

# Erin Angelini

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🌐 [eeangelini](https://github.com/eeangelini)

🌐 [eeangelini.github.io](https://eeangelini.github.io)

## Education

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### University of Washington

*PhD in Applied Mathematics*

Seattle, WA

*Expected Graduation: June 2024*

### Pomona College

*BA in Mathematics*

Claremont, CA

*May 2018*

Relevant Coursework: Probability and Stochastic Processes, Dynamical Systems, Partial Differential Equations, Stochastic Models in the Life Sciences, Perturbation Theory, Optimization

Programming Languages: Python, Matlab, Julia

## Research Experience

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### University of Washington

*Graduate Research Associate*

*Advisor: Dr. Hong Qian*

Seattle, WA

*2019-present*

#### Stochastic Thermodynamics of the Single Cell

*2022-present*

- Presented a mathematical re-formulation of classical thermodynamic analysis (Gibbs).
- Starting from counting statistics, derived the concept of “internal energy” using principles of Legendre-Fenchel & Lagrangian duality.
- Made the case for incorporating this thermodynamic framework into the standard applied mathematics approach to dynamical models and data, including those from single-cell biology.
- This work has resulted in a manuscript which is currently under review for publication.

#### Quantifying Cellular Heterogeneity

*2020-present*

- Apply concept of an “epigenetic landscape” to the phenotypic evolution of cancer.
- Gain functional insight into the non-genetic heterogeneity observed in tumors.
- Develop a mathematical framework to infer phenotype transition rates from single-cell lineage tracing experiments.
- Collaboration with Dr. Sui Huang at the Institute for Systems Biology in Seattle, WA and Dr. Joseph X. Zhou at Novartis Institutes in Cambridge, MA.

#### Evolutionary Dynamics of Tumor Recurrence

*2019-2022*

- Analyzed a dynamical model for cancer population dynamics during chemotherapy.
- Investigated relation between induced drug-resistance and inevitability of tumor recurrence.
- Derived general conditions for the inherent limit to the success of continuous therapy.
- Collaboration with Dr. Sui Huang at the Institute for Systems Biology in Seattle, WA.

## Publications & Preprints

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- **E. Angelini** and H. Qian. “Statistical analysis of random motion and energetic behavior of counting: Gibbs’ theory revisited.” *Manuscript submitted for publication* (2022).
- **E. Angelini**, Y. Wang, J.X. Zhou, H. Qian, and S. Huang. “A model for the intrinsic limit of cancer therapy: Duality of treatment-induced cell death and treatment-induced stemness.” *PLoS Comput Biol* 18(7): e1010319 (2022). doi: [10.1371/journal.pcbi.1010319](https://doi.org/10.1371/journal.pcbi.1010319)

## Presentations

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- “Stochastic physics of the single cell: ergodicity, prior probability, and Bayesian inference.” E. Angelini. Selected short talk at the *Stochastic Physics in Biology Gordon Research Conference (GRC)*. Ventura, CA (2021). Slides available online at [https://eeangelini.github.io/files/GRC\\_2023\\_Presentation.pdf](https://eeangelini.github.io/files/GRC_2023_Presentation.pdf).

## Teaching Experience

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**University of Washington** **Seattle, WA**  
*Teaching Associate* *2019*

- Calculus with Analytic Geometry I (Fall 2019)
- Partial Differential Equations and Waves (Spring 2019)

## Leadership & Service

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**Gordon Research Conferences** **Ventura, CA**

Gordon Research Seminar on Stochastic Physics in Biology  
*Conference co-chair* *2023*

- Organized a one-day trainee-centered seminar on the fields of stochastic physics and biology.
- Curated a list of speakers selected from the conference applications.
- Coordinated fundraising and promotion for the seminar.

**University of Washington** **Seattle, WA**

Society for Industrial and Applied Mathematics (SIAM)  
*Student Chapter Treasurer* *2021-2022*

- Managed budget for weekly meetings and other events.

*Student Chapter President* *2020-2021*

- Coordinated weekly events, including student-led panels and technical tutorials.
- Organized Q&A sessions for students with guest speakers.

Association for Women in Mathematics (AWM)  
*Student Chapter President* *2019-2020*

- Hosted quarterly events to build community among graduate students.
- Sponsored events for students to meet with visiting speakers.

## Awards & Honors

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**University of Washington** **Seattle, WA**

SIAM Certificate of Recognition *2021*

- For outstanding work as SIAM student chapter president.

Achievement Rewards for College Scientists Fellowship *2018-2021*

- Awarded to select incoming PhD students.