2023 MIT Madrid Symposium

November 7, 2023 9:30 am - 2:30 pm

9:30 AM Welcome and Introduction

Raimundo Pérez-Hernández
Director
Ramón Areces Foundation

Klaus Schleicher
Director, MIT Industrial Liaison Program

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Director
MIT Industrial Liaison Program

Klaus Schleicher joined the Office of Corporate Relations in 2013. He has a Global Operations and Technology background that has delivered rapid profitable growth in the imaging systems, speech recognition, IT security and consulting, digital printing & media industries. He has executive experience in Sales, Marketing, Product Development, Strategy and Business Development and has held senior positions at Universal Wilde, Presstek Inc., Consul Risk Management B.V. (IBM), Lernout & Hauspie (Nuance), Agfa (Bayer Corp.) and Honeywell Inc. He holds a Master Degree in Computer Science and Engineering, from the Technical University of Giessen in Germany.

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Eduardo Garrido
Program Director, MIT Industrial Liaison Program

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Eduardo Garrido is a Program Director at the Office of Corporate Relations at MIT.

Eduardo Garrido has a strong multicultural and multidisciplinary background, with deep expertise in higher education, banking and management consulting, acquired in Argentina, Spain and USA. He currently serves as Program Director at the Industrial Liaison Program, Office of Corporate Relations (MIT), the largest conduit between corporations and MIT.

Before joining MIT, Eduardo was the Director of Santander Universities at Santander Bank, N.A., based in Boston, MA. In this role, he managed the institutional and business relationship with 46 universities, mainly in the northeastern US. He also served as Santander US representative at President Obama's 100,000 Strong in the Americas initiative and the Woman for Africa Foundation, among other relevant global higher education projects, and as Member of the Global President's Council at NYU and the Advisory Boards of the Deming Cup, ECLA (Columbia University) and Newcastle University Business School.

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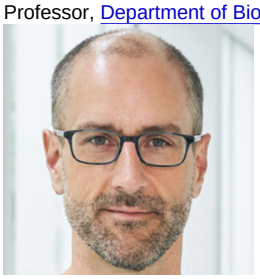
Before his assignment at Price Waterhouse he served as Director of Consulting Services at MSA International, Inc. and as Financial Control Manager at Citibank España, S.A.

Eduardo graduated as Industrial Engineer at Universidad de Buenos Aires and has a MBA

9:45 AM

Next-Generation Nucleic Acid Materials for Healthcare

Mark Bathe
Director, MIT New Engineering Education Transformation
Member, Harvard Medical School Initiative for RNA Medicine
Associate Member, Broad Institute of MIT and Harvard
Professor, Department of Biological Engineering



Mark Bathe
Director, MIT New Engineering Education Transformation
Member, Harvard Medical School Initiative for RNA Medicine
Associate Member, Broad Institute of MIT and Harvard
Professor
Department of Biological Engineering

Mark Bathe is a Professor in the Department of Biological Engineering at MIT, Director of the MIT New Engineering Education Transformation, Member of the Harvard Medical School Initiative for RNA Medicine, and Associate Member of the Broad Institute of MIT & Harvard. He obtained his Doctoral Degree at MIT working in the Departments of Mechanical, Chemical, and Biological Engineering before moving to the University of Munich as an Alexander von Humboldt Fellow to carry out his postdoctoral research in Biological Physics. He returned to MIT in 2009 to join the faculty in the Department of Biological Engineering, where he runs an interdisciplinary research group focused on engineering nucleic acids for application to vaccines, therapeutics, structural biology, and computing. He is academic co-founder of Cache DNA, Inc. and Kano Therapeutics, Inc., and in his free time he enjoys running, biking, swimming, and skiing amongst other outdoor activities.

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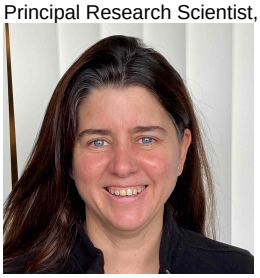
Nucleic acids have emerged in the 21st Century as a central molecule for advanced therapeutics, vaccines, diagnostics, and pathogen surveillance. Prominent examples include clinically approved antisense oligonucleotides (ASOs) and short interfering RNAs (siRNAs) for the treatment of numerous genetic disorders and diseases; messenger RNA (mRNA) vaccines for COVID19; and PCR-based point-of-care tests for SARS-CoV-2, as well as other RNA viruses. Despite these recent remarkable successes, numerous major challenges remain to fully leverage the power of nucleic acid based materials for healthcare. These include the challenge of realizing targeted, *in vivo* delivery of nucleic acid therapeutics and vaccines to any site of disease in the human body needed to treat over 10,000 genetic disorders and diseases, as well as innumerable deadly cancers. And second, the ubiquitous and worldwide collection, storage, and analysis of genomic DNA and RNA from humans, as well as emergent pathogens, needed to understand the genetic basis of rare diseases and better manage or avoid entirely future pandemics. In this talk, I'll present next-generation nucleic acid based materials to address these preceding challenges by enabling the targeted *in vivo* delivery of therapeutic nucleic acids by mimicking attractive properties of viruses such as AAV, while circumventing their severe limitations, and enabling the extremely large-scale, ubiquitous collection and storage of genomic DNA and RNA samples from humans and pathogens worldwide using innovative, scalable nucleic acid encapsulation and barcoding strategies for genomic analysis and surveillance.

10:30 AM

Understanding the Interface of Vascular and Mental Health: From Nano and Microscale to Tissues, Organs and Patients
Mercedes Balcells-Camps
Principal Research Scientist, MIT Institute of Medical Engineering & Science



Mercedes Balcells-Camps
Principal Research Scientist
MIT Institute of Medical Engineering & Science

Dr. Balcells-Camps is a Principal Research Scientist at MIT's Institute for Medical Engineering and Science and *Profesora Titular* in Bioengineering at Institut Químic de Sarrià in Barcelona. Her research in tissue engineering has shown how endothelial cell states are critical to tissue response to injury. She was the first to show that cells respond to flow frequency not just shear stress and in a manner which is tissue bed dependent. She demonstrated that endothelial cells from the heart and blood vessels, lungs or gastrointestinal tract proliferate optimally under flow conditions whose frequency is tuned to the operating frequency of their host tissue. This simple notion was borne out in sophisticated experimental models carefully matched through dimensional analysis. Dr. Balcells' group developed novel culture methods and perfusion systems that enable patient-specific geometrical parameters to tissue response. Those methods have been used to characterize cellular response to medical devices and pharmaceutical formulations in collaboration with industry.

Through her dual appointment at MIT and Institut Quimic de Sarria, Dr. Balcells-Camps has promoted innovative, highly productive research and educative exchanges between both institutions and countries. As a direct consequence of her work in extending MIT's international opportunities for students and faculty she created and directs the international MIT-Spain Program. In 2011, Spain's government bestowed Dr. Balcells-Camps with the Cross of the Order of the Civil Merit for her contribution to establish a fruitful channel between MIT and her home country, Spain. Dr. Balcells-Camps chairs MIT innovation program IDEA^2 Global within MIT LinQ Initiative. For her service to MIT and to the world, Dr. Balcells-Camps received the 2019 MIT Excellence Awards "Advancing inclusion and global perspectives: maximizing MIT's strengths".

Dr. Balcells is a passionate basic scientist who embraces working with physicians and clinicians as well as industry partners to accelerate the path of new technologies and therapies from bench to bed-site. She is also a motivated mentor and the projects she leads become the ideal venue to educate the next generation of engineers, biologists, material scientists, physicians, computer scientists and chemists who learn to work collaborative as the only way to solve today's greatest challenges in health.

People suffering from chronic illnesses are more likely to suffer from depression. Additionally, the risk of developing chronic illnesses is higher in people with mental disease. Researchers from MIT Institute of Medical Engineering and Science (Cambridge, US), Instituto Politecnico Nacional (Mexico City), Albizu University (Miami, US) and Universitat Oberta de Catalunya (Barcelona, Spain) have joined forces to establish novel and unexplored phenotypes of chronic disease and mental health that classical measurements done during doctors visits are not able to capture. We are using novel digital data measurements from smartphones as well as tissue-engineered models of the vasculature in a vibrant international and multidisciplinary collaboration.

11:15 AM

Break

11:45 AM

Smart Materials for Medical Devices and the Delivery of Cells, RNA and Genome Editors

Daniel G. Anderson
Professor, Chemical Engineering and Institute for Medical Engineering and Science
Member, Marble Center for Cancer Nanomedicine
Associate Member, Broad Institute
Associate Member, Ragon Institute

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Learn more about the work that Professor Anderson's lab is doing to create tiny nanoparticles that can deliver RNA to a cancer cell to stop tumor growth by watching this video: "Inside the Lab: Daniel G. Anderson, Ph.D."

Daniel G. Anderson is a leading researcher in the field of nanotherapeutics and biomaterials. He is appointed in the Department of Chemical Engineering, the Institute for Medical Engineering and Science, the Koch Institute for Integrative Cancer Research, and the Harvard-MIT Division of Health Science and Technology at MIT. The research done in Prof. Anderson's laboratory is focused on developing new materials for medicine. He has pioneered the development of smart biomaterials, and his work has led to advances in a range of areas, including medical devices, cell therapy, drug delivery, gene therapy and material science. Prof. Anderson received a B.A. in mathematics and biology from the University of California at Santa Cruz and a Ph.D. in molecular genetics from the University of California at Davis. His work has resulted in the publication of over 400 papers, patents and patent applications. These advances have led products that have been commercialized or are in clinical development, as well as to the foundation of companies in the pharmaceutical, biotechnology, and consumer products space. Dr. Anderson is a founder of Living Proof, Olivo Labs, Crispr Therapeutics (CRSP), Sigilon Therapeutics, Verseau Therapeutics, VasoRx, and Orna.

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12:30 PM

Roundtable Discussion
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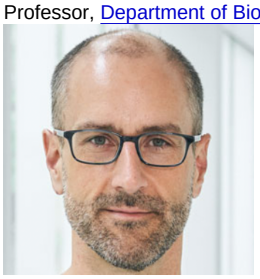

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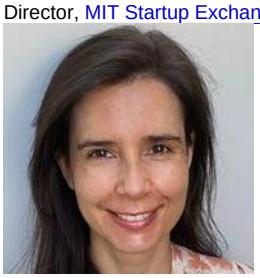
1:00 PM

Introduction to Startup Exchange
Catarina Madeira
Director, MIT Startup Exchange



Catarina Madeira
Director
MIT Startup Exchange

Catarina has been working with the Cambridge/Boston startup ecosystem for over 10 years and joined Corporate Relations with a solid network in the innovation and entrepreneurial community. Prior to MIT, she was part of the team that designed and launched the startup accelerator IUL MIT Portugal, which was later rebranded as Building Global Innovators. She was based in Lisbon and worked in direct relation with the Cambridge team. She held positions including Operations Coordinator, Program Manager, and Business Developer. The accelerator soon achieved steady growth in large part due to the partnerships that Catarina led with regional and global startup ecosystems. After that, she worked at NECEC, leading a program that connects cleantech startups and industry. In this role, she developed and built a pipeline of startups and forged strong relationships with both domestic and European companies. She has also held positions in Portugal and France, including at Saboaria e Perfumaria Confiança and L'Oréal as Technical Director and Pharmacist. Catarina earned her bachelor's in chemistry and pharmaceutical sciences in Portugal. She went on to earn her Master of Engineering for Health and Medicines in France.

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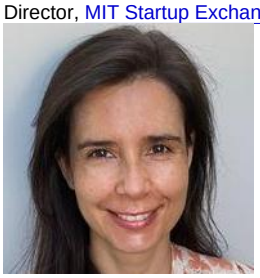
MIT Startup Exchange Lightning Talks
Catarina Madeira
Director, MIT Startup Exchange



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José Wong
Chief Product Officer
Dynocardia

Pablo Lapuerta, MD
CEO, Founder & Director
4M Therapeutics

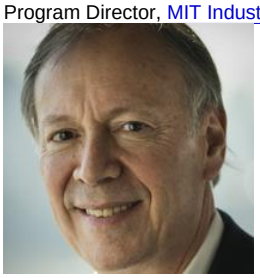
Carlos Castro-Gonzalez
Co-founder and CEO
Leuko

Heather E. Williams
Vice President, Clinical Genomics Operations & Chief of Staff
Cache DNA

Ines Herrero
Founder
BioMixing

2:15 PM

Wrap Up and Closing
Eduardo Garrido
Program Director, MIT Industrial Liaison Program



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