Linnéa Gyllingberg

Knut and Alice Wallenberg Postdoctoral Fellow, Department of Mathematics, UCLA

Applied mathematician working across disciplinary boundaries, using mathematical modelling and computational methods to study complex systems, with a focus on biological intelligence, adaptive behaviour, and the theory and practice of scientific modelling.

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Academic Positions

- **2024–2026**: Fulbright Scholar & Knut and Alice Wallenberg Postdoctoral Fellow, Department of Mathematics, University of California, Los Angeles, USA.
- **Autumn 2024**: Research Fellow, "Mathematics of Intelligences" Program, Institute of Pure and Applied Mathematics, University of California, Los Angeles, USA.
- **2016–2024**: Ph.D. Student, Department of Mathematics, Uppsala University, Sweden. *Parental leave (October 2019–December 2020, October 2021–August 2022) during PhD studies.*
- **Autumn 2018**: Graduate Fellow, "Mathematical Biology" Program, Mittag-Leffler Institute, Stockholm, Sweden.
- **Spring 2017**: Visiting Ph.D. Student, Department of Mathematics, Imperial College London, UK.
- **2013–2016**: Teaching Assistant, Department of Mathematics, Uppsala University, Sweden.

Education

- **2016-2024**: Doctorate of Philosophy in Applied Mathematics and Statistics, Uppsala University, Sweden. *Thesis: "The Art of Modelling Oscillations and Feedback across Biological Scales"*
- **2013–2016**: Master of Science in Mathematics, Uppsala University. *Thesis: "Mean Field Approximations of Spatial Models of Evolution"*
- **2010–2013**: Bachelor of Science in Mathematics, Uppsala University. *Thesis: "Evolutionary Language Games"*
- **Spring 2014**: Erasmus Exchange, Mathematical Biology, Technische Universität München, Germany.
- **2012–2014**: Additional coursework in Linguistics and Nordic Languages at University of Iceland, Uppsala University, and Helsinki University (72 ECTS in total), studied in parallel with studies in Mathematics.

Industrial Experience

- **2014**: Analyst, Precis Digital, Stockholm, Sweden. Worked on Bayesian statistical modeling for price optimization of Google Ads and developed Markov models and game theoretical models for attribution processes.

Publications and Preprints

7. Wenjun Zhao, Alma Plaza-Rodriguez, Pichayathida Luanpaisanon, Elena Xinyi Wang, **Linnéa Gyllingberg**, Elana J. Fertig, Genevieve L. Stein-O'Brien *Inferring the regulation dynamics of oscillatory networks from scRNA-seq data*, bioRxiv 2025.11.08.687360, submitted, 2025.

6. Kira Pugh, **Linnéa Gyllingberg**, Stanislav Stratiev, Sara Hamis. *A bibliometric study on mathematical oncology: interdisciplinarity, internationality, collaboration and trending topics*, Bulletin of Mathematical Biology, 2025.

5. Polyphony Bruna and **Linnéa Gyllingberg**. *Cognition without neurons: modelling anticipation in a basal reservoir computer*, arXiv:2505.02114, submitted, 2025.

4. **Linnéa Gyllingberg**, Yu Tian, David J.T. Sumpter. *A minimal model of cognition based on oscillatory and current-based reinforcement processes*, Journal of the Royal Society Interface, 2025.

3. **Linnéa Gyllingberg**, David J.T. Sumpter, Åke Brännström. *Finding analytical approximations for discrete, stochastic, individual-based models of ecology*, Mathematical Biosciences, 2023.

2. **Linnéa Gyllingberg**, Alex Szorkovszky, David J.T. Sumpter. *Using neuronal models to capture burst and glide motion and leadership in fish*, Journal of The Royal Society Interface, 2023.

1. **Linnéa Gyllingberg**, Abeba Birhane, David J.T. Sumpter. *The lost art of mathematical modelling*, Mathematical Biosciences, 2023.

Grants

Total Funding Awarded: SEK 3,600,000 (approx. USD 335,000)

- **2024–2026**: Knut and Alice Wallenberg Postdoctoral Fellowship (USD 175,000).
- **2024**: Fulbright Research Scholar (SEK 63,000).
- **2024**: STINT International Postdoc Fellowship (SEK 1,200,000, offered, declined).
- **2024**: Lennanders Postdoctoral Fellowship (SEK 300,000, offered, declined).
- **2016–2025**: Multiple travel and research grants (total: SEK 454,000), including:
  - **2025**: AWM-NSF Travel Grant (USD 3500).
  - **2025**: SIAM Child Care Grant for the SIAM Conference on Applications of Dynamical Systems (USD 425)
  - **2023, 2024**: G.S. Magnuson Foundation (total: SEK 56,500).
  - **2024**: Uddeholms Travel Scholarship (SEK 30,000).
  - **2024**: Knigge Travel Grant (SEK 2,500).
  - **2024**: Sederholms Travel Grant (SEK 29,000).
  - **2024**: Tullberg Grant for Biological Research (SEK 37,000).
  - **2023, 2024**: Liljewalch Travel Scholarship (total: SEK 50,000).
  - **2023**: Zandréns Grant (SEK 15,000).

- **2023**: G-Research Grant for Early Career Researchers (GBP 1,200).
- **2017–2024**: Anna Maria Lundin Travel Scholarship (total: SEK 122,500).
- **2016**: Wilgott Stenholm Travel Scholarship (SEK 49,500).

Workshops, Summer Schools and Shorter Research Visits

- **April 2025**, Research visit to Dr. Anastasia Bizyaeva, Department of Mechanical Engineering, Cornell University, USA.
- **January 2025**, Women in Mathematical Computational Biology Workshop, Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, USA.
- **May 2024**, The Lake Como Summer School: *"Complex Networks: Theory, Methods, and Applications,"* Como, Italy.
- **April 2024**, Research visit to Dr. Audrey Dussutour's lab, Centre national de la recherche scientifique (CNRS), Toulouse, France.
- **January 2024**, Research visit to Professor Mason Porter's group, Department of Mathematics, University of California, Los Angeles, USA.
- **August 2018**, The Helsinki Summer School on Mathematical Ecology and Evolution, Turku, Finland.
- **April 2018**, Research visit to Dr Sara Merino-Aceituno's group at the Department of Mathematics, University of Sussex, UK.

Awards and Recognition

- **2026**: Selected as a Rising Star in Computational and Data Sciences, Rising Stars Workshop, Oden Institute for Computational Engineering and Sciences, University of Texas at Austin. Competitive recognition of emerging research leaders in computational and data sciences.
- **2024**: Fulbright Swedish Scholar Award 2024–2025. Awarded by the Fulbright Commission for postdoctoral research at the University of California, Los Angeles (UCLA).
- **2023**: Awarded O. Andrén's Scholarship (SEK 25,000). Awarded to a Ph.D. student at Uppsala University for exceptional academic performance.
- **2019**: Uppsala Electrical Engineering Students' Pedagogical Prize, Uppsala University.
- **2017**: Best Talk at Imperial College London Society for Industrial and Applied Mathematics (SIAM) 3rd Annual Conference, Imperial College, London, UK

Teaching and Supervision Experience

Lecturer & Course Instructor

- **Transform Methods (1MA034)**, Uppsala University *Lecturer, Course Designer, and Examiner (Autumn 2017 and 2018)*
  - Designed and delivered lectures, developed assignments, and assessed student performance.

  - Course evaluation scores: *4.9/5 (2017), 4.7/5 (2018).*
  - Awarded the Uppsala Electrical Engineering Students' Pedagogical Prize (2019) for excellence in teaching this course.

Guest Lecturer

- **Perceptions of U.S. Abroad (GLBLST 19)**, UCLA (Winter 2025).
- **Mathematical Methods of Physics (1FA121)**, Uppsala University (Spring 2024).
- **Modelling of Dynamic Systems (1RT155)**, Uppsala University (Spring 2023).

Teaching Assistant

Extensive experience as a teaching assistant over ten years, covering a range of undergraduate mathematics courses. Responsibilities included leading problem-solving sessions, supervising exercises, and grading.

- **Transform Methods (1MA034)** (2013, 2015, 2016, 2019, 2022).
- **Single Variable Calculus (1MA013)** (2013, 2015, 2016, 2021).
- **Linear Algebra and Geometry I (1MA025)** (Autumn 2016).
- **Mathematics Project with LaTeX (1MA193)** (Spring 2018).
- **Introduction to Studies in Mathematics (1MA219)** (Autumn 2018).

Summer Review Course Lecturer

Taught intensive review courses to help students prepare for final exams.

- **Transform Methods (1MA034)** (Summer 2015).
- **Algebra I (1MA004)** (Summer 2014).
- **Single Variable Calculus (1MA013)** (Summer 2013).

Supervision

- Yushi Qin, Undergraduate Research Project, UCLA, 2026: *Topic: Network Analysis of Academic Collaboration and Mentorship*
- Julia Brandt, Undergraduate Research Project, UCLA, 2026: *Topic: Network Analysis of Academic Collaboration and Mentorship*
- AJ Fong, Undergraduate Research Project, UCLA, 2026: *Topic: Network Analysis of Academic Collaboration and Mentorship*
- Ananya Sampat, Undergraduate Research Project, UCLA, 2025-2026, *Topic: Modelling Synchronization-Constrained Growth in Complex Networks*
- Kai Bengston, Undergraduate Research Project, UCLA, 2025-2026, *Topic: Evolutionary Games on Networks.* (Co-advised with Prof. Mason Porter)
- Emily Kim, Undergraduate Research Project, UCLA, 2025, *Topic: An Exploration of how Social Network Structure Affects Disease Spread.* (Co-advised with Dr. Leah Keating)
- Alice Graf Brolund, Master Thesis, Uppsala University, 2021, *Topic: Compartmental Models in Social Dynamics.*

Selected Presentations and Talks

Invited Talks & Seminars

- **Department of Mechanical Engineering**, Cornell University, USA, 2025. *Mathematical models of basal cognition.*
- **Department of Physics**, Syracuse University, USA, 2025. *Mathematical models of basal cognition.*
- **Department of Cognitive and Information Sciences**, UC Merced, USA, 2025. *Mathematical models of basal cognition.*
- **Laboratory of Cell Geometry**, UC San Fransisco, USA, 2025. *Mathematical models of basal cognition.*
- **Institute for Pure and Applied Mathematics**, UCLA, USA, 2024. *Mathematical models of basal cognition.*
- **Institute for Pure and Applied Mathematics**, UCLA, USA, 2024. *Mathematical models of basal cognition.*
- **Brainnet+ Workshop**, Royal Institute of Technology, Stockholm, Sweden, 2024. *Beyond Neurons: Modeling Basal Cognition in Slime Molds.*
- **The National Institute for Theoretical and Computational Sciences**, Stellenbosch University, South Africa, 2024. *Modeling Basal Cognition.* (Online Seminar)
- **Icelab**, Umeå University, Sweden, 2024. *Modeling Basal Cognition.*
- **Collective Behaviour Seminar**, Online, 2024. *Using neuronal models to capture burst-and-glide motion and leadership in fish.*

Conference & Workshop Presentations

- **Mathematics of Cancer**, Institute for Pure and Applied Mathematics, Los Angeles, USA, 2026. Poster: *A bibliometric study of past and present trends in mathematical oncology.*
- **NetSciX**, Auckland, New Zealand, 2026. Talk: *Oscillatory Adaptive Networks in Biological Information Processing.*
- **Dynamics Days**, Tucson, USA, 2026. Talk: *Self-organizing physical and biochemical interactions explain diverse behaviours in Physarum polycephalum.*
- **SIAM Conference on Applications of Dynamical Systems**, Denver, USA, 2025. Talk: *A minimal model of cognition based on oscillatory and current-based reinforcement processes.*
- **Biological Systems that Learn**, National Institute for Theory and Mathematics in Biology (NITMB), Chicago, USA, 2025. Poster: *Oscillations and Adaptation: Mathematical Models of Non-Neural Cognition.*
- **Mathematics of Intelligences Culminating Workshop at Lake Arrowhead**, Institute for Pure and Applied Mathematics, University of California, Los Angeles, 2024. Talk: *Non-neural pattern completion in an adaptive reservoir computer.*
- **AI4Research Annual Workshop**, Uppsala University, Sweden, 2023. Poster: *The lost art of mathematical modelling — How should we do mathematical modelling in the machine learning era?*

- **Collective Behaviour Workshop**, Isaac Newton Institute, Cambridge, UK, 2023. Talk: *Using neuronal models to capture burst-and-glide motion and leadership in fish.*
- **Collective Intelligence Symposium**, Santa Fe Institute, New Mexico, USA, 2023. Poster: *The lost art of mathematical modelling.*
- **Data-Driven Mechanistic Mathematical Modelling for Life-Science Applications**, Chalmers University, Gothenburg, Sweden, 2023. Talk: *The lost art of mathematical modelling—How should we do mathematical modelling in the machine learning era?*
- **Conference on Complex Systems**, Cancún, Mexico, 2017. Talk: *Spatial models of the evolution of social behaviour: Can helping and non-helping behaviour coexist?*
- **Imperial College London SIAM 3rd Annual Conference**, Imperial College London, UK, 2017. Talk: *Spatial models of the evolution of social behaviour: Can helping and non-helping behaviour coexist?*
- **9th Workshop on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS)**, Turin, Italy, 2018. Talk: *A spatial model for the evolution of social behaviour.*
- **8th Swedish Meeting on Mathematics in Biology**, Gothenburg, Sweden, 2016. Talk: *The evolution of reproductive helping through resource competition.*

Science Outreach & Diversity Initiatives

- **2024–2025**: Mentor, "Women in Mathematics" Program, UCLA. Mentoring female undergraduate students in mathematics.
- **2017–2018**: Organizer, Breakfast Meetings for Women and Non-Binary Math Students, Uppsala University. Organized regular breakfast meetings to create a social and supportive space for women and non-binary students in mathematics.
- **2014**: Organizer, Mathematics Day for Female High School Students, Uppsala University. Planned and ran a one-day event to encourage high school girls to study mathematics.

Professional Activities

Reviewer

- Mathematical Biosciences
- Discrete and Continuous Dynamical Systems Series B
- Chaos, Solitons & Fractals
- Analysis and Mathematical Physics

Institutional Committee Service

- **2016–2018**: Ph.D. Student Representative, Equal Opportunities Group, Department of Mathematics, Uppsala University.
- **2013–2014**: Student Representative, Academic Senate, Uppsala University.
- **2012–2014**: Student Representative, Educational Board of Science, Uppsala University.

- **2012–2014**: Student Representative, Equal Opportunities Group, Department of Mathematics, Uppsala University.
- **2013–2014**: Student Representative, Master Programme Council of Mathematics, Uppsala University.
- **2013–2014**: Student Representative, Bachelor Programme Council of Mathematics, Uppsala University.