Yuanzhao Zhang

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CURRENT POSITION

Northwestern University 2015 –
Graduate Student

EDUCATION

Northwestern University *exp.* 2020
Ph.D. Physics · Advisor: Adilson E. Motter

Northwestern University 2015
M.Sc. Applied Mathematics

Zhejiang University 2014
B.Sc. Mathematics (Honors)

PUBLICATIONS

- **Y. Zhang**, Z. G. Nicolaou, J. D. Hart, R. Roy, and A. E. Motter, *Critical switching in globally attractive chimeras*, under review
- **Y. Zhang** and A. E. Motter, *Symmetry-independent stability analysis of synchronization patterns*, under review
- **Y. Zhang** and A. E. Motter, *Disorder beats design in network synchronization*, in preparation

1. J. D. Hart*, **Y. Zhang***, R. Roy, and A. E. Motter, *Topological control of synchronization patterns: trading symmetry for stability*, *Phys. Rev. Lett.* **122** 058301 (2019)
2. **Y. Zhang** and A. E. Motter, *Identical synchronization of nonidentical oscillators: when only birds of different feathers flock together*, *Nonlinearity* **31** R1-R23 (2018)
3. **Y. Zhang**, T. Nishikawa and A. E. Motter, *Asymmetry-induced synchronization in oscillator networks*, *Phys. Rev. E* **95** 062215 (2017)
4. G. Duan*, **Y. Zhang***, B. Luan, J. K. Weber, R. W. Zhou, Z. Yang, L. Zhao, J. Xu, J. Luo and R. Zhou, *Graphene-induced pore formation on cell membranes*, *Sci. Rep.* **7** 42767 (2017)
5. **Y. Zhang**, J. K. Weber and R. Zhou, *Folding and stabilization of native-sequence-reversed proteins*, *Sci. Rep.* **6** 25138 (2016)
6. Z. Lin and **Y. Zhang**, *Stirring by multiple cylinders in potential flow*, *J. Fluid Mech.* **794** 552 (2016)
7. Z. Gu*, **Y. Zhang***, B. Luan and R. Zhou, *DNA translocation through single-layer boron nitride nanopores*, *Soft Matter* **12** 817 (2016)
8. **Y. Zhang***, C. A. Jimenez-Cruz*, J. Wang, Z. Yang, B. Zhou and R. Zhou, *Bio-mimicking of proline-rich motif applied to carbon nanotube reveals unexpected subtleties underlying nanoparticle functionalization*, *Sci. Rep.* **4** 7229 (2014)
9. Y. Tu, H. Lu, **Y. Zhang**, T. Huynh and R. Zhou, *Capability of charge signal conversion and transmission by water chains confined inside Y-shaped carbon nanotubes*, *J. Chem. Phys.* **138** 015104 (2013)

* equal contributions

RESEARCH EXPERIENCE

Northwestern University 2015 –
Advisor: Adilson E. Motter · Topics: networks dynamics, complex systems, synchronization, symmetry breaking

IBM Thomas J. Watson Research Center 2015
Advisor: Ruhong Zhou · Topics: molecular dynamics simulation, protein folding, nanotechnology

Zhejiang University 2013 – 2014
Advisor: Zhi Lin · Topics: fluid dynamics, mixing

TALKS (SELECTED)

SIAM Conference on Applications of Dynamical Systems — Snowbird 2019
Contributed talk · Critical switching behavior in globally attractive chimera states

Dynamics Days — Evanston 2019
Contributed talk · Random beats design in network synchronization

Dynamics Days — Denver 2018
Contributed talk · Identical synchronization of nonidentical oscillators

Network Frontier Workshop — Evanston 2017
Invited talk · Identical synchronization of nonidentical oscillators

SIAM Network Science Workshop — Pittsburgh 2017
Contributed talk · Asymmetry-induced synchronization in multilayer networks

Brown Bag Seminar — Evanston 2017
Invited talk · Asymmetry-induced synchronization in oscillator networks

TEACHING EXPERIENCE

Physics of Magic — Northwestern University · 2016 Fall
Student assistant · Helped design and teach part of this pilot course introducing counterintuitive phenomena in physics

General Physics — Northwestern University · 2017 – 2019
Teaching assistant · Led weekly discussion sessions and weekly labs for undergrads in STEM majors

AWARDS

First Place, Northwestern Science Images Contest — 2018
the winning images (click to view)

Presidential Fellowship finalist — 2018
12 students are selected as finalists from the entire graduate school each year at Northwestern

Dynamics Days Travel Award — 2018
awarded to rising early-career scientists attending this international conference on nonlinear dynamics

SIAM Student Travel Award — 2017
awarded to exceptional students presenting at the SIAM Annual Meeting

Chu Kochen Innovation Scholarship — 2013
awarded to 6/20,000 undergrads at Zhejiang University each year for outstanding research

PROFESSIONAL SOCIETIES

Society for Industrial and Applied Mathematics (SIAM) — 2016 –
Activity Group on Dynamical Systems

American Physical Society (APS) — 2017 –
Topical Group on Statistical & Nonlinear Physics

OUTREACH

To converge you must diverge (click to read) — Helix Magazine · 2017
Nontechnical article on how diversity can promote consensus in society

Network, synchronization, and the paradox of heterogeneity (click to watch) — Northwestern · 2016
Broad audience talk developed as part of the Seven Minutes of Science Symposium

Syncing up without sameness (click to watch) — Regina Dominican High School · 2016
Dance piece developed with high school students at Regina Dominican explaining diversity-induced synchronization

SERVICE

ACADEMIC ORGANIZATIONS & EVENTS

President, Northwestern University Student Chapter of SIAM 2018 –
Organizer of quarterly seminars highlighting the broad applications of mathematics in diverse disciplines

Vice President, Northwestern University Student Chapter of SIAM 2017 – 2018
Co-organizer of the Chicago Area SIAM Student Conference (approx. 100 participants)

REFEREEING FOR JOURNALS

Physical Review X, Physical Review Letters, Physical Review E, Physical Review Research, Physical Review A, Nonlinearity, SIAM Journal on Applied Dynamical Systems, Chaos, The European Physical Journal B, Journal of Nonlinear Science

MENTORING

Mentoring undergraduate student Fiona Brady on a research project extending stability analysis of cluster synchronization patterns to directed networks (2018 –)