

Yi-Hsuan Lin, PhD

☎ 416-829-6531 ✉ yi-hsuan.lin@outlook.com in yihsuanlinphysics 🌐 laphysique

HIGHLIGHTS

- **10+** years of research experience in **theoretical biophysics**, **computational biology**, and **bioinformatics**
- **15** scientific papers in peer-reviewed journals of, cumulatively cited **~ 800** times
- **11** invited seminars and colloquia in world-leading academic institutes and conferences, including the **Machine Learning in Biophysics** lecture at the 2021 Canadian Association for Physicists Congress.

EDUCATION

Ph.D., Physics, The Ohio State University, Ohio, USA 2015
B.Sc., Physics, University of Illinois at Urbana-Champaign, Illinois, USA (GPA 3.74, High Distinction) 2009

EXPERIENCE

Molecular Modelling Lead Jan 2021 – present

HTuO Biosciences, Vancouver, BC, Canada

- Establishing the physics principles of a new molecular dynamics force field for pharmaceutical applications
- Developing a molecular dynamics simulation software with the above-mentioned new force field embedded
- Incorporating machine learning to parametrize force fields and optimize their simulation performance
- Implementing mathematical physics to validate stability of various simulation methods

Data Scientist Jun 2020 – Oct 2020

Sustainability.Exchange, Toronto, ON, Canada

- Applied supervised machine learning algorithms and Bayesian statistics to build models for time series forecasting of environmental, social and corporate governance (ESG) financial data.

Postdoctoral Fellow Jul 2015 – Jul 2021

University of Toronto & Hospital for Sick Children, Toronto, ON, Canada

- Developing statistical physics theories for the “sequence specificity” in biological liquid-liquid phase separation
- Collaborating with experimentalists and computational biologists to test the above-mentioned physics theory
- Develop Monte Carlo simulation programs from scratch for modelling protein assemblies
- Published **13** peer-reviewed papers in theoretical/computational physics, chemistry, and biology
- Supervised and mentored over **4** junior scientists (graduate students and trainees)
- Project: *Theories for sequence-dependent phase behaviors of biomolecular condensates*

SKILLS

- **Math/Stat:** Numerical Analysis, Bayesian Statistics, Multivariate Linear/Nonlinear Optimization, Linear Algebra, Multivariable Calculus, Stochastic Calculus, Partial Differential Equation, Complex Analysis
- **Modelings:** Theoretical Physics, Molecular Biophysics, Bioinformatics, Monte Carlo Simulation, Molecular Dynamics Simulation, Data-Driven Statistical Modeling, Machine Learning, Deep Learning, Data Visualization, Principal Component Analysis, Time Series Forecasting
- **Programming:** Python, Matlab/Octave, C/C++, Mathematica, Julia, SQL
- **Tools:** Numpy, Scipy, Pandas, Matplotlib, Scikit-Learn, PyMC, SQLite, MPI, PyCharm, Git

PUBLICATIONS

15. Wessén J, Pal T, Das S, **Lin Y-H**, and Chan HS (2021) A simple explicit-solvent model of polyampholyte phase behaviors and its ramifications for dielectric effects in biomolecular condensates. *J Phys Chem B* **125** 4337–4358
14. Das S, **Lin Y-H**, Vernon RM, Forman-Kay JD, and Chan HS (2020) Comparative roles of charge, π , and hydrophobic interactions in sequence-dependent phase separation of intrinsically disordered proteins. *Proc Natl Acad Sci USA* **117** 28795–28805
13. Amin AN*, **Lin Y-H***, Das S, and Chan HS (2020) Analytical theory for sequence-specific binary fuzzy complexes of charged intrinsically disordered proteins. *J Phys Chem B* **124** 6709–6720 (*equal contribution)
12. **Lin Y-H**, Brady JP, Chan HS, and Ghosh K (2020) A unified analytical theory of heteropolymers for sequence-specific phase behaviors of polyelectrolytes and polyampholytes. *J Chem Phys* **152** 045102
11. Cinar H, Oliva R, **Lin Y-H**, Chen X, Zhang M, Chan HS, and Winter RHA (2020) Pressure sensitivity of SynGAP/PSD-95 condensates as a model for postsynaptic densities and its biophysical and neurological ramifications. *Chem Eur J* **26** 11024–11031
10. Das S, Amin AN, **Lin Y-H**, and Chan HS (2018) Coarse-grained residue-based models of disordered protein condensates: utility and limitations of simple charge pattern parameters. *Phys Chem Chem Phys* **20** 28558–28574
9. **Lin Y-H**, Forman-Kay JD, and Chan HS (2018) Theories for sequence-dependent phase behaviors of biomolecular condensates. *Biochemistry* **57** 2499–2508
8. Das S, Eisen A, **Lin Y-H**, and Chan HS (2018) A lattice model of charge-pattern-dependent polyampholyte phase separation. *J Phys Chem B* **122** 5418–5431
7. **Lin Y-H**, Brady JP, Forman-Kay JD, and Chan HS (2017) Charge pattern matching as a “fuzzy” mode of molecular recognition for the functional phase separations of intrinsically disordered proteins. *New J Phys* **19** 115003
6. Brady JP, Farber PJ, Sekhar A, **Lin Y-H**, Huang R, Bah A, Nott TJ, Chan HS, Baldwin AJ, Forman-Kay JD, and Kay LE (2017) Structural and hydrodynamic properties of an intrinsically disordered region of a germ-cell specific protein upon phase separation. *Proc Natl Acad Sci USA* **114** E8194–E8203
5. **Lin Y-H** and Chan HS (2017) Phase separation and single-chain compactness of charged disordered proteins are strongly correlated. *Biophys J* **112** 2043–2046
4. **Lin Y-H**, Song J, Forman-Kay JD, and Chan HS (2017) Random-phase-approximation theory for sequence-dependent, biologically functional liquid-liquid phase separation of intrinsically disordered proteins. *J Mol Liq* **228** 176–193
3. **Lin Y-H**, Forman-Kay JD, and Chan HS (2016) Sequence-specific polyampholyte phase separation in membraneless organelles. *Phys Rev Lett* **117** 178101
2. **Lin Y-H** and Bundschuh R (2015) RNA structure generates natural cooperativity between single-stranded RNA binding proteins targeting 5' and 3'UTRs. *Nucleic Acids Res* **43** 1160–1169
1. **Lin Y-H** and Bundschuh R (2013) Interplay between single-stranded binding proteins on RNA secondary structure. *Phys Rev E* **88** 052707

HONORS AND AWARDS

Postdoctoral Award , Intrinsically Disordered Protein Subgroup, Biophysical Society (USA)	2019
Connell Award for Postdoctoral Fellow , Department of Biochemistry, University of Toronto	2018
Scholarship for Study Abroad , Taiwan Ministry of Education	2007–2013
Gold Medal , The 36 th International Physics Olympiad	2005

CERTIFICATES

Financial Engineering and Risk Management I & II (Coursera.org/Columbia Univ)	2020
Introduction to Deep Learning with Honors (Coursera.org/HSE Univ)	2020
Bayesian Methods for Machine Learning with Honors (Coursera.org/HSE Univ)	2020
Practical Reinforcement Learning with Honors (Coursera.org/HSE Univ)	2020