Christoffer G. **Alexandersen**

Mathematical modeling of neurodegenerative disease · Neuroimaging and multimodal data analysis · Bayesian Inference and parameter estimation

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Academic Employment

University of Pennsylvania Postdoctoral Researcher — *June 2024 – Present*, *Philadelphia, USA*

School of Engineering and Applied Science
Department of Bioengineering
Complex Systems Lab
Principal Investigator: Prof. Dani S. Bassett

Education

University of Oxford PhD. Mathematics — *Oct. 2020 - Sept. 2024*, *Oxford, UK*

- Thesis: Mathematical modeling of neuronal dynamics during disease
- Advisors: Prof. Alain Goriely and Prof. Christian Bick

Norwegian University of Science and Technology 5-year MSc. Computational Biology — *Sept. 2015 - July 2020*, *Trondheim, Norway*

- Thesis: Acknowledging the uncertainty of enzyme kinetic parameters in constraint-based metabolic modeling
- Advisor: Prof. Eivind Almaas

Publications

1. **Alexandersen CG**, Brennan GS, Brynildsen JK, Henderson MX, Iturria-Medina Y, Bassett DS. Network Models of Neurodegeneration: Bridging Neuronal Dynamics and Disease Progression. *IEEE Reviews in Biomedical Engineering. 19:140–158. doi:10.1109/RBME.2025.3643310. 2026.*
2. Cabrera-Álvarez J, del Cerro León A, Carvajal BP, Carrasco-Gómez M, **Alexandersen CG**, Bruña R, Maestú F, Susi G. The fluctuations of alpha power: bimodalities, connectivity, and neural mass models. *Imaging Neuroscience. 3 IMAG.a.64. doi:10.1162/IMAG.a.64. 2025.*
3. Borgquist J, **Alexandersen CG**. HeMiTo-dynamics: a characterization of mammalian prion toxicity using non-dimensionalization, linear stability and perturbation analyses. *Mathematical Medicine and Biology. Volume 42, Issue 2, Pages 159–175. doi:10.1093/imammb/dqae024. 2025*
4. **Alexandersen CG**, Goriely A, Bick C. Neuronal activity induces symmetry breaking in neurodegenerative disease spreading. *Journal of Mathematical Biology. 89, 3. doi:10.1007/s00285-024-02103-x. 2024*
5. **Alexandersen CG**, Duprat C, Ezzati A, Houzelstein P, Ledoux A, Liu Y, Saghir S, Destexhe A, Tesler F, Depannemaecker D. A mean-field to capture asynchronous irregular dynamics of conductance-based networks of adaptive quadratic integrate-and-fire neuron models. *Neural Computation. 36 (7): 1433–1448. doi:10.1162/neco_a_01670. 2024*
6. **Alexandersen CG**, Douw L, Zimmermann MLM, Bick C, Goriely A. Functional connectotomy of a whole-brain model reveals tumor-induced alterations to neuronal dynamics in glioma patients. *Network Neuroscience. 9 (1): 280–302. doi:10.1162/netn_a_00426. 2024*
7. **Alexandersen CG**, de Haan W, Bick C, Goriely A. A multi-scale model explains oscillatory slowing and neuronal hyperactivity in Alzheimer's disease. *Journal of the Royal Society Interface. 20: 20220607. doi:10.1098/rsif.2022.0607. 2023*

Accepted / In Press

1. **Alexandersen CG**, Bassett D, Goriely A, Chaggar P. Neuronal activity and amyloid-β promote tau seeding in the entorhinal cortex in Alzheimer's disease. *Brain*. Accepted, 2025. https://doi.org/10.1093/brain/awaf374.

Preprints

1. **Alexandersen CG**, Brynildsen JK, Prigent A, Tamborrino M, Mantziou A, Kurgat K, Henderson MX, Bassett DS. Rise-and-fall dynamics reveal a molecular and cellular vulnerability axis in prion-like α-synuclein propagation. *bioRxiv*. doi: https://doi.org/10.64898/2026.03.27.714785 . 2026.

Awards & Scholarships

2020–24	**Aker Scholarship**, funding covers tuition, conferences, travel, and living costs throughout doctoral program	*Oslo, Norway*
2023	**Linacre College Academic Travel Grant**, Grant awarded for research stay at Alzheimer Center Amsterdam	*Oxford, UK*

CONFERENCES, TALKS & LECTURES

Invited Conference & Workshop Talks

July 2026	**(upcoming) Dynamics Days Europe**, Talk: *Minisymposium: "Applications of Dynamical Systems in Epidemics, Collective Dynamics and Neuroscience"*	*Lisbon, Portugal*
Feb 2026	**Workshop in New Trends in Mathematics and Brain Mechanics**, Talk: *Modeling neurodegenerative disease progression and neuronal activity*	*Oslo, Norway*
Sept 2023	**Bernstein Conference**, Minisymposium: "Whole-brain Dynamics: Modeling and Applications"	*Berlin, DE*
Apr 2023	**British Applied Mathematics Conference**, Minisymposium: "Neurodynamics"	*Bristol, UK*
Sept 2022	**International Conference on Clinical Neurophysiology**, Symposium: "Translational Computational Modelling Relates AD Pathophysiology to Large-Scale Brain Dynamics"	*Geneva, CH*

Invited Seminars

Mar 2025	**Oxford–GSK Computational Medicine Center Seminar**, University of Oxford	*Oxford, UK*
Jan 2025	**Network Science Institute Seminar**, Northeastern University	*Boston, USA*
Feb 2025	**Computational Neuroscience Initiative Seminar**, University of Pennsylvania	*Philadelphia, USA*
Nov 2024	**Brain Connectivity Workshop Seminar Series**, University of Pennsylvania	*Philadelphia, USA*
Jun 2024	**Department of Mathematics Seminar Series**, Vrije Universiteit	*Amsterdam, NL*
Jan 2024	**Linacre College Seminar Series**, University of Oxford	*Oxford, UK*

Invited Guest Lecture

Sep 2025	**Network Neuroscience (Graduate course, instr. Dani Bassett)**, University of Pennsylvania	*Philadelphia, USA*

Invited Research Center & Group Talks

May 2025	**Alzheimer's Center**, Amsterdam University Medical Center	*Amsterdam, NL*
Jun 2024	**Network Neuroscience Group**, Amsterdam Universtiy Medical Center	*Amsterdam, NL*
Jun 2024	**Alzheimer's Center**, Amsterdam University Medical Center	*Amsterdam, NL*
Sept 2024	**Methods Group**, University College London	*London, UK*
Dec 2023	**Center for Brain and Cognition**, Pompeu Fabra University	*Barcelona, ES*
Nov 2021	**Alzheimer's Center**, Amsterdam University Medical Center	*Amsterdam, NL*
Dec 2021	**Mathematical Neuroscience Group**, University of Nottingham	*Nottingham, UK*
Nov 2021	**Neuromodeling Group**, University of Birmingham	*Birmingham, UK*

Contributed Talks and Posters

June 2026	**(upcoming) International School and Conference on Network Science (NetSci)**, Talk: "Disease spreading on brain networks"	*Boston, USA*
Sept 2022	**Bernstein Conference**, Poster: "Multi-scale Model of Alzheimer's Disease"	*Berlin, DE*

ORGANIZATIONAL EXPERIENCE

Network Neuroscience Satellite Symposium, NetSci 2026 *June 2026, Boston, MA, USA*

Co-organizing the satellite symposium "Network Neuroscience" at the International School and Conference on Network Science (NetSci 2026), coordinating speakers and program development.

Oxford Mathematical Brain Modeling Seminars *Sept. 2022 - May 2024, Oxford, UK*

Organized biweekly seminars on mathematical & computational neuroscience (hybrid and in-person talks).

International Conference on Mathematical Neuroscience (ICMNS 2022) *July 2022, Online*

Organized the minisymposium "Dynamical Systems for Neurological Disorders."

SUPERVISION & MENTORING

BSc Student Mentorship at the University of Pennsylvania *Mar 2026–Present, Philadelphia, USA*
Equation discovery for neurodegenerative disease progression. Co-mentor: Prof. Dani S. Bassett.

Phd Student Mentorship at the University of Pennsylvania *July 2025–Present, Philadelphia, USA*
Control of phase-oscillator networks. Co-mentor: Prof. Dani S. Bassett.

MSc Student Mentorship at the University of Pennsylvania *March 2025–Present, Philadelphia, USA*
Computational model for predicting disease initiation in Alzheimer's. Co-mentor: Prof. Dani S. Bassett.

MSc Student Mentorship at the University of Amsterdam *Sept 2024–July 2025, Amsterdam, Netherlands*
Computational modeling of working memory deficits in Alzheimer's disease. Co-mentors: Profs. Jorge Mejias & Christian Bick.

TEACHING EXPERIENCE

2024	**Python Demonstrator, *Computational Mathematics***, University of Oxford, Mathematical Institute	*Oxford, UK*
2023	**Teaching Assistant, *Nonlinear Systems***, University of Oxford, Mathematical Institute	*Oxford, UK*
2022	**Teaching Assistant, *Networks***, University of Oxford, Mathematical Institute	*Oxford, UK*
2021	**Teaching Assistant, *Continuous Optimisation***, University of Oxford, Mathematical Institute	*Oxford, UK*
2018–2019	**Teaching Assistant, *Mathematical Methods B***, NTNU, Department of Mathematical Sciences	*Trondheim, Norway*
2017	**Teaching Laboratory Assistant, *Organic Chemistry***, NTNU, Department of Chemistry	*Trondheim, Norway*

OUTREACH

The Network Pages *June 2022, Online*
Article on modeling neural oscillations titled "Oscillators and Alzheimer's"
https://www.networkpages.nl/oscillators-and-alzheimers/

References

Prof. Dani S. Bassett
J. Peter Skirkanich Professor, University of Pennsylvania, United States
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Prof. Alain Goriely
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