

Nat Lund

Curriculum Vitae

Nathaniel J. Lund
British Citizen and
New Zealand Citizen
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*Physicist venturing into software development. Passionate
about code readability and clear technical writing.*

Web **Github Account:** <https://github.com/natlund>

Computer Skills

Python

Python scientific libraries such as Matplotlib, Pandas, Numpy, Scipy, Keras

C++, SQL, \LaTeX

Linux, Git, Bash, Jenkins, Agile development

Amazon cloud services, Django web framework

Communication Skills

Written **Technical Writing:** PhD thesis noted for outstanding depth and clarity.

Tutoring **codebar** participation: Volunteer tutoring in minority-friendly environment.

Recent Work

Sep 2016 – **Software Engineer, Data Scientist**, METAIL, Cambridge UK, www.metail.co.uk.

Present Metail is a fashion-tech startup that builds virtual fitting-room 3-D modelling technology for use on fashion retail websites, and provides a digital composite photography service. I worked in three areas: Data Science, physics modelling in C++, and deploying a machine-learning microservice with AWS.

- The data science technology stack centred on the use of Python and SQL to query an Amazon Redshift database, and Python pandas for data processing.
- Did various ad-hoc business analyses of user behaviour, as well as more exploratory modelling eg. created a flowchart of user behaviour and transition probabilities.
- Maintained and extended Looker, a graphical business intelligence dashboard tool. Conducted training on Looker for non-technical users.
- Learnt C++ and read through an 8,000-line physics modelling code base that had been untouched for 5 years. Did minor refactoring and extension.
- The physics code modelled fabric as a spring-mass network, with collisions and gravity.
- Wrote comprehensive documentation of the physics code, including 40 pages of technical prose and 80 slides of diagrams.
- Explained the workings – and quirks – of the physics code to non-technical consumers of the physics modelling software, thereby resolving long-standing puzzles.
- Converted an image segmentation Convolutional Neural Network model from the R&D team into Python code suitable for wider consumption.
- Helped deploy the image segmentation machine-learning model as a Python microservice on Amazon.

Work History

- Jun – Aug **Data Analyst**, BOOKING.COM, Cambridge UK, www.booking.com.
2016 Worked in the Pay-Per-Click Webmarketing department of a large internet travel retailer, writing Python code to do data analysis and automate various business processes.
- Text-processing to automatically shorten hotel names to fit into advertisement formats.
 - Developed scoring system to rate relevance of advertising copy to search query terms. Wrote code to score advertisements, generate a table of actionable items, and email the table to automatically assigned Account Managers.
- Jun 2014 – **Data Scientist**, PUBLONS, Wellington NZ, www.publons.com.
Mar 2015 Worked in a rapidly-growing internet startup using the Python web framework Django. Main projects included data cleanup, name disambiguation, text matching, search, and statistics. Additional work included basic web programming, and user interface design.
- Wrote heuristic code to flag suspicious data, thus enabling data cleanup.
 - Researched string matching algorithms, and implemented a modified version that gave best results for matching names.
 - Built a prototype search engine from basic Python language processing and linear algebra components.

Tutoring

- 2005 - 2006 One-on-one mathematics tutoring of a student with Asperger's syndrome.
2004 Small-group tutoring of first-year mathematics.

Education

- 2014 **PhD in Theoretical Physics**, *Victoria University of Wellington*, New Zealand.
Fluid Mechanics (Microfluidics)
2006 **BSc Honours in Physics**, *Victoria University of Wellington*, New Zealand.
First Class Honours
2004 **BSc in Mathematics and Physics**, *Victoria University of Wellington*, New Zealand.

Doctoral Thesis

- Title *Effective Slip Lengths for Stokes Flow over Rough, Mixed-Slip Surfaces*
Supervisor Professor Shaun Hendy
Description The motivation was the recent development of surfaces patterned on the nano scale that offer reduced drag to liquids flowing over them. The physics was modelled as incompressible Stokes flow with a rough, periodic boundary condition. Analytic solutions were obtained by the perturbation and homogenization methods, yielding a prediction of the improved flow of liquids over nano-patterned surfaces.
Examiner's Remark "[This] chapter describes ... fluid mechanics concepts with a **depth and clarity which is very rarely found even in classical fluid mechanics textbooks**. It is an absolute pleasure to read... The candidate does a very good job of explaining complex concepts with clear and concise arguments."

Interests

- Economics
- Guitar
- Philosophy of Science
- Music from Bluegrass to Heavy Metal