Dr. Sc. Christos Bergeles

Citizen of Greece, Born 21st March 1984

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Languages:
Expert English (Profiencies of Michigan and Cambridge)
Intermediate French (Delf Level I)
Conversational German (∼A3)

Professional Experience

University College London **United Kingdom**
Assistant Professor *September 2015–now*

I am a member of the Wellcome EPSRC Centre for Surgical and Interventional Sciences, and the Translational Imaging Group of the Centre for Medical Image Computing.

Activities and Responsibilities:
- Leading the "Robotics and Vision in Medicine" team (2 post-docs, 4 Ph.D. students, and 3 M.Sc. students).
- Conducting research on light-field imaging, including calibration, imaging formation, and ray-based SfM.
- Supervising research, modelling, and development of endoscopes based on multi-lens arrays.
- Researching Simultaneous Localisation and Mapping from low-resolution endoscopes.
- Research on photoreceptor cell detection in retinal images based on classic machine learning and RNNs.
- Supervising robot development for stem cell implantation in the retina.

Imperial College London **United Kingdom**
Hamlyn Fellow *May 2013–August 2015*

I was a Research Fellow at the Hamlyn Centre for Robotic Surgery, working on image-guided surgical robotics.

Activities and Responsibilities:
- Developed a multi-view 3D reconstruction algorithm for endoluminal scenes (*Matlab*).
- Developed computationally efficient kinematics solvers for the Centre's surgical robot (*C++*).
- Conceived and supervised Ph.D. research on unified visual tracking and shape estimation of flexible robots.

Boston Children's Hospital and Harvard Medical School **United States**
Research Fellow *January 2012–April 2013*

I worked on medical imaging for surgical robot guidance.

Activities and Responsibilities:
- Programmed MRI pulse sequences to actuate and image a magnetic biopsy robot (*Qt, C, C++*).
- Developed path planners that guarantee safe navigation of flexible robots within the human body (*C++*).
- Developed algorithms for the design and in silico evaluatio of patient-specific flexible robots (*Matlab*).

ETH Zurich **Switzerland**
Research Associate *April 2011–December 2011*

I led the evaluation of intraocular microrobots via animal trials, coordinating engineers of the Multiscale Robotics Lab of the Institute of Robotics and Intelligent Systems and the veterinarians of Tierspital Zurich.

ETH Zurich **Switzerland**
Research Assistant *September 2006–March 2011*

Dissertation-related Activities:
- Developed pose estimation algorithms from non-perspective (ophthalmic) images (*Matlab, Qt, C++*),
- Developed image tracking algorithms for soccer-playing microrobots (*Qt, C++*).

Education

ETH Zurich **Switzerland**
Doctor of Sciences *December 2006–March 2011*
Dissertation: "Visually servoing wireless untethered intraocular microrobots".

National Technical University of Athens **Greece**
Dipl.-Ing. Electrical and Computer Engineering *October 2001–July 2006*
First Class Honours (top 1%)
Major in Computer Science, Minor in Signals, Systems, and Robotics.
M. Sc. thesis: "Tracking of moving objects with emphasis on human gestures".

Selected Awards and Honours

2017 NVIDIA Corp. Academic Grants Program - Quadro M5000 donation for deep learning.
2016 IPEM Outstanding M.Sc. Project Award for my student ZuiQui Duan.
2016 EPSRC-funded UCL Future Leaders Award.
2016 TEDMED Research Scholar.
2015 IEEE Trans. Automation Science and Engineering Best Application Paper Award.
2014 Hamlyn Symposium on Medical Robotics, Best Orally Presented Paper Finalist.
2013 IEEE Int. Conf. Robotics and Automation, Best Medical Robotics Paper Finalist.
2011 Int. Conf. Medical Image Computing and Computer-Assisted Intervention, Best Medical Robotics and CAI Systems Paper Finalist.
2011, IEEE Int. Conf. Robotics and Automation, Best Computer Vision Paper Finalist.

Selected Secured Funding

ERC Starting Grant (€1,500,000) **ERC**
Principle Investigator *April 2017–March 2022*
"Peri-ocularly navigated exteroceptive snake robot for novel retinal interventions".

AMS Springboard Grant (£99,876) **Academy of Medical Sciences & Wellcome Trust**
Principle Investigator *September 2016–August 2018*
"3D in-focus endoscopic imaging with light-field cameras: optomechatronics and algorithms".

Selected Academic Publications

1. C. Bergeles, *et al.*, ''Unsupervised identification of cone photoreceptors in non-confocal adaptive optics scanning light ophthalmoscope images", *Biomedical Optics Express*, 2017.
2. A. Vandini, C. Bergeles, *et al.*, "Unified tracking and shape estimation for concentric tube robots," *IEEE Trans. Robotics*, 2017.
3. K. Leibrandt, C. Bergeles, and G.-Z. Yang, "Rapid path-planning for unstable concentric tube robot guidance," *IEEE Robotics and Automation Magazine (RAM)*, 2017.
4. C. Bergeles, *et al.*, "Concentric tube robot design and optimization based on task and anatomical constraints," *IEEE Trans. Robotics (TRO)*, 2015.
5. C. Bergeles, *et al.*, "Visually servoing magnetic intraocular microrobots," *IEEE Trans. Robotics (TRO)*, 2012.
6. C. Bergeles, *et al.*, "Single-camera focus-based localization of intraocular devices," *IEEE Trans. Biomedical Engineering (TBME)*, 2010.