



Doctoral Vacancy Announcement form

Research Topic Title: Modelling and Simulation of active matter microengineering

No. of Openings: 1

Description:

Over the past decade, active catalytic colloids have emerged as a prototypical system for studying self-propelled motion at microscopic scales, with promising applications in microfluidics, micro-machinery, and therapeutics. Their motion in a viscous fluid hinges on their ability to induce surface slip flows from self-generated solute gradients.

This doctoral work will explore self-propulsion, suspension dynamics, and fluid–structure interactions at the microscale, contributing to the design of next-generation microengineering and soft robotic systems. The successful candidate will develop theoretical and computational models combining fluid mechanics, transport phenomena, and interfacial physics.

Required Qualifications:

Candidates should possess a Bachelor's and postgraduate degree of Master's level from accredited Universities in Chemical/Mechanical Engineering, Applied Mathematics, Physics, Material Science, or any other related field, have strong analytical and numerical skills, and be fluent in English.

Funding: Available, PhD Fees waived

Research Advisor:

Name/Surname: Panayiota Katsamba

Position: Lecturer

Email: panayiota.katsamba@cut.ac.cy



Research Topic Title: Design of coatings with anti-bacterial embeddings to combat AMR in high-risk settings

No. of Openings: 1

Description: Antimicrobial resistance (AMR) is a critical global health threat, responsible for 1.27 million deaths in 2019 and contributing to nearly 5 million more. This crisis demands innovative solutions to combat resistant pathogens.

Antimicrobial coatings help reduce infections by preventing microbial growth on high-touch surfaces, medical devices, textiles, and food packaging. Beyond healthcare, they have potential in wastewater treatment (WWT), where AMR hotspots emerge.

Antimicrobial-agent-embedded coatings offer an innovative approach to mitigating AMR risks by selectively targeting resistant bacteria while minimizing disruptions to beneficial microbial populations. This doctoral research will focus on the design and development of polymer-based antimicrobial coatings, with embedded antimicrobial agents. This will be achieved through a combination of modelling, computational and experimental work, that will investigate the kinetics of the antimicrobial agent-bacteria interactions, the interplay between microscale phenomena of diffusion, absorption and flow. The balance between these components will be tuned according to the competences of the selected candidates.

Required Qualifications: Candidates should possess a Bachelor's and postgraduate degree of Master's level from accredited Universities in Chemical Engineering, Biotechnology, Bioengineering, Environmental Engineering or any other related field and must be fluent in English. Applications from candidates in Applied Mathematics with a strong track-record in biomedical, industrial, engineering or environmental applications are also encouraged.

Funding: Available, PhD Fees waived

Research Advisor:

Name/Surname: Panayiota Katsamba

Position: Lecturer

Email: panayiota.katsamba@cut.ac.cy



Research Topic Title: Addressing Uncertainty in the in-silico design of circular composite materials

No. of Openings: 1

Description: Our ever-increasing waste production, averaging to about 5000kg per person and totalling 2.2 Billion tonnes across EU annually, requires accelerating our transition to a Circular Economy. At the heart of this endeavour lies waste valorisation, emphasized as a cornerstone for sustainable growth, by the European Union's Circular Economy Action Plan. A key challenge is addressing the uncertainty in material and morphological properties of materials derived from waste streams. In-silico design supports material development, by reducing trial and error experimentation. In the case of circular composite materials, in-silico material design requires addressing the uncertainty in material properties of constituents so that the uncertainty in the end-product is minimised and falls within acceptable QA standards.

This doctoral work will combine homogenisation techniques for composite materials, FEM simulations with Uncertainty Quantification techniques of Statistics, such as Bayesian and Monte Carlo methods. The successful candidate will extend current homogenisation techniques to address the uncertainty in morphological shapes of reinforcing additives in composite materials and the material properties of the matrix and inclusions.

The selected candidate will join an interdisciplinary research team with strong expertise in in-silico material design, mathematical modeling, computational simulations.

Required Qualifications:

Candidates should possess a Bachelor's and postgraduate degree of Master's level from accredited Universities in Chemical/Mechanical Engineering, Applied Mathematics, Physics, Material Science or any other related field and to be fluent in English.

Funding: Available, PhD Fees waived

Research Advisor:

Name/Surname: Panayiota Katsamba

Position: Lecturer

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Research Topic Title: Modelling and simulations of the dynamics of degrading microplastics in complex environmental conditions and settings

No. of Openings: 2

Description: One of the grand challenges of our generation, and many to come, is understanding and mitigating the impact of microplastics on the environment and human health. As plastic pollution continues to escalate, driven by increasing production and inadequate waste management, microplastics have become pervasive contaminants in marine, freshwater, and terrestrial ecosystems. Their persistence, capacity to adsorb toxic substances, and potential for bioaccumulation raise critical concerns about long-term ecological and health consequences.

Addressing this challenge requires a multidisciplinary approach that integrates advanced modeling, computational simulations, and experimental studies to unravel the complex mechanisms governing microplastic degradation, transport, and interactions with biological and chemical systems. By improving our understanding of these processes, we can develop more effective strategies for monitoring, predicting, and ultimately reducing the risks associated with microplastic pollution.

The doctoral openings will examine complex microscale phenomena of degrading microplastics, examining the effect of anisotropic particle geometries, surface degradation phenomena and environmental conditions, in fluidic or porous media. The balance between modelling, computational work (and potential experimental work) will be tuned according to the competences of the selected candidates.

The selected candidate will join an interdisciplinary research team with strong expertise in mathematical modeling, computational simulations (Prof Tom Montenegro-Johnson, University of Warwick), laboratory work and microplastic pollution research (Prof Stefan Krause, University of Birmingham).

Required Qualifications: Candidates should possess a Bachelor's and postgraduate degree of Master's level from accredited Universities in Chemical/Environmental/Mechanical/Bio Engineering, Applied Mathematics, Physics, Material Science or any other related field and to be fluent in English.

Funding: Available, PhD Fees waived

Research Advisor:

Name/Surname: Panayiota Katsamba

Position: Lecturer



Research Topic Title: Separation of liquid-liquid mixtures

No. of Openings: 1

Description: Liquid-liquid mixtures are common in industrial processes, such as oil and gas production, chemical manufacturing, pharmaceuticals, and food processing. Dispersed liquid-liquid mixtures naturally separate under the influence of gravity due to density differences. Their separation behaviour is governed by the interplay between droplet settling, drop-drop coalescence, and drop-interface coalescence. This project will investigate the separation of polydisperse liquid-liquid mixtures in gravity settlers and horizontal pipes through combined experimental and modelling studies. The outcomes will contribute to the optimisation of industrial separators and the development of predictive tools for liquid-liquid systems.

Required Qualifications:

- Undergraduate degree in Chemical Engineering, or a related field.
- Experience with MATLAB / Python / gPROMS / OpenFOAM or similar tools.
- Fluent in English.
- Previous experience in fluid mechanics, multiphase systems, or mathematical modelling will be considered an advantage.

Funding:

- Full tuition waiver in the form of a scholarship according to the decisions of the 236th Session of the Rector's Council.
- Funding will be made available through my start-up grant.

Research Advisor:

Name/Surname: Nikola Evripidou

Position: Lecturer

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Research Topic Title:		Energy and Meteorology	
No. of Openings:	2		
Description:	Electricity production from Photovoltaics (PVs) is heavily dependent on local meteorological phenomena, especially cloud type and cloud cover. Thus, in order to further promote the penetration of small-scale roof-top PVs in cities, the effect of clouds on PVs and the prediction of electricity production from these systems needs to be understood and any problems should be resolved. The current project addresses this topic and a software will be developed based on a novel methodology (patent pending) for the prediction electricity production from PVs.		
Funding:	Not applicable		
Required Qualifications:	Successful candidates should possess Bachelor's and Master's degrees from an accredited University in Mechanical or Electrical Engineering or Physics. They should have experience in computer software (Python/C++/Matlab/GIS/etc) and should be willing to engage in interdisciplinary work on energy and meteorology.		
Research Advisor:			
Name/Surname:	Alexandros Charalambides		
Position:	Associate Professor		
Email:	a.charalambides@cut.ac.cy		



Research Topic Title:		Creating Local Ecosystems of Climate Innovation	
No. of Openings:	2		
Description:	The aim of the research is to measure and analyze the effect of local traditions for the development of integrated regeneration practices for a sustainable future through innovation and entrepreneurship. Existing practices in South-East Europe (Greece, Croatia, Western Balkans, Cyprus) and the whole of the Middle East-North Africa (MENA region) will be studied and compared with more developed countries (Israel, Korea, USA, etc). Furthermore, the role of "champions" and of "regional development policies" will be an integral part of this research.		
Funding:	Not applicable		
Required Qualifications:	Successful candidates should possess a Bachelor's and/or Master's degrees from an accredited University in Business and/or Management and/or Environmental Studies or in a relevant field. Should be willing to engage in interdisciplinary work on climate studies, engineering and innovation.		
Research Advisor:			
Name/Surname:	Alexandros Charalambides		
Position:	Associate Professor		
Email:	a.charalambides@cut.ac.cy		



Research Topic Title: Use of nanoparticles in Cells for Therapeutic Applications

No. of Openings: 1

Description: Aims of the Project: Synthesis of nanoparticles in flow systems for therapeutic applications. Design of Au-based functionalised colloidal nanoparticles for cancer diagnosis and potential treatment. Study the effect of size and shape, and final morphology. Use of monometallic and bimetallic nanoparticles based on Au, Ag and Cu. Study the effect of stabiliser. Apply the synthesised nanoparticles for possible biomedical applications, such as: Targeted Drug Delivery, Enhanced Imaging, Therapeutic Agents Multifunctionality, Overcoming Drug Resistance and Personalized Medicine. CFD modelling on the formation of the AuNPs and mechanistic studies for cancer applications.

Required Qualifications: Candidates should possess an undergraduate degree and postgraduate qualification at the Master level from accredited universities in chemical engineering, or any other related field. A strong background in computer programming using MATLAB, gPROMS, COMSOL Multiphysics or similar languages is required

Funding: n/a

Research Advisor:

Name/Surname: Dr Achilleas Konstantinou

Position: Associate Professor

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Research Topic Title: Waste PVC Thermolysis as a Recycling Route

No. of Openings: 1

Description: With rapid economic growth and massive urbanization, waste-to-energy technology is recognized as a renewable source of energy and is playing an increasingly important role in municipal solid waste (MSW) management. Plastic solid waste is growing rapidly as world bank data suggests and PVC is playing a pivotal role in the accumulation of waste due to its rapid use in almost every household across the world. Pyrolysis of plastic solid waste (PSW) has gained importance due to having better advantages towards environmental pollution and reduction of carbon footprint of plastic products by minimizing the emissions of carbon monoxide and carbon dioxide compared to combustion and gasification.

In this work the pyrolysis of PVC waste which will be reclaimed from various sources and conditions, shall be treated in TG & TG-IR set-up to study its mechanism and determine its fuel like gases that are to be evolved against time of reaction. Process modelling of the thermolysis process will be the key aspect of this research work in order to optimise the reactor design and conditions as well the pyrolysis oil yield.

Required Qualifications: Candidates should possess an undergraduate degree and postgraduate qualification at the Master level from accredited universities in chemical engineering, or any other related field. A strong background in computer programming using MATLAB, gPROMS, COMSOL Multiphysics or similar languages is required

Funding: n/a

Research Advisor:

Name/Surname: Dr Achilleas Konstantinou

Position: Associate Professor

Email: a.konstantinou@cut.ac.cy



Research Topic Title:

Application of Advanced Oxidation Processes (AOPs) for the detoxification of cyanotoxin contaminated water

No. of Openings: 1

Description:

The presence and subsequently the removal of micropollutants like pesticides, hormones, medical drugs and naturally occurring toxic metabolites (cyanotoxins) from water resources comprises a challenge for the water and wastewater industry. In order to remove micropollutants in trace concentrations from water resources chemical oxidation technologies such as ozonation and advanced oxidation processes (AOPs) are increasingly used to treat different types of source water and wastewater. The aim of this thesis is to explore the potential application of various AOPs for the removal of a group of natural toxins produced from the toxic strains of cyanobacteria, commonly known as cyanotoxins. The study aims to determine the tested AOPs efficiency and energy demands, toxicity of end product and unveil the transformation products. This will be a collaborative project with the University of Gdansk in Poland (Prof. Hanna Mazur-Marzec).

Required Qualifications:

Successful candidates must possess a Bachelor's degree from an accredited University in Chemistry or Chemical Engineering or Biochemistry and/or a postgraduate degree (Master level) from an accredited University in the field of Environmental Chemistry, Analytical Chemistry, Toxicology, Environmental Science or Environmental Engineering. The candidates must be fluent in English. Previous experience in the above-mentioned research topic will be considered as an advantage.

Funding:

N/A

Research Advisor:

Name/Surname: Maria G. Antoniou

Position: Associate Professor

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Research Topic Title:

Detection and removal of taste and odor compounds from surface waters contaminated with cyanobacterial harmful blooms (cyano-HABs)

No. of Openings: 1

Description:

Cyanobacteria (blue-green algae) are phototrophic microorganisms and represent an essential component of the food web in all aquatic ecosystems. However, certain strains of cyanobacteria have the ability to produce bioactive secondary metabolites along with taste and odor compounds that make the water unfit for use. Climate change and anthropogenic activities are major contributors towards the more frequent and prolonged appearance of cyanobacterial harmful blooms (Cyano-HABs) across the globe, adding further pressure on scarce fresh water supplies. In order to mitigate the effects of cyanobacteria and cyanotoxins measurements need to be taken at source. This study aims to apply advanced analytical techniques to identify taste and odor compounds (beyond the terpenoids geosmin and MIB) apply various physico-chemical methods for restoring cyanobacterial contaminated sites. This will be a collaborative project with the Technical University of Crete (Prof. Elia Psillakis).

Required Qualifications:

Successful candidates must possess a Bachelor's degree from an accredited University in Chemistry, Environmental Engineering, Chemical Engineering and/or a postgraduate degree (Master level) from an accredited University in the field of Environmental Chemistry, Analytical Chemistry, Environmental Science or Environmental Engineering. The candidates must be fluent in English. Previous experience in the above-mentioned research topic will be considered as an advantage.

Funding:

N/A

Research Advisor:

Name/Surname: Maria G. Antoniou

Position: Associate Professor

Email: maria.antoniou@cut.ac.cy



Research Topic Title: Development of Sustainable Packaging Solutions Based on Microalgal Biomass & Side Streams

No. of Openings: 1

Description: Developing novel and efficient packaging solutions to improve product quality, shelf life and reduce waste, is a major challenge to improve sustainability of food and cosmetics supply chains. The objective of the thesis is the introduction of economically and environmentally sustainable packaging materials based on microalgal biomass and the evaluation of the effect of novel biodegradable packaging systems on the quality and safety of perishable food and cosmetics in the supply chain of EU. Major food-derived residues will be exploited for production of bioplastics (PHB) and bioactive compounds (polyunsaturated fatty acids - PUFAs) through co-cultivation of microalgae with bacteria, aiming to maximize the productivity of the specific biomolecules under extreme culture conditions. The formulation of sustainable packaging as well as assessment of its effect on the quality and safety of food and cosmetics will be conducted via fully funded placements in research groups and companies participating in AQUAPACK (<https://aquapack.aua.gr/>), which are located in Italy, Greece, Portugal, UK, Croatia, The Netherlands, Spain and France. Thus, the successful candidate will be offered the opportunity for cross-cutting interdisciplinary knowledge exchange, technology transfer and training to improve employability and career prospects.

Required Qualifications: Candidates should possess a Bachelor's and postgraduate degree of Master's level from accredited Universities in Chemical Engineering, Chemistry, Biotechnology, Bioengineering, Biology, Environmental Engineering or any other related field and to be fluent in English. Past practical experience in bioprocess development will be an advantage.

Funding: The project is supported via AQUAPACK (an MSCA Staff Exchanges EU funded programme), which includes fully-funded research secondments of the student in different European countries. The successful candidate will be offered up to a maximum of 12 months secondments (in one or several mobility periods, split stays are allowed), where the candidate will receive a net amount of €2300 per month of secondment.

Research Advisor:

Name/Surname: Michalis Koutinas

Position: Associate Professor, Environmental Bioprocessing Lab (<https://enblab.weebly.com/>), Department of Chemical Engineering

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Research Topic Title: Valorization of Waste Bioplastics Towards Added-Value Products Manufacture

No. of Openings: 1

Description: Although biodegradable plastics are truly biodegradable only under industrial conditions, their leakage to the marine and terrestrial environment should be avoided given that the disposal of bioplastics could enhance the negative impact imposed by “white pollution”. The current Thesis will focus on developing novel bioprocesses for valorisation of major bioplastics, which will be applied without or following aging/pretreatment. Each biopolymer selected will be transformed into the corresponding monomer molecules, which will be subsequently upcycled into biofuels, biomaterials and biochemicals via tailored innovative fermentation strategies. Therefore, the PhD candidate will exploit novel solutions and sustainable methods to decrease the pollution caused by bioplastics through their conversion into added-value products.

Required Qualifications: Candidates should possess a Bachelor’s and postgraduate degree of Master’s level from accredited Universities in Chemical Engineering, Chemistry, Biotechnology, Bioengineering, Biology, Environmental Engineering or any other related field and to be fluent in English. Past practical experience in bioprocess development will be an advantage.

Research Advisor:

Name/Surname: Michalis Koutinas

Position: Associate Professor, Environmental Bioprocessing Lab (<https://enblab.weebly.com/>), Department of Chemical Engineering

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