

# Duncan Blythe

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## EDUCATION

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- **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

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- **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

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- **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

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- **LF1 GmbH** Berlin, Germany  
*CEO and co-founder* 2019 - present
  - Bootstrapped startup to 30.000 EUR monthly revenue within 1.5 years
  - Programmed, as a team of 2, 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

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- **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

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- [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.