

# Heyang Li (Thomas)

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Nationality: New Zealand (NZ)

## Profile

- Motivated, with good interpersonal, teaching, written and verbal communication skills.
- Driven with the passion for mathematics, computer programming and its applications.
- Inspired to research challenging problems, to produce practical and useful solutions.
- Researched and developed 3D Computed Tomography image reconstruction algorithm.
- Programming skills and experience in Python (fluent), C++, Matlab and Maple.
- Experience with linux, command line, parallel programming with supercomputer and GPU.

## Education and Qualifications

- 2012 - 2016 **Australian National University (ANU), Australia.**
- Have **recently submitted my thesis.**
  - PhD Candidate in Applied Mathematics, focussed on **improving the resolution and signal-to-noise** in 3D Computed Tomography image reconstruction algorithms by developing **source deblurring and phase contrast modelling** techniques.
  - Extensive programming experience in python and C++, parallel programming using supercomputer, GPU cluster - data size up to 1TB.
  - Joint European and US patent No: 15181202.1
- 2009 - 2011 **University of Canterbury (UC), New Zealand.**
- Mathematics major, Bachelor of Science (Honour).
  - Top student in the department.

## Publications (peer reviewed):

- **Li H**, and et. al. – 3D X-Ray Source Deblurring in High Cone-Angle Micro-CT, IEEE Transaction on Nuclear Science (2015).
- **Li H**, and et. al. – Improving spatial-resolution in high cone-angle micro-CT by source deblurring, Developments in X-Ray Tomography IX (2014).
- Kingston A, **Li H**, and et. al. – Optimised x-ray source scanning trajectories for iterative reconstruction in high cone-angle tomography, SPIE Optical Engineering (2016).
- G. Myers, **Li T**, and et. al. – Rapidly-converging multigrid reconstruction of cone-beam tomographic data, SPIE Optical Engineering (2016).

- Kingston A, **Li H**, and et. al. – Fourier inversion of the mojette transform, 18th IAPR International Conference, DGCI 2014 8668 (2014).
- Mooers A, **Li H**, and et. al. – Branch lengths on birth–death trees and the expected loss of phylogenetic diversity, Systematic biology (2012).
- **Li H**, and et. al. – Fresnel Region Phase Retrieval in Multi-Energy Computed Tomography for Material Discrimination. [*In preparation*].

## Achievements:

### This Year

- 2016 – Winning the **BHP Phase-X optimisation challenge (\$35,000)**, optimising open pit mining phases, drawing from gigabytes of BHP Billiton’s operational data. There were 286 participants from 53 cities and 20 different countries.
- Invited with pay (\$1.5k) to present at the Australian Society for Operations Research conference.
- 2012 - 2016 – **ANU PhD Scholarships** (2 in total: covering living cost and full fees – \$150k).
- 2016 – Winner of the NASSCOM student innovation award for IT technical innovation, after pitching to an industry panel at the final.

### PhD

- 2015 – **Joint patent** filed: “Novel acquisition and processing of data in a tomographic image apparatus”. (European Patent pending: 15181202.1).
- 2015 – Second in the Ore-X image classification challenge, with over 270 contestants and 100 entries from 20 countries. We founded a startup <https://illuminate.io/>
- 2015 – Awarded the VC travel to grant to present at the ICTMS conference (Canada).
- 2014 – Dean's prize (2nd) in the Research School's John Carver Seminar competition.
- 2014 – Invited presentation at the SPIE Optics + Photonics Conference (USA).
- 2013 – Invited to the ICTMS conference (Belgium).

### Undergraduate

- 2011 – **Cook Memorial Prize** (top mathematics Honours student in the university).
- 2009 - 2011 – **Departmental Full Fee Scholarship** through my whole degree,
- 2 summer research scholarships,
  - 2 departmental prizes for being the top student for 2nd and 3rd year,
  - ANZ scholarship, and
  - UC senior scholarship.

### High School

- 2008 – Represented New Zealand in the 49th **International Mathematical Olympiad** Hosted in Spain with Honourable Mention
- First place in Senior Mathematics Competition, a high school competition in NZ.
- 2007 – First place and medalist in the Australian Mathematics Competition.

## Work Experience

- 2016 - Current **ANU / Monash – Department of Applied Mathematics / Monash Centre for Electron Microscope – Temporary Postdoc Researcher**  
– A collaborative project on understanding gold nanostructures. My work is **turning limited 2D projections** (between 2-5 angles) **into a 3D discrete tomographic reconstruction** with single atom precision on the boundaries.
- 2012 - Current **ANU – Mathematical Science Institute (MSI) – Tutor**  
– **Giving tutorials and quizzes, marking assignments and exams.** Received student survey average above 80% (in 2015 and 2016). **Invited speaker in MSI maths lecture.**
- 2010 - 2011 **University of Canterbury (UC) – Mathematics and Stats Department – Tutor**  
2008 - 2011 **Canterbury Mathematics Olympiad Group – Teacher**

## Other Experiences and Interests

- 2009 - Current Football Referee – Capital Football.  
2015 ANU SPIE Chapter – Committee member.  
2013 - 2015 ANU Dance Society – President/committee member.  
2009 - 2011 University of Canterbury Mathsoc - Cofounder and president.  
Hobbies Golf, Table Tennis and Photography.

## Referees

A/Prof. Adrian Sheppard (PhD Supervisor)  
Head of Department  
Department of Applied Mathematics (ANU)  
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Prof. Mike Steel (Honours Supervisor)  
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