Neha P. Kamat
Associate Professor of Biomedical Engineering
Northwestern University, 2145 Sheridan Road, Evanston, IL 60208
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EDUCATION

B.S., Bioengineering (Magna Cum Laude) (2008) Rice University, Houston, TX
Ph.D., Bioengineering (2012) University of Pennsylvania, Philadelphia, PA
Postdoctoral Fellow (2016) Harvard University and Massachusetts General Hospital, Boston, MA

PROFESSIONAL EXPERIENCE

Associate Professor, Department of Biomedical Engineering, Northwestern University (2023 – present)

Affiliations at Northwestern:

Courtesy Faculty, Dept. of Chemical and Biological Engineering, Northwestern (2024-present)
Member, Center of Synthetic Biology (2018 – present)
Member, Chemistry of Life Processes Institute (2017 – present)
Member, Robert H. Lurie Comprehensive Cancer Center (2022 – present)
Affiliated Member, International Institute for Nanotechnology (IIN) (2023 – present)
Preceptor, Interdisciplinary Biological Sciences Graduate Program (2017 – present)
Preceptor, Molecular Biophysics Training Program (2017– present)

Assistant Professor, Department of Biomedical Engineering, Northwestern University (2017 – 2023)
Postdoctoral Fellow, Molecular Biology, Harvard Univ. and Massachusetts General Hospital, (2012 – 2016)

HONORS AND AWARDS

2026	Berkeley BioE Rising Star Lecture, Fall 2026
2022	ACS Synthetic Biology Young Innovator Award
2021	NSF CAREER Award
2021	2021 Young Innovators of Cellular and Molecular Bioengineering Award
2021	BMES Cellular and Molecular Bioengineering Rising Star Award
2019	Rice Outstanding Young Engineering Alum Award
2018	Cornew Innovation Award, Chemistry of Life Processes, Northwestern University
2018	Air Force Young Investigator Research Program Recipient
2018	Selection for the National Academy of Engineering Frontiers of Engineering Symposium
2014-2016	NASA Postdoctoral Research Fellowship, Harvard University
2013	Solomon R. Pollack Award; thesis award in Bioengineering, University of Pennsylvania
2011	Nano/Bio Interface Center Graduate Research Award; best graduate research on Nanotechnology applied to Biology at the University of Pennsylvania
2009-2012	NSF Graduate Research Fellowship, University of Pennsylvania
2008-2009	GAANN Fellowship, University of Pennsylvania
2008	Student Association Outstanding Senior Award, Rice University
2008/2009	Outstanding Bioengineering Junior/Senior Award, Rice University
2005-2007	Beckman Scholars Award, Arnold and Mabel Beckman Foundation
2004-2008	Rice University Trustee Distinguished Scholarship, Louis J. Walsh Engineering Scholarship
2004-2006	Rice University Century Scholars Program
2004	Intel Science Talent Search Semifinalist

PUBLICATIONS

* = corresponding author; underline = member of Kamat group; # = equal contribution; † = highlighted

Submitted:

1. Boyd, M.A.; Alam, K.; Lucks, J. B.*; Kamat, N.P.*Transcription-based sensing inside lipid vesicles using a fluorescent aptamer. **2023** *in revision*
2. Steinkühler, J.*; Abrahamson, C. H.; Agudo-Canalejo, J.; Golestanian, R.; Tullman-Ercek, D.*; Kamat, N. P.* Enzymatically-active bacterial microcompartments follow substrate gradients and are protected from aggregation in a cell-free system. bioRxiv [Preprint] **2022**. DOI: 10.1101/2022.05.16.492142 *in revision at Nature Chemistry*

Published:

3. Kelly, M. D.[#]; Vu, T. Q.[#]; Iyer, A. U.; Luo, Y.; Linderman, A.; Cline, L.; Sanchez, C.; Kamat, N.P.* DNA-directed assembly of multivalent lipid nanoparticles for targeted T cell gene delivery. **2026** *accepted Journal of Controlled Release*
4. Vu, T. Q.[#]; Sridhar, S.[#]; Shekour, B. G.;Cline, L.; Iyer, A.; Kimmel, B. R.; Modica, J. A.; Mrksich, M.*; Kamat, N. P.* Controlled assembly of vesicle-based superstructures using MegaMolecules. **2026** *accepted ACS Applied Materials and Interfaces*
5. Villaseñor, C. G.; Karagiaridi, A.; Dimitrova, V. S.; Buyco, D. G.; Candal, I.; Smirnova, A.; Pinkett, H. W.; Kamat, N. P.*Assessing Protein-Lipid Interactions with a Low-Cost, Accessible Centrifugation Assay. *Biophysical Reports* **2025**
6. Wilkes, R. A.; Miller, R. E.; Waldbauer, J.; Zhou, N.; Zhang, L.; DiBiase, B. N.; Kamat, N. P.; Aristilde, L.; Beckham, G. T.; and Werner. A. Z.*; *ACS Synthetic Biology* **2025** *14* (7), 2739-2752
7. Hu, V.T.; Ezzatpour, S.; Selivanovitch, E.; Carter, J. S.; Adeleke, R. A.; August, A.; Aguilar, H. C.*; Daniel, S.*; Kamat, N.P.* Cell-free expression of Nipah virus transmembrane proteins for proteoliposome vaccine design. *ACS Nano* **2025** 19(23), 21290
8. Gu, A.A., Uçar, M.C., Tran, P. Prindle, A.; Kamat, N. P.; Steinkühler, J.* Remodeling of lipid-foam prototissues by network-wide tension fluctuations induced by active particles. *Nat Commun* **2025** 16
9. Jacobs, M. L.; Steinkühler, J.; Lemley, A.; Larmore, M. J.; Ng, L. C.; Cologna, S. M.; DeCaen, P. G.*; Kamat, N. P.* Probing the force-from-lipid mechanism with synthetic polymers. eLife **2025**.
10. Fedosejevs, C. S.; Cline, L.; Kamat, N. P.* Melting Point Matters: Designing Lipid Nanocarriers for Improved T Cell Activation. *Faraday Discuss*. Accepted **2025**
11. Larmore, M.; Palomero, O. E.; Kamat, N. P.; DeCaen, P. G.* A synthetic method to assay polycystin channel biophysics. *eLife* **2024** 13:RP98534
12. Peruzzi, J.A.[#]; Gunnels, T.F.[#]; Edestein, H.I.; Lu, P.; Baker, D.; Leonard, J.N.*; Kamat, N.P.*Enhancing extracellular vesicle cargo loading and functional delivery by engineering protein-lipid interactions. *Nature Communications* **2024** † Highlighted in Northwestern Engineering News
13. Karim, A.S.; Brown, D.M.; Archuleta, C.M.; Grannan, S.; Aristilde, L.; Goyal, Y.; Leonard, L.N.; Mangan, N.; Prindle, A.; Rocklin, G. J.; Tyo, K. J.; Zoloth, L.; Jewett, M. C.; Calkkins, S.; Kamat, N.P.; Tullman-Ercek, D.; Lucks, J.B.* Deconstructing synthetic biology across scales: a conceptual approach for training synthetic biologists. *Nature Communications* **2024**
14. Peruzzi, J. A.; Steinkühler, J.; Vu, T. Q.; Gunnels, T. F.; Lu, P.; Baker, D.; Kamat, N. P.* Hydrophobic mismatch drives self-organization of designer proteins into synthetic membranes. *Nature Communications* **2024** † Highlighted in Northwestern Engineering News
15. Steinkühler, J.*[#]; Peruzzi, J.A.[#]; Krüger, A.; Jacobs, M. L.; Jewett, M. C.; Kamat, N. P.* Improving cell-free expression of membrane proteins by tuning ribosome co-translational membrane association and nascent chain aggregation. *ACS Synthetic Biology* **2024**, 13, 129-140
16. Peruzzi, J.A.[#]; Vu, T.Q.[#]; Gunnels, T.F.; Kamat, N.P.*Rapid Generation of Therapeutic Nanoparticles Using Cell-Free Expression Systems. Small Methods **2023** *in press* DOI:10.1002/smtd.202201718
17. Peruzzi, J. A.; Galvez, N. R.; Kamat, N. P.* Engineering transmembrane signal transduction in synthetic membranes using two-component systems. *Proceedings of the National Academy of Sciences of the United States of America* **2023**, 120, e2218610120 † Highlighted in Northwestern Engineering News

18. Vu, T. Q.[#]; Sant'Anna, L. E.[#]; Kamat, N. P.* Tuning Targeted Liposome Avidity to Cells via Lipid Phase Separation**.** *Biomacromolecules* **2023**, 24, 1574-1584
19. Peruzzi, J. A.; Vu, T. Q.; Kamat, N. P.* Engineered membrane receptors with customizable input and output functions. Trends Biotechnol. **2023**, 41, 276-277
20. Manszer, Z. A.; Ghosh, S.; Roy, A.; Jacobs, M. L.; Carten, J.; Kamat, N. P.; Daniel, S.* Cell-free synthesis goes electric: dual optical and electronic biosensor via direct channel integration into a supported membrane electrode. *ACS Synthetic Biology* **2022**, 12, 502-510 † Featured on the cover
21. Hu, V. T.; Kamat, N. P.* Cell-free protein synthesis systems for vaccine design and production. *Current Opinion in Biotechnology* **2022**,79, 102888
22. Boyd, M. A.; Thavarajah, W.; Lucks, J. B.*; Kamat, N. P.* Robust and tunable performance of a cell-free biosensor encapsulated in lipid vesicles. *Science Advances* **2022,** 9, eadd6605
23. Steinkühler, J.; Jacobs, M. L.; Boyd, M. A.; Loverde, S. M.; Kamat, N. P.* PEO-b-PBD diblock copolymers induce packing defects in lipid : hybrid membranes and improve insertion rates of natively folded peptides. *Biomacromolecules* **2022**, 23, 4756-4765
24. Ankeny, C. J.[#]*; Dunton, C.[#]; Virk, R.; Scott, E.; Kamat, N. P. Development of a low-cost, easy-to-adopt diversity, equity, and inclusion program during crisis. *Biomedical Engineering Education* **2022**, *1-7*
25. Gunnels, T. F.; Stranford, D. M.; Mitrut, R. E.; Kamat, N. P.*; Leonard, J. N.* Elucidating design principles for engineering cell-derived vesicles to inhibit SARS-CoV-2 infection. *Small* **2022**, 18, 2200125
26. Vu, T. Q.; Peruzzi, J. A. ; Sant'Anna, L. E.; Kamat, N. P.* Lipid phase separation in vesicles enhances TRAIL-mediated cytotoxicity. *Nano Letters* **2022,** *22, 2627-2634*
27. Jacobs, M. L.; Kamat, N. P.* Cell-free membrane protein expression into hybrid lipid/polymer vesicles. *Cell-free gene expression. Methods in Molecular Biology* **2022**, *2433*
28. Boyd, M. A.; Davis, A. M.; Chambers, N. R.; Tran, P.; Prindle, A.; Kamat, N. P.* Vesicle-based sensors for extracellular potassium detection. *Cellular and Molecular Bioengineering* **2021**, *14, 459-469*
29. Boyd, M. A.; Kamat, N. P.* Designing artificial cells towards a new generation of biosensors. *Trends in Biotechnology* **2021**, *39, 927-939* † Featured on the cover † Best of Trends in Biotechnology 2021
30. Jacobs, M. L.; Faizi, H. A.; Peruzzi, J. A.; Vlahovska, P. M.; Kamat, N. P.* EPA and DHA differentially modulate membrane elasticity in the presence of cholesterol. *Biophysical Journal* **2021**, *120, 2317-2329, published* † Best of Biophysical Journal 2021
31. Warfel, K. Hershewe; J. M.; Iyler, S; Peruzzi J. A.; Roth, E.; Kamat, N. P.; Jewett, M.* Improving cell-free glycoprotein synthesis by characterizing and enriching native membrane vesicles. *Nature Communications* **2021**, *12, 1-12* † Highlighted in Northwestern Engineering News
32. Manzer, Z. A.; Ghosh, S.; Jacobs, M. J.; Krishnan, S.; Zipfel, W.R.; Piñeros, M.; Kamat, N. P.* **;** Daniel, S.* Cell-Free Synthesis of a Transmembrane Mechanosensitive Channel Protein into a Hybrid-Supported Lipid Bilayer. *ACS Applied Bio Materials* **2021**, *4, 3101-3112*
33. Webber, M. J.; Kamat, N. P.; Messersmith, P. B.; Lecommandoux, S. Bioinspired Macromolecular Materials. *Biomacromolecules* **2021**, *22, 1-3*
34. Steinkühler, J,; Kamat. N. P.* Energy Dissipation at Interfaces drives multicompartment remodeling. *Chem* **2020**, *6*, 1051-1052
35. Peruzzi, J. A.; Jacobs, M. L.; Wang, K. S.; Kamat, N. P.* Barcoding Biological Reactions with DNA-Functionalized Vesicles. *Angewandte Chemie International Edition* **2019**, *131, 18856-18863* † Highlighted in Northwestern Engineering News
36. Hilburger, C. E.; Jacobs, M. L.; Lewis, K. R.; Peruzzi, J. A.; Kamat, N. P.* Controlling secretion in artificial cells with a membrane AND gate. *ACS Synthetic Biology* **2019**, *8*, 1224-1230
37. Jacobs, M. J.; Boyd, M. A.; Kamat, N. P.*; Diblock copolymers enhance folding of a mechanosensitive membrane protein during cell-free expression. *Proceedings of the National Academy of Sciences of the United States of America* **2019,** *10*, 4031-4036 † Highlighted in Northwestern Engineering News
38. Boyd, M. A. and Kamat, N. P.* Visualizing tension and growth in model membranes using optical dyes. *Biophys J*. **2018**, *115, 1307-1315*

39. O'Flaherty, D. K.[#]; Kamat, N.P.[#] *; Mirza, F. M.; Li, L.; Prywes, N.; Szostak, J. W.* Copying of mixed sequence RNA templates inside model protocells. *Journal of the American Chemical Society* **2018,** *140, 5171-5178* [#] authors contributed equally; * co-corresponding authors

PUBLICATIONS - prior to Northwestern

40. O'Callaghan, J.A.; **Kamat, N. P.**; Vargo, K. B.; Chattaraj, R.; Lee, D.*; Hammer, D. A.* A microfluidic platform for the synthesis of polymer and polymer-protein-based protocells. *The European Physical Journal E* **2024,** 47, 37
41. Jin, L.[#]; **Kamat, N. P**.[#]; Jena, S.; Szostak, J. W. Fatty Acid/Phospholipid Blended Membranes: A Potential Intermediate State in Protocellular Evolution. *Small* **2017,** 1704077. [#] authors contributed equally
42. Izgu, E. C.; Bjorkbom, A.; **Kamat, N. P.**; Lelyveld, V. S.; Zhang, W.; Jia, T. Z.; Szostak, J. W. NCarboxyanhydride-Mediated Fatty Acylation of Amino Acids and Peptides for Functionalization of Protocell Membranes. *Journal of the American Chemical Society* **2016**, *138*, 16669-16676.
43. **Kamat, N. P**.; Tobe, S.; Hill, I. T.;Szostak, J. W. Electrostatic Localization of RNA to Protocell Membranes by Cationic Hydrophobic Peptides. *Angewandte Chemie* **2015**. † Highlighted in The Science Times and designated as a "Hot Paper" by journal
44. Adamala, K.; Engelhart, A. E.; **Kamat, N. P.**; Jin, L.;Szostak, J. W. Construction of a Liposome Dialyzer for the Preparation of High-Value, Small-Volume Liposome Formulations. *Nature Protocols* **2015,** *10,* 927-38.
45. Percec, V.; Leowanawat, P.; Sun, H.-J.; Kulikov, O.; Nusbaum, C. D.; Tran, T. M.; Bertin, A.; Wilson, D. A.; Peterca, M.; Zhang, S.; **Kamat, N. P.**; Vargo, K.; Moock, D.; Johnston, E. D.; Hammer, D. A.; Pochan, D. J.; Chen, Y.; Chabre, Y. M.; Shiao, T. C.; Bergeron-Brlek, M.; Andre, S.; Roy, R.; Gabius, H.-J.;Heiney, P. A. Modular Synthesis of Amphiphilic Janus Glycodendrimers and Their Self-Assembly into Glycodendrimersomes and Other Complex Architectures with Bioactivity to Biomedically Relevant Lectins. *Journal of the American Chemical Society* **2013,** *135,* 9055-9077.
46. **Kamat, N. P.**; Henry, S. J.; Lee, D.;Hammer, D. A. Single-Vesicle Patterning of Uniform, Giant Polymersomes into Microarrays. *Small* **2013,** *9,* 2272-2276.
47. Lee, M. H.; Hribar, K. C.; Brugarolas, T.; **Kamat, N. P.**; Burdick, J. A.;Lee, D. Harnessing Interfacial Phenomena to Program the Release Properties of Hollow Microcapsules. *Advanced Functional Materials* **2012,** *22,* 131-138. † Featured on the cover
48. Katz, J. S.; Eisenbrown, K. A.; Johnston, E. D.; **Kamat, N. P.**; Rawson, J.; Therien, M. J.; Burdick, J. A.;Hammer, D. A. Soft Biodegradable Polymersomes from Caprolactone-Derived Polymers. *Soft Matter* **2012,** *8,* 10853-10862.
49. Hammer, D. A.; **Kamat, N. P.** Towards an Artificial Cell. *Febs Letters* **2012,** *586,* 3766-3766.
50. **Kamat, N. P.**; Liao, Z.; Moses, L. E.; Rawson, J.; Therien, M. J.; Dmochowski, I. J.;Hammer, D. A. Sensing Membrane Stress with near Ir-Emissive Porphyrins. *Proceedings of the National Academy of Sciences of the United States of America* **2011,** *108,* 13984-13989. † Highlighted in Penn Today, World of Chemicals, and NSF News from the Field
51. **Kamat, N. P.**; Lee, M. H.; Lee, D.;Hammer, D. A. Micropipette Aspiration of Double Emulsion-Templated Polymersomes. *Soft Matter* **2011,** *7,* 9863-9866.
52. **Kamat, N. P.**; Katz, J. S.;Hammer, D. A. Engineering Polymersome Protocells. *Journal of Physical Chemistry Letters* **2011,** *2,* 1612-1623. † Featured on the cover
53. Cheng, Z.; Elias, D. R.; **Kamat, N. P.**; Johnston, E. D.; Poloukhtine, A.; Popik, V.; Hammer, D. A.;Tsourkas, A. Improved Tumor Targeting of Polymer-Based Nanovesicles Using Polymer-Lipid Blends. *Bioconjugate Chemistry* **2011,** *22,* 2021-2029.
54. **Kamat, N. P.**; Robbins, G. P.; Rawson, J.; Therien, M. J.; Dmochowski, I. J.;Hammer, D. A. A Generalized System for Photoresponsive Membrane Rupture in Polymersomes. *Advanced Functional Materials* **2010,** *20,* 2588-2596.

PATENTS

1. Daniel A Hammer, Ivan Julian Dmochowski, Gregory Patrick Robbins, Masaya S Jimbo, Michael J Therien, and Neha P Kamat. Polymer Vesicles for Selective Electromagnetic Energy-Induced Delivery. US Patent App. 12/548, 801.
2. Timothy Vu, Justin A. Peruzzi, Neha P. Kamat. Phase-segregated vesicles for spatially controlled protein conjugation and cell therapy. U.S. Provisional Patent
3. Justin A. Peruzzi, Jan Steinkuehler, Neha P. Kamat. Leveraging lipid-protein interactions to engineer spatial organization in cell-free systems. U. S. Provisional Patent.
4. Margrethe A. Boyd, Walter Thavarajah, Julius B. Lucks, Neha P. Kamat. Membrane encapsulated cell-free systems for expanded biosensing and biosynthesis capabilities. U. S. Provisional Patent

SELECT INVITED PRESENTATIONS † = keynote or plenary

Accepted/ Upcoming:

Rice University Student-Invited SSPB Seminar Series, Spring 2027
6th Northwestern Tel Aviv University workshop, Tel Aviv, Israel, December 2027

Completed:

Berkeley BioE Rising Star Lecture, Fall 2026
Center for Cancer Engineering-CURES-Ohio State University, Fall 2026 † = Plenary International Speaker
University of Texas at Arlington, Materials Science Engineering Seminar Series
University of Texas at Austin MRSEC Seminar (student group invitation), 2025
University of Pennsylvania, Bioengineering Seminar Series, 2025
Australian and New Zealand Society for Extracellular Vesicles (ANZSEV) 2025 Conference, Wellington, New Zealand, November 2025 † = Plenary International Speaker
International Bottom-Up Biotechnology Conference, Okinawa, Japan, November 2025
University of Toledo Bioengineering Seminar Series, Spring 2025
National Academies of Sciences Workshop on Mirror Image Biology, Fall 2025
National Academies of Sciences, Engineering, and Medicine Webinar on Synthetic Cells at the Frontier: Navigating Innovation and Risk, Summer 2025
DARPA BTO workshop: Frontiers of Synthetic Biology, Lighting talk, Summer 2025
2025 Gordon Research Conference on Synthetic Biology, Sunday River, ME, July 2025
2025 Febs/EMBO Meeting in Physical Virology, Sant Feliu de Guixols, Spain, June 2025
Faraday Discussions, Structural and functional asymmetry of plasma membranes, London, March 2025
Next-Generation Synthetic Biology Conference, Flanders Institute of Biotechnology, Ghent, Belgium, Dec 2024
23rd International Conference on Systems Biology (ICSB), IIT, Bombay, Mumbai, December 2024
2nd Artificial Biology Conference: Assemble-Imitiate-Adapt, Aarhus, Denmark, August 2024
Gordon Research Conference, 2024 Systems Chemistry, Mount Snow, VT, June 2024
Tufts University, Biomedical Engineering Department, Seminar Series, April 2024
Systems Chemistry Virtual Symposium July 2023
Telluride Science Research Center Workshop on Complexity in the Chemistry and Physics of Lipid Membranes, Telluride, CO, June 2023
Gordon Research Conference, 2023 Membrane Protein Folding, Castelldefels, Spain, June 2023
Sanders Tri-Institutional Chemical Biology Seminar Series, co-organized by Weill Cornell Medical College, The Rockefeller University, and Memorial Sloan Kettering Cancer Center, Spring 2023
Cornell University, Chemical and Biomolecular Engineering, Seminar Series, Spring 2023
Union College, Engineering Seminar Series, Spring 2023
International Chemical Biology Society 11th annual conference † = keynote, Brisbane Australia
Washington University, Molecular Engineering and Sciences Institute, Seminar Series, Seattle, WA, Fall 2022 (selected and invited by graduate students)
Discussion Meeting on Artificial Cells, Royal Society in London, Virtual, Fall 2022

Biophysical Society of Japan Annual Meeting, Hakodate, Japan, Virtual, Fall 2022
Northwestern University and Westfaelische Wilhelms-Universitaet (WWU) Münster Symposium on Smart Materials: From Nanoscience to Biomedicine † = keynote
ACS Fall 2022 Meeting, Colloids and Surface Chemistry, Chicago, IL Fall 2022
Naval Research Laboratory HBCU/MI Internship Program, Summer 2022
Gordon Research Conference, 2022 Bioanalytical Sensors, Newport, RI, June 2022
Gordon Research Conference, 2022 Bioinspired Materials, Les Diablerets, Switzerland, June 2022
Synthetic Biology: Engineering, Evolution & Design (SEED) Conference, Arlington, VA, Spring2022
Penn State, Department of Chemistry, Seminar Series, State College, PA, Winter 2022
Biophysical Week, Biophysical Society, Virtual Series, Winter 2022
Washington University, Department of Bioengineering, Seminar Series, Seattle, WA, Winter 2022
Washington University, Department of Chemical Engineering, Fall 2021
Biomedical Engineering Society Young Innovator Award Session, Fall 2021
University of Guelph, Department of Chemistry, Seminar Series, Fall 2021
Tethered Membrane Conference (TETHMEM), Bad Honnef, Germany, August 2021
Amarin Advisory Board Meeting, Virtual, Fall 2021
Build a Cell Seminar Series, Virtual, Summer 2021
University of New Mexico and Max Planck Institute for Medical Research, International Conference on Engineering Synthetic Cells and Organelles, Spring 2021
New York University, Department of Biomedical Engineering, Seminar Series, Spring 2021
University of Virginia, Department of Biomedical Engineering, Seminar Series, Spring 2021
Rice University, Bioengineering Department, Seminar Series, Winter 2021
Cellular and Molecular Bioengineering Rising Star Award Talk, CMBE Annual Meeting, Winter 2021
Society for Developmental Biology, 79th Annual Meeting, Chicago, IL, July 2020
Kyoto University, Inst. for Integrated Cell-Material Sciences (iCeMS) Retreat, Kyoto, Japan, July 2019
Washington University in St. Louis, T32 Mechanobiology Retreat, Spring 2019 † = keynote
University of Illinois at Chicago, Department of Chemistry, Seminar Series, Spring 2019
Northwestern University Department of Pharmacology Retreat, Spring 2019
Northwestern University, Biotechnology Training Program, Seminar Series, Spring 2019
2019 ACS Great Lakes Regional Meeting (GLRM), Spring 2019
Northwestern University, Center of Synthetic Biology, Fall 2017
University of Nebraska-Lincoln, Big 10 BME Speaker Exchange, Spring 2017
Northwestern University, Department of Chemical Engineering, Faculty Lunch Series, Fall 2017
Northwestern University Interdisciplinary Biosciences Retreat, Fall 2017

INVITED PRESENTATIONS - prior to Northwestern

Northwestern University, Department of Biomedical Engineering, Seminar Series, Spring 2016
Columbia University, Department of Biomedical Engineering, Seminar Series, Spring 2016
Stanford University, Department of Chemical Engineering, Seminar Series, Spring 2016
Boston University, Department of Biomedical Engineering, Seminar Series, Spring 2016
Columbia University, Department of Chemical Engineering, Seminar Series, Spring 2016
Duke University, Department of Biomedical Engineering, Seminar Series, Fall 2015
Northeastern University, College of Engineering, Seminar Series, 2014.
Earth-Life Science Institute Origins of Life Chemistry Workshop, Tokyo, Japan, 2014.

INVITED WORKSHOPS

NSF, Current needs for advancing living sentinel cell research, Fall 2023 (organizing committee)
ARL, Synthetic Biology: Projected S&T Advances in 2050 and Beyond, Summer 2023
DoD, Control of Living Organisms Roadmap, Summer 2023
EBRC, Engineering Biology &Materials Science Roadmap, Winter 2021
DoD and EBRC, Synthetic Biology for Military Environments Roadmap, Winter 2019
NSF, Understanding the Rules of Life: Building a Synthetic Cell Ideas Lab, Winter 2019

NSF, 2018 NSF EFRI Workshop: Convergence and Interdisciplinarity in Advancing Larger Scale Research, Summer 2018

CONTRIBUTED PRESENTATIONS AND POSTERS by NPK or KAMAT GROUP MEMBERS at NATIONAL CONFERENCES - at Northwestern

Presentations by group members (Oral presentations (17); Poster presentations (18))

name = presenting author * = undergraduate

2018, 2019, 2021, 2022, 2023 Annual Biomedical Engineering Society Meeting
Oral: Boyd, *Hilburger, Boyd, *Davis, Hu, Peruzzi, Gunnels, Kelly
Posters: *Hilburger, Vu, *Sant'Anna, Kelly, *Alroogi
2019 Chicago Area Undergraduate Research Symposium (Oral: Hilburger)
2019, 2021, 2022, 2023, 2024 Biophysical Society Annual Meeting
Oral: Jacobs, Peruzzi
Posters: *Hilburger, Peruzzi, Steinkühler, Villaseñor, Buyco
2019, 2022, 2023, 2024 Synthetic Biology: Engineering, Evolution and Design Meeting (SEED)
Posters: Peruzzi, Boyd, Hu, DiBiase
2017, 2020, 2021, 2022, 2023 AIChE National Meetings
Oral: Kamat, Peruzzi (3), DiBiase
Poster: *Gu
2019, 2021 Biomaterials Society Annual Meeting (Oral: Kamat, Vu)
2021 TETHMEM, Bonn, Germany (Posters: Steinkühler)
2022 Bioinspired Materials Gordon Research Seminar (Oral: Peruzzi)
2018, 2022 Bioinspired Materials Gordon Research Seminar (Poster: Kamat, Peruzzi)
2022 Midwest Protein Folding Symposium (Posters: Peruzzi, Jacobs, Hu, Villasenor)
2022 Gordon Research Conference Immunoengineering (Posters: Vu)
2022 International Nanomedicine and Drug Delivery Symposium (NanoDDS) (Posters: Vu)
2022 ACS Fall Meeting: (Oral: Vu; Poster: *Sant'Anna)
2022 SynCell (Oral: Steinkühler)
2022 Biomembrane Days (Oral: Kamat, Poster: Steinkühler)
2022, 2023, 2024 SACNAS (Poster: Villaseñor)
2023 Engineering Biology Research Consortium (EBRC) Annual Meeting (Poster: Hu, Gunnels)
2023 Gordon Research Conference Membrane Protein Folding (Poster: Villaseñor)
2023 Gordon Research Conference Biomaterials and Tissue Engineering (Poster: Kelly)
2024 International Society of Extracellular Vesicles Annual Meeting (Poster: DiBiase)

POSTDOCTORAL SCHOLARS SUPERVISED

1. **Rachel Mizenko**, Ph.D. University of California, Davis (September 2024- present)
2. **Sara Carina Fedosejevs,** Ph.D. TU Dortmund University, Dortmund, Germany (January 2023 – May 2025)
3. **Jan Steinkühler**, Ph.D. Max Planck Institute of Colloids and Interfaces, Potsdam, Germany (March 2020 – Feb 2022) current: W1 Professor at University of Kiel, Germany

PHD DISSERTATIONS SUPERVISED-current

1. **Diego Montoya,** Ph.D. Biomedical Engineering (2025-present)
2. **Miguel Guzman,** Ph.D. Biomedical Engineering (2024-present)
3. **Belize Utebay**, Ph.D. Materials Science (2023-present) (Co-advised with Prof. Jonathan Rivnay)
4. **Zachary Shaver**, MSTP, Molecular Biosciences (2022-present) (Co-advised with Prof. Michael Jewett)
5. **Madison Briggs**, Ph.D. Chemical and Biological Engineering (2023-present)
6. **Matthew Lucia**, Ph.D. Chemical and Biological Engineering (2023-present) (Co-advised with Prof. Danielle Tullman-Ercek)

7. **Natalia Mendonca,** Ph.D. Biomedical Engineering (2023-present)
8. **Crystal Sanchez**, Ph.D. Biomedical Engineering (2023-present)
9. **Lariana Cline**, Ph.D. Biomedical Engineering (2023- present)
10. **Delfin Buyco**, Ph.D. Molecular Biosciences (2022-present)

PHD DISSERTATIONS SUPERVISED-completed

1. **Miranda Jacobs**, Ph.D. Molecular Biosciences (2017-2022) PhD, Thesis Title: "Investigating How Membrane Mechanical Properties Affect the Expression, Folding, and Function of a Model Mechanosensitive Channel Protein " current: Protein Scientist at Teledyne FLIR
2. **Margrethe Boyd**, Ph.D. Biomedical Engineering (2017-2022) PhD, Thesis Title: "Engineering bilayer membranes for nano- and microscale sensing" current: Field Application Scientist at CytoTronics
3. **Justin Peruzzi**, Ph.D. Chemical and Biological Engineering (2017-2023) PhD, Thesis Title: "Engineering the active interface: Harnessing membrane biophysical features for biosensing and therapeutics" current: Scientist at AI Proteins
4. **Timothy Vu**, Ph.D. Biomedical Engineering (2018-2023), Thesis Title: "Mimicking the Cell Membrane with Lipid Nanocarriers to Enhance Membrane Protein Signaling" current: Postdoctoral researcher at Lawrence Livermore National Laboratory
5. **Taylor Gunnels**, Ph.D. Biomedical Engineering (2019-2024) (Co-Advised with Prof. Joshua Leonard), Thesis Title: "Building Extracellular Vesicle Therapies to Selectively Interface with Human Physiology" current: Postdoctoral Scientist at Eli Lilly
6. **Vivian Hu**, Ph.D. Biomedical Engineering (2020-present)
7. **Beth Dibiase**, Ph.D. Chemical and Biological Engineering (2022-present) (Co-Advised with Prof. Joshua Leonard)
8. **Zachary Shaver,** Ph.D. Molecular Biosciences (2022 – 2026) (Co-Advised with Prof. Michael Jewett)
9. **Citlayi Villaseñor,** Ph.D. Molecular Biosciences, (2020-2026)Thesis Title: "Investigating the Role of Membrane Biophysical Properties in Membrane Protein Synthesis, Insertion, Folding, Assembly, and Function Using In Vitro and In Vivo Approaches "
10. **Mary Kelly**, Ph.D. Biomedical Engineering (2021- 2026), "Deploying Genetic Instructions Across Biological and Material Boundaries"

UNDERGRADUATE RESEARCH MENTORING * = publication in Kamat Lab

1.
2. Jenny Chen (Spring 2025- present)
3. Ethan Lao (Fall 2025- present)
4. Diego Negrete ((Summer 2025, REU)
5. *Lara Mocan (Spring 2025- present)
6. Anastasia Smirnova (Spring 2024- Summer 2025)
7. Ria Palo (Spring 2024 – present)
8. *Yiming Luo (Spring 2024- present)
9. Teresa Rojas Rodriguez (Fall 2023-present)
10. *Aiden Linderman (Spring 2023-present)
11. Isa Candal (Winter 2023-present)
12. Jessy Gonzalez (Summer 2022, REU)
13. Yazeed Alroogi (2022- 2024)*
14. *Atiriya Iyer (2022- Spring 2024)*; next: Medical student at UT Southwestern
15. *Andre Gu (2021- 2023); Stanford BioE PhD; next: PhD student at Stanford Univ.
16. Ugochinyere Ndukwe (Summer 2021, REU); next: Analyst at Roivant Sciences
17. *Nina Galvez (2020- 2023); next: Medical student at Loyola University
18. *Lucas Sant'Anna (2020-2023, Stanford PhD); next: PhD student at Stanford Univ.
19. *Anna Davis (2019-2021, Georgia Tech PhD); next:PhD student at Georgia Tech Univ.
20. Summer Duffy (2019-2020); next:Staff Engineer at Johns Hopkins Univ. Applied Physics Lab
21. Jacob Brandner (Summer 2019, REU): next:PhD student at University of Washington

22. *Nora Chambers (2019-2021); next:Medical student at University of Illinois Chicago
23. *Kenneth Wang (2019-2021); next: Medical student at Univ Chicago School of Medicine
24. Kayla Purdy (Summer 2018, REU): next: PhD student at University of Pennsylvania
25. *Claire Hilburger (2017-2019, next: NSF Graduate Fellow, PhD student at Berkeley
26. *Kamryn Lewis (2017-2018); next: Medical student at UT Southwestern
27. David Alexander Fong (2017-2019); next: Technical Services Specialist at Medtronic

INTERNATIONAL STUDENT EXCHANGES

1. Victoria Thusgard Ruhoff, Niels Bohr Institute, Denmark (March 2024- July 2024)
   Visiting student from Prof. Pól Martin Bendix's laboratory
2. Jan Baas Wennemar, University of Münster, Germany (September 2024-February 2025)
   Visiting student from Prof. Seraphine Wegner's laboratory

ACHIEVEMENTS BY GROUP MEMBERS

Grants/Fellowships:
NDSEG Graduate Fellowships: 2019 (Boyd)
NSF Graduate Fellowships: 2018 (Peruzzi), 2019 (Boyd- *declined)*, 2020 (Hilburger), 2021 (Gunnels), 2022 (DiBiase), 2023 (Sant'Anna), 2024 (Sanchez, Mendonca)
American Heart Association Predoctoral Fellowship: 2019 (Jacobs)
Regenerative Engineering Training Program (RE-Training): 2022 (Kelly)
Molecular Biophysics Training Program NIH: 2017-18 (Jacobs), 2018 (Boyd), 2021 (Villaseñor)
Synthesizing Biology Across Scales (SynBAS) National Research Traineeship NSF: 2021-2023 (Hu), 2022-2023 (Buyco), 2024 (Lucia)
Biotechnology Training Program NIH: 2019 (Vu), 2024 (Cline)
IIN Postdoctoral Fellowship: 2024 (Mizenko)
Northwestern Graduate School Conference Travel Grant: 2019 (Jacobs)
Northwestern Interdisciplinary Biological Sciences Program Travel Award: 2019 (Jacobs)
Northwestern Undergraduate Research Assistant Program Grant: 2017 (Hilburger)
Northwestern Undergraduate Research Grant: 2017 (Fong), 2018 (Hilburger), 2019 (Wang, Chambers), 2020 (Davis, Chambers, Sant'Anna)
Northwestern McCormick Grant: 2018 (Fong), 2019 (Duffy), 2023 (Candal), 2025 (Mocan)
Northwestern BME Research Grant: 2017 (Fong, Lewis), 2019 (Chambers), 2021 (Galvez)
Northwestern Jaharis Undergraduate Research Fellowship: 2021 (Sant'Anna), 2022 (Alroogi)

Awards/Recognition:
International Institute for Nanotechnology (IIN) Outstanding Research Award Finalist: 2023 (Vu)
ABioM 2023 Graduate Student Research Award: 2023 (Vu)
Biomedical Engineering Thesis Award: 2022 (Runner up: Boyd), 2025 (Gunnels)
Schmidt Science Fellow Institutional Nominee: 2022 (Peruzzi)
STAR Award Society for Biomaterials Meeting: 2021 (Vu)
AIChE Area 8B Graduate Student Award Session, 1st Place: 2020 (Peruzzi)
Ryan Graduate Fellowship, Northwestern University: 2020 (Peruzzi)
Biomedical Engineering Research Award, Northwestern University: 2019 (Boyd)
Northwestern BME Undergraduate Award for Research: 2019 (Hilburger), 2021 (Davis), 2022 (Alroogi)
Northwestern Lyle F. Mockros Outstanding Senior Award: 2021 (Chambers), 2022 (Galvez, Sant'Anna)
BMES Student Design and Research Award: 2019 (Hilburger)
Alumnae of Northwestern University STEM Scholarship: 2018 (Hilburger)

TEACHING ACTIVITIES

BME 250 – Thermodynamics (Winter 2017 – present)
BME 446 - Synthetic Biology in Biomaterials (Spring 2018)

BME 403 – Quantitative Systems Physiology (Spring 2019 – 2022)
BME 495 – Biological Phenomena in Cell/Cell-Free Systems (Spring 2022 – present)
"Managing the publishing process" – Northwestern SynBAS NRT Workshop (2022, 2023, 2024)

SERVICE- CONFERENCE/ SYMPOSIUM/ COLLOQUIUM ORGANIZATION

- **2025 Cell-free Systems Meeting**
- Meeting Co-Chair and organizer, Evanston, IL
- **2025 Telluride Science Research Center Workshop: Information Processing at the Biology-Material Interface**
- Meeting Co-Chair and organizer, Telluride, CO
- **Materials Research Society**
- Symposium Organizer of a new session: Symposium SB11: Engineering Biomaterials with Synthetic Biology, Fall 2022, Boston, NY
- **Synthetic Biology: Engineering, Evolution & Design (SEED), 2019-present**
- Meeting Co-Chair and organizer, 2024, Atlanta, GA
- Organizing Committee, 2019 and Chair of Session 2: The Materials Science/ Synthetic Biology Interface, June 2019, NY, NY
- Organizing Committee, 2021-2022, Arlington, VA
- Organizing Committee, 2023-2024, Atlanta, Georgia
- **Biomedical Engineering Society Annual Meeting, 2017-present**
- Co-chair, "Applications of nanopores and Nanoparticles," October 2017, Phoenix, AZ
- Co-chair, "Nanotechnologies for Nucleic Acid Detection and Exosome Analysis," Oct 2018, Atlanta, GA
- Abstract reviewer, 2017- present
- **American Institute of Chemical Engineers, 2017-2019**
- Co-chair, "Biomaterials," Nov 2017, San Francisco, CA
- Co-chair, "Biomimetic Materials," Nov 2019, Orlando, FL
- **Central US Synthetic Biology Workshop**
- Organizing Committee, Sept 2018, Evanston, IL
- Organizing Committee, Sept 2019, Evanston, IL
- **Cell-Free Systems Conference**
- Co-Chair, Aug 2025, Evanston, IL
- Organizing Committee, Dec 2019, Boston, MA
- **American Chemical Society Annual Symposium**
- Co-Chair, "Bio-Inspired Macromolecular Materials," Spring 2020, Philadelphia, PA
- **New York Academy of Sciences, Synthetic Biology Conference**
- Organizing Committee, Fall 2020, NY, NY

SERVICE- PROPOSAL AND MANUSCRIPT REVIEW

1. **National Science Foundation**
   - MCB Ad Hoc Reviewer, 2021
   - NSF Convergence Accelerator, *Networked Blue Economy (Track E),* 2022
2. **National Institute of Health**
   - Gene and Drug Delivery (GDD) Study Section Ad Hoc Reviewer, 2019
   - Biochemistry and Biophysics of Membranes (BBM) Study Section Ad Hoc Reviewer, 2024
3. **European Research Council**
   - Advanced Grants Reviewer, 2017
4. **Journal Reviews**
   - Biomacromolecules, Langmuir, Soft Matter, Biochemistry, ACS Synthetic Biology, Biophysical Journal, ACS Nano, Science Advances, Chem, Nature Chemistry, Nature Nanotechnology, Small, Angewandte Chemie, Advanced Functional Materials, Current Biology, PNAS

SERVICE- PROFESSIONAL

1. **Engineering Biology Research Consortium (EBRC),** Member, 2019- present
2. **ACS Synthetic Biology Journal,** Editorial Advisory Board Member, 2022- present
3. **Build-A-Cell,** Member, 2018-present

SERVICE- UNIVERSITY

BME Graduate Committee (2024-present)
BME Faculty Search Committee, (2024-2025)
ME Faculty Search Committee (2024-2025)
Facilities Planning Committee (2024-2025)
ChBE Faculty Search Committee (2023-2024)
MatSci Faculty Search Committee (2023-2024)
NSF SynBAS NRT Cohort Leader (2023-present)
Northwestern BME Diversity, Equity, and Inclusion (DEI) Committee Chair, 2020 – 2023
Northwestern Interdisciplinary Biological Sciences DEI Committee 2021- 2023
Northwestern BME Undergraduate Academic Advisor, 2017 - present
Northwestern BME Graduate Recruitment Committee, 2017- present
Northwestern BME Undergraduate Club Faculty Advisor, 2017- 2019
Northwestern Undergraduate Research Assistant Program (URAP) Committee (2018- present)
Northwestern HHMI Gilliam Fellow Nomination Committee, 2017

Panels and Outreach Talks
Lunch with Chemistry Life Processes Trainees, 2019
Northwestern U SANCAS Midwest Regional Meeting Panel Member on Importance of Inclusivity in Higher Education, 2020
Guest speaker at CARE T32 Trainee Meeting: “Membranes, mentorship, and motherhood: navigating an academic career in BME,” Nov 2022
Panelist for McCormick Engineering NSF Career Panel Discussion, March 2022
Guest speaker: BME Professional Development Lunch, Topic: “How to not let my PhD take forever,” April 2023
Guest speaker: Center of Synthetic Biology Workshop for Graduate Students, “From Project to Publish: Managing the Research Process,” April 2024
Panelist for IIN Future Faculty Presentation and Panel Discussion, August 2024
Northwestern University Research Program for High Schoolers (NURPH) lab tutorial and tour, November 2024

MEDIA COVERAGE AND HIGHLIGHTS

Media Coverage

Sarah Knapton (2022) Scientists develop ‘decoy cells’ to trick Covid-19 away from healthy ones, The Telegraph
Darlene Tverdohleb (2015) Study Reveals New Insights on Origin of Life, The Science Times

Research and Award Highlights

Win Reynolds (2023) Researchers Detect Fluoride in Water with New Simple Color Change Test, Northwestern Engineering News
Amanda Morris (2022) Decoy particles trick coronavírus as it evolves, Northwestern Engineering News
Alex Gerage (2021) Neha Kamat Receives Prestigious NSF CAREER Award, Northwestern Engineering News
Amanda Morris (2021) Membranes Unlock Potential to Vastly Increase Cell-Free Vaccine Production,Northwestern Engineering News
Alex Gerage (2019) Barcoding’ DNA Vesicles for Selective Biochemical Reactions, Northwestern Engineering News
Glenn Jeffers (2019) Cell Maker, Northwestern Research News

Lisa Valee (2019) 2019 CLP Cornew Awards Kick-Start Three Blue Sky Team Science Projects, CLP Frontpage
Emily Ashford (2019) New Technique Improves Folding of Membrane Proteins, Northwestern Engineering News
Alexandra Jacobson (2018) Northwestern Engineering Faculty Teams Receive NSF Big Ideas for the Future Grants, Northwestern Engineering News
Evan Lerner (2011) Penn Molecular Scientists Develop Color Changing Stress Sensor, Penn Today