

Mitchell Curran

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Education

- **The University of Sydney** **Sydney**
○ *PhD (Mathematics)* 10/2018–12/2023
 - Supervised by A/Prof Robert Marangell, Co-supervised by Prof Yuri Latushkin
 - Thesis title: *Hamiltonian spectral theory and the Maslov index*
- **The University of Sydney** **Sydney**
○ *BSc (Advanced Mathematics)(Honours)* 3/2013–11/2017
 - Honours Class I and the University Medal
 - Honours project: *Spectral theory for the nonlinear Schrödinger equation on quantum graphs*, supervised by A/Prof Robert Marangell
 - Honours courses in Asymptotic Methods and Perturbation Theory, Computational Projects in Applied Mathematics, Advanced Options Pricing, Introduction to Optimal Control, Integrable Systems, PDE's in Mathematical Biology
 - Majors: Mathematics, Financial Mathematics and Statistics

Employment

- **Auburn University** – *Postdoctoral Fellow* 08/2024–Present
Advised by A/Prof Selim Sukhtaiev
- **The University of Sydney** – *Tutor* 02/2017–05/2024
Classes taught listed below
- **The University of Sydney** – *Summer Research Intern* 12/2015–02/2016
Undertook a project in the Bioinformatics and Applied Statistics group, which investigated how to desensitise in-house data, such as melanoma and other health data, for public release

Teaching

- **Auburn University:**
 - Calculus III Spring semester 2025
- **Tutoring history at the University of Sydney:**
 - MATH1014 Introduction to Linear Algebra 2017
 - MATH1011 Applications of Calculus 2017, 2022
 - MATH1013 Mathematical Modelling 2022
 - MATH1002 Linear Algebra 2019–2023
 - MATH1902 Linear Algebra (Advanced) 2022
 - MATH1021 Calculus of One Variable 2020, 2021
 - MATH1921 Calculus of One Variable (Advanced) 2019, 2020, 2022
 - MATH1023 Multivariable Calculus and Modelling 2019
 - MATH1923 Multivariable Calculus and Modelling (Advanced) 2019–2022
 - MATH2061 Linear Mathematics and Vector Calculus 2024
 - MATH2921 Vector Calculus and Differential Equations (Advanced) 2020, 2024
 - MATH3063 Nonlinear Ordinary Differential Equations with Applications 2023, 2024
 - MATH3078 Partial Differential Equations and Waves 2023

Selected Awards, Prizes and Grants

- **B.H. Neumann Prize** 2022
For the best student talk at the Annual AustMS meeting
- **Centre for Complex Systems student travel grant** 2019
For attendance at the Sydney Dynamics Group workshop 2019
- **RTP Stipend** 2018–2022
Funding for PhD candidature
- **Academic Merit prize** 2013–2017
For high performance in undergraduate courses
- **Barker prize** 2017
For proficiency in the Honours examinations
- **K.E. Bullen scholarship no. II in Applied Mathematics** 2017
For proficiency in senior mathematics and statistics courses
- **Dean's List of Excellence** 2015
For proficiency in senior science courses

Publications and preprints

- *Hamiltonian spectral flows, the Maslov index, and the stability of standing waves in the nonlinear Schrödinger equation*. SIAM Journal on Mathematical Analysis (SIMA). 55 (5) pp. 4998-5050. DOI: 10.1137/22M1533797. With Graham Cox, Robert Marangell and Yuri Latushkin (2023).
- *Detecting eigenvalues in a fourth order NLS equation with a non-regular Maslov box*. Submitted. 47 pages. With Robert Marangell.
- *Coupled mode reductions in the cubic-quintic NLS with a double-well potential*. With Robert Marangell, Jeremy L. Marzuola, Yuslenita Muda and Hadi Susanto. In preparation.

Presentations

Invited talks

- *Hamiltonian spectral flows, the Maslov index, and the stability of NLS standing waves* **AIMS** 2023
Special session: Geometric methods in spectral theory of travelling waves and patterns
- *Counting eigenvalues in Hamiltonian systems via the Maslov index* **AustMS** 2022
Special session: Dynamical systems and ergodic theory
- *Detecting eigenvalues in a fourth-order NLS equation with a non-regular Maslov box* **BU Applied Math seminar** 2024

Contributed talks

- *What's in the box* **ANZIAM** 2022
- *The Maslov index and the spectral stability problem for standing waves of the nonlinear Schrödinger equation* **AustMS** 2021
- *Eigenvalues for the NLS equation on a compact interval* **ANZIAM** 2020

Informal talks

- *Hamiltonian spectral theory and the Maslov index* **Final PhD presentation** 2024
- *Introduction to the Maslov index* **MaPS seminar** 2021
- Single-slide presentation **SDG** 2019, 2020, 2022

Workshops and conferences attended

- 13th AIMS (American Institute of Mathematical Sciences) biennial conference on Dynamical Systems, Differential Equations and Applications (**Wilmington, NC** 06/2023)
- AustMS (Australian Mathematical Society) annual meeting (virtually in **Newcastle** 12/2021, **Sydney** 12/2022)
- ANZIAM (Australia and New Zealand Industrial and Applied Mathematics) annual meeting (**Hunter Valley** 01/2020, virtually in **Perth** 02/2022)
- Sydney Dynamics Group workshop (**Jervis Bay** 11/2020, **Auckland** 11/2023)
- Lie Symmetry Techniques for Partial Differential Equations workshop (**Newcastle**, 05/2019)