Theodoros Pissas

Birthdate: 8$^{\text{th}}$ of August 1992
Address: Schwarztorstrasse 36, 3007 Bern, Switzerland
Contact: theodoros.pissas@unibe.ch

EDUCATION

University College London London, UK
PhD in Computer Vision for Medical Image Analysis *Sep. 2017 – Sep. 2022*
Supervised by Dr. Christos Bergeles, Prof Lyndon daCruz
Thesis: "Pixel level semantic understanding of ophthalmic images and beyond"

National Technical University of Athens Athens, Greece
BSc and MSc in Electrical and Computer Engineering 8.02/10 (top 15%) *Sep. 2011 – June 2017*
Diploma Thesis: "Action recognition using convolutional and recurrent neural networks"

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

RESEARCH & WORK EXPERIENCE

University of Bern Bern, Switzerland
Post-doctoral researcher *Oct. 2022 – Now*
Research on multimodal learning for medical imaging
- Developing self supervised learning methods for co-training Vision Transformers on visual data from several imaging modalities in ophthalmology (e.g OCT, Fluorescein Angiography, Infrared, RGB images).
- Exploring the ability of these models to transfer to donwstream tasks such as biomarker detection, semantic segmentation and treatment response prediction and in scenarios with limited data and/or missing modalities.

Research on semantic segmentation
- Contributed to the development of a stochastic segmentation method that captures inter-rater variability in labeling.
- Demonstrated the feasiblity of using denoising diffusion models for the task of semantic segmentation.

University College London & Kings College London London, UK
PhD Student/Research Assistant *Sep. 2017 – Sep. 2022*
Research on computer vision for computer-assisted vitreoretinal surgical interventions.
- Developed methods for semantic segmentation of OCT and OCT-Angiography scans for extracting surgically targeted biomarkers such as retinal vessel maps and fluid volumes.
- Developed a training policy that enables strong performance in long-tailed semantic segmentation of surgical video.
- Contributed to the development of a synthetic dataset generation framework for learning optical flow estimation in retinal surgery videos.
- Developed a supervised multi-scale contrastive learning framework that improves semantic segmentation performance of strong baselines across medical and natural scene benchmarks.

National Technical University of Athens Athens, Greece
Undergraduate research intern *June 2016 – June 2017*
Diploma thesis
- Explored convolutional and recurrent architectures for human action recognition in videos using depth and rgb modalities.
- Implemented a deep learning-based real-time gesture recognition system processing using a Kinect sensor and ROS.

PUBLICATIONS

1. Zbinden L., Doorenbos L., **Pissas T.**, Sznitman R. Márquez-Neila P., "Stochastic Segmentation with Conditional Categorical Diffusion Models ", ICCV (2023).

2. **Pissas T.**, Ravasio C., Da Cruz L., Bergeles C., "Multi-scale and Cross-scale Contrastive Learning for Semantic Segmentation", ECCV, (2022).

3. **Pissas T.**, Ravasio C., Da Cruz L., Bergeles C., "Effective semantic segmentation in Cataract Surgery: What matters most", MICCAI, (2021).

4. Komninos, C., **Pissas T.**, Flores B., Bloch E., Vercauteren T., Ourselin S., Da Cruz L, Bergeles C., "Intra-operative OCT (iOCT) Super Resolution: A Two-Stage Methodology Leveraging High Quality Pre-operative OCT Scans Ophthalmic Medical Image Analysis", Ophthalmic Medical Image Analysis, 9th International Workshop, at MICCAI (2022).

5. Komninos C., **Pissas T.**, Flores B., Bloch E., Vercauteren T., Ourseline S., Da Cruz L., Bergeles C., "Intra-operative OCT (iOCT) Image Quality Enhancement: A Super-Resolution Approach Using High Quality iOCT 3D Scans", Ophthalmic Medical Image Analysis, 8th International Workshop, at MICCAI (2021).

6. Varo, Reed K., Alattar K., Zuckerman B., Bunce C., Nderitu P., Alam U., Clarke B., Hau S., Al-Shibani F., Petropoulos I., Malik R., **Pissas T.**, Bergeles C., Vas P., Hopkins D. and Jackson T., "Multimodal testing reveals subclinical neurovascular dysfunction in prediabetes, challenging the diagnostic threshold of diabetes". Diabetic medicine : a journal of the British Diabetic Association (2023).

7. Komninos C., **Pissas T.**, Mekki L., Flores B., Bloch E., Vercauteren T., Ourseline S., Da Cruz L., and Bergeles C., "Surgical Biomicroscopy Guided Intra-operative Optical Coherence Tomography (iOCT) Image Super Resolution", International Journal of Computer Assisted Radiology and Surgery, (2022).

8. **Pissas T.**, Bloch E., Cardoso MJ, Flores B., Georgiadis O., Jalali S., Ravasio C., Stoyanov D., Da Cruz L., and Bergeles C., "Deep iterative vessel segmentation in OCT angiography", Biomedical Optics Express, (2020). **(Editor's Pick)**

9. Ravasio C., **Pissas T.**, Bloch E., Flores B., Jalali S., Stoyanov D., Cardoso MJ, Da Cruz L., and Bergeles C., "Learned optical flow for intra-operative tracking of the retinal fundus." International Journal of Computer Assisted Radiology and Surgery, (2020).

10. Chotzoglou A., Pissas M., Zervaki A.D., Haidemenopoulos G., **Pissas T.**, "Visualization of the Rolling Contact Fatigue Cracks in Rail Tracks with a Magnetooptical Sensor". Journal of Nondestructive Evaluation, (2019).

TECHNICAL REPORTS

1. Luengo I. et al, "2020 CATARACTS Semantic Segmentation Challenge", arXiv preprint (2021).

AWARDS

Cataracts Semantic Segmentation Challenge at MICCAI 2020 - 1st place   October 2020
- Ranked 1st, 1st and 3rd out of 12 teams in the challenge's subtasks.
- Combined state-of-the-art supervised deep learning methods for semantic segmentation of anatomies and instrumentation in cataract surgery videos.
- Explored self-training methods for learning with labeled and unlabelled surgical video.

Teaching and Mentoring Experience

Thesis supervision (KCL-BMEIS)   2020-2022
- Supervised an undergrad working on semantic segmentation of retinal OCT.
- Supervised a Master's student working on self supervised learning with retinal OCT.

Reinforcement Learning COMP0089 (UCL)   2020-2021
- Teaching assistant responsible for coding assignments.

Introduction to Machine Learning COMP0088 (UCL)   2017-2021
- Teaching assistant conducting weekly coding labs and preparing coding assignments.

Technical Skills

Programming: Python, Matlab, C, Assembly x86
Libraries: Tensorflow, Pytorch
Code samples: https://tinyurl.com/4py3a6jk , https://tinyurl.com/mtdb93c2
Tools: Git, Latex, Robotic Operating System (ROS)

Languages

Greek (native) · English (fluent) · French (fluent)

Personal Interests

Sailing athlete of the National Yachting club of Greece   2007 – 2013