Duncan Blythe

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EDUCATION

Oxford University — Oxford, United Kingdom
MMathPhil in Mathematics and Philosophy; 1st class; 1st in graduating class — *2003 - 2007*
Courses: abstract algebra, analytic topology, axiomatic set theory, Gödel's theorems, model theory

Berlin Institute of Technology — Berlin, Germany
MSc Computational Neuroscience; Thesis: 1,0 (excellent) — *2009 - 2011*
Courses: Machine learning, scientific programming, models of higher brain function and neural systems, analysis of neural data

Berlin Institute of Technology — Berlin, Germany
PhD Computer Science; Summa cum Laude — *2011 - 2015*
Thesis: 'Long-range analysis of EEG data'

PRIZES AND AWARDS

Gibbs Prize in Mathematics — Oxford University, United Kingdom
Best performance in part B examinations — *July 2006*

Gibbs Prize in Mathematics (again) — Oxford University, United Kingdom
Best performance in part C examinations — *July 2007*

Academic Scholarship — Mansfield College, Oxford University, United Kingdom
Consistently excellent academic performance — *2004-2007*

Michael Foster Scholarship — Deutsche Akademische Austausch Dienst (DAAD)
1 year fully funded study in Germany — *2007-2008*

Scholarship in GRK 'Sensory computation in neural systems' — Deutsche Forschungs Gemeinschaft (DFG)
Fully funded PhD research for 3 years — *2012-2015*

SKILLS SUMMARY

- **AI**: Deep learning, NLP, computer vision
- **Machine Learning**: Kernel methods, source separation, time-series analysis and forecasting, dimension reduction
- **Architectures**: Convolutional networks, recurrent networks, transformers, sequence-2-sequence, UNets, bounding-box regression
- **Languages**: Python, MATLAB, Javascript, C
- **Scientific computing**: PyTorch, Tensorflow, Scikit-Learn, Numpy, Scipy
- **Full Stack**: Git, MongoDB, SQL, Flask, React, Redis, RQ
- **Infrastructure**: AWS (EC2, s3, CloudFormation, IAM, ECS), Docker, Jenkins, Kibana
- **Project management**: Scrum, Kanban, Jira, GitHub Projects, Trello

EMPLOYMENT

LF1 GmbH — Berlin, Germany
CEO and co-founder — *2019 - present*

- Developed an end-to-end deep learning based search and navigation system 'Aleph Search' for e-Commerce
- System comprised text-search, similar product recommendation, reverse image search, shop-the-look, tagging
- System was acquired by Attraqt PLC in 2020 in an IP-transfer share deal
- System is now in production at the top e-Commerce websites in Europe, including, Adidas, Asos, Waitrose, Screwfix
- Was highly involved in the integration process of the live system
- Provided technical direction and managed team of 5 researchers and developers
- Created the open source project PADL "pipeline abstractions for deep learning"
- Prototyped a novel interactive system for converting audio into video "Sheen AI"

Zalando Research — Berlin, Germany
Research scientist, AI and machine learning — *2017 - 2018*

- Research on language modelling, natural language processing and multi-modal deep learning
- Prototyped an deep-learning powered search algorithm for fashion
- Published extensively on NLP, receiving 1000s of citations

- **German Centre for Neurodegenerative Disease (Helmholtz Network)** — Bonn, Germany
  Postdoctoral researcher in Machine Learning and Statistics Group — *2016-2017*
    - Research on semi-supervised learning for causal inference

- **African Institute of Mathematics** — Bagamoyo, Tanzania
  Tutor for applied mathematics — *2015 - 2016*
    - Tutoring for lectures for best students from across Africa
    - Supervision of 6 master's projects
    - Assisting students in scientific computing

- **Machine Learning Group, Berlin Institute of Technology** — Berlin, Germany
  Researcher — *2011 - 2012*
    - Applications of source separation techniques to primate LFP data
    - Publication of novel source separation methodology

- **Machine Learning Group, Berlin Institute of Technology** — Berlin, Germany
  Research Assistant — *2010 - 2011*
    - Implementations of source separation and temporal segmentation in MATLAB
    - Job management on sungrid HPC cluster
    - Technical proofreading
    - Contributed to original research on source separation and machine learning

OPEN SOURCE PROJECTS

- **FlairNLP**: A very simple framework for state-of-the-art NLP. Currently more than 12000 stars on GitHub.
- **Pipeline abstractions for deep learning (PADL)**: Fills a void in the PyTorch ecosystem, which has many tools for training models, but few for day-to-day operations and use of models.

SELECTED PUBLICATIONS

[1] Alan Akbik, Tanja Bergmann, Duncan Blythe, Kashif Rasul, Stefan Schweter, and Roland Vollgraf. Flair: An easy-to-use framework for state-of-the-art nlp. In *Proceedings of the 2019 conference of the North American chapter of the association for computational linguistics (demonstrations)*, pages 54–59, 2019.

[2] Alan Akbik, Duncan Blythe, and Roland Vollgraf. Contextual string embeddings for sequence labeling. In *Proceedings of the 27th international conference on computational linguistics*, pages 1638–1649, 2018.

[3] Duncan Blythe and Franz Király. Prediction and quantification of individual athletic performance of runners. *PLoS One*, 11(6):e0157257, 2016.

[4] Duncan Blythe, Vadim Nikulin, and Klaus-Robert Müller. Robust statistical detection of power-law cross-correlation. *Scientific reports*, 6(1):1–10, 2016.

[5] Duncan Blythe, Paul Von Bunau, Frank Meinecke, and Klaus-Robert Muller. Feature extraction for change-point detection using stationary subspace analysis. *IEEE Transactions on Neural Networks and Learning Systems*, 23(4):631–643, 2012.

[6] Steven Hill, Chris Oates, Duncan Blythe, and Sach Mukherjee. Causal learning via manifold regularization. 2019.