Ryan Charles Timms
Curriculum Vitae

Oxford Centre for Human Brain Activity (OHBA), Warneford Hospital, Oxford, OX3 7JX, UK.
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OVERVIEW

I am a third year PhD student interested in using machine learning to analyse time-series electrophysiological data within a variational Bayesian paradigm. My aim is to develop new analysis techniques which can fully exploit rich temporal data and shed more light onto the healthy and diseased human brain.

EXPERIENCE

PhD/DPhil Student in Computational Neuroscience   2017-present
University of Oxford

Supervised by Professors Mark Woolrich and Steve Smith and Dr Andrew Quinnfffici. We are developing algorithms which combine probabilistic models with machine learning architectures to better analyse M/EEG data.

My current focus is taking a dynamic data-driven approach to the source reconstruction problem using generative models and Stochastic Gradient Variational Bayes with an LSTM/GRU-RNN backend. This allows us to account for between-trial differences in (co)variance and provides more accurate images of underlying brain activity.

Master's Student   2016-2017
University of Nottingham

Collaborating with Professor Kessler at Aston University, we quantified the efficacy of using EEG in a fully immersive virtual reality CAVE. We demonstrated that EEG could be used to study human beings in a simulated stressful environment, and that sufficiently high quality data could be recovered after cleaning and beamforming. Supervised by Professor Matt Brookes and Dr Karen Mullinger. I also worked on short projects using rank vector entropy and canonical correlation analysis.

Research Intern   2016
UCL Great Ormond Street Institute of Child Health

At UCL I worked with Dr David Carmichael on source reconstructing EEG data from paediatric focal epilepsy patients.

EDUCATION

MSci. Physics (First Class, Honours).   2013-2017
University of Nottingham, UK

Master's Thesis: "Measuring Human Brain Dynamics In An Immersive Virtual Reality Environment".

SKILLS

Scientific	Expertise in MATLAB; Proficient understanding of Python and TensorFlow
	Expertise in acquiring EEG data
	6+ years' experience using SPM for analysing M/EEG data
	Machine Learning (Neural Networks, Stochastic Gradient Variational Bayes, etc.)
	Computational Modelling and Inference (Bayesian Statistics)
Languages	English (mother tongue), French (rusty-conversational)

ACADEMIC AWARDS

- Bernstein NeuroEthics Winter School Travel Grant, 2020

- Guarantors of Brain Travel Award, 2019

- NeuroHackademy Travel Award, 2019

- EPSRC and MRC Centre For Doctoral Training (Oxford-Nottingham Biomedical Imaging) Scholarship, 2017-2021

- Sir Peter Mansfield High Achiever Scholarship, 2014

CONFERENCE TALKS

1. **R. Timms**, A. Skates, S. Smith, M. Woolrich. Electrophysiological Source Reconstruction with Stochastic Bayesian Machine Learning. BioMedEng 2019.

2. **R. Timms** et al.. Temporally Adaptive Source Reconstruction (TASER). NeuroMatch 3.0 e-conference. October 2020.

CONFERENCE ABSTRACTS

1. **R. Timms**, A. Skates, S. Smith, M. Woolrich. Electromagnetic Source Reconstruction with Recurrent Neural Networks. MEG UK 2019.

2. **R. Timms**, A. Skates, S. Smith, M. Woolrich. A Novel Approach to Temporally Dynamic Probabilistic MEG Source Reconstruction with RNNs. OHBM 2019.

3. **R. Timms**, A. Skates, S. Smith, M. Woolrich. Electrophysiological Source Reconstruction with Stochastic Bayesian Machine Learning. BioMedEng 2019.

4. **R. Timms**, A. Quinn, A. Skates, C. Higgins, U. Pervaiz, S. Smith, M. Brookes, M. Woolrich. Temporally Adaptive Source Reconstruction (TASER). MEG NORD 2020 [Postponed to May 2021].

5. **R. Timms**, A. Skates, S. Smith, M. Woolrich. Time-Varying Source Reconstruction. OHBM 2020.

POSTER AND ORAL PRESENTATIONS

- Invited Talk: *A primer on MEG co-registration and source localisation.* WIN Seminar, Oxford, 2020.

- Invited Talk: *A New Time-Varying Approach to Electromagnetic Source Reconstruction.* Bernstein Center for Computational Neuroscience, Berlin, 2019.

- Invited Talk: *Deep Learning With Human Electrophysiological Data.* University College, Oxford, 2018.

- Seminar: *Temporal Convolutional Neural Networks: An alternative to RNNs for MEG data?.* OHBA, Oxford, 2018.

- Invited Talk: *Source Reconstructing Paediatric Focal Epilepsy EEG Data.* Developmental Imaging & Biophysics, ICH, UCL, 2016.

- Seminar: *Automated baking procedures in vacuum.* Nottingham, 2015.

TEACHING AND DEMONSTRATING EXPERIENCE

- Introduction to Programming. Doctoral Training Centre, Oxford, 2018.

- Essential Maths. Doctoral Training Centre, Oxford, 2018.

- OHBA M/EEG Analysis Workshop 2019.