

MIT Portugal Program

The [MIT Portugal Program \(MPP\)](#) is a multiphase, strategic international collaboration between MIT; Portuguese universities and research institutions; and the Portuguese Ministry of Science, Technology, and Higher Education. The program's initial phase launched in 2006 with a second phase beginning in 2013, and has continuously demonstrated that an investment in science, technology, and higher education can have a positive impact on the Portuguese economy. Since its establishment, the program has created MIT-quality educational and research opportunities for students, researchers, faculty, and industry partners. Program funding is provided by the Fundação para a Ciência e Tecnologia (FCT; the Portuguese Science and Technology Foundation) with the goal of strengthening the country's knowledge base and international competitiveness through strategic investments in research, education, innovative ideas, and entrepreneurial activities.

Phase two of MPP—led by Professors Dava Newman, Bruce Tidor, and Douglas Hart—was hosted by MIT's Technology and Policy Program in concert with MIT's Institute for Data, Systems, and Society. After a successful six-year duration, phase two concluded in June 2019.

The MIT Portugal Partnership 2030 (MPP2030) was launched in June 2018, not as a third phase, but as a novel strategic partnership between MIT and FCT. Building on the successes of phases one and two of MPP, MPP2030 continues to support activities designed to significantly impact the development of the Portuguese innovation ecosystem and workforce. MPP2030 also touches on MIT-strategic areas, such as the environment, climate change, and manufacturing, to amplify the global impact of MIT's educational and research activities as noted in [A Global Strategy for MIT](#), by Associate Provost Richard K. Lester.

MPP2030 continues to be funded by FCT and is anticipated to run through 2030. The goal of MPP2030 is to strengthen Portugal's knowledge base and international competitiveness through strategic investments in research, people, and ideas in areas of global relevance and with significant societal impact—all the while helping MIT faculty and students carry out their research around the world. Within the scope of the new partnership, MPP2030 focuses on fostering research between MIT and Portuguese universities, research institutes, laboratories, companies, and other entities in the focus areas all supported by foundational data science, climate science and climate change, earth systems (oceans to near space), digital transformation in manufacturing, and sustainable cities.

This document includes a high-level summary of MPP2030 research and activities between July 1, 2019 and June 30, 2020.

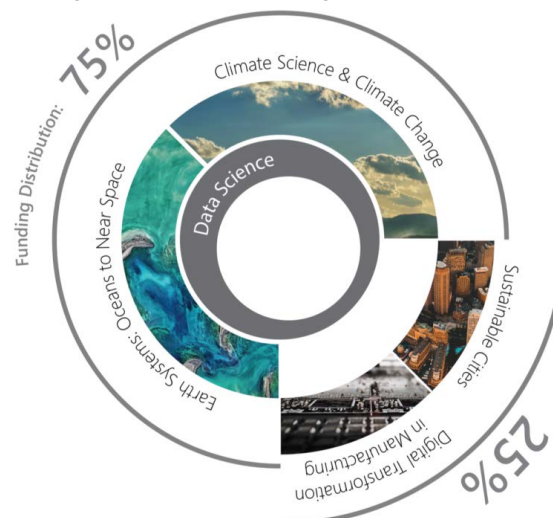
MIT Portugal Program and MPP2030 by the Numbers

- Industry
 - 12 Industrial Affiliates

- Education
 - 71 student & faculty sponsorships funded
 - 1 student project sent to space with another in progress
- Interaction with community
 - 2 annual conferences
 - 11 idea sprints (workshops, seminars, challenges)
 - 26 meeting and outreach events
 - More than 450 participants in MPP organized events
- Research
 - 28 Higher education institutions involved in research and development
 - 34 PT exploratory proposals received
 - 4 collaborative flagship projects funded in 2020, 9 proposals received
 - 27 MIT seed projects funded through competitive calls since 2018, 55 proposals received

Research Activities

Research has been one of the cornerstones of every phase of MPP. From the start, the program has promoted research projects in MPP's focus areas with the goal of fostering collaborations between Portuguese universities, MIT, and industry. The goal of MPP's research is to complement and strengthen educational programs, and stimulate innovation and entrepreneurship. Since MPP's first phase, close to 100 research projects (selected through calls for proposals), have been funded in the program's focus areas, including test bed, seed, and flagship projects. MPP2030 continues to focus on fostering research between its key collaborative entities, specifically using data science-intensive approaches and methodologies in the following focus areas:



The data science driver targets the development of tools to collect, curate, and synthesize data with the goal of making the information available and useful for public and private users—including policy makers, consumers, businesses, and the general population.

MPP2030 Year One Seed Projects (March 2019 to March 2020)

A call for seed proposals was opened in December 2018 with all proposals required to cover at least one of the four research areas of MPP2030 for a maximum of \$90,000 to be used over the course of one year. The program received 22 proposals and ultimately selected 12 projects to be funded. While MIT principal investigators (PIs) were encouraged to work with Portuguese counterparts, a separate exploratory call for proposals was opened in Portugal later in 2019. MPP2030 seed projects at MIT only covered expenses for MIT PIs and their teams.

On March 15, 2019 the proposal awards were announced with funding to be released immediately, kick starting the first round of research seed projects for MPP2030. While several of the seed projects wrapped up in March 2020, some remain ongoing with the aim of completing in September 2020. The awarded projects include the following:

- Developing Low-cost, High-tech Exploration of the Atlantic Ocean—Katy Croff Bell and Joseph Paradiso of MIT Media Lab as PIs
- Towards Smart, Sustainable, and Resilient Energy Systems for Coastal Cities—Audun Botterud of Laboratory for Information and Decision Systems (LIDS) as PI
- Lead and Lead Isotope Ocean Pollution Histories from Cold Water Corals from the US and Portuguese Continental Margins—Edward Boyle of the Department of Earth, Atmospheric and Planetary Sciences (EAPS) as PI
- Collaborative Design for Future Autonomous AUV Servicing Platform—Oliver de Weck of the Department of Aeronautics and Astronautics (AeroAstro) as PI
- Surface Climates at Tipping-Points: Mapping and Detection of Transitions in Surface Water, Energy and Carbon Balances—Dara Entekhabi of the Department of Civil and Environmental Engineering as PI
- Low-Cost Deep Ocean Exploration and Monitoring Utilizing Existing Undersea Cable Networks—Douglas Hart of the Department of Mechanical Engineering (MechE) as PI
- Maturing Small Satellite Control Systems for Future Earth Observation and Space Environment Mission using the International Space Station—Rebecca Masterson of AeroAstro as PI
- Sustainable Manufacturing: Re-Programmable Multi-Color Textures for Data-Driven Adaptation of Objects—Stefanie Mueller of the Department of Electrical Engineering and Computer Science (EECS) and Computer Science and Artificial Intelligence Laboratory (CSAIL) as PI
- Text and Data Mining for Additive Manufacture—Elsa Olivetti of the Department of Materials Science and Engineering (DMSE) as PI

- Exploring the relationship between digital technologies and work in manufacturing firms: co- evolution and consequences in Portugal, Brazil and the United States—Elisabeth Beck Reynolds of the Department of Urban Studies and Planning (DUSP) as PI
- Ocean Wave Energy Harvesting Using Machine Learning and Model Predictive Control—Paul D. Sclavounos of MechE as PI
- Modeling Synergistic Opportunities for a Sustainable and Electrified Coastal City—Jessika Trancik of Institute for Data, Systems and Society as PI

MPP2030 Year Two Seed Projects (Summer 2020 to Fall 2021)

The program's second call for seed proposals was opened in December 2020 with all submissions due by February 14, 2020. As with the previous year's proposals, submissions were required to cover at least one of the four research areas of MPP2030 and were for a maximum of \$90,000 to be used over the course of one year. The program received 33 proposals and 15 were chosen to be funded.

Due to the research delays brought on by the COVID-19 pandemic, many of the seed projects will kick off in fall 2020. The awarded projects are as follows:

- Cold-Water Corals: Exploring Chromium Isotopes as Archives of Intermediate Water Oxygenation—Edward Boyle of EAPS as PI
- A Cross-Cultural Evaluation of the Quality of Urban Spaces to Support the Mobility and Quality of Life of Aging Populations—Joseph Coughlin of MIT Age Lab and Center for Transportation and Logistics as PI
- Student Based Collaboration on Environmental Monitoring Flight Systems—John R. Hansman of AeroAstro as PI
- SoS4Atlantic Multi-Domain Atlantic Ocean-Space Observation: Extended Ocean Observation—Douglas Hart of MechE as PI
- Unlocking Digital Manufacturing at Scale with Cost-Design Analysis Tools and Flexible Organizational Practices—John Hart of MechE as PI
- System of Systems Concept for Effective Oceans to Near Space Observation—Daniel Hastings of AeroAstro as PI
- Planning and Optimization Investments Against Carbon Constraint—Marija Ilic of LIDS as PI
- Cooperative Localization for Sea, Air, and Space—John Leonard of MechE as PI
- Intelligent Observing and Multiscale Modeling for Ocean Exploration and Sustainable Utilization—Pierre Lermusiaux of MechE as PI
- Autonomous Robotic Assembly of Space Structures using On-Orbit Additive Manufacturing for Near-Earth Observation and Space Environment Missions—Richard Linares of AeroAstro as PI

- Introducing 3D Printing into the Production Chain: Modeling the Effects and Providing Guidance Using Data Analysis and Advanced Modeling—Stefanie Mueller of EECS and CSAIL as PI
- A Computationally Scalable Global Ocean Model—Jaime Peraire of AeroAstro as PI
- Producing Methanol as a Sustainable fuel by Coupling CO₂ Capture and Hydrogenation—Yang Shao-Horn of MechE as PI
- Analyzing the Changing Nature of Extreme Solar and Wind Energy Resource Shortage Events and the Consequences for Climate Change Mitigation—Jessica Trancik of Institute for Data, Systems and Society as PI
- Climate Change: Beliefs and Social Consequences in Portugal—Siqi Zheng of DUSP as PI

Flagship Research Projects

The MPP2030 flagship call for proposals was opened in March 2019 as part of a research and development initiative under the international partnerships with Carnegie Mellon University, MIT, and the University of Texas at Austin. The Agência Nacional de Inovação (ANI; National Innovation Agency) in collaboration with FCT was the organization responsible for receiving and analyzing the projects once they were collected in late May 2020. While most details of the proposals received are confidential, ANI disclosed that there was a total of 41 applications (nine MPP-specific projects); more than €71 million of requested investment (overall); and 184 project promoters—71 of which are companies and 113 are noncorporate entities. The awards were set up to fund MIT and Portuguese entities separately, each with comparable budgets for the three-year project duration. The flagship awards were announced in early 2020 with some projects kicking off immediately.

According to FCT, the objective of the flagship projects was: “To promote the internationalization of Portuguese universities, research centers, and companies, taking advantage of the experience and organizational culture of universities from the United States, specifically the Massachusetts Institute of Technology, with which international partnerships are established.” Considered proposals were required to involve industrial research and experimental development activities, leading to the creation of new products, services, processes, and systems. This included the introduction of significant improvements in existing products, services, processes, or systems. Project proposals also needed to demonstrate their contribution to consolidating the intergovernmental initiative, Atlantic Interactions, and the objectives of the UN Sustainable Development Goals. Projects were required to use a data science approach to address one or more of the following industry related topics:

- Climate Science and Climate Change—research aimed at studying, measuring, and modeling the complex dynamics of interactive climate, meteorological, atmospheric, oceanic, terrestrial, and near-Earth systems; implementation of integrated models and methods of study and analysis of large data volume

- Earth Systems (from Oceans to Near Space)—research focused on the Earth’s subsystems, including oceans, land masses, atmosphere, and near-space, with particular emphasis on measurements, technology, and skills development, to address the critical subsystems of the Earth, through technological innovation, the use of big data, the use of autonomous systems, and the exhaustive analysis of these systems
- Digital Transformation in Manufacturing—research includes the multiple aspects of digital transformation that enable new integrated approaches for design, manufacturing, and sustainable adaptive solutions; the aim is to support the development of cyber-physical products and systems, ensuring a better user experience and value creation for the economy and society in general
- Sustainable Cities—research around science, design, and urban engineering with applications in areas such as energy use and improvement of building design, air quality, transport systems, internet of things, and total connectivity, as well as smart cities.; the projects needed to take advantage of and promote the Atlantic Cities Network (i.e., Rio de Janeiro, Brazil; Luanda, Angola; Lagos, Nigeria; Lisbon, Portugal; Porto, Portugal; and Boston, Massachusetts).

Each MPP proposal was required to have an MIT PI, a Portuguese PI, and a leading company based in continental Portugal. MPP2030 received nine collaborative project proposals from faculty in the Schools of Engineering, Science, and Architecture and Planning. Of those nine proposals, four were focused on earth systems, four on digital transformation in manufacturing, and one in sustainable cities. While there were no projects focused primarily on climate science and climate change, three of the projects did cover that topic as a secondary research area.

Awarded Flagship Projects

Project	Promoter	Partners in Portugal	MIT PIs	Portuguese PIs
Transformer 4p0: Digital Revolution of Power Transformers	EFACECEnergia	INESC TEC, INEGI	Dr. Donna H. Rhodes: Systems Engineering Advancement Research Initiative	Professor António Lucas Soares: Faculty of Engineering, Department Informatics @ University of Porto
C-Tech : Climate Driven Technologies for Low Carbon Cities	NOS Comunicações, SA	IST, CEiiA, UNL-LMS, LISBOA E-NOVA	Professor Christoph Reinhart: Department of Architecture; Director, Building Technology Program Professor Jessica Trancik: Institute for Data, Systems and Society	Professor Paulo Ferrão: Mechanical Engineering Department, IST

Project	Promoter	Partners in Portugal	MIT PIs	Portuguese PIs
SNOB-5G: Scalable Network Backhauling for 5G	UBIWHERE LDA	IT - Coimbra	Professor Muriel Medard: Department of Electrical Engineering and Computer Science	Professor Susana Sargento: University of Aveiro; Instituto de Telecomunicações André Zúquete: University of Aveiro
Operator: Digital Transformation in Industry with a Focus on the Operator 40	ZENITHWINGS LDA	FRAUNHOFER Portugal, UNL, VOLKSWAGEN AUTOEUROPA NST APPAREL (EUROPE), UPORTO & UMINHO, CONTROLCONSUL	Professor Elazer R Edelman: Harvard-MIT Biomedical Engineering Center (BMEC)	Professor Miguel Ângelo Carvalho: University of Minho

Idea Sprints

The MIT Portugal Program promotes a series of activities—idea sprints—from workshops to competitions to engage and challenge the community to continually invest in cutting-edge research and ideas. The section below provides a high-level overview of MPP2030's idea sprints in the past year.

Blue Origin Student Payload Competition

In late 2018, MIT Portugal partnered with aerospace manufacturer, Blue Origin, to create an opportunity for Portuguese university students to fly their nano experiments in suborbital space. The first of its kind for MIT Portugal, the competition consisted of two rounds with a final winning team announced in May 2019. The winning team, Team EM²C, was selected to develop their experiment with the help of the NanoRacks and Blue Origin support staff. The biggest milestone took place when their experiment went to space aboard Blue Origin's New Shepard rocket in December 2019.

The program opened its second annual call for the 2020 Student Payload Competition in January 2020. Five competitive submissions were received. The winning team was MiFiRE (Microgravity Fine Regolith Experiment), a research project within the field of planetary geology.

The experiment was developed by students Vítor Martins, Ivan Sá, Ana Caldeira, and Maria Marques, from the faculty of sciences at the University of Porto, with Professor Rui Moura mentoring the group. The team is looking forward to working with Cody Paige, a PhD candidate from MIT's Human Systems Lab in AeroAstro. Paige will assist the team in making sure the experiment is space ready.

The MiFiRE experiment has the ambitious goal of understanding how fine mineral particles adhere in the microgravity environment of space and how they ultimately start to combine by accretion or coagulation. The team will use a JSC-1 lunar regolith simulant, one cube of cut basic igneous rock and one cube of cut metallic meteorite,

placed in a small payload. A video imaging system will film the whole free float using small HD cameras, with the goal of detecting the different electrostatic relations of free-floating regolith and clasts. The ultimate goal is to shed some light on the role of electrostatic forces in the joining of fine mineral particles with one another as well as the joining of these fine particles with larger particles and their respective surfaces. The microgravity environment is ideal for this type of experiment because it simulates the conditions of early planetary formation.

Hosting Portuguese faculty members for the MIT Climate Symposium (October 2019–April 2019)

In keeping with MIT's broad and intensive efforts outlined in President L. Rafael Reif's Plan for Action on Climate Change, the Institute hosted a series of Climate Action Symposia at MIT to discuss climate science and policy, decarbonization of the global economy, and how universities can contribute solutions to the fight against climate change. As climate science/change is one of the four focus areas of research for MPP2030, the program planned to host four faculty members from Portuguese universities as guests to attend a symposium session of their choosing. Due to the pandemic, only a fraction of the planned participants was able to attend. The goal is to welcome the remaining faculty when the COVID-19 situation subsides.

AeroSpace Engineering: Future Challenges on Education and Research, University of Minho, Guimaraes, October 2019

The MIT Portugal Program, jointly with University of Texas at Austin, co-chaired the AeroSpace Engineering event led by the School of Engineering from University of Minho, where the future challenges for teaching and research within this field were discussed. This event marked the signing of the memorandum of understanding between ITA—Aeronautical Technology Institute (Brazil) and School of Engineering from UMinho (Portugal), to prepare and offer short courses in aeronautical and aerospace engineering.

Harnessing the Power of Data workshop, Matosinhos, Portugal, December 2019

This workshop was dedicated to assessing the current state of data science tools, as well as analyzing concrete cases of data application in the research context. The workshop was hosted by MIT Portugal and Elsevier (a publishing company). It was a day dedicated to discussing and furthering Portugal's use of data for sustainable growth. The day opened with short speeches, including one by Portuguese Minister of Science, Technology, and Higher Education Manuel Heitor, on the importance of acquiring and analyzing vast amounts of data. The final talk, by MIT graduate student Brandon Leshchinskiy, offered a vision of machine learning applied to climate change. He introduced the Earth Intelligence Engine, a project at MIT that aims to turn petabytes of Earth observation data into actionable insights, as well as Earth Intelligence Visual Models, a subset of the Engine that will generate satellite imagery from the climate-affected future. Leshchinskiy also discussed his work with EarthDNA's educational efforts. Finally, he shared applications of AI to climate education, noting that local, visual storytelling could be a compelling way to engage with communities on climate change.

Modeling Sustainable Cities workshop, MIT, December 2019

On December 3, 2019 Professor Christoph Reinhart—MIT Portugal's Sustainable Cities lead faculty member—hosted the Modeling Sustainable Cities workshop at MIT. In

attendance were five Portuguese researchers: Carlos Silva (IST), Francisco Costa (IST), Rui Lopes (FCT NOVA), Naim Majdalani (FCT NOVA), and Daniel Aelenei (FCT NOVA) who presented their urban modeling project FIRST. Additionally, Professor Reinhart gave a demonstration about a multidimensional urban modeling and UMI tool; Professor Jessika Trancik presented her lab's greenhouse gas equivalency metrics tool demo; and Audun Botterud exhibited his team's renewable energy grid integration model.

Frontier Development Lab and the Earth Intelligence Engine, virtual summer program (June 2020 to August 2020)

NASA's Frontier Development Lab (FDL), the SETI Institute, and FDL's private sector and space agency partners held their fifth annual summer research accelerator in an entirely virtual structure due to the COVID-19 pandemic. The MPP team worked to explore how we might deploy simulation acceleration methods, generative computer vision models (such as Generative Adversarial Networks), or both, to produce predictions of future climate conditions. The aim was to inform long-term resilience planning strategies (a.k.a., satellite images from the future). To advance UN Sustainable Development Goals 13 (Climate Action), 14 (Life below Water), and 15 (Life on Land), they combined physics-based climate models with generative computer vision methods to simulate high-resolution images of Earth under future climate conditions. The tool accessed historic and real-time data from land, ocean, and atmospheric systems, as well as outputs from weather and climate models to extend and improve existing models. Pairing the climate data with real satellite imagery, the tool generates synthetic, photorealistic satellite images of the modeled regions.

Postponed Idea Sprints and Events MPP2030

Space Week at MIT

The MIT Portugal Program had plans to provide student travel sponsorships for five current Portuguese university students to attend the [2020 Space Week](#) activities on MIT's campus from March 11–13, 2020.

Master Class in Visual Communication with Felice Frankel, Porto, Portugal

The program planned to bring Felice Frankel to the University of Porto to teach a workshop on how to translate research into more effective visuals for journals and presentations. This class, now postponed due to COVID-19, will demonstrate new approaches to representing research by using class time to review draft visuals. This course will also be helpful for those who have a general interest in Photoshop or presenting research and posters at conferences.

The Call of the Atlantic: Oceans to Space Workshop, Faial Island, Azores, Portugal

A one-week program that would consist of ocean robotics classes and an experiential learning student challenge, which would have culminated in a final demo day to showcase student projects. The program (new date to be determined) will host 15 Portuguese university students and 10 MIT graduate students. The courses will be taught by a mix of MIT and Portuguese instructors. The workshop's partners are the AIR Centre, University of Azores, and the Azorean Regional Government.

Selected MPP2030 Events

The program is currently planning its annual conference to take place in October as a hybrid online and in-person program, which will occur in the Pavilion of Knowledge, *Ciência Viva*, in Lisbon, Portugal. This year's conference title is *Research and Reflection Amid Adversity*. The conference will feature world-renowned speakers with sessions related to MPP's four research areas; the participation of the flagship companies with the projects awarded; live demonstrations about ocean and space; the winning team of the Blue Origin Student Payload Competition; and a digital poster session.

Oceans to Space: The New Deep-Blue Economy, Casa de Mateus, Vila Real, Portugal, July 2019

The MIT Portugal Program organized the *Oceans to Space: The New Deep-Blue Economy* workshop, which took place on July 13, 2019 at the Casa de Mateus Foundation. This workshop was organized by MPP2030 with the aim to discuss the new strategic areas of the international partnership, in an informal environment and close to its main stakeholders. In this discussion, a small group of national researchers, MIT researchers, and leaders of national institutions (industry, academic, and R&D) were joined in a unique opportunity to establish new relationships among the different entities.

Lego Serious Play Workshop, University of Minho, Guimarães, Portugal, July 2019

Lego Serious Play was a hands-on workshop in Lego play designed to enhance participants' innovation in communication, creativity, and shared mental models. Participants were encouraged to pause, play, and think about how learning and work can be enhanced by being more open to all forms of innovation. The goal was to create and present symbolic and metaphorical models from Lego bricks among the participants to achieve a common understanding of a question or topic.

Ciência 2019, Lisbon, Portugal, July 2019

Ciência 2019 was the annual meeting of Portuguese researchers that promotes broad debates on the main topics and challenges of the current scientific agenda. At this event, MIT Portugal participated in the GO Portugal initiative, setting a debate with representatives from academia and collaborative labs regarding the relevance of the MPP2030 research areas for the new decade. The panel shared their thoughts and perspectives on the emerging challenges in these fields and what was expected to be accomplished at the end of MPP2030.

MPP Annual Conference: The Atlantic as a Platform for Science and Technological Impact, São Miguel, Azores, Portugal, September 2019

On September 30, 2019 the MIT Portugal Program held its annual conference at the University of the Azores. The conference had over 150 participants from MIT and Portuguese universities. The 2019 MPP Annual Conference set a special milestone because the initiative was the first international partnership to hold an event of this nature in the islands, and because the Azores represent a strategic element in the 2030 vision of the MIT Portugal Program.

The welcome session included remarks by Manuel Heitor, minister of Science, Technology, and Higher Education; João Luís Gaspar, rector of University of Azores; Pedro Arezes, director of the MIT Portugal Program, Portugal; Professor Dava Newman, director of the MIT Portugal Program, MIT; and Helena Pereira, president of the Foundation for Science and Technology. The keynote speaker was Professor James Anderson, Philip S. Weld Professor of Atmospheric Chemistry, Harvard University. His talk addressed rapid, irreversible climate change with new strategic developments in climate research. Professor Anderson is best known for his work linking chlorofluorocarbons to the Ozone Hole.

Fifteen researchers and scientists from MIT and Portugal spoke about their work and how it related to MPP's four strategic areas: climate science and climate change; earth systems (oceans to near space); digital transformation in manufacturing; and sustainable cities—all of which included data science-intensive approaches and methodologies. The MIT presenters at the conference were Professor Edward Boyle, Audun Botterud, Associate Professor Jessika Trancik, Alvar Saenz-Otero, Professor Paul Sclavounos, Assistant Professor Stefanie Mueller, and Haden Quinlan. Additionally, on display at the conference were over 45 posters created by both student and faculty researchers from MIT and Portuguese universities.

MIT Portugal Climate workshop, MIT, February 2020

We were honored to host three esteemed faculty members from Portugal for this event: Professor Paulo Ferrão (IST), Professor Frederico Ferreira (IST), and Professor Paula Ferreira (University of Minho). The mini-workshop was designed to bring together faculty, researchers, and industry pioneers who are all working in different areas of climate science for an exchange of knowledge. The following five invited speakers shared brief updates on their areas of work and research:

- Chris Hill (MIT, Earth, Atmospheric and Planetary Sciences [EAPS]): “Modeling Ocean Circulation and Color for Climate”
- Cyrill Gutsch (founder of Parley for the Oceans): “Fashion Design in the Age of Climate Change”
- Professor Dara Entekhabi (MIT, EAPS): “Surface Climate at Tipping Points: Mapping and Detection of Transitions in Surface Water, Energy, and Carbon Balances”
- Björn Lütjens (MIT PhD Student, EarthDNA): “Creating a Cognitive Earth Platform: From Oceans to Air to Space”
- Professor John Reilly (co-director, Joint Program on the Science and Policy of Global Change, MIT): “Advancing a Sustainable, Prosperous World Through Scientific Analysis of the Complex Interactions Among Co-Evolving, Interconnected Global Systems”

During the last hour, the 25 participants discussed “What are the climate research questions that we can tie into the future of MIT Portugal?” Several members of the group also attended the [MIT Climate Symposia](#), Economy-Wide Deep Decarbonization: Beyond Electricity. The conversation about climate continued into the next day when Professor Paulo Ferrão, former president of Fundação para a Ciência e Tecnologia, shared his

research updates and views on the European Green Deal. He spoke about a unified framework for analyzing urban sustainability in terms of cities' inflows and outflows of matter and energy with a focus on building renovation.

Second Edition of Study and Research in the USA, University of Porto/ University of Minho, February 2020

In this session, participants learned about the different support systems and programs available to assist students in studying in the United States: (FLAD; Fulbright Commission Portugal; MIT Portugal; and Carnegie Mellon Portugal Program). Current MIT Portugal students and alumni were in attendance to answer any questions about their experiences studying abroad.

MIT Portugal COVID-19 Response Highlights

Former MPP faculty member Professor Robert Langer sits on the board of Moderna, an MIT-affiliated startup (now valued at \$28 billion), which is working on an accelerated [vaccine](#) development via messenger RNA and shows promising preliminary results. Many MIT faculty and students are harnessing the powers of big data for the COVID-19 pandemic, including finding funding for 10 new research [projects](#) on health and economic consequences of the pandemic (MIT-IBM Watson AI Lab) and working on [papers](#). MIT Portugal funded students are also conducting mental and physical health surveys for living and working in isolated, confined environments, which is analogous to astronaut training. Faculty and students are working 24/7 producing personal protective equipment (masks, [shields](#), [ventilators](#), and [supply chains](#)) and to assess the changing world of [work](#).

Professor Siqi Zheng (2020 MIT Portugal seed fund recipient) was awarded research funding to address COVID-19 from a multi-institutional MassCPR initiative. She will receive funding for research on quantifying “the role of social distancing in shaping the COVID-19 curve: incorporating adaptive behavior and preference shifts in epidemiological models using novel big data in 344 Chinese cities,” according to an MIT news [article](#). The article also notes that her research “will compare different regions and how people react to social and physical distancing during a pandemic, and will examine various government policies aimed at controlling the spread of the virus.”

Program Communications

The MIT Portugal coordination offices at the University of Minho and MIT work closely together to promote the program's activities and milestones through curated social media posts, newsletters, and a content-rich website. In February 2020, the Portuguese MPP Coordination Office hired a communications officer, Joana Soares. She assists with ensuring the program shares the most up-to-date news and information, utilizing the following tools:

- Bi-monthly e-newsletters with over 3,600 recipients to announce program updates and opportunities, event invitations, and so forth
- Maintaining the [website](#) so it reflects the newest information about MPP initiatives
- Increased social media presence (Facebook, Twitter, and LinkedIn) as a secondary platform to promote program activities, meetings, and calls for proposals

Educational and Visiting Student Programs

In spring 2020, the MIT Portugal team worked with FCT to organize a call for PhD applications. In July 2020 MIT Portugal announced the opening of the 2020 call for FCT-MPP2030 PhD grants. Candidates must be conducting research in at least one of the four aforementioned areas of focus for MIT Portugal. This call will be hosted under the MIT Portugal Partnership 2030 and the grants to be awarded are FCT PhD scholarships.

Historically, MPP has offered transdisciplinary education curricula in seven graduate education programs (four PhDs, three masters) across four focus areas: bioengineering systems; engineering design and advanced manufacturing; sustainable energy systems; and transportation systems. As of June 2018, more than 4,300 student applications were received, including more than 3,500 applications for MPP's PhD and more than 700 for masters programs. The representation of international applicants is 51%. The average acceptance rate is 24% for the PhD and 35% for the masters programs. More than 1,100 PhD and masters students were enrolled cumulatively at Portuguese partner universities since 2006, and more than 490 students have graduated since the start of MPP.

Since 2017, more than 20 MPP students and scholars have been hosted at MIT. Visiting MPP students conducted part of their thesis research with support from their MIT thesis co-advisor (more than 200 student visits since 2006). MIT faculty that hosted visiting MPP scholars (more than 50 scholar visits since 2006) to further strengthen existing collaboration and strong ties among MPP faculty, fostering continued exchange and collaboration in research, education, innovation, and entrepreneurship. MPP has also successfully engaged the growing MPP alumni community and conducted surveys among MPP PhD and masters graduates that provided valuable information about their professional development and experiences

Program Personnel

MIT Portugal Partnership 2030 Team

Dava Newman
 Director, MIT Portugal Partnership 2030
 Apollo Program Professor of Astronautics
 Department of Aeronautics and Astronautics
 Harvard-MIT Health, Sciences, and Technology

Douglas Hart
 Co-Director, MIT Portugal Partnership 2030
 Professor of Mechanical Engineering

Leah Lovgren
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 Administrative Assistant II, MIT Portugal Partnership 2030

MIT Portugal Partnership 2030 Research Area Leaders

Climate Science and Climate Change

Dava Newman

Douglas Hart

Earth Systems (Oceans to Near Space)

Olivier de Weck, Professor of Aeronautics and Astronautics and Engineering Systems

Digital Transformation in Manufacturing

John Hart, Professor of Mechanical Engineering; Director of the Laboratory for Manufacturing and Productivity; Director of the Center for Additive and Digital Advanced Production Technologies

Sustainable Cities

Professor Christoph Reinhart, Professor of Architecture; Director, Building Technology Program

MIT Portugal Partnership 2030 Governing Committee

António M. Cunha

President of the Council of Portuguese Rectors; Representative of the Portuguese participating entities

Isabel Furtado

CEO of TMG Automotive; Portuguese industry representative

Richard K. Lester

MIT associate provost for international activities; MIT senior administration representative

Helena Pereira

president of Fundação para a Ciência e Tecnologia; representative of Fundação para a Ciência e Tecnologia

Maria Zuber

vice president for research at MIT; MIT senior administration representative

MIT Portugal MPP2030 External Review Committee

John Beddington

former UK government chief scientific adviser

Pascale Ehrenfreund

chair of the DLR executive board

Mohan Munasinghe

former vice-chair, UN Intergovernmental Panel on Climate Change that shared the 2007 Nobel Peace Prize

Melany Hunt

Caltech Dotty and Dick Hayman Professor of Mechanical Engineering

Dava Newman

Director, MIT Portugal Partnership 2030