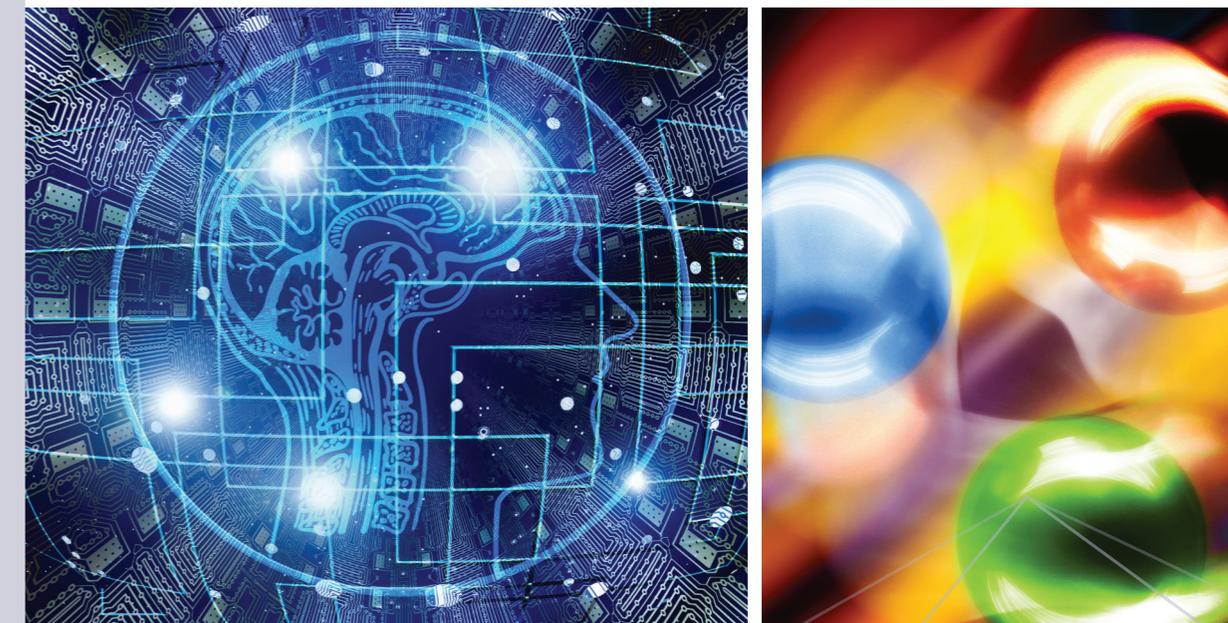
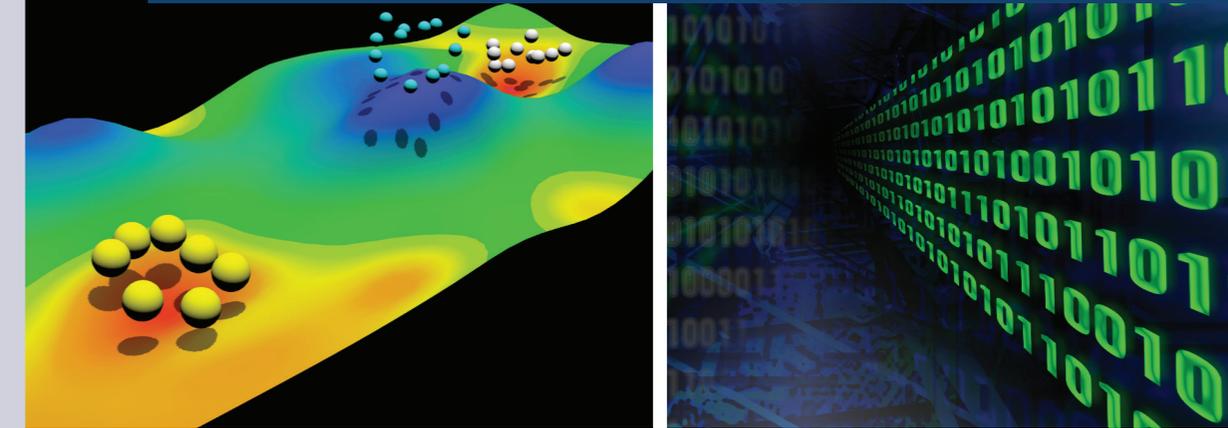


# MSc Simulation and Data Science



## Why study at The Cyprus Institute Graduate School?

### EXCEPTIONAL FACULTY

Students have the opportunity to study alongside exceptional inter-disciplinary faculty and world-leading research teams. These faculty and researchers are attracted to the institute due to its intensive research focus and Cyprus's unique geographical position which provides access to an area abundant with research challenges and opportunities.

### STATE-OF-THE-ART FACILITIES

The Cyprus Institute has the most advanced research infrastructure in Cyprus dedicated to cross-disciplinary research, with some of the facilities unique on a regional level. Our students have access to this infrastructure throughout the duration of their graduate research.

### LOW STUDENT-FACULTY RATIO

The Graduate School maintains a small number of hand-picked students, which results in a low student-faculty ratio. This allows for a high degree of individual focus

in research, personal guidance, mentoring and career coaching resulting in successful placements.

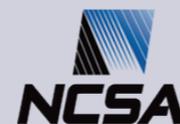
### MULTICULTURAL ENVIRONMENT

The School values the strengths that a multicultural environment provides so it has made it a priority to promote diversity, hence: 56% of our students and 68% of our faculty are international. English is the language of instruction and communication.

### COMPETITIVE RESEARCH

Cyl is a champion in competitive research, attracting an impressive number of European projects and other competitive grants. In Horizon 2020, Cyl has attracted 12 times the European average in terms of funds per R&D FTE personnel (2014 to 2020). As a result, many of our students are offered financial aid through their participation in research teams, which strengthens their research experience alongside their theoretical education.

Collaborations with:



### ADMISSION REQUIREMENTS

A BACHELOR'S DEGREE from a recognized accredited institution, with a strong background in Mathematics, Computer Science, Natural Science or Engineering.

### PROOF OF ENGLISH LANGUAGE PROFICIENCY

Check our website for requirements and waiver conditions.

### FINANCIAL AID

Merit-based scholarships will be offered.

### APPLICATION DEADLINE

Check our website for application deadlines.

### PROGRAM COORDINATOR

Prof Constantia Alexandrou

### CONTACT

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The Cyprus Institute  
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The Cyprus Institute Graduate School reserves the right to make any changes to the program upon approval by the Ministry of Education, Culture, Sport and Youth.

## Why Simulation and Data Science?

This is a unique degree program in Cyprus which combines simulation with the new field of data science.

The program provides training that combines Simulation with the emerging field of Data Science. Simulation has become an indispensable part of research and development in numerous diverse areas based on the rapid evolution of computer technologies. Advanced computing is also becoming essential in order to analyse the huge amount of data collected in almost all disciplines, either from simulations or from observations and instruments. Environmental, biological and physical sciences, financial economics, and the humanities are producing an unprecedented amount of data that needs to be analysed and visualized. Through modeling and simulation, machine and deep learning approaches, students will learn to use modern computers to gain new insights in a diverse area of applications.

Students enrolled in the Master's program will carry out their research primarily at the Computation-based Science and Technology Research Center (CaSToRC) of the institute.

## Career Prospects for Program Graduates

Program alumni will be prepared for a career as computational and data scientists in the private or public sector in fields such as: academia, physical sciences applications, the financial sector, engineering (aerospace, oil & gas, automobile, etc.), health, environmental sciences, digital humanities, market modelling.

Students can also continue their studies at the PhD level either in Cyprus or abroad. In particular, graduates of the program can apply to the PhD in Computational Sciences of The Cyprus Institute, which offers generous financial aid opportunities.

## Research Infrastructure

### SUPERCOMPUTER, HPCF

The main production machine is a multi-teraflop/s High Performance Computing Facility, which consists of the hybrid CPU and GPU machine and associated storage.

### PROTOTYPES FOR EVALUATING NEW TECHNOLOGIES

CYI maintains prototype systems for evaluating new computer technologies, including a system of Intel Xeon Phi and NVIDIA PASCAL GPUs.

### EDUCATIONAL SYSTEMS

CYI maintains small clusters equipped with GPU accelerators for education and training purposes.

### ACCESS TO MULTI-PETAFLUP SYSTEMS

Systems especially designed for compute intensive, highly scalable applications are accessible to CYI researchers via large scale allocations, for example via PRACE. Systems include supercomputers at the Jülich and Leibniz Supercomputing Centers in Germany, the Swiss National Supercomputing Centre, and at the Oakridge National Lab in the US.

### VISUALIZATION UNIT ESTABLISHED IN PARTNERSHIP WITH JVC US RESEARCH LAB, G. OURISSON

Visualization Laboratory (VisLab) allows researchers from all centers of Cyl to better understand complex phenomena and visualize their data as images on large-scale and high-resolution visualization walls or other display devices.

### VISUALIZATION IMMERSIVE ENVIRONMENT

It features state-of-the-art equipment, such as 3D stereoscopic projectors, Oculus Rift stereoscopic goggles, and a Vitruix Omni treadmill.

### PRIVATE CLOUD, HPCF

A private cloud based on OpenStack is hosted by the HPCF. The private cloud consists of 15 compute nodes providing 100 physical cores, 1 TB of RAM and 100 TB of storage.

## PROGRAM STRUCTURE

The full name of the degree offered is Master of Science in Simulation and Data Science. This is a 90 ECTS credit, 12-month program.

Students take courses during the first two terms (30 ECTS credits during each term). Students are also required to complete a research project which is submitted in the form of a thesis project and must be defended at the end of the program.

Students in the program will acquire the following skills:

- Predictive analytics, machine learning including deep learning algorithms
- Computing environments and workflows
- Data management and visualization of large and diverse data sets
- Statistical techniques and methods to interpret data
- Numerical methods and scalable algorithms for current computer architectures such as graphic cards
- Mathematical modeling of processes covering applications from a range of fields such as physics, earth system science, chemistry, biology, digital humanities, medical imaging
- Solution of real-world problems at the core of data science that use and exploit big data

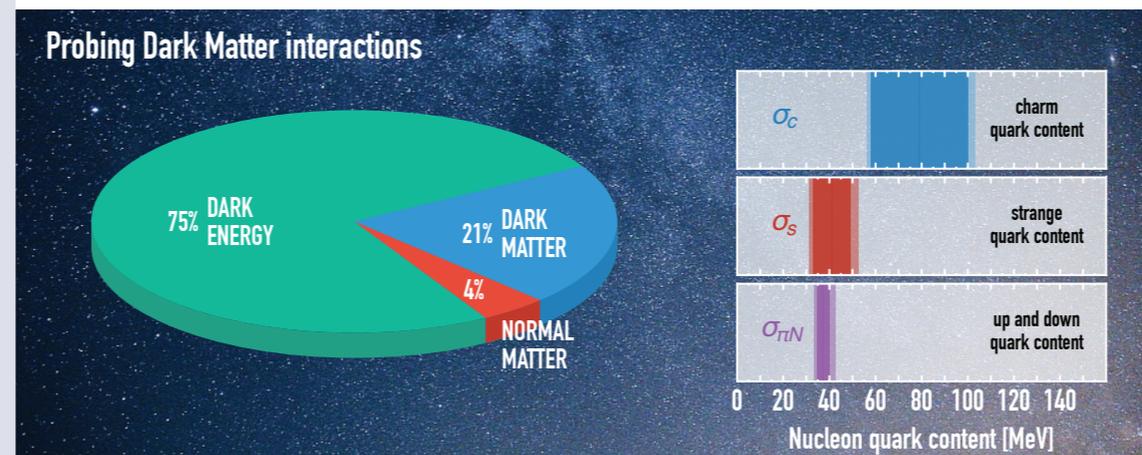
## COURSES

Mandatory Courses		ECTS
SDS 401	Mathematical Modeling and Algorithms	10
SDS 402	Introduction to High Performance Computing	10
SDS 403	Fundamentals of Data Science and Statistics	10
SDS 404	Machine Learning and its Applications	10
Elective Courses		
SDS 416	Visualization and Advanced Data Structures	10
SDS 417	Advanced Computer Architectures	10
SDS 418	Deep Learning Approaches	10
SDS 419	Modeling and Simulation for Scientific Applications	10

The language of instruction and communication of The Cyprus Institute (Cyl) is English.

Students have the opportunity to take courses through cross registration with the University of Cyprus Department of Physics.

Students who continue on to PhD studies at Cyl may have certain courses and research requirements waived.



Large-scale simulation for the direct evaluation of the quark content of the nucleon from lattice QCD by researchers of CaSToRC of The Cyprus Institute in collaboration with the University of Cyprus and DESY-Zeuthen