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
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

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, 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
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Dr Tim Petersen — PhD supervisor
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Prof. Michael Morgan — PhD supervisor
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Theo Hughes — manager
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