# 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 stellar structure and nuclear reaction networks) and carried out large-scale (>1000 core) Monte Carlo simulations of radiation and particle transport. I have a strong interest in computer graphics, performance optimisation, and enjoy learning new technologies. I would like to develop my knowledge of GPU programming (CUDA/OpenCL), machine learning, and computer vision (OpenCV).

LinkedIn Profile

## Email

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 unfortunately 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*, Australian National University
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.