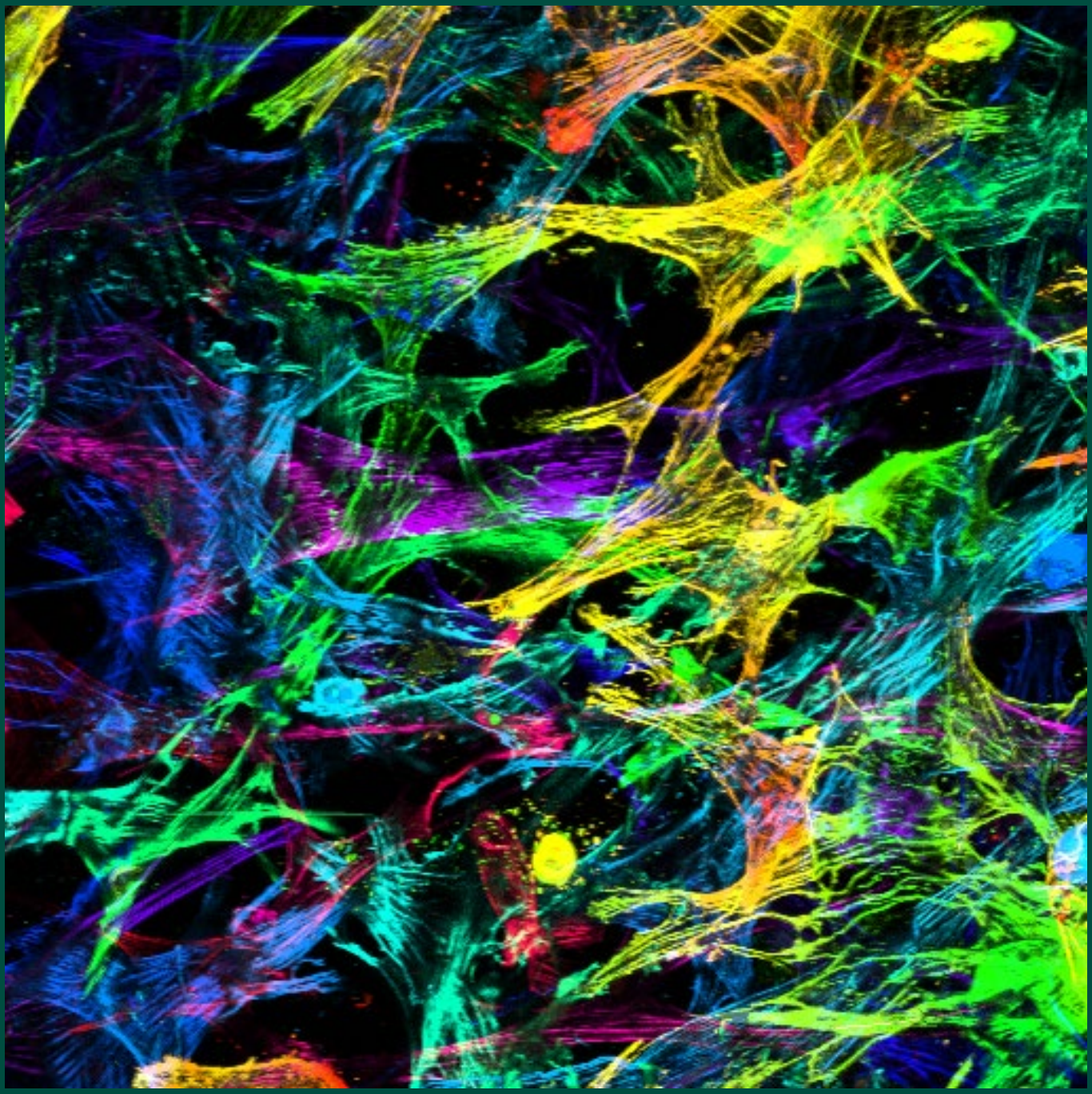
AuSMB

Australian Society for Mechanobiology



Winter Newsletter, July 2026

Acknowledgement of Country

We acknowledge the Traditional Owners and Custodians of the lands on which we live and work. We pay our respects to Elders past, present and emerging, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

President's Welcome

Welcome to the inaugural edition of the Australian Society for Mechanobiology (AuSMB) Newsletter. We are excited to launch this newsletter as a new way of keeping our community connected, informed and engaged throughout the year.

It has been a busy start to the year for the Executive Committee as we continue to build on the momentum of our growing Society. Reflecting on 2025, it was another successful year for AuSMB, with strong member engagement and excellent scientific activities.

I would like to sincerely thank our Immediate Past President, A/Prof Maté Biro, for his outstanding leadership and service to AuSMB. We are delighted that he will continue to support the Society as Immediate Past President.

While we celebrate these achievements, we also recognise that ongoing conflicts and humanitarian crises continue to affect members of our community and the broader scientific community. Our thoughts are with everyone facing these difficult circumstances.

Looking ahead, 2026 promises to be an exciting year. We are delighted to launch our inaugural AuSMB Research and Strategy Workshop, which will provide opportunities for members to present their work, build collaborations, and help shape the future of mechanobiology in Australia. We encourage you to join us and keep an eye on our website for further details.

The International Society for Mechanobiology Meeting is just around the corner, and we are pleased to support several members with travel awards to represent Australian mechanobiology on the international stage. Planning is also underway for our next AuSMB Annual Meeting, which is anticipated to be held in New Zealand. Your continued membership and support enable us to provide travel grants, networking opportunities, and initiatives that strengthen our community.

This edition also includes updates from across the Society, member achievements, and information about upcoming events. Thank you for your continued support, and I look forward to seeing many of you throughout the year.

-*Sara Baratchi,* President

Cover Image: Depth-coded mammary cancer cells in collagen matrices, subjected to compressive force. Credit: Dr Sarah Boyle (Centre for Cancer Biology, Adelaide University)

The Executive Committee in 2026

We are pleased to introduce the AuSMB Executive Committee for 2026. While many of our Council members continue in their existing roles, including Treasurer Dr Charles Cox, we welcome A/Prof Sara Baratchi as President, A/Prof Anne Lagendijk as Vice President, and Dr Sarah Boyle as Secretary. We also welcome Dr Marco Enriquez Martinez as our Early Career Researcher Representative and Murron Carroll as our Student Representative. We extend our sincere thanks to Dr Remy Brynn for valuable contributions to the Executive Committee and wish Remy all the best.

Sara Baratchi
President

Anne Lagendijk
Vice President

Charles Cox
Treasurer

Sarah Boyle
Secretary

Thank You to Our Immediate Past President

AuSMB sincerely thanks A/Prof Maté Biro for his outstanding leadership and dedicated service as President over the past two years. During his tenure, the Society continued to grow through improvements to our website, the successful delivery of our national meeting, and the introduction of travel support for members attending the International Society for Mechanobiology meeting. These initiatives strengthened our community and created valuable opportunities for our members. We are delighted that Maté will continue to support AuSMB as Immediate Past President, and we look forward to his ongoing contributions to the Society.

Maté Biro
Past President

Recognition, Positions and Awards

Professor Alpha Yap of UQ's Institute for Molecular Bioscience was recently elected to the 2026 Fellowship of the Australian Academy of Science. This is well-deserved recognition of his contribution to Australian Science and leadership in our field. Congratulations!

The Society congratulates Phoebe Adler (University of Otago) and Metka Gorkič Casey (UQ IMB) on their successful applications to receive AuSMB Registration Support to the upcoming International Society of Mechanobiology Meeting at SynSci2026, in Glasgow. We look forward to hearing about their experience at the conference!

Congratulations to those in our community who received Australian Research Council funding at the end of 2025, for funding that commenced this year, including:

- A/Prof Sam Stehbens (UQ), Discovery Project “Understanding how cells withstand compression in crowded environments.”
- Prof Alpha Yap (UQ), Discovery Project “How Adherens junctions coordinate cell signaling for epithelial homeostasis.”
- Dr Zijing Zhou (UNSW/VCCRI), Discovery Early Career Research Award “A new family of mechanically-activated lipid scramblases.”

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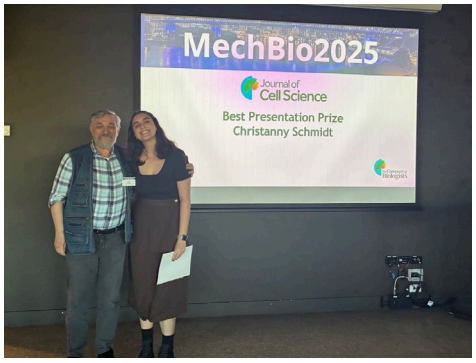
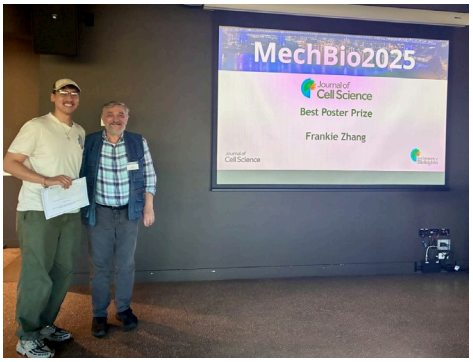
Meeting Report – MechBio2025, Brisbane

SPONSORS: The University Of Queensland AUSTRALIA | Coherent SCIENTIFIC | Journal of Cell Science | ANZSCDB

MechBio2025 was held 5-6 Nov in sunny Brisbane. It brought together 57 researchers with a shared interest in understanding how physical forces and cell mechanics control cell and tissue behaviour. The meeting showcased unpublished work from established experts, ECRs and PhD students. We also hosted two distinguished international keynote speakers; Prof. Julia Yeomans from the University of Oxford and Prof. Edouard Hannezo from the Institute for Science and Technology in Austria. The 22 presentations and poster sessions evoked lively discussion and undoubtedly led to new ideas and collaborative avenues. Discussions became ever more lively during the amazing outdoor conference dinner at the Greek Club were attendees enjoyed delicious food with a striking view of the Brisbane skyline. Prizes were awarded to Christanny Schmidt (best presentation) and Frankie Zhang (best poster).

-Anne Lagendijk and Melanie White





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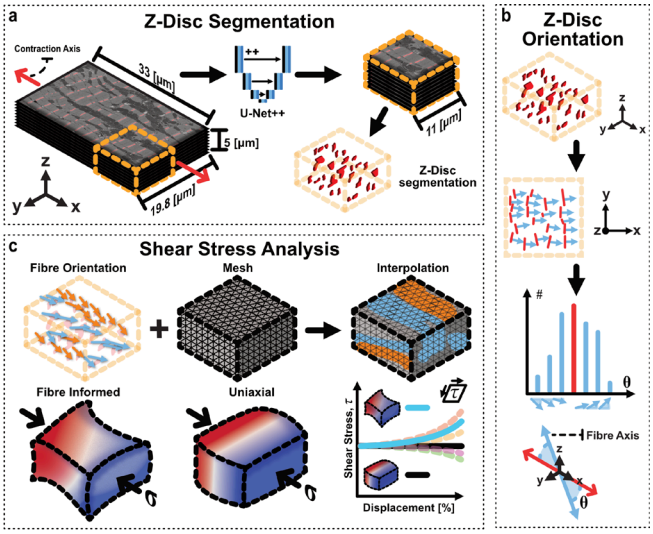
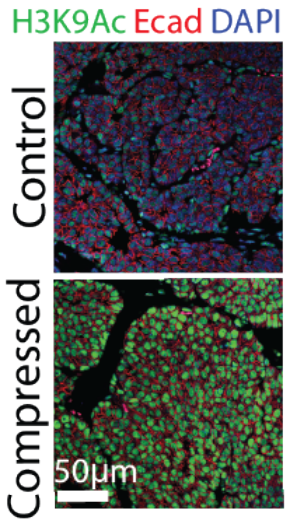
Publication Highlights from Members

“Cardiac myofibril networks induce shear stress”
npj Systems Biology and Applications 12:75 (April 2026)
Lead author: Liam Murray
Senior author: Vijay Rajagopal
https://www.nature.com/articles/s41540-026-00696-1

This work explores the impacts of myofibril orientation on the stress dynamics of contracting sheep cardiomyocytes. Recently, researchers have highlighted that myofibrils create complex networks, challenging existing assumptions about the organisation of the myocyte’s force-producing machinery. Here, segmentation of electron microscopy images, alongside physics-based simulations, demonstrates that myofibrils create a distribution of angles within the cell. Consequentially, contraction induces shear stresses that are not accounted for in existing uniaxial models, and may have ramifications for cellular processes.





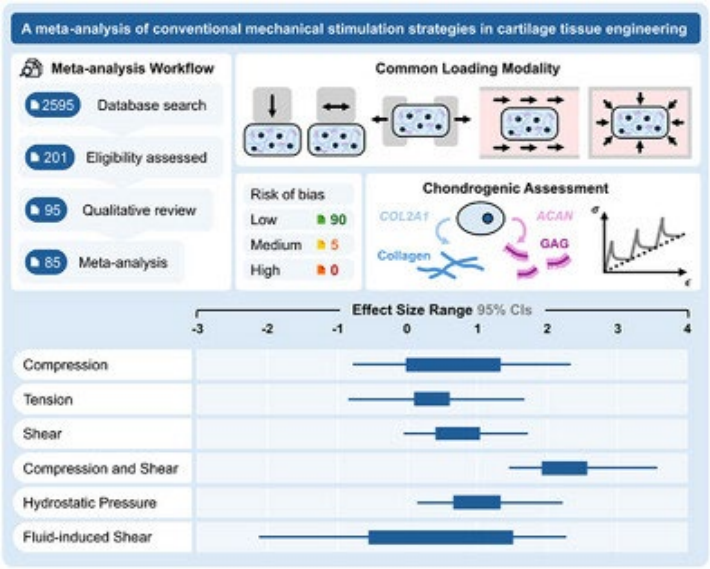
Compression-induced epigenetic mechanical memory, denoted by histone acetylation (green), promotes mammary cancer growth

“Compressive stress–driven Piezo1 activation and Rho-ROCK mechanotransduction promote tumor progression via epigenetic mechanical memory”
Science Advances 12:10 (March 2026)
Lead/Co-corresponding author: Sarah Boyle
Senior/Co-corresponding author: Michael Samuel
https://www.science.org/doi/10.1126/sciadv.aeb1271

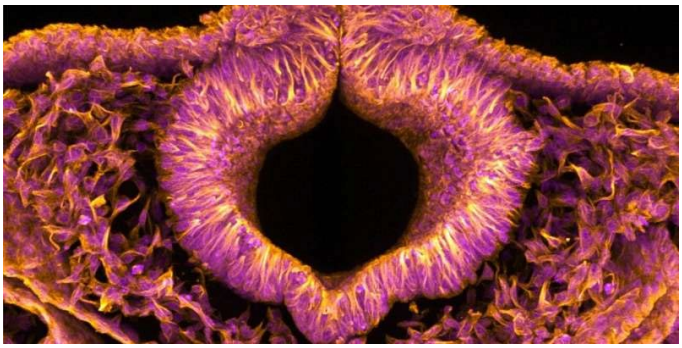
This report demonstrates that breast cancer cells subjected to compression, such as during rapid tumour growth within the confined mammary duct, are permanently altered in ways that exacerbate tumour aggressiveness. Compressive forces activate the mechanosensitive ion channel PIEZO1, leading to calcium-dependent activation of the Rho-ROCK mechanotransduction pathway. This rapidly induces acetylation of nuclear histone proteins, shifting chromatin into a transcriptionally active state. These epigenetic alterations establish mechanical memory within breast cancer cells, causing them to become, and remain, highly invasive and proliferative even after the mechanical stimulus has been removed. Given the elevated levels of PIEZO1 observed in patients with early-stage breast cancer, the findings suggest that PIEZO1 expression may help identify patients at risk of aggressive disease and that this signalling axis represents a potential mechanotherapy target.

“Standardized Effect Measures Informing Next-Generation Strategies for Mechanical Stimulation in Cartilage Tissue Engineering”
Advanced Healthcare Materials 0:e71309 (May 2026)
Lead author: Jiaqi Shen
Senior author: Kathryn Stok
https://advanced.onlinelibrary.wiley.com/doi/10.1002/adhm.71309

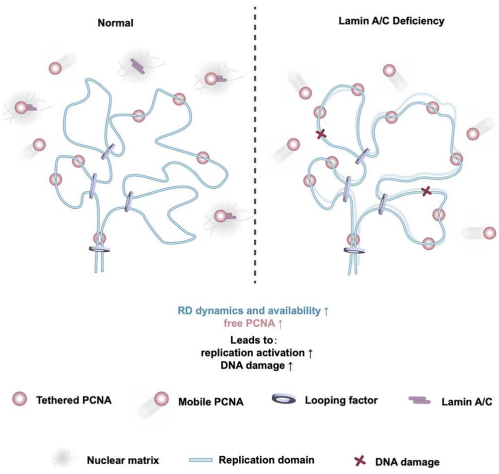
This systematic review quantitatively compares conventional mechanical stimulation strategies in cartilage tissue engineering across 85 heterogeneous in vitro studies. Applying standardised effect measures, meta-analysis reveals that combined compression and shear loading optimally promotes cartilage matrix development. These findings establish a quantitative baseline for mechanically stimulated chondrogenesis, guiding future stimulation protocol optimisation and next-generation bioreactor design.



"Quantitative live imaging reveals PRICKLE1 controls junctional neural tube morphogenesis independent of Planar Cell Polarity"
Nature Communications 17:3654 (April 2026)
Lead author: Jianxiong Wang
Senior author: Melanie White
https://www.nature.com/articles/s41467-026-71242-0
Using high-resolution quantitative live imaging in transgenic quail embryos, this study uncovers a planar cell polarity-independent role for Prickle1 in junctional neural tube formation, providing new insights into how junctional neural tube defects may arise.

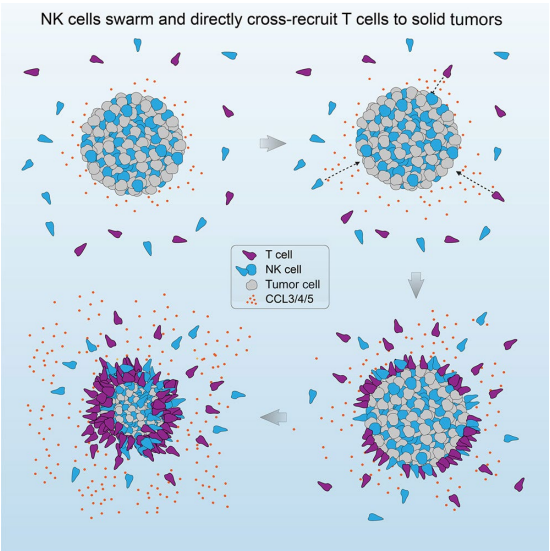


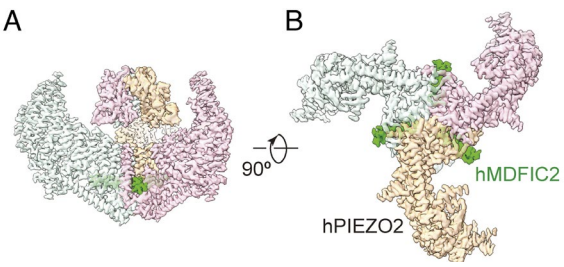
A cross-section of the fully formed quail neural tube



"Lamin A/C safeguards replication initiation by orchestrating chromatin accessibility and PCNA recruitment"
Cell Reports 45:3 (March 2026)
Lead author: Mengling Zhang
Co-Senior authors: Qian Peter Su and Yujie Sun
https://www.cell.com/cell-reports/fulltext/S2211-1247(26)00153-1
This study used super-resolution imaging to investigate how lamin A/C regulates replication initiation by orchestrating the chromatin structure and the recruitment of proliferating cell nuclear antigen (PCNA). The authors demonstrate that lamin A/C deficiency leads to an increase in chromatin dynamics, replication domain accessibility, and PCNA availability, together facilitating increased initiation density and replication-dependent DNA damage. This highlights lamin A/C as a critical gatekeeper of balanced replication initiation, offering valuable insights into its involvement in replication-associated diseases and therapeutic opportunities.

"Natural killer cells swarm and cross-recruit cytotoxic T cells via CCR5"
Cell Reports 45:36 (June 2026)
Lead author: James Cremasco
Senior author: Maté Biro
https://www.cell.com/cell-reports/fulltext/S2211-1247(26)00493-6
To understand mechanisms by which cytotoxic T lymphocytes are recruited to solid tumours, authors employed a combination of solid tumour models and quantitative imaging to investigate the interplay between NK cells engaging targets and distal cytotoxic lymphocytes. They found that both murine and human NK cells swarm to tumour targets via secretion of diffusive chemokines that bind the CCR5 receptor, and that activated NK cells and CTLs can directly cross-recruit one another via CCR5. They further demonstrate that tumour-reactive NK cells promote the tumour infiltration of subsequently transferred NK cells and CTLs. These results demonstrate that NK cells can swarm via homotypic chemokine signalling and that NK cells and CTLs engage in direct heterotypic cross-recruitment to targets.





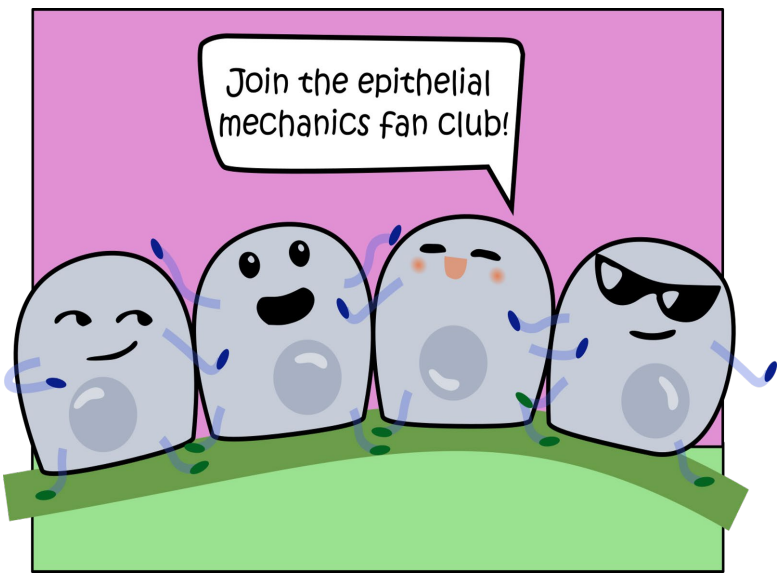
Cryo-EM map of the human PIEZO2:MDFIC2 complex

"MDFIC2 is a sensory neuron–specific PIEZO channel auxiliary subunit"
PNAS 123:15 (April 2026)
Co-Lead authors: Zijing Zhou and Fei Dai
Co-Senior/corresponding authors: Yixiao Zhang and Charles Cox
https://www.pnas.org/doi/abs/10.1073/pnas.2530071123
This report identifies a completely uncharacterized MyoD family member, MDFIC2, as a PIEZO channel auxiliary subunit that is selectively and abundantly expressed in subsets of mechanosensitive sensory neurons. The structures generated also represent a glimpse of human PIEZO2 and identify a potentially druggable interface that could be used for the rational design of PIEZO-targeted therapeutics.

Student/ECR News and Matters

Discover the Epithelial Mechanics Fan Club – A Growing Global Community for Early-Career Researchers

For nearly three years, Julia Eckert (Postdoc, IMB at UQ, Australia) and Nimesh Chahare (Postdoc, Columbia University, USA) have been leading the ***Epithelial Mechanics Fan Club,*** a vibrant online platform with thousands of followers worldwide. This initiative, recently featured on FocalPlane, offers early-career researchers an opportunity to showcase their research interests through mini-review threads, covering a wide range of topics – from cutting-edge tools for probing cell mechanics to mechanobiological mechanisms, developmental biology, and theoretical models of both in vitro and in vivo systems.



The community's growing reach has already sparked collaborations and opened doors for young scientists seeking their next opportunities.

They are active on Bluesky and have recently launched a dedicated website highlighting their delegates and their insightful threads. They are constantly seeking new stories and exciting topics to expand the network and foster meaningful connections.

Are you passionate about #EpithelialMechanics? Want to share your research or recent publication? The Fan Club would love to hear from you! Reach out via email or through the links below to become part of their thriving community:

Julia Eckert: j.eckert@imb.uq.edu.au
Bluesky: https://bsky.app/profile/epimechfc.bsky.social
Website: https://epithelialmechanics.github.io/

Nimesh Chahare and Julia Eckert

Upcoming Events

The Australian Society for Mechanobiology is pleased to launch its inaugural Research & Strategy Workshop — a new community-focused initiative designed to strengthen connections across the Australian mechanobiology community.

The workshop aims to bring researchers together in a collaborative and interactive environment to identify emerging opportunities and help shape the future direction of the field.

Further details regarding abstract submissions, registration, speakers, and the evolving workshop program will be announced soon.
https://ausmb.org/meetings/2026-workshop.php

Calls for Papers

The following journals have active Special Calls for Papers in the Mechanobiology field:

Mechanobiology in Medicine (ScienceDirect)

- Special issue on Cellular Mechanobiology and Immune Engineering, submission deadline 31 Dec 2026
- Special issue on Mechano-Regulation on Cell Memory, submission deadline 31 Dec 2026

npj Biological Physics and Mechanics (Nature group)

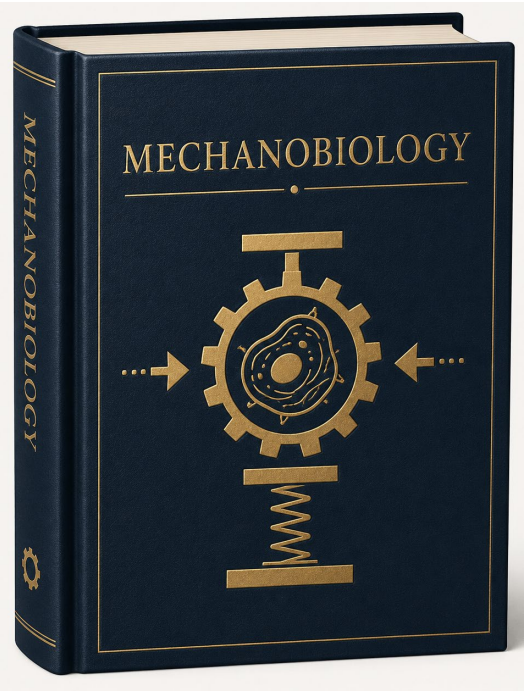
- Special issue on Mechanobiology of the Extracellular Matrix, submission deadline 31 Aug 2026
- Special issue on Nuclear Mechanobiology, submission deadline 12 Sept 2026
- Special issue on Mechano-Signaling Systems in Multicellular Tissues, submission deadline 30 Sept 2026
- Special issue on Decoding Mechanosensitive Cell Types: From Molecular Transducers to Therapeutic Innovations, submission deadline 06 Nov 2026
- Special issue on Mechanosensitive and Mechanoregulatory Ion Channels, submission deadline 24 Dec 2026

Mechanobiology (Sage Journals)

- Special Collection on Mechanical Force Quantification in the Immune System, submission deadline 31 Aug 2026

Cancer and Metastasis Reviews (Springer Nature)

- Special Collection on Mechanobiology, submissions ongoing



Get Involved!

Do you have news, recent publications, or received an award? Know of upcoming conferences, grant/fellowship funding or other opportunities of interest to the field (e.g. paper submission calls)? Have a job opening?
We want to hear from you! Send any future newsletter items to secretary Sarah Boyle (sarah.boyle@adelaide.edu.au) or get in touch via your State Representative.

Interested in joining the AuSMB Council? We are currently seeking a Diversity and Inclusion (D&I) Representative to join our team, someone to help shape inclusive policies, initiatives, and resolutions for our Society. If you are interested in this role, please get in touch.

For all the society news, follow AuSMB via our website (https://ausmb.org/) and on X (@AuSMBSoc).

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