TECHNICAL UNIVERSITY OF CRETE
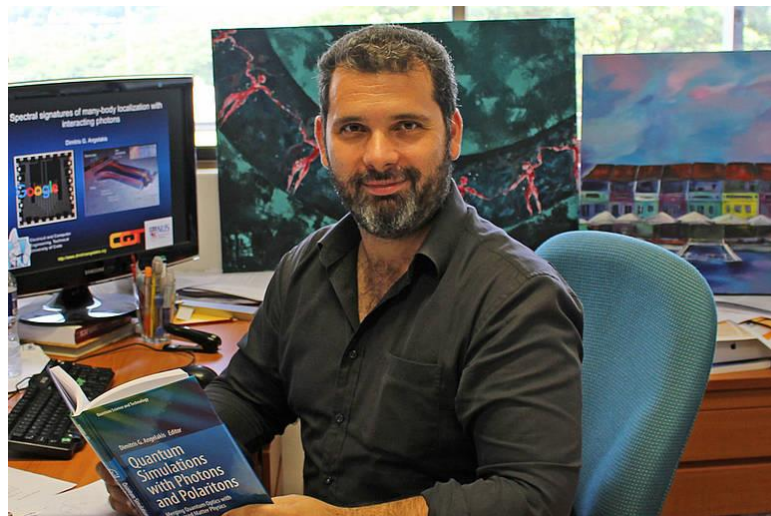
In the spotlight

Awards & Distinctions

January 2017 – December 2017

www.tuc.gr

Copernicus Masters Awards Ceremony
Tallinn, Estonia, November 2017
Image: © AZO

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In March 2016, the External Evaluation Committee of the Hellenic Quality Assurance & Accreditation Agency (HQA) [www.hqaa.gr] evaluated the Technical University of Crete at the highest possible rank: "**Worthy of Merit**". "*Research is a core mission of the Institution and as a result, TUC delivers scientific output of high calibre and volume. In terms of research publications, TUC is one of the most productive research institutions in Greece and compares very favorably with peer institutions in Europe and North America. The number of grant-funded projects has more than doubled since 2012.*" With these words, the HQA External Evaluation Report for the Technical University of Crete confirms the high-level research produced by TUC.

In addition, in the ShanghaiRanking's [www.shanghairanking.com] Global Ranking of Academic Subjects for the year 2017, the Technical University of Crete, ranked 151-200 in the subject of Civil Engineering and 31st in the list of the world's best universities for Oil, Gas, and Petroleum Engineering, according to the results of the CEOWORLD magazine university rankings.

This booklet describes selected international distinctions of our institution during the year of 2017, beginning with the most recent ones.

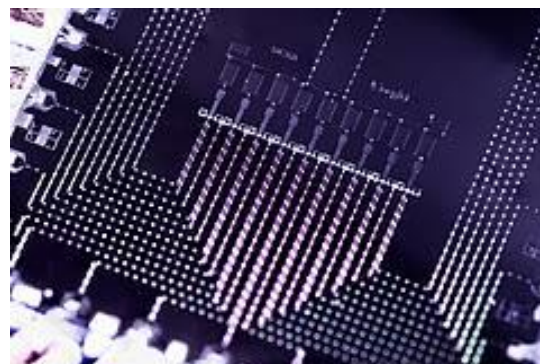## The research group of Dimitris Angelakis collaborates in quantum simulations on Google's superconducting chip

TUC Associate Professor Dimitris Angelakis
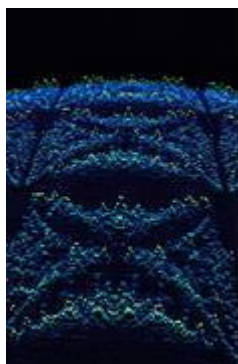
Quantum Butterfly
Photo Credit:
Visual Science and Google Inc.

Google's 9-Qubit Chip
Photo Credit: Erik Lucero, Google Inc.

The research group of **Dimitris Angelakis,** Associate Professor at TUC and Principal Investigator at the Centre for Quantum Technologies, has collaborated with the scientists building Google's quantum chips to simulate complex phenomena in physics. The team has published a study of the Hofstadter butterfly and many-body localisation in the famous journal **Science**. Using a chain of nine superconducting quantum bits (qubits), the collaborators simulated the surprising and beautiful pattern of the 'Hofstadter butterfly', a fractal structure first predicted in 1976 to describe the behavior of electrons. The team also studied the complex phenomenon of 'many-body localisation'. This is a quantum phase transition – akin to the phase change that happens when water freezes into ice – that determines whether materials are conductors or insulators. The results, published in Science, show how quantum simulators are starting to live up to their promise as powerful tools. With group members Jirawat Tangpanitanon and Victor Bastidas, Angelakis collaborated with the group led by John Martinis at Google and the University of California, Santa Barbara. The CQT teams are theorists who contributed to developing the ideas for the experiments – often in group Skype calls with Pedram Roushan, a quantum electronics engineer at Google. The experiments relied on the team's invention of a novel spectroscopy technique they dub 'hit and listen'. The technique maps the energy levels of light particles, photons, stored in the nine qubits.

Professor Ioannis Tsanis appointed as an Associate Fellow Member of GERICS

Ioannis Tsanis, Professor of the School of Environmental Engineering at the Technical University of Crete, was appointed as an **Associate Fellow Member** of the **Climate Service Center Germany (GERICS)**. GERICS was initiated by the German Federal Government in 2009 as a fundamental part of the German high tech-strategy for climate protection. Since June 2014, GERICS has been a scientific organizational entity of Helmholtz-Zentrum Geesthacht – Zentrum für Material – und Küstenforschung GmbH. Dr. Tsanis is the Director of the Water Resources Management and Coastal Engineering Laboratory at the Technical University of Crete, and a Professor Emeritus of the Department of Civil Engineering at McMaster University, Canada.

International Distinctions for SenceLab at the 'Copernicus Masters' competition

Images: © AZO

Two prizes were awarded to two projects of the Spatial Informatics research group of the Geodesy and Geomatics Engineering Laboratory (SenseLab) at TUC in the context of the international competition «**Copernicus Masters**», namely Space Oscars!

- **1st place** under the category challenge European Commission Big Data, for the project:
  SandMap: Real time tangible interactive maps fostering Earth Observation

- **3rd place** under the category challenge e-Government, for the project:
  SafAIR: Smart cities, safe cities using EO and environmental crowdsourcing

Experts from industry and research were tasked with selecting one winner for each challenge. All winners were announced as part of a festive Awards Ceremony on November 7, 2017 in Tallinn, Estonia. The jury selected the project SandMap, because "*it successfully addresses the requirements and objectives of this challenge. It will make Sentinel data easier to use, it will bring the data very close to pupils and students, and it uses the new cloud-based e-infrastructure called DIAS. We congratulate the team of the Technical University of Crete on this promising project.*"

About the Project: SandMap visualises Earth observation and geospatial information onto 3D sand formations that respond to shape changes imposed by users in real-time. The main functions of SandMap include real-time adaptive visualisation of any 3D information (contours, inclination, visibility), as well as interactive similarity exercises to familiarise students with geography. It also offers adaptive scenario modelling by placing miniature coded objects on the sand (representing people, vehicles, etc.), and a VR headset connection in order to virtually experience any area, its morphological changes (e.g. landslides) and all Sentinel multi-spectral data in first person views. SandMap capital introduces a whole new scale of interactive education and adaptive modelling for decision makers, transforming Big Spatial Data to Smart Data. It promotes geographic awareness as a novel interactive education tool. It also advances a wide range of modelling applications: natural disasters, emergency management, security, agriculture, healthcare, e-Government and more. It is a must-have for every school and command centre.

Team members: Assistant Professor Panagiotis Partsinevelos, Achilles Tripolitsiotis, Sarantis Kyritsis, Aggelos Antonopoulos, Dimitrios Chatziparashis, Ioannis Brellas, Sotirios Liliopoulos, George Vastardis, Androniki Petrou.

TUC Professor in the top 1.5% of the Social Sciences Research Network according to the international "Top Authors" ranking

According to the rankings "SSRN Top Authors" (05/11/2017) and "SSRN Top Business Authors" (01/11/2017) - as well as a series of earlier monthly rankings issued by the Social Science Research Network (SSRN) - **Fotios Pasiouras,** Associate Professor with the School of Production Engineering and Management at TUC, was ranked: (a) **in the top 1.5% of the SSRN,** according to the "SSRN Top Authors" list, taking into account all the social science authors registered in SSRN (approximately 350,000 authors worldwide) and the all-time total number of downloads of their research papers, and (b) **in the top 3.5% of the SSRN,** according to the "SSRN Top Authors" list, taking into account the same number of authors and the number of downloads over the last twelve months only. He was also included in the list "SSRN Top Business Authors", which is restricted to authors affiliated with Business Schools around the world.

Professor Costas Synolakis broke the 10,000 citation level as reported by Google Scholar

[Costas Synolakis](#), Professor of Natural Hazards with the School of Environmental Engineering at TUC, broke the **10,000 citation level as reported by Google Scholar**. Professor Synolakis is the Director of TUC's Natural Disasters and Coastal Engineering Laboratory (NDCEL); he is also Professor with the Viterbi School of Engineering at the University of Southern California (USC) and the Director of USC's Tsunami Research Center (TRC). He is the Chairman of UNESCO's IOC Review Board on the Pacific Tsunami Warning Center and, formerly, he was the President of the Hellenic Centre for Marine Research.

He was awarded the 2014 Sergey Soloviev Medal of the European Geosciences Union on natural hazards and the 2015 Moffat and Nichol Award of the American Society of Civil Engineers. Professor Synolakis was elected on 17 March 2016 as the 45th member of the Academy of Athens, which is the only National Academy of Greece. He is the 4th Academician in the 90-year history of the Academy of Athens to hold the Chair of Earth Sciences. Professor Synolakis is the leading tsunami engineer, whose research over the past three decades spans a wide array of topics including: tsunamis, coastal engineering, water wave theory, breaking waves, run-up, near-shore processes, seismology, marine geosciences, and volcanism.

TUC ranked in the range 151-200 of the Civil Engineering subject in the ShanghaiRanking's Global Ranking of Academic Subjects

The [Academic Ranking of World Universities (ARWU)](#) was first published in June 2003 by the Center for World-Class Universities (CWCU), Graduate School of Education of Shanghai Jiao Tong University, China, and is updated on an annual basis. Since 2009, the Academic Ranking of World Universities (ARWU) has been published and copyrighted by the ShanghaiRanking Consultancy. More than 1200 universities are actually ranked by ARWU every year and the best 500 are published.

At the ShanghaiRanking's Global Ranking of Academic Subjects 2017, **TUC was ranked in the 151-200 range in the subject area of Civil Engineering.**

To be included in a subject ranking, the universities need to have a minimum number of research publications during the period of 2011-2015. The publication threshold is different for different subjects. Bibliometric data are collected from InCites. In particular, the rankings were based on the weighted total scores from five indicators measured during the period of 2011-2015:

- The number of papers authored by an institution in an Academic Subject
- Category Normalized Citation Impact (CNCI)
- International Collaboration (IC)
- The number of papers published in Top Journals in an Academic Subject for an institution
- The total number of the staff of an institution winning a significant award in an Academic Subject.

Apart from TUC, five Greek Higher Education Institutions are ranked in the ARWU list in the subject area of Civil Engineering.

Best Student Paper Award to School of ECE Ph.D. Candidate
How music and radio stations can assist agriculture

George Vougioukas, Ph.D. candidate at the School of Electrical & Computer Engineering (ECE) of TUC, received the single **Best Student Paper Award** at the 8th annual IEEE International Conference on RFID Technology & Applications (RFID-TA), in Warsaw, Poland for the paper: *Georgios Vougioukas and Aggelos Bletsas, "24μW 26m Range Batteryless Backscatter Sensors with FM Remodulation and Selection Diversity".* This work describes how FM radio stations, transmitting music kilometres away, can «illuminate» ultra-low cost and power wireless and battery-less sensors that can be received by any commodity FM receiver (e.g., in smartphones). The sensors exploit reflection radio techniques, so that information can be modulated with an intelligent and low energy way, on top of existing broadcasting signals from radio stations. Know-how from advanced reflection/backscatter radio techniques, developed in recent years at the Technical University of Crete, is exploited and applications relevant to soil moisture humidity sensing have been demonstrated. In a few words, this work shows how our favourite music from FM radio stations can assist agriculture!

George Vougioukas graduated with excellence from TUC's ECE School and received the Diploma in Electrical and Computer Engineering in 2016. He continues his graduate studies towards a Ph.D. at the same school under the supervision of Associate Professor Aggelos Bletsas.

Professor Nikos Varotsis receives the 2017 Outstanding Technical Editor Award by SPE

Every year, the **Society of Petroleum Engineers (SPE)** recognizes members who have made an exceptional effort to ensure the technical excellence of the Society's peer-reviewed journals. **Nikos Varotsis**, Professor of the School of Mineral Resources Engineering at TUC, has been selected by the SPE Journal Associate Editors to receive the **2017 Outstanding Technical Editor Award,** for his contribution and for his dedication to technical excellence provided to authors, to SPE, and to the industry. Professor Varotsis, together with other honorees received his award at the Publications Reception that was held in San Antonio, Texas, USA on October 8, 2017 during SPE's Annual Technical Conference & Exhibition.

Professor Nikos Varotsis holds a Chemical Engineering degree from the National Technical University of Athens, Greece, M.Eng. and Ph.D. degrees in Petroleum Engineering from Heriot-Watt University, Scotland and he is Director of the PVT & Core Analysis Laboratory of TUC.

SPE is the largest individual member organization serving managers, engineers, scientists and other professionals worldwide in the upstream segment of the oil and gas industry.

TUC among the World's Best Universities for Oil, Gas, and Petroleum Engineering in 2017

The Technical University of Crete **is 31st in the list of the world's best universities for Oil, Gas, and Petroleum engineering,** according to the results of the 2017 CEOWORLD magazine university rankings.

This list also includes the following schools: McDougall School of Petroleum Engineering at the University of Tulsa, University of Aberdeen, Montanuniversität Leoben, Pennsylvania State University, IFP (Institut Français du Pétrole), The University of Texas at Austin, Delft University of Technology, Colorado School of Mines, Polytechnic University of Turin (Politecnico di Torino), Texas A&M University, University of Oklahoma, Robert Gordon University, University of Louisiana at Lafayette, New Mexico Institute of Mining and Technology, University of Pittsburgh, DTU, Norwegian University of Science and Technology, Stanford

University, China University of Petroleum, Imperial College, Heriot Watt Institute of Petroleum Engineering, University of Stavanger and others.

World's best universities for Oil, Gas, and Petroleum engineering in 2017 by the CEOWORLD magazine is based on **six major indicators of quality,** so that the overall Score (100%) is the sum of:

1) Academic reputation
2) Admission eligibility
3) Job placement rate
4) Recruiter feedback
5) Specialization
6) Global reputation and influence

Data for these indicators are collected from publicly available sources, university's website, the magazine's research, and survey. They measure the quality of education, job placements of students, and the recruiters' feedback, without relying on university data submissions. Students, industry professionals, and recruiters are asked to rate universities on a scale from 1 "marginal" to 100 "outstanding" or "don't know."

Master's in Petroleum Engineering among the best programs in Europe for an Oil and Gas Career according to drillers.com

Petroleum Engineering postgraduate program of the Technical University of Crete is among the 12 top European programs for a petroleum engineering, technology or geoscience course, according to www.drillers.com - a professional network for the Oil and Gas Industry (top picks for European University Oil and Gas courses).

«*The Technical University of Crete made it onto our list mainly because of its industry connections and fine reputation. Also, the popular holiday destination of Crete would be a wonderful place to study, with its natural beauty and rich history. Greece, officially the Hellenic Republic or Hellas as called from ancient times has a reputation for academia, but due to the recent financial issues, would be very affordable if you're taking time out of work for a masters' degree. Industry connections, sponsors and collaboration partners include Schlumberger, Hellenic Petroleum and Geotech*.»

The drillers.com list also includes the following schools: The University of Aberdeen, IFP (Institut Français du Pétrole), Delft University of Technology, Montanuniversität Leoben, The University of Stavanger, Heriot Watt Institute of Petroleum Engineering, Imperial College, Norwegian University of Science and Technology (NTNU), Robert Gordon University, Technical University of Denmark (DTU), Polytechnic University of Turin (Politecnico di Torino).

"Magna Mater", a team from three Greek Universities, has been awarded the 3rd prize in a student biomimicry innovation challenge

"Magna Mater" is the Greek team from the Technical University of Crete, the National Technical University of Athens, and the Aristotle University of Thessaloniki, that has been named as the **third prize winner in the student category of a global design challenge focused on climate change solutions.**

Over 100 teams entered the 2017 Biomimicry Global Design Challenge, answering the call to apply biomimicry, or nature-inspired design, to develop solutions to reverse or adapt to the climate change. In the open category, winning teams have been chosen to receive a cash prize and an invitation to enter the 2017-2018 Biomimicry Accelerator, which culminates in the $100,000 **Ray C. Anderson Foundation** Ray of Hope Prize™.

In the student category, the third place team from Greece emulated coral calcification to create a design that sequesters carbon dioxide from the sea. This team created CO_2 EUS (CO_2 Efficient Uptake System), a device that sequesters excess carbon dioxide (CO_2) seawater into calcium carbonate ($CaCO_3$). This design aims to enhance the ocean's capacity to absorb and process CO_2, ultimately contributing to the re-stabilization of the carbon cycle. The team will receive a $750 cash prize.

Team members:

Nikolaos Kontonikolis (Technical University of Crete | School of Electrical & Computer Engineering)
Theodoros Bechlivanis (Aristotle University of Thessaloniki | School of Chemical Engineering)
Nelli Kanata, Xanthi–Lida Katopodi & Natalia Bartzoka (National Technical University of Athens | School of Chemical Engineering)

Foteini Agrafioti among tech leaders in Canada's top 40 under 40

Caldwell partners and MNP have released its **list of Canada's Top 40 Under 40,** highlighting Canada's up-and-coming leaders. Canada's Top 40 Under 40 is a dynamic awards program that identifies outstanding young achievers in Canadian business, visionaries and innovators changing the way things are done; and each one of them is under the age of forty. **The top 40 under 40 list includes TUC alumna Foteini Agrafioti,** together with CEOs, CFOs, executives, and entrepreneurs, Canada's top technological and medical minds and a multiple Olympic gold medalist. **Dr. Foteini Agrafioti is the Chief Science Officer and Head of RBC Research, RBC.** The recipients were selected from more than 900 nominations nationwide by the top 40 Advisory Board, composed of respected and experienced individuals from across Canada, leaders in their industries, professions, and communities.

TUC Eco Racing team is the winner of the Shell Eco Marathon 2017 Safety Award in the Urban Concept category

[TUC Eco Racing (TUCer)](#) team of the Technical University of Crete participated for the 10th time in the [Shell Eco Marathon 2017](#) which took place in London, UK, from 25th to 28th of May, 2017. The entries, from 29 countries around Europe exceeded 170, however TUCer remains the only Greek participant in the Urban Concept category. TUCER team studies, designs and develops green zero emission urban vehicles powered by hydrogen fuel cells and/or batteries since 2007, at TUC. **For the fourth year in a row, TUCer won the Shell Eco Marathon Safety Award in the Urban Concept category,** for the excellent blend of vehicle design and safety, as well as the excellent approach to safety while working at the event. The team also shared some of their hydrogen sensors with another team – demonstrating the Shell Eco-marathon spirit of collaboration. The safety manager of Shell's pumping platforms noted that his company has a lot to learn from the TUCer team and the Director of Linde's in UK and Africa explained that the TUCer team won the award performing much ahead of the rest of the teams as far as safety issues are concerned.

2017 Team Members: Spanoudakis Polychronis, Piperidis Savvas, Saradinoudis Nicolaos, Papadokokolakis Eftychios, Moschopoulos Gerasimos, Stefanoulis Theodoros, Giannis Ioannou and Tsourveloudis Nikolaos.

Professor Stelios Mertikas became member of the Mission Advisory Group in the European Space Agency

Professor **Stelios Mertikas** has become a member of the Mission Advisory Group in the European Space Agency that will take the lead in advising the Agency on the Sentinel-6/Jason-CS Mission until the end of post-launch Switch-On and in Orbit Verification (planned for 2020). This Mission Advisory Group is formed in respond to the need to capture the requisite scientific/technical skills needed for independent, informed advice to the Project Managers of the transatlantic and cooperative Sentinel-6/Jason-CS mission. MAG members are appointed "Ad-persona", on the basis of their skills, and ability to deliver sound, independent and unprejudiced advice to the European Space Agency.

Distinction for Professor Konstantinos Zopounidis in the area of operational research and management science

Konstantinos Zopounidis, Professor of the School of Production Engineering & Management at TUC, has been recognized as one of the most productive and influential authors in the European Journal of Operational Research (EJOR). According to a 40th Anniversary Paper entitled "Forty years of the European Journal of Operational Research: A bibliometric overview" (Volume 262, Issue 3, 1 November 2017, Pages 803-816), Professor Zopounidis is placed 28th out of 50 OR & MS scientists who have published in EJOR and are considered to be the most productive and influential authors in those areas. The paper presents a general overview of the journal over its lifetime by using bibliometric indicators. The results indicate that EJOR is one of the leading journals in the area of operational research (OR) and management science (MS), with a wide range of authors from institutions and countries from all over the world publishing in it.

Associate Professor Fotios Pasiouras was ranked in the top 4% authors-researchers in economics

Fotios Pasiouras, Associate Professor at the School of Production Engineering and Management and member of the Financial Engineering Laboratory at the Technical University of Crete was ranked **in the top 4% authors - researchers in economics** in the world based on his publications over the last decade. According to the ranking (January 2017) of the bibliographic database **IDEAS/RePEc** he was included in the top 4% of the list "'Top 10% Authors – Last 10 years publications". This ranking was the outcome of the evaluation of a total of 49,208 registered authors in economics from around the world based on number of research/academic criteria relative to their publication record over the last ten years (number of citations, Wu-index, H-index, Number of Distinct Works Weighted by Recursive Impact Factor, Downloads, etc.)

IDEAS / RePec is the largest bibliographic database dedicated to the general discipline of Economics (financial economics, banking economics, macroeconomics, microeconomics, health economics, public economics, etc.) in the world indexing over 2,200,000 items of research from academic journals and 13,734 economic institutions (universities and other research active institutions).

# Most Cited Transportation Research by the Dynamic Systems and Simulation Laboratory
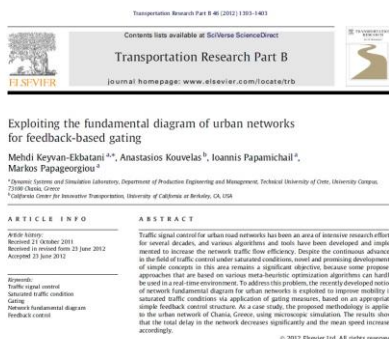
The paper *"Keyvan-Ekbatani, M., Kouvelas, A., Papamichail, I., Papageorgiou, M.: Exploiting the fundamental diagram of urban networks for feedback-based gating"* authored by TUC members, was mentioned as one of the **Most Cited Articles** published since 2012, according to the web site of **Transportation Research - Part B: Methodological Articles** (Scopus data). Transportation Research - Part B is the scientific journal with the highest Impact Factor (3.8) in the Transportation subject area.

Paper Abstract:

Traffic signal control for urban road networks has been an area of intensive research efforts for several decades, and various algorithms and tools have been developed and implemented to increase the network traffic flow efficiency. Despite the continuous advances in the field of traffic control under saturated conditions, novel and promising developments of simple concepts in this area remains a significant objective, because some proposed approaches that are based on various meta-heuristic optimization algorithms can hardly be used in a real-time environment. To address this problem, the recently developed notion of network fundamental diagram for urban networks is exploited to improve mobility in saturated traffic conditions via application of gating measures, based on an appropriate simple feedback control structure. As a case study, the proposed methodology is applied to the urban network of Chania, Greece, using microscopic simulation. The results show that the total delay in the network decreases significantly and the mean speed increases accordingly. © 2012 Elsevier Ltd.

Best Freeway Operations Paper in 2016
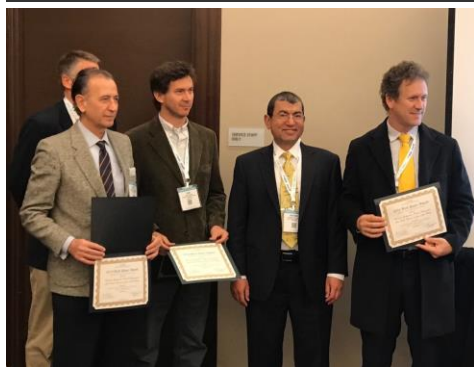
The TRB (Transportation Research Board) paper of ''*Spiliopoulou, A., Papageorgiou, M., Herrera, J.C., Muñoz, J.C.: Real-time merging traffic control at congested freeway off-ramp areas"* authored by TUC members was selected as the **Best Freeway Operations Paper in 2016.** The paper was presented at the TRB's 95th Annual Meeting, Washington, D.C., in January 2016 and the award was received during the 96th Annual Meeting of the TRB, Washington, D.C., on January 10, 2017. Best Freeway Operations Paper is a prestigious award that is given annually to the highest rated freeway operations related paper published by TRB. The paper was selected as the top paper by the TBR Freeway Operations Committee from over 50 papers that were received from all around the world.

A Distinction for Highly Cited Research from the editors of the Scientific Journal "Progress in Organic Coating"

An Elsevier distinction for **Highly Cited Research** in the scientific Journal **"Progress in Organic Coating"** was awarded to **P. Maravelaki,** Associate Professor of the School of Architecture and **C. Capridaki,** post-doctoral researcher, in recognition of the contribution to the quality of the journal made by the paper: **"TiO2-SiO2-PDMS nano-composite hydrophobic coating with self-cleaning properties for marble protection»**. The paper was published in 2013 and was highly cited in 2014 and 2015 up until June 2016 according to data from Scopus.

TUC Eco Racing team was the winner of the Shell Eco Marathon 2017 Safety Award in the Urban Concept category. The team participated with the advanced vehicle, named Spyros Louis, honoring the great Greek Olympic Marathon winner.

Panoramic view of the Technical University of Crete Campus

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TECHNICAL UNIVERSITY OF CRETE

PUBLIC & INTERNATIONAL RELATIONS DEPARTMENT