

ZISOS MITROS

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EDUCATION

University College London (UCL) *September 2017 - Present*
PhD Student at the Wellcome EPSRC Centre for Interventional and Surgical Sciences
Primary Supervisor: Dr. Christos Bergeles (KCL)-Secondary Supervisor: Prof. Lyndon daCruz (UCL)
PhD Title: “Design & Modelling of a Multi-Arm Concentric Tube Robot for Interventions in Eye Orbit”

National Technical University of Athens (NTUA) *October 2010 - July 2016*
Diploma in Mechanical Engineering (5 year-long degree) *GPA: 7.72/10*
Mechanical Design specialization
Thesis: “Analysis, Dynamics and Control of Robotic System for Docking to Orbital Space Systems”
Supervisor: Prof. Evangelos G.Papadopoulos, Control Systems Lab (CSL)

Nationwide University Entrance Examination *2010*
Score: 19.198/20.000 (top 5% nationwide)

RESEARCH & WORK EXPERIENCE

Research Interests Robotics, Dynamics, Modelling, Control Theory, Mechanical Design

PhD Student *September 2017 - now*
University College London

Design & Manufacture of a multi-arm snake robot for ultra-minimally invasive surgeries
Modelling & Control of the flexible multi-arm robot taking into account the coupled mechanics and the eccentricity of the manipulation arms

Research Assistant *September 2019 - December 2019*
University of Edinburgh

Modelling & Design of a Push/ Pull Actuated Continuum Robot for Thoracic Interventions

Postgraduate Teaching Assistant (PGTA) - Mentoring *October 2018 - June 2018*
University College London

Engineering Challenges I & II | Design of Manufacture | How to Change the World

Mentoring *May 2019 - present*
King's College London

Christian Duhay (Master's student in Biomedical Engineering)
Leonardo Di Felice (Undergraduate student in Biomedical Engineering)
Zhe Khue Au (Undergraduate student in Biomedical Engineering)

Research Assistant (RA) *May 2017 - September 2017*
National Technical University of Athens, Control Systems Lab

Project's Title: “Control and Management of Robotics for Active Debris Removal”
Mechanical Design, Conducting the required experiments, Document the results

Obligatory military service *September 2016 - December 2017*
Greek Armed Forces

Redaction of daily administrative reports regarding the eight supervised factories

Diploma Student/ Research Assistant September 2016 - December 2017
National Technical University of Athens, Control Systems Lab
 Mathematical modelling of impact docking, Dynamics of a 5-DOF space robot, Control of a manipulator via impedance control methodology
 Assistance in the update of the NTUA planar space emulator (Electronics, CAD Design)
 hArmonised System Study on Interfaces and Standardization of fuel Transfer (CAD Design)

Tutor September 2015 - June 2017
Private School
 Preparation of students for entrance into highest and higher education

Undergraduate Research Trainee October 2013 - December 2014
National Technical University of Athens, Control Systems Lab
 CAD design of the NTUA Single Actuator Hopping Robot (SAHR)
 Design and manufacturing of the reaction wheel of the NTUA planar space emulator

Design of a High Pressure Hydraulic Circuit 2014
National Technical University of Athens
 Semester Project for the course “Hydraulics and Pneumatics”

Public Relations & Fund Raising Group Leader November 2011 - December 2013
National Technical University of Athens, Prom Racing NTUA FSAE Team
 Promotion activity of the team including communication with sponsors and media

SKILLS

Languages	English	Excellent knowledge: CPE University of Michigan, 2008 IELTS, Grade 7, 2016
	French	Basic Knowledge: Diplme d'tudes en langue franaise Level B2, 2007
	German	Basic Knowledge: Goethe-Zertifikat B1 Level B1, 2013
	Greek	Native
Operating Systems	MS Windows, Linux, MAC OSX	
Programming	Matlab/Simulink	
Design Software	Solidworks SolidCam, ANSYS Mechanical	
Other Software	MS Office, Wolfram Mathematica, LaTeX	

PRESENTATIONS & TALKS

2015 “On Inertia and Stiffness Effects During Impact Docking” - ASTRA 2015
 2016 “On Robotic Impact Docking for On Orbit Servicing” - MED 2016
 2018 “Towards Modelling Multi-Arm Robots:Eccentric Arrangement of Concentric Tubes” - BioRob 2018
 2018 “Mechanic Modelling of Eccentrically Arranged Concentric Tubes” - HSMR 2018

HONORS & AWARDS

2014 “**Board of European Students of Technology-NTUA’s Competition**” - 3rd place
 2016 **Thomaidion Award for Scientific Publications, NTUA** for the paper
 “On Inertia and Stiffness Effects During Impact Docking”
 2017 **Thomaidion Award for Scientific Publications, NTUA** for the paper
 “On Robotic Impact Docking for On Orbit Servicing”
 2018 **Thomaidion Award for Scientific Publications, NTUA** for the paper
 “Impedance control design for on-orbit docking using an analytical and experimental approach”

ADDITIONAL COURSES

- 2015, October Underactuated Robotics - MIT (edx) - Completed
2016, January Space Mission Design and Operations - EPFL - Completed

VOLUNTEER EXPERIENCE

- 2015, March European Space Expo, Athens 2015
2015, December “The Robots are back...” workshop organized by Eugenides Foundation
2016, June Coordinator of all the volunteers at MED '16

PAPER REVIEWING

IEEE Transactions on Robotics (T-RO), IEEE Robotics and Automation Letters (RA-L), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), European Control Conference (ECC), IEEE International Conference on Biomedical Robotics and Biomechanics, (BIOROB)

PUBLICATIONS

Journal Publications

1. **Mitros, Z.**, Thamo B., Bergeles, C., DaCruz, L., Dhaliwal K., and Khadem, M., “ Design and Modelling of a Continuum Robot for Distal Lung Sampling in Mechanically Ventilated Patients in Critical Care”, *Frontiers in Robotics and AI Biomedical Robotics* , September 2020 - **under review**
2. **Mitros, Z.**, Sadati, S.M.H., Seneci, C., Bloch, E., Leibbrandt, K., Khadem, M., DaCruz, L., and Bergeles, C., “Optic Nerve Sheath Fenestration with a Multi-Arm Continuum Robot”, *IEEE Robotics and Automation Letters*, vol. 5, no. 3, pp. 4874-4881, July 2020.
3. Mohsen, K., O'Neill, J., **Mitros, Z.**, DaCruz, L., and Bergeles, C., “Autonomous Steering of Concentric Tube Robots via Nonlinear Model Predictive Control”, *IEEE Transactions on Robotics*.

Conference Publications

1. Sadati, S.M.H., **Mitros, Z.**, Henry R., DaCruz, L., and Bergeles, C., “Reduced-Order Real-Time Dynamics of Concentric Tube Robots: A Polynomial Shape (PS) Parametrization”, *IEEE International Conference on Robotics and Automation, (ICRA 21)*, 30-5 June, Xi'an, China - **under review**
2. **Mitros, Z.**, Sadati, S.M.H., Seneci, C., Bloch, E., Leibbrandt, K., Khadem, M., DaCruz, L., and Bergeles, C., “Optic Nerve Sheath Fenestration with a Multi-Arm Continuum Robot”, *IEEE International Conference on Intelligent Robots and Systems, (IROS 20)*, 25-29 October, Las Vegas, USA
3. Mohsen, K., O'Neill, J., **Mitros, Z.**, DaCruz, L., and Bergeles, C., “Autonomous Steering of Concentric Tube Robots with Enhanced Force/ Velocity Manipulability”, *IEEE International Conference on Intelligent Robots and Systems, (IROS 19)*, 3-8 November 2019, Macau, China
4. **Mitros, Z.**, Khadem, M., Seneci, C., Ourserlin, S., DaCruz, L., and Bergeles, C., “Towards Modelling Multi-Arm Robots: Eccentric Arrangement of Concentric Tubes”, *IEEE International Conference on Biomedical Robotics and Biomechanics, (BIOROB 18)*, 26-29 August 2018, Enschede, The Netherlands.
5. **Mitros, Z.**, Khadem, M., Seneci, C., DaCruz, L., and Bergeles, C., “Mechanic Modelling of Eccentrically Arranged Concentric Tubes”, *Hamlyn Symposium on Medical Robotics*, 24-27 June 2018, London, UK.

6. **Mitros, Z.**, Garyfallidis, S., and Papadopoulos, E., “On impedance control on landing mechanisms for comets and planets”, *14th Symposium on Advanced Space Technologies in Robotics and Automation, (ASTRA 17)*, ESA, ESTEC, 20-22 June 2017, Leiden, The Netherlands.
7. **Mitros, Z.**, Rekleitis, G., and Papadopoulos, E., “Impedance control design for on-orbit docking using an analytical and experimental approach”, *IEEE Mediterranean Conference on Control and Automation*, 3-9 July 2017, Valletta, Malta
8. **Mitros, Z.**, Paraskevas, I., and Papadopoulos, E., “On Robotic Impact Docking for On Orbit Servicing” , *IEEE Mediterranean Conference on Control and Automation*, 21-24 June 2016, Athens, Greece
9. Paraskevas, I., **Mitros, Z.**, and Papadopoulos, E., “On Inertia and Stiffness Effects During Impact Docking”, *13th Symposium on Advanced Space Technologies in Robotics and Automation, (ASTRA 15)*, ESA, ESTEC, 11-13 May 2015, Noordwijk, The Netherlands.

Workshop Publications

1. **Mitros, Z.**, Seneci, C., Khadem, M., Leibrandt, K., DaCruz, L., and Bergeles, C., “Towards a flexible multi-arm robot for interventions within the eye orbit”, *IEEE International Conference on Robotics and Automation Workshop, (ICRA Workshop '19)*, 20-24 May 2019, Montreal, Canada
2. **Mitros, Z.**, Khadem, M., Seneci, C., DaCruz, L., and Bergeles, C., “Towards Single-Port Surgery via Multi-Arm Robots Modelling of an Eccentric Arrangement of Concentric Tubes”, *Image Guided Therapies Network+ Meeting*, 28 June 2018, London, UK.