Ca' Foscari University of Venice

What does Ca' Foscari University pursue?

- excellence in research
- stimulating learning experience for all of its students and researchers
- development of international partnerships
- investment in academic talent
- global competitiveness and the circulation of knowledge

Ca' Foscari fosters and sustains applied research and scientific cooperation with the private sector, local, national and international institutions and relevant stakeholders.

Ca' Foscari by numbers (2019)

Students > 23.000

PhD students > 350

Research Fellows > 130

International cooperation agreements > 180

Professors and Researchers 600

EU grants awarded under FP7 and Horizon 2020 180
Of which: **ERC:** 12
Marie Curie Individual Fellowships, first in Italy 64

Results (2019)

Research in Italy
Times World University Ranking 5°

University digital archive results >52.000

Yearly scientific publications >2.300

Patents field by Ca' Foscari researchers >50

Spin-off 13

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Research for Global Challenges
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Research facilitator: Carole Maignan, Lara Lamon

Selected funded projects

H2020-SwafS-19-2018-2019 Deadline Id: H2020-SwafS-2018-1	quest	**QUEST** – QUality and Effectiveness in Science and Technology communication
H2020-SC2-SFS-21-2017	GAIN	**GAIN** – Green Aquaculture Intensification in Europe
H2020-ICT-26-2018-2020	AI4EU	**AI4EU** – A European AI On Demand Platform and Ecosystem
NMBP-13-2018 - Risk Governance of nanotechnology	RISK GONE	**RiskGONE** – Risk Governance of Nanotechnology
H2020-EE24-2017 - Making the energy efficiency market investible	EeDaPP	**EeDaPP** – Energy efficiency Data Protocol and Portal
H2020-SC3-EE24 Making the energy efficiency market investible	EeMAP	**EeMAP** – Energy efficient Mortgages Action Plan
H2020 SC6 - Europe in a changing world - Inclusive, innovative and reflective societies Call TRANSFORMATIONS-04-2019-2020 Topic TRANSFORMATIONS - (SOCIOECONOMIC AND CULTURAL TRANSFORMATIONS IN THE CONTEXT OF THE FOURTH INDUSTRIAL REVOLUTION)	MEMEX	**MEMEX** – "MEMories and EXperiences for inclusive digital storytelling"
H2020 SC2 - Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy H2020 SC2 MG-BG-02-2019 - Ship emission control scenarios, marine environmental impact and mitigation	EMERGE	**EMERGE** – Evaluation, control and Mitigation of the EnviRonmental impacts of shippinG Emissions

Ca' Foscari University of Venice

Research for Global Challenges
Complexity

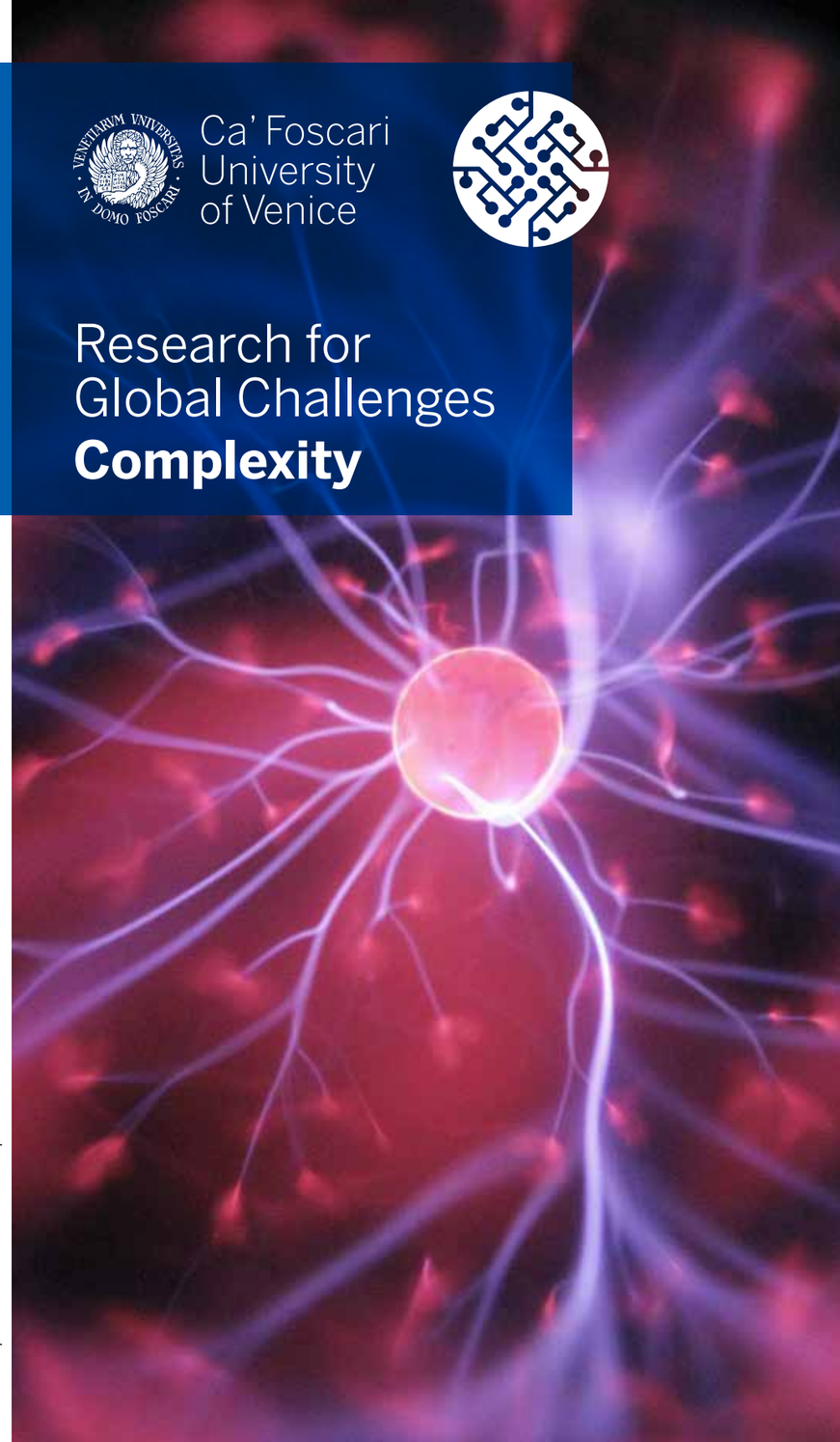

foto di copertina: Hal Gatewood / unsplash

The Research for Global Challenges initiative

Ca' Foscari is....
highly committed in achieving excellence in research, developing international partnerships and funding promising researchers. Our Research Institutes for Global Challenges enforce this engagement by promoting a collaborative approach to research. Six interdisciplinary Research Institutes of 50 to 90 researchers from our 8 departments are committing their expertise to solve global issues and to contribute to international research projects.

Research Institute for Complexity	**Science of complex economics, human and natural systems**
Research Institute for Digital and Cultural Heritage	**Creative arts, cultural heritage and digital humanities**
Research Institute for Social Innovation	**Public governance, welfare and social innovation**
Research Institute for International Studies	**Cross cultural and area studies**
Research Institute for Green and Blue Growth	**Environmental technology and green economy**
Research Institute for Innovation Management	**Economics and management of innovation and entrepreneurship**

Research Institute for Complexity

Our Research Institute comprises around 96 members including professors, phd students, senior and junior researchers, technicians.

It focuses on transdisciplinary study of **complex systems** which offers innovative solutions to outstanding scientific questions and global societal challenges. It requires the work and contributions of mathematicians, computer and data scientists, physicists, linguists, historians, social scientists and researchers in the fields of humanities, economy, ecology and climatology. In complex systems, growth patterns and final structures are not predictable: no design is possible from a priori knowledge but design possibilities are experimented: it requires evolutionary algorithms to optimize complex systems.

Pattern identification and the study of **dynamic interactions** in **complex systems** allow the development of **models and simulation tools** that fit stylized facts and can be applied in a variety of fields, ranging from climate projections to the implementation of **risk management and mitigation** strategies and the understanding of behaviours in socio-economic, and natural systems.

Research Areas

Area 1: CLIMATE SCIENCES
Challenge: characterization, understanding, projections and analysis of climate variability and trends for socio-ecosystem management at different time and spatial scales

- Observation and monitoring of present climate and global climate variability
- Paleoclimate reconstructions from centuries to million years before present
- Data and model comparisons
- Natural and anthropogenic climate changes
- Integrated climate, socio-economic and environmental modelling
- The cryosphere in the Earth system: quantifying the role of sea ice, glaciers, ice-sheets in shaping global climate
- Near-term climate prediction and predictability
- Downscaling of global changes to regional/local environments for integrated assessment of socio-ecosystems
- Volcanoes, climate and societies
- Identification of abrupt climate shifts
- Risk, vulnerability and adaptation assessment for climate change

Area 2: COMPUTER SCIENCE
Challenge: Accessible, reliable and secure digital societies

- Program Analysis
- Security and Cryptography
- Blockchain
- Artificial intelligence
- Machine learning
- Data and web mining
- Computer vision
- Distributed Systems
- Cloud Computing
- High Performance Computing

Area 3: ECONOMICS, BIG DATA AND COMPLEXITY
Challenge: modelling, inference and decision making with big data in economics and finance

- Econometrics and machine learning
- Networks data analysis and modelling
- Data analytics for wealth management
- Energy efficiency finance
- Financial and macroeconomic risks
- ESG risk assessment
- Blockchain and cryptocurrency
- Data analytics and tourism
- Big data in health economics
- Behavioural analysis

Area 4: ADVANCED AND SMART MATERIALS
Challenge: Develop and study advanced systems to device new sensing platforms and technologies for electronics and photonics

- Nanostructured (hybrid) systems to devise new platforms for health (precision medicine), food, environment and safety
- Next-generation bioreceptors for drug-monitoring and (bio-)analytes detection
- Labelling systems, based on organic, inorganic and organometallic dyes, for sensing, anti-counterfeiting and imaging
- New methodologies and tools, specifically designed for precision medicine
- Electrochemical, optical and coupled (bio-)sensing platforms for advanced, fast and reliable analyses
- Molecular, nanostructured systems to develop nanoelectronics and photonics for sensing, energy storage, lightning and imaging
- Carbon dots from renewable carbon sources for photo- and electro-catalysis
- Smart Materials for Cultural Heritage
- Polymers and Biopolymers based composites with custom features
- Innovative ceramics
- Biobased nanostructured systems for controlled active release and imaging
- Biobased nanostructured systems for nanoelectronics and structural nanocomposites

AREA 5: BIOINFORMATICS
Challenge: Bioinformatics for personalized medicine

- Lead Molecule Optimization
- Computational Biology techniques for proteins and DNA
- Genetic, search and evolutionary adaptive algorithms in Molecular Systems
- Modelling sparse high dimensional systems
- Quantitative analysis of drug combination
- Data design for biological systems
- Statistical models for drug discovery
- Combinatorial search and machine learning techniques for de novo proteins
- Metabolic pathways and networks
- Representation, analysis and simulation of ecosystems services / trophic networks