INSTITUTE FOR SYSTEMS
AND COMPUTER ENGINEERING,
TECHNOLOGY AND SCIENCE

INESCTEC 35 1985 TRINTA E CINCO ANOS 2020

CSIG

SCOPE AND ACTIVITY 2021

CCI/2021-07-13

from knowledge
generation to
science-based
innovation

INFORMATION SYSTEMS AND COMPUTER GRAPHICS

We are specialized on complex and difficult engineering problems facing industry and other organizations.

We have a wide and deep expertise to analyze, design, mine and implement large information systems

We use best practices for designing, developing and testing software systems.

We provide the visual and user interaction components solutions require.

WE ARE **COMPUTER SCIENCE**
WE ARE **INESC TEC**

Reseach Areas

R1 Computer Human Interaction (CHI) - Tânia Rocha

R2 Computer Graphics and Digital Media (CGDM) - António Coelho

R3 Information Management and Information Systems (IMIS) - Sérgio Nunes

R4 Software Engineering (SE) - Filipe Correia

R5 Large Scale and Special Purpose Computing Systems, Languages and Tools (SPECS) – João Bispo

Innovation Areas

I1 Geospatial Information Systems Engineering (GISE) - Lino Oliveira

I2 Personalised Health Research (PHR) - José Ornelas

I3 Earth, Ocean and Space Science (EOSS) - Marco Amaro Oliveira

I4 Information Systems and Applied Computing (ISAC) - José Correia

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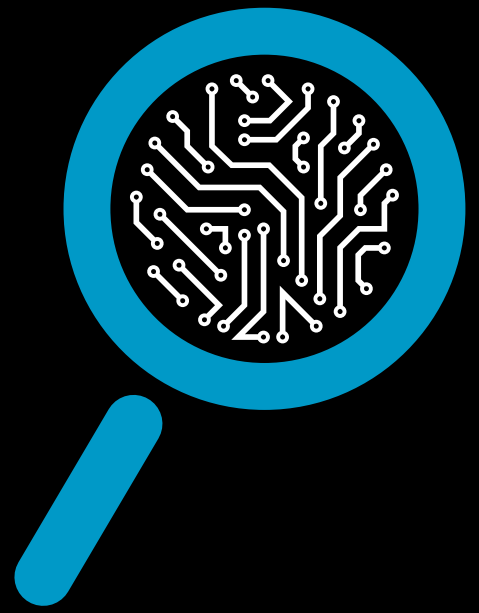
RESEARCH



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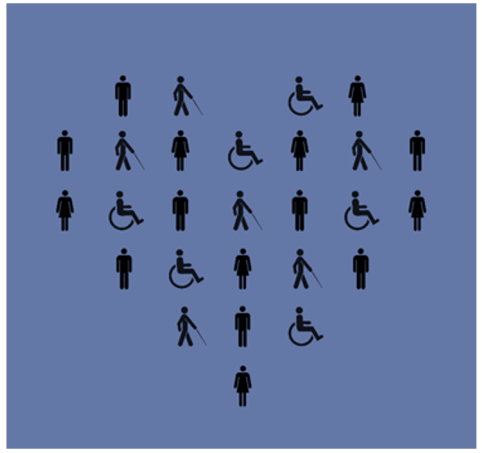
COMPUTER HUMAN INTERACTION



For the People, by the People

Themes

- Accessibility and Assistive Technologies
- Multimodal and XR Interaction
- Collaborative and social computing
- User Experience
- Human AI

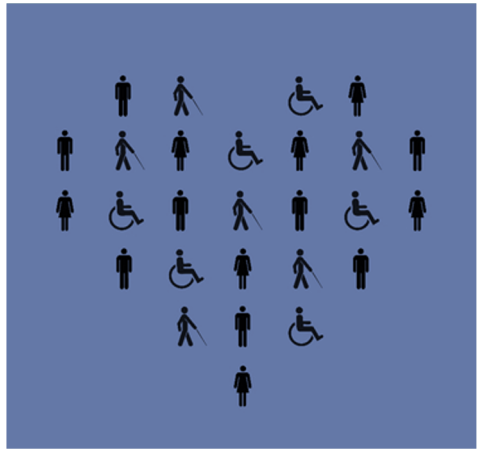
Cases

- Accessibility
- Personalized Health
- Active and Healthy ageing
- Sports and well-being
- Climate changes
- Industry 4.0/Factory of the Future

Flagship Topics

- Human AI
- Intelligent Interfaces
- Human Augmentation

COMPUTER HUMAN INTERACTION



For the People, by the People

Key Achievements

- High societal impact;
- Reference research: BLIND NAVIGATION AND AUTONOMY [1] , PERSONNAL UX [2], HUMAN IA [3];
- Extensive NATIONAL AND INTERNATIONAL NETWORK

Research Impact

- [2,3]PAFSE (H2020)
- [1,2] WALKINGPAD (FCT)
- [1,2] BLAVIGATOR (FCT)
- [1,2] CE4BLIND (UTAUSTIN/FCT)
- [3]ECSAAP (CMU/FCT)
- [3,2]WEX_ATLANTIC (FCT)
- [1,2]NANOSTIMA (NORTE2020)
- [3]NG_CRAI (INESC TEC/SEED PROJECT)
- HCILAB

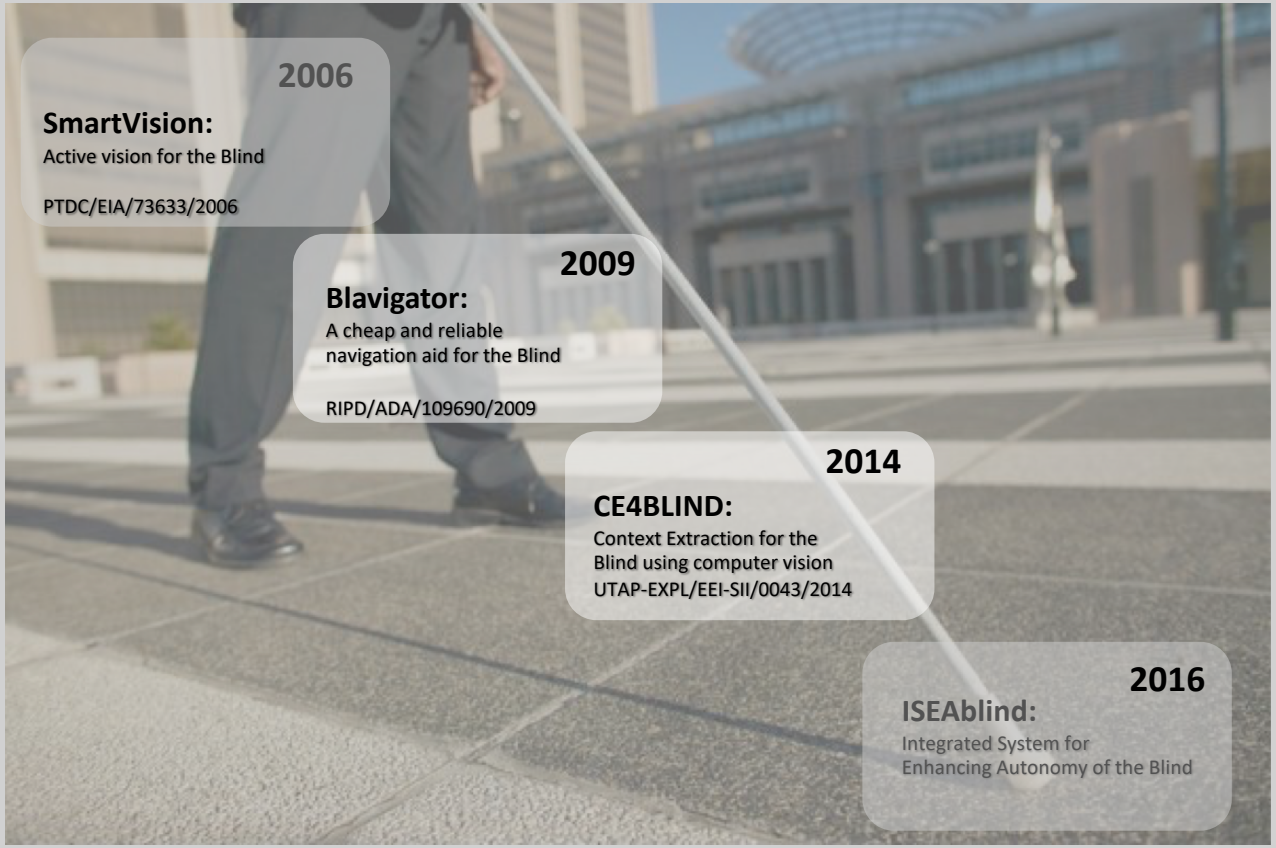
Societal Impact

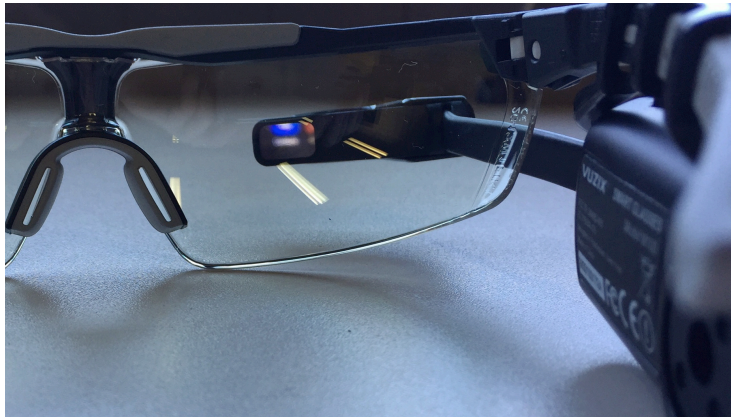
- National and International network
- DSAI/ TECH-EDU CONFERENCES

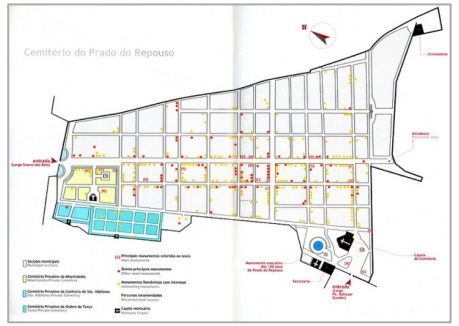
Innovation Impact

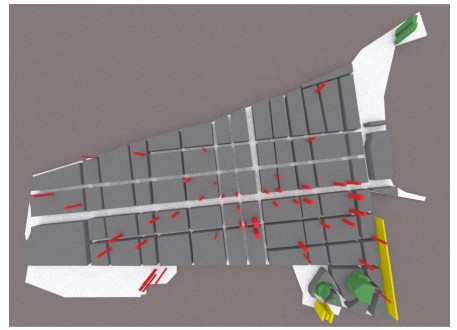
- ISEABLIND (BENGALA+APP);
- SAMI (APP)

TECHNOLOGIES FOR BLIND PEOPLE









COMPUTER GRAPHICS AND INTERACTIVE DIGITAL MEDIA

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Themes

- Immersive Environments
- Technology Enhanced Learning
- Digital Games and Gamification
- Visualisation

Vision

- To provide Extended Reality (XR) solutions with intuitive authoring and collaboration

Flagship Topics

- Multisensory Immersive Environments
- Procedural Modeling / content generation for games
- Immersive Learning Environments
- Extended reality / collaborative immersive environments

COMPUTER GRAPHICS AND INTERACTIVE DIGITAL MEDIA

INESCTEC

Virtual and Augmented Reality
Multisensorial Experiences

360º video and spatialized audio

(Serious) Games

Collaboration in virtual and augmented reality

INFORMATION MANAGEMENT AND INFORMATION SYSTEMS

Themes

- Research Data Management
- Information Retrieval
- Information Interaction
- Data Infrastructures

Applications

- R&D sector
- Archives
- Health
- Digital Media

Flagship Topics

- Data Infrastructures
- Data Preservation
- Human Information Interaction
- Information Preservation
- Information Management
- Linked Data and Semantic Web
- Open Data and Open Science
- Search Engines
- Research Data Management
- Web Information Systems

INFORMATION MANAGEMENT AND INFORMATION SYSTEMS

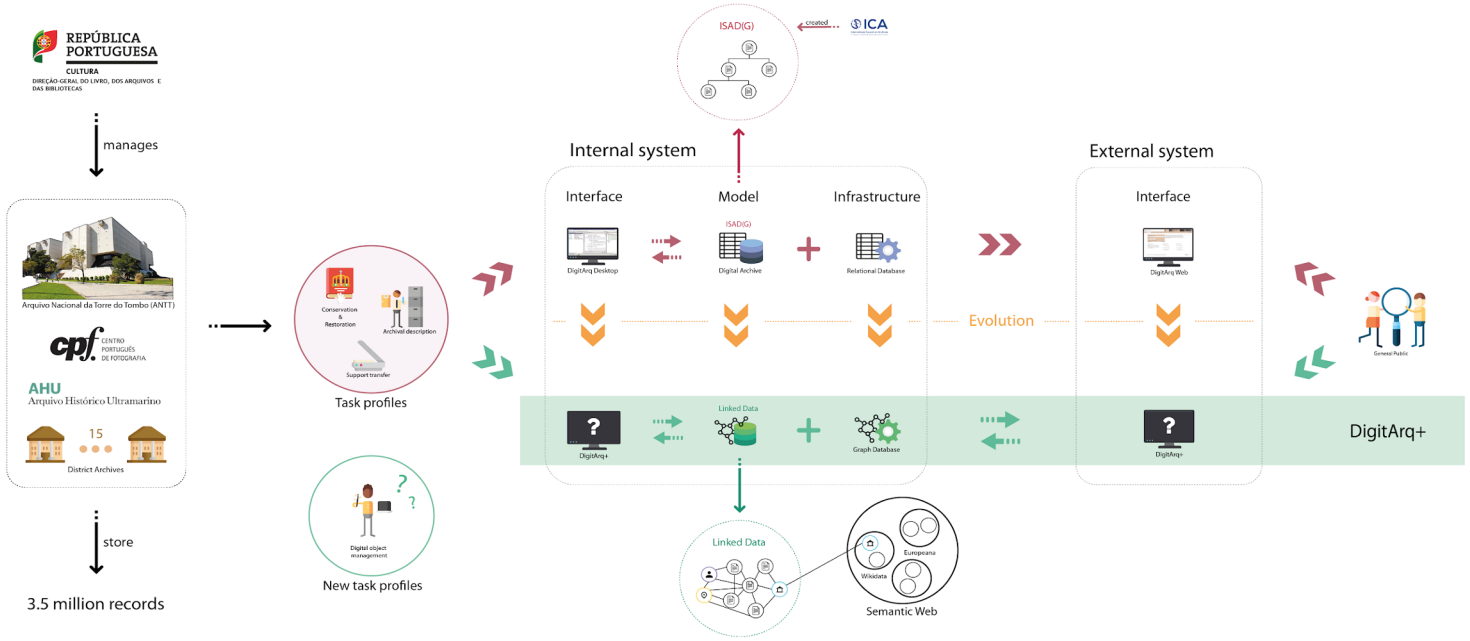
Project: EPISA

Entity and Property Inference for Semantic Archives

FCT Project, 2019 – 2022

Semantic Web, Digital Archives

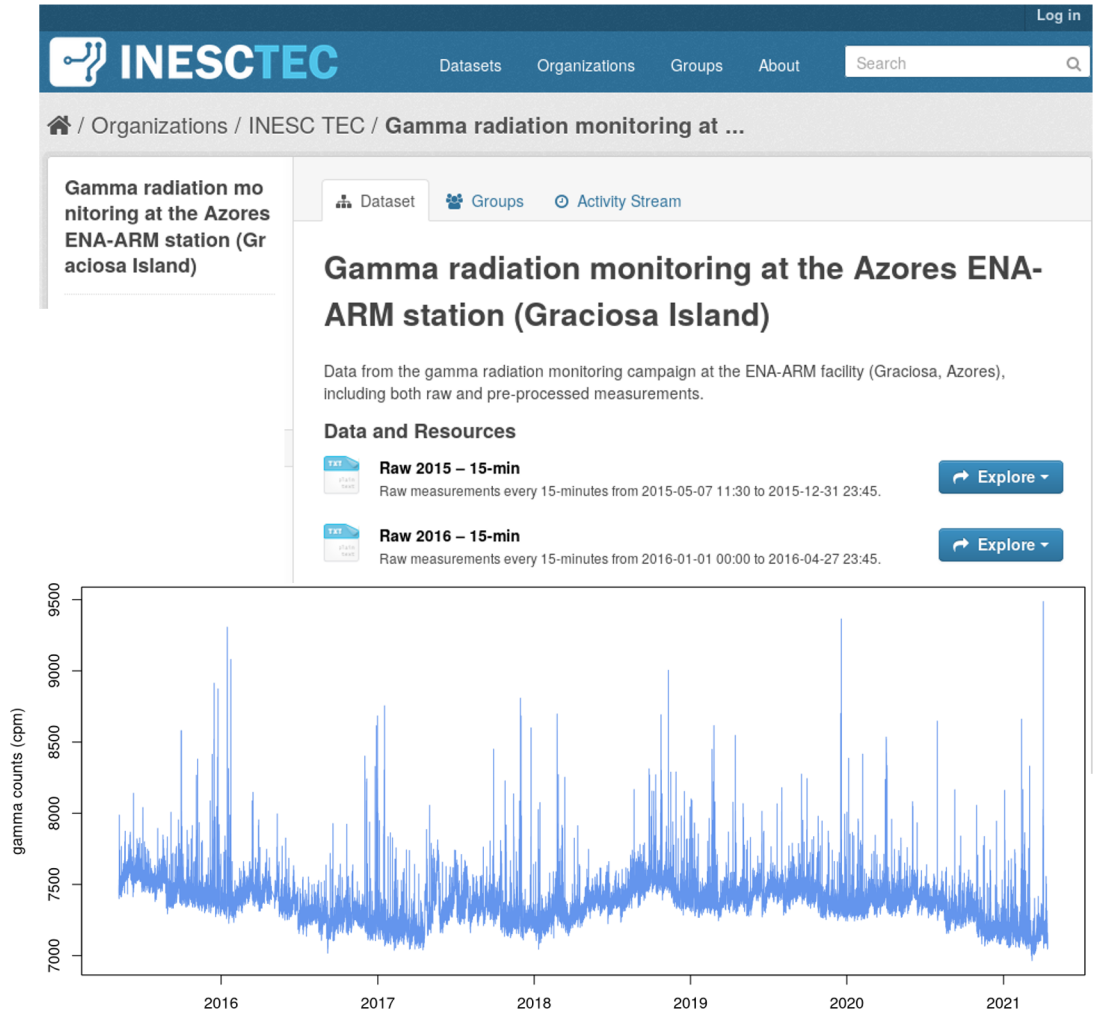
Project lead, data model design and implementation, and technical infrastructure to support the migration from hierarchical representations of archival data to graph-based models and standards. Project partners: DGLAB, U.Évora.



EPISA Project			
Author: Cláudia Guedes	Content: From DigitArq to DigitArq+	Version: 1	Data: 11/03/2020
Led by: INESCTEC	Partners: DGLAB	Financed by: FCT	

MONITORIZAÇÃO DE RADIAÇÃO GAMA NA GRACIOSA

[CLIMA – INTERACÇÕES ESPAÇO/ATMOSFERA-SUPERFÍCE | DESDE 2015]



Journal of Environmental Radioactivity 172 (2017) 218–231

Contents lists available at ScienceDirect

Journal of Environmental Radioactivity

journal homepage: www.elsevier.com/locate/jenvrad

Short-term variability of gamma radiation at the ARM Eastern North Atlantic facility (Azores)

S.M. Barbosa [a, *], P. Miranda [b], E.B. Azevedo [c]

[a] INESC TEC - INESC Technology and Science, Porto, Portugal
[b] University of Lisbon, Instituto Dom Luiz, Lisboa, Portugal
[c] Center of Climate Meteorology and Global Change, University of the Azores, Portugal

Journal of Environmental Radioactivity 195 (2018) 72–78

Contents lists available at ScienceDirect

Journal of Environmental Radioactivity

journal homepage: www.elsevier.com/locate/jenvrad

Meteorological and soil surface effects in gamma radiation time series - Implications for assessment of earthquake precursors

Susana Barbosa[a,*], Johan Alexander Huisman[b], Eduardo Brito Azevedo[c]

[a] INESC TEC - INESC Technology and Science, Porto, Portugal
[b] Agrosphere Institute (IBG-3), Forschungszentrum Jülich GmbH, Juelich, Germany
[c] Center of Climate Meteorology and Global Change, University of the Azores, Portugal

ANÁLISE DE DADOS GEODÉSICOS (MARÉGRAFOS, ALTIMETRIA SATÉLITE, GNSS)

[CLIMA – VARIAÇÃO DO NÍVEL DO MAR]

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Geophysical Journal International

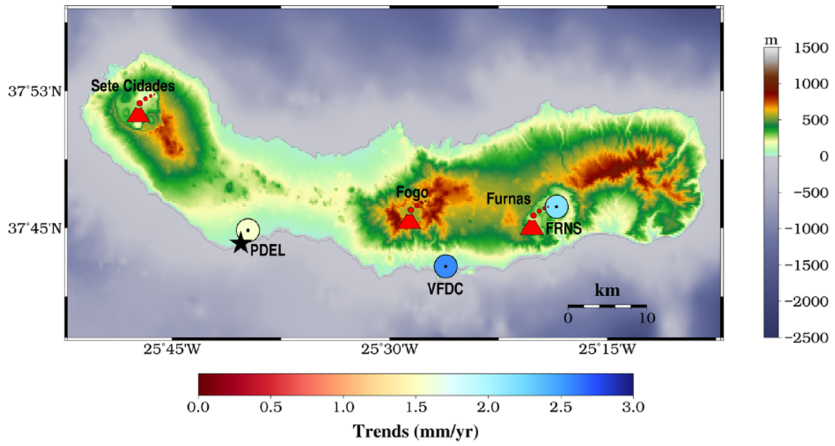
Geophys. J. Int. (2017) **210,** 1264–1280
Advance Access publication 2017 May 24
GJI Gravity, geodesy and tides

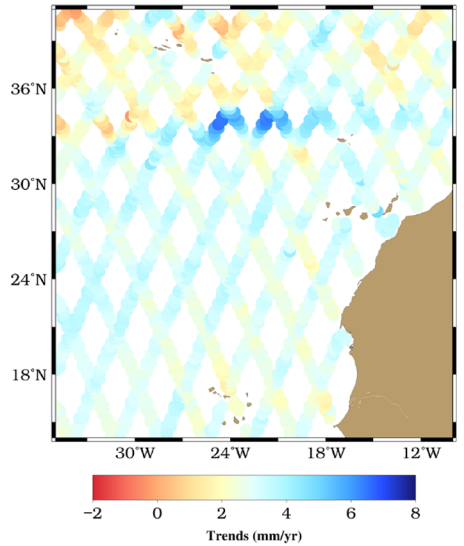
doi: 10.1093/gji/ggx229

Vertical land motion and sea level change in Macaronesia

V.B. Mendes,[1] S.M. Barbosa,[2] I. Romero,[3,4] J. Madeira[1] and A. Brum da Silveira[1]

[1]*Instituto Dom Luiz, Faculdade de Ciências, Universidade de Lisboa, Lisbon, Portugal. E-mail: vmendes@fc.ul.pt*
[2]*INESC TEC - INESC Technology and Science, Porto, Portugal*
[3]*Canary Advanced Solutions SL, Gran Canaria, Spain*
[4]*European Space Operations Centre (ESA/ESOC), Darmstadt, Germany*





INFORMATION MANAGEMENT AND INFORMATION SYSTEMS

- Project: WindScanner.PT
  - European Union Funding, 2017 – 2021
  - Research Data Management, Data Infrastructures
  - Data infrastructure for the WindScanner facility, a laser-based wind measurement system that can generate detailed maps of wind conditions covering several square kilometers.
- Project: RDA-pt
  - European Union Funding, 2019 – 2020
  - Research Data Management
  - Research Data Alliance Portugal (RDA-pt) is a national RDA node that links Portuguese data management communities to the RDA. RDA-pt is a formal participant of RDA Europe 4.0, the European plugin to the global Research Data Alliance.
- Project: Stop PropagHate
  - Google Digital News Innovation (DNI) Fund, 2018 – 2019
  - Social Media, Journalism, Machine Learning
  - Use artificial intelligence to help detect and reduce hate speech in online news media. Improve hate speech detection in text. Help detect news pieces that originate reaction containing hate speech.
- Event: TPDL 2018
  - 22nd International Conference on Theory and Practice of Digital Libraries
  - General Chair (Cristina Ribeiro and Gabriel David) of the 22nd edition of TPDL, in Porto

LARGE SCALE AND SPECIAL PURPOSE COMPUTING SYSTEMS, LANGUAGES AND TOOLS

INESCTEC

Compilation for non-conventional architectures

- From High-Performance Computing (HPC) to Embedded Systems

A bridge between hardware and software

- Between informatics (e.g. M.EIC, MESW) and electronics (e.g. M.EEC)

LARGE SCALE AND SPECIAL PURPOSE COMPUTING SYSTEMS, LANGUAGES AND TOOLS

INESCTEC

Topics

- Domain-Specific Languages (DSLs)
- Compilers
- Reconfigurable Computing (including FPGAs)
- Embedded Computing (including high-performance embedded computing)
- Distributed Computing and Mobile Computing

Flagship Topics

- **Performance Engineering**
- Parallel and distributed computing systems
- Algorithms and data-structures for large-scale computing
- Custom Computing
- Approximate Computing
- Heterogeneous Computing including Hardware Accelerators
- **Energy Efficiency**
- **Multi-language analysis and transformation**
- Hardware design and High-level Synthesis

LARGE SCALE AND SPECIAL PURPOSE COMPUTING SYSTEMS, LANGUAGES AND TOOLS

INESCTEC

Top Achievement – LARA Framework

- Origin: European Project 2010-2012
  - Still active and in development!
- Allows to easily build source-to-source compilers
- Very wide applicability range:
  - Automatic parallelization
  - Code vulnerabilities detection and fixing
  - Metrics and design pattern extraction
  - Hardware/Software codesign
  - … and many more

LARGE SCALE AND SPECIAL PURPOSE COMPUTING SYSTEMS, LANGUAGES AND TOOLS

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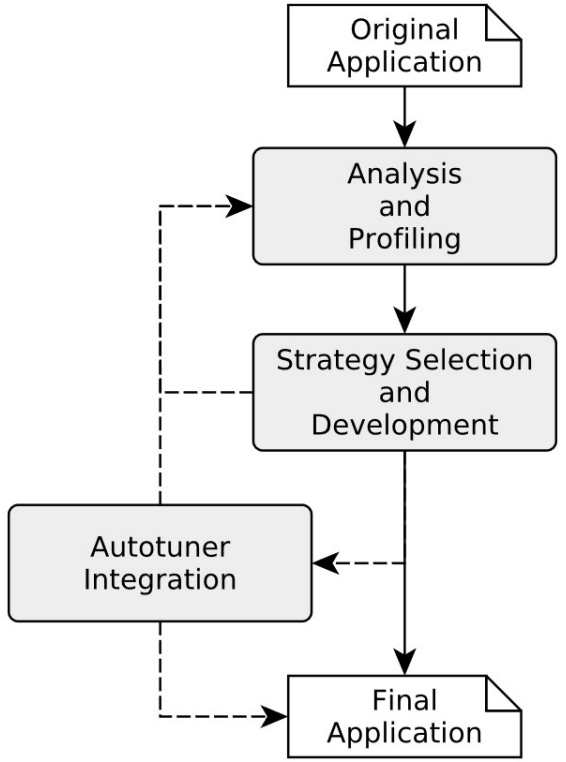
Top Achievement – Pegasus Approach (IEEE Trans. on Software Engineering)

- One of the top achievements of the european project ANTAREX
- Holistic approach for performance engineering
- Automates several tasks
  - Analysis
  - Profiling
  - Code transformations
  - Auto-tuning integration



CLAVA

ANTAREX 10^{18}

SOFTWARE ENGINEERING

Themes

- Software Requirements, Design & Construction
- Software Testing
- Agile Processes
- Knowledge Management
- Serious Games for Software Engineering

Vision

- To develop novel methods, techniques, and tools that advance the way software is designed, synthesized and assessed.

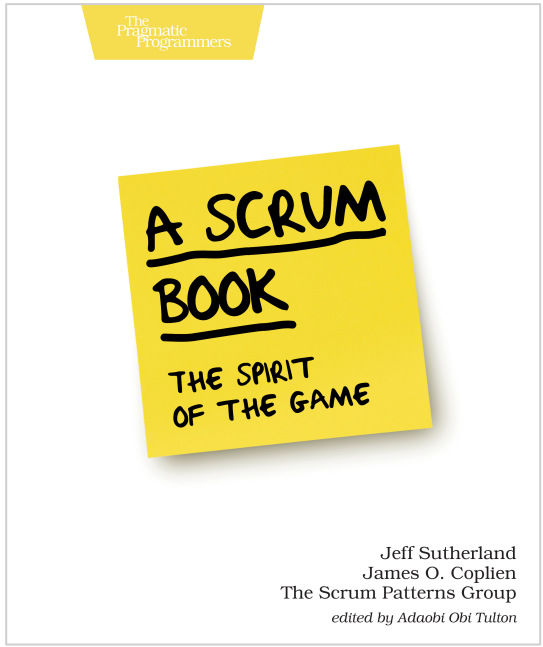
Flagship Topics

- Agile at Scale
- Cloud Software Engineering
- Developer Experience
- Microservices Architectures
- Model-Based Testing
- Secure Software Engineering
- Software Analytics
- Software Engineering and AI
- Quantum Software Engineering

SOFTWARE ENGINEERING

Key Achievements

- A Scrum Book: The Spirit of the Game
  8 years, 20 authors. High impact in the agile community and industry.
- ICSE 2024 – CORE A*
  Flagship conference in Software Engineering to happen in Portugal in 2024.
- ICST 2021 – CORE A
  Top conference in the area of Testing, Verification and Validation
- XP 2018, <Programming 2020>, PLoP, etc – CORE B



RESEARCH LINES

COMPUTER SCIENCE

INESCTEC

SIGMIS
Management Information Systems

SIGMETRICS
Mesurement and Evaluation

SIGHPC
High Performance Computing

SIGIR
Information Retrieval

SIGWEB
Hypertext, Hypermedia & the Web

SIGACCESS
Accessibility & Computing

Big Data & Machine Learning

SIGKDD
Knowledge Discovery & Data Mining

SIGMOD
Management of Data

SIGOPS
Operating Systems

Privacy Preserving Computing

SIGSAC
Security, audit & Control

SIGGRAPH
Computer Graphics

Virtual Environments

SIGCHI
Computer-Human Interface

SIGACT
Algorithms & Computation Theory

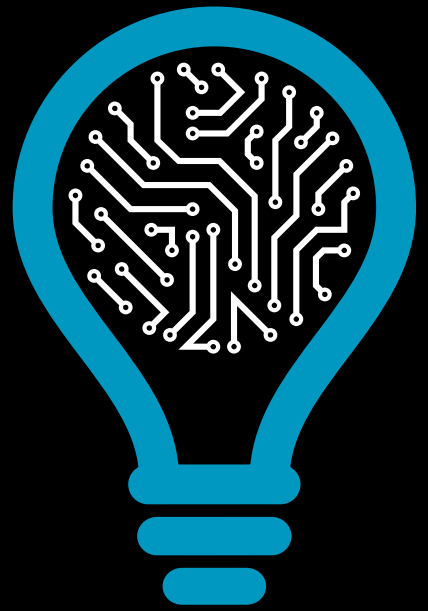
Tools for Reliable Software Development

SIGSOFT
Software Engineering

SIGLOG
Logic & Computation

SIGPLAN
Programming Languages

INNOVATION



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GEOSPATIAL INFORMATION SYSTEMS ENGINEERING

INESCTEC

Themes

- Applied research in geospatial information science, leading to products and services solutions.

Applications

- Agriculture
- Ports
- Industry
- Public Administration

Flagship Topics

- Spatial Data Infrastructures
- OGC's emerging standards
- Geospatial-enabled technologies
- Digital Twin

GEOSPATIAL INFORMATION SYSTEMS ENGINEERING

3PORT Integrated Port Management System

Geospatial port management system, fully aligned and integrated with Port Authority business processes and existing systems and applications.

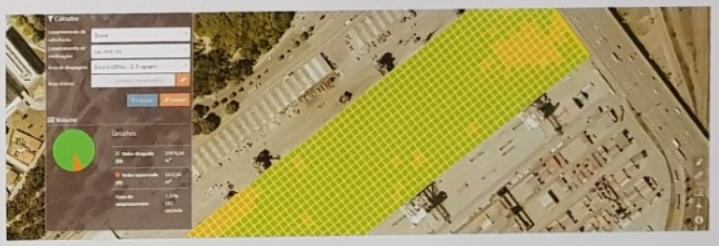
IMPACT

DEVELOPMENT & INNOVATION

INESC TEC was the innovation partner and the booster of a technology transfer triangle composed by INESC TEC (producer of the innovation), TRIEDE TTI (producer of the solution, integrating the innovation) and APDL (user of the solution and the one identifying the requirements).
The system brought together best practices from open source software, GIS web mapping, business process management, software engineering, social networks, crowdsourcing information systems and mashup approaches in an innovative way to a new area of application.

SECTORIAL IMPACT

Increased port operations efficiency .
Lowered costs of ownership, integrating open source GIS software and imagery from public web mapping services and marine information services.



NATIONAL IMPACT

Increased competitiveness of a Portuguese software house (TRIEDE TTI), with a state of the art product.
AMA, Portuguese Government Modernization Agency, considered 3PORT a Best Practice in public administration.
The system is in operation in all 5 main Portuguese ports: Leixões, Viana do Castelo, Aveiro, Figueira da Foz e Douro river ports. (TRL 9)

INTERNATIONAL IMPACT

Attracted interest in several countries, namely Brazil, Chile, Peru, Angola and Cape Vert.
Seminar on Port Management: European and Brazilian Initiatives, Rio de Janeiro, Brazil
Workshop on Innovation in the Integration of Port Processes, Ports of State Santa Catarina, Florianopolis, Brazil

GEOSPATIAL INFORMATION SYSTEMS ENGINEERING

INFRAVINI

Vineyard Climate Change Management

Monitor both the impact of meteorological variability and the impact of climate change

Challenge

Adaptation to climate change is one of the biggest challenges for the wine sector, taking on a temporal and a spatial dimension.

Motivation

Develop an instrument capable of supporting winegrowers to become more resilient to climate change.

Opportunity

For the creation of a Thematic Spatial Data Infrastructure (SDI) for the Management of Climate Change in the Vineyard.

INFRAVINI

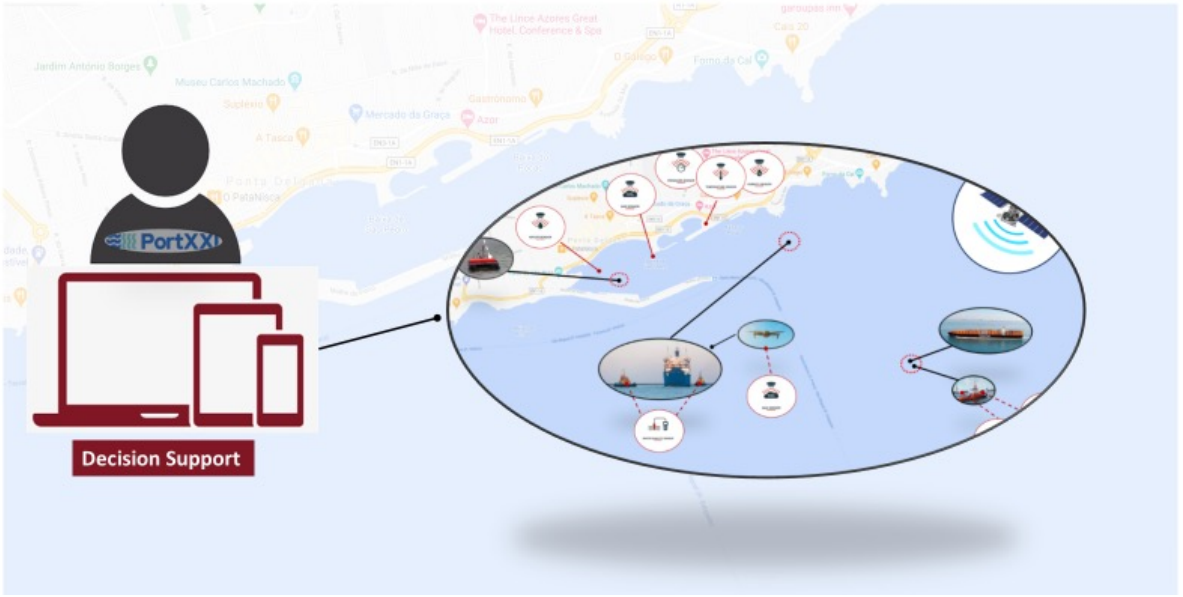
INESCTEC GeoDouro utad ADVID ASSOCIAÇÃO PARA O DESENVOLVIMENTO DA VITICULTURA DURIENSE

GEOSPATIAL INFORMATION SYSTEMS ENGINEERING

Space Enabled Sustainable Port Services

Identify and evaluate the deployment of transformative environmental monitoring and management services that could help ports minimize their environmental impact, while keeping operational costs contained by taking advantage of EARTH OBSERVATION, SATCOM and SAT NAV infrastructures, in combination with information gathered from other sources such as CCTV, data repositories, in situ sensors, mobile sensors, using autonomous robotic solutions and incorporating Big Data and AI techniques for automatic knowledge extraction.

PortXXI



https://portxxi.org/

AIR CENTRE
INESCTEC
amberjack SOLUTIONS
IN+ CENTER for INNOVATION, TECHNOLOGY and POLICY RESEARCH
PORTOS DOS AÇORES
Moniport

Personalized Health Research

Flagship Topics

- Platforms and methods for Personalized Health Research
- Large Scale Health Research Infrastructures for Privacy-Preserving Computing
- New computational methods to support emerging treatments

Project highlights

- Inno4Vac (IMI2) (recently approved, GA in preparation)
- H2020 iReceptor Plus
- H2020 EUCAN-Connect
- H2020 RECAP Preterm
- FCT iCare4Depression
- Moodbuster/DIFFER Consortium (Boozebuster, Moodbuster 2.0, etc..)
- FOREUM Sepia (Studying Experiences of Pain In Adolescents)

Vision

Empowering researchers in the health domain achieving **evidence-driven** science towards **personalized** treatments. Two main sub-areas emerge from the main goal: **novel personalized Internet-based treatments**; and **human data storage, harmonization, controlled sharing and privacy-preserving analysis**.

Alignment

Important trends and challenges include **collaborative tools and methods for health research leveraging on the FAIR principles**, **security** and **privacy preservation**. Furthermore, this area contributes to the cluster RL Machine Learning by fostering distributed ML techniques as well as AI reproducibility. Processing involves big data (e.g. genetic data) using HPC, posing challenges on how to integrate different computing paradigms.

Potential applications

RECAP Preterm

Research on European Children and Adults Born Preterm

Objectives

Create a sustainable, geographically diverse and multidisciplinary platform for cohort studies

Develop hypothesis-driven research on health and care data of VPT/VLBW children

Involve society and stakeholders into the platform to disseminate results towards policy recommendations for optimal care and support

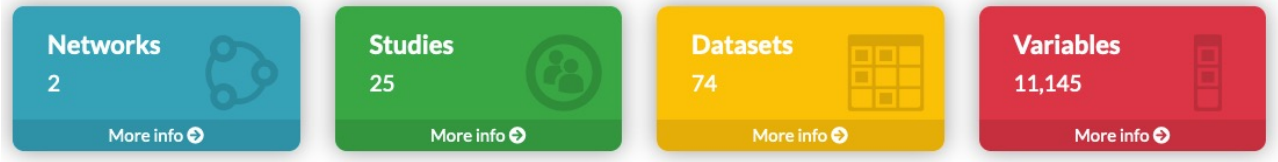
Results

RECAP Preterm Network of 13 distributed RECAP Nodes across Europe

25 studies from 23 cohorts across 14 countries

11 145 variables from 74 datasets (goal is to achieve 20 000 variables)

Distributed platform for harmonisation studies and privacy-preserving analysis



Variable	EPICE-PT	NTNU LBW Life	BEST/BLS	ACTION	UA_EPIBEL	EPICE	AYLS	PIPARI	PEP
id	✓	✓	✓	✓	✓	✓	✓	✓	–
mat_id	✓	✓	✓	✓	✓	✓	✓	×	×
ga_wks_birth	✓	✓	✓	✓	✓	✓	✓	✓	✓
ga_days_birth	✓	✓	×	✓	×	✓	×	✓	×
month_birth	✓	×	✓	✓	✓	✓	✓	✓	×
year_birth	✓	✓	✓	✓	✓	✓	✓	✓	×
wgt_g_birth	✓	✓	✓	✓	✓	✓	✓	✓	✓
multiple_int_birth	✓	✓	✓	✓	✓	✓	✓	✓	✓
mat_age_yrs_birth	✓	✓	✓	✓	✓	✓	✓	✓	✓
sex_bin	✓	✓	✓	✓	✓	✓	✓	✓	✓
alive_bin_onslab	✓	✓	✓	✓	✓	×	✓	✓	×
alive_bin_matadmit	×	✓	✓	×	×	×	✓	✓	×
alive_bin_birth	✓	✓	✓	✓	✓	✓	✓	✓	×
alive_bin_nicadmit	✓	✓	✓	✓	✓	✓	✓	✓	×

Number of Participants	Studies
less than 1,000	11
1,000 to 4,999	7
5,000 to 9,999	1
10,000 to 49,999	2
50,000 to 99,999	0
100,000 to 499,999	1
500,000 and more	0

The RECAP Preterm Network

Navigate the map to find other nodes in the RECAP Preterm network that can contribute to your research.

Potential applications

EUCAN-Connect

Connecting Europe and Canada in personalized and preventive health care

Objectives

To deliver an open, federated data platform to deposit, curate and analyse cohort (meta)data that meets FAIR principles

To create a sustainable framework for long-term collaboration that enables better data-reuse, privacy-preserving and increased benefit to scientific communities worldwide

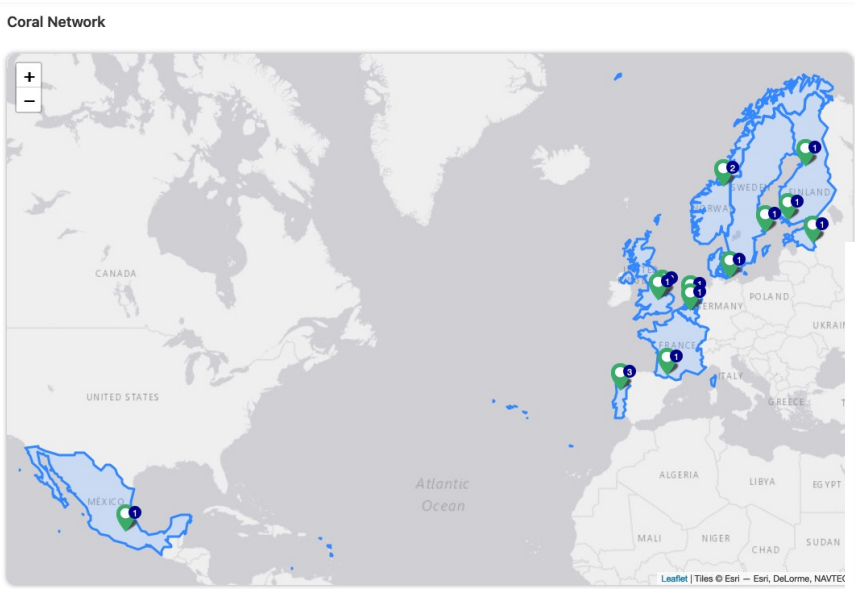
Open Science, Open Innovation and Open to the World

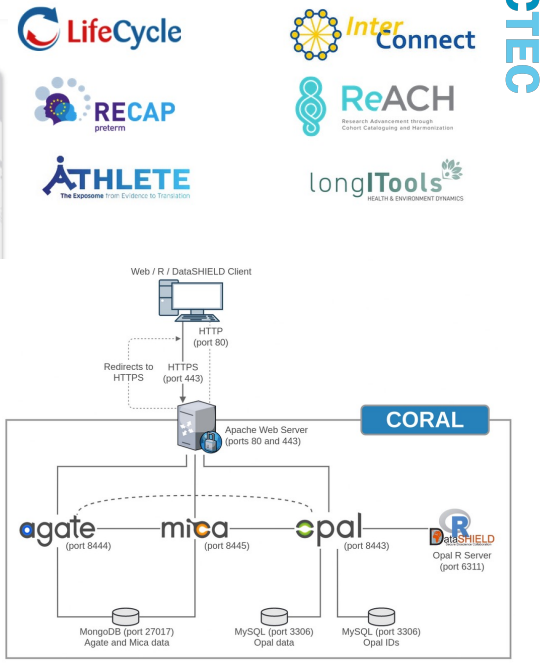
Results

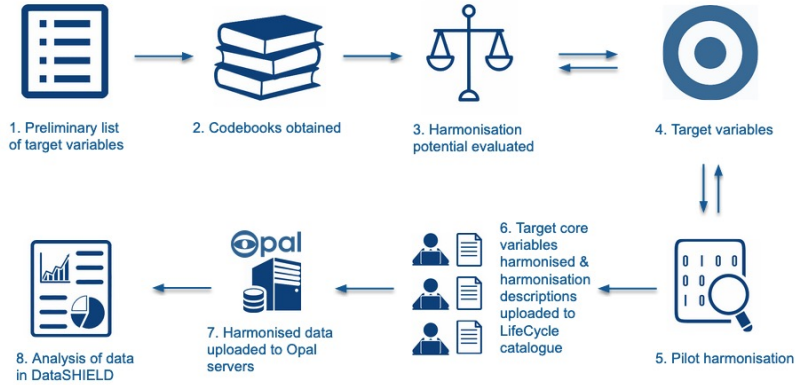
CORAL software distribution

CORAL Network of 18 distributed nodes

Enabling exchange/federation between 6 major cohort consortia







Moodbuster ecosystem

Design, implement and test digital interventions that resort on new computational tools and methods to obtain scientific evidence of treatment effectiveness

Previous projects

E-COMPARED

ict4depression

STOP DEPRESSION

iCare4 Depression

differ
Digital Framework for E-health Research

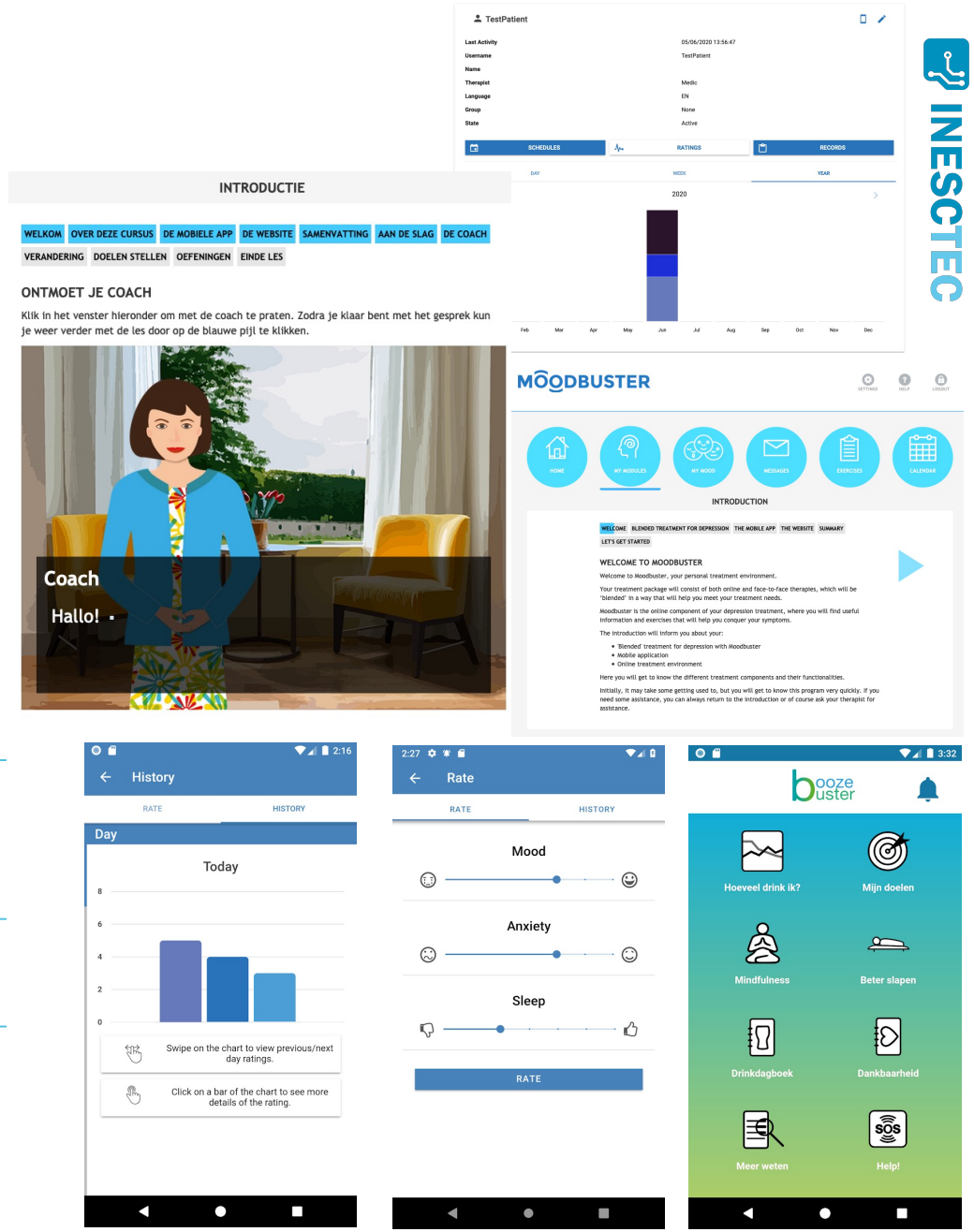
Ongoing projects

Moodbuster blended CBT for studying depression

Moodbuster Lite digital solution enhanced by virtual avatar for researching on depression treatments

Boozebuster for understanding alcohol consumption

Moodbuster 2.0 – supports multiple studies such as for the elderly or for anxiety

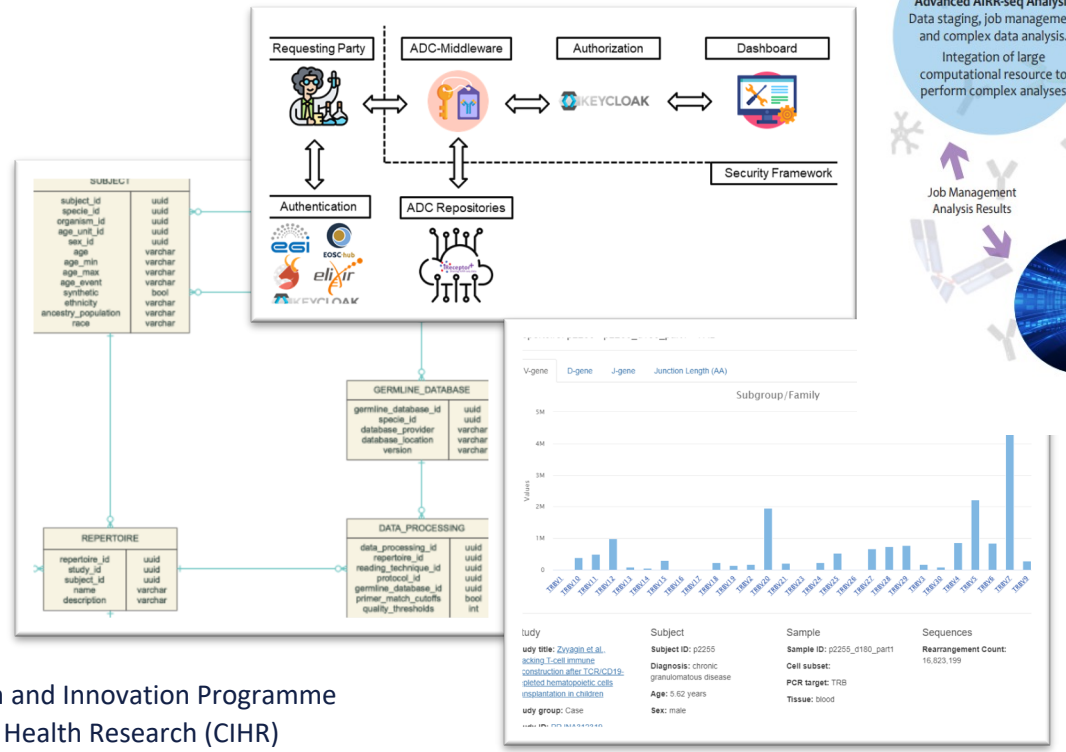


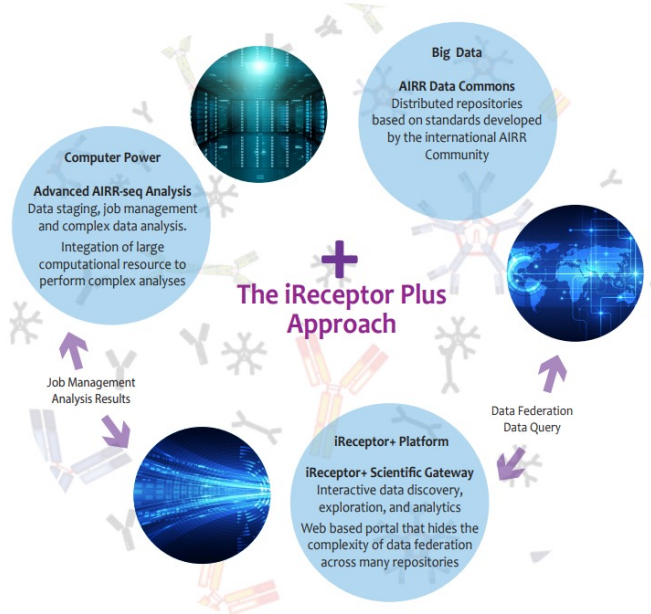
iReceptor +

Enable researchers around the world to share and analyze huge immunological datasets taken from healthy individuals and sick patients that have been sequenced and stored in databanks in multiple countries.

Results

- SECURITY Framework
- Interactive VISUALIZATION Library
- IMMUNEML Framework
- Data TRACEABILITY and REPRODUCIBILITY
- Data ANALISYS





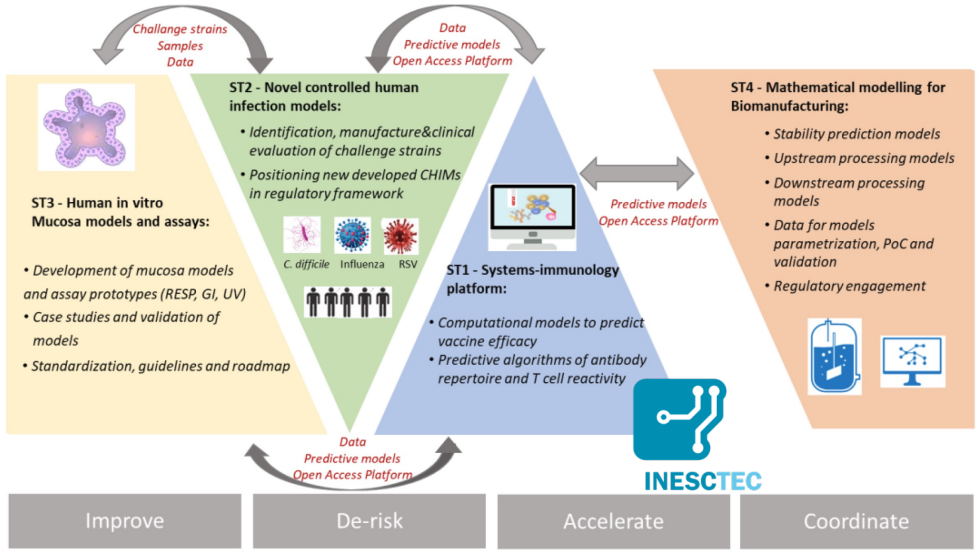
This project is funded by the European Union's H2020 Research and Innovation Programme under Grant Agreement No. 825821 and Canadian Institutes of Health Research (CIHR)

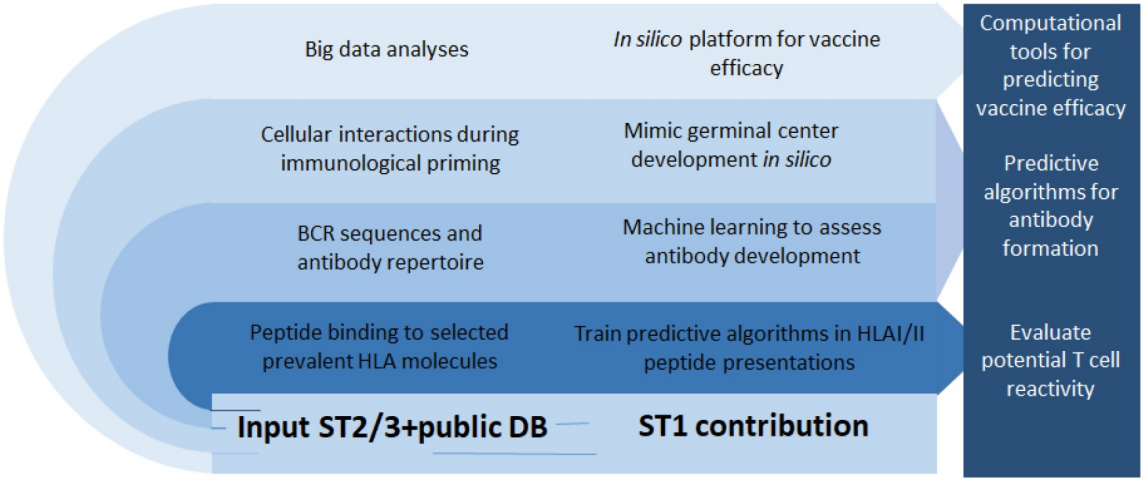
Inno4Vac

Innovations to accelerate vaccine development and manufacture

Objectives

Harness the latest advances in immunology, disease modelling, and modelling for tackling persistent scientific bottlenecks in vaccine development and for de-risking and accelerating this process.





- INESC TEC takes part in Subtopic 1: VAXPRED - A cloud-based systems-immunology platform for reliable predictions of vaccine efficacy.
- In VAXPRED, Artificial intelligence (AI, machine learning, ML) in combination with big data and computational modeling will be used to build an open-access and cloud-based platform for in silico vaccine efficacy assessment and development.
- First Innovative Medicines Initiative (IMI2) approved in Portugal

Earth, Ocean and Space Science

Flagship Topics

- Digital Twins
- Real Time Data Streaming and Processing
- IoT
- Semantic Interoperability
- Big Data Analysis
- Spatial-temporal systems
- Information and Scientific visualization
- Systems of Systems

Project highlights

- ILIAD (Recently approved)
- H2020 MELOA
- EPOS-SP
- MarRisk
- SeaBioData

Vision

Support researchers and stakeholders in the EOSS field in achieving **evidence-driven science**, by providing **systematic and collaborative methods**, assisted by **data science tools** to address important societal challenges such as climate change, human impacts or the sustainable management of the environment and its resources.

Alignment

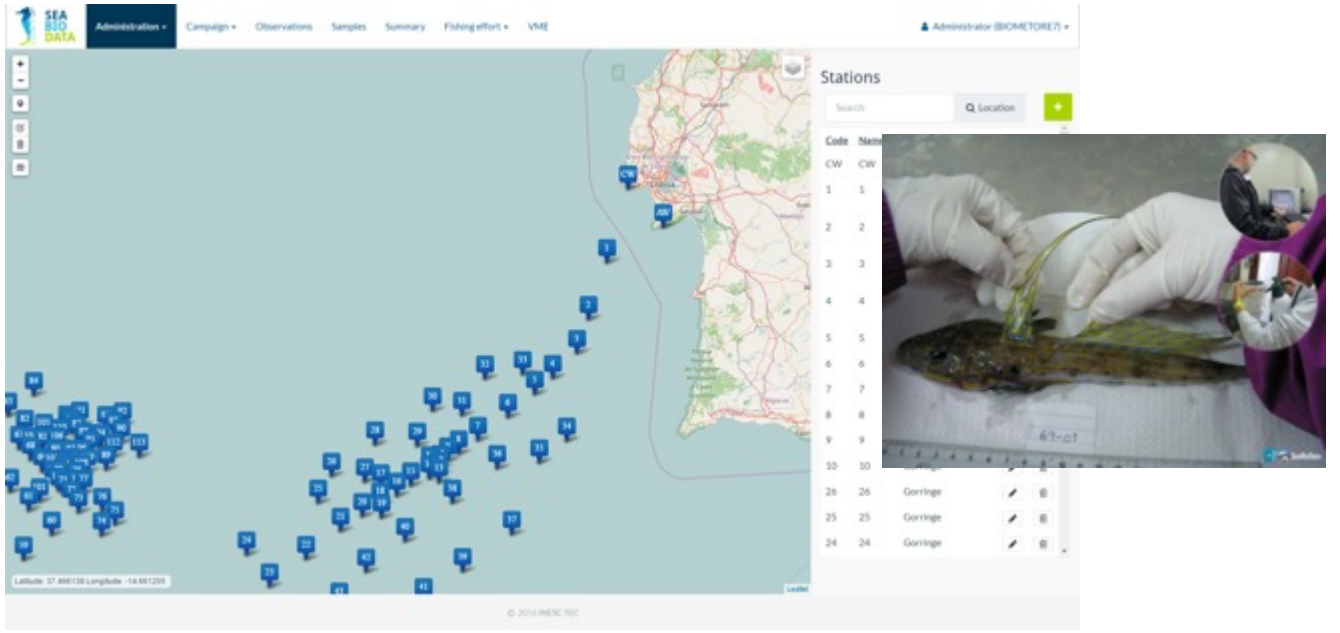
Semantic interoperability, **IoT**, **real time data stream processing**, **big data analysis** and **Digital Twins** are but a few examples of the undergoing trends and challenges. In terms of the cluster RLs it is aligned with big data processing and software tools to assure quality in research. In terms of societal challenges it is aligned with **European Green Deal** and **A Europe fit for the digital age** Strategies, the Sustainable Blue **Economy** approach, and the **Destination Earth** policies to develop a high precision digital model of the Earth

Potential applications

SeabioData*

Portuguese Seamounts

Biodiversity Data Management



Objectives

Data Management system (physical, chemical, ecological parameters)

Facilitated data insertion

Environmental state evaluation

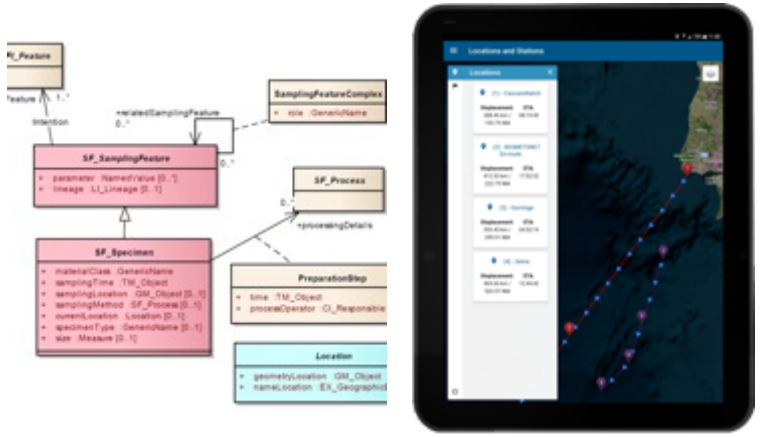
Improve ocean monitoring

Results

Heterogeneous data integration (campaigns, observations,…)

Monitoring ecosystems and human impacts

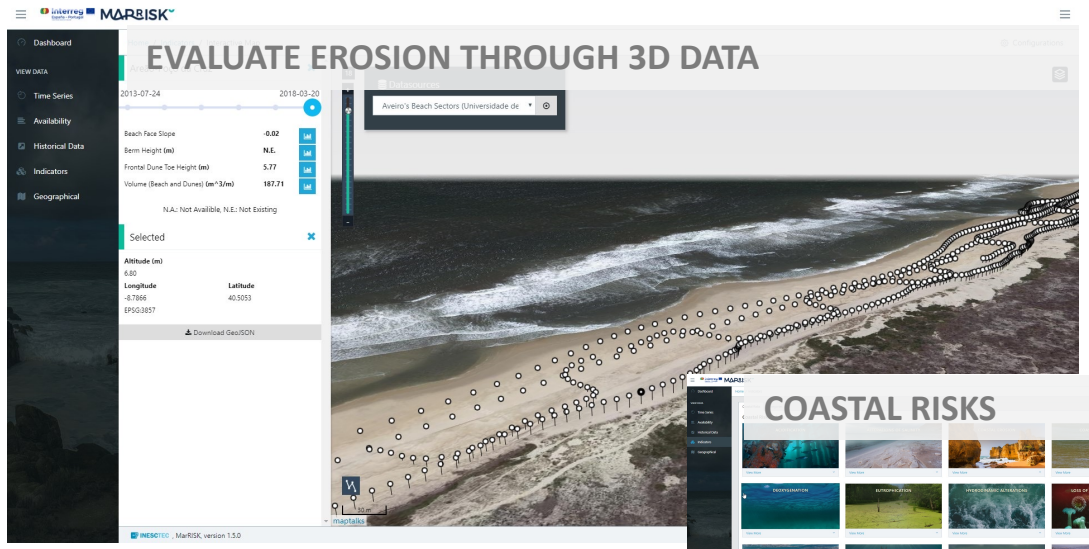
Identification of vulnerable areas



Potential applications

MarRISK*

Costal adaptation to climate change

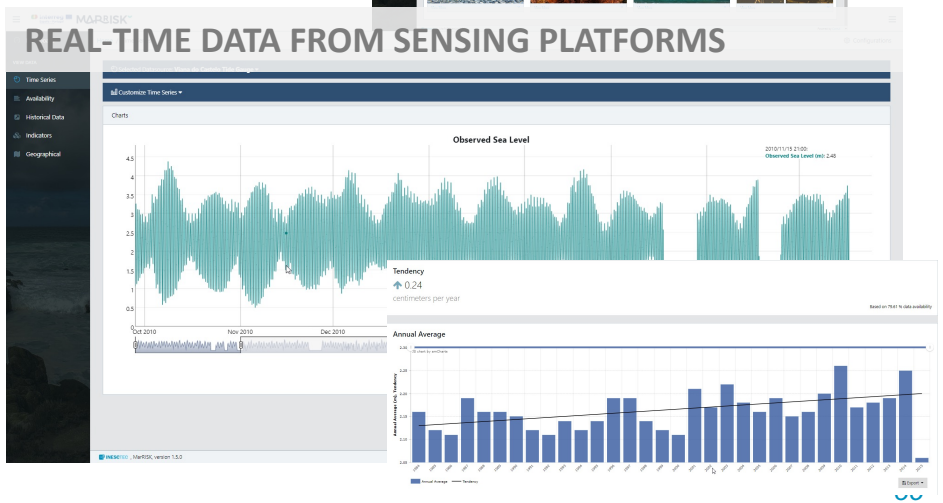


Objectives

- Integration of NetCDF, Thredds and GeoServer
- Ocean-Weather data collection
- Coastal risks and indicators

Results

- Real-time, remote access to data from stations and sensing platforms
- Data visualization and risk evaluation

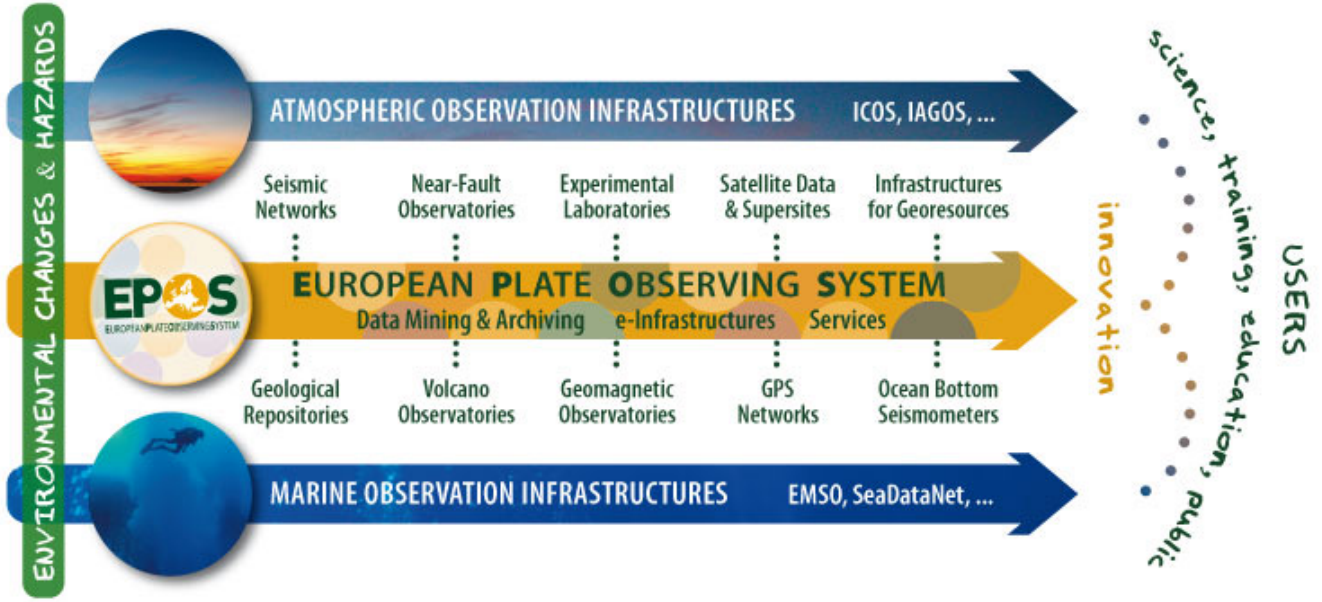


EPOS

European Plate Observing System(ERIC)

Objective

Multidisciplinary, distributed research infrastructure that facilitates the integrated use of data, data products, and facilities from the solid Earth science community in Europe.



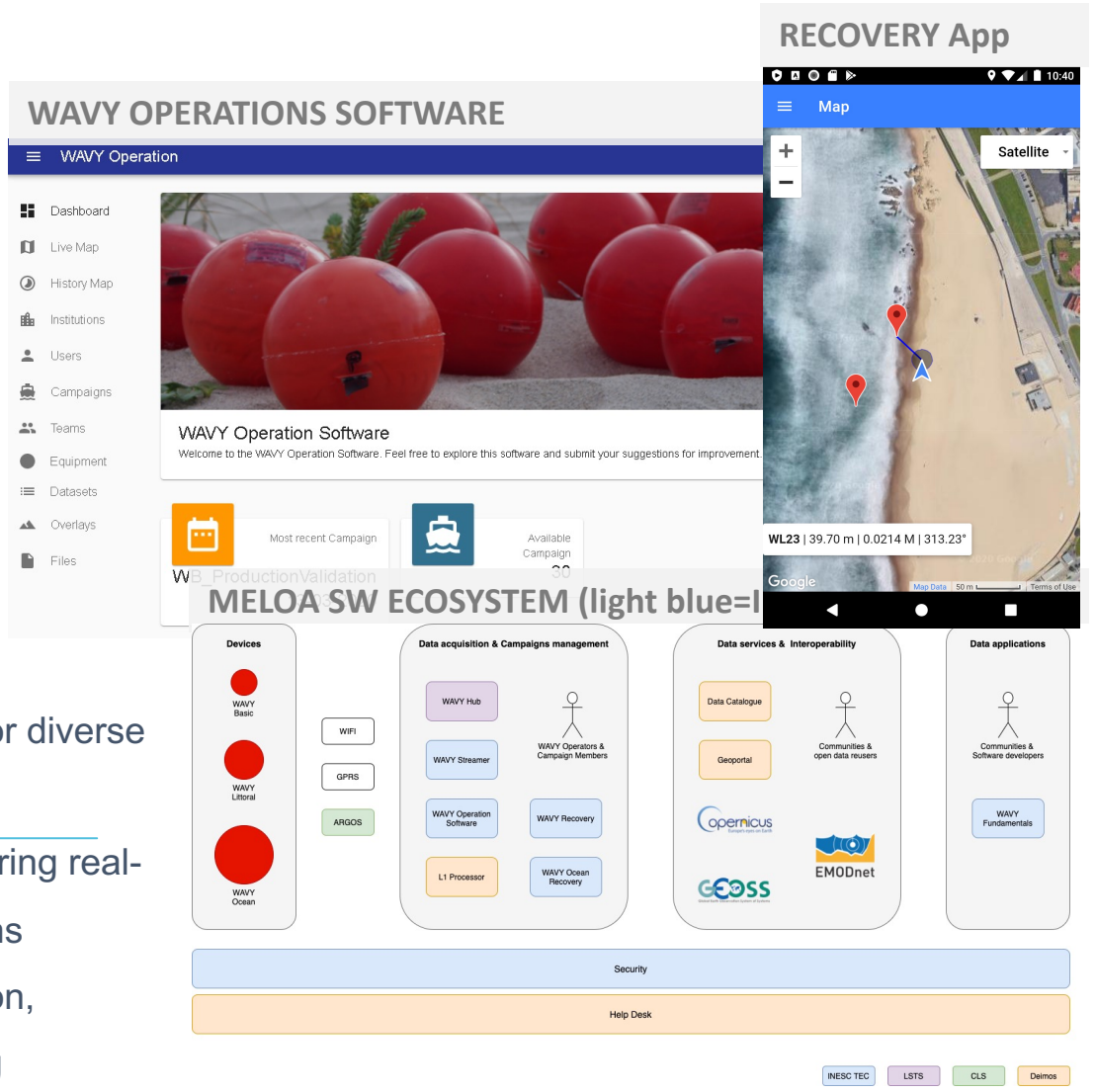
On October the 30th 2018, the European Commission granted the legal status of European Research Infrastructure Consortium (ERIC) to EPOS.

TEC4SEA “EARTH, OCEAN AND SPACE SCIENCE”

Potential applications

MELOA

Multi-purpose/Multi-sensor Extra Light Oceanography Apparatus



Objectives

- Surface current monitoring
- In-land, coastal, and open water usage
- Oil spill/polutant monitoring

Results

- Family of WAVY drifters for diverse types of usage
- Software ecosystem covering real-time acquisition, operations management, data curation, processing and publishing

ILIAD - INTEGRATED DIGITAL TWINS FOR MARINE AND MARITIME DATA AND INFORMATION SERVICES

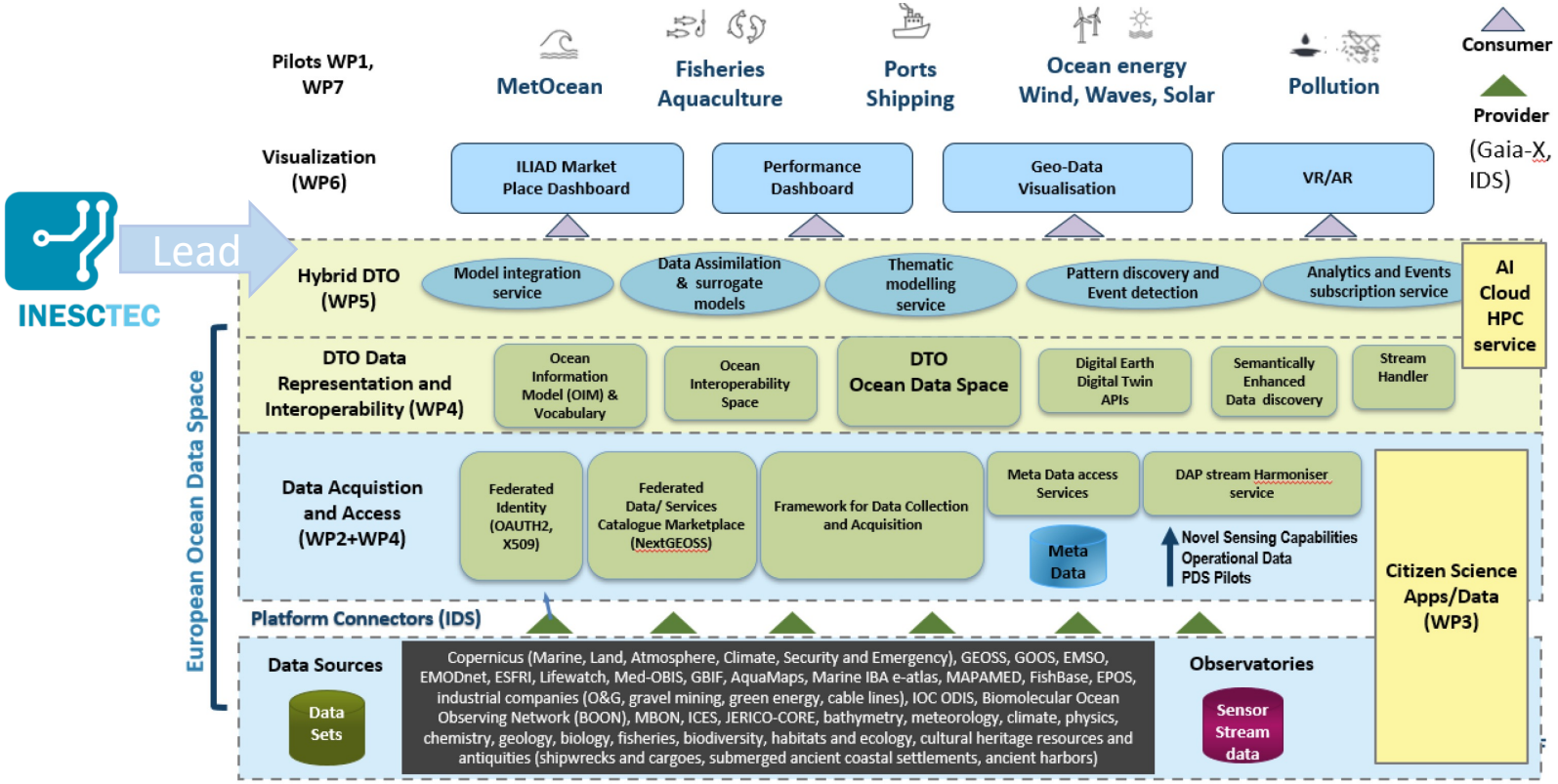
[TOPIC: LC-GD-9-3-2020: TRANSPARENT & ACCESSIBLE SEAS AND OCEANS: TOWARDS A DIGITAL TWIN OF THE OCEAN]

Objective

Establish an interoperable, data-intensive, and cost-effective Digital Twin of the Ocean (DTO).

Contribute towards a sustainable ocean economy

Fuse large volumes of diverse data, in a semantically rich and data agnostic approach to enable simultaneous communication with real world systems and models.



- Materializes the strategy for this area.
- Sets the foundations for the Digital Twin of the Ocean.
- INESC TEC lead WP5 - DTO Modelling and Analytics services.

INFORMATION SYSTEMS AND APPLIED COMPUTING

INESCTEC

Themes

- Enterprise Computing; Data Management Systems and Applications
- Digital Business and Learning
- Application sectors include the R&D sector
- Organizations and Digital Transformation

Flagship Topics

- Information Systems Planning
- Information Systems Design
- Information Systems Management
- Enterprise Architecture
- Organizational Engineering
- Requirements Engineering
- Accessibility and Usability
- Organizational Digital Learning
- Information and Information Systems Security

INFORMATION SYSTEMS AND APPLIED COMPUTING

Entity | Project(s)

- CNSIDA [SI.VIDA; SI.VIDA2; SI.VIDA3]
- GENERG [Generg-SI]
- Monte Adriano / Elevo [SARA]
- IMOFILTER [PWA; IMOPORTAL; IMOPORTAL3]
- RTE SA [RTE]
- **Ordem dos Arquitectos [ARQNET; ARQNET 2]**
- Ambifood [EYEFRYPlus; EYEFRYprot2prod]
- PROVERE [PalacioDaAgua]
- JMD [ARQT_EMPR; DigCore]
- **Forestis [SIFOREST]**
- AGIF [PLIS1asis]
- Banco Montepio [PGDados]
- Quadrilátero Urbano [mobData4Urb]

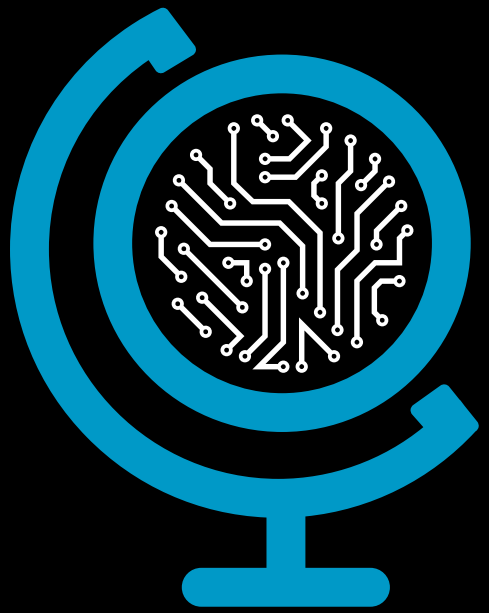
Funding entity | Project

- QREN Co-promoção [MOBILES]
- QREN Mobilizador [TICE.Mobilidade]
- QREN Co-promoção [Ecoplanner]
- FCT [ACESSWEB]

PARTNERSHIPS

INESCTEC

LABS



OUR LABORATORIES

DEMONSTRATION, EXPERIMENTATION AND ADVANCED TRAINING

LABORATORY OF SMART GRIDS AND ELECTRIC VEHICLES *

IILAB - INDUSTRY AND INNOVATION LAB

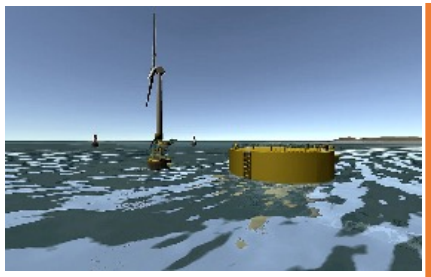
LABORATORY OF INDUSTRIAL ROBOTICS AND AUTOMATION

LABORATORY OF ROBOTICS AND IOT FOR SMART PRECISION AGRICULTURE AND FORESTRY

ROBOTICS AND AUTONOMOUS SYSTEMS LABORATORY

TEC4SEA RESEARCH INFRASTRUCTURE *

EMSO PT - EUROPEAN MULTIDISCIPLINARY SEAFLOOR AND WATER COLUMN OBSERVATORY *



ATLANTIS LABORATORY

LABORATORY OF SOFTWARE ENGINEERING

MASSIVE - LABORATORY OF COMPUTER GRAPHICS AND VIRTUAL ENVIRONMENTS

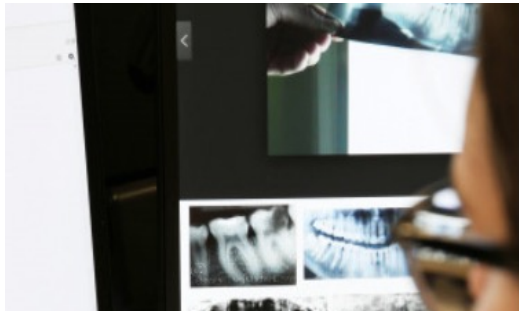
* Roadmap for strategic infrastructures in Portugal

OUR LABORATORIES

DEMONSTRATION, EXPERIMENTATION AND ADVANCED TRAINING

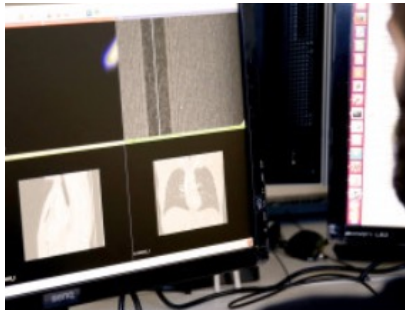
INESCTEC

LABORATORY OF SOUND AND MUSIC COMPUTING

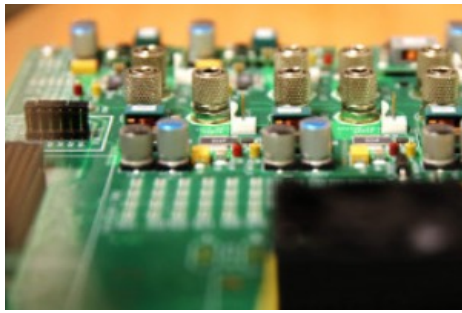


BIOMEDICAL IMAGING LABORATORY

NEUROENGINEERING AND ADVANCED HUMAN SENSING LABORATORY

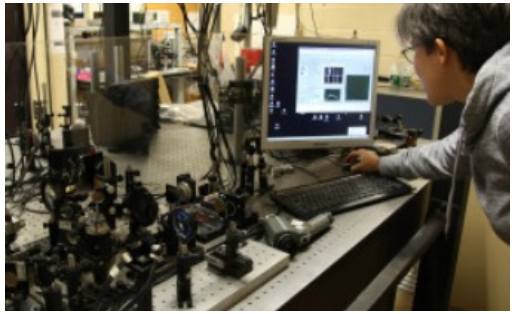


BIOINSTRUMENTATION LAB



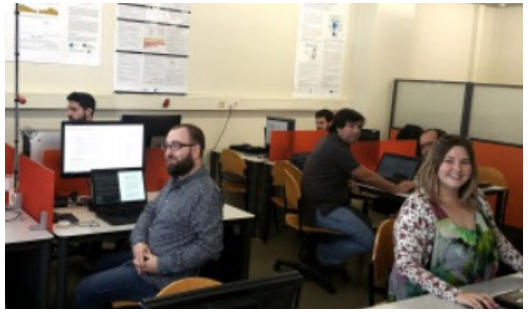
OPTICAL AND ELECTRONIC TECHNOLOGIES RESEARCH LABORATORY

LABORATORY OF MICROFABRICATION



IMAGING LABORATORY

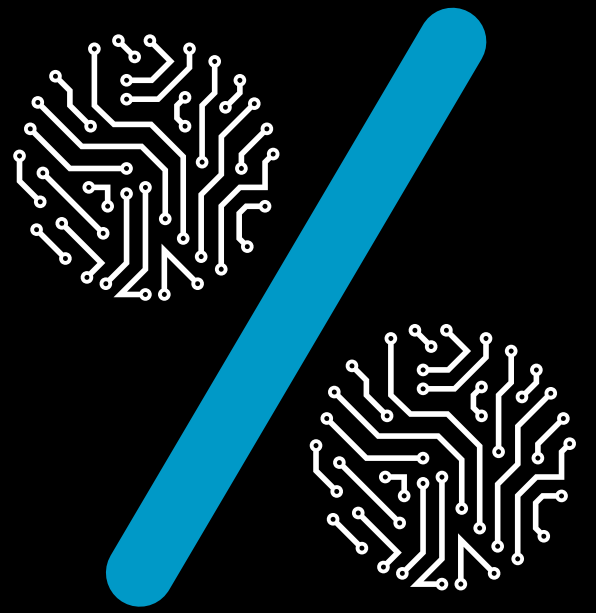
CLOUDINHA LABORATORY



INFORMATION SYSTEMS LABORATORY

COMPUTING SYSTEMS LABORATORY

CENTRE IN NUMBERS



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KEY FIGURES IN 2020

90
INTEGRATED RESEARCHERS

49
PHD RESEARCHERS

+1.4M€
ACTIVITY

1
PATENT APPLICATIONS

+5
NATIONALITIES

+20
PEOPLE GOING TO THE MARKET/YEAR

+30
ONGOING R&D PROJECTS

1
ACTIVE SPINOFFS

INESCTEC

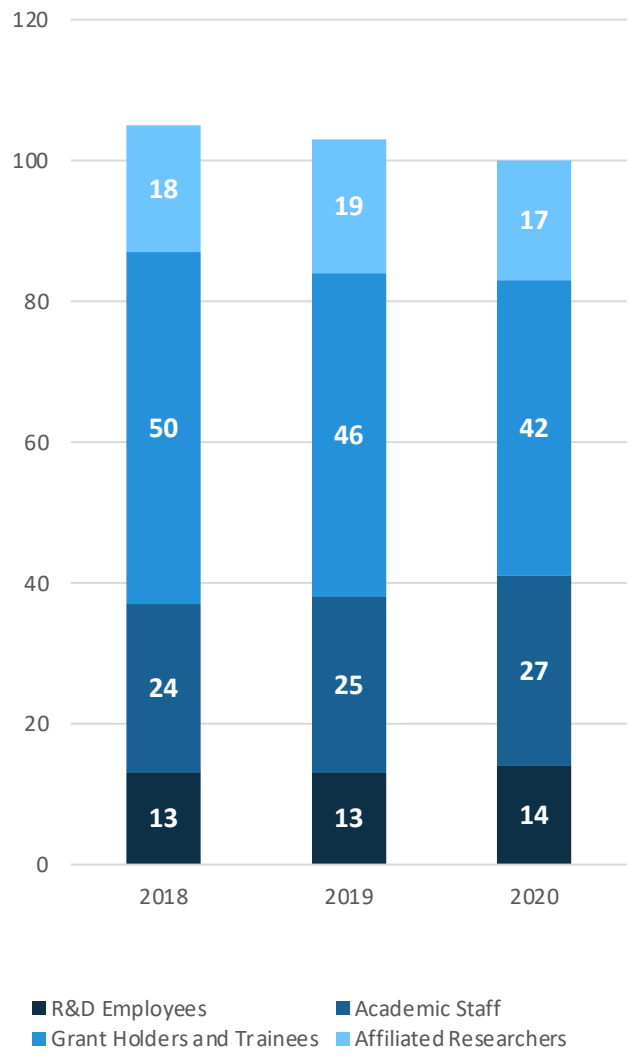
OVER 99 INDEXED PUBLICATIONS
AND RELEVANT ACTIVITY IN SHARING R&D RESULTS

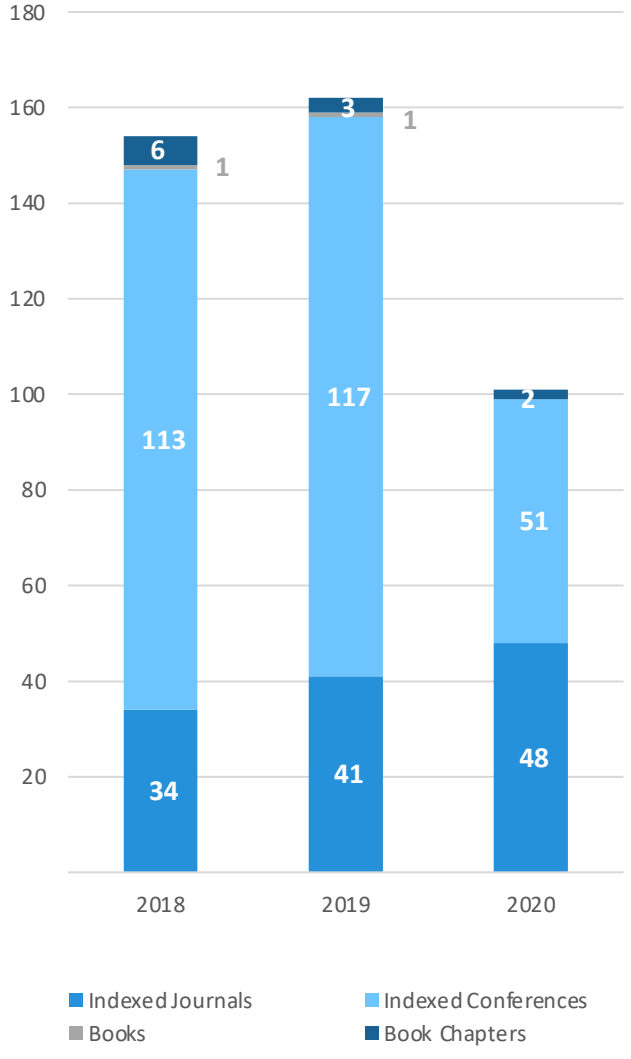
Majority (36,5%) of journal publications in quartile Q1 (SCOPUS)

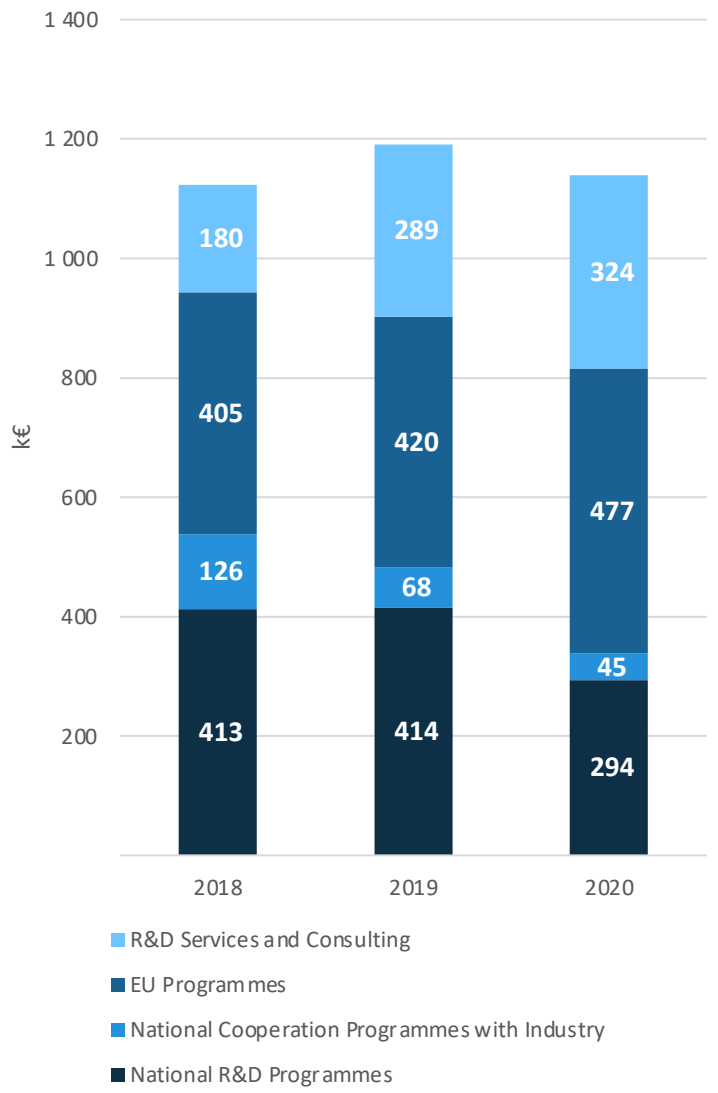
48 Indexed Journals Papers
51 Indexed Conference Articles
9 Concluded PhD Theses - Supervised

5 Conferences, workshops and scientific sessions
organized by the R&D Centres
3 Advanced Training Courses Organised
10 Editorial Roles in Journals
24 Organisation of conferences
in organizing committee or chairing technical committees
44 International Events
with members of INESC TEC partaking in programme committees
9 Participation in Fairs and Events

CSIG - TEAM AND ACTIVITY







PRE-INCUBATION OF SPIN-OFFS

MORE THAN 20 SPINOFFS CREATED IN THE LAST 30 YEARS

INESCTEC

2020 ACTIVE SPIN-OFFS

Keyruptive Technologies

Mobile app solution for secure cloud storage and management of digital assets such as cryptocurrency.

Ubirider

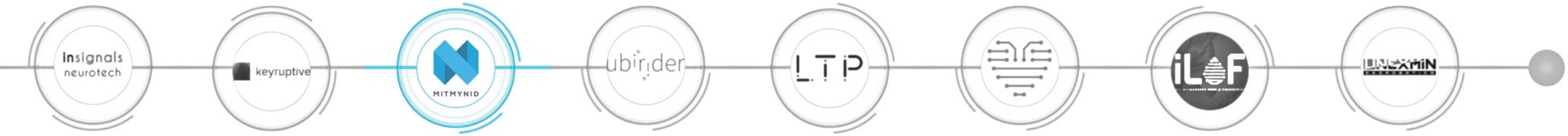
Develop solutions to make urban mobility smarter and improve travellers' overall experience.

WeSENSS

in development
Corporate solutions for security and quantified occupational health approaches to promote worker wellbeing and improve performance.

iLoF

in development
Leverage machine learning to drastically reduce the cost and time of drug discovery using a patented photonics and Artificial Intelligence system.



Insignals Neurotech

Wearable wireless devices to precisely measure wrist rigidity, helping surgeons place brain implants more accurately during surgery with Parkinson's, epilepsy and others.

MitMyNid

Marketplace to search and compare transport and logistics services with simple or multimodal door-to-door solutions.

LTP Labs*

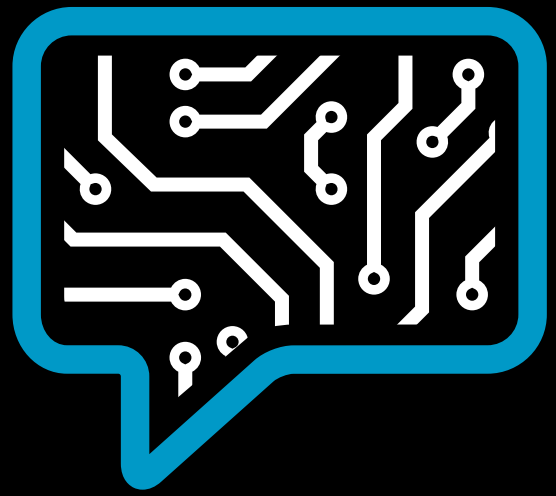
Advanced analytics and business consultancy in Marketing, Sales, Operations and Supply Chain, based on digital platforms.
* Successful exit in 2019

UNEXMIN Georobotics Ltd.

in development
Underwater mine exploration robotic system for commercial mine surveying, exploration and geoscientific purposes.

INESCTEC

2021



OBJECTIVES AND THEIR ACHIEVEMENT IN 2021

- Increase the number of Post-docs and PhD students;
- Improve the quality of publication venues and outcomes;
- Establish and strengthen partnerships with high-profile international research centres and networks.
- Evolve the portfolio of projects to focus on fewer but higher impact research projects.
- Reduce fragmentation in research and innovation teams and foster closer alignment between research and innovation activities.

MAIN ACTIONS AND THEIR ACHIEVEMENT IN 2021

Action	#Objective	Expected Outcomes	Calendar
Disseminate and promote open positions of centre projects among Post-doc and PhD candidates	1	2 new Post docs and 5 new PhD students	Jan
Advise researchers to select and prioritize high-quality venues for publication of key research results	2	Increase in number of high-quality publications	Jan
Actively look for establishing strategic partnerships related with the centre' areas of research and innovation	3	Increase in number of high-profile international partnerships, either in projects or other scientific activities	Jan
Identify, promote and focus more on the stronger research areas of activity without loosing the existing diversity	4	Decrease in number of projects and increase their impact	Jan
Plan and follow the value creation funnel, from ideas, research concepts and prototypes, to applied research and innovative services and products	5	Increase in value added activities and respective results and impact	Jan

THEREFORE...

WE ARE an interdisciplinary research center at the forefront of **human-centered computing (HCC)** with a wide and deep expertise in **computer science (CS)** and **information science (IS).**

WE ARE engineers, scientists and designers passionate to envision and build software systems capable to leverage human abilities and practices, within their communities and environments.

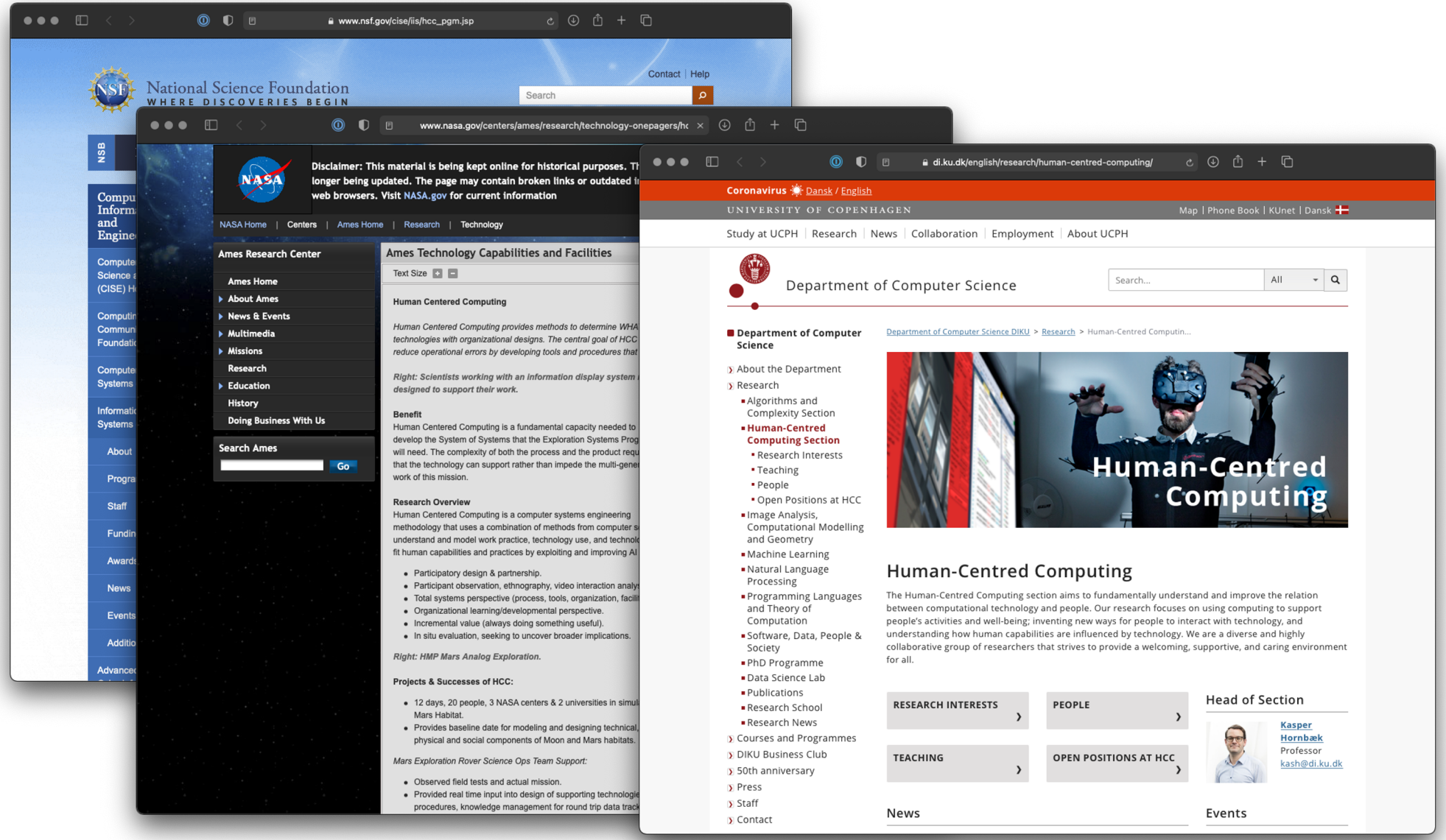
WE AIM to advance the state-of-the-art on novel ways to improve the development of human-centered computer systems of **high technical and managerial complexity**, either due to **large scale**, **high heterogeneity**, **high uncertainty**, **high integrity**, **severe compliance to standards and legal frameworks**, or **domain-specific organizational issues**.

INESCTEC

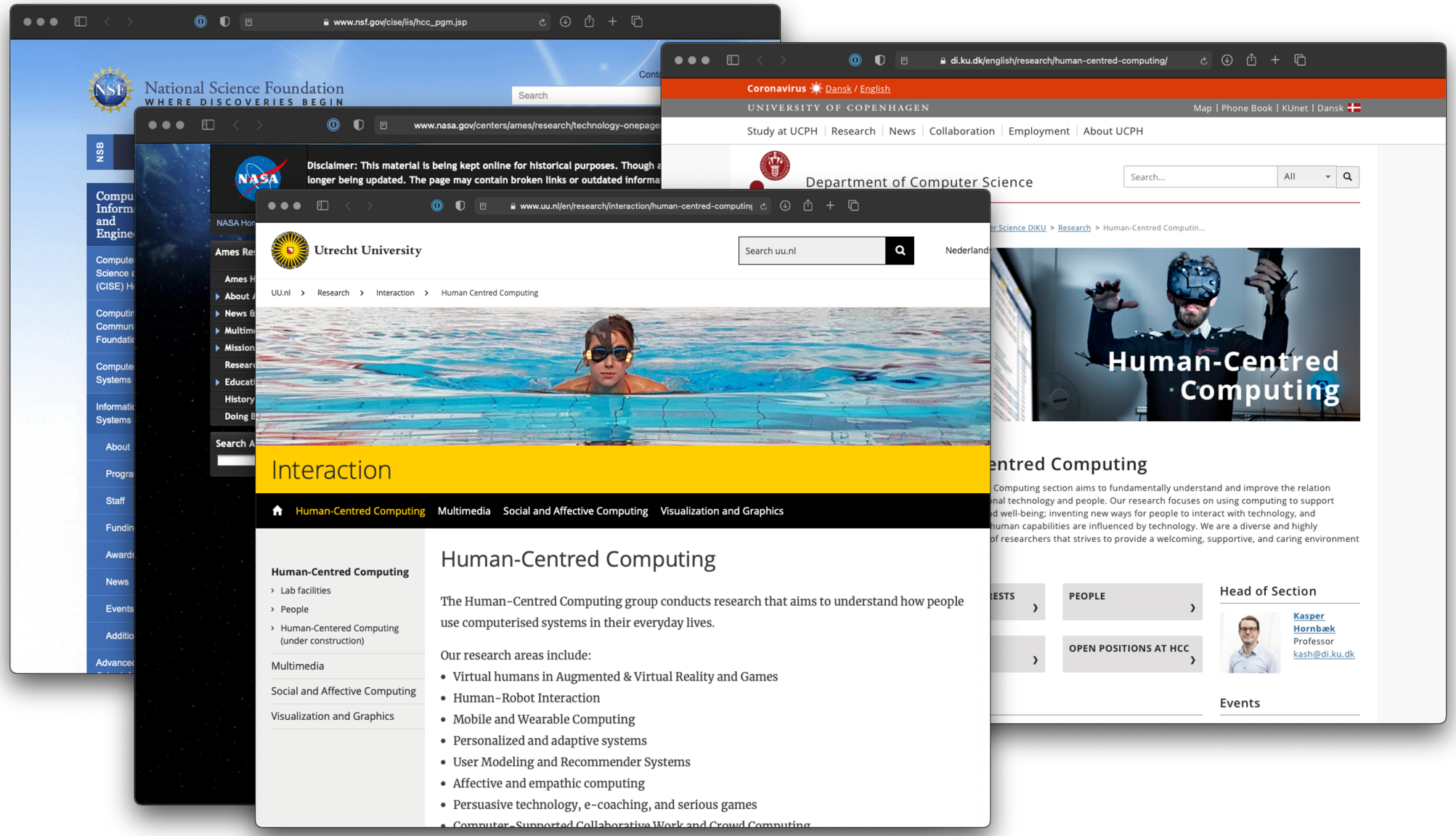
HCC worldwide

HCC worldwide

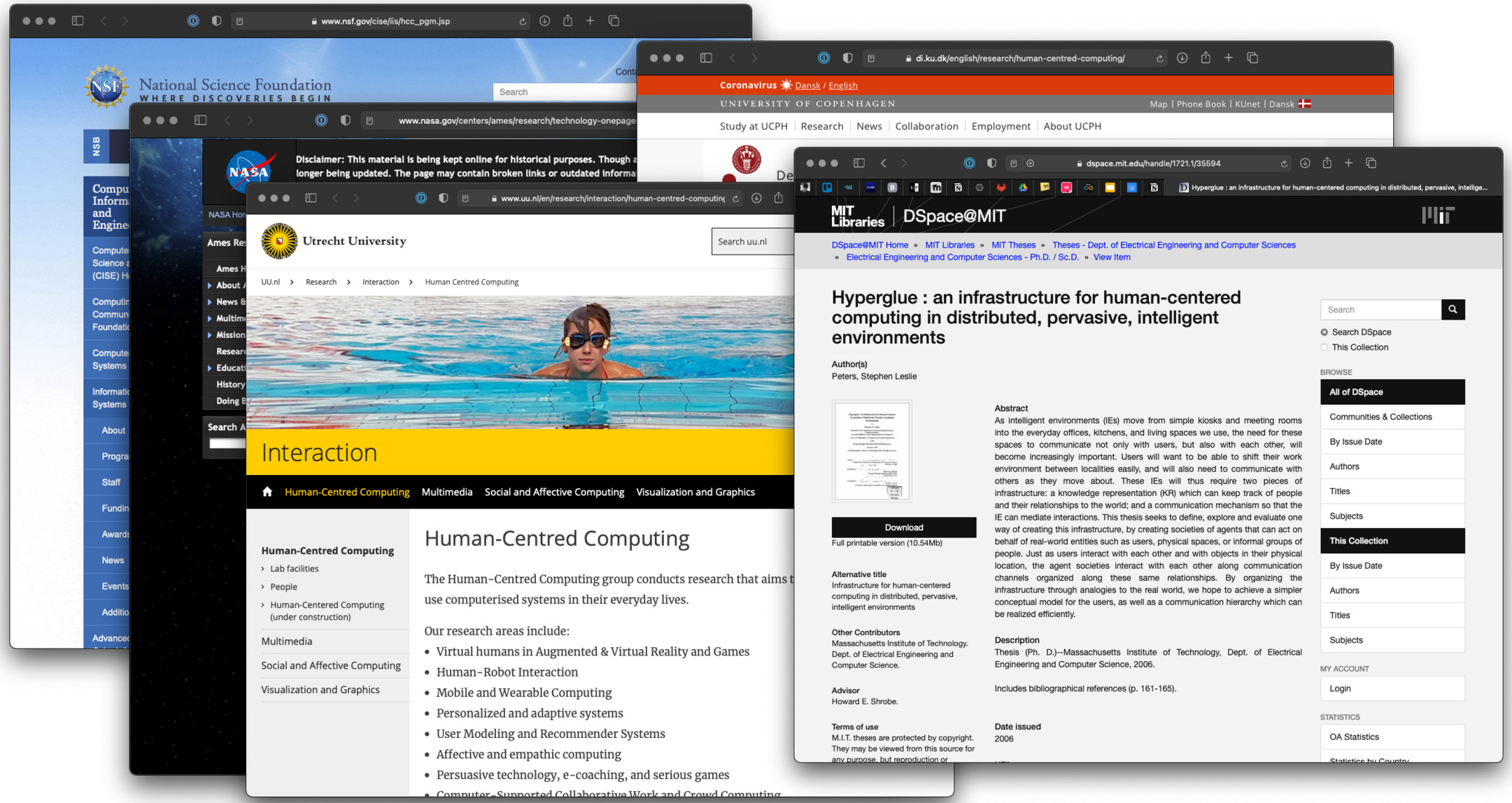
HCC worldwide



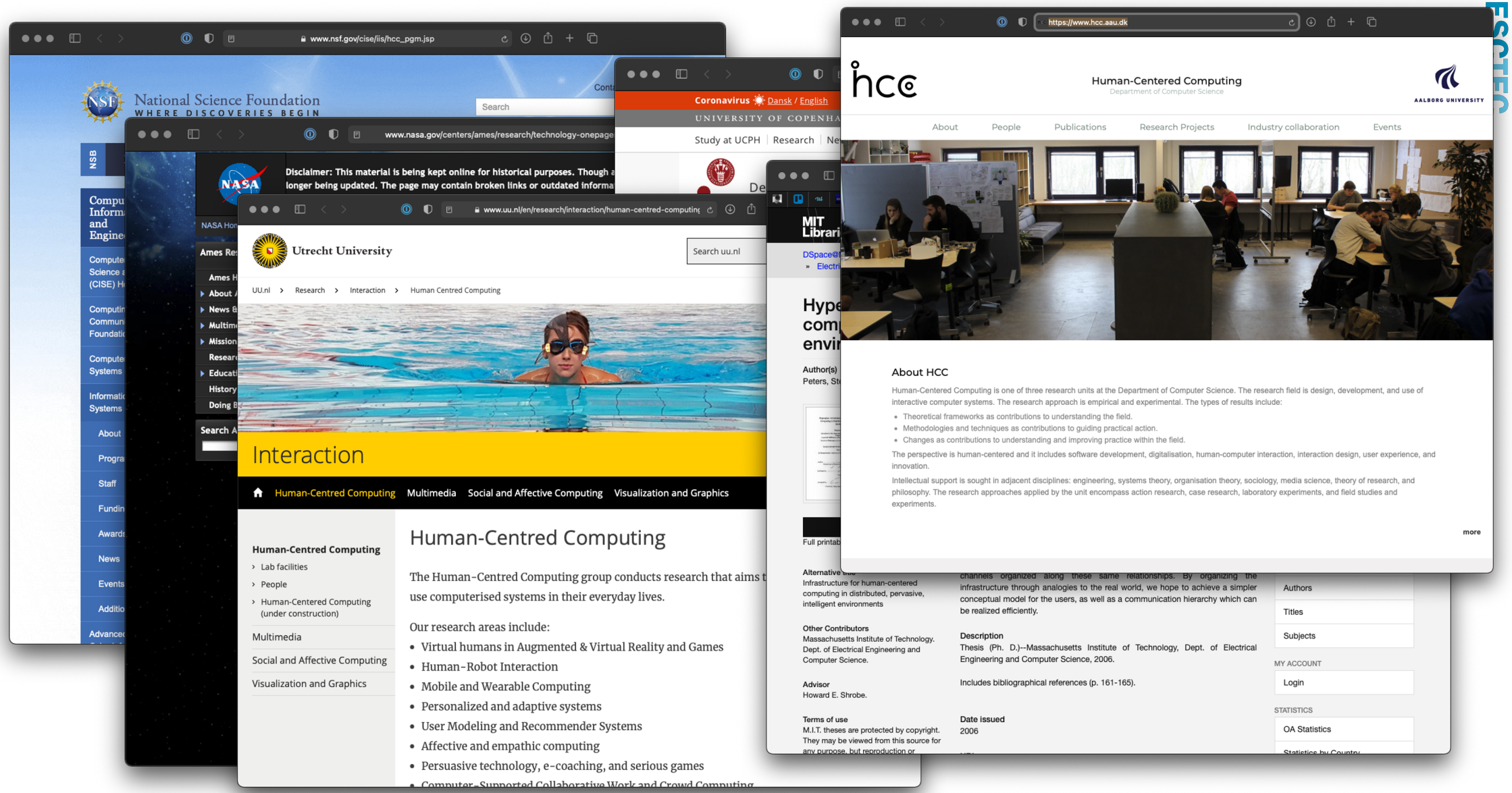
HCC worldwide



HCC worldwide



HCC worldwide



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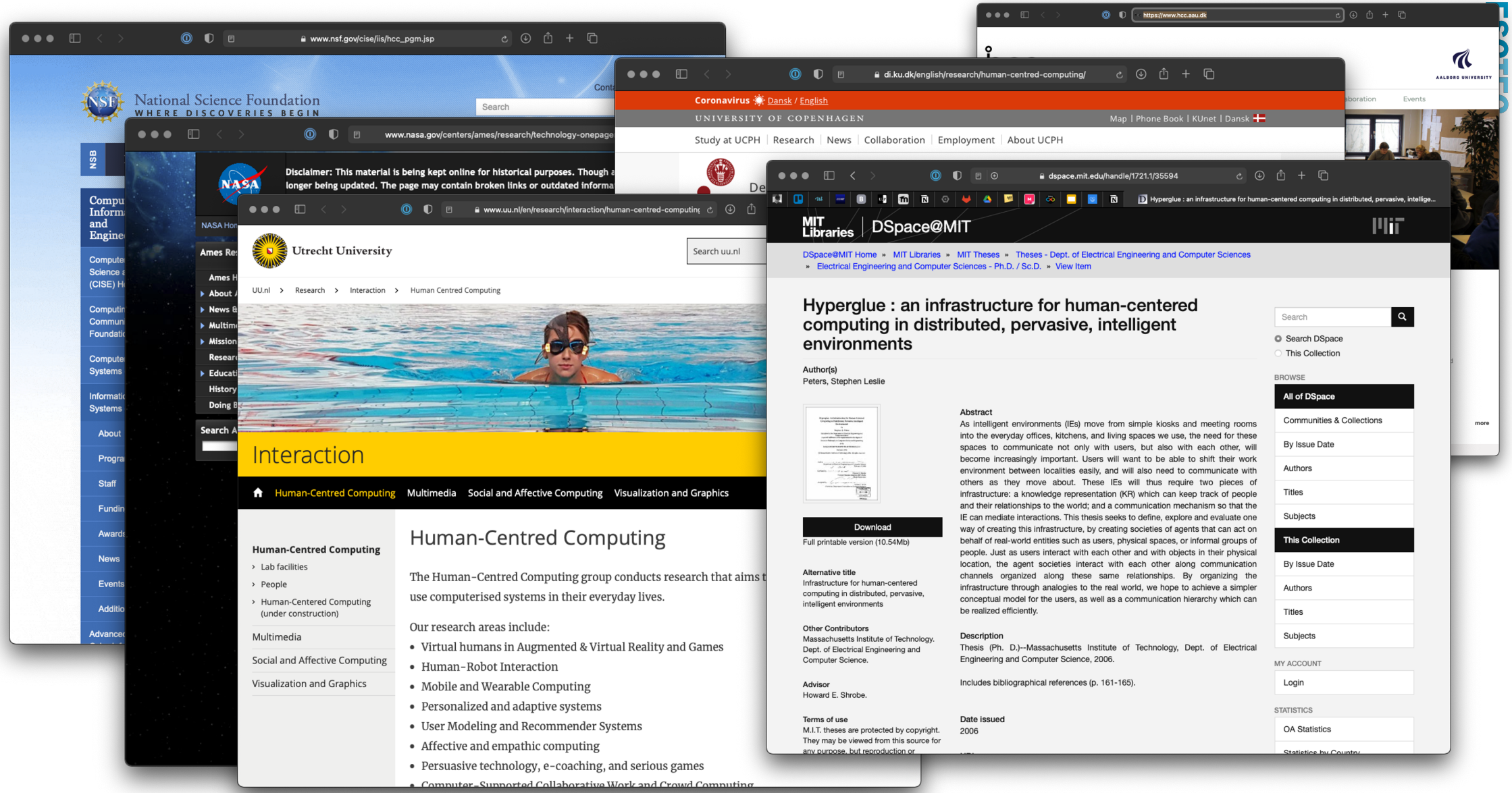
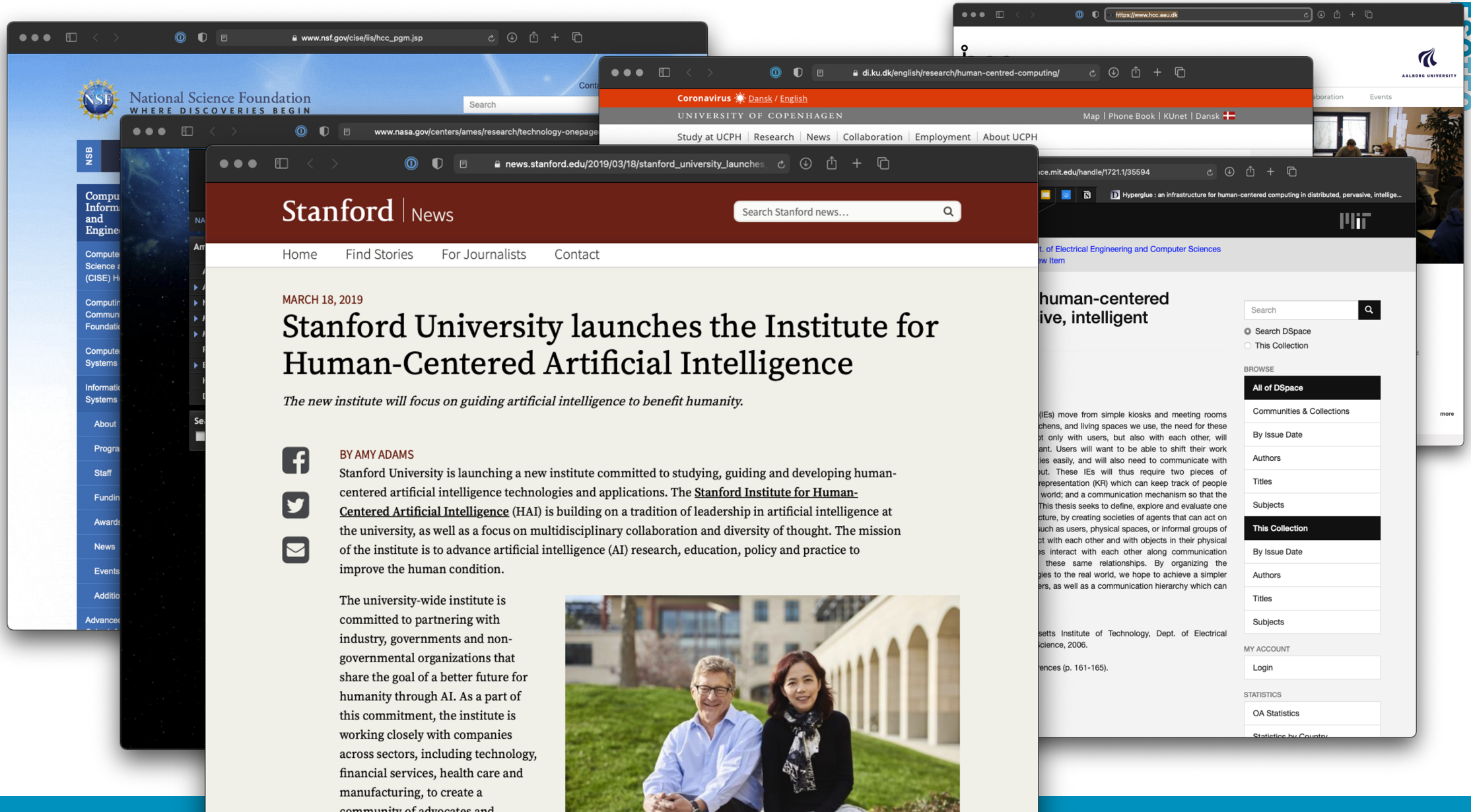


HCC worldwide



INSTITUTE FOR SYSTEMS
AND COMPUTER ENGINEERING,
TECHNOLOGY AND SCIENCE

INESCTEC 35 1985 TRINTA E CINCO ANOS 2020

HumanISE

HUMAN-CENTERED COMPUTING AND INFORMATION SCIENCE

from knowledge generation to science-based innovation

WE ARE INESC TEC WE ARE KNOWLEDGE GENERATION WE ARE SCIENCE-BASED INNOVATION
WE ARE NETWORKED INTELLIGENT SYSTEMS WE ARE POWER AND ENERGY WE ARE INDUSTRIAL
AND SYSTEMS ENGINEERING WE ARE COMPUTER SCIENCE WE ARE INESC TEC WE ARE
KNOWLEDGE GENERATION WE ARE SCIENCE-BASED INNOVATION WE ARE NETWORKED
INTELLIGENT SYSTEMS WE ARE POWER AND ENERGY WE ARE INDUSTRIAL AND SYSTEMS
ENGINEERING WE ARE COMPUTER SCIENCE WE ARE INESC TEC WE ARE KNOWLEDGE
GENERATION WE ARE SCIENCE-BASED INNOVATION WE ARE NETWORKED INTELLIGENT
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WE ARE COMPUTER SCIENCE WE ARE INESC TEC WE ARE KNOWLEDGE GENERATION WE
ARE SCIENCE-BASED INNOVATION WE ARE NETWORKED INTELLIGENT SYSTEMS WE ARE
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SCIENCE WE ARE INESC TEC WE ARE KNOWLEDGE GENERATION WE ARE SCIENCE-BASED
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SYSTEMS WE ARE POWER AND ENERGY WE ARE INDUSTRIAL AND SYSTEMS ENGINEERING

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