Richard Droste

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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 exmperiment 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. – **Oral presentation**
- **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 MICCAI 2020 Student Travel Award (awarded to the highest scoring first author students).

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, LaTeX, MS Office, Siemens NX (CAD), ANSYS CFX (CFD), Mathematica.
Coursera	Algorithms: Design & Analysis (I&II); Structuring Machine Learning Projects.
Languages	*Proficient*: English (118/120 TOEFL); *Native*: German; *Beginner*: Russian, Italian.