
Education

PhD in Engineering Science, University of Oxford,

Since 10.2017

- *Topic*: Machine learning & deep learning for fetal ultrasound video analysis.
- *Funding*: Full scholarship by the University of Oxford.
- *Summer School*: 2018 Medical Imaging Summer School.

MSc Mechanical Engineering, ETH Zurich,

9.2014-6.2017

- Graduated with Distinction; Swiss GPA*: 5.89.
- *Specialization*: Biomedical Engineering, Computer Vision, Robotics, Micro- and Nanotechnology.
- *Master Thesis*: “Motion State Binning for the Reconstruction of 4D Flow Magnetic Resonance Imaging”
- *Summer School*: 10th Zurich Summer School on Multiscale Biomedical Imaging.
- *Exchange Semester*: National University of Singapore; received Exchange Student Scholarship.

BSc Mechanical Engineering, ETH Zurich,

9.2011-9.2014

- Ranked top 7%; Swiss GPA*: 5.23
- *Final Year Project*: “Design and Fluid Mechanical Evaluation of Photobioreactors for a Life Support System in Space”
 - Selected for the 24th parabolic flight experiment campaign of the German Aerospace Center.

Employment

Research Assistant, Cardiovascular Magnetic Resonance Group, ETH Zurich,

4.2017-8.2017

- Accelerated cardiac blood flow imaging (5D Flow MRI).
- Developed, implemented and evaluated an efficient ADMM-based low-rank + sparse image reconstruction algorithm.

Fellow Intern, McKinsey & Company, Düsseldorf, Germany,

4.2016-6.2016

- Developed and implemented a growth strategy for a leading global specialist in energy management and automation.

R&D Intern, Siemens Healthcare MR, Erlangen, Germany,

2.2015-7.2015

- Implemented and advanced a novel method for label-free MR neuro perfusion imaging (multi-TI 3D pCASL).

Teaching Assistant, ETH Zurich,

9.2012-12.2014

- *Stochastics (Probability and Statistics)* for the Department of Mathematics (Fall 2014).
- *Innovation Project* for the Chair in Product Development & Engineering Design (Spring 2013).
- *Technical Drawing and Computer Aided Design* for the Inst. for Robotics & Intelligent Systems (Fall 2012).

Publications

Conference Papers

- **Richard Droste**[†], Jianbi Jiao[†], J. Alison Noble. Unified Image and Video Saliency Modeling. In: *European Conference on Computer Vision (ECCV)*, 2020. – **Spotlight presentation**
- **Richard Droste**, Lior Drukker, Aris T. Papageorghiou, J. Alison Noble. Automatic Probe Movement Guidance for Freehand Obstetric Ultrasound. In: *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2020.
- **Richard Droste**, Pierre Chatelain, Lior Drukker, Harshita Sharma, Aris T. Papageorghiou, J. Alison Noble. Discovering Salient Anatomical Landmarks by Predicting Human Gaze. In: *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2020. – **Oral presentation, runner up for Best Paper Award**
- Jianbo Jiao, **Richard Droste**, Lior Drukker, Aris T. Papageorghiou, J. Alison Noble. Self-supervised Representation Learning for Ultrasound Video. In: *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2020.
- **Richard Droste**, Yifan Cai, Harshita Sharma, Pierre Chatelain, Lior Drukker, Aris T. Papageorghiou, J. Alison Noble. Ultrasound Image Representation Learning by Modeling Sonographer Visual Attention. In: *Information Processing in Medical Imaging (IPMI)*, 2019.
- **Richard Droste**, Yifan Cai, Harshita Sharma, Pierre Chatelain, Aris T. Papageorghiou, J. Alison Noble. Towards Capturing Sonographic Experience: Cognition-Inspired Ultrasound Video Saliency Prediction. In: *Medical Image Understanding and Analysis (MIUA)*, 2019. – **Oral presentation, Best Paper Award.**

- Harshita Sharma, **Richard Droste**, Pierre Chatelain, Lior Drukker, Aris T. Papageorghiou, J. Alison Noble. Spatio-Temporal Partitioning and Description of Full-length Routine Fetal Anomaly Ultrasound Scans. In: *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2019.– **Oral presentation.**

Journal Papers

- Lior Drukker[†], **Richard Droste**[†], Pierre Chatelain, J. Alison Noble, Aris T. Papageorghiou. Safety indices of ultrasound: adherence to recommendations and awareness during routine obstetric ultrasound scanning. *European Journal of Ultrasound* 41(02): 138–145, 2020
- Lior Drukker[†], **Richard Droste**[†], Pierre Chatelain, J. Alison Noble, Aris T. Papageorghiou. Expected-value bias in routine third-trimester growth scans. *Ultrasound in Obstetrics & Gynecology* 55: 375–382, 2020.
- Yifan Cai, **Richard Droste**, Harshita Sharma, Pierre Chatelain, Lior Drukker, Aris T. Papageorghiou, J. Alison Noble. Spatio-Temporal Visual Attention Modelling of Standard Biometry Plane-Finding Navigation. *Medical Image Analysis*, 65: 101762, 2020.

Selected Clinical Abstracts

- Lior Drukker[†], **Richard Droste**[†], J. Alison Noble, Aris T. Papageorghiou. Which landmarks do sonographers look at while acquiring second- and third-trimester standard biometry planes? In *Annual Integrative Ultrasound Meeting (AIUM)*, 2020. – **Oral presentation.**
- Lior Drukker[†], **Richard Droste**[†], Pierre Chatelain, J. Alison Noble, Aris T. Papageorghiou. OC10.02: Bioeffects safety indices of ultrasound: quantifying adherence to recommendations on routine obstetric scan *Ultrasound Obstet. Gynecol.*, 54: 24-24, 2019.– **Oral presentation.**
- Lior Drukker[†], **Richard Droste**[†], Pierre Chatelain, J. Alison Noble, Aris T. Papageorghiou. OC19.02: A novel eye tracking study: how common is expected value bias in fetal growth scan assessment? *Ultrasound Obstet. Gynecol.*, 54: 47-48, 2019. – **Oral presentation.**
- Lior Drukker, **Richard Droste**, Pierre Chatelain, Harshita Sharma, Yifan Cai, Jaan Toots, Mohammed Alsharid, J. Alison Noble, Aris T. Papageorghiou. Monitoring Sonographer Performance: The Perception Ultrasound by Learning Sonographer Experience (PULSE) Study. In *AIUM*, 2019. – **Oral presentation.**

Extracurricular Activities

- Captain**, Oxford University Underwater Hockey Club, **2019-2020**
- Student council member**, Department of Mech. and Proc. Eng., ETH Zurich, **2011-2015**
- Contributed to department politics. Presented at the European Mechanical Engineering Student Council Congress.
- Lead organizer of exam preparation courses**, Department of Mech. and Proc. Eng., ETH Zurich, **2011-2014**
- Organized over eighty non-profit exam preparation courses for roughly six hundred students at the department.
- Elected semester spokesperson**, Department of Mech. and Proc. Eng., ETH Zurich, **2011-2014**
- Elected annually; communicated student concerns to professors; evaluated and improved teaching quality.

Awards and Scholarships

- 2020 Runner up for best paper award at the IEEE Int. Symp. on Biomedical Imaging (ISBI).
- 2019 Best paper award at the 23rd Conference on Medical Image Understanding and Analysis (MIUA).
- 2017 Full scholarship for PhD by the University of Oxford (tuition fees and living costs).
- 2017 Awarded distinction by ETH Zurich for outstanding academic performance.
- 2017 Won 2nd place out of over 140 teams at HackZurich (Europe's largest Hackathon) 2017.
- 2016 Won 2nd place out of over 50 teams at the LauzHack Major League Hackathon 2016.
- 2015 Exchange student scholarship for an exchange semester at the National University of Singapore (tuition fees and travel stipend), awarded by ETH Zurich based on academical merit.

*The Swiss grading scale ranges from 1.0 (very poor) to 6.0 (excellent); Distinction granted in the Master for a GPA above 5.75

[†]Equal contribution.

Skills

Programming	Python, C++, MatLab, Julia, Bash.
Frameworks	PyTorch, Keras, Scikit-Learn, Pandas, Scipy, Numpy.
Software	Git, GNU/Linux, L ^A T _E X, MS Office, Siemens NX (CAD), ANSYS CFX (CFD), Mathematica.
Coursera	Algorithms: Design & Analysis (I&II); Structuring Machine Learning Projects.
Languages	<i>Proficient</i> : English (118/120 TOEFL); <i>Native</i> : German; <i>Beginner</i> : Russian, Italian.