

Zac Kemp

BSc (Hons), PhD (Physics)



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zac-k.github.io

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

- 2017–2018 **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 ENG1080 - Foundation Physics
RAD1021 - Radiological Physics PHS1042 - Environmental Physics
PHS1022 - Fields and Quantum 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

- 2018 **Propagation based phase retrieval of simulated intensity measurements using artificial neural networks**
Z D C Kemp
Journal of Optics 20.4 (2018): 045606
- 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, L^AT_EX, 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

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PhD supervisor

Dr Tim Petersen

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Prof. Michael Morgan

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manager