

Yao Xiong

Materials Research Laboratory
University of California, Santa Barbara
Santa Barbara, CA 93106

(352)283-1183 | yaoxiong@ucsb.edu | <https://yaoxiong-p.github.io/>

RESEARCH INTERESTS:

Soft Matter; Machine Learning; Multiscale Modeling; Additive Manufacturing; Soft Robotics; Sustainability

EDUCATION:

- 2016–2022 **Ph.D.** in Materials Science and Engineering, Clemson University
Thesis: "Modeling Pattern Formation and Morphology Development in Polymer Networks" · Advisor: Prof. Olga Kuksenok
- 2014–2016 **M.S.** in Materials Science and Engineering, University of Florida
- 2010–2014 **B.E.** in Composite Materials Engineering, Wuhan University of Technology

RESEARCH EXPERIENCE:

- 2025–Present **Postdoctoral Researcher**, UC Santa Barbara · Advisor: Prof. Glenn Fredrickson
- Developing computational and field-theoretic methods to study the time evolution of protein–polysaccharide conjugation processes.
 - Investigating morphology development in glycopolymers.
- 2022–2025 **Postdoctoral Researcher**, Northwestern University · Advisor: Prof. Monica Olvera de la Cruz
- Led the development of multiscale theoretical and continuum models for stimuli-responsive covalent adaptable networks and hydrogels, elucidating stress relaxation and dynamic chemo–mechanical-diffusive coupling mechanisms.
 - Directed the design of functional soft materials, including magnetoelastic Janus microswimmers and supramolecular polymer–protein complexes, establishing new strategies for monoclonal antibody purification and active material design.
- 2016–2022 **Graduate Researcher**, Clemson University · Advisor: Prof. Olga Kuksenok
- Developed and extended multiscale simulation frameworks, including a 3D lattice spring model and dissipative particle dynamics, to study morphology and phase transitions in polymer networks and blends.
 - Demonstrated control of hydrogel pattern formation and surface topography via mechanical constraints and light-driven host–guest interactions, linking molecular mechanisms to macroscopic functionality.

PROFESSIONAL AFFILIATIONS:

American Physical Society (APS); American Chemical Society (ACS); Materials Research Society (MRS); American Institute of Chemical Engineers (AIChE)

HONORS & AWARDS:

- 2025 Postdoc Talk Competition Winner, Georgia Institute of Technology
- 2025 Heeger Fellowship, UC Santa Barbara

2021	David Jennings Memorial Fellowship, Clemson University
2020	Dr. Robinson Fellowship, Clemson University
2019	David Jennings Memorial Fellowship, Clemson University
2018	David Jennings Memorial Fellowship, Clemson University
2017	David Jennings Memorial Fellowship, Clemson University
2014	Achievement Award Scholarship, University of Florida

PUBLICATIONS:

(† equal contribution)

Journal Articles

- (1) **Y. Xiong**, C. Deng, S. Wei, L. M. Campos, M. Olvera de la Cruz "[Design Principles of Stimuli-Responsive Covalent Adaptable Networks](#)". *Macromolecules* **2025**, 58, 9546–9555.
- (2) C. M. Hemmingsen, S. J. Chapman, C. Deng, **Y. Xiong**, C. J. Hanley, V. Zhang, M. Olvera de la Cruz, J. A. Kalow "[Rheological Isotope Effects for Molecular Insight in Covalent Adaptable Networks](#)". *Macromolecules* **2025**, 58, 7957–7966.
- (3) **Y. Xiong**, A. Aggarwal, M. Olvera de la Cruz "[Chemo-Mechanical Coupling in Hydrogels: Dynamics in the Diffusion-Limited Regime](#)". *Advanced Functional Materials* **2025**, 2507078.
- (4) **Y. Xiong**, H. Yuan, M. Olvera de la Cruz "[Janus magnetoelastic membrane swimmers](#)". *Soft Matter* **2023**, 19, 6721–6730.
- (5) **Y. Xiong**, O. Kuksenok "[Photocontrol of pattern formation and hysteresis loops in polymer gels with host-guest interactions](#)". *iScience* **2022**, 25, 105606.
- (6) **Y. Xiong**, C. K. Choudhury, V. Palkar, R. Wunderlich, R. K. Bordia, O. Kuksenok "[Mesoscale Modeling of Phase Separation Controlled by Hydrosilylation in Polyhydromethylsiloxane \(PHMS\)-Containing Blends](#)". *Nanomaterials* **2022**, 12, 3117.
- (7) **Y. Xiong**, O. Kuksenok "[Mechanical Adaptability of Patterns in Constrained Hydrogel Membranes](#)". *Langmuir* **2021**, 37, 4900–4912.
- (8) **Y. Xiong**, P. Dayal, A. C. Balazs, O. Kuksenok "[Phase Transitions and Pattern Formation in Chemo-Responsive Gels and Composites](#)". *Israel Journal of Chemistry* **2018**, 58, 693–705.

PRESENTATIONS:

Talks

- (T1) **Y. Xiong**, M. Olvera de la Cruz, “Elasticity By Design: Controlling Mechanical Response in Covalent Adaptable Networks”, AIChE Annual Meeting, Boston, MA, November, 2025.
- (T2) M. Olvera de la Cruz, A. Aggarwal, **Y. Xiong**, “Responsive biomimicking materials” (invited, talk by M. Olvera de la Cruz), APS March Meeting, Minneapolis, MN, March, 2024.
- (T3) **Y. Xiong**, H. Yuan, M. Olvera de la Cruz, “Magnetically Driven Propulsion of Janus Magnetoelastic Membrane Swimmers”, Physics Symposium of CUHK-Shenzhen, virtual, July, 2023.
- (T4) **Y. Xiong**, H. Yuan, M. Olvera de la Cruz, “Janus Magnetoelastic Membrane Swimmers”, APS March Meeting, Las Vegas, NV, March, 2023.
- (T5) **Y. Xiong**, O. Kuksenok, “Mechanical Adaptability of Patterns in Confined Hydrogels”, APS March Meeting, virtual, March, 2021.

- (T6) **Y. Xiong**, O. Kuksenok, “Dynamic Control of Pattern Formation and Restructuring in Constrained Hydrogel Membranes”, CMD2020GEFES (Europhysics Conference), virtual, September, 2020.
- (T7) **Y. Xiong**, O. Kuksenok, “Controlling Pattern Formation and Feedback Mechanisms in Hydrogels”, SEM Annual Conference, Greenville, SC, June, 2018.
- (T8) **Y. Xiong**, O. Kuksenok, “Pattern Formation in Hydrogels: Controlling Functionality via Feedback Mechanisms” (talk by O. Kuksenok), MRS Spring Meeting, Phoenix, AZ, April, 2018.
- (T9) O. Savchak, **Y. Xiong**, T. N. Morrison, K. G. Kornev, O. Kuksenok, “Magnonics in hydrogels: modeling and magnetomechanical effects in GHz frequency range” (talk by O. Kuksenok), MRS Spring Meeting, Phoenix, AZ, April, 2017.

Posters

- (P1) **Y. Xiong**, A. Aggarwal, M. Olvera de la Cruz "Soft Robots with Adaptive Motion Driven by Photoactuation of Hydrogels", Complex Active and Adaptive Material Systems Gordon Research Conference, Ventura, CA, February, 2025.
- (P2) **Y. Xiong**, Y. Li, T. H. Piao, Y. Li, L. L. Lock, D. Stern, M. Morrow, J. Mills, X. Xu, S. Ghose, Z. J. Li, H. Cui, M. Olvera de la Cruz "Capture and Precipitation of Monoclonal Antibodies with Supramolecular Polymers", Colloidal, Macromolecular and Polyelectrolyte Solutions (GRC), Ventura, CA, February, 2024.
- (P3) **Y. Xiong**, C. K. Choudhury, V. Palkar, R. Wunderlich, R. K. Bordia, O. Kuksenok "Mesoscale Modeling of Phase Separation Controlled by Hydrosilylation in Polyhydromethylsiloxane (PHMS)-containing Blends", SC EPSCoR State Conference, Columbia, SC, April, 2022.
- (P4) **Y. Xiong**, O. Kuksenok "Modeling Dynamics of Pattern Formation and Restructuring in Constrained Hydrogel Membranes", APS March Meeting, virtual, March, 2021.
- (P5) **Y. Xiong**, O. Kuksenok "Modeling Pattern Formation and Restructuring in Hydrogel Membranes", Nonlinear Dynamics in STEM Workshop, virtual, January, 2020.
- (P6) **Y. Xiong**, O. Kuksenok "Modeling Dynamics of Pattern Formation in Confined Hydrogels", SC EPSCoR/IDeA State Conference, Columbia, SC, April, 2019.

TEACHING:

Clemson University

2016–2022	Teaching Assistant, Introduction to Materials Science (MSE2100)
2022	Teaching Assistant, Transport Phenomena (MSE3270)
2016	Teaching Assistant, Thermodynamics of Materials (MSE3260)

Academic Advising

Undergraduate

2021	Raleigh Wunderlich, Georgia Institute of Technology, REU in Advanced Material Sciences at Clemson University
------	--

ACADEMIC SERVICES:

Discussion Leader

2024	Colloidal, Macromolecular and Polyelectrolyte Solutions (GRS)
------	---

Journal Reviewer

2025 Macromolecules (1), ACS Omega (1)
2024 Journal of chemical physics (2)
2023 Macromolecules (3), Materials today chemistry (3)

REFERENCE:

- Prof. Glenn H. Fredrickson
Mitsubishi Distinguished Professor in Functional Materials
Department of Chemical Engineering, University of California, Santa Barbara
ghf@ucsb.edu
- Prof. Monica Olvera de la Cruz
Lawyer Taylor Professor of Materials Science and Engineering
Department of Materials Science and Engineering, Northwestern University
m-olvera@northwestern.edu
- Prof. Olga Kuksenok
Professor
Department of Materials Science and Engineering, Clemson University
okuksen@clemson.edu
- Prof. Matthew V. Tirrell
D. Gale Johnson Distinguished Service Professor Emeritus in the UChicago Pritzker School of Molecular Engineering
Pritzker School of Molecular Engineering, University of Chicago
mtirrell@uchicago.edu

Last updated: October 30, 2025