

LEARNING FROM THE PAST. CHALLENGING THE FUTURE.

Annual Report









Annual Report 2015



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A CENTRE OF DESIGN FOR GLOBAL CHANGE, CREATING SOCIOTECHNICAL SYSTEMS SUITED TO HOLISTIC CHALLEAGES



ABOUT THE INSTITUTE

PACK

"...the Board underlines the vitality of the M-ITI as a community of brilliant scientists, the novelty of its scope and ambition..."

M-ITI Advisory Board, 2015



The Madeira Interactive Technologies Institute (M-iti) is a non-profit innovation institute of the University of Madeira, the youngest and smallest public university in Portugal. It is located in the Autonomous Region of Madeira, an outermost region of Europe.

M-iti was conceived in 2000, formally integrated as a research group in 2007, and established as an Innovation Institute in 2010. M-iti has also been a member of the National Associated Laboratory for Robotics and Systems in Engineering (LARSyS) since 2011.

In 2015, M-iti was considered a Public Utility Institute (as published in the Jornal Oficial of 19 February 2015, series number 30).

M-iti operates in the interdisciplinary domain of Human-Computer Interaction (HCI), encapsulating contributions from the disciplines of computer science, psychology and social sciences, and design, with the goal of engaging in important scientific and technological challenges.

The location of M-iti provides a unique setting to deploy a Living Lab for Interactive Technologies, where systems and services can be tested using open-innovation frameworks.

VISION

A centre of design for global change, creating socio-technical systems suited to holistic challenges.

Global changes - in climate or demographics; labour systems or capital flows; sustainable resource management or energy efficiency; memes or pandemics - are happening at a pace that could not have been anticipated a few decades ago. Our planet's newest mass extinction is being ushered in by the very same technologies and means of production that were the crowning accomplishments and best practices of our grandparents. It is clear that many of our approaches must change swiftly and radically. Yet our habits of thinking, organising, and living are largely configured to address the challenges and goals of prior epochs, and most of our tools still reflect and support those old habits. Our current technologies and material culture impede rather than enable our ability to live appropriately. We must mindfully design new materialities that foster inclusive, innovative, and reflective societies in a changing world.

M-ITI aims to step into the new millennium by developing tools, systems, and techniques better suited to address its challenges. In particular: the distribution and use of natural resources, the societal and personal use of energy, global inequality of resources and opportunities, and the relationship of production and consumption all require serious reform. Reducing inequalities and social exclusion in Europe, overcoming the economic and financial crisis, and tackling unemployment require new ideas, strategies, and governance structures that bring opportunities to the young and creative generations and leverage the reflective European society to position Europe as a global actor.

The long-term vision of M-ITI is an excellence centre of design for global change, aimed at identifying fresh approaches to the design of new technologies, new means of production, and new political configurations that are better suited to the global challenges of this century. Some of these challenges might be unique to Europe but others are shared by communities around the world. By projecting M-ITI into the future of challenge-based research we envision exploring, designing for, and at times even anticipating global critical situations and opportunities for change. Strategically placed at the intersection of the American, European and African



sides of the Atlantic, M-ITI is poised to play a crucial role in connecting, exchanging, and contributing to the innovation across the continents with which Portugal enjoys a strong relationship. As a multi-disciplinary Centre combining natural and social scientists, engineers, humanists, designers, and artists, its output will be focused on the area of applied science and human-centred technology. We will develop and share methods, working proofs, and "spin-off enterprises" focused on rebalancing the relationship of people and environment, production and consumption, the local and the global.

Strategy and Research Infrastructure

M-ITI will serve as a hub for a global network to ideate, co-create, test, and document new forms of local/global production for global challenges. The goal of these efforts is not just the generation of new understanding of problem solving in an era of cheap information, but also tangible proofs of organisation through the creation of enterprises that embody and engage in that problem solving. Our research will result in human/animal/technical networked systems that are both research platforms and, more importantly, working examples of global coordination and problem solving.

M-ITI's research focus will be on developing techniques and technologies that:

• investigate how nature and communities are affected by - and technologies that can empower them to confront - natural, political, and economic global pressures - in particular supporting the transition to reliable, sustainable and competitive energy systems. This will lead to a climate change resilient economy and society and help to explore the opportunities related to aquatic living and marine research and bio-based industries for the blue economy;

• invent new design techniques to best respond to, or shepherd, complex and interrelated natural, social, and cultural global issues - that could help repositioning Europe in a changing world through new ideas, strategies and governance structures that integrate and inspire the younger and more creative generations leveraging Europe's cultural heritage to build a more inclusive, innovative and reflexive society;

• develop personal, business, scientific, and civic technological platforms for better understanding and situating actions, choices, and self in a global perspective - enabling the transition towards a green economy and society through eco-innovation and developing comprehensive and sustained global environmental observation and information systems.

M-ITI will develop a unique research infrastructure that leverages the identification of demonstration of breakthrough research and design situated outside of global urban capitals, including active research in, and with, the global south for which Madeira is one of the outposts for transnational EU cooperation. This research infrastructure will enable exploration of Future Coastal Urban Environments which have a particular relationship with the oceans by advancing sensing, communication, tracking and monitoring solutions to increase our understanding of the underlying resources and ecosystems. This test bed will explore the potential of healthy marine ecosystems to provide a range of services with high potential social and economic benefits for the blue economy. The test bed will focus on building a symbiotic relationship between cyber-physical and ecological systems thus becoming a platform for scientific collaboration between researchers interested in biodiversity, climate change, engineering, material science and design.

MESSAGE FROM NUNO NUNES

President of the Board



Madeira Interactive Technologies Institute (M-iti) is one of the leading research centers in Portugal focusing on human-computer interaction and design innovation. M-iti is a non-profit innovation institute emerging from the association of the University of Madeira, the Regional Government of Madeira and Carnegie Mellon University. It is located in the Autonomous Region of Madeira, an outermost region of Europe. M-iti was conceived in 2000, formally integrated as a research group in 2007, and established as an Innovation Institute in 2010. M-iti has also been a member of the national Laboratory of Robotics and Engineering Systems (LARSyS) since 2011. M-iti's mission is to research, enable, design and create transformative experiences that empower people to lead the best possible life in harmony with their environment.

Our strategic priority was always to attract the best talent to Madeira, from students to junior and senior faculty that could help make M-iti an excellence center in HCI research and design-driven innovation. In 2015 M-iti is currently associated with 22 integrated members, around 30 researchers (including PhD students) and a cohort of more than 120 master and post-grad students, supported by a dedicated group of five staff members. This vibrant and enthusiastic community comes form 16 different nationalities from four continents. We welcome these people recognizing that excellence, in particular in one of the most remote regions of Europe, can only be achieved if you attract and retain the best.

We are pleased to highlight some of M-iti's accomplishments in 2015. In 2015 we finalized the recruitment of the ERAChair team, including new additions to our research and administrative staff. During 2015 we continued the very controversial FCT evaluation process for which LARSYS got a borderline to excellent "Very Good" evaluation still under rebuttal. We still expect this process to recognize our developing scientific performance as this report highlights. 2015 was also a year of changes at the University of Madeira with a significant reduction of competences of the Innovation Institutes. Unfortunately, our expectations of becoming an "organic unit" of the University capable of developing an interdisciplinary research and education agenda in HCI were not accepted for discussion. We still believe this was the best path to continue our development within the context of the national research and higher education system in Portugal. The changes promoted by the University of Madeira will push M-iti even more towards research, reducing the impact in terms of master level education which was an important goal for regional development. Notwithstanding, 2015 was also the start of our collaboration in two PhD FCT program together with Tecnico from U. Lisbon (in networked interactive cyberphysical systems) and with U. Porto and U. Nova Lisbon (in Digital Media). We are excited to welcome a new cohort of brilliant PhD students and deepen our collaboration with these partner institutions. These new programs reinforce M-iti as a "hub" between the US and Europe with connections with mainland Portugal and UCL in London in the near future.



Our challenges and ambitions were brought to the External Advisory Board in October in quite intense and intellectually stimulating gathering. The recommendations of the Advisory Board are filled with good and difficult advice related to the complexities of the regular operation and management of a research institution like M-iti. Our Advisory Board points out two challenges: i) the geographic location which is both an opportunity and a challenge for development and sustainability; and ii) the long standing and difficult economic situation of Portugal and the damaging austerity policies which pushed many of our colleagues towards emigration.

Finally, 2015 was the year of several important visits to our institute, including the visit of the President of the Regional Government and the visit of the President of the Republic of Portugal.

The success of M-iti relies on the hard work and creativity of our dedicated community of researchers, students and staff. We believe that we should aim to become an excellence center in design for global change. We want to leverage our location because global changes often happen outside of or at the periphery of the EU, away from the decision centers where the excellence in research is concentrated. M-iti is particularly well positioned to showcase the advantages of research and design situated outside of global capitals, including active research in and with the global south for which Madeira is one of the outposts for transnational EU cooperation.

FOUNDING MEMBERS

M-iti was founded in 2010 as an outgrowth of the Carnegie Mellon International partnership. Its founding members are the University of Madeira (UMa), Madeira Tecnopolo S.A. (MT) and Carnegie Mellon University (CMU). M-iti conducts research and provides graduate training in the domain of human-computer interaction, contributing to the development of the field and addressing/engaging in important scientific and technological challenges that are both relevant to society and have significant economic impact.



International Partnerships



LARSyS - Associate Laboratory of Robotics and Engineering Systems

LARSyS's ultimate goal is to be actively involved in a new generation of research questions and advanced training in Robotics and Engineering Systems, leading to new frontiers of knowledge and the training of skilled human resources at the best international level. Our researchers aim to create and develop new knowl-edge bases with impact in ocean, urban, aeronautic and space, biomedical, and future working environments, as well as to stimulate new industry-science relations and deepen our understanding of network science.

To achieve this strategy and vision, LARSyS supports its activities in the competences available in its four research centers (i.e., ISR@IST, IN+@IST, MARETEC@ IST, and M-iti@UMadeira). These centers provide specific areas of expertise in their main domains of knowledge through ten Laboratories and/or Groups, affiliating researchers that conduct specialized work in their main fields of expertise at an international level of excellence. Overall, they provide the necessary knowledge and experience to foster LARSyS scientific program.

On the top of that structure, the strategy of LARSyS is promoted and implemented through six Thematic Areas. They aim to explore new frontiers of knowledge driven by needs and markets as we envisage them today, making use of target objectives and linkages with end-users. They consider emerging themes under, on, above, in and beyond our daily human live.

Each Thematic Area has been defined together with a main target in a time horizon of 15 years (2030), without prejudice of involving other projects. They include five Areas of Application-driven Research and one area of Fundamentals. They provide a matrix-based form for the organization of LARSyS, facilitating networks of researchers from the various centers and groups to foster the exchange of ideas across disciplines and the exploration of new frontiers of knowledge in emerging themes.

The five Thematic Areas of Application-driven Research are as follows:

• OCEAN EXPLORATION and EXPLOITATION, relying on competences and human resources of DSORg (ISR/IST), MARETEC, LTPM (IN+/IST) and M-iti.

 \bullet URBAN SYSTEMS, relying on competences and human resources of SIPg (ISR/ IST), MARETEC, LIES (IN+/IST) and M-iti.

• AERONAUTIC and SPACE SYSTEMS, relying on competences and human resources of IRSg and DSORg (ISR/IST), MARETEC, LTCES and LTPM (IN+/IST) and M-iti.

• ENGINEERING FOR AND FROM THE LIFE SCIENCES, relying on competences and human resources of SIPg, IRSg, LASEEBg and VISLAB (ISR/IST), LTCES and LTPM (IN+/IST) and M-iti.

 \bullet COGNITIVE ROBOTS AND SYSTEMS FOR ASSISTED LIVING AND WORKING, relying on competences and human resources of VISLAB and IRSg (ISR/IST), LTPM (IN+/IST) and M-iti.

The Thematic Area of Fundamentals consider formal and informal networks of researchers, from various centers, aimed to explore new frontiers of knowledge in themes without any specific known application. They consider basic knowl-edge beyond our current applications. It is named as follows:

DISTRIBUTED INFORMATION PROCESSING AND DECISION MAKING, relying on competences and human resources of SIPg (ISR/IST), DSORg, IRSg (ISR/IST), MARETEC, LTPM (IN+/IST) and M-iti.









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The key thrust of LARSyS activity will be threefold: research, advanced training, and outreach activities, including public service. For research and advanced training, LARSyS complements its internal multidisciplinary with external cooperation by networking with highly reputed research and academic institutions and industrial partners worldwide. To this effect, impetus will be given to the exchange of scientific personnel, participation in international projects, and hiring of exceptional PhD students and senior researchers. Special attention is given to the organization of summer schools and research internships.

Advanced training initiatives are at the center of LARSyS at the best international level and involve several international partnerships, as follows:

• MIT-Portugal Program, through its overall coordination and an active involvement of researchers in the areas of Sustainable Energy Systems (SES) and Engineering Design and Advanced Manufacturing (EDAM);

• Carnegie Mellon Portugal Program, through an active involvement of researchers in the areas of Electrical and Computer Engineering (ECE), Computer Science (CS), Human Computer Interaction (HCI) and Engineering and Public Policy (EPP);

• IST EPFL Program, Joint Doctoral Initiative in the area of Distributed and Cognitive Robotics involving Instituto Superior Técnico and École Politechnique Federal de Lausanne (EFPL).

• IRGC, International Risk Governance Council, through the coordination of IRGC-Portugal, which involves five Associate Laboratories in Portugal Outreach activities, including public service, is foreseen as one of the missions of LARSyS.

This takes the form of collaboration with public administration bodies, including governmental departments and local administrations, as well as with ONGs and, above all, basic and secondary schools and science centers.

Our target is to enhance collaboration with a diversified range of stakeholders to foster the dissemination of scientific knowledge and culture to the public at large. This has been particularly achieved by a strong involvement of LARSyS over the years in the Portuguese Ciência Viva program.

To achieve all these goals, the managing structure of LARSyS considers three complementing approaches: i) bottom-up; ii) middle-out; and iii) top-down. The bottom-up nature of LARSyS is promoted through its Scientific Council, which includes all doctorate researchers. It is aimed to examine and approve the annual plans and reports, and to define the Governance structure of LARSyS. It meets twice a year.

The middle-out managing structure of LARSyS is promoted through each of the ten Research Groups/Laboratories and the six Thematic Areas. Each of the ten groups has a Principal Investigator (PI), and each of the six Thematic Areas has a PI and a Management Committee.

In addition, the necessary top-down management of LARSyS is used for overall coordination. It lies on a coordinating Board of Directors with the responsibility of supervising and guiding the activities of the four participating R&D units. This Board is composed by the directors of the four R&D units involved and by the PIs of the ten Thematic Areas. The President of the Board of LARSyS coordinates the Board of Directors and is elected among its members. A small Executive Board, including the directors of the four R&D units involved, supports the President for the daily management of the activities resulting from the collaboration among the participant units and to guarantee its accurate fulfillment.

The activities of the LARSyS are followed yearly by an External Advisory and Review Board, consisting of national and international experts, as established by decision of the Scientific Council.

RESEARCHERS

The researchers of M-iti organize themselves in research groups by scientific affinity and through association with funded research projects. Each research group has a leader (Principal Investigator), who is either the main person responsible for the funded project, or who is appointed to the role by senior members of the institute to cover specific research areas of direct interest to M-iti.



Arminda Lopes Research Fellow

PhD from Leeds Metropolitan University, U.K, currently a professor at Polytechnic Institute of Castelo Branco and her main research area is Human Computer Interaction, Research Methods Methodologies.



Evangelos Karapanos Assistant Professor

PhD in Human-Computer Interaction from Eindhoven University of Technology. Focuses on the design and evaluation of pervasive computing systems with a focus on the experiential and social consequences of their adoption.



Bongkeum Jeong Research Fellow

PhD in Design Policy, Hongik University, Seoul. Post-Doc Researcher in Design & HCI, Carnegie Mellon University, Pittsburgh. Current interests lie in Policy Design for Value Added Enhancement of Visual Content Industry



Marisa Cohn Research Fellow

Phd in Information and Computer Science. Collaborates with the ERA Chair team in developing new and existing projects. Main research in Human Computer Interaction, Anthropology, and Science and Technology Studies for the study of sociotechnical systems.



David Aveiro Assistant Professor

PhD in Computer Science and Information Systems Engineering from Instituto Superior Técnico of the Technical University of Lisbon. His teaching interests include organizational engineering, database management systems and decision support systems



José Luís Silva Assistant Professor

PhD in Computer Science from the University of Minho. Interested in the identification of how prototypes can be used to explore the users' mobility and interaction to access services within ubicomp environments.



Jesús Ibañez Research Fellow

PhD in Computer Science from University of Murcia, Spain. Interests are in intelligent user interfaces, affective computing, intelligent systems, interaction with virtual environments, virtual reality.



Mary Amasia

Post-Doctoral Researcher

PhD in Chemical and Biochemical Engineering from the University of California, and a B.S. in Chemical Engineering and Materials Science from Columbia University. Has an extensive experience in leading international multi-team collaborations with industrial partners.



Julian Hanna

Assistant Professor

PhD in English Literature from University of Glasgow. With interests in literature and place; experimental fiction; digital humanities; group dynamics.



Lina Brito Assistant Professor

PhD in Telecommunication systems and eletrotecnical engineering from the University of Madeira. Focus are on Wireless Sensor Networks and Wireless Networks.



Karolina Baras Assistant Professor

PhD in Technologies and Information Systems from University of Minho. Her research interests are ubiquitous computing, sensing well-being and Internet of things.



James Auger Associate Professor

PhD in Design from the Royal College of Art (UK), Auger is a designer, researcher and lecturer whose work examines the social, cultural and personal impact of technology and the products that exist as a result of its development and application.



Luísa Soares Assistant Professor

PhD in Psychology from Universitat Ramon Llull. Assistant professor of Psychology at University of Madeira, Center of Arts and Humanties. Researcher at University of Porto, Psychology Research Center and at Larsys in M-iti



Morgado Dias Assistant Professor

PhD in Electrical Engineering from University of Aveiro. Artificial Neural Networks. Editorial Board Member of International Journal of Control Science and Engineering. Has recently been elected President of the Portuguese Control Association.



Monchu Chen Assistant Professor

Phd in Human-Computer Interaction from Carnegie Mellon University. Main research is on visual attention in interaction design, peripheral visual design, information visualization.



Elise Leclerc Executive Director

Post-Graduate Degree in English Linguistics from the University of Sorbonne Nouvelle and Masters Degree in European Affairs (Paris). Previously Lecturer in English Linguistics in la Sorbonne Nouvelle, Associate Director at Teaching Leaders (London).



Mónica Cameirão

Assistant Professor

Postdoctoral researcher with a PhD in ICT and Audiovisual Media. Involved in the development and clinical assessment of pilot interactive technologies for neurorehabilitation.



Nuno Nunes Associate Professor

PhD in Computer Science from University of Madeira. Focused interest on designing, building and evaluating interactive systems and services. Spanning different areas of human life such as sustainability, design innovation and digital culture.



Mónica Mendes Assistant Professor

PhD in Digital Media from New University of Lisbon. As Digital Media Artist, the focus on scientific activity lies in Design and HCI, complementing with interactive environments, interface design and communication design.



Olga Lyra Research Fellow

PhD in Inclusive Education from University of CologneEducational researcher with interests in persuasive technologies for educational and social inclusion.



Pedro Campos Assistant Professor

PhD in Human-Computer Interaction, from University of Madeira Research interests lie upon Interaction Design, Augmented Reality, Agile Software Development Methods, Natural Interaction for Modeling and Inter- action Design Tools.



Simone Ashby Assistant Professor

PhD in Computer Science and Informatics from University College Dublin. Main research interests lies in Mobile-based speech and language technologies for development (SLT4D), computational phonology, acoustic phonetics, speech synthesis, adaptive speech.



Chris Csikszentmihályi ERA Chair & Scientific Director

PhD(hc) from Cornish College of the Arts, has been a professor at colleges, universities, and institutes, including Distinguished Visiting Professor of Art and Design Research at Parsons the New School for Design. He cofounded and directed the MIT Center for Future Civic Media.



Valentina Nisi Assistant Professor

PhD in Interactive Location Based Narrative from Trinity College, Dublin. Research focuses on designing and producing digitally mediated experiences in real spaces, merging architecture, context and landscape.



STRATEGIC AMBITIONS

Research Capacity

Establish M-iti as an active player in the European Research Area by building an experienced partnering network of European excellence centers that will assist in strengthening our research capacity through know-how exchange, infrastructure setup, EU funding access and brain-drain prevention.

Human Resources

Reach distinctive and critical human capital in interactive technologies by overcoming the fragmentation of competences (typically driven by academic and not research requirements) that is currently straining M-iti's existing human resources.

Networking

Overcome the brain drain by recruiting high quality experienced researchers, engineers and established scientists, and promoting free exchange of knowledge and people within and across the partner network.

Critical Technical Practice Lab

Improve the innovation performance by creating a unique research infrastructure based on an open innovation model that leverages Madeira as an international living lab for testing innovative interactive technologies and their social impacts.

Strategic Planning

Focus M-iti research strategy in key application domains that correspond to important societal challenges aligned with the ERA strategic planning: entertainment and assistive technologies, creative media and digital culture, and sustainability for smart cities.

Intellectual Property

Substantially improve the RTD indicators of the Autonomous Region of Madeira and contribute to changing the economic and development paradigm, which is presently under enormous pressure due to the financial crisis.

Startups and Spin-Offs

Boost the potential of M-iti to generate innovative ideas that can be turned into new marketable interactive systems and services through the attraction of industry and the generation of startups and spin-offs

Development Paradigm

Enhance the use of generated knowledge through instituting an effective strategy for managing intellectual property.



SWOT ANALYSIS

A SWOT analysis portrays M-iti aim to develop a single strong focus that can be communicated as an umbrella vision stating a research agenda to which all members of the institute can contribute and collaborate in more group-oriented projects, the focus and vision exploits the specific characteristics of Madeira being an island and the local geographical expertise.

STRENGTHS

- High potential research faculty
- Institutional support and strategic alignment
- International connections and high quality graduate education
- Attractiveness and high quality of life in Madeira
- Cooperation with industry
- Strong leadership
- Alignment with Madeira RIS3
- Completed the hiring of ERA Chair's R&D team

OPORTUNITIES

- Increased importance of HCI and design innovation in ICT
- Increased relevance for ERA ICT challenges
- Agility and empowerment of young research team
- Industry demand for design thinking
- Lower costs of research and availability of talent
- Increasing entrepreneurship mindset of our Researchers





WEAKNESSES

- •Limited participation in the ERA
- Lack of research management structure
- Low critical mass, visibility and reputation
- Lack of in-house and large scale deployment equipment
- Lack of innovation, entrepreneurship and intellectual
- property management
- Insufficient laboratory space

THREATS

- Economic downturn
- Brain drain
- Competition to hire talented researchers
- Dependency from National research funds
- Internal resistance
- Lack of career development opportunities

FUNDING SOURCES



FOSTERING RESEARCH



Currently M-iti is involved in 13 research projects involving a total funding of **786 000,58 €** Our current project portfolio spans the areas of neuro-rehabilitation, energy, digital culture and human-robot interaction.





Start: 2012 Finish: 2016

Neuroscience Based Interactive Systems for Motor Rehabilitation

http://neurorehabilitation.m-iti.org

RehabNet is a highly interdisciplinary project that addresses several research areas including: A) clinical research; B) robotics, C) Human Computer Interaction (HCI); and D) neurofeedback and neuroscience.

RehabNet proposes to develop a novel rehabilitation paradigm, based on low cost technology that can deliver motor rehabilitation for ALL patients, ANYWHERE they are.



Sergi Bermudez i Badia (M-iti)



Researchers Mónica Cameirão, Ana Lúcia Faria, André Ferreira, Teresa Paulino, Athanasios Vourvopoulos, John Sousa, Daniel Camacho and Fábio Pereira.

Partners M-iti, CMU, Myomo Inc. and the Hospital of Funchal

Funded by FP7- PEOPLE 2011- CIG Budget

€100 000



Selected Publications & Exhibitions

Alves, J., A. Vourvopoulos, A. Bernardino, and S. Bermúdez i Badia, "Eye Gaze Correlates of Motor Impairment in VR Observation of Motor Actions". Methods Inf Med, 55. http://doi.org/10.3414/ME14-01-0125 S, 2016.

Cameirao, M. S., and S. Bermúdez i Badia, "An integrative framework for tailoring VR based motor rehabilitation after stroke. In Human Computer Confluence: Advancing our Understanding of the Emerging Symbiotic Relation between Humans and Computing Devices", pp. 245–262, VERSITA, 2015.

Faria, A. L., and S. Bermúdez i Badia, "Development and evaluation of a web-based cognitive task generator for personalized cognitive training: a proof of concept study with stroke patients. In REHAB 2015: 3rd Workshop on ICTs for improving Patients Research Techniques." ACM. http://doi.org/10.1145/2838944.2838945, 2015.

Vourvopoulos, A., J. E. M. Cardona, and S. Bermúdez i Badia, "Optimizing Motor Imagery Neurofeedback through the Use of Multimodal Immersive Virtual Reality and Motor Priming." Presented at the 2015 International Conference on Virtual Rehabilitation (ICVR), 2015.



Start: 2014 Finish: 2018

Augmented Human Assistance

http://neurorehabilitation.m-iti.org/lab/aha-augmented-human-assistance/

The Augmented Human Assistant project is an ambitious scientific and technological endeavour that aims at providing solutions to alleviate the current and upcoming social, psychological and economical burden related to sedentarism and aging related morbidities. It brings together innovation and research in a cross-disciplinary consortium with expertise in such diverse areas such as Human Functioning and Performance, Augmented Reality (AR) technologies, serious games for health, physiological signal acquisition systems, computer vision systems, robot navigation and intelligent scene assessment.

The integrated AHA system will be composed by a mobile robotic platform with advances in perception, navigation and control skills; leveraged with an extended set of sensors for human sensing and emotional state estimation; serious gaming abilities through novel augmented reality methods yielding extended feedback modalities for physical exercising and motor rehabilitation; and a virtual coach system with technologies and techniques that assist and encourage users while they perform rehabilitation exercises, and instills better compliance with their prescribed exercise regimen. Such platform will define a new class of assistive devices for healthy, elderly and patient users, allowing new modalities of interaction and engagement not yet available in the state-of-the-art.

The technologies and techniques that we are proposing in this project are expected to lead to better adherence to training/rehabilitation, hence better and faster outcomes. Specifically, we are proposing personalization technologies that will adapt the physical training uniquely to each user and each exercise session in the context of an overall rehabilitation process. We will deploy our technologies in end user trials that explore various combinations of technology and user engagement.



Selected Publications & Exhibitions

Gonçalves, A. R., Gouveia, E. R., Cameirão, M. S., and S. Bermúdez i Badia, "Automating Senior Fitness Testing Through Gesture Detection with Depth Sensors." In IET International Conference on Technologies for Active and Assisted Living (TechAAL 2015). INSPEC, IEEE., 2015. Muñoz, J., S. Bermúdez i Badia, M. Cameirão, and E. Gouveia, "Visualization of Multivariate Physiological Data for Cardiorespiratory Fitness Assessment through ECG (R-Peak) Analysis." In 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE., 2015.

Cameirão, M. S., A. Smailagic, G. Miao, and D. P. Siewiorek, "Coaching or gaming? Implications of strategy choice for home based stroke rehabilitation." Journal of NeuroEngineering and Rehabilitation, 13(1), 1, 2016.

SLTAPHIT

Start: 2014 Finish: 2015

Studying the Long-Term Acceptance of Personal Health Informatic Tools

http://www.m-iti.org/node/2474

Triggered by recent advances in sensor technology and ultra low power microcontrollers, the market of wearable activity trackers, such as Fitbit, Jawbone up, and Nike+ Fuelband, has grossed over \$230M in 2013 and is expected to continue its growth. With chronic diseases such as diabetes, cardiovascular and respiratory diseases accounting for nearly 40% of mortality cases and 75% of health care costs, and obesity alone accounting for an estimated 12 percent of the health spending growth in the U.S., wearable activity trackers promise a new health care model that stresses patient-driven prevention.

Yet, researchers have raised concerns over the plausible wear-off of any initial effects on users' behaviors. A recent survey has found that over a third of owners of wearable activity trackers have discarded them within six months of use. It remains unclear whether this is because healthy routines became established or whether the trackers lost their appeal over time.

The goal of the project is to understand the factors that drive users' long-term engagement with wearable activity trackers, and to design new solutions for prolonged engagement.





Researchers Ruben Gouveia Ana Caraban

Partners

M-iti, CMU, Folkwang University of Arts Funded by FCT, CMUP-EPB/ TIC/0063/2013 **Budget** €12 500



Selected Publications & Exhibitions

Karapanos, E., "Sustaining user engagement with behavior-change tools. interactions", 22(4), pp. 48-52, 2015. http://dl.acm.org/citation.cfm?id=2775388

Gouveia, R., E. Karapanos, and M. Hassenzahl, "How do we engage with activity trackers?: a longitudinal study of Habito." In Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing, pp. 1305-1316, 2015. ACM. http://dl.acm.org/citation.cfm?id=2804290

Gouveia, R., F. Pereira, A. Caraban, S. A. Munson, and E. Karapanos, "You have 5 seconds: designing glanceable feedback for physical activity trackers." In Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers, pp. 643-647, 2015. ACM. http://dl.acm.org/citation. cfm?id=2809437

Ornelas, T., A. Caraban, R. Gouveia, and E. Karapanos, "CrowdWalk: leveraging the wisdom of the crowd to inspire walking activities." In Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers, pp. 213-216, 2015. ACM. http://dl.acm.org/citation.cfm?id=2800923

Caraban, A., M. J. Ferreira, R. Gouveia, and E. Karapanos, "Social toothbrush: fostering family nudging around tooth brushing habits." In Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers, pp. 649-653, 2015. ACM. http://dl.acm.org/citation.cfm?id=2809438



Start: 2013 Finish: 2015

Future Fabulators http://futurefabulators.m-iti.org

The Future Fabulators (FFab) project aims to imagine, research, and prototype a range of possible futures, designed as artistic investigations and narrative artefacts to be experienced in the present. FFab uses techniques from physical narration, context-aware narrative, and future pre-enactment to translate future scenarios into storyworlds, which are built as immersive situations in public and private spaces and designed to be playfully explored and enacted by a broad population.

FFab research at M-iti is focused particularly on developing context-aware, multimedia, and transmedia stories. We investigate the contemporary panorama of creative media and translate stories of the future into artifacts of the present. Our goal, in close synergy with our FF partners, is to unfold the potential of technology and storytelling, blending tangible narrative, interactive technologies, and future forecasting.





Researchers

Julian Hanna, Mara Dionisio, Luis Ferreira, Paulo Bala, Rui Trindade

Partners	Funded by	Budget
M-iti, Time's Up, FoAM, AltArt	Culture Programme (2007-2013)	€50 000



Selected Publications & Exhibitions

Nisi, V., J. Hanna and M. Dionisio, "Exploring Ecosystem Services of the Macaronesian Laurel Forest Through Transmedia Storytelling, Culture(s) in Sustainable Futures: Theories, Practices and theories.", International Conference, 6-8 May 2015, Helsinky, Finland.

Nisi, V., J. Hanna, M. Dionisio, R. Trinidade, and P. Bala, "Time's Up, Lucid Peninsula: DreamScope An Interactive Physical Installation, Creativity & Cognition" 2015 ArtWorks, Glasgow, Uk.

Dionisio, M., M. Barreto, V. Nisi, J. Hanna, F. Ferreira, and N. Nunes, "Evaluation of Yasmine's Adventures: exploring the socio-cultural potential of location aware multimedia stories.", In proceedings of ICIDS, International Conference of interactive Digital Storytelling, 1-4 December 2015, Copenhagen.

Nisi, V., M. Dionisio, J. Hanna, F. Ferreira, and N. Nunes, "Yasmine's Adventures: An interactive urban experience exploring the socio cultural potential of Digital entertainment", IFIP International Conference on Entertainment and Computers 29 Sept. - 2 Oct. 2015 Trondheim, Norway.

Nisi, V., M. Dionisio, J. Hanna, F. Ferreira, and N. Nunes, "Yasmine Adventures, ICEC Trondheim 2015 Grand challenge: Entertainment for a better life.", Winner of the First Prize of the Grand Challenge.

Dionisio, M., P. Bala, R. Trinidade, and V. Nisi, "Time's Up, Lucid Dreaming Interactive Tabletops and Surfices", Demo track, 15-18 Nov. 2015 Funchal, Portugal.

Dionisio, M., P. Bala, R. Trinidade, V. Nisi, "Time's Up Lucid Dreaming.", ICIDS Art Exhibition, 30 Nov.- 5 Dec. 2015 Copenhagen, Denmark.



Start: 2015 Finish: 2018

Tools to analyze trends in tourism and marketing complemented with transmedia experience http://beanstalk.m-iti.org/

Beanstalk is a multidisciplinary project based at the Madeira Interactive Technologies Institute, in partnership with the Associação de Promoção da Madeira (AP Madeira). Our goal is to design and and prototype new analytics tools to analyse Madeiran trends in tourism and marketing and further complement this with a transmedia experience that can potentially stimulate local economy.

This project is divided into two components – the first of which focuses on the creation of a platform where it is possible to keep track of the flow of people in Madeira. The second component consists in the development of a location based storytelling experience, using everyday mobile devices, that capitalizes on the previously collected data.



Coordinators

Valentina Nisi Nuno Nunes (M-iti)



Researchers

Dina Dionisio, Sandra Olim, Paulo Bala, Rui Trindade, Miguel Ribeiro, Ana Bettencourt, and Bonkeum Jeong

Partners

M-iti and Madeira Promotion Bureau (AP Madeira) Funded by MADEIRA14-20 FEDER Madeira Promotion Bureau (AP Madeira) **Budget** €369,854.50

MITIEXCELL

Start: 2015 Finish: 2018

Improving MITI's Excellence in R&D and leveraging international

MITIExcell will Improve M-ITI's capacity in research and technological development, expanding human potential and promoting a critical mass of researchers with interdisciplinary experience in human computer interaction (HCI) seeking to investigate and develop humanistic and technological innovative solutions, that take advantage of outermost geographical position of Madeira to promote justice social, environmental sustainability and motivation of communities by new technologies and social networks. It shall also work on tools to analyze trends in tourism and marketing, complemented with transmedia experience. The three year project will be leveraging international Partnerships with Carnegie Mellon University, University of Texas at Austin and University College London, in the R&D aspect.





Researchers

Nuno Nunes (M-iti) Valentina Nisi (M-iti)

Dulce Pacheco, Cátia Jardim, Ângela Barbosa and Evandro Amaro

Partners

M-iti, Carnegie Mellon University, University of Texas at Austin and University College London Funded by Madeira 1420 (IDR) Budget

€1642189.52

VISION 3D

Start: 2014 Finish: 2015

VISION 3D projects aims at supporting research and development of image Optimizing and targeted display algorithms for medical context and optimize such algorithms for embedded application in "hardware" of small size, portable processing and low power. It is likely that this "hardware" be allocated to processing platforms based on FPGA (Field-programmable gate array).





Coordinator Fernando Morgado Dias (M-iti)

Researchers

Nuno Ferreira, Sheik Mostafa, Linda Natércia, Leonardo Reis, and Fábio Baptista

Partners

M-iti, Awaiba

Funded by + Conhecimento II do Programa Intervir + **Budget** €138 736,80



Selected Publications

Sousa, R. M., M. Wäny, P. Santos, and F. Morgado-Dias, "Advanced illumination control algorithm in VHDL", SPIE Sensing Technology + Applications, 2015.

Sousa, R. M., M. Wäny, P. Santos, and F. Morgado-Dias, "Multi-camera synchronization core implemented on USB3 based FPGA platform" BIOS, SPIE, 2015.

Sousa, R. M., M. Wäny, P. Santos, and F. Morgado-Dias, "Multi-camera synchronization core implemented on USB3 based FPGA platform Electronic Imaging", Photonics West, SPIE, 2015.

Sousa, R. M., M. Wäny, P. Santos, and F. Morgado Dias, "Image synchronization for 3D application using the NanEye sensor", Electronic Imaging, Photonics West, SPIE, 2015.

Baptista, F. D. and F. Morgado-Dias, "Automatic general-purpose neural hardware generator" Neural Computing and Applications, published on-line in August 2015.



Rodrigues, S., F. Faria, N. Cafofo, X. Chen, and F. Morgado Dias, "The Current Situation of the Residential and Commercial PV System Self-Consumption Market in Portugal", International Renewable Energy and Environment Conference (IREEC-2015), Prague, 2015.

Rodrigues, S., F. Faria, A. Ivaki, N. Cafofo, X. Chen, and F. Morgado Dias, "New opportunities for using Tesla Powerwall Battery in the United States of America and Portugal", The 6th International Congress of Energy and Environment Engineering and Management (CIIEM15), Paris, France, July 2015.

Rodrigues, S., F. Faria, N. Cafofo, X. Chen, and F. Morgado Dias, "Self-Consumption and Battery Bank PV Systems in the Residential Sector in Portugal", International Conference on Renewable Energy and Bioenergy (ICREB 2015), Romenia, 2015.

Rodrigues, S., R. Torabikalaki, F. Faria, N. Cafôfo, X. Chen, A. Ramezani Ivaki, H. Mata-Lima and F. Morgado-Dias, "Economic feasibility analysis of small scale PV systems in different countries", Solar Energy, accepted for publication.

Rodrigues, S., F. Faria, N. Cafôfo, X. Chen, F. Morgado-Dias, "Small Scale Photovoltaic Analysis for the Residential and Commercial Market in Portugal" International Journal of Chemical and Environmental Engineering, August 2015.



Start: 2014 Finish: 2019

Enhancing the Research and Innovation Potential of M-iti through Human-Computer Interaction and Design Innovation

http://erachair.m-iti.org

The goal of this project is to expand the research and innovation potential of the Madeira Interactive Technologies Institute (M-iti) of the University of Madeira through the hiring of an ERA Chair in Human-Computer Interaction (HCI) and Design Innovation (DI). The LEAPFROG HCI-DI aims at unlocking the full potential of interdisciplinary research in interactive technologies, while strengthening innovation and knowledge transfer activities in close collaboration with local and global industrial partners and contributing to the smart specialization strategy of Madeira.



Selected Publications & Exhibitions

Csikszentmihalyi, C., and S. Candea, "Disruptive technologies in the service of journalism", Data Harvest European Investigative Journalism Conference,Brussels, 2015, Keynote.

Csikszentmihalyi, C., "HCI politics and activism", British HCI, Lincoln, UK, 2015, Panel Abdelnour-Nocera, J., C. Csikszentmihályi, T. Clemmensen, and C. Sturm, "Design, Innovation and Respect in the Global South", Human-Computer Interaction – INTERACT 2015, vol. 9299: Springer International Publishing, pp. 630-632, 2015.

Csikszentmihalyi, C., "Political Economics of Design: recognizing that funding trumps form or function", FuturePlaces, Porto, Portugal, 2015, Keynote.

Hayoun, N., J. Auger and E. Celary, "If Willy Wonka Was a Designer", Domestic Futures, Beckmans Auditorium, Stockholm, 2015, Design Seminar.

EDUCATIONAL PROGRAMS



M-iti is active in research and education in the areas of Human-Computer Interaction, Informatics Engineering and Entertainment Technology.
In all three domains M-iti offers high-quality programs with our partners, University of Madeira, University of Lisbon, University of Porto, New University of Lisbon, University of Texas in Austin and Carnegie Mellon University.





Professional Master in Human-Computer Interaction

http://www.m-iti.org/mhci

A dual degree program, taught entirely in English, in collaboration with Carnegie Mellon University, Pittsburgh, USA. This 16-month international program aims to attract students from any continent and leads to two degrees awarded by Carnegie Mellon University and the University of Madeira.



Number of students enroled in 2015

PROJECTS

TEAM PLAY

Israel Gonzales, Letícia Patricio, Michael Richardson

Team Push workied for Play (Poland) looking to understand how families with primary school age children interact and communicate in order to design an engaging service that facilitates family relationships. PLAY's key competitive advantages have been based so far on best on the market value for money B2C voice and data offer for individual customers.

http://push.m-iti.org

PLAY

Play is the 4th largest mobile network provider in Poland. Over last 7 years, they have secured approximately 20% share of the market with just over 12 million subscribers. Play came to us wanting to explore users in market segments that had not primarily focused on.

http://www.play.pl/en

TEAM WAVESFM

Nalena Santiago, Jennifer Barannoff, Katie Ramp, Juan Corzo

The project was focused on finding ways the diaspora could help their peers in developing countries obtain graduate degrees and international experience. Diaspora members are eager to share their knowledge with those at home.

http://wavesfm.m-iti.org



The client, RootIO from Uganda, aims to rebuild radio in the era of wifi and peer production for and with rural communities in the global south. They build microstations powered by small FM transmitters and Android smartphones.

http://rootio.org

MET

Master in Entertainment Technology

http://www.m-iti.org/met

A dual degree program in collaboration with Carnegie Mellon University, Pittsburgh, USA. This international program, taught in English, starts with a semester at M-iti, followed by a semester at the Entertainment Technology Center and concludes with two more semesters at M-iti. At the end students are awarded two degrees, one by Carnegie Mellon University and one by University of Madeira.



Number of students enroled in 2015

TEAM PRISM

Paulo Bala, Rui Trindade, Ingrid Ecker, Sandra Olim and Marco Vieira

PRISM is a Master of Entertainment Technology (MET) team at the Madeira Interactive Technologies Institute (M-ITI) for the Spring semester of 2015, in which we are set to develop a 3D animated short film, entitled "Blending".

Blending is a 3D animation that depicts discrimination. This is the story about a world where everything is green. A world where anything that is not green, is not accepted or simply seen as something immoral. But the reality is somehow different – people have to hide their real color because they fear this green mentality.

With this short animation film, we intend to create a bond between the story and the audience personal experience related with discrimination. Whether this experience is associated with LGBT rights, human rights, race rights, bullying, etc. We want to reach every single person that was affected by any kind of discrimination.

http://prism.m-iti.org/

TEAM CREWCIAL

Rui Rela, Ingrid Ecker, Sandra Olim and Marco Vieira

Our mission is to create an engaging experience that allows you at the same time to contribute to the preservation of the natural environment of Madeira.

In our game you guide a water drop by balancing rotating platforms just with your arms extended. The water drop will reach the bottom, that's for sure. But the question is: "How many seeds will it water?" Depending on the number of tree seeds you can water this number of real trees will be planted in the mountains of Madeira.

http://crewcial.m-iti.org

The Airport of Madeira represented by Dr. Francisco Fernandes. He is one of the advisors to the board of directors.

www.ana.pt

PAHT

Bridging-program on Human Aspects of Technology

http://www.m-iti.org/baht

This is a one-year bridging program, in which students have the opportunity to work in multidisciplinary and multicultural teams. This graduate program is extremely valuable because of the different areas of knowledge that students obtain in the field of Human-Computer Interaction. Students accepted for this program usually come from different areas such as design, art, communication, social sciences, etc.



MEI

MSc in Computer Science

http://www.m-iti.org/mei

The Master of Science degree in Computer Science is a program in the Bolonha agreement and offers a degree awarded by the University of Madeira. Computer Engineering is currently present in all areas essential to economical and social advancement. Whether developing information visualisation tools, air traffic or ambulance control systems, this branch of engineering has a determinant impact on the decisions that affect our daily lives. It is a collaborative, interdisciplinary activity which requires transversal skills at the level of management, technology, leadership and imagination. Computer engineers shall be able to: conceive, shape, develop, operate and maintain computer applications, information systems, computational architectures and data networks; Deal with complexities and abstraction, and to easily adapt to the constant technological changes in this area.



Number of students enroled in 2015

Ana Beatriz da Palma Rodrigues Neto

SysPRE Systematized process for requirements engineering in knowledge discovery projects

> Supervisor: David Aveiro (M-iti)

Ana Karina Caldeira Caraban

Technologies that Motivate Healthy Toothbrushing Practices Through Social Translucence

> Supervisor: Evangelos Karapanos (M-iti)

> > •

Andreia Filipa Camacho Marques

Desenho e Implementação de uma Plataforma Integrada para Monitorização e Gestão de uma Rede de um Departamento da Uma

> Supervisor: Lina Brito (M-iti) Eduardo Miguel Dias Marques

> > •

Daniel José Gomes Aguiar

IP Network Usage Accounting - Parte I

Supervisor: Karolina Baras (M-iti) Lina Brito (M-iti)

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Duarte Paulo Brazão Gouveia

Producing Applications with XHTML - Organizations Redesign and Building of Information Systems - Templated Extendable Resources for Rapid Application Reuse, Update and Maintenance

> Supervisor: David Aveiro (M-iti)

> > •

Eduardo Manuel Vieira Fernandes

XpressTrades - Aplicação Android para troca de itens

Supervisors: Karolina Baras (M-iti) Lina Brito (M-iti)

Hugo Samuel de Abreu Gonçalves

Visualização de música

Supervisors: Mon-Chu Chen (M-iti)

• Jorge Castro Freire Canha

IP Network Usage Accounting - Parte III

Supervisors: Karolina Baras (M-iti) Lina Brito (M-iti)

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José Carlos Vieira da Silva

Color Measurement Using a Smartphone Applied to Madeira Wines

> Supervisors: Mon-Chu Chen (M-iti) José Carlos Antunes Marques

• Júlio Miguel Gomes Rebelo Alves

Integrating Eye Tracking in Virtual Reality for Stroke Rehabilitation

> Supervisors: Sergi Bermudez i Badia (M-iti) Alexandre José Malheiro Bernardino

• Luís Miguel Sousa Martins

Gestão de alarmes para a Web e dispositivos móveis, utilizando o software Connexall

> Supervisors: Karolina Baras (M-iti) Lina Brito (M-iti)

Luís Miguel Correia Ferreira

IP Network Usage Accounting - Parte 2, Accounting

Supervisors: Karolina Baras (M-iti) Lina Brito (M-iti)

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Márcio José Chaves Oliveira

Desenvolvimento de Software na Ad Infinitum Business

> Supervisors: Eduardo Leopoldo Fermé

Mónica Raquel Pereira Baptista

Estudo Comparativo de CMSs. Estudo de caso: uma IPSS

> Supervisors: Karolina Baras (M-iti)

> > •

Nelson Manuel Marques Vieira

Graphical Constraints - a graphical user interface for constraint problems

Supervisors: Elsa Cristina Batista Bento Carvalho

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Roberto Caires

Sociable reading

Supervisors: Yoram Chisik (M-iti) Monchu Chen (M-iti)

Sara Patrícia Fernandes Tranquada

Hospital Hero A Game for Reducing Stress and Anxiety of Children While Waiting in Emergency Room

> Supervisors: Mon-Chu Chen (M-iti)

> > •

Sérgio Manuel Nóbrega de Barros

Contextualising feedback in physical activity trackers

Supervisors: Evangelos Karapanos (M-iti)

Tiago Alexandre Vieira Gonçalves

Sistema de Suporte à Operação de Redes de Fibra Óptica

> Supervisors: Karolina Baras (M-iti) Lina Brito (M-iti)



PhD in Digital Media

http://www.m-iti.org/pdmd

This program was created through the partnership between the FCT/UNL (Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa), the FEUP (Faculdade de Engenharia da Universidade do Porto) and UT Austin (University of Texas in Austin, United States).

This is a 4-year PhD program, that is aimed at students with a masters degree (2nd cycle Bologna or pre-Bologna) in the areas of information / communication sciences, multimedia, interactive design and all scientific and technological digital media areas. Digital media is an area that is rapidly growing and has gained increasing importance in our daily lives.

The Digital Media PhD program aims to train researchers, academics and leaders in innovative processes. This training will enable the conceptualization and development of digital products and services, having taken into account target audiences, contexts, and goals relevant to several distribution channels.



NETSYS

PhD in Networked Interactive Cyber Physical Systems

http://www.m-iti.org/netsys

This is a 4-year PhD program, where students have one year dedicated to curricular courses and three years dedicated to research.

This program is aimed at students with a masters degree (2nd cycle Bologna or pre-Bologna) in engineering (electronic, computers, mechanical, aerospace and IT), computer science and applied mathematics and it offers a high level of expertize and skills in cyber-physical interactive systems. This PhD will provide students with the conceptual, scientific and technological tools to deal with the most challenging problems that happen in some of the most relevant real-life situations in the world.

This PhD in networked interactive cyber-physical systems aims to train researchers, professors and professionals to deal with innovative processes and situations. It also aims to enable them to analyze complex situations and to propose new solutions, as well as giving them the ability to manage multidisciplinary teams.



PHD STUDENTS



M-iti offers doctoral programs in collaboration with University of Madeira, University of Lisbon, University of Porto, New University of Lisbon, University of Texas in Austin and Carnegie Mellon University. Our current cohort of PhD students follows.

Afonso Gonçalves

Augmented Assistive Exergames: Healthy Exercising Through Adaptive Games in a Spatial Augmented Reality

> Supervisor: Sergi Badia i Bermúdez (M-iti)

Amanda Marinho

Sharing Economy: when the collective became better than the ownership. An investigation about goods and service design amenable for collaborative consumption.

> Supervisor: Nuno Nunes (M-iti)

Ana Lúcia Faria

Design and Assessment of Virtual Reality Methods for the Cognitive Rehabilitation of Stroke. Supervisors: Salomé Pinho (Univ. Coimbra) and Sergi Bermúdez i Badia (M-iti)

Ana Caraban

Sustaining users' engagement with physical activity trackers

Supervisors: Pedro Campos (M-iti) Evangelos Karapanos (M-iti)

• Augusto Esteves

Understanding Epistemic Actions in Human-Computer Interaction

> Supervisors: Ian Oakley (M-iti)

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Anastasios Spiliotopoulos

Application of social network analysis techniques for studying behaviour in social network sites. Supervisor: Ian Oakley (M-iti)

•

Athanasios Vourvopoulos

Multimodal Neuro-Robotic VR system for Stroke Rehabilitation Supervisor: Sergi Badia i Bermúdez (M-iti) **Christian Koehler**

Motivation Behavior Change in Climate Control Systems.

Supervisor: Ian Oakley (M-iti)

Clinton Jorge

Improving Adoption and Awareness of Pervasive Public Displays.

> Supervisors: Valentina Nisi and Nuno Nunes (M-iti)

Duarte Gouveia

Executable Model Ontology for Temporal Intelligent Organizations in Network Systems

> Supervisor: David Aveiro (M-iti)

Filipe Quintal

Exploring the dimensions of eco-feedback technology in the wild.

Supervisors: Valentina Nisi and Nuno Nunes (M-iti)

Frederica Gonçalves

•

Designing and evaluating creative writing environments: a directed storytelling, ethnography-based approach.

> Supervisor: Pedro Campos (M-iti)

Fábio Darío Vieira Baptista

•

Rapid Hardware Implementation of New Paradigms of Artificial Neural Network (RHINPANN) for Renewable Energy

> Supervisor: Morgado Dias (M-iti) João Paulo Costeira (IST)

Greice Silva

Sharing Economy

Supervisor: Nuno Nunes (M-iti)

Hildegardo Noronha

Interoperable Exoskeletons for Improved Immersion, Plausibility and Performance: a Haptics-based Approach.

> Supervisor: Pedro Campos (M-iti)

Jayant Venkatanathan

•

Examining the Interplay Between Universal Behavioural Tendencies, Online Social Networks and Social Capital

> Supervisors: Evangelos Karapanos (M-iti) and Vassilis Kostakos (Oulu University, Finland)

> > John E. Muñoz

•

Creation of adaptive videogames for sustain active aging: the role of biocybernetic loops in game experience

> Supervisor: Sergi Badia i Bermúdez (M-iti)

> > •

José Corujeira

Telerobotics augmentation of Situation Awareness through Multimodal Interfaces

> Supervisor: José Luís Silva (M-iti)

> > •

Jude Mukundane

Creation of adaptive videogames for sustain active aging: the role of biocybernetic loops in game experience

> Supervisor: Chris Csikszentmihalyi (M-iti)

Kenneth Keane

Spatial Narrative as an Interaction Resource Towards the Discovery and Sharing of Place.

> Supervisor: Valentina Nisi (M-iti)

Lígia Duro

How could the use of activity trackers offer a long-term value?

Supervisor: Pedro Campos (M-iti)

•

Lucas Pereira

Hardware and software platforms for energy monitoring and eco-feedback research.

Supervisors: Sergi Badia i Bermúdez (M-iti)

• Luis Duarte Andrade Ferreira

The impact of music and reminiscence therapy in the cognitive performance of Alzheimer

> Supervisors: Nuno Nunes (M-iti) and Mario Bergés (Carnegie Mellon University)

• Mara Dionísio

Fostering engagement and awareness about local nature and cultural capitals through mobile interactive entertainment

> Supervisor: Valentina Nisi (M-iti) Nuno Correia (FCT/NOVA)

Maria José Ferreira

•

Measuring the impact of inclusive educational interventions on students' development through wearable sensor technology

> Supervisor: Evangelos Karapanos (M-iti)

> > •

Michelle Kasprzak Innovation in Extreme Scenarios

Supervisors: Chris Csikszentmihalyi (M-iti)

Min Lee

Coaching Systems

Supervisors: Sergi Badia i Bermúdez (M-iti) and Alexandre Bernardino (IST)

Pedro Valente

Adaptation of the software development effort to the organization's return of investment capabilities

Supervisors: Nuno Nunes and David Aveiro (M-iti)

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Per Jakob Rogstadius

Enhancing Disaster Situational Awareness Through Scalable Curation of Social Media

> Supervisor: Evangelos Karapanos (M-iti)

> > •

Ricardo Nuno Araújo Sol de Jesus

Eye Hand Coordination in Interactive Information Visualization

> Supervisor: Karolina Baras M-iti)

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Roham Torabikalaki

Towards the Integration of service design methods and tools in software development process.

Supervisor: Morgado Dias (M-iti) and Álvaro Gomes (UC)

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Ruben Gouveia

Understanding users' engagement with activity trackers.

Supervisor: Evangelos Karapanos (M-iti)

Rui Alves

Towards the Integration of service design methods and tools in software development process. Supervisor:

Nuno Nunes (M-iti)

Rui Duarte Fernandes Brás

Knowledge Representation in Communities of Practice

> Supervisor: Eduardo Fermé (UMa)

Sandy Carmo Relva Rodrigues

Non-Invasive Monitoring System for Photovoltaic Installations

> Supervisor: Morgado Dias (M-iti)

> > ٠

Sara Tranquada

Internet of things

Supervisor: Chris Csikszentmihalyi (M-iti) and Nuno Correia (FCT/NOVA)

Sheikh Shanawaz Mostafa

•

Automated Sleep Apnea Hipoapnea Syndrome Detector

> Supervisor: Morgado Dias (M-iti)

Vanessa Cesário

Digital connected devices and mediated storytelling - between children and adults -Supervisor: Valentina Nisi (M-iti)



Augusto Esteves

Understanding Epistemic Actions in Human-Computer Interaction

> Supervisor: Ian R. Oakley 2015

Per Jakob Rogstadius

1Enhancing Disaster Situational wareness Through Scalable Curation of Social Medias

> Supervisor: Evangelos Karapanos, 2015

Jayant Venkatanathan

Examining the Interplay Between Universal Behavioural Tendencies, Online Social Networks and Social CapitalOnline Social Networks and

> Supervisor: Evangelos Karapanos, 2015

PHD THESIS

Abstracts, 2015



Augusto Esteves Supervisor: Ian R. Oakley

Understanding Epistemic Actions in Human-Computer Interaction

As digital systems move away from traditional desktop setups, new interaction paradigms are emerging that better integrate with users' real- world surroundings, and better support users' individual needs. While promising, these modern interaction paradigms also present new challenges, such as a lack of paradigm-specific tools to systematically evaluate and fully understand their use. This dissertation tackles this issue by framing empirical studies of two novel digital systems in embodied cognition – an exciting new perspective in cognitive science where the body and its interactions with the physical world take a central role in human cognition. This is achieved by first, focusing the design of both these systems on a contemporary interaction paradigm that emphasises physical actions – tangible interaction; and second, by comprehensively studying user performance in these systems through a set of novel performance metrics grounded on epistemic actions, a relatively well established and studied construct in the literature on embodied cognition. The first system presented in this dissertation is an augmented Four-in-a-row board game. Three different versions of the game were developed, based on three different interaction paradigms (tangible, touch and mouse), and a repeated measures study involving 36 participants measured the occurrence of three simple epistemic actions across these three interfaces. The results highlight the relevance of epistemic actions in such a task and suggest that the different interaction providing novel quantitative insights into the real benefits of tangible systems. The second system presented in this dissertation. Two studies with single and paired users provide several insights into the impact of epistemic actions. The second system presented in this dissertation is a tangible tabletop scheduling application. Two studies with single and paired users measured the occurrence of three simple epistemic actions on the user experience when these are performed outside of a system's sensi

can physical tokens be designed to better support them. Finally, and based on the results obtained to this point, the last study presented in this dissertation directly addresses the lack of empirical tools to formally evaluate tangible interaction. It presents a video- coding framework grounded on a systematic literature review of 78 papers, and evaluates its value as metric through a 60 participant study performed across three different research laboratories. The results highlight the usefulness and power of epistemic actions as a performance metric for tangible systems. In sum, through the use of such novel metrics in each of the three studies presented, this dissertation provides a better understanding of the real impact and benefits of designing and developing systems that feature tangible interaction.



Per Jakob Rogstadius Supervisor:

Supervisor: Evangelos Karapanos

MEnhancing Disaster Situational wareness Through Scalable Curation of Social Medias

The period of time following a natural disaster or other large scale emergency is traditionally characterized by individuals having limited situational awareness bound to their immediate surroundings, combined with sparse high level summaries provided by traditional media. In recent years however, online social media and other emerging ICTs have enabled regular citizens to participate actively in information exchange during large-scale events, such as earthquakes, elections, bushfires and terrorist attacks. Reports of incidents often get published through social media before being picked up by regular media. Availability of timely citizen reports opens up opportunities for unprecedented levels of situational awareness among emergency managers, affected citizens and other decision makers. However, despite the timeliness and high accessibility of social media, message inflow rates can reach hundreds of thousands of items per hour during large scale events and current methods do not effectively provide overview and navigation of this source. While some software tools have been proposed to bring order to the information, challenges remain in terms of accuracy and scalability of processing, summarization capabilities, organizational acceptance and even basic understanding of users' needs. This doctoral dissertation has two main contributions. First, work currently in progress will provide a comprehensive view of stakeholders and their roles in the overall information flow during large-scale humanitarian crises. Mapping out this complex flow helps identify weak but important links that can be strengthened by new software tools. Second, the dissertation presents the CrisisTracker software tool, built to improve the analysis and utilisation of citizen-reported information on social media during large-scale crisis. The system does this by combing the scalability of automated information management techniques, such as clustering and keyword extraction, with the adaptivity and accuracy of human information curators. Crisi



Jayant Venkatanathan Supervisor:

Supervisor: Evangelos Karapanos

Examining the Interplay Between Universal Behavioural Tendencies, Online Social

Interaction with others is fundamental to well-being, as it serves to fulfil our basic needs. Thus humans have various behavioural tendencies, patterns of behaviour that serve as strategies to fulfil these needs. Given the increasingly crucial role of online social networks on our communication and interaction, it is important to study these factors in the online context. In this thesis we explore how universal behavioural tendencies, i.e. behavioural tendencies that have been observed across cultures, affect our online interaction and how these in turn affect social capital. Focusing on disclosure behaviour and social network structure as proxies for online interaction behaviour, this work consists of three main components developed over four studies. Firstly, we attempt to understand how the tendency to reciprocate affects individuals' willingness to disclosure patterns and their positions in the network. Finally, we study how individuals, along with their differences in universal behavioural tendencies, accrue social capital from the structure of personal information, both when the initial disclosure is directed towards them, and also when it is broadcast and directed to nobody in particular, (2) The centrality of individuals in a social network is related to how much information they disclose, and how much others disclose to them, and (3) Online social network structure is related to social capital, and network structure and empathy play an interconnected role in the creation of social capital. The empirical findings, discussions and methodologies presented in this work will be useful for HCI and social science researchers studying the fundamental aspects of humans' use of social technologies.

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Csikszentmihalyi, C., and S. Candea, "Disruptive technologies in the service of journalism", Data Harvest European Investigative Journalism Conference,Brussels, 2015, Keynote

Csikszentmihalyi, C., "HCI politics and activism", British HCI, Lincoln, UK, 2015, Panel Abdelnour-Nocera, J., C. Csikszentmihályi, T. Clemmensen, and C. Sturm, "Design, Innovation and Respect in the Global South", Human-Computer Interaction – INTERACT 2015, vol. 9299: Springer International Publishing, pp. 630-632, 2015.

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Dionisio, M., M. Barreto, V. Nisi, J. Hanna, F. Ferreira, and N. Nunes, "Evaluation of Yasmine's Adventures: exploring the socio-cultural potential of location aware multimedia stories.", In proceedings of ICIDS, International Conference of interactive Digital Storytelling, 1-4 December 2015, Copenhagen.

Dionisio, M., P. Bala, R. Trinidade, and V. Nisi, "Time's Up, Lucid Dreaming Interactive Tabletops and Surfices", Demo track, 15-18 Nov. 2015 Funchal, Portugal.

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Faria, A. L., and S. Bermúdez i Badia, "Development and evaluation of a web-based cognitive task generator for personalized cognitive training: a proof of concept study with stroke patients. In REHAB 2015: 3rd Workshop on ICTs for improving Patients Research Techniques." ACM. http://doi.org/10.1145/2838944.2838945, 2015.

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Gouveia, R., E. Karapanos, and M. Hassenzahl, "How do we engage with activity trackers?: a longitudinal study of Habito." In Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing, pp. 1305-1316, 2015. ACM. http://dl.acm.org/citation.cfm?id=2804290

Gouveia, R., F. Pereira, A. Caraban, S. A. Munson, and E. Karapanos, "You have 5 seconds: designing glanceable feedback



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Nisi, V., J. Hanna and M. Dionisio, "Exploring Ecosystem Services of the Macaronesian Laurel Forest Through Transmedia Storytelling, Culture(s) in Sustainable Futures: Theories, Practices and theories.", International Conference, 6-8 May 2015, Helsinky, Finland.

Nisi, V., J. Hanna, M. Dionisio, R. Trinidade, and P. Bala, "Time's Up, Lucid Peninsula: DreamScope An Interactive Physical Installation, Creativity & Cognition" 2015 ArtWorks, Glasgow, Uk.

Nisi, V., M. Dionisio, J. Hanna, F. Ferreira, and N. Nunes, "Yasmine's Adventures: An interactive urban experience exploring the socio cultural potential of Digital entertainment", IFIP International Conference on Entertainment and Computers, 29 Sept.- 2 Oct. 2015 Trondheim, Norway.

Nisi, V., M. Dionisio, J. Hanna, F. Ferreira, and N. Nunes, "Yasmine Adventures, ICEC Trondheim 2015 Grand challenge: Entertainment for a better life.", Winner of the First Prize of the Grand Challenge.

Ornelas, T., A. Caraban, R. Gouveia, and E. Karapanos, "CrowdWalk: leveraging the wisdom of the crowd to inspire walking activities." In Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers, pp. 213-216, 2015. ACM. http://dl.acm. org/citation.cfm?id=2800923

Rodrigues, S., F. Faria, N. Cafofo, X. Chen, and F. Morgado Dias, "The Current Situation of the Residential and Commercial PV System Self-Consumption Market in Portugal", International Renewable Energy and Environment Conference (IREEC-2015), Prague, 2015.

Rodrigues, S., F. Faria, A. Ivaki, N. Cafofo, X. Chen, and F. Morgado Dias, "New opportunities for using Tesla Powerwall Battery in the United States of America and Portugal", The 6th International Congress of Energy and Environment Engineering and Management (CIIEM15), Paris, France, July 2015.

Rodrigues, S., F. Faria, N. Cafofo, X. Chen, and F. Morgado Dias, "Self-Consumption and Battery Bank PV Systems in the Residential Sector in Portugal", International Conference on Renewable Energy and Bioenergy (ICREB 2015), Romenia, 2015.

Rodrigues, S., R. Torabikalaki, F. Faria, N. Cafofo, X. Chen, A. Ramezani Ivaki, H. Mata-Lima and F. Morgado-Dias, "Economic feasibility analysis of small scale PV systems in different countries", Solar Energy, accepted for publication.

Rodrigues, S., F. Faria, N. Cafôfo, X. Chen, F. Morgado-Dias, "Small Scale Photovoltaic Analysis for the Residential and Commercial Market in Portugal" International Journal of Chemical and Environmental Engineering, August 2015.

Sousa, R. M., M. Wäny, P. Santos, and F. Morgado-Dias, "Advanced illumination control algorithm in VHDL", SPIE Sensing Technology + Applications, 2015.

Sousa, R. M., M. Wäny, P. Santos, and F. Morgado-Dias, "Multi-camera synchronization core implemented on USB3 based FPGA platform" BIOS, SPIE, 2015.



Sousa, R. M., M. Wäny, P. Santos, and F. Morgado Dias, "Image synchronization for 3D application using the NanEye sensor", Electronic Imaging, Photonics West, SPIE, 2015.

Sousa, R. M., M. Wäny, P. Santos, and F. Morgado-Dias, "NanEye-An Endoscopy Sensor with 3D Image Synchronization", IEEE Sensors, accepted for publication.

Vourvopoulos, A., J. E. M. Cardona, and S. Bermúdez i Badia, "Optimizing Motor Imagery Neurofeedback through the Use of Multimodal Immersive Virtual Reality and Motor Priming." Presented at the 2015 International Conference on Virtual Rehabilitation (ICVR), 2015.

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WORKSHOPS AND TALKS



WORKSHOPS

Information Visualization Workshop Robert Spence, from 26 January 26th to February 06th

Problematic Creation Workshops Charles DeTar from February 11th to March 13th

> Supplies Study Workshop Mathew Hockenberry, March 27th

Videomaking Workshop Diego Nicoletti, from April 7th to April 16th

Workshop Node.js Pedro Teixeira, from April 20th to May 14th

TALKS

Interactive Media at the Univ. of Applied Sciences Augsburg Thomas Rist, 16th December

> Artistic Injection December 14th

Human-Centred Computing: The Interactive, The Cooperative, and The Ubiquitous Tom Gross, November 25th

> **Aesthetics of Interaction** Mati Mõttus, November 4th

Context Aware Capture to support Memory Recall Evangelos Niforatos, October 23rd Surveillance and internet security - Internet Surveillance after Snowden: Mapping personal communication through NSA interception points Andrew Clement, October 12th

The downgrade path: Countering evolutionary narratives of technological change Marisa Cohn, July 10th

> A Brief Introduction of life cycle assessment Julie Chen, June 23rd

Large-scale personalization of interactive media Maurits Kaptein, May 5th

> **Sponge Perspectives** Andreea Bonea, March 17th

Searching for Sugar Man Stefan Candea, March 17th

Node.js, more than back-end JavaScript: industry, use cases and community insights Pedro Teixeira, February 25th

SEMINARS & SYMPOSIA

ACM ITS International Conference on Interactive Tabletops and Surfaces 2015 From November 15 to 18th 2015

> UT Austin Partnership workshop From June 1 to 2nd 2015

INVESTING IN THE FUTURE

M-iti's primary goal is to keep investing in a professional infrastructure that promotes innovation, warranting that the results of our research becomes relevant to companies and has impact in our economical environment. In 2015 M-iti invested heavily to bring management and business development professionals. A new startup, created by PhD students, was spun off and won a H2020 SME-I contract, with coaching proved by M-iti.

Attract and retain experienced researchers from other parts of the world that will develop their scientific careers in M-iti and therefore contribute to build critical mass and the internationalization and development of the University of Madeira, as well as to the outermost region of Madeira. This growth will be support by a two million euro grant from European funds, granted at the end of the year. International partnerships will be a pillar of M-iti's medium and long term future, and we shall work on deepening intuitional links with CMU and University of Texas at Austin. M-iti is seeking funds to allocate 1000 m2 of new lab space for the implementation of the Critical Technical Practice Lab. This new shared space for M-iti's researchers will be contiguous and integrate seamlessly with the current facilities used for M-iti'songoing projects.

Improving the innovation performance through a unique research infrastructure that will attract researchers and industry to the Madeira Interactive Technologies "Living Lab" and promote an economic impact through the successful creation and development of startups, spinoffs and industry-funded labs capable of generating new marketable interactive systems and service.



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