JO SCHLEMPER

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SUMMARY

Currently I **lead the AI team** at Hyperfine, where I delivered several **FDA-approved**, **deep learning based products**, one of which was built on the **state-of-the-art MRI reconstruction techniques** that I developed during my **PhD** at **Imperial College London**. Throughout this process, I contributed to **30+** publications in **machine learning and medical image analysis**, which currently have **7500+** citations, and co-patented **7+** key innovations of which are being used in the products.

PROFESSIONAL EXPERIENCE

Team Lead, Manager - *Hyperfine, CA, USA* Oct 2022 - Present
Staff AI Scientist Jan 2022 - Oct 2022
Senior Deep Learning Scientist Nov 2019 - Dec 2021
Deep Learning Intern Nov 2018 - Mar 2019

- Pioneered a state-of-the-art deep learning (DL) MRI reconstruction algorithm and a novel training framework for reconstructing extremely noisy low-field MRI data with no ground truth.
- Delivered significant contributions to FDA 510(k) clearances for DL reconstruction and AI measurement tools for brain MRI, including designing and deploying models, developing training and evaluation schemes for noisy and heterogeneous dataset with limited labels, and devising and executing verification and validation protocols for the regulatory requirements.
- Conduct research and develop key innovations in: model-based image reconstruction, unsupervised image denoising, reconstruction, and nonrigid registration, simulation-based model training frameworks.
- Mentor a team of senior scientists and interns to help them navigate the R&D process for projects including signal processing, sensor-data denoising, anatomical segmentation, and self-supervised learning.

Machine Learning Research Intern - *Twitter, London, UK* Jun - Sept 2018

- Investigated learned index structure and approximate nearest neighbour systems to improve real-time content-based image retrieval system. (link)

Software Engineer Intern - *Moore Europe Capital Management, London, UK* Jun - Oct 2014

- Worked on front-end projects for their quasi real-time analytic infrastructures for financial analysis and econometrics. The technology involved JavaScript and React framework.

SELECTED PUBLICATIONS

B. Zhou, **J. Schlemper**, et al., "DSFormer: A Dual-domain Self-supervised Transformer for Accelerated Multi-contrast MRI Reconstruction", under review. (link)

N. Dey, **J. Schlemper**, et al., "ContraReg: Contrastive Learning of Multi-modality Unsupervised Deformable Image Registration", under review.

K. Hammernik, **J. Schlemper**, et al., "Systematic evaluation of iterative deep neural networks for fast parallel MRI reconstruction with sensitivity-weighted coil combination." Magnetic Resonance in Medicine, Jun 2021. (link)

J. Schlemper*, O. Oktay*, et al., "Attention Gated Networks: Learning to Leverage Salient Regions in Medical Images". Medical Image Analysis, 2019. (link)

Jinming Duan*, **J. Schlemper*** et al., "VS-Net: Variable Splitting Network for Accelerated Parallel MRI Reconstruction", MICCAI 2019 *(Oral presentation)*. (link)

J. Schlemper et al., "Cardiac MR Segmentation from Undersampled k-space Using Deep Latent Representation Learning", MICCAI, 2018 *(Spotlight Oral, Student Travel Award)*. (link)

J. Schlemper, et al., "Bayesian Deep Learning for Accelerated MR Image Reconstruction". MLMIR, 2018. (link)

J. Schlemper, et al., "A Deep Cascade of Convolutional Neural Networks for Dynamic MR Image Reconstruction". IEEE TMI, Oct 2017. (link)

SELECTED PATENTS

J. Schlemper et al., "Deep learning techniques for magnetic resonance image reconstruction", US Patent App. 16/524,598, US Patent App. 16/524,598. (link)

J. Schlemper et al., "Deep learning techniques for generating magnetic resonance images from spatial frequency data", US Patent App. 16/817,370 (link)

C. Lazarus, **J. Schlemper** et al., "Deep learning techniques for suppressing artefacts in magnetic resonance images", US Patent App. 16/541,511 (link)

COMPETITIONS

fastMRI Image Reconstruction Challenge 2019

- 34 teams participated in the challenge of developing state-of-the-art MR image reconstruction techniques for large-scale knee MR dataset.
- Placed **2nd**, **3rd** and **5th** in "multicoil 4x", "multicoil 8x" and "singlecoil 4x" tracks respectively. (link)

Multi-sequence Cardiac MR Segmentation Challenge (STACOM2019)

- Placed **1st** in the challenge of developing state-of-the-art techniques for segmenting myocardium provided limited data in multi-contrast. (link)

EDUCATION

PhD, Computer Science - *Imperial College London, UK* 2015 - 2019

- Thesis: *Deep Learning for Fast and Robust Medical Image Reconstruction and Analysis* (link)
- Supervisors: Prof. Daniel Rueckert and Prof. Jo Hajnal.
- Specialisation: Deep Learning, Convolutional & Recurrent Neural Networks, Inverse Problems, Image Segmentation, Compressed Sensing, Magnetic Resonance Imaging.

MEng, Mathematics and Computer Science - *Imperial College London, UK* 2011 - 2015

- *First Class Honours*, Dean's List in year 2 (top 3 of the class)
- Thesis: *Deep Belief Network: A step towards modelling Attachment Theory*
- Courses: Machine Learning, Computer Vision, Medical Image Processing, Software Engineering (Algorithm, Design, Practice, Operating Systems, Database), Mathematics (Advanced Algebra, Statistics, Calculus and Analysis)

ACADEMIC EXPERIENCE

Reviewer 2017 - Present

- Active reviewer for IEEE Transactions on Medical Imaging, Medical Image Analysis, Magnetic Resonance in Medicine, NeuroImage, Medical Physics, IEEE DCC, IEEE TCS, etc..

Organising Committee Dec 2017 - Dec 2018
ISMRM Workshop on Machine Learning, Alisomar, CA, USA, 14-17th Mar. 2018
ISMRM Workshop on Machine Learning II, Capital Hilton, DC, USA, 25-28 Oct. 2018.

- Participated in organising ISMRM machine learning workshops. Roles included co-chairing one of the oral presentations, reviewing abstracts, and scheduling.

TEACHING EXPERIENCE

Graduate Teaching Assistant - *Dyson School of Design Engineering, Imperial College London* April 2018

- Computational Intelligence: designed part of the coursework, helped lead the tutorial and practical sessions.

Mathematical Methods Tutor - *Imperial College London* Sep - Dec 2016, 2017

- Provided weekly tutoring for 1st year Computing students. Topics included analysis and linear algebra.

SKILL

Programming	Proficient in Python Competent in Matlab, JavaScript, HTML/CSS, Java, and SQL Familiar with C/C++, Haskell, Prolog, PHP and Assembly.
Libraries	Deep learning frameworks (TensorFlow, PyTorch), Scikit-learn, OpenCV, CUDA
Dev Tools	Emacs, VS Code/PyCharm, Git, CircleCI, Docker, AWS
OS	Mac OSX, Linux (Ubuntu).

LEADERSHIP

President - *Funkology, a hip hop dance society at Imperial College London* 2014 - 2015

- Funkology is a society of more than 100 students and dancers. Responsibilities included financing, annual budgeting, organising events including, weekly classes, workshops with professional UK dancers and socials.
- Crew Leader of the advanced group. Awarded 1st place at Edinburgh 2016/17, 2nd Place Royal Holloway 2013/14.

Publicity Officer - *Funkology* 2012 - 2014

- Responsibilities included development and maintenance of the society website, video editing and any other technology and publicity related tasks.

PASSIONS (other than research!)

- Rock climbing and running (completed NYC marathon in 2020).
- Cooking
- Dancing and choreographing (awarded best male dancer at Edinburgh Dance Competition in 2017).
- Board games, puzzles and maths.