Population.

Internationally, his work spans breastfeeding and infant mortality in developing countries, anthropometric indicators, and the nutrition transition. He created NOVA, a globally used food classification system for studying how processing affects diet quality and health, and led numerous population studies linking ultra-processed food consumption to chronic disease. He served on the WHO Nutrition Guidance Expert Advisory Group from 2010 to 2023. Since 2020, he has coordinated NutriNet Brasil, a cohort that monitors the diets and health of more than 100,000 Brazilians. He has been Scientific Editor of the Revista de Saúde Pública since 2004.

In 2010, he received PAHO's Abraham Horwitz Award for Scientific Leadership in Health in the Americas. In 2024, the World Obesity Federation honored him with the William Philip T James Award for contributions to obesity management, prevention, and surveillance. A member of the Brazilian Academy of Sciences since 2007, he has been ranked among the most influential Social Sciences researchers by Web of Science since 2018.

ULTRA-PROCESSED FOODS: A CONVINCING EXPLANATION FROM BRAZILIAN RESEARCHERS FOR THE PANDEMIC OF OBESITY AND OTHER FOOD-RELATED CHRONIC ILLNESSES.

This conference will combine narrative and systematic reviews with original analyses and metaanalyses to assess three hypotheses about a dietary pattern based on ultra-processed foods. The first hypothesis—that this pattern is globally displacing long-established diets centered on whole foods and their culinary preparation as dishes and meals—is supported by decades of national food intake and purchase surveys and recent global sales data. The second—that this pattern results in deterioration of diet quality, especially in relation to chronic disease prevention—is confirmed by national food intake surveys, large cohorts, and interventional studies showing gross nutrient imbalances; overeating driven by high energy density, hyper-palatability, soft texture, and disrupted food matrices; reduced intake of health-protective phytochemicals; and increased intake of toxic compounds, endocrine disruptors, and potentially harmful classes and mixtures of food additives. The third and final hypothesis—that this pattern increases the risk of multiple diet-related chronic diseases through various mechanisms—is substantiated by more than 100 prospective studies, meta-analyses, randomized controlled trials, and mechanistic studies, covering adverse outcomes across nearly all organ systems. The totality of the evidence supports the thesis that the displacement of long-established dietary patterns by ultraprocessed foods is a key driver of the escalating global burden of multiple diet-related chronic diseases. Finally, policy actions and broader public health strategies to promote, protect, and support diets based on fresh and minimally processed foods, and to prevent the displacement of these foods by ultraprocessed foods, will be specified.



DRÁULIO BARROS DE ARAÚJO

Federal University of Rio Grande do Norte (Brazil)

Dráulio Barros de Araújo is a full professor at the Brain Institute of the Federal University of Rio Grande do Norte (UFRN). He holds bachelor's and master's degrees in physics and a PhD in Physics Applied to Medicine and Biology from the University of São Paulo, where he also earned his "livre-docência"3. (habilitation). He was a Fulbright visiting scholar at the University of California, Santa Barbara (UCSB). His research integrates neuroscience techniques and clinical trials to investigate the neural bases of altered states of consciousness and the therapeutic potential of psychedelic substances— particularly ayahuasca and DMT—in treating depression. He coordinates clinical and translational studies in the field of psychedelic medicine and directs the Advanced Center for Psychedelic Medicine. His work seeks to bridge neuroscience, clinical practice, mental health innovation, ethics, and dialogue with traditional knowledge systems.

FROM PHYSICS TO PSYCHEDELICS: BRAIN, CULTURE, AND MENTAL HEALTH

In this lecture, I aim to present a personal and scientific journey marked by the convergence of different fields of knowledge: from physics applied to medicine and neuroscience, from functional neuroimaging to clinical mental health research, to studies involving ayahuasca and DMT, and to dialogue with traditional knowledge. Drawing on this trajectory, I will discuss how complex issues—such as consciousness, depression, and altered states of consciousness—demand approaches that transcend rigid disciplinary boundaries. The talk will address neurobiological and clinical evidence from our studies on psychedelic substances, as well as their historical, cultural, ethical, and social contexts. The central idea is to demonstrate how integrating natural sciences, the humanities, clinical practice, therapeutic innovation, and traditional knowledge can spark new questions and open new pathways.



MAURO PIACENTINI

University of Rome “Tor Vergata” (Italy)

Prof. Mauro Piacentini is Professor Emeritus of Cell and Developmental Biology at the University of Rome “Tor Vergata” since 2024. He also served there as Full Professor (2000–2003), as an elected member of the Board of Directors (2013–2021), and as President of the Degree Program in Biotechnology (2005–2013). Since 1998, he has been the Director of the Laboratory of Cell Biology and Electron Microscopy at the National Institute for Infectious Diseases IRCCS “Lazzaro Spallanzani”. From 2018 to 2025, he served as President of the Technical Health Committee of the Italian Ministry of Health. Since 2006 is Scientific Director of Heal Italia Foundation. He is actively involved in numerous scientific and educational collaborations with prominent international institutions (Karolinska Institute in Sweden, Gustave Roussy Institute and Paris Cite University in France, Newcastle University in the UK, Russian Academy of Sciences, Federal University of São Paulo in Brazil, and Debrecen University in Hungary). He was President of the European Cell Death Organization (2002–2005). His many successful international collaborations earned him, among other honors, the prestigious European “Descartes Award” for collaborative research in 2007. He is one of the founders and senior editors of the journal Cell Death and Differentiation (IF 13.6) and Editor-in-Chief of Cell Death and Disease (IF 12.4), both published by Springer/Nature. His scientific output includes approximately 400 peer-reviewed articles (H-index: 90 on Scopus, 107 on Google Scholar, and over 65,000 citations), published in leading international journals (Nature, Science, Nature Medicine, Nature Cell Biology, Journal of Experimental Medicine, PNAS, etc.). He has delivered numerous invited scientific lectures at major national and international conferences (Gordon Conference, Nobel Conference, Philippe Laudat Conference, ECDO Conference, among others). His scientific interests have focused on the study of molecular mechanisms regulating cell death and autophagy, and their role in the pathogenesis of cancer (Head and Neck, Hepatocellular Carcinoma, Melanoma, Neuroblastoma) and infectious diseases (HIV, HCV, MTB). He has received numerous national (AIRC, Telethon, Ministry of Health, Ministry of University, CNR, Istituto Superiore di Sanità, Lazio Region, Cystic Fibrosis Foundation) and international grants (9 European projects and a Mega-Grant from the Russian Academy of Sciences), totaling over 10 million euros.

SCIENTIFIC PUBLISHING IN THE ERA OF ARTIFICIAL INTELLIGENCE

The rapid development of artificial intelligence (AI), particularly large language models (LLMs) and generative AI, is profoundly transforming the landscape of scientific publishing. AI is reshaping every stage of the publication process, from literature discovery and hypothesis generation to manuscript drafting, language editing, peer review, and post-publication analysis. These technologies have the potential to increase productivity, improve accessibility for non-native English speakers, accelerate knowledge dissemination, and facilitate the synthesis of rapidly expanding scientific literature. At the same time, the widespread adoption of AI raises important concerns regarding scientific integrity, authorship, transparency, reproducibility, plagiarism, fabricated data and references, algorithmic bias, and the potential amplification of misinformation. Publishers, editors, reviewers, and research institutions are therefore challenged to establish clear ethical frameworks and robust guidelines governing the responsible use of AI throughout the scientific workflow. Rather than replacing human expertise, AI should be viewed as an assistive technology that complements critical thinking, scientific creativity, and ethical judgment, while preserving human accountability for the accuracy and originality of published research. Future scientific publishing will likely evolve toward a hybrid model in which AI supports routine and analytical tasks, whereas human researchers maintain responsibility for hypothesis generation, experimental design, interpretation of results, and final editorial decisions. Ensuring transparency in AI-assisted writing, developing reliable AI-detection and validation tools, and promoting international standards for responsible AI use will be essential to maintain trust in scientific literature. Ultimately, the integration of AI into scholarly communication represents both an unprecedented opportunity to accelerate scientific discovery and a critical test of the research community’s ability to preserve the principles of rigor, reproducibility, and integrity that underpin scientific progress.



NGUYEN TK THANH MAE

University College London (United Kingdom)

Prof. Thanh held a University Research Fellowship (2005-2014) and served as Professor of Nanomaterials at University College London's Healthcare Biomagnetic and Nanomaterials Laboratories and the Department of Physics and Astronomy. Her research career began in 1992, when she received Vietnam National University, Hanoi's top Chemistry achievement award and a NUFFIC scholarship to study at the University of Amsterdam. In 1994, she earned an EU-funded PhD in Biochemistry, developing a method to analyze lipids in rat kidneys and urine. Her findings showed that lipids could serve as noninvasive markers for renal papillary necrosis, a disease linked to long-term analgesic abuse.

After postdoctoral research in medicinal chemistry at Aston University in 1999, she developed cell-permeable fluorescent analogs of cAMP and cGMP to study memory storage. This work gave her chemical synthesis expertise that later informed her nanotechnology research. In 2001, she moved to the United States and combined her skills to create nanoparticle-based biological sensors, demonstrating how nanotechnology could make bioanalytical tests faster and less costly. She also developed a sensitive, specific antibody immunoassay using gold nanoparticles, which inspired her to pursue nanotechnology.

In 2003, she joined the Liverpool Center for Nanoscale Science, where she gained interdisciplinary experience and collaborated with biological researchers and physicists studying nanoparticle properties. In 2005, she received a Royal Society University Research Fellowship and a lectureship at the University of Liverpool. In 2009, she became a UCL-RI Reader in Nanotechnology, leading research on nanomaterial design, synthesis, physical properties, and biomedical applications. Promoted to Professor of Nanomaterials in 2013, she now leads an interdisciplinary group developing nanomaterials for biomedicine.

She is Editor-in-Chief of the Royal Society of Chemistry's Nanoscience and Nanotechnology book series and an Associate Editor of Nanoscale and Nanoscale Advances (2024–present). Prof. Thanh has published more than 246 peer-reviewed papers, with 26, 26,630 citations and an h-index of 49.

NANOMATERIALS FOR THE FUTURE

The strategic engineering of advanced nanomaterials is a cornerstone of next-generation healthcare technologies. Among these, plasmonic and magnetic nanomaterials have emerged as powerful platforms because of their unique optical, electronic, and magnetic behaviors at the nanoscale. By combining these properties, researchers can design smart, multifunctional systems that bridge the gap between diagnosis and therapy (theranostics). This innovative research leverages the synergistic effects of noble metals and magnetic oxides to overcome the limitations of conventional medicine, offering highly precise, minimally invasive solutions for early disease detection and targeted cancer treatments. The four pillars of the research framework are:

1. Design: Conceptualizing complex hybrid architectures (such as core-shell, heterodimers, or branched structures) to maximize synergy between magnetic and plasmonic fields while ensuring longterm colloidal stability.
2. Synthesis: Utilizing advanced chemical routes (including thermal decomposition, co-precipitation, and microfluidic synthesis) to achieve rigorous, reproducible control over the size, shape, and crystallinity of the nanoparticles.
3. Characterization: Employing state-of-the-art analytical tools—such as Transmission Electron Microscopy (TEM), X-ray Diffraction (XRD), and SQUID magnetometry—to assess physical metrics and validate precise structure-property relationships.
4. Biofunctionalization: Engineering the nanoparticle surface with biocompatible polymers (e.g., PEG) and specific targeting ligands (antibodies, peptides, or aptamers) to evade immune clearance andselectively bind to molecular biomarkers.

The lecture will cover examples and applications of magnetic and metallic nanoparticles.



RISTO ILMONIEMI

Aalto University (Finland)

Risto Ilmoniemi is Professor Emeritus (Applied Physics) at the Department of Neuroscience and Biomedical Engineering at Aalto University. During his early career, he pioneered magnetic measurements of human brain activity, building the world's first multichannel SQUID magnetometer for brain mapping in 1983 and developing signal-analysis methods for data interpretation. After postdoctoral work at New York University, he led efforts in the 1990's at the Helsinki University Hospital to develop transcranial magnetic stimulation (TMS) technology; he founded Nexstim Ltd in 2000, acting as its Chairman and CEO until 2005. He now coordinates the ERC Synergy project ConnectToBrain (2019–2027), in which multi-locus TMS (mTMS) is developed to enable precise and effective modulation of brain networks based on real-time feedback from EEG and other recordings. He is a co-founder of Cortisys Ltd, which develops and markets multi-locus TMS systems.

BUILDING A BIDIRECTIONAL ELECTROMAGNETIC LINK TO THE BRAIN: COMBINING MULTILOCUS TMS, EEG, AND AI

Among the deepest motivations in science are the beauty and logic of mathematics and physics, as well as questions that seem to reach beyond them. For example, are events ultimately predetermined or random, and where, in the physical world, including AI machinery, is there room for consciousness or free will? Such thought experiments can inspire one to study neuroscience, where mathematics, electromagnetism, electronics, and medicine converge in the effort to characterize, understand, and influence the human brain.

Particularly striking examples of this convergence are electroencephalography (EEG), magnetoencephalography (MEG) and transcranial magnetic stimulation (TMS). With EEG and MEG, one can observe brain activity by measuring electromagnetic fields outside the head. In contrast, TMS allows modulating brain activity with brief, strong magnetic-field pulses that induce electric currents in the brain, depolarizing neuronal membranes and triggering action potentials. This method is used in basic research, diagnostics, and therapy. However, conventional TMS therapy is still largely nonindividualized: pulses are typically delivered repeatedly to a single target, with limited adaptation to the patient's brain state or response.

We have developed the first multi-locus TMS (mTMS) devices, collaborating closely also with the University of São Paulo. These instruments can change the location and orientation of the stimulating electric field electronically, in less than 1 ms, without moving the coils. This has required overcoming considerable engineering challenges: TMS systems operate with currents of thousands of amperes and instantaneous power in the megawatt range. Our current five-coil system enables electronic targeting and electric-field orientation control within a cortical region approximately 30 mm in diameter.The combination of simultaneous mTMS and EEG creates a bidirectional, non-invasive link to the brain. EEG can reveal the brain's state and its immediate response to stimulation, while computer algorithms can use this information in real time to select the next stimulus. Our long-term goal is a closed-loop system that interacts with the brain somewhat like a therapist: listening, responding, and continuously adapting the approach.

By bringing together physics, mathematics, neuroscience, and artificial intelligence, this approach may substantially improve the precision, individualization, and therapeutic efficacy of brain stimulation.



SUJIT SIVASUNDARUM

University of Cambridge

Sujit Sivasundarum is Professor of World History and Fellow, Gonville and Caius College. His research focuses on world history, particularly the eighteenth and nineteenth centuries, although his more recent work has expanded well beyond these periods. He began his academic career as a Research Fellow in History at Gonville and Caius College, University of Cambridge, in 2001. He subsequently served as a College Teaching Officer at the college, supervising across the range of world history papers. He then took up a Lectureship in South Asian History at the London School of Economics. He returned to the University of Cambridge in 2010 and was appointed Professor of World History in 2019. He has also served as Director of the University's Centre of South Asian Studies.

Throughout his career, he has held visiting fellowships in Paris, Singapore, Munich, and Sydney. From 2015 to 2017, he was the Sackler Caird Fellow at the National Maritime Museum in Greenwich. In 2012, he was awarded the Philip Leverhulme Prize for History, and in 2023, he was elected a Fellow of the British Academy.

His graduate training was in the History and Philosophy of Science. His research now engages with imperial history, the history of science, environmental history, cultural history, the history of race, Indian Ocean history, and Pacific Ocean history. His distinguished lectures include the Royal Historical Society's Prothero Lecture (2019), the University of Edinburgh's Fennell Lecture (2018), the Innes Lecture in Norwich (2025), the Stenton Lecture at the University of Reading (2025), and the Mossman Lecture at McGill University, Canada (2026). In addition, his 2022 keynote lecture, delivered at the University of Jaffna in northern Sri Lanka to mark one hundred years of the humanities and social sciences, is available online.

THE INDIAN OCEAN AND ENVIRONMENTAL FRAGMENTS

The Indian Ocean's history brings together the richest diversity of human exchanges, migrations, and cultural patterns. Though it trails behind the other two major oceans by way of its size, it is estimated that around one third of the global population lives facing this vast sea. In order to provide some new insights into the environmental history of this busy maritime highway, this lecture works from history, outwards to other disciplines. It also concentrates on various environmental 'bits and pieces', which I call fragmentary or elemental, in order to think through how humans and material from nature, including various species, interacted across this sea over the long-term. Here I focus on four of the 'bits and pieces' that I'm currently working on: coir rope, cowrie shell, ambergris and sea cucumber. Their persistence over the long-term despite their smallness or slipperiness; their durability when worked up and cast as technique in human hands; their ability to build up to structures like exploration, religiosity, capitalism, imperialism or globalisation; the way in which they create material composites and symbolic associations with other materials but also critically here in what I will say with the human frame itself; all of this means that there is a case for further scrutiny of this class of stuff which is often misplaced in historical narration.



THIAGO LIMA NICODEMO

University of Campinas (Brazil)

Thiago Lima Nicodemo is the undersecretary responsible for the Public Archive of the State of São Paulo, an associate professor (livre-docente) of Theory of History at Unicamp, and head of the Center for Digital Humanities at IFCH-Unicamp (https://www.chd.ifch.unicamp.br). He chaired the State Commission for Access to Information (CEAI) between 2021 and 2023 and has served as its executive secretary since 2024. He is also the technical lead for the Digital Memorial of the Covid-19 Pandemic, an initiative of the Pan American Health Organization (PAHO) and the Ministry of Health (https://memorialdigitalcovid19.org.br).

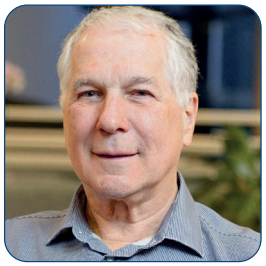
With a degree in History from USP and in Law from PUC-SP, he holds a master's and a doctorate in Social History from USP. He completed two post-doctoral fellowships at the Institute of Brazilian Studies at USP (Fapesp, 2012 and 2014) and obtained his livre-docência degree from Unicamp (2025). He was a researcher at the Freie Universität Berlin as an Alexander von Humboldt Foundation fellow in the experienced researcher category (2017-2020). He has served as a researcher or professor at Adam Mickiewicz University in Poznań (2019), Stony Brook University (2015), the Oliveira Lima Library/The Catholic University of America (2014), the University of Texas at Austin (2009-2010), and the University of Bologna (2007). He is the author of Urdidura do vivido (Edusp, 2008) and Alegoria moderna (Unifesp, 2014), and co-author, with Pedro A. C. dos Santos and Mateus Pereira, of Uma introdução à história da historiografia brasileira, 1870-1970 (FGV, 2018). Together with the same co-authors and through the same publisher, he is currently publishing Eurocentrismo e história: ensaio sobre a historiografia do século XXI.

In the Government of the State of São Paulo since January 2021, he is responsible for the state policy on document management. This encompasses the SEI.sp, SEI Cidades, and Documentos Digitais systems of the SP Sem Papel program, as well as Despapeliza.SP, all aimed at digital transformation and the streamlining of public administration. He currently leads the implementation of the State Digital Preservation Policy and a public repository for digitized and born-digital documents and data.

THE HUMANITY OF THE MACHINE: SOVEREIGNTY, RESPONSIBILITY, AND EDUCATION IN THE DIGITAL HUMANITIES

Debates on artificial intelligence usually ask what the technology does to the humanities; this talk asks what the humanities can bring to the machine, and to the training of those who will build and govern it. Rather than defending their specificity, it seeks the ground the humanities share with other disciplines and with code itself, read as a historical artifact. Three questions follow: sovereignty, or who controls the infrastructure, data and archives on which AI and public memory depend; responsibility, or how historical method, provenance and critique can keep AI-assisted knowledge accountable; and formation, or what the humanities should bring to AI curricula, so that future professionals can understand and shape these tools, not merely use them.

SCIENTIFIC COMMITTEE



OSWALDO BAFFA FILHO

USP

Dr. Oswaldo Baffa Filho is a Full Professor of Physics at the Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo (FFCLRP-USP), where he has served on the faculty since 1981 and as full professor since 1996.

He received his Bachelor's (1976), Master's (1980), and Ph.D. (1984) degrees in applied physics from the Instituto de Física e Química de São Carlos, Universidade de São Paulo (IFQSC-USP).

His research focuses on interdisciplinary problems at the interface of biophysics and medical physics, with pioneering contributions to radiation dosimetry using Electron Spin Resonance (ESR/EPR) and Magnetic Resonance Imaging (MRI) in radiotherapy, alongside investigations in ESR dating, biomagnetism, and biomedical instrumentation.

A recipient of fellowships from both the John Simon Guggenheim Memorial Foundation and the Fulbright Foundation, Dr. Baffa conducted postdoctoral research in the Department of Medical Physics at the University of Wisconsin–Madison, where he maintains an active collaboration as a visiting professor through 2027.

His international academic activities also include serving as a lecturer for the International Centre for Theoretical Physics (ICTP) in Trieste, Italy.

Throughout his career, Dr. Baffa has held major leadership roles, including Director and Vice-Director of FFCLRP-USP, President of the Medical Physics Commission of the Brazilian Physical Society, member of the executive board of Biomedical Physics and Engineering Express (BPEX), of the International Advisory Board of Physics in Medicine and Biology, and associate editor of the Brazilian Journal of Physics.

He is a CNPq 1A-Physics Researcher who has published over 300 scientific articles and mentored numerous graduate students and researchers in Brazil and abroad.



DEISY DAS GRAÇAS DE SOUZA

UFSCar

Full Professor in the Department of Psychology at the Federal University of São Carlos. She has been a visiting scholar at University of Maryland Baltimore County and at the Eunice Kennedy Shriver Center for Mental Retardation.

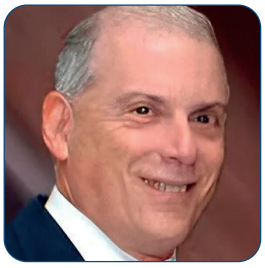
She earned her PhD in Experimental Psychology from the University of São Paulo.

She has experience in basic research on learning in non-human subjects (avoidance behavior, choice, and cooperation) and in experimental, applied, and conceptual analyses of phenomena involving stimulus control, such as symbolic behavior, learning by exclusion, stimulus equivalence, and the recombination of behavioral repertoires.

She has published in prominent journals, both in Brazil and abroad and she has extensive experience in advising master's and doctoral students, as well as in supervising postdoctoral research projects.

She is Fellow of the Association for Behavior Analys International (ABAI) and has served as the president of the Brazilian Association of Psychology, member of the Executive Council of ABAI, member of the Board of Directors of the Society for the Advancement of Behavior Analysis (SABA), member of the Council of the Institute for Advanced and Strategic Studies (IEA-E) at UFSCar, and Editor of the journals Acta Comportamentalia and the Brazilian Journal of Behavior Analysis.

He has also held the positon of member of the Area Panels of the São Paulo Research Foundation (FAPESP) in Life Sciences and Social Sciences.



EMMANUEL DE ALMEIDA BURDMANN

USP

Associate Professor in the Division of Nephrology, Department of Internal Medicine, at the University of São Paulo Medical School in Brazil. He earned his medical and PhD degrees from the University of São Paulo, where he also completed his fellowship. He completed his postdoctoral fellowship with Professor William Bennett at Oregon Health Sciences University. A member of numerous scientific societies, he is the past president of both the Latin American Society of Nephrology and Hypertension and the Brazilian Society of Nephrology. He has served on the Council of the International Society of Nephrology and the Kidney Disease Improving Global Outcomes (KDIGO®) Executive Committee, and as co-director of the 0by25 Program of the International Society of Nephrology. Prof. Burdmann helped develop the KDIGO® 2012 clinical practice guidelines on acute kidney injury. He serves on the editorial board of PLOS One and the American Journal of Kidney Diseases and has authored or co-authored more than 230 journal manuscripts. His H-index is 48. He has been included in the Stanford/Elsevier list of the world's top 2% most-cited scientists every year since 2020 for single-year citation impact and since 2022 for career-long citation impact.



GABRIELA PELLEGRINO SOARES

USP

Gabriela Pellegrino Soares is Professor of Contemporary History of the Americas at the University of São Paulo (USP), a CNPq Research Fellow, and co-director of the Transatlantic Cultures open platform (https://transatlantic-cultures.org), funded by Fapesp, ANR and CNRS. She has been a visiting professor at IHEAL, Sorbonne Nouvelle University, and at the University of Concepción in Chile, as well as a visiting scholar at New York University, besides cooperating with Universities of Argentina, Colombia, Germany and Mexico. She is scientific advisor of FAPESP´s Board for Social Sciences, Humanities and Arts and coordinates the History Advisory Committee at CNPq. She is also vice-president of the Comité International des Sciences Historiques, founded in Ginebra in 1926.
Gabriela Pellegrino is a member of the scientific board of the Peruvian journal ISHRA - Instituto Seminario de Historia Rural Andina -, Historia, published by the University of Concepción, and of the Hispanic American Historical Review (Duke University Press). Her research focuses on Cultural and Political History, mainly on the history of publishing, the uses of reading, and the social circulation of ideas in the Americas.



JOÃO SETTE WHITAKER FERREIRA

USP

João Sette Whitaker Ferreira is an architect, urban planner, and economist; he is a full professor and the current Dean of the Faculty of Architecture, Urbanism, and Design at the University of São Paulo. He has international experience as a visiting professor at various institutions in France and was awarded an Honoris Causa Doctorate by the University of Lyon. He is the author of several books covering topics such as urban planning, urban economics, urban sociology, and social housing. He also has experience in public administration, having served as the Secretary of Housing for the city of São Paulo from 2015 to 2016.



NANCY LOPES GARCIA

Unicamp

Full Professor in the Department of Statistics and Associate Director of the Institute of Mathematics, Statistics and Scientific Computing (IMECC) at the University of Campinas (UNICAMP), Brazil. She previously served as Vice-Rector for Graduate Studies at UNICAMP and currently serves as Area Coordinator for Mathematics, Probability, and Statistics at CAPES. She has also served on the Mathematics and Statistics Advisory Committees of FAPESP and CNPq, as Vice-President of the Brazilian Mathematical Society, and as Editor-in-Chief of the Brazilian Journal of Probability and Statistics. Her research interests lie in Probability and Statistics, particularly stochastic processes, spatial point processes, perfect simulation, and statistical inference, with recent work also focusing on high-dimensional functional data analysis (FDA).



SORAYA SOUBHI SMAILI

Unifesp

Full Professor at the Pharmacology Departament, Escola Paulista de Medicina (EPM) of the Federal University of São Paulo (UNIFESP). She is graduated from University of São Paulo (USP), obtained a Master, a PhD, and a *Livre-Docência* degree in Pharmacology from the Escola Paulista de Medicina. She completed postdoctoral studies at Thomas Jefferson University and the National Institutes of Health (NIH), served as a Visiting Researcher at the NIH and was a Fogarty Foundation fellow. She currently coordinates the UNIFESP Center for Global Health (www.saudeglobal.unifesp.br), the Center for Society, University, and Science (SOU_CIENCIA, www.souciencia.unifesp.br), and the Laboratory of Spatial Multi-omics / Advanced Center for Molecular Diagnostics (https://diagnosticomolecular.unifesp.br/). She serves on several boards, including the Conrado Wessel Foundation and is a Research Fellow Level A (the highest tier) at the National Council for Scientific and Technological Development (CNPq). She holds Chair number 36 at the National Academy of Pharmacy and is a member of the São Paulo State Academy of Sciences (ACIESP). She is the Vice-President of the Brazilian Society for the Advancement of Science (SBPC), having previously served as a regional secretary and board member. She is a member of the National Council for Science and Technology, which advises the Presidency of the Republic. She served as Rector of the Federal University of São Paulo for two terms (between 2013 and 2021).

SCIENTIFIC COMMITTEE ADMINISTRATIVE & FINANCIAL SUPPORT

David Santiago (USP)

Mariana Caldeira Pires do Rio Caldeira (USP)

Patricia Raffaini (USP)

Phelipe Mott (USP)

FAPESP´S EVENT OPERATIONS TEAM LOCAL ORGANIZING COMMITTEE

Marcelo Meletti

Vera Sirin

Rodrigo Leme

Maria Cristina Shigaki

Camila Mola

PROGRAM

November, 9
(Monday)

17h00 Registration *(Hotel Reception)*
18h00 Opening ceremony *(Safira Room)*
19h00 **Marco Antonio Zago,** *FAPESP's President*
The path from knowledge discovery to innovation in the age of artificial intelligence
Antonio José de Almeida Meirelles, *Administrative diretor of FAPESP*
Oswaldo Baffa | Gabriela Pellegrino Soares | Emmanuel Burdmann
Scientific Committee representatives
20h00 Dinner *(Safira Room)*
22h00 End of the day

November, 10
(Tuesday)

08h30 CONFERENCE 1
Risto Ilmoniemi, *Aalto University (Finland)*
Building a Bidirectional Electromagnetic Link to the Brain: Combining multi-locus TMS, EEG and AI
09h30 Discussion
10h00 Coffee break
10h30 Oral pitch presentations – post docs
12h00 Lunch *(Cavalariça restaurant)*
14h00 CONFERENCE 2
Dráulio Barros de Araujo, *UFRN*
From Physics to Psychedelics: Brain, Culture and Mental Health
15h00 Discussion
15h30 Oral pitch presentations – post docs
16h20 Poster session / Coffee break
17h30 Joint conference with Ecenem *(Azul Room)*
Carlos Monteiro, *USP*
Ultra-processed foods. A convincing explanation from brazilian researchers for the pandemic of obesity and other food-related chronic illnesses
19h00 Dinner *(Cavalariça restaurant)*
21h00 End of the day

November, 11
(Wednesday)

08h30 CONFERENCE 3
Bruno Gualano, *FMUSP*
Exercise as Therapy: Yesterday, Today and Tomorrow
09h30 Discussion
10h00 Coffee break
10h30 CONFERENCE 4
Mauro Piacentini, *University of Rome "Tor Vergata" (Italy)*
Scientific Publishing in the Era of Artificial Intelligence
12h00 Discussion
12h30 Lunch *(Cavalariça restaurant)*
13h30 Meeting point *(reception desk)*
14h00 Departure to site visit
LNLS: Brazilian Synchrotron Light Laboratory – Campinas/SP
20h00 Dinner *(Cavalariça restaurant)*
21h00 End of the day

November, 12
(Thursday)

08h30	CONFERENCE 5 **Álvaro Penteado Crósta**, *Unicamp* *Earth's Other Story: Cosmic Catastrophes that Shaped our Planet*
09h30	Discussion
10h00	Coffee break *(Safira Room)*
10h30	Oral pitch presentations – post docs
12h00	Lunch *(Cavalariça restaurant)*
14h00	CONFERENCE 6 **Nguyen TK Thanh**, *University College London (United Kingdom)* *Nanomaterials for the Future*
15h00	Discussion
15h30	Oral pitch presentations – post docs
16h20	Poster session / Coffee break
17h30	Joint conference *(Azul Room)* **Sujit Sivasundarum**, *University of Cambridge* *The Indian Ocean and Environmental Fragments* *Moderator: Gabriela Pellegrino Soares (USP)*
19h00	Dinner *(Cavalariça restaurant)*
21h00	End of the day

November, 13
(Friday)

08h30	Joint panel *(Azul Room)* **André Carvalho**, *USP* *AI – Artificial Intelligence: when, what, how and why* **Thiago Nicodemo**, *Unicamp* *The Humanity of the Machine: Sovereignty, Responsibility and Education in the Digital Humanities* *Moderator: Oswaldo Baffa Filho*
09h30	Discussion
11h30	Closing remarks
12h00	Check-out
12h00	Lunch *(Cavalariça restaurant)*
13h00	Departure *(meeting point - reception desk)*


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