

Wes Caldwell

Curriculum Vitae

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EDUCATION

Carnegie Mellon University

- Ph.D., Mathematical Sciences, May 2025.
 - Advised by Irene Fonseca & Giovanni Leoni
 - Thesis: *Non-Local Phase Transitions*

University of Maryland, College Park

- B.S., Mathematics, December 2018.
- B.S., Physics, December 2018.

EMPLOYMENT

Whiting School of Engineering, Johns Hopkins University

- NIST PREP Postdoc, Aug 2025 - Present.

National Cancer Institute, National Institutes of Health

- Summer Research Fellow, June 2018 - August 2018.
- Postbaccalaureate Research Fellow, February 2019 - April 2019.
 - Advised by Hormuzd Katki & Ronald Summers.

PUBLICATIONS AND PREPRINTS

1. **Non-Local Phase Transitions.** (*Ph.D. Thesis*) Carnegie Mellon University, 2025.
2. **Non-Local, Anisotropic Phase Transitions with Singular Kernels.** *ESAIM: Control Optim. Calc. Var.*, Volume 31, Issue 32, 2025.
3. **On the Four Dimensional Holonomy of the 4D, $\mathcal{N} = 1$ Complex Linear Supermultiplet** (joint with S. James Gates, et al.). *International Journal of Modern Physics A*, Volume 33, Issue 12, 2018.

CONTRIBUTED TALKS & POSTERS

1. *Variational Approaches to Gradient Flows in Metric Spaces II.* Carnegie Mellon University, CNA Working Group, 18 March 2025.
2. *Variational Approaches to Gradient Flows in Metric Spaces I.* Carnegie Mellon University, CNA Working Group, 11 March 2025.
3. *Non-Local Phase Transitions.* Carnegie Mellon University, Graduate Student & Postdoc Seminar, 7 November 2024.
4. *Markov Semigroups.* Carnegie Mellon University, SIAM Working Group Seminar, 31 October 2024.
5. *Nonlocal, Anisotropic Phase Transitions with Singular Kernels.* SIAM Conference on Mathematical Aspects of Materials Science, 19 May 2024.
6. *Quantitative Stability for the Isoperimetric Inequality.* Carnegie Mellon University, SIAM Working Group Seminar, 4 April 2024.
7. *The Lyusternik-Fet Theorem and Minimax Theory.* Carnegie Mellon University, SIAM Working Group Seminar, 7 December 2023.
8. *Calculus of Variations and the Index Theorem, Part II.* Carnegie Mellon University, SIAM Working Group Seminar, 26 October 2023.
9. *Calculus of Variations and the Index Theorem, Part I.* Carnegie Mellon University, SIAM Working Group Seminar, 12 October 2023.
10. *An Intuitive Introduction to Morse Theory.* Carnegie Mellon University, SIAM Working Group Seminar, 7 September 2023.
11. *The Infinity-Laplacian and its Applications.* Carnegie Mellon University, SIAM Working Group Seminar, 6 April 2023.
12. *Introduction to the p -Laplacian.* Carnegie Mellon University, SIAM Working Group Seminar, 9 February 2023.
13. *Orlicz Spaces and Concentration of Measure.* Carnegie Mellon University, SIAM Working Group Seminar, 15 September 2022.

14. *Introduction to Homogenization*. Carnegie Mellon University, SIAM Working Group Seminar, 3 February 2022.
15. *Hypersingular Integrals, the Snake Lemma, and You*. Carnegie Mellon University, Graduate Student & Postdoc Seminar, 29 September 2021.
16. *The Wigner Semicircular Law*. Carnegie Mellon University, SIAM Working Group Seminar, 21 October 2021.
17. *Immersion, Embeddings, and Sufficient Statistics*. Carnegie Mellon University (held virtually), SIAM Working Group Seminar, 8 April 2021.
18. *Sphere Bundles and Characteristic Classes*. Carnegie Mellon University (held virtually), CMU HoTT Graduate Student Workshop, 26 February 2021.
19. *Dual Connections on Manifolds*. Carnegie Mellon University (held virtually), SIAM Working Group Seminar, 18 February 2021.
20. *The Dynamic Programming Approach to Deterministic Control Problems*. Carnegie Mellon University (held virtually), SIAM Working Group Seminar, 15 October 2020.
21. *Classifying Emphysema on CT Images via Convolutional Neural Networks in the National Lung Screening Trial (Poster)*. National Institutes of Health, NIH Summer Research Poster Day, 9 August 2019.

TEACHING EXPERIENCE

Carnegie Mellon University

- Course Instructor, 21-240 Matrix Algebra with Applications (Spring 2024).
- Teaching Assistant, 21-254 Linear Algebra and Vector Calculus for Engineers (Spring 2020, Fall 2020*, Spring 2021*, Fall 2021*, Spring 2022*, Fall 2022*, Spring 2023*).
- Teaching Assistant, 21-256 Multivariate Analysis (Fall 2019).

ORGANIZATION

Society for Industrial & Applied Mathematics

- Co-President for the Carnegie Mellon SIAM student chapter, Spring 2023 - Spring 2025.
- Vice President for the Carnegie Mellon SIAM student chapter, Fall 2022 - Spring 2023.
- Treasurer for the Carnegie Mellon SIAM student chapter, Fall 2021 - Fall 2022.

AWARDS

- Outstanding Teaching Prize, Department of Mathematics, Carnegie Mellon University (2022).
- Angelo Bardasis fellow, University of Maryland (2018).
- President's scholarship, University of Maryland (2015).
- National Merit scholarship (2015).

*Lead TA