



EMBL Australia Group Leaders

Cytoskeleton and molecular motors

Vaishnavi Ananthanarayanan

University of New South Wales

vaish@unsw.edu.au



UNSW
SYDNEY



Vaishnavi Ananthanarayanan studies how cells organise themselves in space and time, with a particular focus on intracellular transport, and organelle dynamics.

Her research combines cell biology, biophysics and quantitative imaging to understand how molecular motors, organelles and other cellular components work together to maintain cellular organisation and function, using systems ranging from yeast to animal cells.

Research interests:

- Intracellular organisation
- Regulation of motor proteins
- Cytoskeleton-organelle interactions
- Cellular decision making

Selected publications:

Chacko, L. A., Nakaoka, H., Morris, R. G., et al. (2025) [Mitochondrial function regulates cell growth kinetics to maintain mitochondrial homeostasis](#). *Current Biology*, 35(21), 5278–5288.e4. doi: 10.1016/j.cub.2025.09.046

Tirumala, N.A., Redpath, G. M. I., Skerhut, S.V., et al. (2024) [Single-molecule imaging of stochastic interactions that drive dynein activation and cargo movement in cells](#). *Journal of Cell Biology*, 223(3):e202210026. doi: 10.1083/jcb.202210026

ORCID: 0000-0003-2936-7853

Cellular physiology

Senthil Arumugam

Monash Biomedicine Discovery Institute
senthil.arumugam@monash.edu



Senthil Arumugam develops and applies advanced microscopy technologies to explore dynamic processes at the level of single molecules to entire living tissues.

His research focuses on intracellular trafficking and organization, membrane biology, and cell signalling, while also creating new bioimaging tools and analysis platforms that allow researchers to visualise and quantitatively measure biological processes across scales, from molecules to whole organisms.

Research interests:

- Inter-organelle interactions and integrative processes
- Advanced fluorescence imaging and spectroscopy
- Computational image analysis
- Cellular interactions in developmental biology

Selected publications:

Mitra, K., Kim, S., Oettinger, D., et al. (2026) [A ratiometric fluorescent reporter of mitochondrial sodium](#). *Nature Chemical Biology*, 22, 1320-1329. doi: 10.1038/s41589-026-02253-7

York, H.M., Joshi, K., Wright, C.S., et al. (2023) [Deterministic early endosomal maturation emerges from a stochastic trigger-and-convert mechanism](#). *Nature Communications*, 14(1):4652. doi: 10.1038/s41467-023-40428-1

York, H.M., Patil, A., Moorthi, U.K., et al. (2021) [Rapid whole cell imaging reveals a calcium-APPL1-dynein nexus that regulates cohort trafficking of stimulated EGF receptors](#). *Communications Biology*, 4(1):224. doi: 10.1038/s42003-021-01740-y

ORCID: 0000-0001-6733-4679

Malaria immunology

Michelle Boyle

Burnet Institute

michelle.boyle@burnet.edu.au



Michelle Boyle studies the human immune response to malaria, with the goal of developing more effective vaccines and therapeutics.

Her research has uncovered key antibody and CD4 T cell responses that contribute to protection against malaria, using clinical cohorts and human infection studies to understand how protective immunity develops.

The Boyle Group also investigates ways to enhance immune responses through host-directed therapies, helping to address one of the major challenges in malaria control and elimination.

Research interests:

- Cell signalling and cell differentiation
- Disease mechanisms, pathogens, molecular medicine and stem cells
- Gene regulation, transcription, chromatin and epigenetics
- Infection and immunity

Selected publications:

Webster, R., Oyong, D.A., Llewellyn, S. et al. (2025) [Adjunctive ruxolitinib attenuates inflammation and enhances immunity in volunteers experimentally infected with *Plasmodium falciparum*](#). *Science Translational Medicine*, 17(826): eaea2531.
doi:10.1126/scitranslmed.aea2531

Dooley, N.L., Chabikwa, T.G., Pava, Z. et al. (2023) [Single cell transcriptomics shows that malaria promotes unique regulatory responses across multiple immune cell subsets](#). *Nature Communications*, 14(1):7387.
doi: 10.1038/s41467-023-43181-7

ORCID: 0000-0001-6733-4679

Neuroimmunology & spinal cord repair

Faith Brennan

Australian Regenerative Medicine Institute

faith.brennan@monash.edu



Faith Brennan investigates how interactions between the nervous and immune systems shape tissue damage, repair, and functional recovery following spinal cord injury.

Combining experimental models, genetics, cellular and molecular approaches, and single-cell genomics, her laboratory examines the roles of immune, glial, neural, and vascular cells in neuroinflammation, tissue remodelling, and neural circuit plasticity, including how these processes are influenced by biological sex and systemic infection.

Her research aims to uncover mechanisms that can be targeted to limit secondary injury and improve long-term neurological outcomes.

Selected publications:

Brennan, F.H., Swarts, E.A., Kigerl, K.A., et al. (2024) [Microglia promote maladaptive plasticity in autonomic circuitry after spinal cord injury in mice](#). *Science Translational Medicine*, 16(751): eadi3259. doi: 10.1126/scitranslmed.adi3259

Brennan, F.H., Li, Y., Wang, C., et al. (2022) [Microglia coordinate cellular interactions during spinal cord repair in mice](#). *Nature Communications*, 13, 4096. doi: 10.1038/s41467-022-31797-0

ORCID: 0000-0002-9201-2476

Research interests:

- Neuroinflammation and neuroimmune communication
- Spinal cord injury, repair and regeneration
- Microglia and macrophage biology
- Neuroimmune regulation of neural plasticity
- Sex differences and systemic immune responses

Computational RNA biology

Eduardo Eyras

The Australian National University

eduardo.eyras@anu.edu.au



Australian
National
University



Eduardo Eyras is a computational RNA biologist whose research examines how RNA processing, alternative splicing and RNA modifications contribute to human health and disease.

His group develops bioinformatics and machine-learning approaches to analyse transcriptomes and epitranscriptomes, with a particular interest in cancer biology, RNA regulation and RNA therapeutics.

Research interests:

- RNA biology in cancer
- Machine learning for RNA regulation
- Algorithms for long-read sequencing and genomics

Selected publications:

Acera Mateos, P., Sethi, A.J., Ravindran, A. et al. (2024) [Prediction of m6A and m5C at single-molecule resolution reveals a transcriptome-wide co-occurrence of RNA modifications.](#) *Nature Communications*, 15(1), 3899. doi: 10.1038/s41467-024-47953-7

Trincado, J.L., Entizne, J.C., Hysenaj, G., et al. (2018). [SUPPA2: Fast, accurate, and uncertainty-aware differential splicing analysis across multiple conditions.](#) *Genome Biology*, 19(1):40. doi: 10.1186/s13059-018-1417-1

ORCID: 0000-0003-0793-6218

Theoretical biophysics

Richard Morris

University of New South Wales
r.g.morris@unsw.edu.au



UNSW
SYDNEY



Richard Morris applies theoretical physics, mathematics and computational modelling to understand biological systems.

His research spans soft and active matter, differential geometry, topology and non-equilibrium statistical mechanics, seeking to identify the physical principles that drive complex biological patterns across scales, from molecular assemblies to supra-cellular tissues.

Research interests:

- Geometry and topology
- Fluctuations, phase transitions and critical phenomena
- Signalling and information processing

Selected publications:

Al-Izzi, S.C. & Morris, R.G. (2023)
[Morphodynamics of active nematic fluid surfaces](#). *Journal of Fluid Mechanics*, 957, A4.
doi: 10.1017/jfm.2023.18

Spinney, R.E. & Morris, R.G. (2025)
[Nonstationary critical phenomena: Expanding the critical point](#). *Physical Review E*, 111:064129. doi: 10.1103/hx6n-9qsk

ORCID: 0000-0002-5018-1239

Muscle cell biology

William Roman

Australian Regenerative Medicine Institute
william.roman@monash.edu



William Roman studies skeletal muscle development, repair and regeneration.

His research focuses on how cells coordinate nuclear positioning, cytoskeletal organisation and gene regulation to maintain healthy muscle tissue and recover from damage.

By combining advanced imaging, cell biology and bioengineering approaches, his work aims to uncover mechanisms that could inform future regenerative medicine strategies.

Research interests:

- Skeletal muscle cell biology
- Tissue bioengineering of skeletal muscle organs
- Intra- and inter-cellular communication

Selected publications:

Roman, W., Pinheiro, H., Pimentel, M. R., et al. (2021) [Muscle repair after physiological damage relies on nuclear migration for cellular reconstruction.](#) *Science*, 374(6565), 355-359.
doi: 10.1126/science.abe5620

Roman, W., Martins, J. P., & Gomes, E. R. (2018) [Local arrangement of fibronectin by myofibroblasts governs peripheral nuclear positioning in muscle cells.](#) *Developmental Cell*, 46(1), 102-111.
doi: 10.1016/j.devcel.2018.05.031

ORCID: 0000-0002-2210-0980

RNA biology

Robert Weatheritt

Garvan Institute of Medical Research
r.weatheritt@garvan.org.au



Garvan Institute
of Medical Research



Robert Weatheritt investigates how RNA processing and transcript architecture generate functional diversity in human cells and how these processes are disrupted in disease.

His group combines long-read and single-cell transcriptomics, computational genomics and functional perturbation to study alternative splicing, co-transcriptional RNA regulation, RNA isoforms and allele-specific regulation.

A major focus is understanding how RNA regulatory mechanisms shape cell identity and contribute to neurological disease, particularly ALS, with the aim of uncovering new disease mechanisms and therapeutic opportunities.

Research interests:

- Alternative splicing & co-transcriptional RNA regulation
- Neurobiology & neurodegenerative disease
- Gene regulation, transcription, chromatin & epigenetics
- Computational genomics & bioinformatics
- Functional genomics & single-cell biology

Selected publications:

Kjer-Hansen, P., Pazaky, K., Kavanagh, D., et al. (in press). [Alternative splicing fine-tunes modular protein interfaces to control protein localisation](#). *Nature Structural & Molecular Biology*.

King, H.E., O'Connell, S., Kavanagh, D., et al. (2026) [Isoform-specific single-cell Perturb-seq reveals distinct functions of alternative promoters in drug response](#). *Nucleic Acids Research*, 54(4):gkag118. doi: 10.1093/nar/gkag118

Kjer-Hansen, P., Phan, T. G., & Weatheritt, R. J. (2024). [Protein isoform-centric therapeutics: expanding targets and increasing specificity](#). *Nature Reviews Drug Discovery*, 23(10), 759-779. doi: 10.1038/s41573-024-01025-z

ORCID: 0000-0003-3716-1783

Cancer epigenetics

Qi Zhang

South Australian immunoGENomics Cancer Institute
qi.zhang@adelaide.edu.au



Qi Zhang studies the molecular mechanisms that regulate chromatin and gene expression.

Her research focuses on histone lysine methyltransferases and demethylases and how their activities establish and maintain chromatin states to control cell identity and development.

Her group uses stem cell-derived cellular and organoid models, together with biochemical, molecular, genomics and bioinformatic approaches to understand how epigenetic regulation shapes normal development and disease.

Research interests:

- Epigenetic and gene regulation
- Chromatin biology
- Cancer biology
- Neurodevelopment

Selected publications:

Healy, E., Zhang, Q., Gail, E.H., et al. (2024) [Inseparable RNA binding and chromatin modification activities of a nucleosome-interacting surface in EZH2](#). *Nature Genetics*, 56(6), 1193-1202. doi: 10.1038/s41588-024-01740-8

Zhang, Q., McKenzie, N.J., Warneford-Thomson, R., et al. (2021) [PALI1 facilitates DNA and nucleosome binding by PRC2 and triggers an allosteric activation of catalysis](#). *Nature Communications*, 12(1), 4592. doi: 10.1038/s41467-021-24866-3

ORCID: 0000-0003-1121-8817