Rebecca Schulman, Ph.D.
Department of Chemical & Biomolecular Engineering
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I. Education

Ph.D. Computation and Neural Systems, California Institute of Technology 2001 – 2007
Pasadena, California (Advisor: Erik Winfree)
B.S. Mathematics, Massachusetts Institute of Technology 1996 – 1999
Cambridge, Massachusetts
B.S. Computer Science, Massachusetts Institute of Technology 1996 – 1999
Cambridge, Massachusetts

II. Professional Experience

Associate Professor July 2018 – present
Department of Chemical and Biomolecular Engineering
Department of Computer Science (secondary appointment)
The Johns Hopkins University

Assistant Professor September 2011 – present
Department of Chemical and Biomolecular Engineering
Department of Computer Science (secondary appointment)
The Johns Hopkins University

Miller Fellow September 2008 – August 2011
Department of Physics (Sponsor: Jan Liphardt)
University of California, Berkeley

Postdoctoral Scholar June 2007 – August 2008
Department of Computer Science (Sponsor: Erik Winfree)
California Institute of Technology

III. Awards and Honors

Presidential Early Career Award for Scientists and Engineers (PECASE) 2019
DARPA Director's Fellowship Award 2018
Johns Hopkins University Catalyst Award 2017
DARPA Young Faculty Award 2016
DOE Early Career Award 2016
Best Paper award DNA Computing and Molecular Programming, DNA20 2014
(with Dominic Scalise, graduate student, out of 30 papers)
NSF CAREER Award 2013
Turing Centenary Scholar Award 2012
Miller Institute Postdoctoral Fellowship 2008
Sherwood Chang Award for Student Excellence in the Origin of Life 2008
Excellent Student Paper Award, DNA Computing 12 2006

Philanthropic Education Organization (PEO) Scholar	2006
Best Paper Award, VIIIth European Conference on Artificial Life (out of 94 papers)	2005
National Science Foundation Graduate Research Fellowship (Scientific Computing)	1999
Exceptional Student Researcher Award, National Institutes of Health	1995

IV. Awards and Honors Granted to Students Advised by R. Schulman

MRS Symposium Best Oral Presentation, Synthetic Biology (Phillip Dorsey)	2019
DNA24 Conference Travel Award (Dominic Scalise)	2018
Johns Hopkins Three Minute Thesis Contest Finalist (Dominic Scalise)	2018
JHU ChemBE Outstanding Graduate Research Award (Ruoyu Jiang)	2018
JHU ChemBE Outstanding Graduate Research Award (Dominic Scalise)	2018
JHU ChemBE Outstanding Graduate Research Award (Joshua Fern)	2018
JHU-DLC Diversity Recognition Award (Dominic Scalise)	2017
Foundations of Nanoscience (FNANO) Best Poster Award (Angelo Cangialosi)	2017
JHU ChemBE Excellence in Teaching Award (Seth Reinhart)	2017
JHU-DLC Diversity Innovation Grant (Dominic Scalise)	2016
Carl Storm Underrepresented Minority Fellowship, GRC Travel Award (Phillip Dorsey)	2016
JHU-Kenan Fund Teaching Grant (Dominic Scalise)	2016
JHU ChemBE Master's Essay Scholarship (Qi Huang)	2016
DNA22 Conference Travel Award (Dominic Scalise)	2016
JHU's AIChE Travel Award for Undergraduates (Jiaxao Wu)	2016
JHU ChemBE Excellence in Graduate Teaching Assistant Award (John Zenk)	2015
Sara K. Doshna ChemBE Undergraduate Research Award (Tyler Jorgenson)	2015
NSF Graduate Research Fellowship (Samuel Schaffter)	2015
JHU-Kenan Fund Teaching Grant (John Zenk)	2015
JHU-DLC Diversity Innovation Grant (Dominic Scalise)	2015
Provost's Undergraduate Research Award (Tyler Jorgenson)	2015
JHU Walter L. Robb Fellow (Dominic Scalise)	2014
JHU ChemBE Outstanding Graduate Research Award (Abdul M. Mohammed)	2014
Provost's Undergraduate Research Award (Chanon Tuntivate)	2014
DNA20 Conference Travel Award (Dominic Scalise)	2014
ALIFE Conference Travel Award (Dominic Scalise)	2014
DNA Computing and Molecular Programming, Best paper award (Dominic Scalise)	2014
JHU Student Teaching Award (Dominic Scalise)	2013

V. Publications

Va. Peer-reviewed journal publications:

Number of Citations: 1240; h-index=18; Source: Google Scholar
Cumulative Impact Factor (CIF) (=Sum of the IF (2016) of published papers): 272
ORCID ID: 0000-0003-4555-3162
*Corresponding Author; [Impact factor]; [1]These authors contributed equally to this work.

1. P. Dorsey, M. Rubanov, W. Wang and R. Schulman*. "Digital maskless photolithographic patterning of DNA-functionalized poly(ethylene glycol) diacrylate hydrogels with visible light enabling photo-directed release of oligonucleotides." *ACS Macro Letters,* accepted, 2019.

2. S. Schaffter and R. Schulman*. "Developing *in vitro* transcriptional regulatory networks that integrate multiple functional circuit motifs." *Nature Chemistry*, accepted, 2019.

3. Y. Li and R. Schulman*. "DNA Nanotubes that Self-Heal in Serum." *Nano Letters*, May 2019. DOI: 10.1021/acs.nanolett.9b00888

4. D. Scalise and R. Schulman*. "Control of Matter at the Molecular Scale with DNA Circuits." *Annual Review of Biomedical Engineering*, June 2019. DOI: 10.1146/annurev-bioeng-060418-052357

5. J. Zenk, M. Billups and R. Schulman*. "Optimizing Component-Component Interaction Energies in the Self-Assembly of Finite, Multicomponent Structures." *ACS Omega*, Dec. 2018. DOI: 10.1021/acsomega.8b02303

6. J. Fern and R. Schulman*. "Modular DNA Strand-Displacement Controllers that Direct Material Expansion." *Nature Communications 9*, Article 3766, 2018. DOI: 10.1038/s41467-018-06218-2. PMID: 30217991 [13.691]

7. D. Scalise, N. Dutta and R. Schulman*. "DNA strand buffers." *Journal of the American Chemical Society*, 140 (38), pp 12069-12076, 2018, DOI: 10.1021/jacs.8b05373. PMID: 30204433 [13.858]

8. S. W. Schaffter, L. Green, J. Schneider, H. Subramanian, R. Schulman* and E. Franco*. "T7 polymerase transcribes and induces melting of DNA nanostructures". *Nucleic Acids Research,* 46 (10): 5332-5343, 2018. doi: 10.1093/nar/gky283. PMID: 29718412 [10.162]

9. D. Agrawal, R. Jiang, S. Reinhart, A. M. Mohammed, T. Jorgenson and R. Schulman*. "Terminating DNA Tile Assembly with Nanostructured Caps." *ACS Nano,* 11 (10): 9770-9779, 2017 *[13.942].* DOI: 10.1021/acsnano.7b02256. PMID: 28901745

10. A. Cangialosi[1], C. Yoon[1], J. Liu, Q. Huang, J. Guo, T. Nguyen, D. Gracias* and R. Schulman*. "DNA Sequence Directed Shape Change of Photopatterned Hydrogels via High-Degree Swelling." *Science.* 357: 1126-1130, 2017. *[37.205]. DOI: 10.1126/science.aan3925.* PMID:28912239

11. J. Fern and R. Schulman*. "Design and Characterization of DNA Strand-Displacement Circuits in

Serum-Supplemented Cell Medium." *ACS Synthetic Biology,* 6 (9): 1774-1783, 2017. *[5.382].* DOI:10.1021/acssynbio.7b00105. PMID:28558208

12. A. Mohammed, J. Zenk, P. Šulc and R. Schulman*. "Self-assembling DNA nanotubes to connect molecular landmarks." *Nature Nanotechnology*, 12: 312-316, 2017. doi:10.1038/nnano.2016.277 *[39.986].* DOI:10.1038/nnano.2016.277. PMID: 27992412

13. J. Zenk, D. Scalise, K. Wang, P. Dorsey, J. Fern, A. Cruz and R. Schulman*. "Stable DNA-based Reaction-Diffusion Patterns", *RSC Advances* 7 *18032-18040*, 2017. *[3.108]. DOI: 10.1039/C7RA00824D.*

14. T. Jorgenson, A. Mohammed, D. Agrawal and R. Schulman*. "Self-Assembly of Hierarchical DNA Nanotube Architectures with Well-Defined Geometries." *ACS Nano* 17 (2): *1927-1936*, 2017. doi: 10.1021/acsnano.6b08008 *[13.942].* PMID:28085250.

15. A. Mohammed, A. Chisenhall, D. Schiffels, L. Velazquez, D. Fygenson, R. Schulman*. "Self-assembly of precisely defined DNA nanotube superstructures using DNA origami seeds." *Nanoscale* 9 (2): *522-526*, 2017. doi: 10.1039/C6NR06983E *[7.367].* PMID:27957574.

16. J. Fern, D. Scalise, A. Cangialosi, D. Howie, L. Potter, and R. Schulman*. DNA Strand-Displacement Timer Circuits." *ACS Synthetic Biology* 6 (2): *190-193*, 2016. *[5.382].* DOI:10.1021/acssynbio.6b00170. PMID:27744682*.*

17. J. Zenk, C. Tuntivate and R. Schulman*. "The Kinetics and Thermodynamics of Watson-Crick Base Pairing-Driven DNA Origami Dimerization", *Journal of the American Chemical Society 138 (10): 3346-3354*, 2016. *[13.858].* DOI:10.1021/jacs.5b10502. PMID:26925853.

18. J. Fern, J. Lu and R. Schulman*. "The energy landscape for the self-assembly of a 2-dimensional DNA origami complex", *ACS Nano 10 (2): 1836-1844*, 2016. *[13.942].* DOI:10.1021/acsnano.5b05309. PMID:26820483.

19. D. Scalise and R. Schulman*. "Emulating cellular automata in chemical reaction–diffusion networks." *Natural Computing*, *15*(2): 197-214, 2016. *[0.778] DOI:10.1007/s11047-015-9503-8.*

20. Y. Hu, R. Lin, P. Zhang, J. Fern, A. Cheetham, K. Patel, R. Schulman, C. Kan and H. Cui*. "Electrostatic-Driven Lamination and Untwisting of *β*-Sheet Assemblies", *ACS Nano 10 (1): 880-888*, 2016. *[13.942].* DOI:10.1021/acsnano.5b06011. PMID:26646791.

21. D. K. Agrawal, E. Franco and R. Schulman*. "A Self-Regulating Biomolecular Comparator for Processing Oscillatory Signals", *Journal of the Royal Society Interface 12 (111): 20150586*, 2015. *[3.579].* DOI:10.1098/rsif.2015.0586. PMID:26378119.

22. R. Schulman*, Christina Wright and Erik Winfree. “Increasing Redundancy Exponentially Decreases Error Rates in Algorithmic Self-Assembly”, *ACS Nano 9 (6): 5760-5771*, 2015. *[13.942].* DOI:10.1021/nn507493s. PMID:25965580

23. R. Schulman* and David Doty. “Designing Ordered Nucleic Acid Self-Assembly Processes”, *Current Opinion in Structural Biology. 31: 57–63*, 2015. *[6.932].* DOI:10.1016/j.sbi.2015.03.003. PMID:25827396.

24. J. Zenk and R. Schulman*. “An Assembly Funnel Makes Biomolecular Complex Assembly Efficient”, *PLoS One 9 (10): e111233*, 2014. *[2.806].* DOI:10.1371/journal.pone.0111233. PMID:25360818.

25. D. Scalise and R. Schulman*. “Designing Modular Reaction-Diffusion Programs for Complex Pattern Formation”, *Technology 02: 55–66*, 2014. *[IF not yet available]*

26. A. Mohammed and R. Schulman*. “Directing Self-Assembly of DNA Nanotubes Using Programmable Seeds”, *Nano Letters, 13 (9): 4006–4013*, 2013. doi: 10.1021/nl400881w *[12.712].* PMID:23919535.

27. S. Whitelam*, R. Schulman* and L. Hedges. “Self-assembly of multicomponent structures in and out of equilibrium”, *Physical Review Letters, 109: 265506*, 2012. *[8.462].* DOI:10.1103/PhysRevLett.109.265506. PMID:23368583.

28. R. Schulman*, B. Yurke and E. Winfree. “Robust Self-Replication of Combinatorial Information via Crystal Growth and Scission”, *Proceedings of the National Academy of Sciences USA, 109 (17): 6405–6410*, 2012. *[9.661]. DOI: 10.1073/pnas.1117813109*

29. R. Schulman and E. Winfree. “Simple Evolution of Complex Crystal Species”, *Natural Computing, 11: 187–197*, 2012. *[0.778]. DOI:10.1007/978-3-642-18305-8_14.*

30. R. Schulman and E. Winfree. “Programmable control of nucleation for algorithmic self- assembly”, *SIAM Journal on Computing, 39 (4): 1581–161 6*, 2009. *[1.433].* DOI:10.1073/pnas.0701467104. PMID:17881584.

31. R. Barish[1], R. Schulman[1], P. Rothemund and E. Winfree. “An Information-Bearing Seed for Algorithmic Self-Assembly”, *Proceedings of the National Academy of Sciences USA, 106 (15): 6054-6059*, 2009. *[9.661].* DOI:10.1073/pnas.0808736106. PMID:19321429.

32. R. Schulman and E. Winfree. “How Crystals that Sense and Respond to Their Environments Could Evolve”, *Natural Computing, 7 (2): 219-237*, 2008. *[0.778]. DOI: 10.1007/s11047-007-9046-8*.

33. R. Schulman and E. Winfree. “Synthesis of Crystals with a Programmable Kinetic Barrier to Nucleation”, *Proceedings of the National Academy of Sciences USA, 104 (39): 15236–15241*, 2007. *[9.661].* DOI:10.1073/pnas.0701467104. PMID:17881584.

34. H. Chen[1], R. Schulman[1], A. Goel and E. Winfree. "Reducing Facet Nucleation During Algorithmic Self-Assembly", *Nano Letters, 7 (9): 2913–2919*, 2007. *[12.712].* DOI:10.1021/nl070793o. PMID:17718529.

R. Barish

Vb. Manuscripts under review:

35. X. Cui, D. Scalise and R. Schulman*. "Powering DNA strand-displacement circuits with a continuous flow reactor." (submitted, *Natural Computing)*

36. M. S. Pacella, V. Mardanlou, S. Agarwal, A. Patel, E. Jelezniakov, A. M. Mohammed, E. Franco* and R. Schulman*. "Characterizing the Length-Dependence of DNA Nanotube End-to-End Joining Rates." (submitted, *Molecular Systems Design & Engineering*)

Vc. Manuscripts in preparation (complete drafts available upon request):

1. D. K. Agrawal and R. Schulman*. "Modular Protein-Oligonucleotide Signal Exchange."

2. Q. Huang, J. Fern and R. Schulman*. "Microfluidic Fabrication of DNA-Responsive Hydrogel Microparticles."

3. R. Jiang and R. Schulman*. "Rule-Based Point-to-Point Assembly of DNA Nanotubes between Multiple Types of Molecular Endpoints."

4. P. Dorsey, D. Scalise and R. Schulman*. "DNA Reaction-Diffusion Attractor Patterns."

Vd. Peer Reviewed Conference Papers:

1. D. Agrawal, E. Franco and R. Schulman. "Designing a Self-Regulating Biomolecular Comparator", *American Controls Conference (ACC), IEEE*, 2015.

2. D. Scalise and R. Schulman. "Emulating Cellular Automata in Chemical Reaction- Diffusion Networks", *in Proceedings of the 20th Annual Conference on DNA Computing and Molecular Programming*, 2014. (**Won Best Paper at conference)**

3. R. Schulman and B. Yurke. "A Molecular Algorithm for Path Self-Assembly in 3 Dimensions", *in Proceedings of Robotics: Science and Systems, 2010*. **(<20% acceptance rate for submitted papers)**

4. R. Schulman and E. Winfree. “Simple Evolution of Complex Crystal Species”, *in Proceedings of the 16th Annual Conference on DNA Computing and Molecular Programming*, 2010.

5. R. Schulman and E. Winfree. “Self-Replication and Evolution of DNA Crystals”, *in Proceedings of the VIIIth European Conference on Artificial Life*, 2005. (**Won Best Paper at conference)**

6. R. Schulman and E. Winfree. “Controlling nucleation rates in algorithmic self-assembly”, *in Proceedings of the 10th Annual Conference on DNA-Based Computation*, 2004.

7. R. Schulman, S. Lee, N. Papadakis and E. Winfree. “One-dimensional boundaries for DNA tile self-assembly”, *in Proceedings of the 9th Annual Conference on DNA-Based Computation*, 2003.

Ve. Invited Papers and Proceedings (Not Peer Reviewed):

1. Y. Li and R. Schulman. “Talking across the membrane”, *Nature Chemistry, 11*, 18-20, 2019. (News and Views)

2. F. C. Simmel and R. Schulman. “Self-Organizing Materials built with DNA”. *Materials Research Society Bulletin*, *December 42 (12): 913-919*, 2017.

3. D. Scalise and R. Schulman. “Chemical reaction networks: Colour by number”, *Nature Chemistry, 5 986–987*, 2013. (News and Views).

4. R. Schulman. “Beyond Biology: Designing a New Mechanism for Self-Replication and Evolution at the Nanoscale”, *in Proceedings of the Conference on Genetics and Evolutionary Computation (GECCO)*, 2011.

VI. Patents and disclosures

1. DNA strand buffers (Disclosure filed August 2018)
2. Molecular DNA strand-displacement controllers for directing material expansion (Disclosure filed January 2018)
3. A programmable soft robot (Disclosure filed September 2017 - patent filed August 2018)

VII. Press about R. Schulman

1. Self-healing DNA nanostructures – American Chemical Society – May 29, 2019. Featured in Phys.org, EurekAlert, *Genetic Engineering & Biotechnology News*, *Interesting Engineering* and Science Daily.

2. Technology Spotlight: “Responsive Materials That Could Move Cells” *Johns Hopkins Technology Ventures,* March 1, 2019

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3. “Swell Findings in Hydrogels” *The New England Journal of Medicine,* March 1, 2018.

4. “Harnessing the Power of Shape-shifting Polymers” *Chemical and Engineering News*, February 26, 2018.

5. “DNA Sequences Shape-Shift Hydrogels” *Nanoteckweb.org*, September 19, 2017

6. “A New Way to Create Soft Robots” *Johns Hopkins University,* September 18, 2017

7. “Scientists Have Built a Bridge of Homing DNA” *Popular Mechanics (Russia*), January 10, 2017.

8. “Watch Nanotubes Wiggle to Form a Bridge” *Futurity,* January 9, 2017.

9. “Captured on Video: DNA Nanotubes Build a Bridge Between 2 Molecular Posts” *The Science Explorer,* January 6, 2017.

10. “Scientists Coax DNA Nanotubes Into Assembling Into Bridge-Like Structures” *International Business Times,* January 6, 2017.

11. “Research on DNA Nanotubes Leads to New Means for Direct Communication with Cells” *AZoNano*, January 6, 2017

12. “Video Shows DNA Nanotubes Walking a Tightrope” *Controlled Environments Magazine,* January 6, 2017.

13. “DNA nanotubes self-assemble into molecular bridges between cells” *Johns Hopkins University Institute for NanoBioTechnology,* January 6, 2017.

14. “Captured on video: DNA nanotubes build a bridge between two molecular posts” *Johns Hopkins Whiting School of Engineering,* January 5, 2017.

15. “The idea that life began as clay crystals is 50 years old” *(research included in article) BBC Earth*, September 2016.

16. Interview about “Increasing Redundancy Exponentially Decreases Error Rates in Algorithmic Self-Assembly” *ACS Podcast Interview*, June 2015.

17. Interview about “Designing Modular Reaction-Diffusion Programs for Complex Pattern Formation” *The IET (Institute of Engineering and Technology) Magazine Article*, October 2014.

VIII. Professional Activities

Sessions Chaired

1. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2017.
2. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials, November 2016 (with Esmaiel Jabbari).
3. Gordon Research Conference on Bioinspired Materials, Discussion Leader, Adaptive Design of Materials, Les Diablerets, Switzerland, June 2016.
4. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2016.
5. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials, November 2015 (with Esmaiel Jabbari).
6. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2015.
7. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials; November 2014 (with Esmaiel Jabbari).
8. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2014.
9. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials; November 2013 (with Esmaiel Jabbari).
10. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2013.
11. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2012.
12. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2011.

Member of

American Institute of Chemical Engineers

American Chemical Society

Biophysical Society

Materials Research Society

IX. Proposal Review

1. Mail in reviewer, DOE, 2019
2. Mail in reviewer, NSF, 2019
3. Virtual panel member, National Science Foundation, Division of Civil, Mechanical and Manufacturing Education, 2018.
4. Panel member, National Science Foundation, Division of Civil, Mechanical and Manufacturing Education, 2018.
5. Panel member, National Science Foundation, Division of Civil, Mechanical and Manufacturing Education, 2017.

6. Mail in reviewer, Keck Foundation, 2017.
7. Mail in reviewer, Army Research Office, 2017.
8. Panel member, National Science Foundation, Division of Civil, Mechanical and Manufacturing Education, 2017.
9. Mail in reviewer, Department of Energy, Biomolecular Materials Program, 2016-2017.
10. Panel member, National Science Foundation, Division of Civil, Mechanical and Manufacturing Education, 2016.
11. Panel member, National Science Foundation, Division of Civil, Mechanical and Manufacturing Education, 2016.
12. Panel member, National Science Foundation, Division of Electrical, Communication and Cyber Systems, 2015.
13. Mail in reviewer, Department of Energy, Biomolecular Materials Program, 2015-2016.
14. Mail in reviewer, Templeton Foundation, 2014.
15. Mail in reviewer, Israeli Science Foundation, 2014.
16. Mail in reviewer, National Science Foundation, Materials Research Science and Engineering Centers, 2014.
17. Program reviewer, Office of Naval Research, 2013.
18. Mail in reviewer, Lawrence Berkeley National Laboratory User Program, 2013.
19. Mail in reviewer, Brookhaven National Laboratory User Program, 2012.

X. RESEARCH GRANTS

Current Active Grants

1. Elsa U. Pardee Foundation: “Single-Cell Secretomics for identifying presymptomatic pancreatic cancer”, December 2018; PI Schulman, co-PI Hur. Total award $163,364.

2. EFRI C3 SoRo: Award 1830893, “Programming Thermobiochemomechanical (TBCM) Multiplex Robot Gels”, September 2018; PI Gracias, co-PIs Cowan, Nguyen, Schulman. Total award $2,000,000.

3. National Science Foundation / Semiconductor Research Council. NSF Award 1807546. “SemiSynBio: Collaborative Research: YeastOns: Neural Networks Implemented in Communicating Yeast Cells" August 2018-July 2022; PI Schulman, co-PIs Klavins, Ellington, Vogelstein. To Schulman group $600,000. Total award $1,500,000.

4. National Science Foundation CMMI-1562661 “Collaborative Research: Parallel, Adaptive Manufacturing of Nanoscale Electrical Interconnects Using DNA Self-Assembly,” September 2016-August 2019; PI Schulman, PI Woolley. To Schulman group $100,000.

5. Department of Energy Biomolecular Materials Program DE-SC0010426; “Programmable Dynamic Self-Assembly of DNA Nanostructures,” September 2016–June 2019; PI Schulman, co-PI Franco. To Schulman group: $693,000

6. DARPA Young Faculty Award D16AP00147; “Self-Targeting Biotic-Abiotic Interfaces,” September 2016–September 2019; PI Schulman: $500,000 + Directors Award Option $395,207

+

7. Department of Energy Biomolecular Materials Program Proposal 221874; “Resilient Hydrogels from the Nanoscale to the Microscale,” July 2016–June 2021; PI Schulman: $750,000

Peer-reviewed grants; Expired

8. Johns Hopkins University Catalyst Award “Telling the left hand what the right hand is doing: Building spatially aware multifunctional materials,” June 2017-December 2018; PI Schulman. $75,000.

9. National Science Foundation 1527377; “SHF: Continuously operable biomolecular circuits,” August 2015–December 2018; PI Schulman: $481,977

10. National Science Foundation CAREER Award CMMI-1253876; “DNA-templated assembly of nanoscale circuit interconnects,” January 2013–December 2017; PI Schulman $400,000

11. Northrop Grumman “DNA Tinkertoys for Self-Assembly of Structures with Micron-Scale Features Over Large Surface Areas” June 2016–May 2017; PI Schulman; $20,000

12. Army Research Office (PI David Gracias, co-PI Schulman, co-PI Thao Nguyen); “DNA Programmable Hydrogel Chemomechanical Actuators,” September 2015–December 2016; to Schulman group: $90,000

13. Kenan Award; “Think like a Programmer,” January 2016–May 2016; PI Schulman: (for teaching) $5,000

14. Johns Hopkins Discovery Award (PI Rong Li, co-PI Schulman, co-PI Sharon Gerecht, co-PI Takanari Inoue, co-PI Sean Sun); “An Interdisciplinary Investigation of the Mechanism of Autosomal Dominant Polycystic Kidney Disease,” July 2015–July 2016; to Schulman group: $15,000

15. Department of Energy Biomolecular Materials Program DE-SC0010595; “Programmable Dynamic Self-Assembly of DNA Nanostructures,” PI Schulman PI Franco; September 2013–August 2016; to Schulman group: $435,000.

16. Environment, Energy, Sustainability and Health Institute Seed Grant; “Real-Time, Sensitive Detection of Escherichia coli in Drinking Water,” PI Schulman, PI Kai Loon Chen; July 2012–July 2013; to Schulman group: $12,500

17. Turing Centenary Research Fellowship; “From molecules to endless forms most beautiful: How to build molecular programs for morphogenesis,” July 2012–June 2015; PI Schulman, £75,000

18. National Science Foundation Award 1161941; “From molecules to complex shapes: Programming pattern formation with DNA Medium, collaborative proposal,” Computing and Communications Foundation division, PI Schulman, PI Georg Seelig; October 2012–September 2016; to Schulman group: $500,000

XI. Research Supervised

Postdoctoral Fellows

1. Joshua Fern (August 2017 – December 2018), "DNA-responsive hydrogels for medical and robotic applications"
   B.S.: Chemical Engineering and Chemistry, University of Wisconsin, 2012
   Ph.D, Chemical and Biomolecular Engineering, Johns Hopkins University, 2017

2. Naresh Dhanasekar, Ph.D. (March 2017 – present), "Electrophysiological Characterization of Ion Transport in DNA Nanostructures"
   B.S.: Biochemistry, University of Madras, 2007
   M.S.: Biotechnology, University of Madras, 2009
   *Ph.*D.: Biochemistry, Jacobs University Bremen, 2016

3. Michael Pacella, Ph.D. (March 2017 – present), "Model-Driven Design of Programmable Dynamic DNA Nanostructures and Architectures"
   B.S.: Chemical Engineering, University of Maryland Baltimore County, 2010
   *Ph.*D.: Biomedical Engineering, Johns Hopkins University, 2017

4. Sisi Jia, Ph.D. (November 2016 – present) "Receptor-specific attachment of DNA nanostructures to the cell surface and nanostructure growth in the cellular environment"
   B.S.: Physics, Hebei Normal University, 2009
   *Ph.*D.: Inorganic Chemistry, Shanghai Institute of Applied Physics, 2014

5. Abdul Majeed Mohammed, Ph.D. (November 2016 – January 2017), "Environmentally Adaptive Self-Assembly of DNA Nanostructures"
   B.T. and M.T.: Biotechnology, Indian Institute of Technology, 2011
   *Ph.*D.: Chemical and Biomolecular Engineering, Johns Hopkins University, 2016
   Current Position: Scientist DNA Nanotechnology, Ultivue, Inc.

6. Deepak Agrawal, Ph.D. (November 2013 – November 2016) "Control of DNA nanostructure assembly using organizing complexes and molecular circuits"
   M.S.: Microsystem and Circuit Designing, Indian Institute of Technology, Madras, 2007
   *Ph.*D.: Engineering, University of Cambridge, 2013
   Current Position: Postdoctoral Scholar, Boston University

7. Ankur Verma, Ph.D. (January 2012 – January 2014) "Integrating top-down and bottom up methods for DNA self-assembly and patterning"
   B.T.: Chemical Engineering, Bundelkhand University, 2002
   M.T.: Materials Science Program, Indian Institute of Technology, 2004
   *Ph.*D.: Chemical Engineering, Indian Institute of Technology, 2011
   Current Position: Assistant Professor, Indian Institute of Technology (BHU) Varanasi

Ph.D. Students

1. Katherine Miller (January 2019-present)
   B.S.: Chemistry, Stockton University, 2017
   Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

2. Kuan-Lin Chen (November 2018-present)
B.S.:
Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

3. Joshua Cole (August 2018-present)
B.S.: Chemical Engineering, Oklahoma State University, 2016
Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

4. Ruohong Shi (December 2017-present) (Jointly advised with Prof. David Gracias)
B.S. Materials Chemistry, University of Science and Technology in China, 2017
Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

5. Lei Zhang (December 2017-present)
B. Eng. Molecular Science and Engineering, Tianjin University, 2017
Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

6. Yi Li (November 2016 – present)
B.S.: Chemical Engineering, University of Washington, 2016
Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

7. Samuel Schaffter (November 2015 – present)
B.S.: Chemical Engineering, Purdue University, 2015
Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

8. Philip Dorsey (November 2015 – present)
B.S.: Chemical Engineering, Princeton University, 2014.
Ph.D. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

9. Angelo Cangialosi (November 2013 – May 2018)
B.S.: Biochemistry, Boston College, 2010
Ph.D., Chemical and Biomolecular Engineering, Johns Hopkins University, 2018

10. Joshua Fern (November 2012 – May 2017)
“Design and Applications of DNA-Based Devices for Self-Assembly, Molecular Cicuits and Soft Materials”
B.S.: Chemical Engineering and Chemistry, University of Wisconsin, 2012
Ph.D, Chemical and Biomolecular Engineering, Johns Hopkins University, 2017

9. John Zenk (November 2012- December 2016)
“Engineering DNA-Based Self-Assembly Systems to Produce Nanostructures and Chemical Patterns"
B.S.: Chemical Engineering, University of Colorado at Boulder, 2012
*Ph.*D.: Chemical and Biomolecular Engineering, Johns Hopkins University, 2016

10. Dominic Scalise (July 2012 – September 2018)
B.S.: Mechanical Engineering, University of California, Berkeley, 2011
Ph.D., Chemical and Biomolecular Engineering, Johns Hopkins University

11. Abdul M. Mohammed (November 2011 – October 2016)
"Environmentally Adaptive and Hierarchical Self-Assembly of DNA Nanostructures"
B.T. and M.T.: Biotechnology, Indian Institute of Technology, 2011
*Ph.*D.: Chemical and Biomolecular Engineering, Johns Hopkins University, 2016

Masters Students

1. Madeline Noble (October 2018 – present)
B.S. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University
M.S.E. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

2. Yi Xiao (October 2018 – present)
B.S.: Applied Chemistry, University of Science and Technology Beijing, Beijing, China
M.S.: Environmental Technology and Engineering, Ghent University, Ghent, Belgium
M.S.E. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

3. Wenlu Wang (September 2017 – May 2019)
B.S.: Light Chemical Engineering, Sichuan University, Chengdu, China
M.S.E., Chemical and Biomolecular Engineering, Johns Hopkins University

4. Misha Rubanov (September 2017 – January 2019)
B.S.: Biomedical Engineering, University of Texas, Dallas
M.S.E., Chemical and Biomolecular Engineering, Johns Hopkins University

5. Artun Hoscan (November 2016 – May 2018)
"Indication of Direction and Intensity of Flowrate using DNA Nanotubes."
B.S.: Chemical Engineering and Cell Biology and Neuroscience, Rutgers University
M.S.E., Chemical and Biomolecular Engineering, Johns Hopkins University

6. Ruoyu Jiang (November 2016 – May 2018)
"Dynamic Control of DNA Nanotube Self-Assembly Processes."
B.A.: Chemical and Biomolecular Engineering, Georgia Institute of Technology, 2016
M.S.E., Chemical and Biomolecular Engineering, Johns Hopkins University

7. Xinyu Cui (October 2016 – May 2019)
B.S., Pharmacy, Sun Yat-Sen University, 2014
M.Eng., Chemical Engineering, Oregon State University, 2016
M.S.E. candidate, Chemical and Biomolecular Engineering, Johns Hopkins University

8. Seth Reinhart (September 2016 – May 2017)
"Characterizing DNA nanotube nucleation at a variety of temperatures and monomer concentrations."
B.S.: Chemical and Biomolecular Engineering, Johns Hopkins University, 2016.
M.S.E., Chemical and Biomolecular Engineering, Johns Hopkins University

9. Qi Huang (November 2015 – August 2017); (Masters Thesis Defense date: summer 2017).
"Specific DNA Sequence Responsive DNA Crosslinked Hydrogel and its Application"
B.S.: Chemical Engineering, Tianjin University, 2015

M.S.E., Chemical and Biomolecular Engineering, Johns Hopkins University

Rotation Students

1. Jessica Dunn (December 2018 – February 2019)
   CBI Ph.D. student

Undergraduate Research Assistants (* = published a peer-reviewed paper in the group)

1. David Sheng, Chemical and Biomolecular Engineering, 2019 - present
2. Tiffany Hou, Chemical and Biomolecular Engineering, 2018 - present
3. Paul Vallejo, Chemical and Biomolecular Engineering, 2018 - present
4. Marc Bordui, Chemical and Biomolecular Engineering, 2018 - present
5. Ruby Liu, Biomedical Engineering, 2018 – present
6. Paroma Mukhopadhay, Biomedical Engineering, 2018 - present
7. Colton Hebert, Chemical and Biomolecular Engineering, 2017
8. Zoya Khan, Molecular and Cell Biology, Johns Hopkins, 2017 – 2018
9. Ronan Perry, Biomedical Engineering, Johns Hopkins, 2017 - present
10. Pragya Singh, Chemical and Biomolecular Engineering, Johns Hopkins, 2017 – 2019
11. Jasen Zhang, Chemical and Biomolecular Engineering, Johns Hopkins, 2017 – present
12. Jenna Jacobs, Chemical and Biomolecular Engineering, Johns Hopkins, 2017 – 2018
13. Jonathan Gunn, Chemical and Biomolecular Engineering, Johns Hopkins, 2017 – present
14. Natalie Kelly, Chemical and Biomolecular Engineering, Johns Hopkins, 2017 – 2018
15. Madeline Noble, Chemical and Biomolecular Engineering, Johns Hopkins, 2017 – 2018
16. Anusha Patel, Chemical and Biomolecular Engineering, Johns Hopkins, 2016 – 2019
17. Oliver Hickson, Chemical and Biomolecular Engineering, Johns Hopkins, 2016 – 2018
18. Joanna Schneider, Chemical and Biomolecular Engineering, Johns Hopkins, 2016 – 2018
19. Nisita Dutta, Chemical and Biomolecular Engineering, Johns Hopkins, 2015 - 2018
20. Benjamin Kaminow, Chemical and Biomolecular Engineering, Johns Hopkins, 2015 – 2016
21. Eric Rothchild, Materials Science and Engineering, Johns Hopkins, 2015 – 2016
22. Matthew Billups, Chemical and Biomolecular Engineering, Johns Hopkins, 2015 – 2016
23. Shuheng (Kathy) Wang, Chemical and Biomolecular Engineering, Johns Hopkins, 2015-2016
24. Jiaqi (Judy) Wang, Biomedical Engineering, Johns Hopkins, 2015-2016
25. Jiayao (Katherine) Wu, Chemical and Biomolecular Engineering, 2014-2016
26. *Leo Potters, Chemical and Biomolecular Engineering, Johns Hopkins, 2014 - 2018
27. *Jennifer Lu, Chemical and Biomolecular Engineering, Johns Hopkins, 2014-2016
28. *Allison Chisenhall, Chemical and Biomolecular Engineering, 2014 - 2015
29. Seth Reinhart, Chemical and Biomolecular Engineering, 2014 – 2016
30. *Dylan Howie, Chemical and Biomolecular Engineering, Johns Hopkins, 2014 - 2016
31. *Tyler Jorgenson, Chemical and Biomolecular Engineering, Johns Hopkins, 2014 – 2016
32. Tanner Liechty, Chemical and Biomolecular Engineering, 2014
33. Joshua Scaralia, Chemical and Biomolecular Engineering, 2014
34. *Chanon Tuntivate, Chemical and Biomolecular Engineering, Johns Hopkins, 2013 – 2015
35. *Ariana Cruz, Chemical and Biomolecular Engineering, Johns Hopkins, 2013 – 2016
36. James Moxley, Chemical and Biomolecular Engineering, 2013
37. *Kaiyuan Wang, Chemical and Biomolecular Engineering, Johns Hopkins, 2012 - 2016

High-School Researchers

1. Elizabeth Jelezniakov, Baltimore Polytechnic Institute, Baltimore, Maryland, Spring 2017-present

2. Chad Fisher, Pikesville High School, Pikesville, Maryland, Summer 2016 and Summer 2017
3. Ceida Portillo, Western High School, Baltimore, Maryland, Spring 2016

Research Volunteers

1. Jon Millburn, engineering professionals masters program, 2017-present
2. Alexander Baca, engineering professionals masters program, 2017-present
3. Stephen Salaz, engineering professionals masters program, 2016-present

XII. Presentations

Invited Presentations at Meetings and Conferences

1. To be determined. 2nd European Conference on Cell-Free Synthetic Biology (ECCSB), Raitenhaslach, Germany. May 2020.

2. To be determined. Cell Free Systems Conference, Boston, Massachusetts, December 2019.

3. "Self-Regulating DNA Assembly Processes," Gordon Research Conference on Supramolecular Chemistry and Self-Assembly over Multiple Scales and Forms, Les Diablerets, Switzerland, May 2019.

4. "Chemomechanics with polymer-co-DNA hydrogels," American Physical Society, Boston, Massachusetts, March 2019.

5. "Materials that compute with biochemistry," Materials that Compute Workshop, Raleigh, North Carolina, March 2019..

6. "Building *in vitro* transcriptional regulatory architectures by integrating multiple functional circuit motifs," 12th Annual Genomics and Bioinformatics Symposium, Johns Hopkins University, October 2018

7. "Biomolecular controllers for active soft materials," 9th International Wyss Institute Symposium on "Molecular Robotics." Harvard University, Cambridge, Massachusetts, September 2018.

8. "Using biomolecules to trigger hydrogel shape change," Gel Symposium 2018, Yamagata University, Yamagata, Japan, August 2018.

9. "Could we build a biochemical operating system?", Gordon Research Conference on Systems Chemistry, Newry, Maine, July 2018

10. "Soft Materials Controlled by Biomolecules and Biomolecular Circuits," Gordon Research Conference on Biologically Inspired Materials, Les Diablerets, Switzerland, June 2018

11. "Point-to-point assembly, healing and selective melting of DNA nanotubes," 26th American Association of Crystal Growth and Epitaxy Western Section Conference on Crystal Growth & Epitaxy. West Lake Tahoe, Nevada, June 2018.

12. "Self-assembling circuit connections with biomolecules", Functional Supramolecular Systems Symposium, CUNY Advanced Research Science Center, New York, New York, May 2018

13. “Embedding Biomolecular Sensing, Self-Direction and Adaptation into Biomaterials”, Johns Hopkins Institute for Nanobiology 12th Annual Symposium, Baltimore, Maryland, May 2018

14. “Two-Dimensional DNA Computation” DNA Computing and Molecular Programming 23, Austin, Texas, September 2017

15. “Dynamic, Reconfigurable Materials Made with DNA” American Chemical Society Annual Meeting and Exposition, Self-Assembly & Non-Covalent Interactions: The Fundamental Science of Supramolecular Materials, Washington, D.C., August 2017

16. “Resilient Hydrogels from the Nanoscale to the Macroscale”, Department of Energy Biomolecular Materials Program Principal Investigators Meetings, Gaithersburg, Maryland, August 2017

17. “Biomolecular circuits for controlling materials”, Synthetic Biology, Engineering, Evolution, and Design (SEED), Vancouver, British Columbia, Canada, June 2017

18. “Making Materials into Robots with Synthetic Biology”, Scientific and Technological Challenges in Defining a New Paradigm for Sustainable Biomaterials Workshop, Manchester, Great Britain, May 2017

19. “Far-from-Equilibrium Strand Displacement Circuits for Controlling Materials”, 1st European Conference on Cell-Free Synthetic Biology (ECCSB), Locarno, Switzerland, March 2017

20. “Active Control of Complex, Multicomponent Self-Assembly Processes”, Organization of Soft Materials Far from Equilibrium Session, American Physical Society Annual Meetings, New Orleans, Louisiana, March 2017

21. “DNA Circuits for Programming Hydrogel Shape and Pattern,” Gordon Research Conference on Complex Adaptive & Adaptive Material Systems, Ventura, California, January 2017

22. “Isothermal Control of DNA Nanostructure Self-Assembly and Reconfiguration,” Gordon Research Conference on RNA Nanotechnology, Ventura, California, January 2017

23. “Large-scale ordered nucleic acid self-assembly processes,” Semiconductor Research Council (SRC) Semiconductor / Synthetic Biology (Semi-SynBio) Workshop, November 2016

24. “Programmable, Chemically Mediated Control of Hydrogel Patterning and Mechanical Response” Bionanotechnology plenary, American Institute of Chemical Engineers annual meeting (AIChE), San Francisco, California, November 2016

25. “From One, Many: Multiscale Reconfigurable Materials Built with DNA,” DNA Computing 22, Munich, Germany, September 2016

26. “Kinetic Engineering of DNA Self-Assembly Processes,” American Chemical Society, Philadelphia, Pennsylvania, August 2016

27. “Self-Assembling Adaptive Structures with DNA” Unconventional Computation and Natural Computation, Manchester, United Kingdom, June 2016

28. “Programmed Self-Organization of Synthetic Biomolecular Filaments,” Frontiers at the Interface of Chemistry and Biology, Baltimore, Maryland, May 2016

29. “Toward Synthetic Organelles via Nucleic Acid Assembly,” Johns Hopkins University and University of Maryland Baltimore Polycystic Kidney Disease Mini-Workshop, April 2015

30. “Toward Synthetic Organelles via Nucleic Acid Assembly,” RNA Nanobiology Workshop, National Institutes of Health, Gaithersburg, Maryland, March 2016

31. “Origami as the Seeds of Replicators and Adaptive Networks,” Ten Years of DNA Origami Workshop, Caltech, Pasadena, California, March 2016

32. “Point-to-point assembly of DNA nanotubes,” The Molecular Programming Project Workshop, University of Washington, Seattle, Washington, January 2016

33. “Designing Self-Organizing Filament Architectures Using DNA Nanotubes,” The Berkeley Statistical Mechanics Mini-Meeting, Berkeley, California, January 2016

34. “Self-Assembly of Adaptive Form Across Scales,” Dagstuhl Workshop on Self-Organization and Biology, Dagstuhl, Germany, October 2015

35. “Programmable Dynamic Assembly of DNA Nanostructures,” Department of Energy Biomolecular Materials Program PI Meeting, Gaithersburg, Maryland, August 2015

36. “Ubiquitous Chemical Computation: Turing’s Other Legacy,” Workshop on Computation at the Computability in Europe Conference, Budapest, Romania, June 2015

37. “DNA Nanotubes as Components for Self-Wiring and Dynamic Organization,” Foundations of Nanoscience, Snowbird, Utah, April 2015

38. “Software for Matter: Programming the Morphogenesis, Replication and Metamorphosis of Everyday Things,” The Turing Centenary Research Project Second Workshop, New York, New York, May 2014

39. “Modular Reaction-Diffusion Programs for Complex Pattern Formation,” NSF Workshop on Self-Organizing Particle Systems, Portland, Oregon, January 2014

40. “Understanding robust chemical information flow *via* design,” Origins 2013, Dresden, Germany, July 2013 Max Planck Institute of Molecular and Cell Biology

41. “Ordering Self-Assembly Processes as a Principle for Rational Design and Scaling,” Workshop on the Programmable Self-Assembly of Matter, New York, New York, June–July 2013

42. “Modular Reaction-Diffusion Processes for Multiscale Pattern Formation,” Computability in Europe, Mind, Mechanism and Mathematics Workshop in Honor of Alan Turing, Milan, Italy, June 2013

43. “Ordering Complex DNA Self-Assembly Processes,” Gordon Conference on Liquid Crystals Bidderford, Maine, June 2013

44. “Molecular Algorithms for Learning and Morphogenesis,” Workshop on Algorithms and the Natural Sciences, Princeton University, Princeton New Jersey, May 2013

45. “Design of living DNA tile assembly processes,” CECAM Workshop on Self-Assembly, Ecole Fédérale Polytechnique de Lausanne (EPFL), Lausanne, Switzerland, March 2013

46. “Autonomously Evolving Nanosystems : Designing Molecules to Design Themselves,” Genetic and Evolutionary Computation Conference, Keynote Lecture, Dublin, Ireland, July 2011 (Keynote lecture)

47. “Programming a Chemical Sequence Replicator using Modular Parts,” Molecular Programming Project Workshop, Friday Harbor, Washington, June 2011

48. “Nanobreadboards and Self-Orienting Polymers: An Introduction to (Synthetic) DNA Nanotechnology,” Golden Gate Polymer Forum, Mountain View, California, October 2010

49. “Self-Assembly of Interconnects in Two and Three Dimensions with Terminal Location Uncertainty,” Molecular Foundry User Meeting, Berkeley, California, October 2010

50. “Self-Assembly of Interconnects in Two and Three Dimensions with Terminal Location Uncertainty,“ Gordon Conference on Nanofabrication, Tilton, New Hampshire, July 2010

51. “Enzyme-Free Chemical Sequence Replication and Evolution,” Chemical Emergence 2.0, Anchorage, Alaska, June 2009

52. “Self-Replication and Evolution of Crystal Sequences,” Caltech Self-Replicating Chemical Systems Workshop, August 2007

53. “The Self-Replication and Evolution of DNA Crystals,” Workshop on Embodied Evolution, Venice, Italy, May 2007

XIII. Invited Presentations at Universities and Companies

1. To be determined, Chemistry seminar, Brandeis University, November 2019.

2. “In vitro synthetic biology for building dynamic materials,” Cold Spring Harbor Laboratory, July 2019

3. “Self-Assembling Dynamic, Adaptive Circuits with Biomolecules,” Mind *In Vitro* Seminar Series, University of Illinois Urbana Champaign, October 2018

4. “Sensing and assembling biomolecules to fold and swell soft materials,” Bioengineering Seminar, Princeton University, October 2018

5. “Soft materials controlled by (bio)molecular circuits,” Northrop Grumman Microsystems Lecture,

University of Maryland, March 2018

6. "Stimulus-responsive materials controlled by DNA signals and circuits," Chemical and Biomolecular Engineering Department Seminar, Columbia University, September 2017

7. "Programmable autonomous materials from DNA," Chemical and Biomolecular Engineering Department Seminar, Johns Hopkins University, May 2017

8. "Self-Assembly of DNA Structures for Microelectronics," Mission Systems University Research Symposium, Northrop Grumman. Arlington, Virginia, April 2017.

9. "Dynamical, Reconfigurable Materials and Nanostructures Built with DNA," Chemical Engineering and Materials Science Department Seminar, University of California Irvine, January 2017

10. "Dynamical, Reconfigurable Materials and Nanostructures Built with DNA," Chemistry and Biochemistry Seminar, University of Arizona, November 2016

11. "Toward Robotic Materials Build with Molecules," Laboratory for Computational Sensing and Robotics (LCSR) seminar, Johns Hopkins University, Baltimore, Maryland, September 2016

12. "Studying Self-Replication and Adaptive Self-Assembly with DNA Hybridization-Driven Self-Assembly," Statistics Physics Seminar, University of Maryland College Park, Maryland, March 2016

13. "Coupling DNA Reactions and Diffusion for Self-Assembling Complex Structures and Patterns." Chemical Engineering, New York University, New York, New York, February 2016

14. "Adaptive Self-Assembly of DNA Nanotube Interconnects", Chemistry, Brigham Young University, Provo, Utah, November 2015

15. "Coupling DNA Reactions and Diffusion for Self-Assembling Complex Structures and Patterns", Widely Applied Mathematics Seminar, Harvard University, Cambridge, Massachusetts, April 2015

16. "Programmed biomolecular pattern formation from the nanoscale up", Department of Molecular Biology and Genetics, Johns Hopkins School of Medicine, Baltimore, Maryland, November 2012

17. "The Computational Power of Chemical Reaction Networks (or What Makes a Group of Molecules a Cell)", Department of Computer Science, University of Maryland, College Park, Maryland, May 2012

18. "The Computational Power of Chemical Reaction Networks (or What Makes a Group of Molecules a Cell)", Department of Computer Science, Johns Hopkins University, Baltimore, Maryland, April 2012

19. "There's Plenty of Room at the Bottom: Molecular Robotics and Construction", Laboratory for Computational Sensing and Robotics, Johns Hopkins University, Baltimore, Maryland, February 2012

20. "Bottom-up assembly at the nanoscale with structural DNA nanotechnology", Nanoscience Group, Environmental Engineering, Johns Hopkins University, Baltimore, Maryland, February 2012

21. “How Complex is Crystal Growth?” Condensed Matter Physics, Johns Hopkins University, Baltimore, Maryland, October 2011

22. “Synthesizing Complex Chemical Machinery with DNA,” Chemistry and Biochemistry, University of Maryland College Park, Maryland, September 2011

23. “Synthesizing Biomolecular Systems and Information Processing Machinery with DNA,” Max Planck Institute of Intelligent Systems, Stuttgart, Germany, March 2011

24. “Synthesizing Biomolecular Systems and Information Processing Machinery with DNA”, Joint Chemistry and Electrical Engineering Seminar, Columbia University, New York, New York, March 2011

25. “Synthesizing Biomolecular Systems and Information Processing Machinery with DNA”, Chemical and Biomolecular Engineering / Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, Pennsylvania, March 2011

26. “What makes a bunch of molecules a cell: The power of chemical reaction networks”, Computer Science, University of Southern California, Los Angeles, California, February 2011

27. “Exploring Biological Self-Assembly Principles through Design”, Physics, University of Pennsylvania, Philadelphia, Pennsylvania, February 2011

28. “Exploring Principles of Biological Self-Assembly by Design”, Mechanical Engineering, University of California Santa Barbara, Santa Barbara, California, January 2011

29. “Programming Materials to Self-Replicate and Assemble into Adaptive Geometries,” School of Engineering, University of Southern California, Los Angeles, California, September 2010

30. “Programming Materials to Self-Replicate and Assemble into Adaptive Geometries,” Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, September 2010

31. “Programming Materials to Self-Replicate and Assemble into Adaptive Geometries,” Engineering Seminar, University of Southern California, Los Angeles, California, September 2010

32. “Towards Synthetic Molecular Machinery of Biological Complexity,” Chemical Engineering, California Institute of Technology, Pasadena, California, March 2010

33. “How Complex is Crystal Growth,” Condensed Matter Physics, University of Pennsylvania, Philadelphia, Pennsylvania, March 2010

34. “Self-Replicating, Self-Designing Devices,” Electrical Engineering, Columbia University, New York, New York, March 2010

35. “Self-Replicating, Self-Designing Devices,”, Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, Maryland, February 2010

36. "Towards Synthesizing a Living Material," Computer Science, University of Washington, Seattle, Washington, February 2008

37. "Synthesizing Life? The Self-Replication and Evolution of DNA Crystals," Computer Science, University of Nottingham, September 2007.

38. "Self-Replication and Evolution of DNA Crystals," Weizmann Institute, Rehovot Israel, July 2005

XIV. Contributed Presentations at Meetings and Conferences *(*Presenter; §poster)*

1. Phillip Dorsey* and Rebecca Schulman. "DNA-based Attractor Patterns", Material Research Society 2019 Conference, Phoenix, Arizona, April 2019

2. Misha Rubanov* and Rebecca Schulman. "Spatiotemporal Release of Oligonucleotides for Soft Material Programming", Material Research Society 2019 Conference, Phoenix, Arizona, April 2019

3. *§* Michael Pacella and Rebecca Schulman. "Characterizing DNA nanotube networks assembled via Y-junction DNA origami seeds", Biophysical Society Meeting, Baltimore, Maryland, March 2019

4. *§* Phillip Dorsey* and Rebecca Schulman. "Self-healing DNA-based reaction-diffusion patterns", Biophysical Society Meeting, Baltimore, Maryland, March 2019

5. Samuel Schaffter* and Rebecca Schulman. "Synthetic integrated *in vitro* transcriptional regulatory networks", Biophysical Society Meeting, Baltimore, Maryland, March 2019

6. *§* Yi Li* and Rebecca Schulman. "Molecular transport through self-assembled DNA nanofluidic channels", Biophysical Society Meeting, Baltimore, Maryland, March 2019

7. *§* Naresh Dhanasekar* and Rebecca Schulman. "Ion-transport through large diameter DNA origami nanotube channels across synthetic membranes", Biophysical Society Meeting, Baltimore, Maryland, March 2019

8. *§* Naresh Dhanasekar* and Rebecca Schulman. "Unlocking the secret of DNA nanostructures in synthetic membranes", Johns Hopkins Institute for Nanotechnology 12th Annual Symposium Foundations of Nanoscience, Baltimore, Maryland, May 2018.

9. *§* Philip Dorsey*, Dominic Scalise and Rebecca Schulman. "Forming and Regenerating Oligonucleotide Gradients within Soft Materials", Johns Hopkins Institute for Nanotechnology 12th Annual Symposium Foundations of Nanoscience, Baltimore, Maryland, May 2018.

10. *§* Yi Li* and Rebecca Schulman. "DNA nanostructures that self-heal in serum." Johns Hopkins Institute for Nanobiology 12th Annual Symposium Foundations of Nanoscience, Baltimore, Maryland, May 2018.

11. Sisi Jia, Siew Cheng Phua, Yuta Nihongaki, Yizeng Li, Michael Pacella, Sean Sun, Takanari Inoue, Rebecca Schulman*. "Measuring flow rates at the cell surface with micron-scale DNA devices." Foundations of Nanoscience, Salt Lake City, Utah, April 2018.

12. ***§*** Sisi Jia*, Siew Cheng Phua, Takanari Inoue, Rebecca Schulman. "Attachment of DNA nanotubes to specific mammalian cell receptors with control over orientation." Foundations of Nanoscience, Salt Lake City, Utah, April 2018.

13. ***§*** Yi Li* and Rebecca Schulman. "DNA nanostructures that self-heal in serum." Foundations of Nanoscience, Salt Lake City, Utah, April 2018.

14. Dominic Scalise* and Rebecca Schulman. "DNA oligonucleotide buffers," American Chemical Society National Meeting, New Orleans, Louisiana, March 2018.

15. Samuel Schaffter* and Rebecca Schulman. "An orthogonal genelet architecture for inducible state-switching of a bistable circuit." The 2nd Mid-Atlantic DNA Nanotechnology Conference, Gaithersburg, Maryland, December 2017.

16. ***§*** Dominic Scalise* and Rebecca Schulman. "Programming the Sequential Release of DNA." The 23rd Annual Conference on DNA Computing and Molecular Programming, Austin, Texas, September 2017.

17. Samuel Schaffter and Rebecca Schulman. "An orthogonal genelet architecture for inducible state-switching of a bistable circuit." The 23rd Annual Conference on DNA Computing and Molecular Programming, Austin, Texas, September 2017.

18. ***§*** Samuel Schaffter*, Abdul Mohammed, Tyler Jorgenson and Rebecca Schulman. "DNA nanostructures for scalable bottom-up assembly of advanced materials and devices." Mission Systems University Research Symposium, Northrop Grumman. Arlington, Virginia, April 2017.

19. Angelo Cangialosi, Chang Kyu Yoon, Qi Huang, David Gracias and Rebecca Schulman*. "Programming Hydrogel Shape with DNA signals" Foundations of Nanoscience, Salt Lake City, Utah, April 2017.

20. ***§*** Angelo Cangialosi*, Chang Kyu Yoon, Qi Huang, David Gracias and Rebecca Schulman. "Programming Hydrogel Shape with DNA signals" Foundations of Nanoscience, Salt Lake City, Utah, April 2017.

21. ***§*** Joshua Fern*, Angelo Cangialosi and Rebecca Schulman. "Modular DNA Strand-Displacement Controllers for DNA-Crosslinked Hydrogel Expansion" Foundations of Nanoscience, Salt Lake City, Utah, April 2017.

22. ***§*** Dominic Scalise* and Rebecca Schulman. "A DNA Strand Displacement Proportional Controller", Gordon Research Conference on Complex Adaptive & Adaptive Material Systems, Ventura, California, January 2017

23. ***§*** Philip Dorsey*, Dominic Scalise and Rebecca Schulman. “Forming and Regenerating Oligonucleotide Gradients within Soft Materials”, Gordon Research Conference on Complex Adaptive & Adaptive Material Systems, Ventura, California, January 2017

24. ***§*** Samuel Schaffter* and Rebecca Schulman. “A Modular Architecture for Dynamic, Environmentally Adaptive DNA Nanostructures”, *Materials Research Society 2016*, Boston, Massachusetts, December 2016

25. Abdul M. Mohammed* and Rebecca Schulman. “Environmentally Adaptive and Hierarchical Self-Assembly of DNA Nanostructures,” Molecular Foundry, November 2016

26. Abdul M. Mohammed* and Rebecca Schulman. “Environmentally Adaptive and Hierarchical Self-Assembly of DNA Nanostructures,” Nanotechnology for Energy, Healthcare and the Environment-focused 12th Annual Fall Symposium. Santa Clara, California, November 2016

27. Abdul M. Mohammed* and Rebecca Schulman. “Adaptive, Point-to-Point Assembly of DNA Nanotubes Between Molecular Landmarks,” American Institute of Chemical Engineers (AIChE) Annual Meeting, San Francisco, California, November 2016

28. ***§*** Rebecca Schulman*. “Self-Targeting Biotic-Abiotic Interfaces,” Department of Advanced Research Projects Administration (DARPA) Young Faculty Award Kickoff Meeting, Arlington, Virginia, October 2016

29. ***§*** Angelo Cangialosi*, Chang Kyu Yoon, Jiayu Liu, Qi Huang, Thao D. Nguyen, David H. Gracias and Rebecca Schulman. “Programmable High-Degree Expansion of DNA Co-polymer Gels”, Society of Engineering Science 2016, College Park, Maryland, October 2016

30. ***§*** Dominic Scalise* and Rebecca Schulman. “Stored-Program Chemical Computing with Reaction-Diffusion Wires,” DNA Computing 22, Munich, Germany, September 2016

31. ***§*** Dominic Scalise and Rebecca Schulman, “A DNA Strand Displacement Proportional Controller”, DNA Computing 22, Munich, Germany, September 2016

32. John Zenk, Joshua Fern and Rebecca Schulman*. “Thermodynamics and kinetics of Watson-Crick base pairing driven assembly of origami nanostructures,” American Chemical Society Annual Meeting, Philadelphia, Pennsylvania, August 2016

33. John Zenk, Joshua Fern and Rebecca Schulman*. “DNA Origami Self-Assembly into Superstructures Via Explicit Characterization and Optimization of the Thermodynamics and Kinetics of the Assembly Process” American Institute of Chemical Engineers (AIChE) Annual Meeting, Salt Lake City, Utah, November 2015

34. ***§*** Deepak Agrawal*, Abdul M. Mohammed, Seth Reinhart, Tyler Jorgenson and Rebecca Schulman. “Dynamic control of DNA Tile Nanotube Nucleation and Elongation”, DNA Computing and Molecular Programming, Boston, Massachusetts, August 2015

35. ***§*** Dominic Scalise, John Zenk, Kaiyuan Wang, Ariana Cruz and Rebecca Schulman. "Stable DNA Reaction-Diffusion Patterns", DNA Computing and Molecular Programming, Boston, Massachusetts, August 2015

36. Deepak Agrawal*, Elisa Franco and Rebecca Schulman. "A Self-Regulating Comparator for Processing Oscillatory Signals", American Controls Conference, Chicago, Illinois, July 2015

37. ***§*** Josh Fern* and Rebecca Schulman. "The Energy Landscape for the Self-Assembly of a 2-Dimensional DNA Origami Complex", ACS Colloids and Surface Science, Pittsburgh, Pennsylvania, June 2015

38. ***§*** John Zenk*, Chanon Tuntivate and Rebecca Schulman. "A Systematic Method for Designing DNA Self-Assembly Processes", ACS Colloids and Surface Science, Pittsburgh, Pennsylvania, June 2015

39. ***§*** Dominic Scalise, Dylan Howie and Rebecca Schulman. "Synthetic DNA Delay Circuits for Temporal Coordination", Synthetic Biology, Engineering, Evolution and Design, Boston, Massachusetts, June 2015

40. Dominic Scalise and Rebecca Schulman*. "Powered DNA Strand Displacement Circuits for Continuous Environmental Monitoring and Memory," Synthetic Biology, Engineering, Evolution and Design, Boston, Massachusetts, June 2015

41. ***§*** Abdul M. Mohammed* and Rebecca Schulman, "Building Connections Between Terminals with Location Uncertainty Using DNA Nanotubes", Biophysical Society Annual Meeting, Baltimore, Maryland, February 2015

42. ***§*** John Zenk*, Chanon Tuntivate and Rebecca Schulman. "A Systematic Method for Designing DNA Self-Assembly Processes", Biophysical Society Annual Meeting, Baltimore, Maryland, February 2015

43. ***§*** Dominic Scalise* and Rebecca Schulman, "Powered DNA Logic Circuits", Biophysical Society Annual Meeting, Baltimore, Maryland, February 2015

44. ***§*** Dominic Scalise* and Rebecca Schulman, "Powered DNA Logic Circuits," Molecular Programming Project 2015 Meeting, San Francisco, California, January, 2015

45. ***§*** Joshua Fern*, Dong-Hwee Kim, Denis Wirtz and Rebecca Schulman, "DNA nanostructures as a nanometer-scale substrate for controlling cell adhesion," American Society for Cell Biology, Philadelphia, Pennsylvania, December 2014

46. Dominic Scalise* and Rebecca Schulman. "Emulating Cellular Automata in Chemical Reaction-Diffusion Networks", The 20th Workshop on DNA Computing and Molecular Programming, Kyoto, Japan, September 2014

47. Dominic Scalise***** and Rebecca Schulman. ""Modular Reaction-Diffusion Programs for Complex Pattern Formation," " NSF Workshop on Computing with Biomolecules: From Network Motifs to Complex and Adaptive Systems, New York, New York, July 2014

48. Rebecca Schulman*. “Hierarchical Self-Assembly of DNA Nanotube-Based Structures”, Mid-Atlantic DNA Nanotechnology Symposium. Baltimore, Maryland, July 2014

49. ***§***John Zenk* and Rebecca Schulman. “Design principles for accelerating the high-yield self-assembly of biomolecular complexes,” ACS Colloids and Surfaces 2014 Annual Meeting, Philadelphia, Pennsylvania, July 2014

50. ***§*** Dominic Scalise* and Rebecca Schulman. “Modular Reaction-Diffusion Programs for Complex Pattern Formation,” Molecular Programming Project 2013 Annual Meeting, Oxnard, California, December 2013

51. Ankur Verma* and Rebecca Schulman. “Anisotropic Shrinkage of DNA Origami After a Wet-to-Dry Transition on Mica Surface,” American Institute of Chemical Engineers 2013 Annual Meeting, San Francisco, November 2013

52. Dominic Scalise and Rebecca Schulman*. “Programmed Reaction-Diffusion Processes for Patterned Release of Molecules,” American Institute of Chemical Engineers 2013 Annual Meeting, San Francisco, November 2013

53. Abdul M. Mohammed* and Rebecca Schulman. “Self-Assembling DNA Nanotubes from Programmable Seeds,” American Institute of Chemical Engineers 2012 Annual Meeting, Pittsburgh, Pennsylvania, October 2012

54. Abdul M. Mohammed and Rebecca Schulman*. “Designed DNA Nanotube Architectures”, American Institute of Chemical Engineers 2012 Annual Meeting, Pittsburgh, Pennsylvania, October 2012

55. Abdul M. Mohammed and Rebecca Schulman*. “Directed Growth of DNA tile nanotubes from self-assembled seed structures,” 244th American Chemical Society Annual Meeting, Philadelphia, Pennsylvania, August 2012

56. Rebecca Schulman*. Abdul M. Mohammed and Jan Liphardt. “Watching DNA Nanotubes Grow in Real Time,” ACS Colloids and Surface Science Symposium. Baltimore, Maryland, June 2012

57. Rebecca Schulman* “Watching DNA Tile Nanotube Nucleation and Polymerization in Real Time” Materials Research Society Symposium on DNA Nanotechnology. San Francisco, California, April 2012

58. ***§*** Rebecca Schulman* and Jan Liphardt. “Self-Assembly of Interconnects in Two and Three Dimensions with Terminal Location Uncertainty”, Gordon Conference on Nanofabrication Tilton, New Hampshire, July 2010

59. Rebecca Schulman* and Bernard Yurke. “There’s Plenty of Room at the Bottom: Algorithms for Automonous Molecular Devices”, Robotic Science and Systems VI. Univesidad de Zaragoza, Zaragoza, Spain, June 2010

60. Rebecca Schulman* and Erik Winfree. “Simple Evolution of Complex Crystal Species”, DNA Computing and Molecular Programming, the 16th Annual Conference. Hong Kong, China, June 2010

61. Rebecca Schulman*, Bernard Yurke and Erik Winfree “Nonbiological Sequence Replication and Evolution”, Foundations of Nanoscience Annual Workshop, Snowbird, Utah, April 2009

62. Rebecca Schulman* and Erik Winfree. “Synthesis of Crystals with a Programmable Kinetic Barrier to Nucleation,” American Chemical Society Fall Meeting. Boston, Massachusetts, August 2007

63. Rebecca Schulman* and Erik Winfree. “Programmable Control of Nucleation for Algorithmic Self Assembly”, 10th International Workshop on DNA Computing. Milan, Italy, June 2004

XV. Professional Activities

Sessions Chaired

1. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2017.
2. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials, November 2016 (with Esmaiel Jabbari).
3. Gordon Research Conference on Bioinspird Materials, Discussion Leader, Adaptive Design of Materials, Les Diablerets, Switzerland, June 2016.
4. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2016.
5. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials, November 2015 (with Esmaiel Jabbari).
6. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2015.
7. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials; November 2014 (with Esmaiel Jabbari).
8. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2014.
9. American Institute of Chemical Engineers, Session Co-Chair, Self-Assembled Biomaterials; November 2013 (with Esmaiel Jabbari).
10. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2013.
11. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April 2012.
12. Foundations of Nanoscience Annual Conference, Chair, Principles and Theory of Self-Assembly, April
2011.

Conference organization and committee service

1. co-chair, Gordon Research Conference on Systems Chemistry, 2020

2. Vice-chair, Gordon Research Conference on Systems Chemistry, 2020

3. Program Committee Member, 22nd International Conference on DNA Computing and Molecular *Programming*, 2018

4. Materials Research Society Symposium Co-chair: "Biomolecules at interface, structure, function and characterization" (with Mingdong Dong, Shuai Zhang and Magali Lingenfelder), 2018

5. Unconventional Computation and Natural Computation Conference Program Committee, 2017

6. Program Committee Member, 22nd International Conference on DNA Computing and Molecular Programming, 2016

7. Program Committee Member, 21st International Conference on DNA Computing and Molecular Programming, 2015

8. Co-organizer (with Paul Paukstelis, University of Maryland), 1st Mid-Atlantic DNA Nanotechnology Symposium, 2014

9. Program Committee Member, 18th International Conference on DNA Computing and Molecular Programming, 2012

10. Organizing Committee, Miller Institute Symposium, 2009-2011

11. Co-Lead Organizer, Caltech Workshop on Self-Replicating Chemical Systems, 2007

Advisory and editorial boards

1. Advisory Board Member, *Advanced Biosystems* (October 2016-present)

Member of

American Institute of Chemical Engineers
American Chemical Society
American Physical Society
Biophysical Society
Editorial Board Member for the Journal of Self-Assembly and Molecular Electronics
Materials Research Society

XVI. Collaborators

Present:

Aleksei Aksimentiev, Ph.D., Department of Physics, University of Illinois Urbana-Champaign, Champaign, IL.
David Baker, Ph.D., Department of Biochemistry, University of Washington, Seattle, WA

Noah Cowan, Ph.D., Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD.

Andrew Ellington, Ph.D., Department of Biochemistry, University of Texas Austin, Austin, CA.

Elisa Franco, Ph.D., Department of Mechanical Engineering, University of California Riverside, Riverside, CA.

Joelle Frechette, Ph.D., Department of Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD.

Sharon Gerecht, Ph.D., Department of Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD

David Gracias, Ph.D., Department of Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD.

Takanari Inoue, Ph.D., Department of Cell Biology, Johns Hopkins Medical Institute, Baltimore, MD.

Eric Klavins, Ph.D., Department of Electrical Engineering, University of Washington, Seattle, WA.

Arvind Murugan, Ph.D., Department of Physics, University of Chicago, Chicago, IL.

Thao (Vicky) Nguyen, Ph.D., Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD.

Petr Sulc, Ph.D., Department of Physics, Arizona State University, Tempe, AZ.

Sean Sun, Ph.D., Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD.

Joshua Vogelstein, Ph.D., Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD.

Adam Woolley, Ph.D., Department of Chemistry, Brigham Young University, Provo, Utah.

Past:

Kai Loon Chen, Ph.D. Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, Maryland

David Doty, Ph.D., Department of Computer Science, California Institute of Technology, Pasadena, CA.

Rong Li, Ph.D., Department of Cell Biology, Johns Hopkins Medical Institute, Baltimore, MD.

Paul W.K. Rothemund, Ph.D., Department of Computing & Mathematical Sciences, California Institute of Technology, Pasadena, CA.

Georg Seelig, Ph.D., Department of Electrical Engineering, University of Washington, Seattle, WA.

Sean Sun, Ph.D., Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD.

Steven Whitelam, Ph.D., Theory of Nanostructured Materials Facility, Lawrence Berkeley National Lab, Berkeley, CA.

XVII. University service

A. Committee Service within the School of Engineering and Department

1. Member, Graduate Admissions Committee, Department of Chemical and Biomolecular Engineering, 2017–2018
2. Chair, Faculty Search Committee, Department of Chemical and Biomolecular Engineering, 2016–2017. Results: Hired Jamie Spangler
3. Member, Faculty Search Committee, Department of Chemical and Biomolecular Engineering, 2015–2016
4. Member, Faculty Search Committee, Department of Chemical and Biomolecular Engineering, 2014–2015
5. Member, Graduate Admissions Committee, Department of Chemical and Biomolecular Engineering, 2014–2015
6. Judge, Siebel Scholars, Department and Whiting School, 2014
7. Commencement Marshal, 2014
8. Chair, Seminar Committee, Department of Chemical and Biomolecular Engineering, 2013–2014
9. Faculty Forum Seminar Series Committee, Homewood Campus, 2013-2015
10. Junior faculty interviewer for research dean search, Whiting School of Engineering, 2013
11. Member, Vredenburg Scholarship Selection Committee, 2013
12. Member, Graduate Admissions Committee, Department of Chemical and Biomolecular Engineering, 2012–2013
13. Chair, Seminar Committee, Department of Chemical and Biomolecular Engineering,, 2012–2013
14. Member, Faculty Search Committee, Department of Chemical and Biomolecular Engineering, 2011–2012. Results: Chao Wang hired
15. Consulting Member, Faculty Search Committee Member LCSR, 2011–2012

B. Thesis Committees / Graduate Board Oral Committees

1. Sneha Suman, Masters Thesis Reader, Department of Chemical and Biomolecular Engineering, January 2019

2. Shourya Ray Berman, Ph.D. GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, October 2018

3. Dominic Scalise, Ph.D. GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, September 2018

4. Shannon Martello, Masters Thesis Reader, Department of Chemical and Biomolecular Engineering, July 2018

5. Aliya Lakhani, Masters Thesis Reader, Department of Chemical and Biomolecular Engineering, June 2018

6. Angelo Cangialosi, Ph.D. . GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, May 2018

7. Nash Rochman, Ph.D. GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, February 2018

8. Sarah Friedrich, Ph.D. GBO and Thesis Defense Committee Member, Department of Biomedical Engineering, January/March 2018

9. Elysia Gao, Masters Thesis Reader, Department of Chemical and Biomolecular Engineering, December 2017

10. Joseph Lubin, Masters Thesis Reader, Department of Chemical and Biomolecular Engineering, July 2017

11. Yumo Wang, Ph.D. GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, July 2017

12. Anna Coughlan, Ph.D. GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, July 2017

13. Qi Huang, Masters Thesis Reader, Department of Chemical and Biomolecular Engineering, June 2017

14. Nick Marze, Ph.D. GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, June 2017

15. Joshua Fern, Ph.D. GBO and Thesis Defense Committee Member, Department of Chemical and Biomolecular Engineering, May 2017

16. Chen Zhao, Ph.D. DBO Committee Member, Department of Biomedical Engineering, May 2017

17. Yuguang Yang, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, February 2017

18. John Zenk, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, December 2016

19. Abdul Mohammed, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, October 2016

20. Tanvi Schroff, Masters Thesis Reader, Department of Chemical and Biomolecular Engineering, April 2016

21. Sarite Koride, Ph.D. Thesis Committee Member, Department of Mechanical Engineering, November 2015

22. Barrett Steinberg, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, June 2015

23. Krishna Praneeth Kilambo, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, January 2015

24. Yi-An Lin, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, June 2014

25. Allison Chambliss, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, May 2014

26. Teena James, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, May 2014

27. Clay Wright, Ph.D. Thesis Committee Member, Department of Chemical and Biomolecular Engineering, March 2014

28. David Holland, GBO Committee Member, Department of Biomedical Engineering, September 2013

29. Daniel Wolozny, Masters Thesis Committee Member, Department of Chemical and Biomolecular Engineering, June 2013

30. Osman Yogertcu, GBO Committee Member, Department of Mechanical Engineering, February 2013

31. Matthew Moses, Ph.D. Thesis Committee Member, Department of Mechanical Engineering, August 2011

C. Masters co-sponsors in co-op programs

1. Sneja Suman, Masters Departmental Advisor (Chemical and Biomolecular Engineering), “Process Development: Maximizing Plasmid Production in Shake Flasks and Bioreactors,” Institute for Nanobiotechnology, MedImmune, September 2018-January 2019
2. Aliya Lakhani, Masters Departmental Advisor (Chemical and Biomolecular Engineering), “Screening for Antibody Reduction at the Clone Selection Stage to Prevent Reduction During Manufacturing.” Institute for Nanobiotechnology, MedImmune, January-June 2018

3. Shannon Martello, Masters Departmental Advisor (Chemical and Biomolecular Engineering), "Improving the Diagnosis of Blood Stream Infections with Becton Dickinson's BACTEC System." Institute for Nanobiotechnology, Becton-Dickinson, January-June 2018

XVIII. Journal and Conference Peer Review

2019: *ACS Nano, ACS Synthetic Biology, Advanced Intelligent Systems, Advanced Materials, Cell Proliferation, Cell Systems, Journal of the American Chemical Society, Nature Communications, Science Robotics, Proceedings of the National Academy of Sciences USA, Trends in Biotechnology*

2018: *ACS Nano, ACS Synthetic Biology, Analyst, Angewandte Chemie International Edition*, *Bioconjugate Chemistry, Chemical Reviews, Interface Focus, Journal of the American Chemical Society, Journal of the Royal Society Interface, Nanoscale, Nature, Nature Chemistry, Nature Materials, New Generation Computing, Proceedings of the National Academy of Sciences USA, Science Robotics, Scientific Reports, Small*

2017: *ACS Nano, ACS Synthetic Biology, Advanced Healthcare Materials, Angewandte Chemie International Edition, Chemical Science, Journal of the American Chemical Society, Journal of the Royal Society Interface, Nature, Nature Chemistry, Nature Communications, Nature Nanotechnology, Nucleic Acids Research, Science*

2016: *ACS Nano, ACS Synthetic Biology, Journal of the American Chemical Society, Journal of Physical Chemistry B, Journal of the Royal Society Interface, Nature, Nature Chemistry, Nature Nanotechnology, Nucleic Acids Research, Physical Chemistry, Sensors, Small*

2015: *ACS Biomaterials Science and Engineering, ACS Nano, ACS Synthetic Biology, Bioconjugate Chemistry, Biophysical Journal, Nature Chemistry, Small*

2014: *ACS Nano, Angewandte Chemie International Edition, Journal of the American Chemical Society, Nature, Nature Chemistry, Nature Communications*

2013: *European Physics Letters (EPL), Journal of Chemical Physics, Journal of Physical Chemistry C, Molecules, Natural Computing, Nature Communications, PLoS One*

2012: *ACS Nano, International Journal of Molecular Sciences, Nature, Nature Communications, Royal Society Interface Focus*

XIX. Classroom Teaching

Courses taught:

Fall 2018	540.305 Modeling and Statistical Analysis of Data for Chemical and Biomolecular Engineers; Enrollment: 49 students
Fall 2017	540.455 Current Topics in DNA Nanotechnology Practicum; Enrollment: 7 students
Fall 2017	540.305 Modeling and Statistical Analysis of Data for Chemical and Biomolecular Engineers; Enrollment: 54 students
Spring 2017	540.455 Current Topics in DNA Nanotechnology Practicum; Enrollment: 5 students
Spring 2017	540.405/605 The Design of Biomolecular Systems;

	Enrollment: 35 students
Fall 2016	540.305 Modeling and Statistical Analysis of Data for Chemical and Biomolecular Engineers; Enrollment: 74 students
Spring 2016	540.405/605 The Design of Biomolecular Systems; Enrollment: 18 students
Fall 2015	540.305 Modeling and Statistical Analysis of Data for Chemical and Biomolecular Engineers; Enrollment: 70 students
Fall 2014	540.305 Modeling and Statistical Analysis of Data for Chemical and Biomolecular Engineers; Enrollment: 66 students
Spring 2014	540.405/605 The Design of Biomolecular Systems; Enrollment: 21 students
Fall 2013	540.305 Modeling and Statistical Analysis of Data for Chemical and Biomolecular Engineers; Enrollment: 72 students
Spring 2013	540.405/605 The Design of Biomolecular Systems; Enrollment: 26 students
Fall 2011	540.449/649 Logic and Decision-making in Biomolecular Systems; Enrollment: 9 students

New courses developed:

540.111 Introduction to Programming for ChemBEs: Matlab Made Easy (with Dominic Scalise)
540.305 Modeling and Statistical Analysis of Data for Chemical and Biomolecular Engineers (complete course redesign from scratch)
540.405/605 The Design of Biomolecular Systems
540.449/649 Logic and Decision-making in Biomolecular Systems
540.455 Current Topics in DNA Nanotechnology Practicum