Ekaterina Landgren

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Professional Experience

Cooperative Institute for Research in Environmental Sciences
at **University of Colorado Boulder**
Postdoctoral Visiting Fellow — January 2023 – present

Education

Cornell University, Ithaca, NY
Ph.D. in Applied Mathematics — December 2022
Dissertation: Models of Varying Complexity from Voter Networks to Extrasolar Planets
M.Sc. in Applied Mathematics — May 2020
Advisor: Steven Strogatz

Brown University, Providence, RI — May 2017
Sc.B. in Applied Mathematics, A.B. in Philosophy
Cum Laude, Phi Beta Kappa, Sigma Xi
Honors thesis: Modeling Evacuation Dynamics in a Crowded Room
Advisor: Bjorn Sandstede

Research Interests

Dynamical systems and their applications, mathematical models of social phenomena, conceptual climate models, intermediate complexity climate models, planetary atmosphere dynamics.

Publications

Landgren and Nadeau. SWAMPE: A Shallow-Water Atmospheric Model in Python for Exoplanets. *Journal of Open Source Software* 7 (80), 4872 (2022)

Landgren and Nadeau. Comparison of Two Analytic Energy Balance Models Shows Stable Partial Ice Cover Possible for Any Obliquity. *Planetary Science Journal* 3.79 (2022)

Landgren, Juul, and Strogatz. How a minority can win: Unrepresentative outcomes in a simple model of voter turnout. *Physical Review E* 104.5 (2021): 054307.

*DeBellevue and Kryuchkova (Landgren). Fractal Behavior of the Fibonomial Triangle Modulo Prime p, Where the Rank of Apparition of p is $p+1$. *Fibonacci Quarterly* 56 (2018): 113-120.
*Alphabetical order indicated by *.*

Presentations

Invited talks

"Introduction to Research" — February 2022
Cornell Chapter of Association for Women in Mathematics
"Effects of Network Structure on Undemocratic Outcomes." — August 2021
Clarkson University Graduate Student Seminar
"When Can Minority Win? A Simple Model of Voter Turnout."
SIAM Conference on Applied Dynamical Systems — May 2021
Women in Network Science Seminar, University of Washington — February 2021

"Noisy El Niño: A Case Study of Conceptual Climate Models" March 2021
Math and Statistics Tea, Mt. Holyoke College
"Snowball Planets: Effects of Obliquity, Albedo, and Heat Transport on Ice Cover" October 2020
Jet Propulsion Laboratory Exoplanet Journal Club

Contributed talks

"How Can Minority Win?"
Contagion on Complex Social Systems Workshop August 2022

Poster presentations

"Exploring the Interaction of Rotation Rate and Stellar Irradiation on Synchronously Rotating Sub-Neptunes"
American Geophysical Union Fall Meeting December 2022
"Introducing SWAMP-E: a Shallow-Water Atmospheric Model in Python for Exoplanets"
American Geophysical Union Fall Meeting December 2021
Emerging Researchers in Exoplanet Science Conference May 2021

Seminars

"Impacts of Noise on a Dynamical Systems Model of El Niño" June 2020
Applied Dynamical Systems Student Seminar, Cornell University
"Effects of Obliquity on the Snowball State" March 2020
Applied Dynamical Systems Student Seminar, Cornell University

Awards and Fellowships

Zonta International Amelia Earhart Fellowship 2021
Awarded annually to up to 35 women around the globe pursuing a PhD in space sciences.
SIAM Student Chapter Certificate of Recognition 2021
Awarded for outstanding service and contributions to the SIAM student chapter.
SIAM Student Travel Award 2019
Undergraduate Research and Teaching Award 2015, 2016
Awarded to Brown students collaborating with Brown faculty on research projects.
2016 Mathematical Contest in Modeling, *Honorable Mention* 2016
In an undergraduate team created, analyzed, and wrote a report on a model of fluid dynamics.
Brown Mathematical Contest for Modeling, *Outstanding Winner* 2015
In an undergraduate team created, analyzed, and wrote a report on a model of Hanta virus spread.

Undergraduate Research Mentorship

"Energy Balance Model for HAT-P-2b" Summer 2022
Thomas Mitchell. Mentored jointly with Nikole Lewis
"Wind farm layout optimization" Spring 2021
Anna Asch. Mentored jointly with Shriya Nagpal and Alice Nadeau
"Mathematics and Climate" Fall 2020
Anna Asch. Directed Reading Program
"Applying the Budyko Model to Martian Obliquity" Summer 2020, Fall 2020
Anushka Naranyan. Mentored jointly with Alice Nadeau

Teaching Experience

MIT ESP (Educational Studies Program), *Instructor* Online, Summer 2020
M14095: Mathematical Models and How to Build One,
Designed and taught a six-session class in mathematical modeling for high school students.

Cornell University

Teaching Assistant
MATH 4210: Nonlinear Dynamics and Chaos Spring 2020

MATH 3610: Mathematical Modeling — Fall 2019
MATH 2930: Differential Equations for Engineers — Spring 2019

Brown University

Teaching Assistant

APMA 1650: Statistical Inference I — Fall 2015, Spring 2017

Industrial Experience

IMA Math-to-Industry Bootcamp III — Minneapolis, MN, Summer 2018
Six-week coding and research program at Institute for Mathematics and its Applications

Hewlett-Packard Customer Operations, *Summer Intern* — Moscow, Russia, Summer 2014

Service and Leadership

SIAM Minisymposium Organizer

Dynamics of Influence and Representation in Social Systems — May 2021
SIAM Conference on Applications of Dynamical Systems
Joint with Alice Schwarze and Leonie Neuhauser

Cornell University

Expanding Your Horizons Conference, *Logistics Chair* — AY 2021
Organize a campus-wide STEM outreach event for 500 middle-school girls.

Center for Applied Mathematics First-Year Mentoring Program, *Mentor* — AY 2019, 2021
Mentor a first-year PhD student

SIAM Graduate Student Chapter, *President* — 2018-2021
Organized SIAM-sponsored events for student chapter members.

Center for Applied Math Anti-Racism Reading Group, *Co-organizer* — AY 2020
Moderated a biweekly graduate student discussion focusing on anti-racism and DEI topics.

ZigZag Mentorship Program, *Mentor* — AY 2017, AY 2019
Mentored undergraduate students on course selection and career development.

Expanding Your Horizons Conference, *Math Workshop Volunteer* — 2018, 2019
Led a mathematics workshop for middle school girls.

Brown University

Applied Mathematics Department Undergraduate Group, *President* — AY 2015, AY 2016
Organized events for undergraduates interested in applied mathematics.

Technology House, *President* — AY 2016
Led a sixty-person, communal living group for students interested in STEM topics.

New Scientist Program, *Mentor* — AY 2015
Mentored and advised a first generation college student.

Professional Memberships

Society for Industrial and Applied Mathematics, *Member*
American Mathematical Society, *Member*
Mathematics of Climate Research Network, *Member*

Languages

- Fluent: Russian, English
- Advanced: Spanish, German
- Intermediate: Korean
- Beginner: Swedish

Skills

Programming languages: Python, R, HTML
Software: MATLAB, Mathematica, Maple