

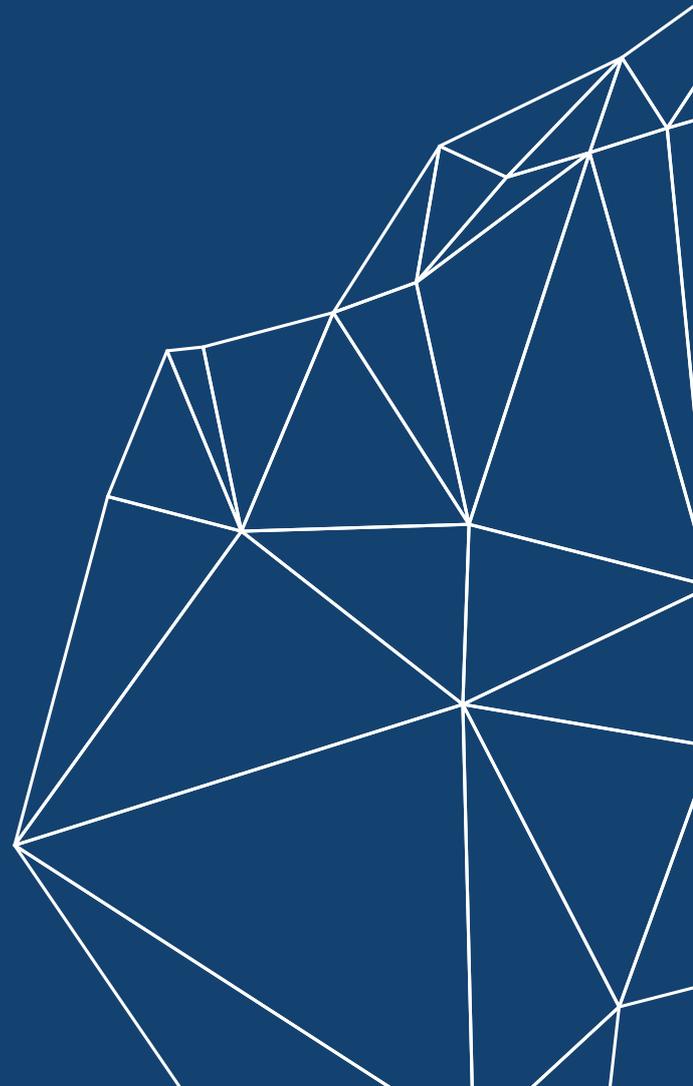


THE CYPRUS
INSTITUTE

THE CYPRUS INSTITUTE GRADUATE SCHOOL

PROSPECTUS

ACADEMIC YEAR
2021-2022



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Message from the President & Provost



World-class universities and research institutions, while small in number, play a catalytic role in advancing human affairs and welfare, economic growth, scientific progress, and cultural achievement.

While firmly anchored in the pursuit of excellence, The Cyprus Institute aspires to reach beyond the traditional models of research institutions and universities: it is a novel institution dedicated to the pursuit of excellence by addressing regional problems of global significance. As part of its educational mission it offers graduate degrees exclusively to a limited number of young scientists aspiring to become future leaders in academia and research.

The Cyprus Institute is approved by the Ministry of Education, Culture, Sport and Youth of the Republic of Cyprus to offer, the following programs of study:

- Digital Cultural Heritage, MSc
- Environmental Sciences MSc/MPhil
- Simulation and Data Science, MSc
- Computational Sciences, PhD
- Energy, Environment and Atmospheric Sciences, PhD
- Science and Technology in Cultural Heritage, PhD

The degree programs of the Institute are highly exclusive: intensive, rigorous and very demanding. They are intended for those eager to shape and drive the international knowledge economy of tomorrow, those who share our vision that future peace and prosperity is founded on social justice and enabled by science and technology.

A limited number of applicants can expect to be admitted, those that are equipped for such a challenge and especially those that have also the drive to excel internationally in the fields of study offered.

The students admitted can expect to become members of a vibrant, truly international research community operating from Cyprus and partnered with some of the leading universities and research centers of the world. Generous financial aid opportunities are available for competitive applicants.

Professor George Christophides
President of The Cyprus Institute
Provost of The Cyprus Institute Graduate School



The Cyprus Institute

The Cyprus Institute (Cyl) is a world-class research and technology institution, carrying out pioneering research programs involving cutting-edge high throughput technologies, in order to address regional problems of global significance. At the same time, it provides training for future researchers and scholars through its high quality educational programs.

The Cyl comprises four specialized multidisciplinary research centers, developed in partnership with leading international institutions in their respective thematic areas:

ENERGY, ENVIRONMENT AND WATER RESEARCH CENTER (EEWRC)

Established in cooperation with the Massachusetts Institute of Technology (MIT)

SCIENCE AND TECHNOLOGY IN ARCHAEOLOGY AND CULTURE RESEARCH CENTER (STARC)

Partnered with the Centre de recherche et de restauration des musées de France (C2RMF)

COMPUTATION-BASED SCIENCE AND TECHNOLOGY RESEARCH CENTER (CASTORC)

Partnered with the University of Illinois

CLIMATE AND ATMOSPHERIC RESEARCH CENTER (CARE-C)

Established in cooperation with: the Max Planck Institute for Chemistry, the Alternative Energies and Atomic Energy Commission (CEA), and the University of Helsinki (UHEL)

Having launched its first research center in 2007, Cyl has demonstrated its keen ability to successfully conduct scientific research and to attract scientists of international repute. It is now pursuing a large

number of research projects, many of them funded by the European Commission, including an Advanced Grant from the European Research Council (ERC), two European Research Area Chairs (ERA Chair) and two Marie Skłodowska-Curie European Joint Doctorates. Cyl operates under the aegis of the Cyprus Research and Educational Foundation (CREF), which is governed by a Board of Trustees, comprised of leading personalities of the international academic, political and business world.

THE VISION OF Cyl IS:

- Tackle climate change for a healthy environment with healthy people
- Innovate for a sustainable and green development toward a brighter future
- Lead in a changing world where data and artificial intelligence are key features
- Analyse and document our past and present to enrich our future
- Educate the new science leaders and policy makers

THE INSTITUTE'S MISSION IS LED BY A STRONG SET OF VALUES THAT ARE TO:

- Conduct cutting-edge scientific research through integrated approaches in areas aligned with local and regional priorities
- Develop big strategic research infrastructures that serve not only our needs but also those of the research communities of Cyprus and the region
- Lead by example of a strong academic and scholarly culture
- Establish strategic partnerships at the local, regional and international levels
- Engage with society and public and private stakeholders
- Utilise our influence and scientific excellence for short and long-term societal and regional impact

The Research Centers

The research organization of the Institute is comprised of cross-disciplinary Research Centers that pursue issues of scholarly relevance, global significance and regional focus.

EEWRC

The Energy, Environment and Water Research Center addresses science, technology, economic and policy issues related to major challenges in the energy, environment and water fields of the Eastern Mediterranean.

The Energy, Environment and Water Research Center was launched in December 2007 as the first research center of The Cyprus Institute.

EEWRC was developed in close collaboration with the Massachusetts Institute of Technology (MIT) to address societally relevant issues on Energy and Renewables, Environment, and Water and Natural Resources. Research at EEWRC is issue-driven and interdisciplinary, embracing the physical, chemical, biological, and human/socioeconomic sciences. The **Energy Division** of EEWRC is embedded in relevant European and International Networks and committees such as ESTELLA, EERA, ESFRI WG etc. and collaborates with most of the EUs Concentrated Solar Energy research institutions in numerous research projects. The **Water and Marine Sciences Division** undertakes fundamental and applied, transdisciplinary research to improve the management of water and land for the sustainable provision of ecosystem services under societal and Climate Change.

EEWRC addresses issues of regional interest but of global importance, and is focused on conducting research on the major areas of:

- Solar harvesting, solar energy receivers, thermal storage, solar desalination, and modelling-design-optimization;
- Hydrologic and environmental monitoring, natural resources management technologies and policies, spatial and environmental economics, shallow and deep-water marine ecosystems

EEWRC operates unique and cutting-edge environmental research facilities, including:

- Facility for Chemical Analysis
- PROTEAS coastal facility in Pentakomo-Cyprus
- Linear FRESNEL facility at the Cyl rooftop
- State-of-the-art equipment for hydrological field research

MAIN PARTNERS & COLLABORATORS

- Max Planck Institute for Chemistry (MPIC), Germany • Centre National de la Recherche Scientifique (CNRS), France
- Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France • Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Italy • German Aerospace Center (DLR), Germany
- Tel-Aviv University, Israel • University of Cairo, Egypt • University of Athens, Greece • University of Crete, Greece • Cyprus University of Technology, Cyprus • University of Cyprus, Cyprus • Department of Environment, Cyprus • Department of Forests, Cyprus • Water Development Department, Cyprus • Department of Meteorology, Cyprus • Department of Labour Inspection, Cyprus • Geological Survey Department, Cyprus • Agricultural Research Institute, Cyprus

>€22
million in
competitive
grants

50
funded
projects

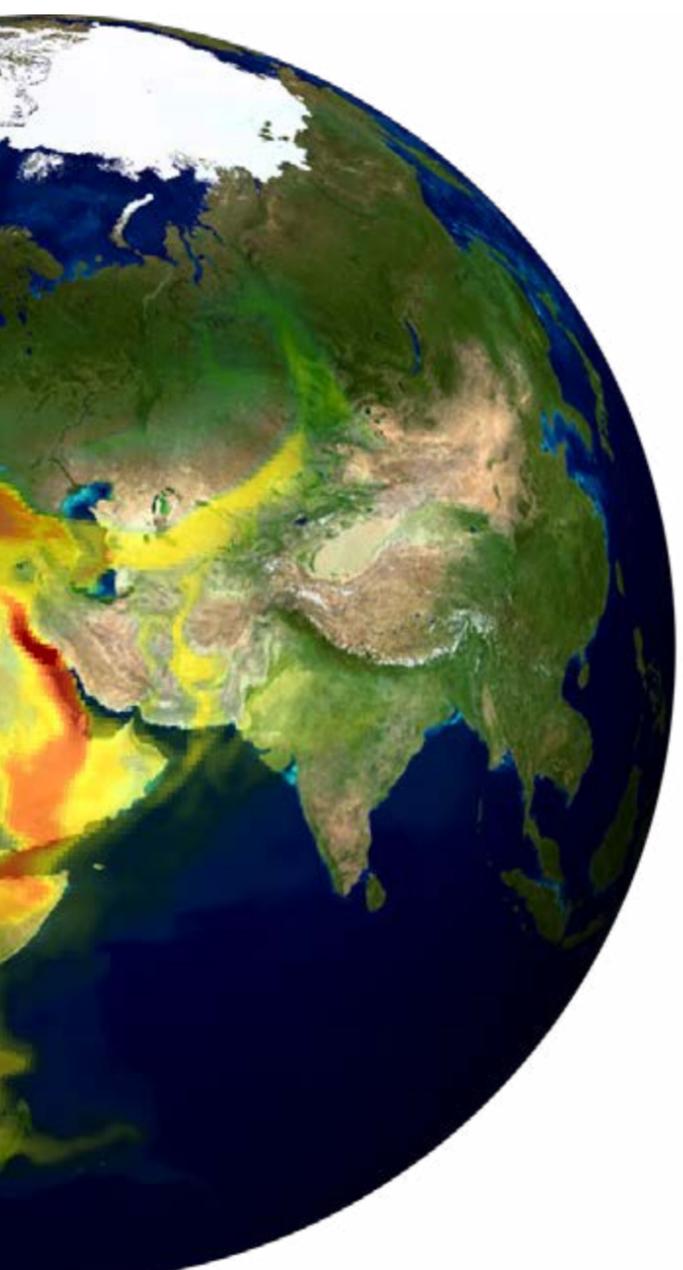
3
infrastructures
& labs

445
publications

35
faculty
& staff

(2008-2019)

Established in collaboration with the Massachusetts Institute of Technology (MIT)



Global Atmospheric-Chemistry model simulation of atmospheric transport of pollution emitted in the East Mediterranean. EMAC model on the Cy-Tera supercomputer of The Cyprus Institute.

CaSToRC

The Computation-based Science and Technology Research Center addresses complex research problems in science, engineering and the humanities, by applying advanced computational and data methodologies.

With its Tier-1 supercomputing facility, CaSToRC aspires to cultivate the use of High Performance Computing (HPC) and Data Science in Cyprus and the Eastern Mediterranean, and to serve the needs for computational and data intensive applications. CaSToRC has developed research, which currently focus on scientific computing and novel computer architectures, climate and environmental modelling, nuclear and particle physics, fluid dynamics and heat transfer, chemistry and materials science, computational biology, digital cultural heritage and 3D visualization.

MAIN PARTNERS & COLLABORATORS

- Partnership for Advanced Computing in Europe, EU
- Julich Supercomputer Center (JSC), Germany
- DESY, Germany
- National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign, USA
- Synchrotron-light for Experimental Science and Applications in the Middle East, Jordan
- University of Cyprus, Cyprus
- Delft, Netherlands

> €10.8
million in competitive grants

28
funded projects

3
infrastructures & labs

>160
publications

20
faculty & staff

(2008-2019)

Established in collaboration with the University of Illinois at Urbana-Champaign



```

ry(document).ready(function(){
  $('.panel-btn').on('click', function(event){
    event.preventDefault();
    $('.panel').addClass('is-visible');
  });
  //close the lateral panel
  $('.panel').on('click', function(event){
    if( $(event.target).is('.panel') || $(ev
      $('.panel').removeClass('is-visible');
      event.preventDefault();
    }
  });
});
});

```

STARC

The Science and Technology in Archaeology and Culture Research Center conducts research on archaeology and cultural heritage using methods from the natural, material and computational sciences.

Working closely with scholars from the humanities and social sciences, our research provides new insights into the past, and the better protection and dissemination of our cultural heritage. Building on a wide network of scientific collaborations with major institutions in Cyprus, the region, Europe and the USA, STARC has been selected as the Eastern Mediterranean hub in the European Research Infrastructure on Heritage Science (E-RIHS). Current research activities focus on four main domains that reflect key aspects of the human past and our tangible and intangible heritage:

- Digital Cultural Heritage focuses on the development and application of computer-based methods for the documentation, investigation and preservation of material culture from the past

- Research in Cultural Landscapes and Built Heritage focuses on the study of the culturally layered landscapes of the Mediterranean region, and the historic built environment
- Bioarchaeological research explores humans as agents in their environment. Using different methods to analyse human bones and plant remains, we explore key issues in archaeology, including networks of contact, agricultural practices, dietary patterns, health and disease, and other aspects of past daily life, rituals and death
- Archaeological Materials include ceramics, metals, glass and pigments. Understanding how these materials were made and used, reveals wide-ranging information about the skills and interests of early craftspeople and artisans

MAIN PARTNERS & COLLABORATORS

- Centre de recherche et de restauration des musées de France (C2RMF), France
- Department of Antiquities, Cyprus
- NCSA, University of Illinois at Urbana Champaign USA
- A.G. Leventis Foundation, Cyprus
- Consiglio Nazionale delle Ricerche (CNR), Italy
- Israel Antiquities Authority, Israel
- Institute for Aegean Prehistory (INSTAP)
- University of Cyprus, Cyprus
- Cyprus University of Technology, Cyprus
- University of Cambridge, UK
- KU Leuven, Belgium
- University of Groningen, The Netherlands
- SESAME Synchrotron, Jordan
- The British Museum, UK
- Bank of Cyprus Cultural Foundation, Cyprus
- Cyprus American Archaeological Research Institute (CAARI), Cyprus

> €8.1
million in
competitive
grants

47
funded
projects

6
infrastructures
& labs

> 200
publications

32
faculty
& staff

(2008-2019)



Established in collaboration with the Centre de recherche et de restauration des musées de France (C2RMF)



Almost human size terracotta statue, 3D virtually reconstructed (black patterns) at The Cyprus Institute. The statue, found in Salamis (Cyprus) is ca. 2500 years old and is currently exhibited in the British Museum.

CARE-C

The Climate and Atmosphere Research Center (CARE-C) is a new “Center of Excellence” dedicated to climate and atmosphere research for the Eastern Mediterranean and Middle East region.

The Climate & Atmosphere Research Center (CARE-C) was launched in January 2020 in the framework of the European Commission Horizon-2020 TEAMING project “EMMECARE” (Eastern Mediterranean and Middle East Climate and Atmosphere Research Centre; Grant no. 856612). The Cyprus Institute established CARE-C in cooperation with EU Advanced Partners: the Max Planck Institute for Chemistry in Mainz in Germany, the Alternative Energies and Atomic Energy Commission (CEA) in France, and the University of Helsinki (UHEL) in Finland.

CARE-C is mainly focused on:

- Science and Research on Climate Change and Air Pollution over the Eastern Mediterranean and the Middle East (EMME) region
- Innovation on early warning systems for dust storm and extreme weather events, new cost-effective atmospheric sensors, Unmanned Aerial

Vehicles in meteorology and air quality, regional carbon footprint and air quality forecasting

- Education and Training on Meteorology and atmospheric sciences (MSc and PhD), climate change and weather forecasting (trainings), hands-on practice on atmospheric instrumentation and knowledge exploitation and transfer.

CARE-C operates four Departments:

- Environmental Observations
- Environmental Predictions
- Impact & Policy
- Innovation

CARE-C’s cutting-edge Research Infrastructure includes:

- Atmosphere & Climate Data Centre
- Cyprus Atmospheric Observatory
- Environmental Chemistry Laboratory
- Instrumentation and NanoLab
- Unmanned Systems Research Lab

MAIN PARTNERS & COLLABORATORS

- Max Planck Institute for Chemistry (MPIC), Germany
- Centre National de la Recherche Scientifique (CNRS), France
- Commissariat à l’énergie atomique et aux énergies alternatives (CEA), France
- Laboratoire des Sciences du Climat et de l’Environnement (LSCE), France
- University of Helsinki (UHEL), Finland
- Institute for Atmospheric and Earth System Research (INAR), Finland
- University of Cairo, Egypt
- National Observatory of Athens, Greece
- Technical University of Delft, The Netherlands
- University of Athens, Greece
- University of Crete, Greece
- Cyprus University of Technology, Cyprus
- University of Cyprus, Cyprus
- Department of Environment, Cyprus
- Department of Forests, Cyprus
- Department of Civil Aviation, Cyprus
- Department of Meteorology, Cyprus
- Department of Labour Inspection, Cyprus
- Ministry of Defence

€20 million in competitive grants

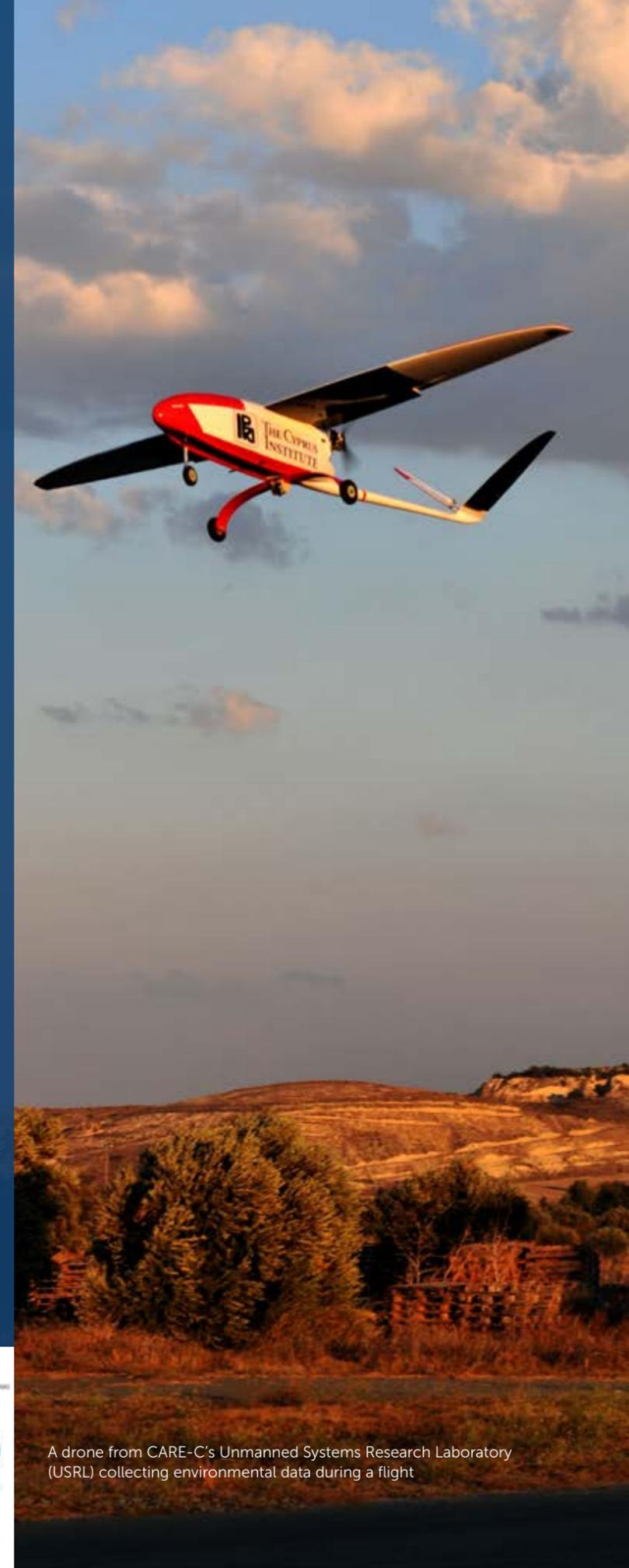
12 funded projects

66 faculty & staff

7 infrastructures & labs

75 publications

Center launched January 2020



Established in collaboration with the Max Planck Institute for Chemistry, the Alternative Energies and Atomic Energy Commission, the University of Helsinki



A drone from CARE-C’s Unmanned Systems Research Laboratory (USRL) collecting environmental data during a flight



The Cyprus Institute's Graduate School Mission

The Graduate School's Mission is to attract and maintain a diverse, international cohort of highly competitive young scholars fully integrated in its cutting-edge research activities, providing them with the theoretical and applied knowledge needed to lead tomorrow's information frontier.

The Graduate School

The Cyprus Institute Graduate School is an accredited, degree-granting institution of higher education established in 2010. It offers postgraduate programs and brings together top students from Cyprus and abroad, to provide them with modern knowledge and skills to serve innovative areas of science, society and tomorrow's economy. Its unique strategy of funding its educational projects through competitive funding, guarantees its students' involvement in cutting edge research.

Why study at Cyl?

EXCEPTIONAL FACULTY

Cyl's intensive research focus is complemented by Cyprus's unique geographic position, which in turn, provides access to an area abundant with challenges and research opportunities. English is the institute's official language of communication thus enabling it to attract renowned scholars and scientists from all over the world.

STATE-OF-THE-ART FACILITIES

Cyl has secured an impressive number of European projects and other competitive grants, which have funded state-of-the-art facilities, many of which are unique to Cyprus, and in some cases the EMME region. Our students have access to these facilities throughout the duration of their graduate studies.

LOW STUDENT-FACULTY RATIO

The Cyl Graduate School's modus operandi is to maintain a small cohort of top students, which provides the advantage of a low student-faculty ratio. This allows for a high degree of individual focus on research, personal guidance, mentoring and career coaching resulting in successful placement.

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.

RESEARCH ASSISTANTSHIPS

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 research assistantships, immersing them in research teams which provides them with research project experience alongside their theoretical education.

PARTNERSHIPS AND COLLABORATIONS

At Cyl, the synergistic benefits of collaborating with other institutions are highly valued. The institute has established partnerships with leading national and international research organizations, academic and government institutions. These collaborations enrich educational programs and research activities. Students benefit directly by being exposed to an international and diverse pool of faculty, researchers and research facilities.

JOINT DEGREES

Students have the option to pursue their PhD studies at Cyl jointly with internationally recognized institutions with which Cyl maintains educational agreements for joint/dual degrees such as the University of Illinois, the University of Paris-Saclay, RWTH Aachen University, etc. Cyl also coordinates two Marie Skłodowska-Curie European Joint Doctorate (ITN-EJD) Programs and to date, Cyl is one of the few institutions coordinating two ITN-EJD projects funded in Europe since 2014. This clearly demonstrates that it is regarded as a European center of excellence in education and training and showcases our experience in attracting and coordinating such projects.

DEGREE PROGRAMS ARE EMBEDDED IN THE RESEARCH ACTIVITIES OF CYI

At Cyl, our educational programmes are purposely designed to link with the research carried out in our Research Centres, thus our curriculum is connected to research by design. Mentored by our distinguished and international faculty and with the help of our expert research staff, students are immersed in our rich research environment and have direct access to our state-of-the-art infrastructure and facilities.

CHAMPION IN COMPETITIVE RESEARCH

Horizon 2020: Cyl attracting 12 times the European average in funds per R&D personnel (FTE) | 2014 to 2020

INTERNATIONAL ENVIRONMENT

56% International Students
68% International Faculty

STUDENT-FACULTY RATIO

Low student-faculty ratio

ACADEMIC & RESEARCH STAFF

Faculty >50
Research Staff >200

TRAINING & DEVELOPMENT

- Internships
- Conferences
- Workshops
- Summer Schools

FUNDING

100% of PhD students received full or partial financial aid

JOINT DEGREES

45% of PhD students enrolled in Joint/Dual Degrees

INTERNATIONAL COLLABORATIONS & PARTNERSHIPS

Member in >40 regional & international networks

STRATEGIC PARTNERS

MAX PLANCK INSTITUTE FOR CHEMISTRY (Germany) • C2RMF (France)
MIT (USA) • UIUC/NCSA (USA)
CNRS (France) • CEA (France)
UNIVERSITY OF HELSINKI (Finland)

MOBILITY

73% spent at least one month abroad

RESEARCH OUTPUTS

- >70 m | Competitive Grants
- 80 | Active Research Projects
- >1000 | Scientific Publications
- 16 | Research Laboratories

STATE-OF-THE-ART FACILITIES

Several unique at regional level

EMPLOYABILITY PROSPECTS

100% within 3 months of graduation

GENDER BALANCE

42% women
58% men

Selected Faculty Profiles



George K. Christophides

- Professor
- Provost of The Cyprus Institute Graduate School
- President of The Cyprus Institute

Research Interests

Infectious Diseases; Innate Immunity; Systems Genomics.

Short Bio

Dr. Christophides is Professor and Chair of Infectious Diseases and Immunity at Imperial College London. He received his PhD from the University of Athens and was Marie Curie research fellow and Staff Scientist at the European Molecular Biology Laboratory in Heidelberg, Germany.

Prof. Christophides is a world leader in the fields of insect immunity and vector-borne diseases and pioneered the field of vector functional genomics. He has an extensive record in management and coordination of large and international research consortia and served as advisor to various international organisations. He is a Wellcome Trust Investigator and collaborates with the Bill and Melinda Gates Foundation to edit the genomes of mosquitoes so that they cannot transmit malaria.



Costas N. Papanicolas

- Cyl Institute Professor
- Advisor to the President of the Republic of Cyprus and Special Envoy on Climate Change

Research Interests

Nuclear and Particle Physics; Medical Physics and Imaging; Solar & Energy Policy.

Short Bio

Prof. Costas N. Papanicolas is the former President and Provost of the Cyprus Institute Graduate School. He is an MIT-trained physicist, an educator and a scientific administrator. He has held positions at CEA, France, and has served as Professor at the University of Illinois (USA), and at the University of Athens (Greece).

He served on numerous boards and committees including: the Council on Educational Evaluation and Accreditation (Chair) of the Republic of Cyprus, on the National Advisory Board on Science and Technology of the Hellenic Republic, and on the National Research and Innovation Council of Cyprus.

Prof. Papanicolas is a Fellow of the American Physical Society, member of the Academia Europea, of the Silk Road Academy of Sciences (China) and a founding member of the Cyprus Academy of Sciences, Letters, and the Arts. He has received numerous awards, including the bestowment of "Medal of Excellence for Service to the Cyprus Republic" and the decoration as "Commendatore dell'Ordine della Stella d'Italia".



Constantia Alexandrou

- Professor
- Acting Director Computation-based Science and Technology Research Center (CaSToRC)

Research Interests

Theoretical strong Interaction Physics; Lattice Quantum Chromodynamics (QCD); Modelling and Algorithms; Novel Computer Architectures.

Short Bio

Prof. Alexandrou is Acting Director of CaSToRC and Professor of Theoretical Physics at the University of Cyprus. She holds a PhD in Theoretical Nuclear Physics from the Massachusetts Institute of Technology. She heads the Lattice QCD Computational Laboratory and leads a successful research program in hadron structure as a node of the European Twisted Mass Collaboration.

At Cyl, she led the efforts to establish the first national supercomputing center in Cyprus, creating at the time the largest research supercomputing facility in the Eastern Mediterranean. She is the coordinator of a number of EU programs and notably two Marie Skłodowska-Curie European Joint PhD programs.

She served on a number of international advisory committees and bodies such as the Computational Physics of the International Union of Pure and Applied Physics, the Computational Physics of the European Physical Society and she is the representative of Cyprus to the Council of the Partnership for Advanced Computing In Europe.



Manuel Jesus Blanco

- Professor
- European Research Area Chair in Solar Thermal Technologies for the Eastern Mediterranean

Research Interests

Energy Systems in general; Concentrating Solar Thermal technologies; Energy Policy; Modelling of Energy Systems; Thermodynamics, Heat Transfer, Optics, and Scientific Programming.

Short Bio

Prof. Blanco holds the European Research Area (ERA) Chair in Solar Thermal Technologies for the Eastern Mediterranean of the Energy Division of the Cyprus Institute.

He holds a PhD in Applied Physics for the University of Massachusetts and a Doctoral Degree in Industrial Engineering from the University of Seville. He is Vice-Chair of the International Energy Agency's SolarPACES Technology Collaboration Program, a program he chaired for the last six years. Before joining the Cyprus Institute, he was Science Leader of the Solar Energy Systems Research Group of CSIRO - Australia's National Research Agency, and Director of the Australian Solar Thermal Research Initiative, the largest research initiative in the solar thermal field ever undertaken in Australia. He is former Director of the Solar Thermal Energy Department of the National Renewable Energy Centre of Spain (CENER), Full Professor and Chair of the Engineering Department of the University of Texas at Brownsville; and Director of CIEMAT's Plataforma Solar de Almería, the world's largest solar research infrastructure. He is author of numerous publications, and participates in a large number of international expert groups.

**Salvatore Carlucci**

- Professor
- Head of Sustainability and Built Environment Division

Research Interests

Building physics; Indoor Environmental Quality; Occupant behavior; Building performance simulation and optimization; Adaptive and responsive building components; Smart buildings; Zero energy/emission neighborhoods.

Short Bio

Dr. Carlucci received a PhD in Building Systems Engineering from the Politecnico di Milano in Italy. From 2014 to 2019, he worked as a professor at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway, where he was Chair of Building Performance Simulation and built a research team on computational modeling of buildings. In 2019, he was appointed Project leader of the Forskerlinjen, a pilot study program for highly motivated and research-oriented students at the Department of Civil and Environmental Engineering of NTNU.

Dr. Carlucci has contributed to several projects funded by the European Union and to four Annexes approved by the International Energy Agency (IEA). Currently, he is a subtask leader of the IEA-EBC Annex 79 on Occupant-centric building design and operation and is a fellow of the International Building Performance Simulation Association.

**Johannes (Jos) Lelieveld**

- Professor
- Head of Environmental Predictions Division

Research Interests

Atmospheric chemistry, aerosols, climate and public health, the atmospheric cleansing mechanism, global and regional atmospheric change. In Cyprus, his research focuses on atmospheric and climate change in the Mediterranean, Middle East and North Africa.

Short Bio

Dr. Johannes (Jos) Lelieveld is Institute Professor at the Cyprus Institute and Professor of Atmospheric Physics at the University of Mainz, Germany. He holds a BSc in Natural Sciences from the University of Leiden, the Netherlands, and a PhD in Atmospheric Physics from the Physics and Astronomy Faculty of the University of Utrecht, the Netherlands (1990). He worked as a Professor and Chair of the Air Quality Department of the University of Wageningen in the Netherlands from 1993 to 1995, and Professor in Atmospheric Physics and Chemistry at the University of Utrecht from 1996 to 2000. Since 2000 he is Director of the Atmospheric Chemistry Department of the Max Planck Institute for Chemistry, Mainz, Germany, and served as Managing Director of the institute from 2004 to 2007 and 2010 to 2014. Since 2008 he is professor at The Cyprus Institute. Prof. Lelieveld is (co)author of 450 peer reviewed publications, a member of national and international academies of science, and has received many international distinctions.

**Thilo Rehren**

- A.G. Leventis Professor in Archaeological Sciences
- Director, Science and Technology in Archaeology and Culture Research Center (STARC)

Research Interests

Reconstructing and understanding of prehistoric and historic processes used in the production of metals, glass and glazes, based on archaeological evidence and materials science methods.

Short Bio

Prof. Rehren is an Earth scientist with a PhD in Volcanology from Freiburg University, Germany, and a higher doctorate in Archaeometallurgy from TU Freiberg, Germany. From 1990-99 he worked as a research scientist at the German Mining Museum's Institute for Archaeometallurgy. In 1999 he was appointed Professor of Archaeological Materials and Technologies at the UCL Institute of Archaeology (London, UK), where he built up a large research team covering ancient metals, ceramics, and glass on a global scale. For several years he also led the Institute's China engagement, with collaborations with the Terracotta Army Museum and Peking University, among others. From 2011 to 2016 he served as founding Director of UCL Qatar, a postgraduate department focussing on research, teaching and professional development in Archaeology, Conservation, Museum Studies and Library Studies in the wider Arab World. He joined Cyl in 2017 and focusses now on research in the EMME (Eastern Mediterranean and Middle East) and surrounding regions.

Prof. Rehren is fluent in German and English.

**Jean Sciare**

- Professor
- Director of the Energy, Environment & Water Research Center (EEWRC)

Research Interests

Experimental characterization of atmospheric aerosols; atmospheric instrumentation; air quality.

Short Bio

Prof. Jean Sciare received a PhD in Atmospheric Chemistry and Physics from Paris-VII University in 2000 and obtained, the same year, a post-doctoral position at the Max Planck of Chemistry in Mainz (Germany) focusing on Cloud Condensation Nuclei measurements. Dr. Sciare obtained a tenure position at CNRS end of 2001 at LSCE and was promoted as CNRS Research Director in 2013. He is the founder of the Aerosol Chemical Monitor Calibration Center (ACMCC), which currently supports the pan-European ACTRIS atmospheric network on Aerosols, Clouds and Trace Gases.

Prof. Sciare is currently leading the development of several major Cyl research infrastructures (Cyprus Atmospheric Observatory, Unmanned System Research Laboratory), addressing issues related to climate change and air pollution in the Eastern Mediterranean and the Middle East, in the framework of several global and international networks, as well as EU funded research projects. Prof. Sciare is the Coordinator of the EU Horizon 2020 strategic Teaming project: "Eastern Mediterranean Middle East Climate and Atmosphere Research Center" (EMME-CARE, GA.856612), establishing a new Climate and Atmosphere Research Center (CARE-C) launched in January 2020. He is (co-)author of more than 110 international refereed publications (H-index 36).

For a complete list of Instructors see Annex 3

Our Campus

The Athalassa campus in Nicosia includes the Cyl administration, many of the laboratory facilities and the Graduate School.

GUY OURISSON BUILDING

The Guy Ourisson building (GOB) serves as the main building of Cyl and it houses the reception of the Institute, offices (for faculty, researchers and administration), seminar and conference rooms as well as auxiliary common areas. The building houses the new Cyl café which provides snacks and refreshments for students, faculty, staff and visitors. It also has a new foyer area which is used as a side entrance to the building, as a lounge area, and an area for events and exhibitions.



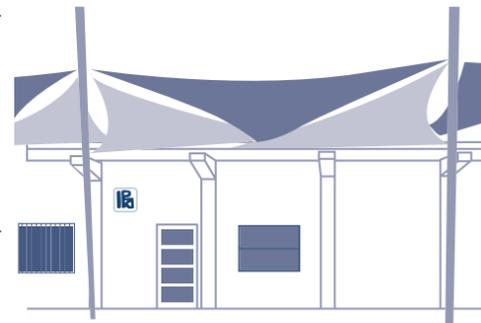
NOVEL TECHNOLOGIES LABORATORY

The Novel Technologies Laboratory (NTL) was inaugurated in April 2014. It is designed as a "green building", using specific standards that allow it to be a near zero energy building. It utilizes advanced energy saving measures and smart energy management. The Laboratory has 1450 sq. meters of laboratory space equipped with latest technology for scientific research, as well as support areas and amenities for offices and events. The laboratory hosts teams from the Energy, Environment and Water Research Center, as well as the Climate and Atmosphere Research Center. NTL is equipped with cutting-edge equipment for scientific research in areas such as atmospheric chemistry, environmental monitoring, solar thermal energy and desalination.



STARC LABORATORIES

The STARC laboratories provide expertise, tools and integrated research methods to answer grand challenges in the region's archaeological and cultural heritage research. They house a unique collection of laboratories for archaeological science and cultural heritage, specialising in archaeological materials, art characterisation, bioarchaeology, human osteoarchaeology, multispectral imaging, and virtual and augmented environments. The labs use advanced imaging methods and chemical and physical analysis, and include both portable equipment for non-invasive in-situ documentation and fixed



instruments for more detailed study including a variable pressure Scanning Electron Microscope with Energy-Dispersive Spectrometer for the analysis of prepared samples and small objects. Dedicated spaces offer researchers and students areas to have meetings, study, perform experiments, brainstorm or simply relax.

THE GRADUATE SCHOOL

The Graduate School is housed in a renovated building on campus. The building houses the Office of Graduate Studies, classrooms, seminar rooms and conference rooms. It also includes office space for its students including quiet spaces for use by its students as needed, a library and a student lounge.

The building has a new entrance, a foyer, which is used as an indoor lounge area. The students have access to a new café in the GOB building next door and a Sports Center on campus.



LIBRARY

The Cyprus Institute is setting up its first physical library for its students. It will be a small library, housed in the renovated Graduate School building and will include the books needed for the courses offered by the Graduate School and research conducted by the Research Centers of the Institute.

The academic staff and students of The Cyprus Institute have full access to the library of the University of Illinois at Urbana, Champaign, including all scientific journals to which the University subscribes (<http://www.library.uiuc.edu/>). Additionally, Cyl students, faculty and research staff have free access to the University of Cyprus library system as external library members.

Other library resources in Nicosia include: the library and archive of the Leventis Municipal Museum, the library and archive of the Bank of Cyprus Cultural Foundation, the library of the Department of Antiquities, the library of the Cyprus American Archaeological Research Institute (CAARI), the library of the Makarios III Cultural Foundation. The Institute has an electronic library system. The Cyl e-Book Library consists of various books and e-Books of all three Cyl Centers.

State-of-the-Art Facilities

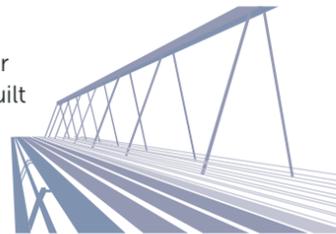
PROTEAS SOLAR RESEARCH FACILITY

The facility's mission is to pursue research and development in solar technologies. Cyprus and the Middle East will be heavily impacted by Climate Change and the mission of PROTEAS Facility is to ameliorate this impact. Located adjacent to the sea, near Limassol, it provides an optimal facility to develop and test technologies optimized for island-coastal environments. One of PROTEAS Facility's main functions is to investigate the use of solar energy to cogenerate electricity and desalinate sea water. PROTEAS illustrates ongoing research in solar thermal processes and demonstrates innovation needed to address the impact of climate change in Cyprus and Middle East. The facility offers laboratories and supportive infrastructure for research, development and testing of technologies related to Concentrated Solar Power (CSP), Solar Thermal Energy (STE) and Thermal Desalination of Sea Water (DSW). The facility is open to the international scientific community on a merit-based priority scheme.



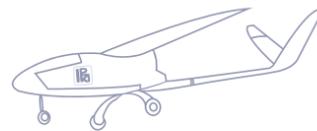
LINEAR FRESNEL FACILITY (LIFE)

The LIFE facility pursues research and development of solar technologies with an emphasis on their utilization in the built environment. It is located on the Cyl campus in Nicosia and it serves the cooling and heating needs of the Novel Technologies Building. The facility uniquely integrates with the existing "smart" climatization system of Cyl's Novel Technologies Building, offering an innovative experimental approach to integrating Concentrated Solar Power (CSP) systems into the built environment.



UNMANNED SYSTEMS RESEARCH LABORATORY (USRL)

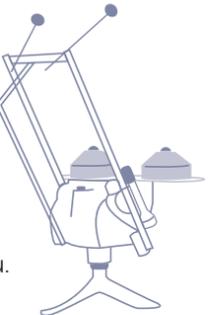
The Unmanned Systems Research Laboratory (USRL) is an important element of the "Eastern Mediterranean & Middle East Climate & Atmosphere Research" Centre of Excellence (<http://emme-care.cyi.ac.cy/>) of The Cyprus Institute and offers on-site facilities and related infrastructure for research, development, and testing of technologies related to UAVs (Unmanned Aerial Vehicles). These are remotely controlled aircraft that can fly autonomously based on pre-programmed flight paths, or can even fly by using more complex dynamic automation systems. UAVs can carry an increasing amount of sensors and fill the gap between ground-based and satellite measurements, by providing, for a very competitive cost and risk, the capacity to perform with high spatial resolution, long-term monitoring observations



necessary for assessing air pollution and climate change in our region. The mission of the USRL is to provide high-quality observations of atmospheric pollutants and other parameters relevant to air quality and climate change. Taking advantage of several other Cyl infrastructures, such as the instrumentation and analytical laboratories for testing and qualifying miniaturized sensors, as well as the private runway and dedicated airspace in close proximity to our Atmospheric Research Facility at Agia Marina Xyliatou, USRL performs regular UAV flights to document and contrast the long range transported pollution from three continents (Europe, Africa and West Asia) as well as the dust aerosols from the largest desert regions in the world (Sahara, Middle East).

CYPRUS ATMOSPHERIC OBSERVATORY

This facility provides high quality, long-term observations of key atmospheric pollutants relevant to air quality and climate change. The station is ideally located to document and contrast long-range transported pollution from three continents (Europe, Africa and West Asia) and dust aerosols from the two largest desert regions in the world (Sahara and the Middle East). The facility is located in Agia Marina Xyliatou.



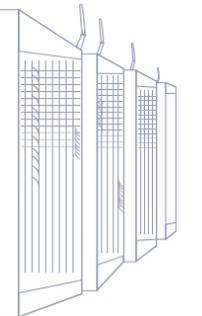
FACILITY FOR CHEMICAL ANALYSES (FCA)

The FCA gathers the latest trace analytical techniques for environmental samples (atmospheric aerosols & gases, rainwater etc.) following international, standardized operating procedures in compliance with EU environmental directives. Combining high tech (mass spectrometer) instrumentation and a team of experienced engineers, FCA provides a large range of controlled chemical analysis relevant for air and water quality. The FCA is fully automated, allowing for the chemical analysis of a very large volume of environmental samples in a timely and efficient manner.



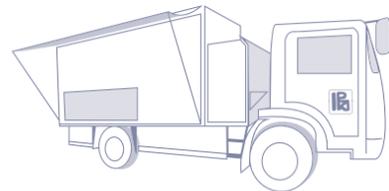
HIGH PERFORMANCE COMPUTING FACILITY (HPCF)

The Cyprus Institute's High Performance Computing Facility, is the home of CyTera and now CyTera-II. CyTera and its successor, CyTera-II, have been two of the most powerful supercomputers in the region that are used for scientific research. CyTera was the first supercomputer in Cyprus and the largest open-access supercomputer in the Middle East. The facility provides high level support and training for scientists in the region, extensive data storage and analytics capabilities as well as access to Cloud resources.



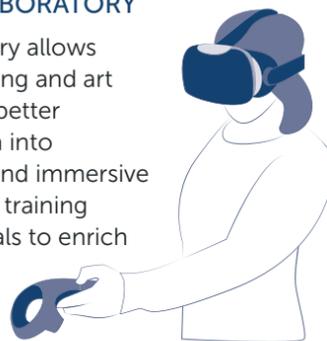
STARLab MOBILE RESEARCH INFRASTRUCTURE FOR HERITAGE AT RISK

STARLab is a unique in the region mobile laboratory infrastructure dedicated to the in-situ investigation of Heritage at Risk. It consists of a 4x4 truck with a custom-made cabin on its chassis offering laboratory space for ca. 4 researchers and a wide range of portable instrumentation for the non-invasive and non-destructive documentation, characterization and analysis of heritage assets. State-of-the-art advanced instrumentation is grouped in four main categories: geo-physical surveying, geodesic and 3D documentation, technical, digital and multi-spectral imaging and spectroscopy analyses. These provide a holistic, integrated documentation of cultural landscapes, archaeological sites, monuments and artifacts for their study, conservation and preservation.



VISUALISATION & VIRTUAL ENVIRONMENTS LABORATORY

The Visualisation and Virtual Environments Laboratory allows researchers from all disciplines of science, engineering and art to conduct simulation and visualisation research to better understand complex phenomena, and translate data into interactive images on large-scale, high-resolution, and immersive Virtual Reality devices. The Laboratory offers unique training opportunities to students, scientists, and professionals to enrich their knowledge on scientific visualization and explore the potential of the technologies available at The Cyprus Institute.



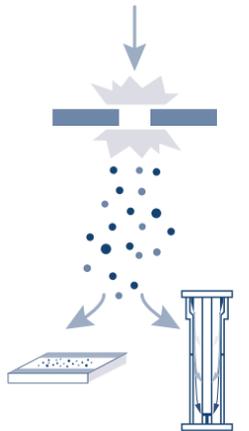
ANDREAS PITTAS ART CHARACTERIZATION LABORATORIES (APAC LABS)

The organization of the Andreas Pittas Art Characterization Laboratories (APAC Labs) reflects its core methodological approach to the effective use of science and technology to address fundamental research questions in art history, archaeology and more broadly cultural heritage. As such, the APAC Labs offer an interdisciplinary research pipeline that is based on a broad and multi-scale diagnostics approach, integrating inorganic/organic physico-chemical methods with reflectography, multi-spectral imaging, and surface 2D imaging/3D geometric characterization. The recent addition of the Cyprus Dendrochronology Laboratory (CDL) has enriched APAC Labs research capacity in the study of wooden heritage with key contributions in art and architectural history as well as paleoclimate research.



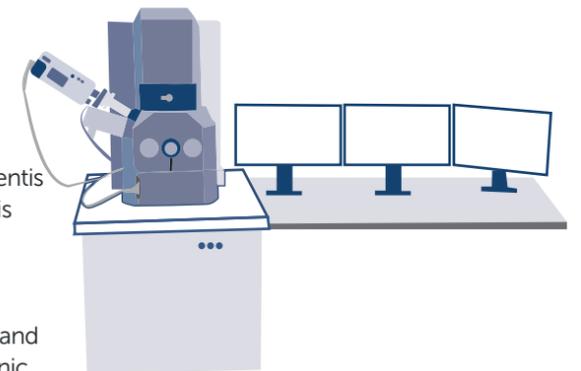
INSTRUMENTATION FOR NANOPARTICLE SYNTHESIS AND CHARACTERISATION LABORATORY (INL)

Scientists working in the INL Lab develop instruments for synthesising and characterising nanoparticles suspended in gaseous media (aerosols). The instruments built in the facility find applications in nanomaterial synthesis for a range of applications, including catalysis and gas sensing, as well as in studies aiming to understand fundamental atmospheric process in which aerosol (nano)particles play an important role. INL Lab is equipped with state-of-the-art tools for synthesising/characterising novel nanomaterials manufactured from well-defined aerosol nanoparticle building blocks. Emphasis is given on the development of nanomaterials for low-cost gas sensors that can be used in air quality monitoring. In this regard, the facility also offers the capability to develop low-cost instruments for the characterisation of atmospheric aerosol particles.



SEM-EDS FACILITY

The modern Scanning Electron Microscope with Energy-Dispersive Spectrometer is part of the A.G. Leventis Chair in Archaeological Sciences. It is supported by a dedicated sample preparation laboratory and a petrographic & metallographic microscope, enabling the chemical and structural characterisation of inorganic materials such as metals, ceramics, glass, pigments and stones, as well as the high-power magnification imaging of organic and environmental remains such as seeds and micro-fossils, soil particles, and wood and charcoal samples, among others.



For more details about the facilities refer to our website: www.cyi.ac.cy

Degree Programs

The Cyprus Institute Graduate School offers the following Master's and Doctoral programs of study.

- Digital Cultural Heritage MSc
- Environmental Sciences MSc and MSc/MPhil
- Simulation and Data Science MSc
- Computational Sciences PhD
- Energy, Environment and Atmospheric Sciences PhD
- Science and Technology in Archaeology and Cultural Heritage PhD

All PhD programs are evaluated and accredited by the Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CYQAA) and adhere to the Bologna Process second or third cycle degrees and international Master's and PhD standard practices. Cyl uses the European Credit Transfer System (ECTS). English is the language of instruction and communication for all of its programs.



Master's Programs

The Cyprus Institute currently offers three Master's programs:

- Digital Cultural Heritage MSc
- Simulation and Data Science MSc
- Environmental Sciences MSc or MSc/MPhil

All of our Master's programs are accredited by the Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CYQAA) and adhere to the Bologna Process second cycle degrees. The Institute uses the European Credit Transfer and Accumulation System (ECTS). English is the language of instruction and communication for all programs offered.

The Environmental Sciences Master's program offers two types of Master's programs: an MSc (90 ECTS/12 months) and an MSc/MPhil (120 ECTS/18 months). The MSc/MPhil option is intended for students that want to pursue a research career thus offering a more enhanced research component.

MSc PROGRAM (90 ECTS/12 MONTHS)

During Term 1 and Term 2, students take courses worth 60 ECTS (30 ECTS each term) and begin work on their research project report. During Term 3, students earn an additional 30 ECTS while working on their research project report. At the end of the term they submit the research project report and defend it.

MSc/MPhil PROGRAM (120 ECTS/18 MONTHS)

During Term 1 and Term 2, students take courses worth 60 ECTS (30 ECTS each term) and begin work on their thesis. During Term 3 and 4 they continue to work on their research and during Term 5 they complete their research, submit their thesis and defend it.



MSc Digital Cultural Heritage

This is a unique program in Cyprus and the region, which aims at providing students with new scientific knowledge to pursue a research and academic career as well as to equip them with a wide range of practical and transferable hands-on skills that will offer them an advantage in the competitive job market of the future. The broader field of Cultural Heritage, be it in the archaeological field, the museum environment, the public administration or the private sector, has become increasingly digital and data is produced at a higher pace than ever before. The course will provide a unique interdisciplinary approach to solve critical challenges in the research, conservation, management and public engagement of Cultural Heritage, Archaeology, Art History and more broadly the Humanities, through digital methods and tools. Strong emphasis will be given to applied approaches, through in-depth examination of real-world case studies in collaboration with key Cultural Heritage institutions on the island.

Program graduates will be prepared to tackle a wide range of career opportunities in the Cultural Heritage private and public sectors, such as Digital Heritage experts in archaeology, curators in museums, innovators in the creative industries, educators of Cultural Heritage or archives management.

PROGRAM OVERVIEW

MSc Program (90 ECTS) 12 MONTHS	
Term 1	ECTS
3 Mandatory Courses*	10 10 5
1 Elective Course	5
Term 2	ECTS
2 Mandatory Courses*	10 5
3 Elective Courses	5 5 5
Term 3	ECTS
Research I Research Project Report Submission I Viva	30
Total (ECTS)	90

*DCH 404 (Mandatory Course) is split into two parts: Part A (5 ECTS) taken during Term 1 and Part B (5 ECTS) taken during Term 2

Course Code	Course Title	Period Duration (in minutes)	Periods (per week)	Periods (per semester)	ECTS
Mandatory Courses					
DCH 401	Arts, Humanities & Culture in the Digital Age	60	3	42	10
DCH 402	Fundamentals of Digital Cultural Heritage	60	3	42	10
DCH 403	Digital Innovation and Cultural Heritage	60	3	42	10
DCH 404	Scientific Reading & Advanced Academic Writing	60	3	21	5 + 5
Elective Courses					
DCH 416	3D Documentation & Scientific Visualization and Cultural Heritage Research	60	3	21	5
DCH 417	The Data Life Cycle in Cultural Heritage	60	3	21	5
DCH 418	Modelling and Simulation of Social & Cultural Phenomena	60	3	21	5
DCH 419	Digital Curatorship & the Museum of the Future	60	3	21	5
DCH 421	Community Engagement & Heritage Education in a Digital World	60	3	21	5
DCH 422	Heritage Science in the Digital Age	60	3	21	5
DCH 423	Synchrotron Radiation (SR)- Enabled Research in Heritage Sciences & Archaeology	60	3	21	5
DCH 424	Environmental & Climate Perspectives on Cultural Heritage	60	3	21	5

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

Course Descriptions

MANDATORY COURSES

DCH 401

Arts, Humanities & Culture in the Digital Age

Introduce fundamental challenges in Cultural Heritage research and addressing them from the broad, multi-disciplinary perspective of integrating humanities and social sciences with natural sciences and digital technologies. Students will be introduced to advanced methods in material culture analysis, art and architectural history research, biological remains analysis, social transformations and cultural developments with a particular but not exclusive focus in the broader Mediterranean region. Introduce fundamental challenges in Cultural Heritage research and addressing them from the broad, multi-disciplinary perspective of integrating humanities and social sciences with natural sciences and digital technologies. Students will be introduced to advanced methods in material culture analysis, art and architectural history research, biological remains analysis, social transformations and cultural developments with a particular but not exclusive focus in the broader Mediterranean region.

Course Content

- Introduction- scope, methods and aims
- The Eastern Mediterranean
- History and Archaeology, Environment and Bio-ecology, People and Material Culture
- Economy and Society
- Art and Architecture
- Cities and Built Heritage
- Intangible Heritage

DCH 402

Fundamentals of Digital Cultural Heritage

The course will introduce concepts of Cultural Heritage research based on digital tools and methods, along the research pipeline of data acquisition – archiving – processing – interpretation – publication, through a variety of examples covering the broad spectrum of Cultural Heritage.

Course Content

- Introduction to Digital Cultural Heritage, its research agenda, methods and aims
- Development of a research pipeline in DCH, basic concepts in computational photography, photogrammetry and imaging, 3D documentation and shape analysis, basic notions in computer graphics, computer vision and virtual research environments

DCH 403

Digital Innovation and Cultural Heritage

The course will examine contemporary transformations in understanding, accessing, sharing and communicating cultural heritage provoked by digital innovation. Students will be introduced to the discourse about the impact of the use of ICT to inclusion, accessibility and the sustainable management of cultural heritage, focusing specifically on good practices of co-creation, smart communities and the playable city for the sustainable promotion and use of CH.

Course Content

- Design thinking for accessing and promoting heritage
- Internet of things and digital transformations in heritage management
- Participatory Approaches in Digital Cultural Heritage
- Digital forms of active engagement with heritage
- The impact of heritage digitization
- Exploring new ways of valuing cultural heritage for the creative industries
- Artificial intelligence and big data analytics in cultural heritage
- Digital strategies for mobile access to heritage and smart tourism applications

DCH 404

Scientific Reading & Advanced Academic Writing (A & B)

The course will provide students the opportunity to critically develop their understanding of scientific articles and research writing skills focusing on topics related to their interests and work. The seminar is designed to help them prepare for the final stage of the M.Sc. program, which is the writing of a final Thesis. Students will be provided with essays and articles on how to improve their writing as well as a series of assignments and class presentations aligned with their particular interests and work. Instructors will offer constructive feedback aimed at improving students' writing output.

Course Content

The first semester (Part A) will be dedicated to:

- Introduction to the course, goals, methods
- Reading scientific articles
- Developing an argument
- Research results and archival work

Part B of the course will be devoted to:

- Structuring a research essay/thesis
- References and footnotes
- Class writing assignment
- Presentations
- Conclusion, course wrap-up

ELECTIVE COURSES

DCH 416

3D Documentation & Scientific Visualization and Cultural Heritage Research

The course will present fundamentals in the 3D documentation, characterization and interpretation of tangible heritage assets (monuments, archaeological sites and works of art) through 3D digital methods such as shape analysis, surface characterization and geometry measurements. Each method will be presented in detail, along with a critical analysis of cost-efficiency and accuracy level.

Course Content

- Basic notions of photogrammetry
- Sensors-based 3D documentation of a wide range of heritage assets
- Post-processing of 3D data and web-based publication
- 3D shape analysis and surface characterization

DCH 417

The Data Life Cycle in Cultural Heritage

The course will introduce concepts of digital libraries and knowledge repositories, data management principles including the FAIR principles, open data policies and related IPR issues. Theoretical discussions will focus on the meaning and differences between data, information and knowledge and how each should be formally expressed in a machine and human readable formats. Practical exercises will demonstrate how to build knowledge repositories in various CH domains for research, archiving, management. Students will be also introduced to the concept of large-scale research infrastructures, data sharing and linked open data.

Course Content

Topics to be covered include:

- Building metadata schemas
- Ontologies
- CIDOC-CRM ISO standard
- Software and architectures of digital libraries, setting-up queries and developing semantic-based research

DCH 418

Modelling and Simulation of Social & Cultural Phenomena

The course will introduce students to modeling and simulation of complex phenomena, such as the impact of built environment on human behavior in order to understand how patterns emerge from the interactions of people with historical built environments and natural environmental characteristics. Students will thus be able to better contextualize historical events as parts of a larger, more complex system of interacting parameters.

Course Content

- Introduction to self-organization, emergence and the modeling complex systems
- Agent-based modeling
- Social behavior and spatial organization
- Crowd simulation
- Social experiments and computing
- Managing complexity

DCH 419 Digital Curatorship & the Museum of the Future

The purpose of the course is to familiarize students with the transformations of the museums' role in contemporary societies due to the integration of technological interfaces when interacting with knowledge. Its objectives include the understanding of the new relationship of museums with their audiences, reflecting on new educational models and opportunities offered by technology, and critical use of ICT for the creation of new curation models for the museum of the future.

Course Content

- Historic evolution of the Museum.
- Contemporary museological approaches to curating representations of cultural identities in Virtual Museums: storytelling and user engagement.
- The Coded Museum: technologies of representing knowledge and interacting with data.
- Museums of the Future: Spatially distributed narratives for immersion in the museum space.

DCH 421 Community Engagement & Heritage Education in a Digital World

The course will introduce modern concepts on the role of Cultural Heritage to social inclusion, awareness and cohesion, defining the concept of participatory heritage and community heritage, as well as how it is taught and socially transmitted. Students will be introduced to digital platforms used nowadays for educating on Cultural Heritage, such as serious games, participatory social media, e-learning platforms and interactive virtual environments.

Course Content

- Defining the terminology: participatory heritage, community heritage, the social role of Cultural Heritage
- Situated knowledge and
- How such concepts are applied in pedagogical and educational programs

DCH 422 Heritage Science in the Digital World

The course will look into the new discipline of heritage science from a critical perspective, detailing its main scientific challenges, research methodology, theory and practice. It will detail fundamentals in the characterization and interpretation of tangible heritage assets and works of art through chemical/physical measurements deriving from material sciences, organic and inorganic chemistry, physics and biology. Each method will be presented in detail, along with a critical analysis of cost-efficiency, invasiveness and contribution to advance the domain.

Course Content

- Definition of the subject area: heritage science, archaeological science and conservation science
- Setting-up an analytical research protocol, using material sciences in heritage and archaeological investigation.
- Organic/inorganic chemistry for the diagnostics of works of art and heritage objects.
- Optical and Electron Microscopy as tools to document and decipher production, use and deterioration indicators
- Micro-XRF, multi-spectral imaging and technical photography as complementary and integrated methods in heritage science

DCH 423 Synchrotron Radiation (SR)- Enabled Research in Heritage Sciences & Archaeology

The course will explore SR enabled approaches to Heritage and Archaeology from a critical perspective, detailing its main scientific challenges, research methodology, theory and practice. It will detail fundamentals in the characterization and interpretation of tangible remains of the past through SR-XRF, SR-XANES, SR-EXAFS, SR-IR and SR-phase contrast microCT, as well as outline the necessary prior laboratory analyses before any proposal for SR beamtime can be submitted. Each SR approach relevant to Heritage and Archaeology will be presented in detail, along with a critical analysis of cost and time-efficiency, invasiveness and contribution to advance the domain.

Course Content

- Setting-up an analytical research protocol including laboratory-based characterization prior to SR measurements
- Research design for SR beam-time
- Digital SR data analysis tools and paths

DCH 424 Environmental & Climate Perspectives on Cultural Heritage

This course will provide an introduction to the role and impact of environmental and climate studies in cultural heritage and archaeology, whether related to the past or in regard to issues of preservation, monitoring and planning for a sustainable future. Increasingly depending on digital technologies and the accumulation of data, environmental sciences have become extremely important in the way we study, protect and manage sites and monuments. In this contexts experts in natural resources management, hydrology, climate change, paleoclimatology, dendrochronology will provide a comprehensive introduction to the challenges and more importantly the relevance of the environment in heritage studies with digital technologies becoming the common language for the documentation, visualization and communication of knowledge.

Course Content

The course will be organized around a series of lectures, supplemented by focused modules and short hands-on training sessions.

MSc and MSc/MPhil Environmental Sciences

The program offers two degree options:

- MSc Environmental Sciences (90 ECTS/12 months)
- MSc/MPhil in Environmental Sciences (120 ECTS/18 months)

Students must select one of two tracks:

- Atmospheric Sciences Track (AST)
- Meteorology Track (MT)

The MSc/MPhil (120 ECTS/18 months) option offers a more enhanced research component and is thus intended for the students who wish to pursue a career in research and students who wish to later pursue a PhD degree in Atmospheric Sciences or Meteorology.

The Atmospheric Sciences Track is a research-based interdisciplinary track intended for students that want to grow with the field and pursue a scientific career, to recognize and understand new concepts, and to master new procedures as they emerge in the literature. To achieve these objectives requires that students understand key physical processes involved in the atmosphere, the basic principles of atmospheric chemistry and biology, the factors controlling air quality and the techniques used for air pollution monitoring and control.

The Meteorology Track syllabus is significantly related with that of AST, yet at the same time covers all topics required

for professionals employed in National and Hydrological Services as prescribed by the World Meteorological Office (WMO). As a result, it is ideal for scientists seeking a professional career in Meteorology as well as existing and future staff of Meteorological Services.

PROGRAM OVERVIEW

MSc Program (90 ECTS) 12 Months	ECTS
Term 1: 1 Mandatory 1 Track Mandatory 1 Elective	10 10 10
Term 2: 1 Mandatory 1 Track Mandatory 1 Elective	10 10 10
Term 3: Research Research Project Report Submission Viva	30
Total	90

MSc/MPhil Program (120 ECTS) 18 Months	ECTS
Term 1: 1 Mandatory 1 Track Mandatory 1 Elective	10 10 10
Term 2: 1 Mandatory 1 Track Mandatory 1 Elective	10 10 10
Term 3: Research	15
Term 4: Research	30
Term 5: Research Thesis Submission Viva	15
Total	120

Course Code	Course Title	Period Duration (in minutes)	Periods (per week)	Periods (per semester)	ECTS
Mandatory Courses					
ES 401	Fundamentals of Atmospheric Physics and Meteorology	60	3	42	10
ES 402	Climatology	60	3	42	10
Track Mandatory Courses					
ES 406	Atmospheric Chemistry and Biology (AST)	60	3	42	10
ES 407	Atmospheric Measurement Techniques (AST)	60	3	42	10
ES 408	Dynamic Meteorology (MT)	60	3	42	10
ES 409	Synoptic Meteorology (MT)	60	3	42	10
Elective Courses					
ES 416	Atmospheric Modelling	60	3	42	10
ES 417	Hydrology and the Atmosphere-Water Cycle	60	3	42	10
ES 418	Aerosol Physics and Chemistry	60	3	42	10
ES 419	Climate Change: Concepts and Perspectives	60	3	42	10

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

Detailed course descriptions can be found on the Cyl website

Simulation of Dust Emission and Transport over Europe and the Mediterranean in September 2015 by The Cyprus Institute Atmospheric & Climate Modelling Group. Imagery produced by VAPOR, a product of the Computational Information Systems Laboratory at the US National Center for Atmospheric Research (NCAR).

Course Descriptions

MANDATORY COURSES

ES 401

Fundamentals of Atmospheric Physics and Meteorology

The course aims to provide: foundation for the physical aspects of the atmosphere and weather, with an emphasis in the lower part of the atmosphere; description of the atmospheric composition and structure; presentation of the main processes in the atmosphere including, heat exchange, radiation, air motion and related manifestations such as air temperature, cloud formation, precipitation, wind patterns, weather systems.

Course Content

- Introduction and fundamental concepts
- Atmospheric thermodynamics
- Radiation
- Clouds and precipitation
- Elements of atmospheric dynamics and weather
- Atmospheric boundary layer

ES 402

Climatology

The course aims to provide: representation of climate in a statistical and physical sense; description of the associated atmospheric motions, radiative and thermodynamic processes; discussion of the causes of climatic variations; classification of climates regionally; methods for statistical and graphical depiction of climate aspects; brief history of the climate evolution; examples of climate types and climatology disciplines.

Course Content

- Concepts of climate and climatology
- Physical climatology
- Dynamic and synoptic climatology
- Statistical climatology
- Other climatological concepts

TRACK MANDATORY COURSES

ES 406

Atmospheric Chemistry and Biology (AST)

The course aims to provide: chemical principles applied to the study of atmospheres; atmospheric photochemistry and kinetics; introduction to thermodynamics, radical reactions, chemical lifetime determinations, acid rain, greenhouse effects, ozone cycle, and evolution are discussed. Emphasis is given on topics of current scientific / societal interest, related to the effects of human activity on air quality and climate: chemistry of urban air, particulate matter, biogeochemical cycles, and chemistry-climate coupling.

Course Content

- The structure and composition of atmosphere
- Energy balance of the atmosphere
- Thermodynamics
- Kinetics and reaction rates
- Atmospheric oxidants and radicals (photochemistry)
- Ozone formation (tropospheric chemistry)
- Stratospheric chemistry-ozone hole
- Atmospheric fate of organic air pollutants compounds
- Atmospheric inorganic compounds (N and S cycle)
- Characterization of chemical structure of atmospheric chemical species
- Structure-reactivity relationship to predict atmospheric oxidation
- Interactions between atmospheric composition and the biosphere
- Aerosols, including biogenic particles

ES 407

Atmospheric Measurement Techniques (AST)

The course aims to provide: scientific and technical knowledge applied to the experimental characterization of the atmosphere; operating principle of air quality instrumentation, including on-line in-situ atmospheric sensors for aerosol chemical / physical / optical properties; laboratory techniques for environmental analyses of trace elements (ions, carbon, trace metals, trace organics). The course also provides hands-on training in the Cyl analytical and instrumentation laboratories and at the Cyprus Atmospheric Observatory (calibration, operation); data processing and interpretation.

and interpretation.

Course Content

- Air Pollution Sources and Properties, Fundamental (Lecture)
- Air Quality Measurement Techniques, Fundamental (Lecture)
- Aerosol & Gas Measurement Techniques, Fundamental Part I (Lecture)
- Aerosol & Gas Measurement Techniques, Fundamental Part II (Lecture)
- Aerosol Measurement Techniques, Hands-on Part I (Field)
- Aerosol Measurement Techniques, Hands-on Part II (Field)
- Gas Measurement Techniques, Hands-on (Field)
- Miniaturized Aerosol Instrumentation, Hands-on (Lab)
- Miniaturized Aerosol Instrumentation, Hands-on (Field, UAV)
- Analytical Techniques in Environ. Chem., Part I (Fundamental, Lecture)
- Analytical Techniques in Environ. Chem., Part II (Fundamental, Lecture)
- Analytical Techniques in Environ. Chem., Part III (Fundamental, Lecture)
- Ion Chromatography (Hands-on, Lab)
- GC-MS, Part I, Sample Preparation (Hands-on, Lab)
- GC-MS, Part II, Analysis and Interpretation (Hands-on, Lab)

ES 408

Dynamic Meteorology (MT)

The course aims to provide the principles of dynamics and kinematics of the atmosphere and familiarize the students with the synoptic-scale weather systems and their evolution in terms of the respective governing equations.

Course Content

- Equations of Motion
- Equations of State and Continuity
- Hydrostatic Balance
- Geostrophic and Ageostrophic Flow
- Gradient Wind
- Quasi-geostrophic Theory
- Divergence and Vorticity
- Potential Vorticity
- Thickness and Thermal Wind
- Atmospheric Energetics – Energy Cascading

ES 409

Synoptic Meteorology (MT)

The course aims to familiarize the students with the synoptic-scale weather systems and their evolution.

Course Content

- Atmospheric Synoptic-Scale Systems
- Air Masses
- Atmospheric Waves
- Atmospheric Circulation
- Hadley and Ferrel Cells
- Intertropical Convergence Zone – ITCZ
- Monsoons
- Extratropical Cyclones – Cyclogenesis
- Fronts – Frontogenesis
- Upper-Air Circulation
- Jet Streams
- Tropical cyclones

ELECTIVE COURSES

ES 416

Atmospheric Modelling

The course covers in detail numerical methods, formulation and parameterizations used in models of the circulation of the atmosphere. Emphasis is given on widely used numerical methods, but emerging concepts and new methods are also reviewed. The numerics underlying a hierarchy of models will be discussed, ranging from simple GFD models to the high-end GCMs with atmospheric chemistry. Parameterizations of convection and large scale condensation, the planetary boundary layer and radiative transfer will be reviewed.

Course Content

- Introduction to Atmospheric Modelling
- Governing Equations and Assumptions
- Programming Numerical Solutions to the Equations
- Spectral Models
- Physical-process Parameterizations
- Boundary Conditions
- Data Assimilation
- Experimental Design in Model-based Research
- Atmospheric Predictability and Ensemble Forecasting
- Atmospheric Chemistry Modelling
- Coupled Special-applications Models
- Climate Modelling and Downscaling
- Post-processing Enhancement of Model Data

ES 417**Hydrology and the Atmosphere-Water Cycle**

The course aims to provide: knowledge on the hydrologic cycle and the atmosphere; understanding of hydrologic processes and water resources management; the capacity to apply hydrologic field and laboratory equipment and equations to measure and model hydrologic processes.

Course Content

- The hydrologic cycle and the atmosphere
- Precipitation
- Infiltration and soil water processes
- Evapotranspiration
- Surface runoff
- Stream flow
- Groundwater
- Water resources management

ES 418**Aerosol Physics and Chemistry**

The objective of the course is to provide the fundamental aspects of aerosol science and technology, with a strong emphasis on atmospheric aerosols. Starting with the basic concepts of aerosols and how to express their key properties (i.e., concentration, size, morphology and density of aerosol particles), the course will provide the basic knowledge for understanding a range of atmospheric processes involving aerosol particles including their interaction with water vapor and their formation from species in the gas phase (i.e., nucleation).

Course Content

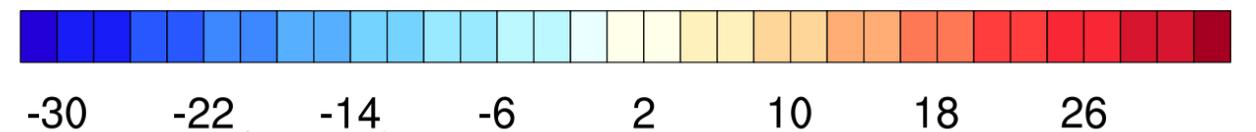
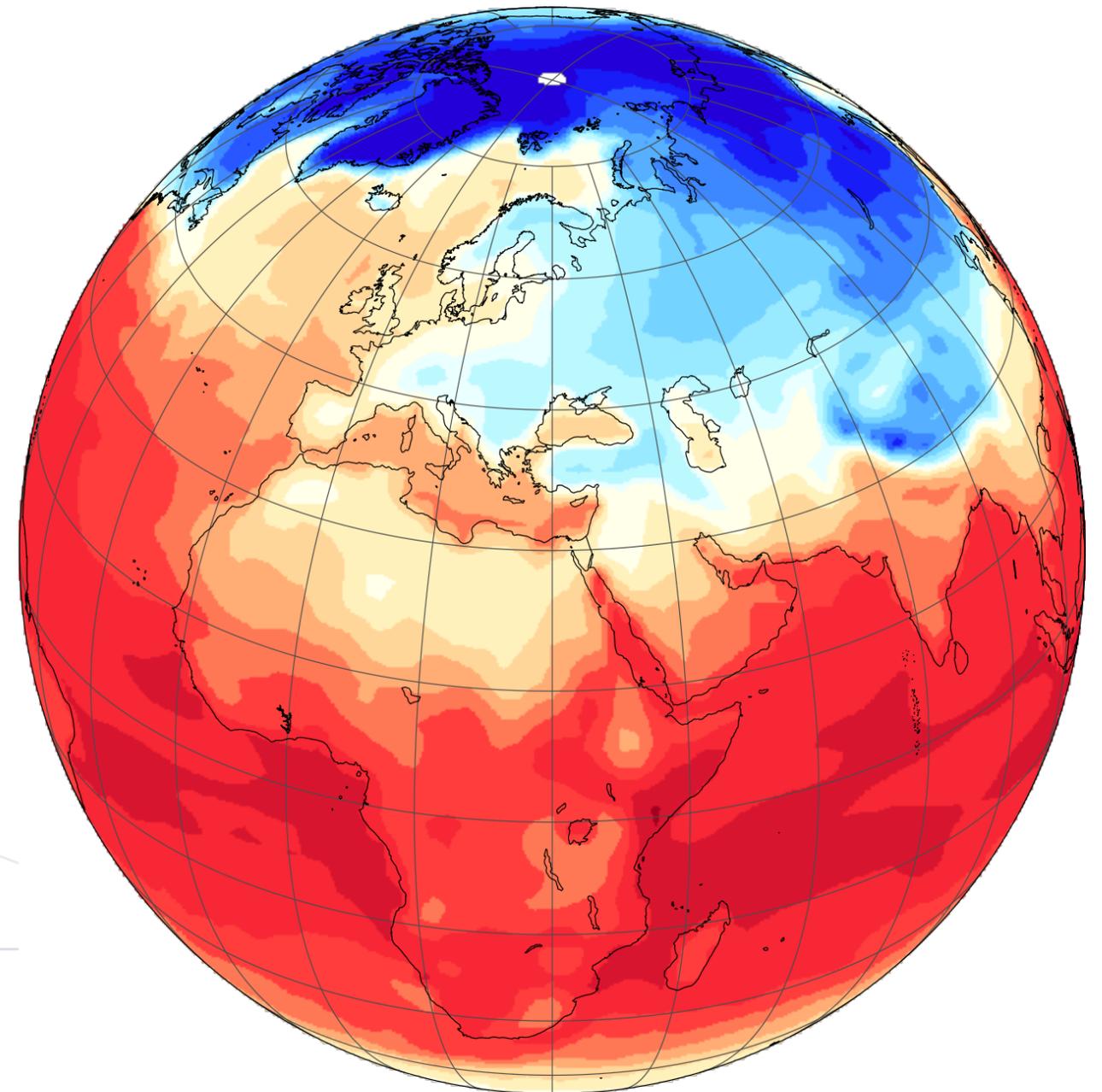
- Introduction and fundamental concepts
- Uniform particle motion
- Accelerated and curvilinear particle motion
- Particle size statistics
- Brownian motion and diffusion
- Sampling and concentration measurements
- Aerosol thermodynamics
- New particle formation

ES 419**Climate Change: Concepts and Perspectives**

The course aims to provide: overview of the climate change science history; presentation of the radiatively relevant atmospheric gases and aerosols; discussion of other human related or natural climate forcing; survey of the observed changes in the climate system; exploration of climate models ability to represent climate; methods of detecting and attribution climate change; results and insights of global and regional climate projections.

Course Content

- Historical overview of climate change science
- Changes in atmospheric constituencies and radiative forcing
- Observations of climate variables changes
- Climate models and their evaluation
- Understanding and attributing climate change
- Global climate projections
- Regional climate projections



mean surface temperature [C°]

The plot depicts a numerical weather forecast using output from the WRF/Chem regional climate model, which utilizes computational resources on The Cyprus Institute's Cy-Tera supercomputer. The shaded contours correspond to the near surface temperature field (in deg. C), the blue-line contours show the sea level pressure (in hPa) and the 10m-wind velocity (in kn) is represented by wind barbs.

MSc Simulation and Data Science

This is a unique course in Cyprus that 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 modelling and simulation, machine and deep learning approaches, students will learn to use modern computers to gain new insights in a diverse area of applications.

Program graduates can pursue a career as computational and data scientists in physical sciences, life sciences, environmental sciences, health, medicine, digital humanities and market modelling. They can also continue their studies at the PhD level either in Cyprus or abroad. In particular, graduates of the program can be admitted to the PhD in Computational Sciences of The Cyprus Institute.

PROGRAM OVERVIEW

MSc Program (90 ECTS) 12 MONTHS	
Term 1	ECTS
3 Mandatory Courses	10 10 10
Term 2	ECTS
1 Mandatory Course	10
2 Elective Courses	10 10
Term 3	ECTS
Research Research Project Report Submission Viva	30
Total (ECTS)	90

Course Code	Course Title	Period Duration (in minutes)	Periods (per week)	Periods (per semester)	ECTS
Mandatory Courses					
SDS 401	Mathematical Modeling and Algorithms	60	4	56	10
SDS 402	Introduction to High Performance Computing	60	4	56	10
SDS 403	Fundamentals of Data Science and Statistics	60	4	56	10
SDS 404	Machine Learning and its Applications	60	4	56	10
Elective Courses					
SDS 416	Visualization and Advanced Data Structures	60	4	56	10
SDS 417	Advanced Computer Architectures	60	4	56	10
SDS 418	Deep Learning Approaches	60	4	56	10
SDS 419	Modeling and Simulation for Scientific Applications	60	4	56	10

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

Detailed course descriptions can be found on the Cyl website

Course Descriptions

MANDATORY COURSES

SDS 401

Mathematical Modeling and Algorithms

The course will introduce mathematical tools and algorithms used in computational sciences focusing on methods used in numerical simulation and data analysis. The course will equip students with core techniques behind efficient methods to find numerical solutions to differential equations, iterative techniques to solve large, sparse linear systems, introduce modeling of real systems via partial differential equations and how to solve them numerically using examples from physical science and engineering domains.

Course Content

Linear algebra review, numerical differentiation and integration of functions, direct methods for linear system, nonlinear sets of equations, polynomial interpolation and extrapolation, sorting algorithms, fast Fourier transform. Introduction to the theory of partial differential equations (PDEs), and methods of solving linear and non-linear PDEs. Students will also learn how to solve equations that come from the world of physics and other sciences.

SDS 402

Introduction to High Performance Computing

The course will provide the students with the necessary computer programming and software engineering background to solve complex problems by numerical methods. The course will also introduce the basic concepts in high performance computing (HPC), modern computer architectures, optimization strategies and parallel programming. Cluster, grid and cloud computing will be introduced.

Students will develop the skills necessary to write their own codes, and will be trained in common practices used to implement numerical methods in software. They will learn high-performance computing techniques, and the utilization of multiprocessing and multithreading. Students will also develop an understanding of the landscape of HPC architectures and an overview of how such machines are utilized.

Course Content

Programming for numerical methods:

Introduction to programming. Example implementations of common numerical algorithms. Introduction to parallel programming. Basics of programming parallel computers including distributed (MPI) and shared memory (OpenMP) programming.

HPC architectures and parallel computing:

Introduction to HPC architectures and the landscape of supercomputer technologies. Distributed and shared memory architectures and their programming paradigms.

SDS 403

Fundamentals of Data Science and Statistics

Introduce students to data science, big data analysis and statistics. This includes a focus on statistical methods for data scientists, including random variables, probability theory, continuous and discrete distributions, inference, estimation, hypothesis testing and statistical significance. To develop a set of practical skills and tools in terms visualizing, exploring, storing and processing data, and an introduction to cluster-computing frameworks (Hadoop, Spark).

Course Content

Introduction to Statistics and Statistical Learning:

Linear algebra review; statistics for data science; probability, random variables, correlation and causation, common probability distributions. Statistical inference; estimation, hypothesis testing and statistical significance; introduction to Bayesian methods, regression, classification and time-series analysis.

Data Programming and Big Data Analysis:

Numerical tools and libraries for managing and analysing data of various types. Exploratory data analysis and visualization. Data structures for manipulating and storing data. Data collection, standardization and analysis; introduction to cluster-computing frameworks (Hadoop, Spark).

SDS 404

Machine Learning and its Applications

The aim of this course is to provide a broad introduction to students on both theoretical as well as practical concepts in machine learning, data mining and pattern recognition. Topics include fundamental machine learning concepts and algorithms, such as supervised learning (parametric and non-parametric algorithms, classification and regression, discriminative and generative learning), unsupervised learning (clustering, dimensionality reduction, data imputation), and learning theory (bias-variance tradeoff, curse of dimensionality).

The course will also include an introduction to deep learning, practical advice for designing machine learning systems, as well as an overview of modern scientific applications of machine learning and data mining (e.g., classification of omics data and applications in biology, object detection and human behaviour analysis, weather forecasting).

Course Content

Introduction to Machine Learning and Data Mining: Supervised learning (parametric and non-parametric algorithms, classification and regression, discriminative and generative learning), unsupervised learning (clustering, dimensionality reduction, density estimation, data imputation), learning theory (bias-variance tradeoff, curse of dimensionality). Exploration of linear and non-linear learning (kernel methods, neural networks). Introduction to reinforcement learning. Introduction to deep learning (convolutional, recurrent networks, adversarial learning).

Machine Learning Applications:

Practical advice for designing machine learning systems (e.g., for big data, combining heterogeneous data sources, on-line learning). Students will carry out practical data-driven projects, utilizing data science tools in scientific applications such as biology (classification of omics data and sequence analysis), computer vision

(human sensing, facial image analysis, object detection), physics (Ising model phase transitions), energy (solar forecasting) and weather modelling (daily rainfall, weather forecasting).

ELECTIVE COURSES

SDS 416

Visualization and Advanced Data Structures

Train students in managing large data sets of various forms, understand their structure and common methods to manipulate them and apply techniques for their visualization. Applications from computational sciences will be used as a demonstration of visualization of scientific data.

Students will learn to identify the various types of data, efficiently structure the data and identify features in the data via appropriate analysis and visualization.

Course Content

Data collection and management:

Scientific data models and formats, structured and unstructured data, data management, classification, queries, mapping and transforming data, annotations and assigning meta-data.

Data visualization:

Visualization and plotting packages, methods for visualizing large datasets, geo-spatial and temporal data visualization, interactive and real-time visualization, 3D visualization, contouring and isosurfaces, visualization of vector fields.

Applications from Computational Sciences:

Hands-on visualization examples from computational science applications.

SDS 417

Advanced Computer Architectures

To advance understanding of High Performance Computing architectures and teach students to design and optimize algorithms suitable for best performance.

Students will be taught how to benchmark parallel applications and implement optimization strategies taking into account the underlying computing architecture.

Course Content

Advanced HPC architectures:

Features of modern HPC hardware including node designs, interconnects, accelerators and multi-core CPUs. Interactions between software performance and the system. Algorithms to make use of particular hardware constraints.

Advanced parallel programming and optimisation:

Advanced techniques for programming multi-core computers, programming models (Shared memory and MPI), issues arising from parallel I/O, portable data formats, advanced MPI programming, advanced OpenMP programming, floating-point and memory optimizations (vector intrinsics, memory storage layouts), accelerator programming (GPUs, Xeon Phi). Methods to analyse the performance of large-scale numerical software on parallel computers, models describing the scaling features of software, comparison to real performance data from multi-core systems.

Applications: As demonstration of the methodology these techniques will be applied to examples from the physical sciences and engineering by engaging the appropriate experts and utilizing existing optimized libraries.

SDS 418

Deep Learning Approaches

To teach students the theoretical concepts on deep learning and how to implement and use them to automatically extract features from data and build prediction models for several applications. Methods covered include feedforward, convolutional, recurrent and recursive networks.

Students will learn the fundamentals, implement and use deep learning methods for a wide range of applications such as object recognition in images, anomaly detection, pattern recognition in omics (e.g., genomics) data, medical diagnosis, etc.

Course Content

- **Neural networks:**
Feedforward networks, radial basis function networks, recurrent neural networks, modular neural networks
- **Deep learning neural networks:**
Feedforward networks (autoencoders, restricted Boltzmann machines), convolutional networks, recurrent networks (long short-term memory), recursive networks (recursive autoencoders, recursive neural tensor networks)
- Usage and hands on experience of state of the art libraries for Deep Learning

SDS 419

Modeling and Simulation for Scientific Applications

To teach students to use simulation algorithms and to analyze their results in order to study complex systems.

The students will be able to use state-of-the-art supercomputers to perform simulations of real life applications.

Course Content

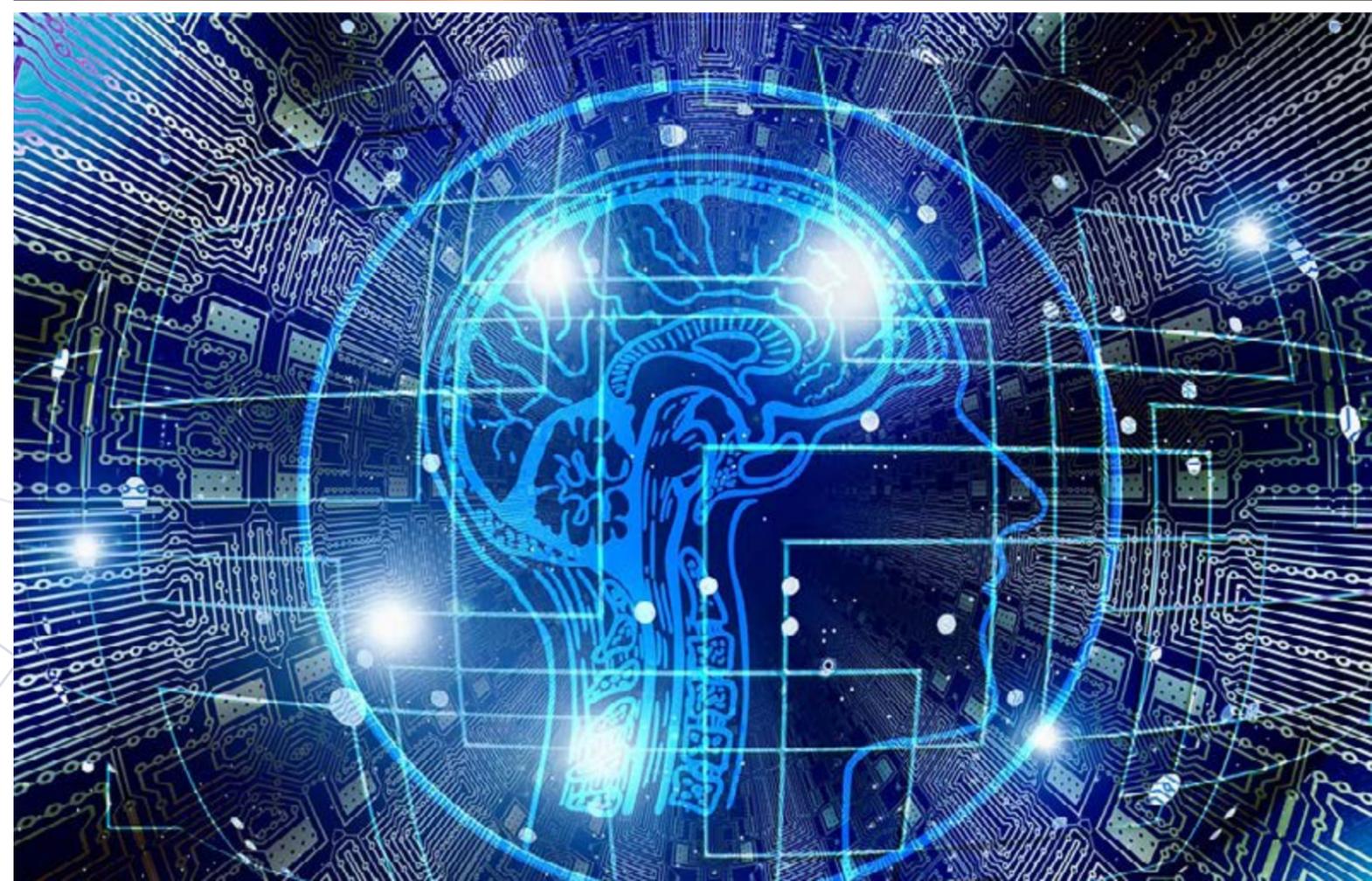
Iterative solvers for linear systems:

Iterative methods for solving systems of equations and eigenvalue problems, Krylov subspace methods including Conjugate Gradient, Lanczos and Arnoldi methods and preconditioners including deflation and multi-grid.

Statistical methods and sampling:

Importance sampling, Markov Chain Monte Carlo, Metropolis algorithm and autocorrelation analysis, molecular dynamics. These concepts will be applied to practical applications, such as the Ising model, and water models.

The course will consist of exercises and a project worked out in groups. Each group will have to give a talk on the methodology and the results.





Doctoral Programs

The Cyprus Institute currently offers three PhD programs:

- Computational Sciences PhD
- Energy, Environment and Atmospheric Sciences PhD
- Science and Technology in Archaeology and Cultural Heritage PhD

All of our PhD programs are evaluated and accredited by the Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CYQAA) and adhere to the Bologna Process third cycle degrees. The Institute uses the European Credit Transfer and Accumulation System (ECTS). English is the language of instruction and communication for all programs offered.

The PhD programs are full-time, 3-year programs, structured in six semesters. Students may apply to enter the program either at the beginning of the Fall or the Spring semester. A part time program path is also offered to accommodate PhD students that are not able to study on a full-time basis, typically due to being employed in a related field.

To satisfy the requirements of the program, students require a total of 180 ECTS, of which 160 ECTS derive from research and 20 ECTS derive from the taught component. For the taught component, students need to attend one mandatory course which is general and covers the different research activities that are related to the program and one or two elective courses (worth 10 ECTS) out of large interdisciplinary pool of advanced and specialized courses. Through the integration of the curricula of the programs, interdisciplinarity is greatly enhanced.

At the end of the first year the students need to successfully complete the Advancement to Candidacy Examination. Towards the end of their studies they need to submit their PhD thesis and successfully complete the PhD Defense Examination.

GENERAL SCHEDULE OF PhD PROGRAMS

Course Requirements Component (20 ECTS)		
Year 1 Fall Semester	1 Mandatory Course (10 ECTS) during Year 1	1 or 2 Elective Courses (10 ECTS)
Year 1 Spring Semester		
Year 2 Fall Semester		
Year 2 Spring Semester		
Year 3 Fall Semester		
Year 3 Spring Semester		

Research Component (160 ECTS) Research conducted throughout the program	
Year 1 Fall Semester	
Year 1 Spring Semester	End of Year 1: Comprehensive Examination
Year 2 Fall Semester	
Year 2 Spring Semester	
Year 3 Fall Semester	
Year 3 Spring Semester	End of Program: Doctoral Examination*

* Before the student can defend their PhD thesis, they must have successfully completed their coursework, completed the Comprehensive Examination and have submitted two scientific publications (one submitted, one accepted) in appropriate for each doctoral program international journals.

The information provided in the table above is indicative

PhD Computational Sciences

The program aims at providing highly interdisciplinary training to educate researchers to use advanced computational and data methodologies to solve complex scientific, and engineering problems. It provides a unified approach to modelling, high performance computing and data science and artificial intelligence-based approaches. Through modelling, simulation, machine learning and the study of specific phenomena, the program delivers cross-disciplinary knowledge but also domain-specific depth in fields like computational fundamental physics, climate modelling, computational fluid dynamics, computational biology, materials science, computational economics and digital cultural heritage.

Course Code	Course Title	Period Duration (in minutes)	Periods (per week)	Periods (per semester)	ECTS
Mandatory Courses					
COS 500	Frontiers & Methodologies in Computational Sciences	60	3	42	10
Elective Courses					
COS 504	Simulations for Physical Systems	60	3	21	5
COS 506	Quantum Computing for Physical Systems	60	3	21	5
COS 510	Computational Approaches for Complex Molecular Systems	60	3	21	5
COS 514	Advanced Topics in Computational and Mathematical Biology	60	3	21	5
COS 518	Climate Modelling	60	3	21	5
COS 522	Computational Methods for Quantum Field Theories	60	3	21	5
COS 524	Large-scale Simulations for Lattice Quantum Chromodynamics	60	3	21	5
COS 528	Computational Fluid Dynamics - Finite Difference and Volume of Fluid Methods	60	3	21	5
COS 530	Computational Fluid Dynamics - The Lattice Boltzmann Method	60	3	21	5

Doctoral students also have the choice to select elective courses from an interdisciplinary pool of specialized and advanced courses with content that spans across all thematic areas available through all Graduate School programs (see courses offered for all other degree programs).

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

More information about the program can be found on the Cyl website

Time evolution of massive halo merger. Created by The Medical Imaging Group of The Cyprus Institute.

Course Descriptions

MANDATORY COURSES

COS 500 **Frontiers & Methodologies in Computational Sciences**

The course objective is to expose students to frontier research in High Performing Computing, Data Science Methodologies and Artificial Intelligence on a seminar-based structure. It aims to train students to overview the literature connected to a research of their interest, to read and understand research articles and to present them to their peers. Students will develop their communication skills, share their findings with their peers and develop awareness on a range of relevant topics, including: evaluating new algorithms and methodologies, code optimization and data-management strategies, novel computing architectures, application of HPC and machine/deep learning in solving complex problems from physics, biology, chemistry, finances and engineering.

ELECTIVE COURSES

COS 504 **Simulations for Physical Systems**

The course aims at teaching students to apply high-performance computing and data analysis approaches to solve complex physical systems. Students will learn to handle a range of applications from condensed matter and biophysics to particle and nuclear physics.

COS 506 **Quantum Computing for Physical Systems**

The goal of the course is to provide a basic introduction to quantum computing and quantum information theory. Students will learn essential theoretical concepts in the field as well as algorithmic approaches with a focus on the circuit model of quantum computation.

COS 510 **Computational Approaches for Complex Molecular Systems**

The students will learn fundamental techniques of molecular, primarily classical, simulations (Monte Carlo and Molecular Dynamics), which are used in order to understand and predict properties of microscopic systems in materials science, physics, biology, and chemistry. All students will obtain experience on multi-scale modelling, as well as on synergistic approaches

between simulations and data analytics methods. A simulation project composed of scientific research, algorithm development, and presentation is required.

COS 514 **Advanced Topics in Computational and Mathematical Biology**

The course deals with advanced topics in modern computational biology focusing on “omics” technologies, computational analysis tools of biological data and mathematical modelling. Its purpose is to equip students that embark on PhD studies in areas related to biology with the basic knowledge and awareness of advanced concepts and techniques in specific topics, which would allow them to progress in their studies. It aims at introducing, on the one hand, students from diverse but not Biology BSc and MSc backgrounds to biological concepts, data and methods and, on the other hand, students from Biology BSc and MSc backgrounds to core mathematical and programming skills.

COS 518 **Climate Modelling**

This course deals with the numerical methods, formulation and parameterizations used in models of the circulation of the atmosphere. Widely used numerical methods will be addressed, as well as novel approaches in connection with emerging novel computer architectures and programming models. Its purpose is to equip students that embark on PhD studies in areas related to atmospheric and climate modelling with the basic knowledge and awareness of advanced concepts and techniques in specific topics, which would allow them to progress in their studies. It aims at introducing students from diverse physical sciences and engineering backgrounds to modelling concepts, data and methods.

COS 522 **Computational Methods for Quantum Field Theories**

The purpose of the course is to equip students with the necessary skills for carrying out research involving simulations of quantum field theories. The course will teach PhD students to use state-of-the-art computational methods for simulating and studying quantum field theories. Lectures introducing the methodologies will be followed by hands-on practical training, requiring students to develop their own codes, obtaining data from the simulations, and performing statistical analysis.

COS 524 **Large-scale Simulations in Lattice Quantum Chromodynamics**

The purpose of the course is to equip students with the necessary skills for carrying out large-scale simulations of physical systems, with focus on lattice gauge theories such as lattice Quantum Chromodynamics (QCD). The course will train PhD students to use state-of-the-art computational facilities and parallel software to study challenging physical systems such as those described by quantum fields and gauge theories. With focus on preparing PhD students for a research carrier in lattice Quantum Chromodynamics and related subjects, the course will include lectures and practical hands-on training with Hybrid Monte Carlo techniques, sparse linear solvers including Krylov methods, and noise reduction techniques.

COS 528 **Computational Fluid Dynamics – Finite Difference and Volume of Fluid Methods**

The aim of the course is to introduce students to numerical techniques for the simulation of complex fluid flows. Starting from an overview of the various formulations and model equations that govern the motion of fluids, the course will focus primarily on finite difference and finite volume methods. Through computer tutorials, students will be exposed in open source CFD software as well as develop their own. The course targets students that have some background in the numerical solution of partial differential equations and scientific computing, but prior knowledge in fluid dynamics is not necessary.

COS 530 **Computational Fluid Dynamics – The Lattice Boltzmann Method**

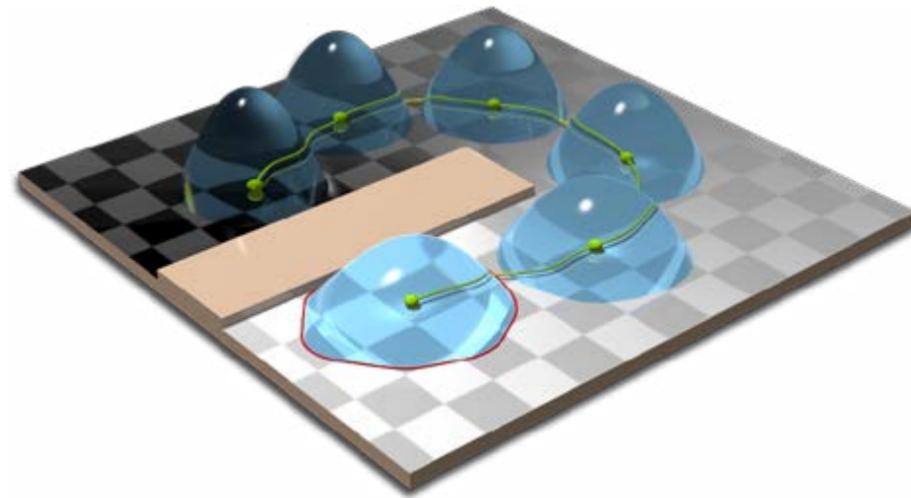
The Lattice Boltzmann method (LBM) is rapidly evolving as one of the popular numerical approaches for modelling complex fluid flows. One of its key advantages is that it is naturally massively parallel compared to more traditional methodologies and it has proved to be rather successful at modelling flows in complex geometries, multiphase flows and interfacial dynamics. The course aims to provide a concise overview of the theoretical foundations of the method, as well as expose students to the practical implementation aspects of the method through a series of hands-on laboratory sessions where they be able to develop their own LBM; practical issues about implementation and performance will also be discussed.



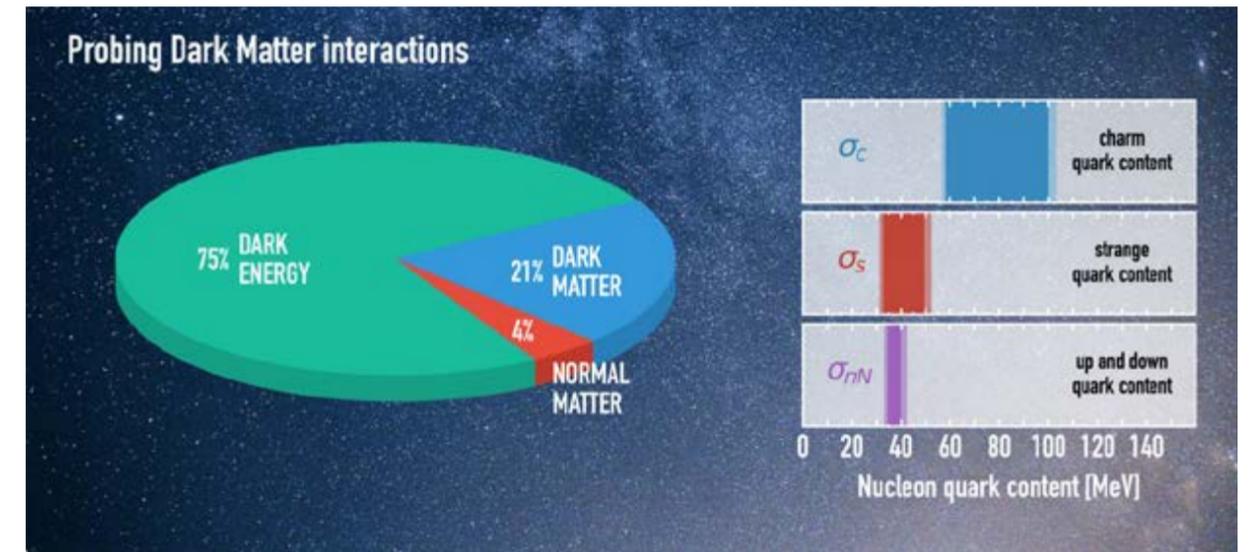
Christos Kallidonis
PhD in Computational Sciences
Current Position:
Senior Scientific Software Engineer
Accuray, Inc.
Solon, Ohio, USA

“The time I spent during my PhD at The Cyprus Institute was certainly the most productive period of my life. The Institute’s exciting and dynamic environment, in combination with excellent professors, provides all opportunities for a standout PhD.

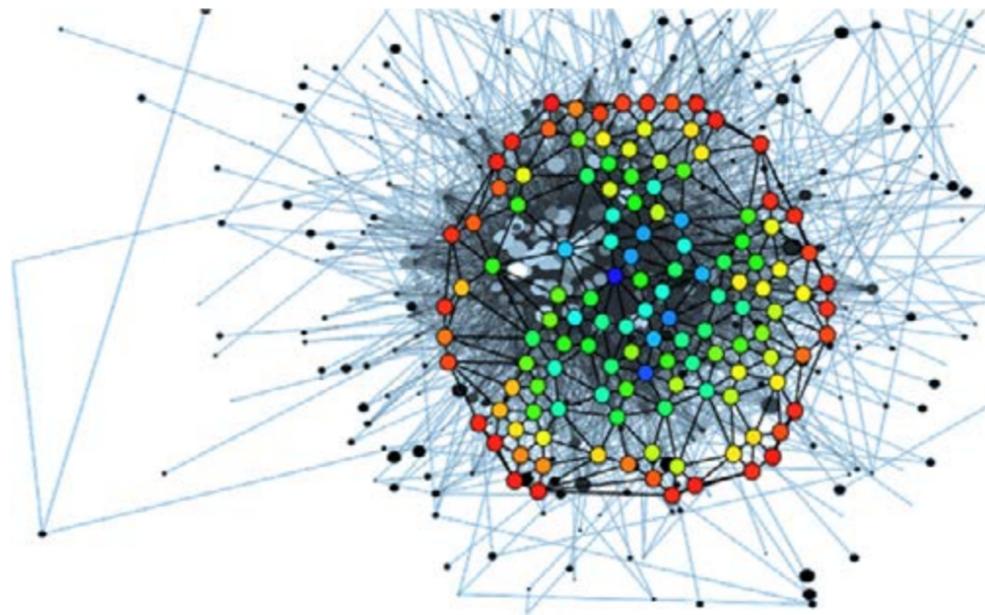
I would recommend The Cyprus Institute to anyone looking to conduct world-class scientific research.”



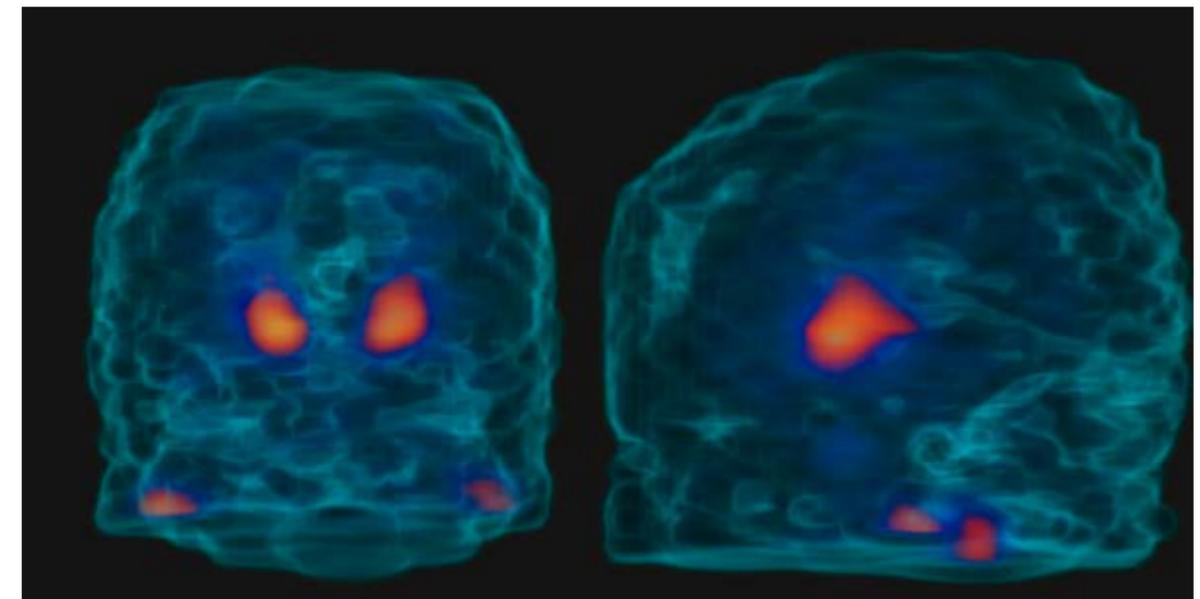
CFD simulation of droplet transport on a chemically patterned substrate, showing snapshots of a droplet as it migrates from less wettable (darker-shaded) to more wettable (lighter-shaded) regions. The red curve marks the position of the droplet at equilibrium.



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.



Machine Learning and Neural Networks.



Single Photon Emission Computed Tomography (SPECT) images of the brain obtained from a patient with Parkinson's Disease. The 3D reconstruction of data was extracted by using the Athens Model Independent Analysis Scheme.

PhD Energy, Environment and Atmospheric Sciences

The program promotes research excellence and educates students on the scientific frontiers and advanced methodologies at the vanguard of interconnected issues related to Climate and Atmospheric Sciences, Energy, Hydrology, Sustainable Built Environment and Sustainable Policy. It encompasses both basic research and the development of technologies and innovations. Particular attention is given to the EMME (Eastern Mediterranean and Middle East) regional background in the context of global climate changes, addressing impacts and possible mitigation and adaptation strategies.

Course Code	Course Title	Period Duration (in minutes)	Periods (per week)	Periods (per semester)	ECTS
Mandatory Courses					
EAS 500	Fundamentals, Frontiers, and Methodologies in Environmental Sciences, Renewable Energy and Sustainable Built Environment	60	3	42	10
Elective Courses					
EAS 511	Monitoring and Modelling Terrestrial Ecosystems and Hydrologic Processes	60	3	21	5
EAS 513	Terrestrial Ecosystems	60	3	21	5
EAS 515	Renewable Energy Sources	60	3	21	5
EAS 518	Energy and the Built Environment	60	3	21	5
EAS 521	Energy Systems Analysis and Modelling	60	3	21	5
EAS 522	Energy and Environmental Policy	60	3	21	5
EAS 523	Interactive Visualisation of the Built Environment	60	3	21	5
EAS 524	Design, Modelling and Optimization of CST Power Plants	60	3	21	5

Doctoral students also have the choice to select elective courses from an interdisciplinary pool of specialized and advanced courses with content that spans across all thematic areas available through all Graduate School programs (see courses offered for all other degree programs).

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

More information about the program can be found on the Cyl website

Course Descriptions

MANDATORY COURSES

EAS 500 Fundamentals, Frontiers, and Methodologies in Environmental Sciences, Renewable Energy and Sustainable Built Environment

Purpose

The course will provide a comprehensive overview of the scientific frontiers and advanced methodologies at the vanguard of Climate and Atmospheric Sciences, Solar Energy, Hydrology, and Sustainable Built Environment. Particular reference will be given to the regional (Eastern Mediterranean and Middle East) background in the context of global climate changes, addressing impacts and possible mitigation and adaptation strategies. Advanced methodologies will be illustrated by the research and innovation thrusts currently pursued within The Cyprus Institute CARE-C (Climate and Atmosphere Research Centre) and EEWRC (Energy, Environment and Water Research Centre).

They will cover (i) Numerical modelling, simulations and predictions, (ii) Atmospheric measurement techniques, (iii) Experimental and modelling tools in Hydrology, (iv) Modelling of Energy Systems in general and of Renewable Energy System (RES) in particular, and (v) Advanced concepts of sustainability and sustainable built environment development (thermal comfort and energy performance using experimental tools and computer models).

Objective

The objective of the course is to familiarize the students with important concepts and the latest results coming from a variety of interconnected disciplines related to the Environment, Energy, and Built Environment. The aim of this course is to create a common understanding of these issues among the participants. The course will include introductions into techniques of independent scientific investigations from the planning to the publication and dissemination stage. It will also provide opportunities for the students to get actively engaged through presentations and reviews of literature provided throughout the course.

ELECTIVE COURSES

EAS 511 Monitoring and Modelling Terrestrial Ecosystems and Hydrologic Processes

Purpose

Mediterranean ecosystems have adopted various strategies and mechanisms to survive and thrive in a water-limited environment. We still have incomplete knowledge about a wide range of hydrologic and ecosystems processes, from leaves to watersheds in semi-arid environments. A good understanding of terrestrial hydrologic and ecosystems processes starts with observing, monitoring and measuring. This course reviews terrestrial hydrological processes, water fluxes between soil, plant and atmosphere, and plant responses to environmental variables. Soil-plant-water relations and characteristics will be measured and analyzed in the field and in the laboratory, using state of the art equipment.

Objective

This course aims to present a broad overview of terrestrial hydrologic processes and the water fluxes between soil, plants and atmosphere. The students will learn to use state of the art equipment for measuring water fluxes and plant physiological processes in the field and in the laboratory. The students will learn how to analyse field and laboratory data and compute water balances.

EAS 513 Terrestrial Ecosystems

Purpose

The development of climate adaptation options and sustainable natural resources management systems requires a solid understanding of terrestrial ecosystems. This includes the interactions between the terrestrial biosphere, hydrosphere and atmosphere, and biogeochemical cycles. This course uses an interdisciplinary framework to understand the interactions between terrestrial ecosystems and environmental processes. It reviews basic meteorological, hydrological, and ecological concepts and their mathematical formulations to examine the physical, chemical, and biological processes by which terrestrial ecosystems affect and are affected by climate.

Objective

This course aims to introduce the students to terrestrial ecosystems, their interactions with the environment and biogeochemical cycles. The students will gain a comprehensive understanding of the theoretical foundations, mathematical formulations and applications of terrestrial ecosystem models. To actively capture the new knowledge, students will work on practical exercises and apply and solve equations to describe and analyse ecosystems processes.

EAS 515 Renewable Energy Sources

Purpose

Energy systems play a critical role in the economy, but also leading role in the anthropogenic influence on the environment, climate and Earth ecosystems. The current world energy system based on the intensive use of non-renewable energy sources (coal, oil and gas) is unsustainable. An energy transition to an environmentally friendly energy system is urgently needed. Renewable energy sources are expected to play a fundamental role in the new emerging world energy system. This course provides an overview of the science and engineering of renewable energy systems. The topics addressed cover the technical and techno-economic aspects related to the development of these sources, with emphasis on wind and solar energy in the regional context of Cyprus.

Objective

The objective of the course is to train the students to use the state of the art bibliography, techniques and tools in renewable energy power generation and to create a common understanding of the technologies involved. The course will provide doctoral students with an understanding of the current structure of the world energy system, the need for the energy transition, the role that renewable energy should play in this transition. It will also provide doctoral students with an understanding of all the elements involved in the technical design, and techno-economic optimization of renewable energy systems, and expose them to state-of-the-art available tools to size, optimize and simulate the behaviour of some of those systems.

EAS 518 Energy and the Built Environment

Purpose

The course uses the concept of sustainability to frame an understanding of the built environment at the community and individual building level by investigating the interaction between the urban and the natural systems. The purpose of the course is to provide students with insights on the role of technical and non-technical issues (economic, social, ecological, ethical, philosophical, political, psychological, cultural) in shaping architectural, urban and engineering decisions. Furthermore, since the building sector is responsible for a large use of resources, over the past two decades, construction industry has been required to provide buildings that perform to increasingly higher energy performance standards. In order to tackle this challenge, the course aims at offering students the theoretical foundations and practical hand-outs on building performance simulation (BPS) to enable them demonstrating a theoretical building energy performance using computational models, which this course will cover.

Objective

The course will provide doctoral students with the advanced concepts of sustainability and sustainable built environment development. Additional emphasis is placed on the range of methods (i) to identify and select sustainable solutions to design problems; (ii) to improve existing solutions; and (iii) to stimulate critical reasoning. Students are asked to consider the many aspects of a building project, such as the economic, physical/scientific, social, psychological, historical, ethical, political, cultural and ecological aspects, and how each of these influences the others.

EAS 521 Energy Systems Analysis and Modelling

The energy transition required to achieve the global climate targets necessitates investments at an unprecedented rate. However, reaching decisions for infrastructure investments that are sustainable and cost-efficient, without compromising energy security, is not a trivial task. Energy models are simplified representations of reality, comprised of mathematical equations, with

the goal of comprehending complex interactions in a given energy system and providing policy insights. This course introduces students to energy systems analysis and the main categories of long-term energy system models. It provides advanced knowledge on a range of energy system models and helps students identify the type of model best suited to address a specific policy question. By participating in this course, students develop the technical and analytical skills required to develop an energy model and carry out an independent analysis, providing insights to policy-makers. A set of case studies is used to illustrate the real-life application of energy models to assist in national energy planning.

EAS 522 **Energy and Environmental Policy**

This course focuses on policies to manage energy resources in a world constrained by finite natural resources and global climate change. It equips students with advanced knowledge of energy and environmental topics and calculation methods, in combination with knowledge of economic principles in order to address energy and environmental management issues at different scales – firm, national and global level. The course highlights the importance of developing a long-term energy strategy, presents key indicators that are used to describe the energy system of a country or a firm and its environmental impact, provides methods and tools to calculate such indicators, and outlines policy options for improving energy efficiency and promoting green mobility. Through a number of case studies, the course will demonstrate that real-world solutions to energy and environmental challenges require a combination of economic and technological knowledge in order to address political and behavioural barriers and achieve progress towards sustainability.

EAS 523 **Interactive Visualization of the Built Environment**

Purpose

The course will introduce students to the visualization of complex phenomena, such as the impact of natural and artificial agents to the built environment, in order to understand how the performance of the latter is the result of its integration in an emergent system of parameters. The purpose of the course is to provide students insights to computer interactive visualisation and simulation of complex systems as a means to better understanding built environment's past and present conditions, as well as to speculate about possible transformations for sustainable

futures by means of data and information collected in the real world. Students will thus be able to better contextualize built environment as part of a larger, more complex (eco) system of interacting parameters. Data visualization is an essential component of planning a smart city, and researchers currently seek new methods for conducting real-time simulations. The impact analysis of "what-if scenarios" becomes ever more useful and relevant for the management of the built environment but it requires a significant amount of time and resources, and virtual reality (VR) can be used as a tool for addressing these challenges. Advanced methodologies will be illustrated by the research and innovation thrusts currently pursued within the EEWRC (Energy, Environment and Water Research Centre, Built Environment) and The Cyprus Institute Virtual Environments Lab. They will cover: (i) visualising complex phenomena in the built environment, (ii) experimental tools for modelling and interacting with built environment data, (iii) constructing Virtual Reality simulations of built environment data, (iv) analysing spatial data, (v) Advanced concepts of immersion in data for interpreting the complex performance of built environment.

Objective

The course will include introductions into techniques of independent scientific investigations from the planning to the publication and dissemination stage. It will also provide opportunities for the students to get actively engaged through presentations and reviews of literature provided throughout the course. Specifically, the objectives of the course include:

- to provide a framework for the integration and classification of state of the art on interactive data visualisation for the study of the built environment
- to reveal areas of research in the field of sustainable built environment
- to summarize issues and challenges related to interactive data visualisation for the study of the built environment, and suggest how these can be pursued
- to forecast future research and development thrusts in this area

EAS 524 **Design, Modelling and Optimization of CST Power Plants**

Purpose

Concentrating Solar Thermal (CST) Power Plants collect and concentrate solar radiation and transform it into thermal energy –typically in terms of the enthalpy increase of working fluid. The thermal energy is then either used to run a conventional power block and

generate electricity or stored as thermal energy to be used when needed for electricity generation. The capacity of CST power plants to store energy in an environmentally friendly and economically efficient way is a distinguishing characteristic and a competitive advantage of these plants. As other energy power systems that use renewable energy sources, CST power plants can make an important contribution to the mitigation of greenhouse gas emissions and to the transition to a sustainable world energy system and, as such, environmentally friendly. The purpose of the course is to familiarize the students with the underlying principles of CST power plant technologies and initiate them in their design, modelling and optimization.

Objective

The objectives of the course are to provide the doctoral students with a clear understanding of the technical and economic aspects that characterize the main CST technologies, and of the methods and trade-offs involved in their design, modelling and optimization. The course will also familiarize the doctoral students with the overall CST plant design, modelling and optimization process and expose them to state-of-the-art computer tools available to facilitate this process.



Hakan Djuma
PhD Energy, Environment
& Atmospheric Sciences

Current Position:
Postdoctoral Fellow in Hydrology
and Land Management at Cyl

"One of the most valuable aspect of the institute's PhD program was the multicultural and multidisciplinary work environment it provided. Thanks to the European projects and the in-house capacity, I have expanded my network, gained practical experience and advanced my knowledge not only in my field but also in related fields."



Marios D. Georgiou

PhD Energy, Environment
& Atmospheric Sciences

Current Position:
Senior Testing Concepts Engineer
with Philip Morris International

"The Cyprus institute provided me with a unique opportunity, through its collaboration with the University of Illinois at Urbana-Champaign, to pursue my studies at a world-class institution in the United States. The experience yielded opportunities beyond my expectations."

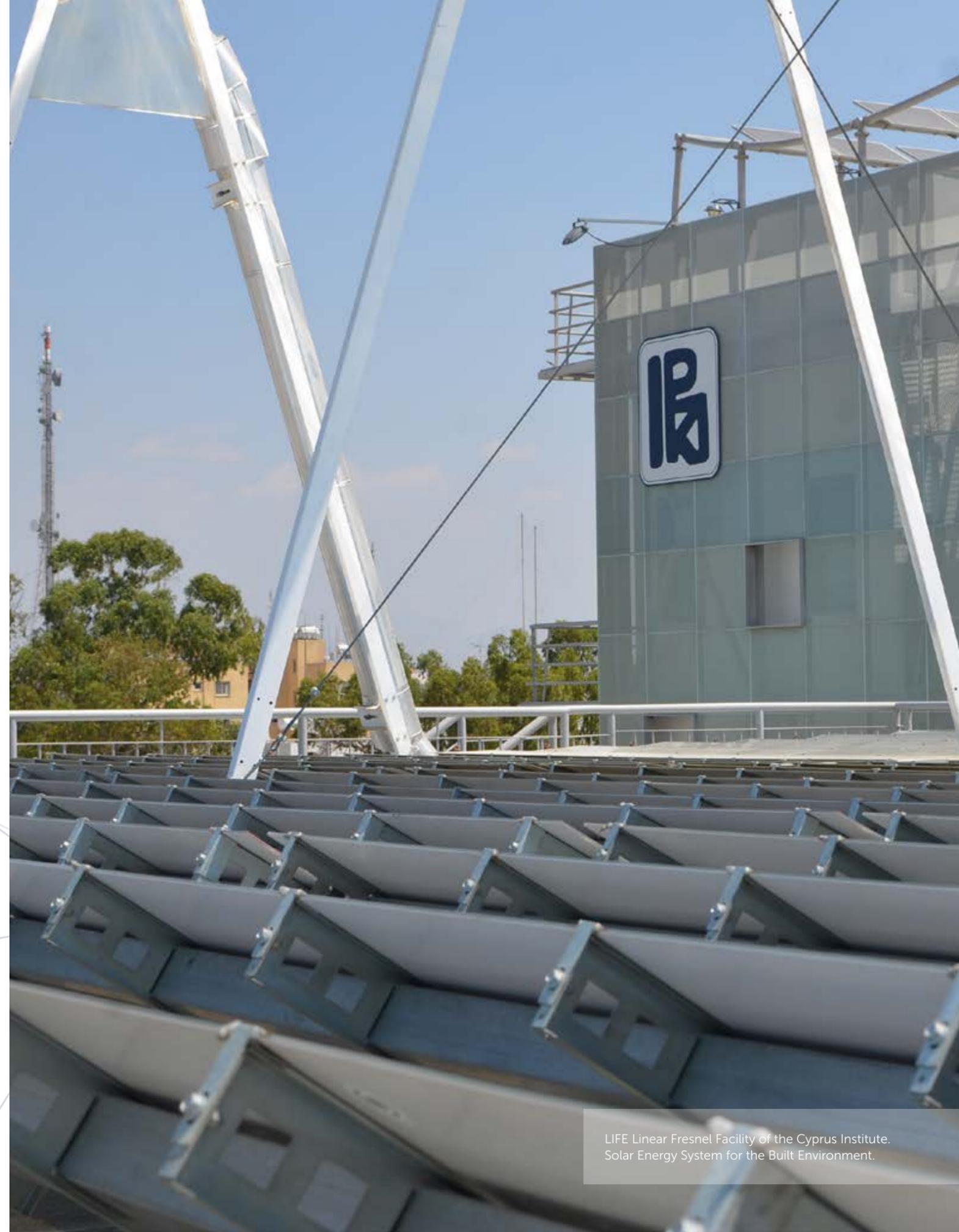


George Zittis

PhD Energy, Environment
& Atmospheric Sciences

Current Position:
Associate Research Scientist
in Regional Climate Change
Modelling, The Cyprus Institute

"I am grateful that I had the chance to meet and work with world-class experts in atmospheric and climate sciences. Besides learning from the best in my field, I further developed my skills by taking advantage of the interdisciplinary and international environment that Cyl offers."



LIFE Linear Fresnel Facility of the Cyprus Institute.
Solar Energy System for the Built Environment.

PhD Science and Technology in Archaeology and Cultural Heritage

This interdisciplinary program aims at preparing doctoral students for research careers in the broader fields of archaeology and cultural heritage based on scientific and technological methods. The program's structure and content are designed to immerse PhD candidates in research that lies at the crossroads between Science, Technology and the Humanities and the Social Sciences. It focuses in preparing students to deal with significant research problems in Cultural Heritage and Archaeology that make effective use of advances in digital technologies and scientific methods.

Course Code	Course Title	Period Duration (in minutes)	Periods (per week)	Periods (per semester)	ECTS
Mandatory Courses					
ACH 500	Frontiers and Methodologies in Science and Technology in Archaeology and Cultural Heritage	60	3	42	10
Elective Courses					
ACH 502	Advanced Methods in Archaeobotany: from the field to the interpretation of the data	60	3	21	5
ACH 504	Advanced Challenges in Archaeological Sciences	60	3	21	5
ACH 506	Advanced Research Topics in Built Heritage and Cultural Landscapes	60	3	21	5
ACH 508	Advanced Methods in Human Osteoarchaeology	60	3	21	5
ACH 509	Advanced Research Topics in Human Bioarchaeology: Contributing to Key Questions within the Archaeology of the Eastern Mediterranean and South West Asia	60	3	21	5

Doctoral students also have the choice to select elective courses from an interdisciplinary pool of specialized and advanced courses with content that spans across all thematic areas available through all Graduate School programs (see courses offered for all other degree programs).

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

More information about the program can be found on the Cyl website

*Detail from the painting of *Penitent Mary Magdalene* (ca 1607)

Course Descriptions

MANDATORY COURSES

ACH 500 Frontiers and Methodologies in Science and Technology in Archaeology and Cultural Heritage

This course aims to (a) introduce students to the wide array of cross-disciplinary research approaches and methods in the broader fields of Archaeology and Cultural Heritage, and, (b) present the range of academic and research work currently undertaken at STARC and Cyl thus encouraging participants to begin formulating their own research topic and approach.

With incoming students having a sound foundation in one discipline as demonstrated in their postgraduate degree (a Masters' in a relevant field), this course will expose students to the core integrated methods of scientific, computational, historical and humanistic research. In addition, students will be provided with the necessary knowledge and methodological approaches to pursue interdisciplinary doctoral research making the best possible use of advanced science and technology methods and tools in archaeology and cultural heritage, as well as developing innovative science and technology methods for investigating archaeology and cultural heritage research questions.

In addition, as this course will be team-taught, led by faculty whose research is affiliated with STARC, students will also be introduced to the current research of each faculty member explored within the broader context of current international trends and frontiers. Class discussions and assignments will also be geared towards helping students develop their own research identity in the context of the program and to formulate their research topics.

ELECTIVE COURSES

ACH 502 Advanced Methods in Archaeobotany: from the field to the interpretation of the data

This course will provide specialized training in archaeobotanical skills, which aim to advance and complement the basic themes outlined in the introductory courses on archaeobotany. The course will include demonstration in the field, training in the laboratory and lectures on advanced issues of archaeobotanical research for the reconstruction of the ancient economy and past environments. In particular, the course will offer themes which will include:

- Theoretical models of advanced archaeobotanical research
- Taphonomical issues and issues of preservation in the archaeobotanical record
- Crop processing sequences
- Sample handling and recording and the analysis of archaeobotanical remains
- Ways of interpreting available data
- Advanced identification of plant remains (cereals, pulses, fruits, nuts and weeds)
- Reconstruction of past landscapes and climates
- Exploring climate change through the archaeobotanical record

The course will include extensive laboratory training using STARC different laboratories.

ACH 504 Advanced Challenges in Archaeological Sciences

This advanced course has two aims. Firstly, it introduces students to specific Science and Technology-based contributions to selected major challenges in Archaeological Science, focussing on Cyprus and the Eastern Mediterranean and the Middle East region (EMME) and the research done within the Archaeological Science group at Cyl. Secondly, it guides the students to develop their own research plan to contribute to addressing these challenges, as part of their thesis development.

With incoming students in archaeological science having a broad and often diverse range of individual experiences and academic backgrounds from their postgraduate degree (a Masters' in a relevant field), this course will introduce students to the core archaeological

themes relevant for their PhD at The Cyprus Institute, and how their own archaeological science research will make unique and essential contributions to them. More specifically, the students will explore specific key archaeological topics relevant for the EMME region, and gain insight into current major science-based research by Cyl faculty in these fields. The students will then explore how their own advanced science and technology-based research will make specific contributions to address those challenges, as part of the archaeological science research group within STARC.

In addition to offering an advanced insight into current major methodological and research challenges of relevance to their thesis, this course, taught by a small team of STARC-affiliated faculty specialising in Archaeological Science, will introduce the students to the specific academic discourse underpinning current research by their supervisors, within the broader context of archaeological research themes. Class discussions and assignments will direct students to develop their own research in such a way that its relevance for the broader archaeological discourse becomes clearly visible.

ACH 506 Advanced Research Topics in Built Heritage and Cultural Landscapes

This graduate seminar course addresses key themes and topics in the interdisciplinary study of built heritage and cultural landscapes. It is a course designed to challenge students and introduce them to new interdisciplinary research perspectives, driven by advances in digital technologies and visualization, that have revolutionized the ways we study the historically layered landscapes of the Mediterranean.

Built Heritage is an emerging field that focuses on the study of architectural landscapes and built environments, especially cities, aiming at the holistic understanding of the historical, cultural, material and environmental conditions that influenced their spatial configuration, experience and development. Through the delivery of lectures and in-class discussion, students will be introduced to approaches that foster the integration of a wide array of interdisciplinary research applications and methods focused on aspects of cities' past and present realities. Additionally, the study of Cultural Landscapes addresses cultural heritage at the broad environmental level including both the natural setting and the societal

context of heritage. These methodological approaches help us to critically analyse the complex social, economic and religious networks behind the experience of the urban and rural landscapes of the Eastern Mediterranean.

Participating students will be encouraged to think outside the methodological boundaries of traditional disciplines and to be ready to utilize technological and scientific applications in CH and Archaeology to pursue an array of research themes in Art and Architectural History, Archaeology, Urban Studies, theories of space, Film Studies and New Media, etc. Course leaders will pursue topics appropriately chosen to meet the needs and interests of participating students. In turn, students will be expected to appropriately develop projects that permit the effective use of interdisciplinary theories, methods and applications. Ideally, these projects will be related to students' PhD research.

ACH 508 Advanced Methods in Human Osteoarchaeology

This course will provide training in advanced human osteoarchaeological skills that extend beyond and complement the core issues explored in introductory courses on human osteology. The focus is on metric and nonmetric skeletal variation as expressed in the context of a) the variability that characterizes the juvenile skeleton and the challenges this poses, b) palaeopathological assessment and interpretation, c) activity markers, and d) biodistance markers. The aim is for students to distinguish between normal and abnormal skeletal morphology and gain expertise in specialized osteoarchaeological methods for capturing and analyzing different morphological parameters. In addition, students will gain analytical skills applicable in human osteoarchaeology with an emphasis on digital technologies and microanalytical methods, as well as in-depth knowledge on the scientific principles of biomolecular and biochemical methods broadly used with skeletal remains. The course will rely heavily on hands-on training in the STARC laboratories.

ACH 509

Advanced Research Topics in Human Bioarchaeology: Contributing to Key Questions within the Archaeology of the Eastern Mediterranean and South West Asia

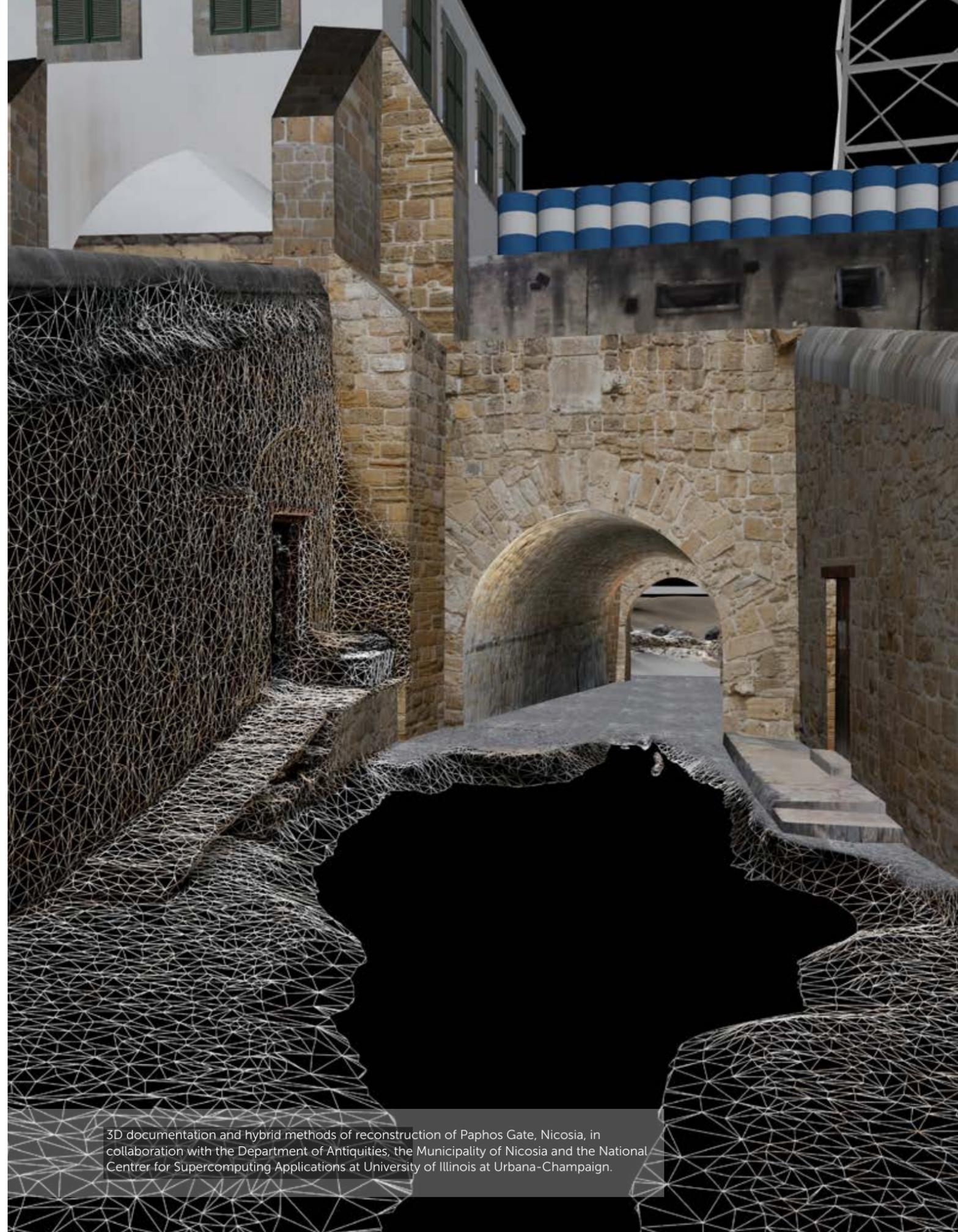
This course aims to enable and support the growth of advanced postgraduate researchers in Human Bioarchaeology. This aim will be realized through the following objectives:

- Engaging students in depth with advanced research topics in Human Bioarchaeology, with direct relevance to their doctoral research and/or postgraduate and future postdoctoral research careers
- Exploring, at advanced level, the crucial relations between frontier research approaches in human bioarchaeology with probing, contributing to, and answering key questions within the archaeology of the Eastern Mediterranean and South West Asia
- Showcasing how by combining recent scientific and technological advances with advanced human bioarchaeological approaches researchers can (1) provide better answers long standing key questions at the cradle of western civilisations, and (2) pose new questions and arrive at rigorous answers supported by data and appropriate methods and techniques



Paola Ronzino
PhD Science & Technology in Cultural Heritage
Current Position:
Researcher VAST-LAB, Italy

“Being a PhD student at CYI has offered me many opportunities of professional growth, thanks to a well-prepared faculty staff and a rich program with interdisciplinary courses. This enabled me to deepen my skills in my research field and to pave the ground of what I hope will be the start of a long and productive career.”



3D documentation and hybrid methods of reconstruction of Paphos Gate, Nicosia, in collaboration with the Department of Antiquities, the Municipality of Nicosia and the National Centre for Supercomputing Applications at University of Illinois at Urbana-Champaign.



Joint/Dual Degrees

Students have the option to pursue their PhD studies at Cyl jointly with internationally recognized institutions with which Cyl maintains agreements for joint/dual degrees.

JOINT/DUAL DEGREES

University of Illinois at Urbana-Champaign
 University Paris-Saclay
 Lund University
 University of Groningen
 Ghent University
 University of Lille
 University of Ferrara
 RWTH Aachen University
 University of Wuppertal
 University of Rome "Tor Vergata"
 Hebrew University of Jerusalem
 Humboldt University of Berlin
 University of Edinburgh

Cyl is one of the few institutions coordinating two ITN European Joint Doctorate projects:

- High Performance Computing in Life Sciences, Engineering and Physics (HPC-LEAP)
<https://hpc-leap.eu/>
 Program completed in 2019



- Simulation in Multiscale Physical and Biological Systems (STIMULATE)
<http://www.stimulate-ejd.eu/>





Admissions Information & Requirements

Our Master's and Doctoral programs are highly selective and attract top students from all parts of the world, providing them with modern knowledge and skills to serve innovative areas of science, society and tomorrow's economy.

Master's Admissions Information & Requirements

To be considered for a Master's program, applicants must have the following:

A BACHELOR'S DEGREE from a recognized accredited institution, with a strong background in the selected field of study. For details about the required background for each field of study refer to the program of interest on our website.

ENGLISH LANGUAGE PROFICIENCY (at least 6.5 on the Academic version of the IELTS, 79 on the Internet-based TOEFL or C on the GCSE or IGCSE). For more details about this requirement refer to our website.

ADMISSION CRITERIA

The Admissions Committees also review applications and makes their decision on the basis of the student's academic merit. The Committees also consider the match between the Institute's research activities and the student's research interests, i.e. Cyl's capacity to support the students' Master's research in terms of facilities, infrastructure and supervision. Candidates may be asked for a personal interview. If students are abroad, they may be interviewed through a video conference call.

APPLICATION PROCEDURE

Students interested in our Master's programs must apply through the online application system. Applicants must submit (upload) the following documents (in English) when filling out the online application:

- Curriculum Vitae
- Academic Degrees
- Academic Transcripts
- English Language Certificate
- Statement of Intent

Students must also provide, in the online application, the names and contact details of at least two faculty members or other professionals who are well acquainted with the applicant's academic, and if applicable, research and professional work and are willing to provide a reference. Referees are contacted directly by Cyl.

APPLICATION DEADLINES

Students can be admitted once per year, in October. Please see table below for application deadlines.

FALL TERM

Early Admissions	Regular Admissions	Late Admissions
Open for EU and International Students	Open for EU and International Students	Open for EU and international students who do not require a visa

Application Deadline

December 20	April 1	July 3
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The dates listed in the sections above are indicative and may change. International applicants should apply early to avoid disappointment due to immigration deadlines.

More detailed information on admission requirements can be found on our website: www.cyi.ac.cy

PhD Admissions Information & Requirements

Our doctoral programs are highly selective. They are designed for research-oriented students aspiring to become leaders in their respective field of study. Selected students are immersed in a rigorous international research environment that requires full-time commitment for the duration of the program. To be considered for admission to a PhD Program, applicants must have the following:

A MASTER'S DEGREE from an accredited institution, in a relevant field of study. For details about the required background for each field of study refer to our website.

ENGLISH LANGUAGE PROFICIENCY (at least 6.5 on the Academic version of the IELTS, 79 on the Internet-based TOEFL or C on the GCSE or IGCSE). For more details about this requirement and exceptions, see the website.

STRONG COMPUTATIONAL SKILLS to allow competent search and analysis appropriate for the selected field of study.

APPLICATION PROCEDURE

Students interested in our PhD programs must apply through the online application system. Applicants must submit (upload) the following documents (in English) when filling out the online application:

- Curriculum Vitae
- Academic Degrees
- Academic Transcripts
- English Language Certificate
- Statement of Intent
- Example of written work

Students must also provide, in the online application, the names and contact details of at least two faculty members or other professionals who are well acquainted with the applicant's academic, research and professional work and are willing to provide a reference. Referees are contacted directly by Cyl. Students who apply for a scholarship may be required to provide additional supporting documents. More information about these requirements can be found on our website.

ADMISSION CRITERIA

The Admissions Committees reviews applications and make their decision on the basis of the student's academic merit. The committees also consider the match between the Institute's research activities and the student's PhD research topic, i.e. Cyl's capacity to support the students' PhD research in terms of facilities, infrastructure and supervision. Candidates may be asked for a personal interview. If students are abroad, they may be interviewed through a video conference call.

APPLICATION DEADLINES

Students can be admitted twice per year: February or October.

FALL SEMESTER

Early Admissions	Regular Admissions	Late Admissions
Open for EU and International Students	Open for EU and International Students	Open for EU and International Students who do not require a visa

Application Deadline

December 20	April 1	July 3
-------------	---------	--------

The dates listed in the sections above are indicative and may change. International students should apply early to avoid disappointment due to migration deadlines.

SPRING SEMESTER

Regular Admissions	Late Admissions
Open for EU and International Students	Open for EU and International Students who do not require a visa

Application Deadline

September 15	December 1
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More detailed information on admission requirements can be found on our website: www.cyi.ac.cy

Academic Calendar 2021-2022

TERM 1 | SEMESTER 1

PhD, MSc, MSc/MPhil | 16 weeks

2021	
SEPTEMBER	
Registration (for all degree programs)	29
OCTOBER	
Commencement of Lectures	4
Last day to select courses	8
Last day to withdraw from a course	3 weeks after classes begin
DECEMBER	
Winter Break	24 Dec 2021-6 Jan 2022
2022	
JANUARY	
End of Lectures	21
Revision Week	24-28
Evaluation – Examination Period	31 Jan 2021-4 Feb 2022
FEBRUARY	
End of Term	4

TERM 2 | SEMESTER 2

PhD, MSc, MSc/MPhil | 16 weeks

2022	
FEBRUARY	
Registration (for PhDs)	2
Commencement of Lectures	7
Last day to select courses	11
Last day to withdraw from a course	3 weeks after classes begin
APRIL	
Spring Break	18-29
MAY	
End of Lectures	27
Revision Week	30 May-3 Jun
JUNE	
Evaluation – Examination Period	6-10
End of Term	10

TERM 3

PhD, MSc, MSc/MPhil | 16 weeks

2022	
JUNE	
Commencement of Term	14
SEPTEMBER	
Viva for MSc	19-30
End of Term	30

TERM 4

MSc/MPhil | 16 weeks

2022	
OCTOBER	
Commencement of Term	3
DECEMBER	
Winter Break	24 Dec-6 Jan 2023
2023	
February	
End of Term	3

TERM 5

MSc/MPhil | 8 weeks

2023	
FEBRUARY	
Commencement of Term	6
MARCH	
Viva for MSc/MPhil	20-31
End of Term	31

PUBLIC HOLIDAYS	
2021	
Cyprus Independence Day	1 October
Ochi Day	28 October
2022	
Epiphany	6 January
Green Monday	7 March
Greek Independence Day	25 March
National Day	1 April
Whit Monday	13 June
Independence Day	1 October
Ochi Day	28 October
2023	
Epiphany	6 January
Green Monday	27 February
Greek Independence Day	25 March
National Day	1 April

The Academic Calendar is subject to change

Tuition & Fees

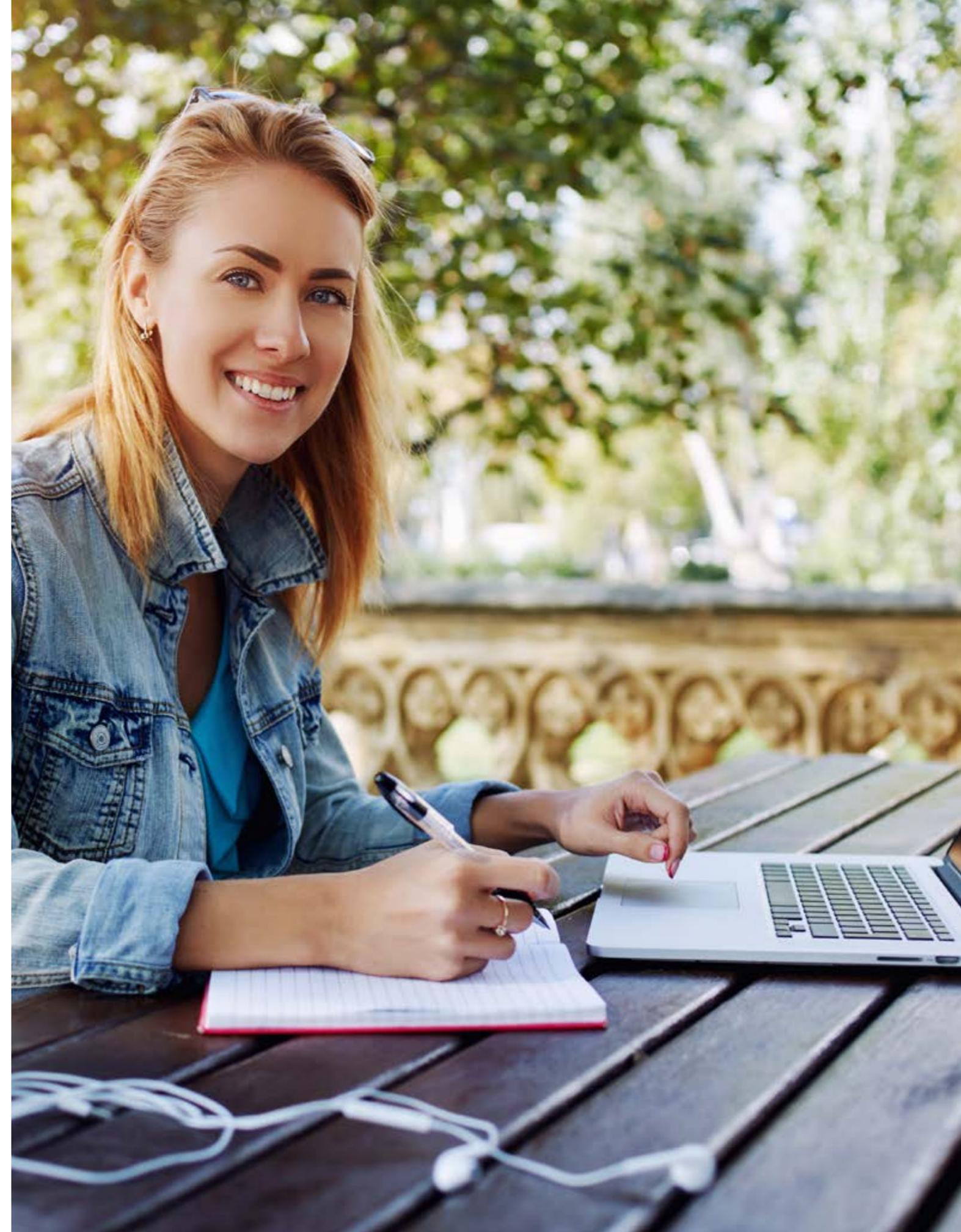
Academic Year 2021-2022

DESCRIPTION	MASTER'S PROGRAM		PHD PROGRAM	
	AMOUNT IN EUROS	DETAILS	AMOUNT IN EUROS	DETAILS
Tuition	€60 per ECTS		€258.33 per ECTS	
Application fee	€50	One-time Non-refundable	€50	One-time Non-refundable
Registration fee	€200	One-time Non-refundable	€500	One-time Non-refundable
Re-examination fee	-		€500	Applicable only in cases when students need to retake their comprehensive examination. Students may retake the exam once.
Health insurance fee	€110 per year*	Students from non-European Union countries are required to have health insurance	€110 per year*	Students from non-European Union countries are required to have health insurance
* This amount is subject to change. Please verify with Office of Graduate Studies.				

Methods of payment are specified to students in writing prior to registration.

Fees are payable at the beginning of each semester, unless specified otherwise.

Tuition and fees may be revised every two years and are subject to increase in accordance with the relevant law upon approval by the Ministry of Education, Culture, Sport and Youth.





Financial Support

The Cyprus Institute offers financial support to prospective students based on merit. The financial support may be offered as a scholarship, research assistantship or work-study or a combination of any of these types of support. All types of support are offered subject to availability of funds.

Scholarships

The Cyprus Institute offers full or partial scholarships to outstanding students to cover tuition and other fees and/ or living expenses. These awards are typically for doctoral students, but exceptional Master's students may also be considered. The following types of scholarships are offered currently:

SELECTION CRITERIA

These awards are granted based on academic merit.

SCHOLARSHIP AMOUNTS & DURATION

Scholarships offered currently are the following:

- **Tuition Scholarships**
Tuition scholarships will cover tuition fees and may be partial or full scholarships
- **Dean's Distinguished Scholarships**
Dean's Distinguished Scholarships cover full funding of tuition and registration fees and a generous stipend for living expenses in addition to an annual research allowance
- **Graduate School Scholarships**
Graduate School Scholarships may cover tuition fees and/or living expenses

Research Assistantships

The research assistantship positions enable students to work as members of a research group in one of the Institute's research projects through an effective arrangement for graduate study and professional training. Work on the student's thesis may be considered as part of the Research Assistant assignment. Research Assistants are considered members of research groups or units in one of the Institute's Research Centers, working under a Supervisor.

SELECTION CRITERIA

Research Assistantships are offered based on academic merit, the alignment between the Institutes' research projects and the interests and qualifications of the students.

GENERAL TERMS OF THE RESEARCH ASSISTANTSHIP

Research Assistantships are offered for one year and are renewable based on the students' performance and availability of funding. Research Assistants are appointed on a part-time or full-time basis, according to the alignment of their PhD project to the Research Assistantship position.

Work-Study Scheme

The work-study scheme is designed to provide the opportunity to doctoral students who need financial assistance to be self-reliant and also to gain valuable work experience. Through this scheme, students undertake several administrative and/or research-related tasks at the Institute.

SELECTION CRITERIA

Work study positions are offered annually, subject to the needs of the Graduate School/The Institute and the good performance of the candidate as well as on the availability of funds.

EMPLOYMENT TERMS

Students who are under the Work-Study Scheme are employed 50% of full time basis equivalent to up to 20 hours per week and are paid a salary.

Additional financial support opportunities can be found on our website: www.cyi.ac.cy



Student Services & Support

The Office of Graduate Studies (OGS) is dedicated to providing quality support services to the students, faculty and staff of the Institute. The Office of Graduate Studies covers all aspects of administration regarding student admissions, registration, academic records, academic progress, social and academic well-being, and financial support and services.



The Office of Graduate Studies

ADMISSIONS & RECRUITING

The OGS arranges visits and information sessions for prospective students. It informs prospective students about the programs offered and the Institute's potential contribution to their professional development. The office advises prospective students about the admissions process and it processes applications for admission.

REGISTRAR

The OGS registers students in their degree programs and their courses. The office maintains student data, monitors students' progress, certifies registration and issues official transcripts and Diploma Supplements.

STUDENT AFFAIRS

The OGS is dedicated to ensuring the wellbeing of its students. The School has a Student Welfare Officer dedicated to ensuring that students have the support they need throughout their studies. Students also benefit from the Student Mentoring Scheme in which more senior students serve as mentors to junior students. The OGS also provides assistance to students with special needs.

NATIONAL & INTERNATIONAL AFFAIRS

The OGS provides support with health services, migration and visa issues and housing.

OFFICE OF EDUCATIONAL PROGRAMS

The OGS provides administrative support for the general administration of the educational programs (e.g. course scheduling, logistical support, etc.)

ERASMUS+

The OGS administers the Erasmus+ program for ingoing and outgoing students and staff of the Institute.

FINANCIAL SUPPORT

The OGS provides guidance and support to students related to scholarships and financial aid issues.



Information for International students

The Cyprus Institute is committed to maintaining an educational community where students of all diverse backgrounds are appreciated and fully supported. Currently, 56% of our students are international students. It is Cyl's priority to maintain and further expand its diversity and to continue to offer an inclusive and supportive environment of academic excellence.

The Office of Graduate Studies

One of the main roles of the Office of Graduate Studies (OGS) is to provide support to international students. It provides guidance on the application process and immigration and visa issues for Non-EU students. It also provides orientation programs for incoming international students to enable them to adapt well to their new environment. Furthermore, the Office supports international students with academic, social, cultural and financial matters and assists them in enriching their academic and cultural experience.

Traveling to Cyprus

The legal points of entry into the Republic of Cyprus are the airports of Larnaka and Pafos and the ports of Larnaka, Lemesos, Latsi and Pafos.

Health Insurance and Services

All EU students who have a European Health Insurance Card are entitled, upon presentation of the card, to free medical and pharmaceutical care by public hospitals in Cyprus (with the exception of non-urgent care as deemed by the hospital). All other international students must obtain private medical insurance for medical treatment in Cyprus immediately after their arrival in Cyprus. The Office of Graduate Studies can provide information on health insurance options for international students.

USEFUL LINKS

- Ministry of Health-Useful Information (www.moh.gov.cy)
- European Commission-European Health Insurance Card (<https://ec.europa.eu/>)

Obtaining a Visa

Prior to their arrival in Cyprus, international students who are citizens of non-EU countries must make preparations for their visa issuance. These students must follow the necessary steps required for the certification of their documents by the appropriate authorities in their home country. Original duly attested documents are sent to the Institute which proceeds with the application for the visa issuance at the Migration Department (of Cyprus). Students applying from countries that have not signed the Hague Convention of 1961 (Apostille) but have a Cyprus Representation in their home country, must have their documents certified by the Ministry of Foreign Affairs in their home country and further attested by the Cyprus Embassy, High Commission or Consulate.

Please note that there are strict deadlines for the certification of documents, the submission of the application to the Migration Department (in Cyprus) and students' arrival in Cyprus.

For further information about visa requirements (which may vary for each country of citizenship) refer to the website of the Ministry of Foreign Affairs of Cyprus or contact the Office of Graduate Studies.

USEFUL LINKS

- Ministry of Foreign Affairs of Cyprus-Diplomatic Missions of the Republic of Cyprus (www.mfa.gov.cy)
- Civil Registry and Migration Department-Migration Section for Students (www.moi.gov.cy)
- Civil Registry and Migration Department-Announcements Section (www.moi.gov.cy)

Students' Rights and Responsibilities

It is the Institute's priority to ensure that our students are fully aware of their rights and responsibilities. We constantly work to ensure that students rights are respected and that their responsibilities are set forth in a clear and concise manner.

STUDENTS' RIGHTS

- Students have access to clear and concise rules and regulations.
- Students have the right of free speech, and have representation in relevant committees. They can expect commitment from Cyl staff and Student Representatives.
- Students grievances are dealt with utmost care and confidentiality, whether it is related to review of grades, review of courses, exemptions from academic regulations or review of decisions concerning disciplinary matters.
- Students have the right to suggest courses to be offered, provide feedback on their academic courses, instructors, administration and resources.

STUDENTS' RESPONSIBILITIES

- Students should be able to fully understand academic paths available as well as all academic program requirements.
- Students should be familiar with the Cyl rules and regulations, and fulfil all their required academic, financial and other obligations to the Institute.
- Students should maintain an academic spirit that is consistent with Cyl regulations when interacting with fellow students, faculty and staff of the institute.

More detailed information about students' rights and responsibilities are stipulated in the Student Handbook

Situated at the north-eastern end of the Mediterranean basin, Cyprus is the third largest island in the Mediterranean sea, with an area of 9,251 km². Cyprus is a member of the European Union and a member of the Eurozone. The official languages of the island are Greek and Turkish. English, though not an official language, is widely spoken.



Erasmus+

The Erasmus Program (European Region Action Scheme for the Mobility of University Students) is a European Union (EU) student exchange program established in 1987.

Erasmus+, is the new catch-all framework program for education, training, youth and sport, which started in January 2014. With a dedicated budget of more than €26 million under the EU's long-term budget for 2021-2027, Erasmus+ will be more inclusive and innovative but also more digital and greener. There are currently more than 4,000 higher education institutions participating in Erasmus+ across the 33 countries involved in the Erasmus+ program and over 4 million Europeans took part to study, train, and gain experience abroad since the program's inception.

The Cyprus Institute was awarded the ERASMUS Charter for Higher Education in December 2020 which will be valid until 2027.

Erasmus+ Student Mobility

One of the aims of the program is to boost the skills and employability of university students by pursuing studies overseas for between three and 12 months, or traineeship for between two and 12 months. The mobility should take place in one of 32 countries in Europe and students receive a grant to help cover the cost of living and travel.

OUTGOING STUDENTS

1. STUDENT MOBILITY FOR STUDIES (SMS)

is a study period abroad for 3 to 12 months at a partner higher education institution (HEI) that has signed an inter-institutional agreement with Cyl. To ensure high-quality mobility activities with maximum impact on the students, the mobility activity must be compatible with the student's degree-related learning and personal development needs. The study period abroad must be part of the student's study program.

2. STUDENT MOBILITY FOR TRAINEESHIP (SMT)

A traineeship (work placement) abroad in an enterprise or any other relevant workplace for 2 to 12 months. Traineeships abroad at a workplace are supported during third cycle studies and within a maximum of one year after the student's graduation. The receiving organization can be any public or private organization active in the labor market or in the fields of education, training and youth. Wherever possible, the traineeships should be an integrated part of the student's study program.

INCOMING STUDENTS

Students from an institution with which Cyl has a valid ERASMUS+ Inter-institutional agreement can apply for study mobility in the relevant subject area. The sending institution must notify Cyl that the student is officially nominated for the mobility, in writing to the Cyl Office of Graduate Studies at: office.school@cyi.ac.cy Students interested in incoming mobility are encouraged to first identify their potential supervisor from the list of staff available on the Cyl website and have direct consultation whenever possible.

The four research centers of The Cyprus Institute provide students with excellent training opportunities at state-of-the-art lab facilities. The sending institution must notify Cyl that the student is officially nominated for the mobility by writing to the Cyl Office of Graduate Studies at:

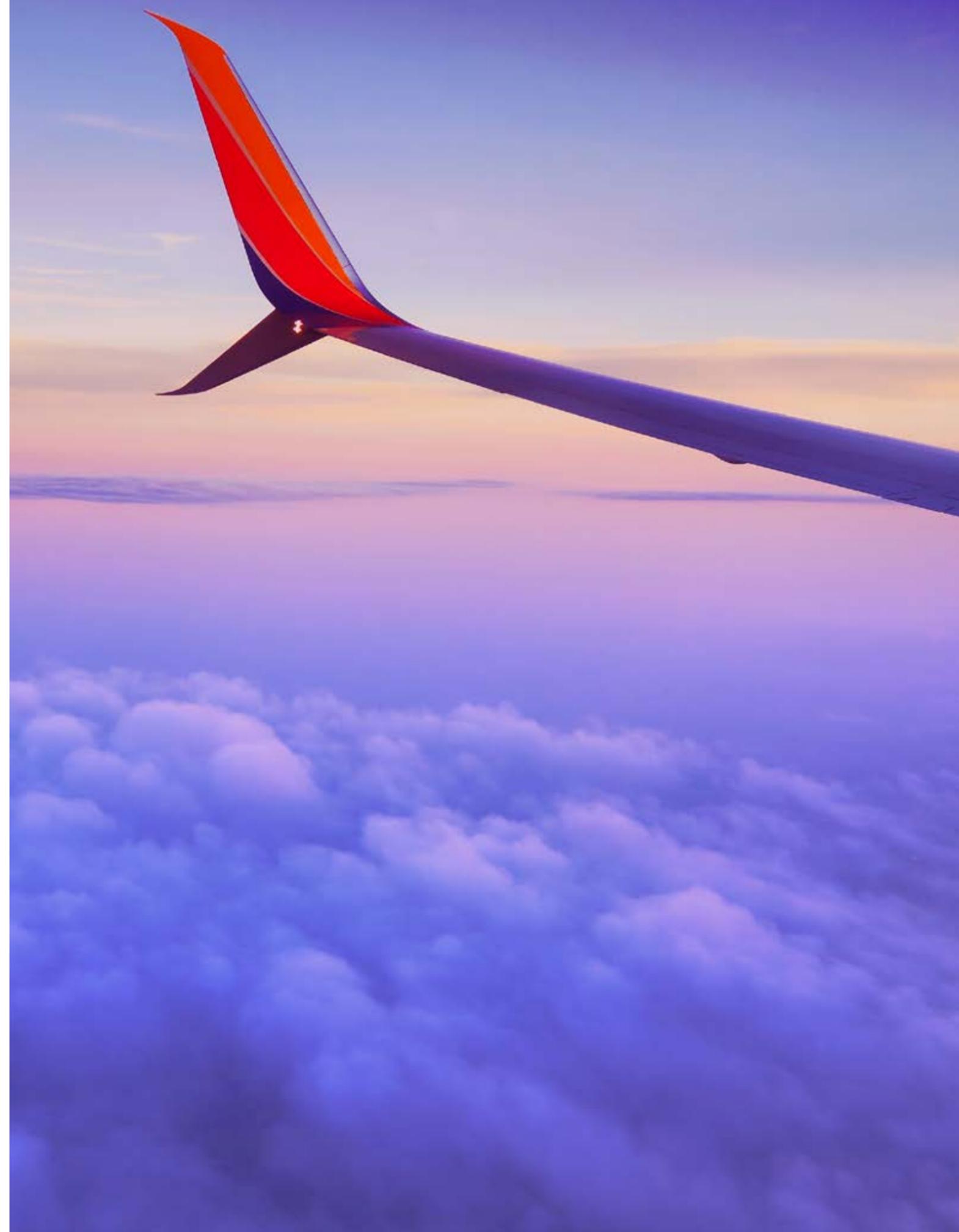
office.school@cyi.ac.cy. Students interested in incoming mobility are encouraged to first identify their potential supervisor from the list of staff available on the Cyl website and have direct consultation whenever possible.

Erasmus+ Staff Mobility

Funding is available to help academic and non-academic staff develop their skills in schools, universities, colleges and adult education environments around 32 countries in Europe through job shadowing, teaching and training activities.

USEFUL LINKS

- Survival Guide (includes general information on Cyprus): <http://esncy.org/survival-guide>
- For more information and specific procedures for applying, refer to the Cyl website: www.cyi.ac.cy



School Governance, Academic & Teaching Staff, Administration

SCHOOL COUNCIL

Prof. George Christophides – Cyl President (Chair)
 Prof. Edouard Brézin – Cyl BoT Member
 Mr. John Joannides – Cyl BoT Member
 Mr. Manthos Mavrommatis – Cyl BoT Member
 Prof. Constantia Alexandrou – Cyl Faculty
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ACADEMIC AND TEACHING STAFF

Name Title	Educational Qualification	Research Interests	Other Duties
Constantia Alexandrou Professor	- PhD Theoretical Nuclear Physics - BA First Class Honours Physics	Theoretical Strong Interaction Physics: Lattice Quantum Chromodynamics, Stochastic techniques for many fermion systems, Quark models, variational methods in quantum field theories	Acting Director of Computation-based Science & Technology Research Center Coordinator of the Doctoral Program in Computational Sciences Coordinator of the Simulation & Data Science Master's Program
Manuel Jesus Blanco Professor	- Doctor of Engineering Industrial Engineering - PhD Applied Physics - MSc Energy Engineering - MSc Industrial Engineering	Energy Systems in general Concentrating Solar Thermal technologies Energy Policy Modelling of Energy Systems Thermodynamics Heat Transfer Optics and Scientific Programming	
Salvatore Carlucci Professor	- PhD Building Engineering - MSc Structural Engineering	Building physics; Indoor Environmental Quality; Occupant behavior; Building performance simulation and optimization; Adaptive and responsive building components; Smart buildings; Zero energy/emission neighborhoods	Head of the Sustainability and Built Environment Division
George Christophides Professor	- PhD Biology - BSc Biology	Biology of infectious diseases (particularly vector-borne) and how this may be affected by human interventions and the changing environment	President of The Cyprus Institute Provost of the Cyprus Institute Graduate School
Vangelis Harmandaris Professor	- PhD Chemical Engineering - Diploma Chemical Engineering (Equivalent to MEng)	Computational Modelling of Complex Systems Hybrid Physics-based Data-driven Models for Materials Multi-scale simulations and data analytics methods for Nano-structured materials Statistical methods and Mathematical Strategies of Coarse-graining	

Name Title	Educational Qualification	Research Interests	Other Duties
Manfred Lange Professor	- Habilitation Geophysics - PhD Geophysics - MSc Geophysics - BSc Geophysics - Engineering Diploma	Assessment of climate change impacts in the Eastern Mediterranean and North Africa and the specification of possible mitigation and adaptation strategies with a particular focus on the Water-Food-Energy Nexus	
Jos Lelieveld Professor	- PhD Physics and Astronomy - Doctorate Natural Sciences - BSc Biology	Atmospheric multiphase chemistry, ozone, aerosols and climate, the atmospheric cleaning mechanism (radical chemistry), regional and global change	Head of Environmental Predictions Division
Costas N. Papanicolas Professor	- PhD Nuclear Physics - BSc Physics	Nuclear and Particle Physics, Accelerator Physics, Medical Physics and Imaging, Solar Energy	CEO of the Cyprus Research and Educational Foundation Head of Energy Division of The Cyprus Institute
Nikos Mihalopoulos Professor	- PhD Chemistry of Air Pollution and Environmental Physics - DEA Chemistry of Pollution - BSc Chemistry	Atmospheric Chemistry and Physics with emphasis on aerosol physicochemical characterization and oxidation capacity of the Mediterranean atmosphere, Global Biogeochemical Cycles of nutrients (N,P) and trace metals, Environmental Analytical Chemistry	
Thilo Rehren Professor	- Higher Doctorate Archaeometallurgy - PhD Petrology and Volcanology - Diploma Mineralogy, Economic Geology, Non-ferrous Metallurgy	Reconstructing and understanding of the processes used in the production of metals, glass and glazes from the Neolithic to the Early Modern period	Director of Science and Technology in Archaeology and Culture Research Center
Jean Sciare Professor	- Habilitation Sciences (Meteorology and Oceanography Physics) - PhD Atmospheric Chemistry - MSc Chemistry - Engineering Diploma Chemical Engineering	Air pollution characterization and impacts (climate, air quality, health) Atmospheric monitoring and instrumentation	Director of Energy, Environment & Water Research Center (EEWRC) Coordinator of the Doctoral Program in Energy, Environment & Atmospheric Sciences

Name Title	Educational Qualification	Research Interests	Other Duties
Thanasis Hadzilakos Adjunct Professor	- PhD Database Theory - MA Theology - BSc/MSc Computer Science	Educational technology: m-learning, distance education, internet related dangers and system design for non-standard applications	
Silas Michaelides Adjunct Professor	- PhD Meteorology - MSc Agricultural Meteorology - Master's Public Sector Management - BSc Mathematics	Atmospheric energetics Methods for weather forecasting Diagnosis of synoptic-scale systems Artificial Neural networks for meteorological applications Desert dust transportation Weather radar applications Satellite meteorology and remote sensing	
Efrosyni Rizopoulou Egoumenidou Adjunct Professor	- PhD Archaeology - MA Archaeology - BA History and Archaeology	Folk Art Folk Architecture Pre-industrial Engineering Material Life of Modern Times, and more generally the Folk Culture of Cyprus and the wider Mediterranean region	
Despina Serghides Adjunct Professor	- PhD Environment and Energy - MSc Energy Studies - Diploma Architecture	Bioclimatic architecture and energy conscious building and Urban design for sustainable indoor and outdoor environments	
Michalis Vrekoussis Adjunct Professor	- PhD Environmental and Analytical Chemistry - MSc Environmental and Analytical Chemistry - BSc Chemistry	Atmospheric chemistry and physics Air quality observations: In situ, ground based and space-based remote sensing observations of key anthropogenic pollutants Numerical simulations: Study of the complex mechanisms and processes controlling the emission, transport, transformation and removal of natural and manmade trace species	
Jonathan Williams Adjunct Professor	- PhD Environmental Science - BSc Chemistry and French	Investigation of the chemistry of volatile organic compounds (VOC) in the atmosphere	

Name Title	Educational Qualification	Research Interests	Other Duties
Sturt Manning Visiting Professor	- PhD - MSc - BA Hons	Aegean, Cypriot, Anatolian and East Mediterranean archaeology, classical archaeology Complex societies, state formation and interactions Dendrochronology/ Dendroarchaeology Radiocarbon dating and analysis -Mediterranean-Near East, N.America, Mexico and China Climate (palaeoclimate) and archaeology/history	Associate Provost Chair of the STARC Scientific Expert Panel
Michel Menu Visiting Professor	- Habilitation Physics - PhD Physics/Optics	Study of the color and art works and Development of new methodologies to analyze color and appearance attributes on paintings in non-invasive way	Member of the STARC Scientific Expert Panel
Franco Niccolucci Visiting Professor	- Laurea in Mathematics	Computer applications to history and archaeology in particular: GIS use for history and archaeology and XML encoding of historical sources Internet use for source and data diffusion	Member of the STARC Scientific Expert Panel
Fairchild Ruggles Visiting Professor	- PhD History of Art - MA History of Art - AB Visual and Environmental Studies	Medieval landscape of Islamic Spain and South Asia; the complex interrelationship of Islamic culture with Christianity, Judaism, and Hinduism; the precise ways that religion and culture are often conflated in the study of these	
Nikolas Bakirtzis Associate Professor	- PhD Art and Architectural History - MA Medieval Art and Architecture - MA Social Anthropology - BA Archaeology	Medieval and Byzantine Art, Architecture and Archaeology Heritage of the Built Environment Heritage in Contested and Divided Cities; Art and Architecture of the Crusader and Renaissance periods in the Eastern Mediterranean Urban and Rural Landscapes Social Anthropology and Folklore	Coordinator of the Doctoral Program in Science and Technology in Cultural Heritage Director, Andreas Pittas Art Characterization Laboratories
George Biskos Associate Professor	- PhD Engineering - MSc Environmental Engineering - BSc Environmental Science	Aerosol science and technology (instrumentation development for measuring airborne particles, atmospheric aerosols and aerosol based nanotechnology)	Coordinator of the Master's Program in Environmental Sciences

Name Title	Educational Qualification	Research Interests	Other Duties
Adriana Bruggeman Associate Professor	- PhD Biological Systems Engineering - MSc Hydrology and Water Management	Monitoring and modeling of hydrological and environmental processes Integrated natural resource management Climate change adaptation Agricultural water management Biogeochemistry Water quality Erosion and soil conservation Stakeholder participation	
Panos Hadjinicolaou Associate Professor	- PhD Numerical Modelling of the Atmosphere - MSc Atmospheric Sciences - BSc Physics	Regional climate modelling Indices and impacts of climate change and extremes Stratospheric ozone depletion Atmospheric chemistry-climate interactions	
Sorin Hermon Associate Professor	- PhD in Archaeology - MA in Prehistory - BA Archaeology, Anthropology, History of Arts and History of the Bible	Computer applications to archaeology, in particular ontologies, 3D scientific visualization, semantic structures and cultural heritage digital documentation	Director of STARLab, Coordinator of the Master's Program in Digital Cultural Heritage
Efstathios Stiliaris Associate Professor	- PhD Experimental Nuclear Physics - MSc Experimental Nuclear Physics - BSc Physics	Experimental Nuclear and Hadronic Physics, Medical Physics Radiation Detector and Solar Energy Instrumentation with emphasis to Monte Carlo Simulations, Real-Time Control and Data Acquisition Systems Inversion of Linear and Non-Linear problems based on Deep Learning with applications to Artificial Neural Networks	
Theodoros Zachariadis Associate Professor	- PhD Mechanical Engineering - Diploma Mechanical Engineering	Integrated energy-economy-environment modelling Techno-economic analysis of energy, environmental and transport policies Environmental taxation Science-policy frameworks to achieve sustainability objectives	

Name Title	Educational Qualification	Research Interests	Other Duties
Charbel Afif Adjunct Associate Professor	- PhD Atmospheric Chemistry and Physics - MSc Atmospheric Chemistry and Environmental Physics - BSc Chemistry	Emission sources and inventories Atmospheric measurements Organic aerosols and gases	
Georgios Artopoulos Assistant Professor	- PhD Architecture - MPhil Architecture and the Moving Image - Diploma/MSc Architecture	Immersive and performative spaces Virtual environments and interaction design Computational visualisation and simulation Material performance and digital construction technologies in the study of built heritage Creative exploration of historical narratives Memory Spaces	
Efstathios Bourksoukidis Assistant Professor	- PhD Natural Sciences - MSc Environmental Physics - BSc Physics	Atmospheric observations of reactive trace gases Air pollution sources and chemical transformations Soil-biosphere-atmosphere interactions and biogeochemical processes in terrestrial ecosystems Tropospheric ozone formation and stratospheric ozone depletion	
Theodoros Christoudias Assistant Professor	- PhD High Energy Physics - BSc Physics	Global climate modelling and tracer transport Regional air quality modelling Computational model development and optimization Scientific data visualisation	
Victor Grigoriev Assistant Professor	- PhD Optics - MSc Optics	Solar Energy Integrated Optics Fiber Optics Metamaterials Light Scattering	
Giannis Koutsou Assistant Professor	- PhD Theoretical Physics - BSc Physics	Computational study of the theory of strong interactions (Lattice QCD) High Performance Computing Novel computing architectures	

Name Title	Educational Qualification	Research Interests	Other Duties
Kirsi Lorentz Assistant Professor	- PhD Archaeology - MSc Human Osteology, Palaeopathology and Funeral Archaeology - MA Joint Hons Archaeology and Anthropology	Bioarchaeology Physical anthropology Palaeopathology Archaeological sciences and Archaeology of the ancient Near East and the Eastern Mediterranean	
Evi Margaritis Assistant Professor	- PhD Archaeobotany - MSc Environmental Archaeology and Palaeoeconomy (Specialization: Archaeobotany) - BA Archaeology and History of Art	The history of the vine and the olive in the Mediterranean and beyond through DNA analysis The integration of rural and urban research: houses, space and function during Iron Age and Classical periods and Agriculture, landscape and economy of palatial centres in the Mycenaean World, through the study of the plant remains from Mycenae, Midea, and Tiryns. Currently developing an interdisciplinary project on ritual and funerary food deposits in Europe	
Mihalis Nicolaou Assistant Professor	- PhD Computer Science - MSc Advanced Computing - BSc Informatics and Telecommunications	Machine Learning and Computer Vision Automatic Analysis of Human Behaviour Machine Learning for Medicine Machine Learning for Games	
Efthymia Nikita Assistant Professor	- PhD Biological Anthropology - MPhil Biological Anthropology - BA Honors Archaeology	Daily life, activity patterns, demography, health and diet of past populations using macroscopic, microscopic and biochemical methods (North Africa, Greece and UK-prehistoric to medieval times)	
Nikos Savva Assistant Professor	- PhD Applied Mathematics - BSc in Applied Mathematics, Engineering and Physics	Applied mathematical modeling Analysis and computation Complex multiscale flows Statistical mechanics of inhomogeneous fluids	

Name Title	Educational Qualification	Research Interests	Other Duties
Christos Keleshis Research and Development Scientist	- PhD Electrical Engineering - MSc Telecommunications Systems - BSc Electrical Engineering	Unmanned Aerial Systems (UAS) Data Acquisition Aerial Imaging Sensors for Unmanned Aerial Systems Telecommunication systems	
Dante Abate Associate Research Scientist	- PhD E-learning Development Delivery - MA History of Art - BA History of Art - BA Cultural Heritage	Reality based 3D modeling Digital technologies for Heritage Documentation Digital technologies for Heritage under threat Digital technologies for Heritage monitoring and conservation Illicit trafficking of cultural properties	
Charalambos Chrysostomou Associate Research Scientist	- PhD Bioinformatics - MSc Computational Intelligence and Robotics - BSc Computer Science	Bioinformatics Computational Biology Medical Imaging Machine Learning Deep Learning	
Kamil Erguler Associate Research Scientist	- PhD Bioinformatics and Theoretical Systems Biology - MSc Bioinformatics and Theoretical Systems Biology - MRes Biochemical Research - BSc Molecular Biology and Genetics	Dynamical Modelling and Analysis of Biological Systems Stochastic Non-linear Dynamics and Chaos Parameter Inference Model Selection Sensitivity Analysis and Data Visualisation Assessment of Human Health Risks from Vector-borne Viral Diseases	
Jacob Finkenrath Associate Research Scientist	- PhD Theoretical Physics - Dipl. Phys. (equiv. to MSc) Theoretical Physics	Lattice Quantum Chromodynamics (LQCD) Algorithm Developments Large Scale Monte Carlo Simulations Hadron Spectroscopy (Tetraquarks and Resonances)	
Nestor Fylaktos Associate Research Scientist	- PhD Mathematical Modelling - MSc Energy Studies - BEng Electrical Engineering	Decarbonisation of the economy Technical and economic aspects of new energy systems Energy futures and modelling of the Mediterranean and EU regions	

Name Title	Educational Qualification	Research Interests	Other Duties
Svetlana Gasanova Associate Research Scientist	- PhD Chemistry - Diploma Chemistry	Heritage science Archaeometry Pigment analysis Non-invasive methods X-Ray Fluorescence spectroscopy	
Elias Giannakis Associate Research Scientist	- PhD Agricultural Economics - MSc Integrated Rural Development - BSc Agricultural Economics	Bio-economic modeling General equilibrium models Environmental economics Agricultural policy Water policy Participatory research Policy impact analysis	
Minas Iakovides Associate Research Scientist	- PhD Environmental Analytical Chemistry - MSc Environmental Protection Technologies - BSc Agriculture	Analytical chemistry Environmental inorganic/organotin chemistry Environmental organic chemistry Molecular markers on air pollution and human health	
Jonilda Kushta Associate Research Scientist	- PhD Environmental Physics and Meteorology - MSc Environmental Science - BSc Physics	Air Quality Modelling Dust Atmospheric Cycle Aerosols and Interactions with Radiation and Clouds Health Impacts of Air Pollution	
Anne Maisser Associate Research Scientist	- PhD Physics - Diploma Physics	Instrumentation development, lightweight, miniaturized instruments Heterogeneous nucleation processes Ion Mobility – Mass Spectrometry and atomic clusters Aerosol based nanotechnology Air quality monitoring	
Alaric Montenon Associate Research Scientist	- PhD University of Toulouse Electrical Engineering - MSc Hydraulics and Fluid Mechanics	Solar Energy Technology Heat transfer, Co-generation, Control, Life Cycle Assessment	

Name Title	Educational Qualification	Research Interests	Other Duties
Michalis Pikridas Associate Research Scientist	- PhD Chemical Engineering - MSc Chemical Engineering - BSc Chemistry	Atmospheric Measurements Aerosol Science New Particle Formation Instrumentation Development Source Apportionment Atmospheric Chemical Analysis	
Evgeni Votyakov Associate Research Scientist	- PhD Physics - MSc (equiv.) Technology of Materials for Electronic Engineering	Statistical Physics CFD MHD Computer Simulation	
George Zittis Associate Research Scientist	- PhD Energy, Environment and Atmospheric Sciences - MSc Meteorology, Climatology and Atmospheric Environment - BSc Geology	Climate Change and Impacts Regional Climate Modeling (PRECIS, CL-WRF) Climate Statistics Climate Extremes Land-Atmosphere Interactions Climate Dynamics Climate Change Communication	
Christos Zoumides Associate Research Scientist	- PhD Water Management - MSc Ecological Economics - BSc Economics	Water management Stakeholder participation Economics of water Rural policy Socio-economic impacts of climate change Water footprint and virtual water trade Sustainability indicators	
Simone Bacchio Computational Scientist	- PhD Computational Physics and Applied Mathematics - MSc Theoretical Physics - BSc Physics	Numerical methods, applied mathematics, linear solvers and multigrid methods High-Performance computing, Software development and GPU programming Modelling and simulations of physical systems with focus on lattice field theories Nuclear physics, QuantumChromo dynamics (QCD) and nucleon observables	

Name Title	Educational Qualification	Research Interests	Other Duties
Spyros Bezantakos Associate/ Post-doctoral Fellow	- PhD Biological Systems Engineering - MSc Environmental Engineering - BSc Energy Mechanical Engineering	Aerosols Physicochemical Properties and Climate Interactions Physicochemical properties of anthropogenic/industrial/indoor produced aerosols and their effects on human health Aerosol Instrumentation Development Aerosol Instrumentation Performance Characterization	
Hakan Djuma Post-Doctoral Fellow	- PhD Energy, Environment and Atmospheric Sciences - MSc Earth and Environmental Sciences - BSc Environmental Technology	Sustainable water management in semi-arid/arid regions Fate of pollutants in soil and sediment Environmentally-friendly land management practices to reduce soil erosion	
Marios Karmellos Post-Doctoral Fellow	- PhD Laboratory of Industrial and Energy Economics - MSc Sustainable Development - MEng Chemical Engineering	Energy systems analysis Distributed energy systems Energy in buildings Energy policy, energy efficiency and optimization	
Maria Kezoudi Post-doctoral Research Fellow	- PhD Atmospheric Physics - MSc Applied Meteorology and Climate with Management - BSc Physics	Airborne mineral dust particles Atmospheric aerosols Optical particle counters Northern lights	
Stefan Kuhn Post-doctoral Research Fellow	- PhD Quantum Optics - Diploma Computational Physics	Quantum computing and quantum simulation techniques for quantum field theories Numerical algorithms for Tensor Networks Numerical simulation of quantum many-body systems	

Name Title	Educational Qualification	Research Interests	Other Duties
Simone Lemmers Post-doctoral Fellow	- PhD Biological Anthropology - MRA Archaeology - BA Archaeology	Biological Anthropology Prehistoric Archaeology Hard Tissue Histology, Microscopy and Imaging Cremation Studies Stress Physiology Burial Taphonomy	
Constantinos Taliotis Post-doctoral Fellow	- PhD Energy and Environmental Systems - MSc Sustainable Technology - BSc Environmental and Resource Sciences	Energy systems analysis Energy policy Energy transition pathways Integrated resource assessment	
Mia Trentin Post-doctoral Fellow	- PhD European Social History from the Middle Ages to the Present Times - MA Palaeography, Diplomacy and Archive Keeping - MA Archaeology and History of Early Italian Middle Ages - MA Medieval History - BSc Conservation of the Cultural Heritage and Management of Cultural Activities	Medieval and Early modern written and graphic culture Travels and socio cultural exchanges in Medieval and Early Modern eastern Mediterranean Medieval and early Modern Building archaeology Historical landscape analysis Digital cultural heritage	
Demetris Charalambous Senior Research Affiliate	- PhD Physics - BA, MA, MEng Engineering Science/ Physics	Theoretical Condensed Matter and General Theoretical Physics Numerical Weather Prediction Atmospheric Predictability	
Filippos Tymvios Senior Research Affiliate	- PhD Applied Physics - MSc Environmental Physics - MSc Public Sector Management - BSc Physics	Neural Network Modeling Numerical Weather Prediction Solar Radiation and Climatic Change	

Name Title	Educational Qualification	Research Interests	Other Duties
Kyriakos Hadjiyiannakou Research Affiliate	- PhD Computational Physics - BSc Physics	HPC Programming and Lattice QCD	
Jean-Daniel Paris Affiliate Researcher	- PhD Meteorology - MSc Radio and Space Sciences - MSc (Engineer) Telecommunications	Global and regional carbon cycle Anthropogenic methane emissions Marine methane sources Atmospheric composition Greenhouse gas metrology	
Konstantina Oikonomou Technical Research Specialist	- MSc Chemistry - BSc Chemistry	Analytical chemistry in Environmental Sciences Experimental characterization of atmospheric aerosols (chemical composition, organic tracers) Spatial/Temporal distribution of air particulate (PM) pollution (long-range transport, multi-year trends) Sources of particulate (PM) pollution in the Eastern Mediterranean and Middle East (desert dust, fossil fuel combustion, biomass burning)	

More details about our Teaching Staff, including CV's, can be found on our website www.cyi.ac.cy

Graduate School Committees

ACADEMIC COMMITTEE

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Assoc. Prof. George Biskos**

Prof. George Christophides

Prof. Constantia Alexandrou

Prof. Thilo Rehren

Prof. Jean Sciare

Assoc. Prof. Nikolas Bakirtzis

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Dr. Michalis Yiangou**

Asst. Prof. Giannis Koutsou

Asst. Prof. Evi Margaritis

Dr. Konstantinos Kleovoulou

Mr. Stefanos Christodoulou

Ms. Ioanna Kyprianou (Student Representative)

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Prof. Salvatore Carlucci

Prof. Jean Sciare

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Asst. Prof. Victor Grigoriev

Asst. Prof. Mihalis Nicolaou

Replacements:
Assoc. Prof. George Biskos
Asst. Prof. Kirsi Lorentz
Asst. Prof. Efthymia Nikita

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Prof. Salvatore Carlucci**

Prof. Costas Papanicolas

Prof. Jean Sciare

Ms. Christiana Melodias (Non-voting)

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Dr. Chrysanthia Leontiou**

Prof. Manuel Blanco

Assoc. Prof. Panos Hadjinicolaou

Asst. Prof. Theodoros Christoudias

Asst. Prof. Efi Nikita

Adjunct Prof. Thanasis Hadzilacos

Dr. Charalambos Chrysostomou

Dr. Konstantinos Kleovoulou

Dr. Jelena Živkovic

Ms. Ioanna Kyprianou (Student Representative)

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Assoc. Prof. Adriana Bruggeman**

Asst. Prof. Theodoros Christoudias

Asst. Prof. Giannis Koutsou

Asst. Prof. Kirsi Lorentz

Dr. Chrysanthia Leontiou

Ms. Ioanna Kyprianou (Student Representative)

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Assoc. Prof. Panos Hadjinicolaou**

Assoc. Prof. Sorin Hermon

Asst. Prof. Victor Grigoriev

Asst. Prof. Mihalis Nicolaou

Dr. Chrysanthia Leontiou

Replacements:
Asst. Prof. Theodoros Christoudias
Asst. Prof. Evi Margaritis
Ms. Athena Zannetti

Chair*

Vice Chair**



The Origins of the Cyl Logo



One of Caesar's rewards to Cleopatra was the restoration of her kingdom to the island of Cyprus, which had been detached by Rome. As a parting gift from Ceasar, a bronze coin of Cleopatra with her infant son, Caesarion was minted in Cyprus, in 47 BC.



On the front of the coin is an idealized portrait of Cleopatra as Aphrodite, the goddess of love, with her son by Caesar, Caesarion, as Eros in front of her. On the reverse are two cornucopiae and a Greek legend which translates: "Of Queen Cleopatra". In addition a stylized Kypr is present to indicate the origin of the coin.



The monogram of The Cyprus Institute is based on the stylized Kypr, updating it and adding the letter 'I' to represent the word 'Institute'. The logo is comprised of the monogram, the name of the Institute and its mission though its three major outputs Research, Technology and Innovation.

Disclaimer

Please note that the information included in this prospectus is updated once per year.

The Prospectus for the academic year 2021-2022 was approved by the Ministry of Education, Culture, Sport and Youth on, August 10, 2021



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