Dr Claire Miller

Aotearoa Fellow
Auckland Bioengineering Institute, University of Auckland

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Qualifications

PhD
Feb. 2016–Feb. 2020
Completion date: Jul. 2020
Conferral date: Dec. 2020

Mathematics and Statistics, University of Melbourne, Australia
Thesis: Understanding the regulation of epidermal tissue thickness by cellular and subcellular processes using multiscale modelling.
Supervisors: A/Prof. James Osborne, Prof. Edmund Crampin.

Bachelor of Engineering
2009–2012

University of Adelaide, Australia
(Computational and Mechanical) with First Class Honours

Research Appointments

Aotearoa Fellow
Aug. 2022–Current

Auckland Bioengineering Institute, University of Auckland, New Zealand
Project: Multiscale modelling of endometriosis lesion onset and growth

Postdoctoral Researcher
Apr. 2020–Apr. 2022

University of Amsterdam, Netherlands (remote from Australia)
In silico clinical trials for acute ischemic stroke (INSIST Project), Computational Science Lab

CSIRO Graduate Fellow
Jul. 2013–Jan. 2016

CSIRO, Melbourne, Australia
Bushfire spread prediction, computational modelling and software group

Fellowships and Awards

Aotearoa Fellowship
2022

Auckland Bioengineering Institute | Four-year fellowship as listed under research appointments.

NZMS Financial Assistance (Research Grant)
2024

New Zealand Mathematical Society | Research grant to support for attendance at the Women in Mathematics Special Interest Group Conference

Early Career Researcher Travel Grant
2023

Society for reproductive biology | Co-recipient with Dr Meaghan Griffiths. Travel grant to fund a visit with Dr Griffiths in Melbourne.

Lift-off Fellowship
2020

Australian Mathematical Society | Funding to cover six weeks of writing PhD papers between thesis submission and the start of postdoctoral position.

T.M. Cherry Prize
2017
ANZIAM Conference | Award for the best student presentation at ANZIAM.

RTP PhD Scholarship
2016–2019
University of Melbourne, Australia
Australian Government Research Training Program (RTP) Scholarship.

Teaching

Tutoring
2018 Sem. 1/2
University of Melbourne | Mathematics for Biomedicine course, School of Mathematics and Statistics, The University of Melbourne.

Computer Lab. Demonstrator
2017 Sem. 2/2018 Sem. 1
University of Melbourne | Systems Biology course, Biomedical Engineering, The University of Melbourne.

Supervision

PhD
2024-Current
Primary Supervisor
Co-supervisor: A/Prof. Alys Clark, Auckland Bioengineering Institute
Project: Electrophysiology of menstruation; a multiscale modelling approach.

PhD
2023-Current
Primary Supervisor
Co-supervisor: A/Prof. Alys Clark, Auckland Bioengineering Institute
Project: Using agent-based modelling to understand vascular-tissue coupling in endometrium and endometriosis lesions.

Masters
2023-Current
Co-Supervisor
Primary supervisor: A/Prof. Alys Clark, Auckland Bioengineering Institute
Project: Variation in form and function of the non-pregnant uterus.

Summer research student
2023-2024
Primary Supervisor
Co-supervisor: A/Prof. Alys Clark, Auckland Bioengineering Institute
Project: Mathematical modelling of epithelial cell polarity in the endometrium.

Masters
2022-2023
Co-Supervisor
Primary supervisor: A/Prof. James Osborne, University of Melbourne
Project: A multicellular model of the endometrium.

Publications

Preprints

1. **Miller, C.,** Lydeamore, M. J., Berger, L., Skerratt, L. F., Flegg, J. A., Waddle, A. W., *et al.* Sunlight-Heated Refugia Protect Frogs from Chytridiomycosis: A Mathematical Modelling Study. *arXiv* (Apr. 2025).

Peer Reviewed Journal Articles

1. **Miller, C.,** Germano, D. P. J., Chenoweth, A. M. & Holdsworth-Carson, S. Mathematical modelling of macrophage and natural killer cell immune response during early stages of peritoneal endometriosis lesion onset. *Accepted for publication in the Journal of The Royal Society Interface* (2025).
2. Waddle, A. W., Clulow, S., Aquilina, A., Sauer, E. L., Kaiser, S. W., **Miller, C.,** *et al.* Hotspot Shelters Stimulate Frog Resistance to Chytridiomycosis. *Nature* **631,** 344–349. (2024) (2024).
3. **Miller, C.,** Konduri, P., Bridio, S., Luraghi, G., Arrarte Terreros, N., Boodt, N., *et al.* In Silico Thrombectomy Trials for Acute Ischemic Stroke. *Computer Methods and Programs in Biomedicine* **228,** 107244 (2023).
4. **Miller, C.,** Crampin, E. & Osborne, J. M. Multiscale modelling of desquamation in the interfollicular epidermis. *PLOS Computational Biology* **18,** e1010368 (2022).
5. Luraghi, G., Bridio, S., **Miller, C.,** Hoekstra, A., Rodriguez Matas, J. F. & Migliavacca, F. Applicability Analysis to Evaluate Credibility of an in Silico Thrombectomy Procedure. *Journal of Biomechanics* **126,** 110631 (2021).
6. **Miller, C.,** Crampin, E. & Osborne, J. M. Maintaining the Proliferative Cell Niche in Multicellular Models of Epithelia. *Journal of Theoretical Biology* **527,** 110807 (2021).
7. **Miller, C.,** Padmos, R. M., van der Kolk, M., Józsa, T. I., Samuels, N., Xue, Y., *et al.* In Silico Trials for Treatment of Acute Ischemic Stroke: Design and Implementation. *Computers in Biology and Medicine* **137,** 104802 (2021).
8. **Miller, C.,** Plucinski, M., Sullivan, A., Stephenson, A., Huston, C., Charman, K., *et al.* Electrically Caused Wildfires in Victoria, Australia Are over-Represented When Fire Danger Is Elevated. *Landscape and Urban Planning* **167,** 267–274 (2017).
9. Hilton, J. E., **Miller, C.,** Sharples, J. J. & Sullivan, A. L. Curvature Effects in the Dynamic Propagation of Wildfires. *International Journal of Wildland Fire* **25,** 1238–1251 (2016).
10. Hilton, J. E., **Miller, C.** & Sullivan, A. L. A Power Series Formulation for Two-Dimensional Wildfire Shapes. *International Journal of Wildland Fire* **25,** 970–979 (2016).
11. Hilton, J. E., **Miller, C.,** Sullivan, A. L. & Rucinski, C. Effects of Spatial and Temporal Variation in Environmental Conditions on Simulation of Wildfire Spread. *Environmental Modelling & Software* **67,** 118–127 (2015).

Peer Reviewed Conference Proceedings

1. **Miller, C.,** van der Kolk, M., Padmos, R., Józsa, T. & Hoekstra, A. *Uncertainty Quantification of Coupled 1D Arterial Blood Flow and 3D Tissue Perfusion Models Using the INSIST Framework* in *Computational Science – ICCS 2021* (Springer International Publishing, Cham, 2021), 691–697.
2. van der Kolk, M., **Miller, C.,** Padmos, R., Azizi, V. & Hoekstra, A. *Des-Ist: A Simulation Framework to Streamline Event-Based In Silico Trials* in *Computational Science – ICCS 2021* (Springer International Publishing, Cham, 2021), 648–654.
3. Hilton, J., **Miller, C.,** Bolger, M., Hetherton, L. & Prakash, M. *An Integrated Workflow Architecture for Natural Hazards, Analytics and Decision Support* in *Environmental Software Systems. Infrastructures, Services and Applications* (Springer International Publishing, 2015), 333–342.
4. **Miller, C.,** Hilton, J., Sullivan, A. & Prakash, M. in *Environmental Software Systems. Infrastructures, Services and Applications* 262–271 (Springer International Publishing, Cham, 2015).

5. Delaney, G. W., Hilton, J. E., Cleary, P. W. & **Miller, C.** *The Role of Inter-Grain Friction in Determining the Mechanical and Structural Properties of Superellipsoid Packings* in. **1542** (American Institute of Physics, 2013), 361–364.

Invited talks

1. Hudson Seminar Program, Hudson Institute of Medical Research, April 2025.
2. Melbourne Mathematical Biology Seminar Series, University of Melbourne, Sept. 2024.
3. Keynote Frontiers of Mathematical Biology: A workshop honouring Prof Edmund Crampin, November 2022.
4. Melbourne Mathematical Biology Seminar Series, University of Melbourne, July 2022.
5. Minisymposia talk Annual Meeting of the Society for Mathematical Biology (SMB) 2021.

Community Engagement and Outreach

ECM Rep, ANZIAM Exec. Committee 2023-Current	I am currently the Early Career Mathematician Representative on the ANZIAM Executive Committee. In this role I organised a 2 half-day early career researcher workshop at the 2024 ANZIAM conference.
Memberships	I am a member of the following scientific communities: - New Zealand Mathematical Society (NZMS) - Australia and New Zealand Industrial and Applied Mathematics (ANZIAM)
Science Outreach	I actively participate in many science outreach activities including: - Running booths and engaging with communities at multi-day events, such as at the Kia Aroha College, and Tūrangawaewae Marae (2024). - An interview with Ready Steady Learn, 95bFM, a student radio station at the University of Auckland (2023). - Presenting on Mathematical Biology at the University of Melbourne micro-mathematicians: a program for high achieving school-aged children (2022). - Developing/running a workshop in Mathematical Biology for international high school students as part of the World Mathematics Championships (2019). - Presenting at epidemiology workshop for the ConocoPhilips Science Program. - Presenting at the University of Melbourne CHOOSEMATHS Day (2018). - Other presentations at grad expos, high school workshops, interviews in university webinars, filming for undergraduate course planning videos, and career panels.