

## Doctor Luke J. Shingles

### Skills and interests

I'm an experienced researcher with a PhD in astrophysics. I'm skilled in high-performance computing, scientific software development (including Python/C/MPI/OpenMP), data analysis, and visualisation.

I have developed and run software on various supercomputers to numerically solve systems of differential equations (e.g., for chemical enrichment of stellar clusters and high-energy particle interactions) and carried out highly-parallel (>1000 core) simulations of radiation transport in supernovae that use Monte Carlo algorithms. I have a strong interest in computer graphics, performance optimisation, and enjoy learning new technologies. I would like to learn more about GPU programming (CUDA/OpenCL), machine learning, and computer vision.

[LinkedIn Profile](#)

### Email

[l.shingles@qub.ac.uk](mailto:l.shingles@qub.ac.uk)

### Citizenship

Australian, Irish

### Languages

English (native), Portuguese (basic), Mandarin Chinese (basic)

### Address

Astrophysics Research Centre,  
School of Mathematics and Physics,  
Queen's University Belfast  
Belfast, Co. Antrim, BT7 1NN  
Northern Ireland, United Kingdom

### Programming experience

Advanced: C, Fortran, Python (numpy/pandas/matplotlib), MPI, OpenMP.

Currently learning: [CUDA](#), [OpenCV](#).

Most of the scientific simulation codes I have worked on are not publicly available. However, some [plotting and analysis tools](#) I developed for the radiative transport code and the [Fortran/OpenMP chemical evolution code](#) are public on my [GitHub Profile](#).

### Education and recent experience

*Postdoctoral Research Fellow*, Queen's University Belfast, Aug 2015–present

Working in the research group of Stuart Sim developing a 3D radiative transfer code to model Type Ia supernovae in their nebular phase, hundreds of days after explosion.

*Doctor of Philosophy (Astrophysics)*, Australian National University, 2012–2015

Thesis: '[Neutron-Capture Nucleosynthesis and the Chemical Evolution of Globular Clusters](#)'

Department: Research School of Astronomy & Astrophysics

Primary Supervisor: Amanda Karakas

Advisors: David Yong, Gary Da Costa, John Lattanzio (Monash), Richard Stancliffe (Bonn)

*Bachelor of Science with Honours (First Class)*, Australian National University, 2008–2011  
Majors: Astronomy & Astrophysics, Theoretical Physics, Mathematics  
Thesis: 'The Sulfur Anomaly in Planetary Nebulae and Post-AGB Stars'  
Department: Research School of Astronomy & Astrophysics  
Supervisor: Amanda Karakas

*Bachelor of Information Technology*, Queensland University of Technology, 2003–2007  
Major: Software Engineering

### **Awards and Scholarships**

RSAA Alex Rodgers Travelling Scholarship, 2014  
Astronomical Society of Australia Travel Assistance, 2014  
RSAA Honourable Mention for Best Student Paper Prize, 2013  
IAU Travel Grant for IAUS298, 2013  
Australian Postgraduate Award, 2012–2015  
International Year of Astronomy Honours Scholarship, 2011  
RSAA Summer Research Scholarship, 2010

### **Service and Committees**

QUB School of Maths and Physics Postdoctoral Society Representative, Jan 2016–present  
QUB School of Maths and Physics Athena SWAN committee for gender equality, Jan 2016–present  
QUB ARC Supernova Journal Club coordinator, Oct 2015–Oct 2016  
ANU RSAA Stellar Lunch coordinator, Feb 2014–Nov 2014  
ANU RSAA Computer Committee, Oct 2013–Apr 2015

### **Talks and Poster Presentations**

Contributed Talk, Radiation Transfer and Explosive Thermonuclear Burning in Supernovae, Rehovot, Israel, June 2018  
Poster Presentation, Supernovae From Simulations to Observations and Nucleosynthetic Fingerprints, Bad Honnef, Germany, January 2017  
Contributed Talk, Supernovae: The Outliers, Garching, Germany, September 2016  
Contributed Talk, RAS National Astronomy Meeting, Nottingham, UK, July 2016  
Contributed Talk, 18th Workshop on Nuclear Astrophysics, Ringberg, Germany, March 2016  
Group Talk at Stars Meeting, Institute of Astronomy, Cambridge, UK, Nov 2015  
Seminar, QUB, Belfast, UK, Oct 2015  
Contributed Talk, ASA AGM, Perth, Australia, July 2015  
Contributed Talk, ANITA Workshop, Canberra, Australia, Feb 2015  
Contributed Talk, Mount Stromlo Student Christmas Seminars, Canberra, Australia, Nov 2014  
Group Talk at Stars Meeting, Institute of Astronomy, Cambridge, UK, Sept 2014  
Poster Presentation, Why Galaxies Care About AGB Stars, Vienna, Austria, July 2014  
Contributed Talk, Nucleosynthesis in AGB Stars, Bad Honnef, Germany, July 2014  
Contributed Talk, Overcoming Great Barriers in Galactic Archaeology II, Palm Cove, Australia, 2014  
Group Talk at Stellar Lunch, ANU RSAA, Australia, August 2013  
Poster Presentation, IAUS298 Setting the Scene for GAIA and LAMOST, Lijiang, China, May 2013  
Poster Presentation, Astronomical Society of Australia Meeting, Sydney, Australia, 2012  
Poster Presentation, Astronomical Society of Australia Meeting, Adelaide, Australia, 2011

### **Teaching Experience**

*Level Four MSci Project*

Queen's University Belfast

Sept 2017 – Jan 2018

Co-supervised two MSci students with projects on positron emission from Type Ia supernovae and high-mass stellar evolution with helium-rich abundances.

*PHY1001 Foundation Physics*

Queen's University Belfast

Oct 2017

Presented lectures on circular motion and simple harmonic oscillators.

*ANU-ASTRO2x Exoplanets*

Australian National University

Jun–Sep 2015

Teaching assistant for edX online course run by Brian Schmidt and Paul Francis on exoplanet search techniques – pulsar timing, radial-velocity variations, transits, microlensing, and direct imaging with adaptive optics.

*ANU-ASTRO1x Greatest Unsolved Mysteries of the Universe,*  
University

Australian National

Mar–Jun 2015

Teaching assistant for edX online course run by Brian Schmidt and Paul Francis covering the expanding universe, dark energy, dark matter, and gamma-ray bursts.

*ASTR3007 From Stars to Galaxies*

Australian National University

Feb–Jun 2013 and May–Jun 2014

Teaching assistant for the third-year course on stellar evolution & nucleosynthesis, galactic structure & dynamics, and introductory computer programming. Duties included marking assignments and answering student questions in the classroom.

*PHYS1201 Physics 2*

Australian National University

Jul–Nov 2012 and Jul–Nov 2013

Teaching assistant for first-year course covering introductory special relativity, electromagnetism, waves & optics, and thermodynamics. Duties included marking assignments and answering student questions in the classroom.