Zachary Kemp

BSc (Hons), PhD (Physics)

3/9 Newman Street
Ballarat East
VIC
3350

0412 457 974

zachary.kemp@monash.edu

github.com/zac-k

education

2012–2016 **Doctor** of Philosophy (Physics) — Monash University, Clayton
Thesis title: *"Sources and effects of errors in vector field electron tomography"*
Description: This work utilises highly realistic electron microscope image simulations (implemented in C++and python) to address the accuracy of three-dimensional electromagnetic vector field reconstruction methods.

2007–2011 **Bachelor** of Science (Hons) — Monash University, Clayton
Thesis title: *"Tomographic reconstruction of vector fields in the presence of noise"*
Description: This work examines the noise-stability of the vector tomography reconstruction process.
Majors: physics, pure mathematics
Minor: astrophysics

experience

2017-present **Teaching** Associate, Third Level — Monash University, Clayton
PHS3000 - Laboratory

2012-present **Teaching** Associate, Second Level — Monash University, Clayton
PHS2061 - Quantum and Thermal Physics
PHS2062 - Electromagnetism and Optics

2010–2011 **Teaching** Associate, First Level — Monash University, Clayton
PHS1011 - Classical Physics and Relativity
RAD1021 - Radiological Physics
PHS1022 - Fields and Quantum Physics
ENG1080 - Foundation Physics
PHS1042 - Environmental Physics
BMS1031 - Medical Biophysics

awards

2012-2015 **Dean's PostGraduate Research Scholarship** — Faculty of Science, Monash University
Awarded to students pursuing a Higher Degree by Research after achieving first class honours.

publications

2017 **Propagation based phase retrieval using artificial neural networks**
Z D C Kemp
In peer review (preprint available at arXiv:1709.09940)

2016 **Sources and effects of errors in vector field electron tomography**
Z D C Kemp
PhD thesis, Monash University (2016)

2016 **Effect of specimen orientation on the accuracy of vector field electron tomography**
Z D C Kemp, D M Paganin, T C Petersen, M J Morgan
Optics Express 24.20 (2016): 22366

2014 **Analysis of noise-induced errors in vector-field electron tomography**
Z D C Kemp, T C Petersen, D M Paganin, K M Spiers, M Weyland, M J Morgan
Physical Review A 90.2 (2014): 023859

2011 **Tomographic reconstruction of vector fields in the presence of noise**
Z D C Kemp
Honours thesis, Monash University (2011)

interests and skills

Physics/mathematics
error analysis, tomography, phase retrieval, image simulation, numerical methods, image processing, electron optics, machine learning, mathematical modelling

Programming and software
C++, python, TensorFlow, MATLAB, LaTeX, Photoshop, Blender

Other skills
technical writing, independent research, teaching, using scientific instrumentation

Laboratory topics taught
optical spectroscopy, γ-spectroscopy, nuclear decay, Fourier analysis, operational amplifiers, dynamics, buoyancy, photoelectric effect, AC signal filters, Ramsauer-Townsend effect, charge-to-mass ratio of electron, microwave optics, Hall effect in water, and many others

Personal interests
music production, 3D modelling, game development

referees

Prof. David Paganin — PhD supervisor
david.paganin@monash.edu
(03) 9396 1574

Dr Tim Petersen — PhD supervisor
timothy.petersen@monash.edu
(03) 9905 9765

Prof. Michael Morgan — PhD supervisor
michael.j.morgan@monash.edu
(03) 9905 3645

Theo Hughes — manager
theo.hughes@monash.edu
(03) 9905 1602