

CTAC 2024

Monash University, Melbourne, Australia

19–22 November, 2024

The 22nd Biennial Computational Techniques and Applications Conference (CTAC2024) was hosted by the School of Mathematics at Monash University in Melbourne, Australia.

CTAC is a flagship event of the ANZIAM Special Interest Group in Computational Mathematics. This biennial conference series, which began in 1981, offers an interactive forum for researchers developing and applying computational methods to solve engineering, scientific, and mathematical problems. Attendees are invited to submit papers based on their presentations for publication in the refereed Electronic Supplement of the ANZIAM Journal.

The editors, Ricardo Ruiz Baier, Bishnu Lamichhane and Quoc Thong Le Gia, thank all reviewers whose efforts helped ensure the quality of the proceedings.

This Special Section of the Proceedings of ANZIAM includes peer-reviewed papers from CTAC2024. The nine plenary speakers and one public lecture were:

- **Santiago Badia, Monash University**
Finite element interpolated neural networks
- **Fleurianne Bertrand, Technische Universität Chemnitz**
Stress-based finite elements methods
- **Victor Calo, Curtin University**
Adaptive stabilized finite element methods: A variational multiscale approach for robust and accurate flow simulations
- **Carsten Carstensen, Humboldt-Universität zu Berlin**
Lower eigenvalue bounds for the harmonic and bi-harmonic operator
- **Vivien Challis, Queensland University of Technology** Computational structural optimisation of piezoelectric materials
- **Nilima Nigam, Simon Fraser University**
Skeletal muscles: modeling and simulation
- **Vijay Rajagopal, University of Melbourne**
What do we need a computational physiology framework to predict single cell biology?
- **Dingxuan Zhou, University of Sydney**
Mathematical theory of structured deep neural networks
- **Terence O’Kane, CSIRO (Public Lecture)**
Mathematical methods and artificial intelligence in climate science

CTAC2024 attracted a vibrant mix of established and early-career researchers, including student contributors whose presentations were eligible for prizes sponsored by MoCaO and AMSI. In total, the program featured over 120 contributed talks across various themes, including numerical analysis, scientific computing, mathematical biology, hybrid and polytopal methods, and optimization.

CTAC2024 Organising Committee (Monash University)

- Anne Boschman
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- Janosch Rieger
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- Jai Tushar
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- Linda Stals (ANU)
- Ian Turner (QUT)

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- School of Mathematics, Monash University
- Australian Mathematical Sciences Institute (AMSI)
- Mathematics of Computation and Optimisation (MoCaO) special interest group of AustMS
- Society for Industrial and Applied Mathematics (SIAM)
- ANZIAM Student Support Scheme