Cyprus
University of
Technology

INVESTORS
IN PEOPLE | Silver
Until 2022

DEPARTMENT OF ELECTRICAL ENGINEERING, COMPUTER ENGINEERING AND INFORMATICS

Department of Electrical Engineering, Computer Engineering and Informatics

Presentation of the MSc in Data Science and Engineering

Dr. Panagiotis Ilia
Lecturer, program co-coordinator

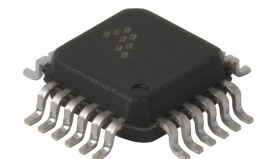## Department of Electrical Engineering, Computer Engineering and Informatics

It brings together the fields of **Electrical Engineering**, **Computer Engineering**, and **Computer Science**

Undergraduate Studies

➢ Electrical Engineering Degree

➢ Computer Engineering and Informatics Degree

Postgraduate Studies

➢ **MSc in Data Science and Engineering**

3

Outline

➢ Analysis of the MSc in Data Science and Engineering

➢ Research conducted by MSc in Data Science and Engineering Faculty

➢ Collaborations with Public and Private Sector

➢ Closing Remarks

Outline

➢ **Analysis of the MSc in Data Science and Engineering**

➢ Research conducted by MSc in Data Science and Engineering Faculty

➢ Collaborations with Public and Private Sector

➢ Closing Remarks

What is Data Science and Engineering? (1/2)

➢ The emergence of internet, cloud and multimedia technologies rendered them an integral part of everyday life, both in the workplace and in areas of personal life

➢ The recording and storage of this data by the providers of these information systems and services is now a routine process, due to the now petty cost of large database systems

➢ Based on these developments, the design and implementation of large-scale analysis systems is a major technological, scientific and business challenge of our time

What is Data Science and Engineering? (2/2)

➢ Systems that have the ability to process in real-time large volumes of data in order to extract useful information of very high added value to guide decision-making processes

➢ Typical cases of organizations where huge volumes of data are collected on a daily basis, competitive knowledge industries such as social networks, search engines, pharmaceuticals, large hospitals, defense systems companies, the banking sector (risk assessment, capital management), as well as large retail companies

Why study Data Science and Engineering at CUT? (1/2)

➢ In 2015, it was among the very first Master's degree in data science in Greece, Italy, Spain, Cyprus, Malta, and the Balkans

➢ It is the new, dynamically emerging technological and scientific field that aims to develop methods and technologies to successfully address precisely the aforementioned business cases

➢ It is offered by a combination of experienced academics, with extensive international experience in most aspects of Data Science and Engineering

Why study Data Science and Engineering at CUT? (2/2)

➢ It encompasses large-scale data processing, storage, and management systems

➢ It teaches highly-complex statistical analysis methods and systems to predict and conclude in uncertainty environments, to apply optimal decision-making techniques based on the results of the analysis, and to employ large-scale network theory for inference and analysis in large-scale systems

Program's Purpose and Objectives

Offer students high quality advanced education in the field of Data Science and Engineering

Meet the modern needs of industry and market globally and offer students opportunities for original research and contribution in the field of Data Science and Engineering

Educate students from a variety of academic backgrounds, ranging from computer engineers, mathematics, to mechanical engineers or other related subjects

Help students specialize in cutting-edge technology areas with a Master's thesis, supervised by the department's academic staff

The graduates of our program are able to (1/2)

➢ Formulate appropriate questions that can be answered using the data available in an organization, and to interpret the results of their decision-making analysis in a correct and strategic way

➢ Develop and efficiently manage very large-scale data storage and processing systems

➢ Develop appropriate models of statistical machine learning to draw high value-added conclusions and forecast future trends/behaviours using the available data

The graduates of our program are able to (2/2)

- Develop and implement efficient software systems for the analysis of large-scale real-time data

- Understand the legal and ethical dimensions and obligations arising from data management and analysis

- Choose the appropriate hardware architectures for the purposes of data analysis of each different organization

Duration of the MSc

PROGRAM REQUIREMENTS	ECTS
Compulsory Courses (7 courses)	53
Elective Courses (1 course)	8
Postgraduate research work (Thesis)	30
Total ECTS	91

➢ 3 semesters plus summer period (full-time study)
➢ 8 semesters (part-time study)

The first two semesters entail 30 and 31 ECTS
The third (fall) semester and the summer period entail 30 Thesis ECTS

Academic Transcripts, and a Curriculum Vitae (C.V.)

University degrees or a confirmation letter that states that the candidate is expected to graduate before he/she starts the postgraduate programme

Student Admission Requirements

A brief Personal Statement of goals and research interests (approximately 500 words) in which the candidate explains why he/she wishes to pursue a graduate programme at CUT

Any other certificates and documents, such as samples of relevant academic or professional work (publications, articles, portfolios etc.) according to the internal rules of graduate studies of each Department where the application is submitted

14

A/A	Course Type	Course Name / Instructor	Course Code	Periods per week	Period duration	Number of weeks	Total periods/ Academic semester	Number of ECTS
				Spring Semester				
1	Compulsory	Advanced Topics in Software Engineering	CEI 521	3	50	13	39	7
2	Compulsory	Advanced and Distributed Operating Systems	CEI 522	4	50	13	52	8
3	Compulsory	Data Science	CEI 523	4	50	13	52	8
4	Compulsory	Network Science	CEI 524	3	50	13	39	7

Analysis of the MSc in Data Science and Engineering

A/A	Course Type	Course Name / Instructor	Course Code	Periods per week	Period duration	Number of weeks	Total periods/ Academic semester	Number of ECTS
				Spring Semester				
5	Elective	Natural Language Processing	CEI 525	3	50	13	39	8
6	Compulsory	Advanced Topics in Data Processing Systems	CEI 526	3	50	13	39	8
7	Compulsory	Research Methods in Comp. and Informatics Engineering	CEI 527	4	50	13	52	7
8	Elective	Deep Learning	CEI 528	3	50	13	39	8
9	Compulsory	Web Security and Privacy	CEI 529	3	50	13	39	8

Teaching Methods

➢ Lectures/presentations (PowerPoint-based, interactive, videos)

➢ Use of computing equipment and networks infrastructure in courses related to specialized topics (e.g., networks, large-scale data processing, etc.)

➢ Supporting/supplementary lectures with exercises and applied case-studies

➢ Case studies and real-world group projects for practical courses (e.g., Software Eng., Data Science, Network Science, Web Security, etc.)

➢ Exposure and experience in a variety of computing tools and programming platforms

Assessment of Learning Outcomes

Presentation of research articles

Oral questions and answers in the class

Summaries of research papers

Homework

Group projects

Final Exams

Consultation with thesis advisor

Employment Prospects for Students/Graduates (1/2)

➢ We create the first generation of graduates in the European South with high-level qualifications that allow them to claim a competitive share in the international division of work in this fast-growing and very well-paid subject of Data Science and Engineering

➢ We give students the opportunity to apply their new knowledge to interdisciplinary projects, simulating the real working conditions of the Data Scientist and Engineer

➢ Students develop skills in the use of the most modern tools and analytical methods, and on how the results of the analysis should be best used by an organization

Employment Prospects for Students/Graduates (2/2)

➤ All our graduates are hired by local and international companies (e.g., Telefonica, UCL, AMDOCS, NCR, MPI-SWS, Forex Companies, Foody, etc.)

➤ The degree has built a very good reputation among local industry stakeholders

➤ Top graduates are competitive for PhD studies (e.g. enrolment in PhD programs in UCL, TU-Berlin, etc.)

After Graduation…

➢ Students have the opportunity to continue their studies in a PhD at our university and leading universities abroad (e.g., UCL)

➢ At the same time, several students work in the numerous funded research projects of the department

➢ The department also offers scholarships based on performance and socio-economic criteria

➢ Due to the option of part-time attendance, our program attracts excellent professionals currently active in the industry

Examples of MSc in DSE Graduates

Google Scholar

	All	Since 2019
Cited by		
Citations	5249	5137
h-index	31	31
i10-index	44	44

Savvas Zannettou

Assistant Professor at Delft University of Technology
Verified email at tudelft.nl - Homepage

Computational Social Science   Hate Speech   Misinformation   Memes

FOLLOW

TU Delft
Delft University of Technology

UCL

Antonis Papasavva

PhD researcher at University Collage London
Verified email at ucl.ac.uk - Homepage

Social Media   Internet Measurement   Data Science   Cybersafety

Disturbed YouTube for kids: Characterizing and detecting inappropriate videos targeting young children
K Papadamou, A Papasavva, S Zannettou, J Blackburn, N Kourtellis, ...
Proceedings of the international AAAI conference on web and social media 14 …
126 * 2020

Raiders of the lost kek: 3.5 years of augmented 4chan posts from the politically incorrect board
A Papasavva, S Zannettou, E De Cristofaro, G Stringhini, J Blackburn
Proceedings of the international AAAI conference on web and social media 14 …
102 2020

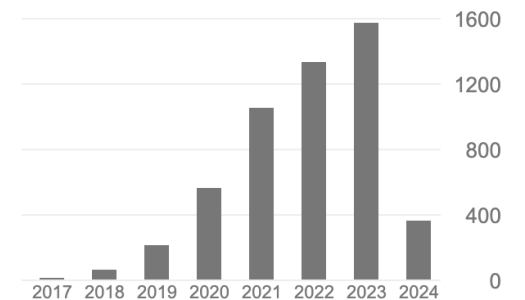"Is it a qoincidence?": An exploratory study of qanon on voat
A Papasavva, J Blackburn, G Stringhini, S Zannettou, ED Cristofaro
Proceedings of the Web Conference 2021, 460-471
79 * 2021

The gospel according to Q: Understanding the QAnon conspiracy from the perspective of canonical information
A Papasavva, M Aliapoulios, C Ballard, E De Cristofaro, G Stringhini, ...
67 * 2022

22

Outline

➢ Analysis of the MSc in Data Science and Engineering

➢ **Research conducted by MSc in Data Science and Engineering Faculty**

➢ Collaborations with Public and Private Sector

➢ Closing Remarks

Digital Heritage Research Laboratory (DHRLab) UNESCO Chair

Software Engineering and Intelligent Information Systems Research Lab (SEIIS)

Data Intensive Computing Research Lab (DICL)

Transferring research results to teaching

Thesis occasionally leads to publications

Network Systems and Science Research Lab (NetSySci)

Statistical Machine Learning Lab (SML)

Social Computing Research Center (SCRC)

Publications and Citations

During the last 7 years

➤ 329 Conference Paper

➤ 348 Journal Articles

➤ 18 Book Chapters

➤ 6 Books

➤ 1 Patent

36900* citations since 2017

Year	Citations
2017	3139
2018	3713
2019	4392
2020	5105
2021	6102
2022	6761
2023	6988
2024	701

25
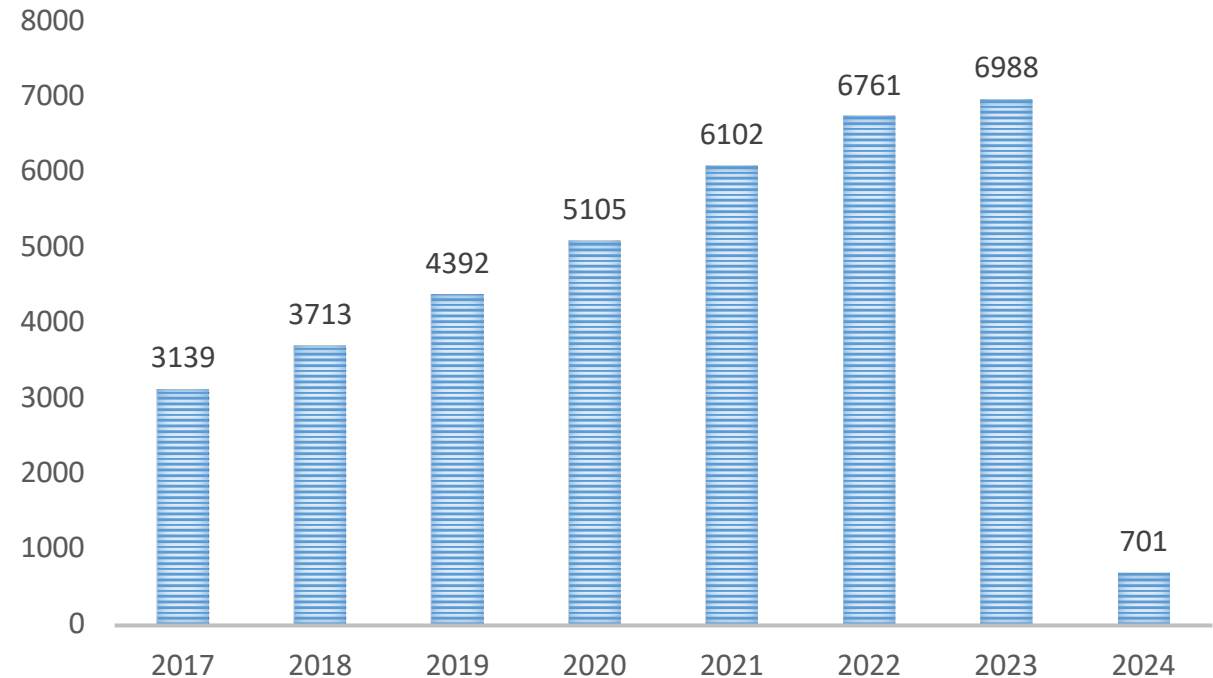
External Funding Mechanisms

H2020

ICT--FP7

Marie Curie—FP7

Interreg Euro-Med

Research & Innovation Foundation

H2020--Twinning

26

Selected Research Projects (1/2)

- MNEMOSYNE: "EU ERA Chair in Digital Cultural Heritage", **H2020 ERA Chair, 2.5M Euro**

- ViMM: "Virtual Multimodal Museum", **H2020 CULT-COOP, 0.6M Euro**

- ITN-DCH: "Initial Training Networks for Digital Cultural Heritage: Projecting our Past to the Future", **FP7 Marie Curie ITN, 0.7M Euro**

- ReCRED: "From Real-world Identities to Privacy-Preserving and Attribute-based CREDentials for Device-centric Access Control", **H2020 Digital Security, 0.5M Euro**

- ENCASE: "ENhancing seCurity and privAcy in the Social wEb: a user-centered approach for the protection of minors", **H2020 Marie Curie RISE, 0.6M Euro**

- DESTINI: "Smart Data ProcESsing and SysTems of Deep INsIght", **H2020 Twinning, 0.5M Euro**

Selected Research Projects (2/2)

- aiD: "aRTIFICIAL iNTELLIGENCE for the Deaf", **H2020 Marie Curie RISE, 0.5M Euro**

- TV-HGGs: "Time-Varying Hyperbolic Geometric Graphs", **Cyprus RIF, 0.6M Euro**

- INCOGNITO: "IdeNtity verifiCatiOn with privacy-preservinG credeNtIals for anonymous access To Online services", **H2020 Marie Curie RISE, 0.25M Euro**

- SECONDO: "a Security ECONomics service platform for smart security investments and cyber insurance pricing in the beyonD 2020 netwOrking era", **H2020 Marie Curie RISE, 0.25M Euro**

- CONCORDIA: "Cyber security cOmpeteNCe fOr Research anD InnovAtion", **H2020 CYBERSECURITY, 0.25M Euro**

- AERAS: "A cybEr range tRaining platform for medicAl organisations and systems Security", **H2020 Marie Curie RISE, 0.2M Euro**

28

International Rankings

CSRankings: Computer Science Rankings

World		
323 ▶ Université Paris Dauphine	1.3	11
323 ▶ Victoria University of Wellington	1.3	17
323 ▶ Virginia Commonwealth University	1.3	10
381 ▶ Bauhaus University Weimar	1.2	3
381 ▶ Bielefeld University	1.2	6
381 ▶ Bilkent University	1.2	10
381 ▶ Boğaziçi University	1.2	5
381 ▶ City University of London	1.2	14
381 ▶ Cleveland State University	1.2	7
381 ▶ Cyprus University of Technology	1.2	4
381 ▶ ETS Montreal	1.2	10
381 ▶ Ecole Normale Superieure de Cachan	1.2	14
381 ▶ GSSI	1.2	9
381 ▶ Georgia State University	1.2	9

Europe		
109 ▶ Université Jean Monnet	1.3	8
109 ▶ Université Paris Dauphine	1.3	11
140 ▶ Bauhaus University Weimar	1.2	3
140 ▶ Bielefeld University	1.2	6
140 ▶ Bilkent University	1.2	10
140 ▶ Boğaziçi University	1.2	5
140 ▶ City University of London	1.2	14
140 ▶ Cyprus University of Technology	1.2	4
140 ▶ Ecole Normale Superieure de Cachan	1.2	14
140 ▶ GSSI	1.2	9
140 ▶ Hamburg University of Technology	1.2	8
140 ▶ IMDEA Networks Institute	1.2	11
140 ▶ Middle East Technical University	1.2	6
140 ▶ Polytechnic University of Catalonia	1.2	11

29

Outline

➢ Analysis of the MSc in Data Science and Engineering

➢ Research conducted by MSc in Data Science and Engineering Faculty

➢ **Collaborations with Public and Private Sector**

➢ Closing Remarks

Research Collaborations (1/6)

International Collaborations with Academia

- CITY UNIVERSITY OF LONDON

- UNIVERSITY OF PATRAS

- FORTH

- UNIVERSITA DEGLI STUDI ROMA TRE

- ARISTOTELIO PANEPISTIMIO THESSALONIKIS

- UNIVERSITY COLLEGE LONDON

- UNIVERSITY OF PIRAEUS RESEARCH CENTER

- UNIVERSITY OF SURREY

- UNIVERSITY OF GREENWICH

Research Collaborations (2/6)

International Collaborations with Academia

- UNIVERSIDAD CARLOS III DE MADRID

- UNIVERSITAET DER BUNDESWEHR MUENCHEN

- UNIVERSITEIT TWENTE

- UNIVERSITE DU LUXEMBOURG

- UNIVERSITE DE LORRAINE

- UNIVERZA V MARIBORU

- UNIVERSITAT ZURICH

- UNIVERSITA DEGLI STUDI DELL INSUBRIA

Research Collaborations (3/6)

International Collaborations with Academia

➢ IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE

➢ UNIVERSITA DEGLI STUDI DI MILANO

➢ UNIVERSITY OF OSLO

➢ UNIVERSITY OF LANCASTER

➢ UNIVERSITAT PASSAU

➢ PANCYPRIAN SCHOOL FOR PARENTS

➢ UNIVERSITY OF CYPRUS

➢ OPEN UNIVERSITY OF CYPRUS

➢ CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE TELECOMUNICAZIONI

33

Research Collaborations (4/6)

International Collaborations with Enterprises

- AEGIS IT RESEARCH GMBH

- PANEPISTIMIAKO GENIKO NOSOKOMEIO IRAKLEIOU

- UNIVERSITY GENERAL HOSPITAL OF HERAKLION PAGNI

- TELEFONICA INVESTIGACION Y DESARROLLO SA

- SIGNAL GENERIX LIMITED

- CYPRUS RESEARCH AND INNOVATION CENTER LTD

- LSTECH ESPANA SL

- CERTSIGN SA

- FOGUS INNOVATIONS & SERVICES P.C.,

Research Collaborations (5/6)

International Collaborations with Enterprises

- KROMAR MESITES ASFALEION MONOPROSOPI EPE

- UBITECH LIMITED, VERIZON NEDERLAND BV

- VERIZON NEDERLAND BV

- WEDIA LIMITED

- UPCOM BVBA

- EXUS SOFTWARE LTD

- UPCOM BVBA

- MTN (EPIC) CYPRUS LTD

- SA, ALLIANZ SE

Research Collaborations (6/6)

International Collaborations with State Agencies/Enterprises

➢ MINISTRY OF EDUCATION AND CULTURE

➢ DIGITAL SECURITY AUTHORITY

➢ CYPRUS NEUROSCIENCE & TECHNOLOGY INSTITUTE

➢ CYPRUS TELECOMMUNICATIONS AUTHORITY

36

Outline

➢ Analysis of the MSc in Data Science and Engineering

➢ Research conducted by MSc in Data Science and Engineering Faculty

➢ Collaborations with Public and Private Sector

➢ **Closing Remarks**

❑ Emphasis on Teaching, Research and Contribution to Society

❑ So far:

➢ Our teaching quality is recognized by the high employment rate of our graduates and the good reputation of the MSc degree among undergraduates and academics
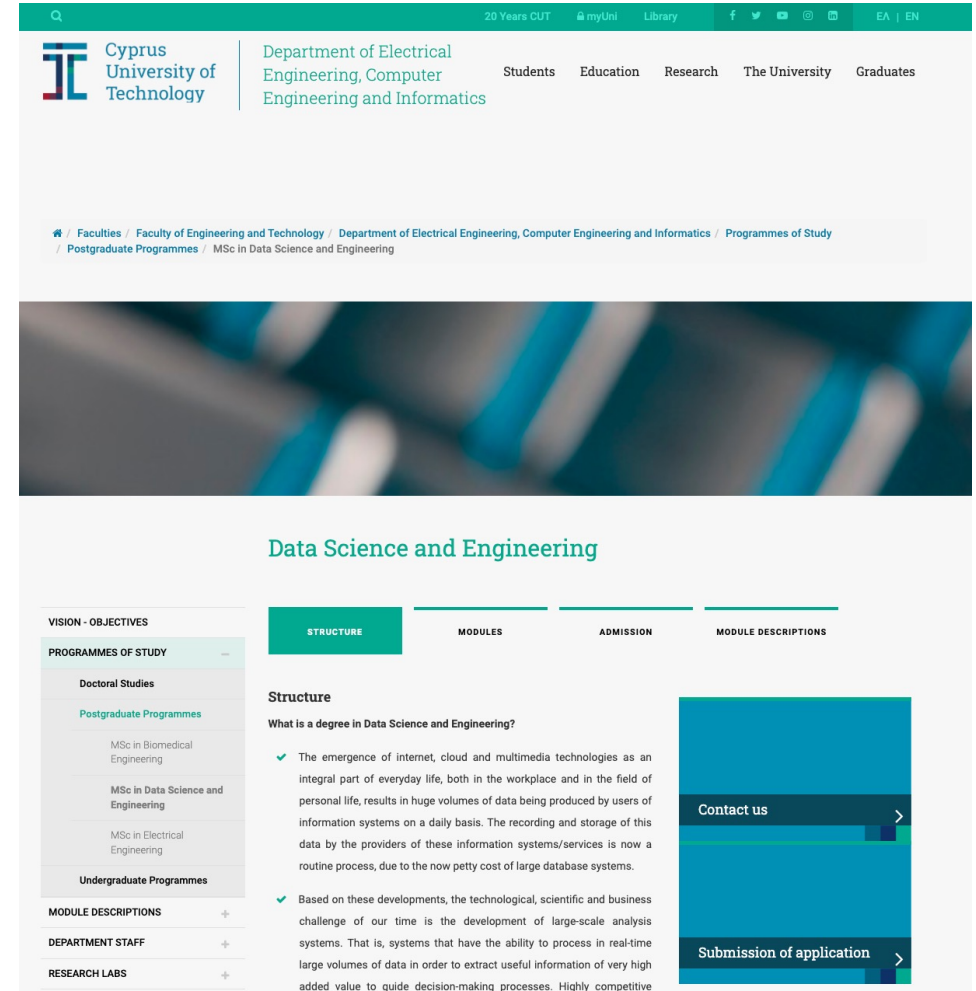
➢ The faculty is very successful in attracting external research funding and publishing in top-tier venues

➢ The department has strong links with society, market and industry (seminars & training sessions, technology awareness, social inclusion, creation of new jobs, etc.)

Closing Remarks

Thank you!

https://www.cut.ac.cy/faculties/feteecei/degrees/postgraduate/msc-data-engineering/