Chunyin, SIU (Alex)

Brain Dynamics Lab, 1520 Page Mill Rd, Palo Alto, CA 94304

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Education

Cornell University, Ithaca, NY *2019 – 2024*
PhD Applied Mathematics; supervised by Prof Gennady Samorodnitsky

The Chinese University of Hong Kong (CUHK), Hong Kong *2017 – 2019*
MPhil Mathematics; supervised by Prof Ronald Lui

The Chinese University of Hong Kong (CUHK), Hong Kong *2013 – 2017*
BSc Mathematics; Minor in Economics

Employment

Postdoctoral Scholar, Stanford University School of Medicine *2024 – present*
develop topological-statistical techniques to analyze neuroimaging data and identify behavioral correlates

Affiliate, Lawrence Berkeley National Laboratory *Summer 2023*
built a neural network to predict the adsorption loadings of zeolite crystals with their topological features
verify a conjecture on the universality of a topological statistic of scientific datasets.

Ongoing Works

Superscripts indicate career stages (UnderGraduate, Post-Bacc, Graduate Student, Post-Doc, Professor).

- C. Siu [PD], S. Pirzada[PB], C. Glick[PB], R. Betzel[P], G. Petri[P], L. Williams[P], M. Saggar[P]. Topological Properties of Edge Times Series for Spontaneous and Evoked Brain Activities Predict Tasks, Personality and Psychopathology.
- C. Siu [PD], S. Madsen[PB], S. Quah[PD], C. Glick[PB], M. Saggar[P]. Revealing the Network Organization of Evoked Brain Activity.

Publications

◇ *indicates alphabetically-sorted author list. Superscripts indicate career stages as in the previous section.*

- C. Siu [GS]. "The Topological Behavior of Preferential Attachment Graphs". *SIAM Journal on Applied Algebra and Geometry*, 2025.
- C. Siu [GS], G. Samorodnitsky [P], C. Yu [P], and R. He [UG]. "The Asymptotics of the Expected Betti Numbers of Preferential Attachment Clique Complexes". *Advances in Applied Probability*, 2025.
- C. Siu [GS], G. Samorodnitsky [P], C. Yu [P], and A. Yao [UG]. "Detection of Small Holes by the Scale-Invariant Robust Density-Aware Distance (RDAD) Filtration". *Journal of Applied and Computational Topology*, 2024.
- ◇ C. Siu [GS], and R. Strichartz [P]. "Geometry and Laplacian on Discrete Magic Carpets". *Journal of Fractal Geometry*, 2023.
- H. Law [GS], C. Siu [GS], and R. Lui [P]. "Decomposition of Longitudinal Deformations via Beltrami Descriptors". *Journal of Scientific Computing*, 2021.
- C. Siu [GS], H.L. Chan [GS], and R. Lui [P] "Image Segmentation with Partial Convexity Shape Prior Using Discrete Conformality Structures". *SIAM Journal on Imaging Sciences*, 2020.
- ◇ J. Li [UG], and C. Siu [UG]. "An Elementary Approach on Left-Orderability, Cables of Torus Knots and Dehn Surgery". Preprint.

Talks and Poster Presentations

∗ *invited talks* • *contributed talk* ◇ *poster presentation.*

"Topological Data Analysis – Connecting Topology, Probability, and Neuroscience".

- ∗ Topology Seminar. Stanford University, CA, Oct 2025.

"A Novel Topological Characterization of Brain-wide Cofluctuation Patterns over Time Reveals Brain-Behavior Links across Spontaneous and Evoked Activity".

- • Computation Persistence Workshop. Albany University, NY, Oct 2025.

"The Topology of Preferential Attachment Clique Complexes – Homology and Homotopy".

- • SIAM Applied Algebraic Geometry Conference, University of Wisconsin-Madison, WI, Jul 2025.
- ∗ Applied Algebraic Topology Research Network (AATRN) Networks Seminar. Virtual, Feb 2025.
- ◇ Mid-Atlantic Topology Conference, Northeastern University, MA, Mar 2024.
- ∗ University of Florida Topological Data Analysis Conference. University of Florida, FL, Feb 2024.
- • Northeast Probability Seminar, New York University, NY, Nov 2023.

"The Topology of Preferential Attachment Clique Complexes – Homology".

- ∗ Probability Seminar. Stanford University, CA, Jun 2025.
- ∗ Probability Seminar. Northwestern University, IL, Feb 2025.
- ∗ Mathematics Seminar. The Chinese University of Hong Kong, Hong Kong, Dec 2023.
- • Northeast Probability Seminar, New York University, NY, Nov 2023.
- • Binghamton University Graduate Combinatorics, Algebra and Topology. Binghamton University, NY, Nov 2023.
- ∗ Applied Topology Seminar. Oxford University, Britain (Virtual), Nov 2023.
- ∗ Applied Algebraic Topology Research Network (AATRN) Online Seminar. Virtual, Nov 2023.
- ∗ Probability and Statistical Physics Seminar. Chicago University, IL, Oct 2023.
- ∗ Seminario Doctorado, Actividad del Programa de Doctorado "Mathematicas". University of Seville, Spain, Sep 2023.
- ∗ Probability and Applications Seminar. Queen Mary University of London, Britain, Sep 2023.
- • Computation Persistence Workshop. Purdue University, IN, Sep 2023.
- ∗ Probability Seminar. Purdue University, IN, Sep 2023.
- • Geometry and Topology meet Data Analysis and Machine Learning. Northeastern University, MA, Jun 2023.
- ◇ Randomness in Topology and its Applications. The University of Chicago, IL, Mar 2023.
- • Finger Lakes Probability Seminar. Binghamton University, NY, Feb 2023.

"Detecting Weak Topological Signals in Noisy Environment".

- • Computation Persistence Workshop. Graz University of Technology, Austria (Virtual), Sep 2024.
- ∗ Hot Topics in Data Science. University at Buffalo, NY (Virtual), Feb 2024.
- • Joint Statistical Meetings. Toronto, Canada, Aug 2023.
- ∗ Imaging Seminar. The Chinese University of Hong Kong, Hong Kong, Jan 2023.
- • Binghamton University Graduate Combinatorics, Algebra and Topology. Binghamton University, NY, Nov 2022.
- • 3rd Upstate New York Topology Seminar. Syracuse University, NY, Oct 2022.
- ◇ Algebraic Topology, Methods, Computation and Science 10. Oxford University, Britain, Jun 2022.
- ◇ Bridging Applied and Quantitative Topology. Virtual, May 2022.
- ◇ AATRN Poster Session. Virtual, Oct 2021.

Select Awards and Honors

Croucher Fellowship for Postdoctoral Research *2024*
Annually, 6 – 10 Hong Kong scholars pursuing overseas postdoctoral research in science are selected.

Croucher Scholarship for Doctoral Study *2019*
Annually, 9 – 16 Hong Kong scholars pursuing overseas doctoral degrees in science are selected.

Sir Edward Youde Memorial Fellowship (for Postgraduate Research Students) *2018*
Annually, 3 – 5 Hong Kong fellows are selected among nominees from local institutions.

Best Teaching Assistant Award at CUHK Math *2019*
Annually, 3 teaching assistants in the Department of Mathematics at CUHK receive this award.

Professional Services

drafting aims and reviewing drafts of an NIH-R01 and an NSF grant for the lab *Spring 25 – present*
reviewer for *Scientific Reports* *Spring 25*
reviewer for *Mathematical Reviews* *Spring 25 – present*
reviewer for the *Electronic Journal of Probability* *Fall 24*
reviewer for *Homology, Homotopy and Applications* *Fall 23*
student representative of the Applied Math Colloquium Committee, Cornell *Fall 23 – Spring 24*
officer of SIAM Student Chapter, Cornell *Fall 22 – Spring 24*

Teaching Experiences

Head Teaching Assistant, Cornell University *Spring 23*
Facilitated testing accommodations for students with disabilities in "Multivariable Calculus for Engineers"
Drafted and reviewed questions in tests and exams
Teaching Assistant, Cornell University *Fall 22*
Led 3 weekly discussion sessions for "Multivariable Calculus for Engineers"
Graded assignments, tests and exams
Teaching Assistant, CUHK *Fall 17 – Spring 19*
Designed and led weekly discussion sessions, and graded assignments, tests and exams in 5 courses, ranging from multivariable calculus to complex analysis
Mentored high school students on number theory and cryptography in a summer outreach program by leading discussion sessions 3 times a week

Mentorship Experiences

Mentorship of Graduate Students and Junior Staff *Fall 24 – present*
Meet biweekly with 3 graduate students to discuss research progress and career development
Provide guidance on mathematical and statistical issues to graduate students and junior staff
Supervision of Undergraduate Research Assistants *Fall 21 – Summer 24*
Onboarded and supervised 3 undergraduate research assistants, 2 are now graduate students at University of Wisconsin-Madison and Rice University; 1 is now a financial analyst
Delegated numerical computations and advised on career development
Mentorship in Undergraduate Directed Reading Program *Fall 20 – Summer 22*
Mentored 4 students in the Undergraduate Directed Reading Program
Tailored and discussed weekly reading materials on topics including random graphs and computational topology

Additional Information

Natural languages	English, Chinese (Cantonese, Mandarin)
Programing	MATLAB, Python, Bash, R, slurm
Neuroscience softwares	FSL, XCP-D, Workbench, Nilearn, NiBabel