Samuel Edward Hatfield

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EDUCATION

DPhil Environmental Research, University of Oxford 2015 - PRESENT

- Advisors: Prof. Tim Palmer and Dr. Peter Düben
- Expected date of completion: October 2019
- Thesis title: *Reduced-precision arithmetic in numerical weather prediction with an emphasis on data assimilation*
- Thesis keywords: Data assimilation, reduced-precision, numerical weather prediction, model error
- Worked in Data Assimilation Research Team, RIKEN Centre for Computational Science, Japan for 2 months (Summer 2017)

MSci Physics, University of Bristol 2010 - 2014

- First-class honours, average mark 78%
- Final year project advisor: Dr. Simon Hanna
- Final year project title: *Knots in geometrically-confined polymers: nanochannels and other geometries*, mark 82%

PEER-REVIEWED JOURNAL PUBLICATIONS

- 2018: **Choosing the optimal numerical precision for data assimilation in the presence of model error**, Sam Hatfield, Peter Düben, Matthew Chantry, Keiichi Kondo, Takemasa Miyoshi and Tim Palmer, *Journal of Advances in Modeling Earth Systems*, **10**, 2177-2191, doi: 10.1029/2018MS001341
- 2018: **Improving weather forecast skill through reduced precision data assimilation**, Sam Hatfield, Aneesh Subramanian, Peter Düben and Tim Palmer, *Monthly Weather Review*, **146**, 49-62, doi: 10.1175/MWR-D-17-0132.1

CONFERENCE PROCEEDINGS

- 2019: **Accelerating high-resolution weather models with deep-learning hardware**, Sam Hatfield, Matthew Chantry, Peter Düben, Tim Palmer, *Proceedings of the Platform for Advanced Scientific Computing Conference - PASC '19*, 1-11, doi: 10.1145/3324989.3325711

SELECTED CONFERENCES

- JULY 2019: **The International Congress on Industrial and Applied Mathematics 2019 (oral presentation)**, Valencia, Spain
  Accelerating data assimilation through reduced precision arithmetic
  Sam Hatfield, Peter Düben, Tim Palmer
- JUNE 2019: **The Platform for Advanced Scientific Computing Conference 2019 (plenary presentation)**, Zurich, Switzerland
  Accelerating high-resolution weather models with deep-learning hardware
  Sam Hatfield, Matthew Chantry, Peter Düben, Tim Palmer,

- January 2019: **The 7th Annual International Symposium on Data Assimilation (oral and poster presentation)**, Kobe, Japan
  Single-precision in 4D-Var: The impact of rounding errors on the tangent-linear and adjoint models
  S. Hatfield, P. Düben, A. McRae, T. Palmer,
- April 2018: **SIAM Uncertainty Quantification (oral presentation)**, Los Angeles, USA
  Reducing Precision in Ensemble Data Assimilation to Improve Forecast Skill
  Samuel Hatfield, Peter D. Düben, Matthew Chantry, Tim Palmer
- April 2017: **EGU General Assembly (oral presentation)**, Vienna, Austria
  Improving Weather Forecasts Through Reduced Precision Data Assimilation
  Sam Hatfield, Peter Düben and Tim Palmer
- February 2017: **RIKEN International Symposium on Data Assimilation (oral presentation)**, Kobe, Japan
  Improving Weather Forecasts Through Reduced Precision Data Assimilation
  Sam Hatfield, Peter Düben and Tim Palmer

TEACHING

- October 2016 - present: Computing demonstrator for Oxford undergraduate students in Physics. **Senior Demonstrator from October 2018 - June 2019.**
- Autumn 2017 and 2018: Python demonstrator for Environmental Research 1st year students

AWARDS AND SCHOLARSHIPS

- June 2019: **PASC'19 Best Paper Prize**, for submission *Accelerating high-resolution weather models with deep-learning hardware*
- June 2019: **Famelab UK Final Runner Up**, for presentation *Climate change: can't we just fix it later?*, £1000 cash prize
- January 2019: **ISDA2019 Best Poster Award (one of top 3)**, for submission *Single-precision in 4D-Var: The impact of rounding errors on the tangent-linear and adjoint models*
- October 2018 - June 2019: **Jesus College Graduate Scholarship**, £900 grant for academic merit
- June - August 2017: **Japan Society for the Promotion of Science (JSPS) Summer Programme**
  Fully funded 2 month research stay at the RIKEN Advanced Institute for Computational Science (AICS), Kobe, Japan hosted by Dr. Takemasa Miyoshi
- November 2016: **Elsevier travel grant**
  Awarded for poster and presentation at Oxford Environmental Research student conference, £1000 cash prize
- July 2014: **Undergraduate Awards Highly Commended** Awarded for MSci thesis, *Knots in geometrically-confined polymers: nanochannels and other geometries*

DEPARTMENTAL SEMINAR TALKS

- Data Assimilation Research Centre, University of Reading, Reading, UK — April 2019
- Marine Meteorology Division, Naval Research Laboratory, Monterey, USA April 2018
- Scripps Institution of Oceanography, San Diego, USA — April 2018
- RIKEN Advanced Institute for Computational Science (AICS), Kobe, Japan — July 2017
- Atmosphere and Ocean Research Institute (AORI), University of Tokyo — July 2017
- Japan Meteorological Agency (JMA) — July 2017
- The Japan Agency for Marine-Earth Science and Technology (JAMSTEC, Yokohama Institute for Earth Sciences, Japan) — July 2017

PEER REVIEW

- Quarterly Journal of the Royal Meteorological Society

TRAINING

- July 2018: CUDA Programming on NVIDIA GPUs, Mathematical Institute, University of Oxford
- June 2016: E2SCMS Summer School (Earth-System modelling), Helsinki
- March - May 2016: Training courses on data assimilation, predictability of weather and climate and numerical methods, ECMWF

OUTREACH

- Famelab 2019: competed in two Oxford regional heats and the UK final
- Led development of "Raspberry Pi Planet Simulator", weather-simulating Raspberry Pi cluster, November 2018 - March 2019

OTHER EXPERIENCE

Microcosm Ltd., Bristol — 2014 - 2015

- Worked on the front- and back-ends of a two-factor authentication system, SmartSign
- Learned PHP, JavaScript, CSS and HTML

TECHNICAL EXPERTISE

- Proficient in: FORTRAN 90, Python (incl. Iris, Numpy, Keras), Bash, git, LaTeX
- Have experience with: C/C++, Matlab, Julia, CUDA

LANGUAGES

- English (native)
- Japanese (conversational)

SUPERVISORS

Professor Tim Palmer
Atmospheric, Oceanic and Planetary Physics
University of Oxford
Oxford, UK
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Dr. Peter Düben
European Centre for Medium-Range Weather Forecasts
Reading, UK
peter.dueben@ecmwf.int