

# Taliesin Beynon

## EDUCATION

### SUMMER SCHOOLS

[Reinforcement Learning S.S.](#) 2019  
Lille, France

[IBRO-Simons Comp. Neuro. S.S.](#) 2019  
Cape Town, South Africa

[Deep Learning Indaba](#) 2017  
Cape Town, South Africa

[Wolfram Science S.S.](#) 2009  
Pisa, Italy

### FORMAL EDUCATION

[BSc Honors, Physics & Maths](#) 2008  
University of Cape Town

[Self-taught high school](#) 2004  
Johannesburg, South Africa

## TECHNICAL SKILLS

### EXPERT

Python, Go, Mathematica, C++, Swift,  
PyTorch,  $\LaTeX$ , Adobe Illustrator

### INTERMEDIATE

JS, Julia, TensorFlow, Swift4TensorFlow

### NOVICE

Bash, Rust, SQL, Adobe Photoshop

## PATENTS

co-inventor with [Stephen Wolfram](#) on  
[4 granted USPTO patents](#)

## INTERESTS

### SOFTWARE

dataviz, {functional, differentiable,  
probabilistic} programming

### MATHEMATICS

geometric algebra, information geometry,  
tensor calculus

### MACHINE LEARNING

RL, architecture search, meta-learning,  
(approximate) Bayesian methods,  
disentangled representations

### NEUROSCIENCE

Bayesian brains, predictive coding, grid &  
place cells, bio-plausible backprop

### HOBBIES

blogging, running, film, science, travel

## LINKS

Email: [contact@taliesin.ai](mailto:contact@taliesin.ai)

Website: [taliesin.ai](http://taliesin.ai)

Twitter: [@taliesinb](https://twitter.com/taliesinb)

Hacker News: [taliesinb](https://news.ycombinator.com/user?id=taliesinb)

GitHub: [github.com/taliesinb](https://github.com/taliesinb)

LinkedIn: [linkedin.com/in/taliesinb](https://linkedin.com/in/taliesinb)

## EXPERIENCE

### WOLFRAM RESEARCH

Lead Developer @ Deep Learning Group 2016 – 2018

- led creation of Mathematica's built-in [deep learning library](#)
- creation & review of 50+ pages of [reference material](#), and [tutorials](#)
- upstream contributions to Amazon's MXNet deep learning backend
- co-wrote blog posts for [O'Reilly](#) and [Wolfram](#)

Manager & Lead Developer @ Advanced Research Group 2013 – 2015

- [Facebook analysis project](#), work publicized in [Wired Magazine](#)
- designed and wrote [DataFrame-like functionality](#) for Mathematica
- co-designed automated machine learning ([Classify](#), [Predict](#))
- co-designed [templating](#), core hash-map data structure ([Association](#))
- supervised Lucene-based [textual search](#), OpenSSL-based [cryptography](#)
- designed & supervised [CloudExpression](#) functional hierarchical database

### WOLFRAM|ALPHA

Manager & Lead Developer @ Special Projects 2012 – 2013

- supervised [W|A's Personal Analytics](#) for Facebook product
- designed, wrote, documented [caching and logging framework](#) for W|A

Research Programmer @ Special Projects 2010 – 2012

- wrote headline features of [W|A Pro automated data & image analysis](#)
- wrote Turing machine [functionality](#) for W|A
- wrote widely-used internal [parsing and visualization tools](#) for W|A

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Software Engineer @ Ndibano Intelligent Systems 2009

Software Engineer @ Nimbula Cloud Computing 2009

Engineering Intern @ Center for High Performance Computing 2008

Engineering Intern @ iThemba LABS Proton Accelerator 2008

## SELECTED TALKS

[Reinforcement Learning](#) IndabaX Sudan 2019

[Mathematica for deep learning](#) UPF Barcelona 2019

[Neuroscience and AI](#) IndabaX South Africa 2019

[Mathematica for transfer learning](#) ETH Zürich 2018

[Peeking inside the black box](#) ML Meetup Cape Town 2017

[Data science for non-scientists](#) SXSW conference 2015

[Machine learning in Mathematica](#) MIT IAP lectures 2015

[Wolfram's data analysis platform](#) Strange Loop conference 2012

## VOLUNTEER WORK

Practicals Team [Deep Learning Indaba](#), Kenya 2019

Head Tutor [Deep Learning Indaba](#), Cape Town 2018

Tutor & Mentor [Wolfram Summer School](#), Boston 2010 – 2014

Math Tutor [IkamvaYouth township tutors](#), Cape Town 2006 – 2007

## OPEN SOURCE

### PROJECTS

[soap](#) feedback alignment & activity propagation in PyTorch

[hypernet](#) library for building flexible hypernetworks in PyTorch

[blinker](#) costly, active observations in OpenAI Gym environments

[spatial game theory](#) lab for experiments in evolutionary spatial game theory

[spieeltjie](#) lab for multi-agent RL on zero-sum differentiable games

[floatworld](#) lab for evolution of population of RNN-controlled agents

[funes](#) persistent, definition-sensitive caching of scientific computations

### CONTRIBUTIONS

[open\\_spiel](#) Swift implementation of Monte Carlo Tree Search ([WIP](#))

[DL Indaba](#) "Build your own TensorFlow" [tutorial](#) to explain reverse-mode AD

[MXNet](#) generalized [reshape\\_like](#) op for dynamically-sized tensors