Nat Lund

Curriculum Vitae

Nathaniel J. Lund
British Citizen and
New Zealand Citizen
074 9095 4037
natjlund@gmail.com

Education

2014 **PhD in Theoretical Physics**, *Victoria University of Wellington*, New Zealand.
Fluid Mechanics

2007 **BSc Honours in Physics**, *Victoria University of Wellington*, New Zealand.
First Class Honours

2005 **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. Approximate analytic solutions were obtained by the perturbation method and the homogenization method, yielding a prediction of the improved flow of liquids over nano-patterned surfaces.

Examiner's Remark "This [introductory] chapter describes fairly standard fluid mechanics concepts but with a **depth and clarity which is very rarely found even in classical fluid mechanics textbooks**. It is an absolute pleasure to read even if this chapter contains very little new/original results. The candidate does a very good job of explaining complex concepts with clear and concise arguments."

Off-Topic Project I was required to do a small project on a technical subject outside of my primary research topic. To gain some insight into the global financial crisis, I studied **fractional-reserve banking** and reviewed Nassim Taleb's **'Black Swan'**.

Other Work Outside of my own PhD work, I volunteered my services on a complex systems project. I learnt Python, taught it to other students, and wrote scripts to **extract data** from a **million-line** text file and create network graphs from the data.

Computer Skills

Intermediate Python, LaTeX (for mathematical typesetting, eg: $\nabla \cdot \vec{u} = 0$)

Basic Django web framework, various scientific Python libraries, Linux, SQL

Communication Skills

Written **Technical Writing:** PhD thesis (35,000 words with 2,000 equations) noted for outstanding depth and clarity.

Oral **Presentations:** About a dozen 10 - 15 minute talks given during graduate study.

Experience

Vocational

2014 – 2015 **Data Scientist**, PUBLONS, Wellington, www.publons.com.

Worked in a small but rapidly-growing internet startup that is developing a web service for academics, using the Python web framework Django. Main projects included data cleanup, name disambiguation, text matching, search, and statistics. Additional work included basic web programming, user interface design, planning and strategizing, relating with various stakeholders.

Details:

- Investigated raw data, and wrote heuristic code to sanitise it automatically.
- Researched string matching algorithms, and implemented a modified version that gave best results for matching names.
- Built a prototype search engine from basic language processing and linear algebra components. (It was later replaced by the industry-standard Lucene engine, which is mathematically equivalent.)
- Generated summary statistics of key company data, with careful attention to graphical presentations that gave the easiest comprehension.
- Developed a rating system designed to allow meaningful comparison of published articles.

Tutoring

2007 - 2012 During my PhD, I provided assistance to various fellow PhD students, often with Python, and in particular to a Polynesian maths graduate who was not familiar with the physics component of his topic.

2006 Tutored first-year mathematics in a small-group setting.

2005 - 2006 One-on-one mathematics tutoring of a student with Asperger's syndrome.

Legal Blindness

1995 - 2007 I was legally blind for approximately 12 years. At the beginning of my PhD, I began the process of corneal transplant surgeries and rehabilitation, which took several years. The process was a great success – I can now legally drive.

Interests

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