




ALBERT TIANXIANG LIU

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EDUCATION

- Anticipated May 2020 Ph.D., Chemical Engineering, Massachusetts Institute of Technology (GPA: 5.0/5.0) 
Thesis: *Engineering Low-Dimensional Materials for Electronics and Energy Applications*
Advisor: Michael S. Strano
- Anticipated May 2020 Graduate Education in Medical Sciences (GEMS), Harvard Medical School
- June 13, 2014 B.S. with honor, Chemical Engineering, California Institute of Technology (GPA: 4.0/4.0) 
Thesis: *Nickel-Catalyzed Asymmetric Alkylation of a-Halo Boronic Esters*
Advisors: Gregory C. Fu, John H. Seinfeld, and John D. Roberts
- May 20, 2012 B.A. with honor, Chemistry, Grinnell College, *Valedictorian* (GPA: 4.0/4.0) 

PROFESSIONAL EXPERIENCES

- 2018–19 **Graduate Programs Committee**, Office of Graduate Education, MIT Cambridge, MA
 - Evaluated proposals for the adoption and termination of graduate degree programs
 - Recommended to the Faculty candidates for advanced degrees
 - Served as the standing Faculty advisory body to the Vice Chancellor and the Vice President
- 2014 **Facilities Engineering Intern**, Chevron Energy Technology Company, Chevron U.S.A. Inc. Richmond, CA
 - **Invented** novel synthetic pathway to Zeolite SSZ-52, for next gen. engine exhaust clean-up
- 2011–12 **Chemistry Student Educational Policy Committee** Grinnell, IA
 - Served as a student-faculty liaison, provided inputs on curriculum and organized social events
 - Participated in faculty reviews, faculty hiring and promotions in the Chemistry Department

RESEARCH EXPERIENCES

- 2014– **Michael S. Strano** (*Material Science, Nanotechnology*) Cambridge, MA
Engineering Nano-Materials for Applications in Energy, and Micro-Robotics
 - Enhanced Thermopower Wave efficiency by **100** folds (featured in [MIT news](#), [Fox news](#)) | [EES \(2016\)](#)
 - Discovered Asymmetric Chemical Doping for liquid phase electricity harvesting | [AM \(2016\)](#) [JACS \(2017\)](#)
 - **Invented** Synthetic Cells – 2D-microparticles with digital memory ([MIT news](#)) | [NM \(2018\)](#)
 - **Invented** Thermal Resonator to harvest energy from thermal fluctuations ([MIT news](#)) | [NC \(2017\)](#)
 - Developed Colloidal Electronics ([MIT news](#), [Nature news](#), [Nature highlight](#), [IEEE](#)) | [NN \(2018\)](#)
- 2014 **Stacey I. Zones** (*Heterogeneous Catalysis, Zeolite Synthesis*) Richmond, CA
 - Generated a library of organic precursors, informed by computational design
 - Developed an economically viable synthetic strategy towards Zeolite SSZ-52 | [CM \(2016\)](#)
- 2012–14 **Gregory C. Fu** (*Organometallic Catalysis, Synthetic Organic Chemistry*) Pasadena, CA
 - Discovered a modular method to synthesize chiral organic compounds ([C&EN](#)) | [Science \(2016\)](#)
- 2013 **John H. Seinfeld** (*Applied Mathematics, Mathematical Modeling*)
 - Solved the pollutant-uptake modeling challenge in acid rain droplets | [AE \(2014\)](#)
- 2011–14 **John D. Roberts** (*Physical Organic Chemistry, NMR Spectroscopy*)
 - Developed a molecular tool to elucidate chelation structures in proteins | [OL \(2013\)](#) [JPC \(2014\)](#)
 - Quantified substituent effects on peptide-carboxylate Hydrogen bond strength | [JOC \(2013\)](#)

TEACHING EXPERIENCES

- 2019 **Teaching Development Fellowship**, MIT Cambridge, MA
Promote pedagogical development within the institute through a series of workshops
Organize and direct department-based resources and events aimed at developing TA's teaching skills

2018	Kaufman Teaching Certificate Program , MIT Teaching and Learning Laboratory Certificate program for MIT graduate students to develop skills for academic teaching	Cambridge, MA
2017-18	Lecturer , SPARK , SPLASH , HSSP , MIT Educational Studies Program MIT run program to teach middle and high school students (teaching profile) <ul style="list-style-type: none"> • (2018 Summer HSSP) Molecular Machines and Electronics – Industrial Revolution 5.0? • (2018 Spring SPARK, HSSP) How Do You Generate Electricity from Water? • (2017 Spring SPLASH) From Molecular Conformation to Nanotechnology, Energy and Medicine • (2017 Spring SPARK) Nanotechnology Enabled Artificial Cells 	Cambridge, MA
2016-18	Project Consultant , Chemical Engineering Projects Lab , MIT <ul style="list-style-type: none"> • Teach, train, and guide third-year undergraduates to design and conduct research projects 	Cambridge, MA
2010-19	Teaching Assistant <ul style="list-style-type: none"> • (2019) Chemical Reactor Engineering (Klavs F. Jensen, Michael S. Strano, MIT) • (2016) Analysis of Transport Phenomena (William M. Deen, Martin Z. Bazant, MIT) • (2014) Chemical Reaction Engineering (Frances H. Arnold, Caltech) • (2014) Separation Processes (John H. Seinfeld, Caltech) • (2012) Organic Chemistry I & II (Stephen R. Sieck, T. Andrew Mobley, Grinnell) • (2011) Classical Mechanics (Sujeev Wickramasekara, Grinnell) • (2010) Organic Chemistry Laboratory (James G. Lindberg, Grinnell) 	Pasadena, CA

AWARDS AND HONORS

2019	Individual Accomplishment Citation, Dept. of Chemical Engineering, MIT <i>“for his extraordinary hard work as a volunteer and representative for the department”</i>
2019	Outstanding Graduate Teaching Assistant Award (for 10.65 – Chemical Reaction Engineering), MIT <i>“for excellence in graduate teaching”</i>
2019	Teaching Development Fellowship , MIT
2018	Inorganic Materials Graduate Student Award (1st place), American Institute of Chemical Engineering <i>“for his contribution on electrical energy generation via reversible chemical doping”</i>
2018	PPG Polymer Engineering Award , Macromolecular Science & Engineering Symposium, University of Michigan
2018	Judge’s Choice (1st place team), Harvard Surgical Program in Innovation , Harvard Medical School
2017	Materials Research Society Graduate Student Award (Silver), Materials Research Society <i>“for particularly significant and timely research presented at the 2017 MRS Fall Meeting”</i>
2017	Electronic & Photonic Materials Graduate Student Award, finalist, American Institute of Chemical Engineering
2017	Outstanding Graduate Teaching Assistant Award (for 10.50 – Transport Phenomena), MIT <i>“in recognition of exemplary performance and service”</i>
2017	Goodwin Teaching Medal, finalist (nominated by Dept. of Chemical Engineering), MIT
2016	Carbon Nanomaterials Graduate Student Award (1st place), American Institute of Chemical Engineering <i>“for his contribution on Sustainable power sources based on high efficiency thermopower wave devices”</i>
2014	Presidential Graduate Fellowship, MIT
2014	Gordon Wu Fellowship (declined), Princeton University
2014	Merck Index Award, Caltech, sponsored by Merck & Co., Inc.
2014	Tau Beta Pi , California Beta Chapter
2013	Jack E. Froehlich Memorial Award, Caltech <i>“awarded annually to one Caltech Junior who shows outstanding promise for a creative professional career”</i>
2013	David S. Koons Research Fellowship, Caltech
2013	Don Shepard Award, Caltech
2013	Andrew W. Archibald Prize for Highest Scholarship (Valedictorian), Grinnell
2013	Chemistry Alumni Award, Department of Chemistry, Grinnell
2013	Phi Beta Kappa , Iowa Beta Chapter
2011	ACS Polymer Chemistry Award, Polymer Education Committee, American Chemical Society
2011-13	Summer Undergraduate Research Fellowship (three semesters), Caltech
2011	Snyder Scholarship (declined), University of Illinois at Urbana-Champaign
2010	Mentored Advanced Project Fellowship, Grinnell
2010	Silver Medal, Grinnell College Team, Iowa Collegiate Mathematics Competition, University of Iowa
2009	Neil Klausner Award, Grinnell
2009-12	Dean’s Lists (all semesters), Grinnell
2003	Silver Medal, National Mathematical Olympiad, Chinese Mathematical Society

PATENTS

- 2018 (04) Cottrill, A. L.; Strano, M. S.; Mahajan, S. G.; **Liu, A. T.** Materials, Devices, and Methods for Resonant Ambient Thermal Energy Harvesting using Thermal Diodes. *18135.124217*.
- 2017 (03) Strano, M. S.; Cottrill, A. L.; Mahajan, S. G.; **Liu, A. T.** Koman, V. B. Energy Harvesting from Ambient Thermal Fluctuations using a Thermal Resonance Device. *18135.124217*.
- 2017 (02) **Liu, A. T.**; Liu, P.; Koman, V. B.; Kozawa, D.; Strano, M. S. 2D Electronic Microparticles. *US 62/525,752*.
- 2016 (01) **Liu, A. T.**; Davis, T. M.; Lew, C. M.; Xie, D.; Elomari, S. A.; Deem, M. Method For Preparing Zeolite SSZ-52. [US 2016/0068402 A1](#).

PEER-REVIEWED JOURNALS (Google Scholar Profile)

(* Equal contribution; † Corresponding author.)

- 2019 (23) **Liu, A. T.***; Kunai, Y.*; Cottrill, A. L.; Strano, M. S.† Solvent Induced Electricity for in situ Electrochemistry. *in revision*.
- 2019 (22) **Liu, A. T.**; Hampel, M.; Yang, J. F.; Pervan, A.; Koman, V. B.; Zhang, G.; Kozawa, D.; Murphey, T. D.; Palacios, T.†; Strano, M. S.† Colloidal State Machines. *in revision*.
- 2019 (21) Cottrill, A. L.; Zhang, G.; **Liu, A. T.**; Bakytbekov, A.; Silmore, K. S.; Koman, V. B.; Shamim, A.; Strano, M. S.† Persistent Energy Harvesting in the Harsh Desert Environment Using a Thermal Resonance Device: Design, Testing, and Analysis. [Applied Energy 2019, 235, 1514–23](#).
- 2018 (20) **Liu, A. T.**; Ge, Z.; Cottrill, A. L.; Strano, M. S.† Direct Energy Generation via Molecular Interaction with Nano-structured Materials, a Mechanistic Perspective. [Advanced Energy Materials 2018, 8, 1802212](#).
- 2018 (19) **Liu, A. T.***; Liu, P.*; Kozawa, D.; Dong, J.; Saccone, M.; Koman, V. B.; Wang, S.; Son, Y.; Wong, M. H.; Strano, M. S.† Autoperforation of 2D Materials for Generating Two Terminal Memresistive Janus Particles. [Nature Materials 2018, 17, 1005–12](#).
- 2018 (18) Cottrill, A. L.; Wang, S.; **Liu, A. T.**; Strano, M. S.† Dual Phase Change Thermal Diodes for Enhanced Rectification Ratios: Theory and Experiment. [Advanced Energy Materials 2018, 1702692](#).
- 2018 (17) Koman, V. B.; Liu, P.; Kozawa, D.; **Liu, A. T.**; Cottrill, A. L.; Son, Y.; Lebron, J. A.; Strano, M. S. Colloidal, Nanoelectronic State Machines Based on 2D Materials for Aerosolizable Electronics.† [Nature Nanotech. 2018, 13, 819–827](#).
- 2018 (16) Cottrill, A. L.; **Liu, A. T.**; Kunai, Y.; Koman, V. B.; Kaplan, A.; Mahajan, S. G.; Liu, P.; Toland, A. R.; Strano, M. S.† Ultra-High Thermal Effusivity Materials for Resonant, Ambient Thermal Energy Harvesting. [Nature Comm. 2018, 9, 664](#).
- 2018 (15) Liu, P.; Cottrill, A. L.; Kozawa, D.; Koman, V. B.; Parviz, D.; **Liu, A. T.**; Yang, J.; Tran, T. Q.; Wong, M. H.; Wang, S.; Strano, M. S.† Emerging Trends in 2D Nanotechnology that Are Redefining Our Understanding of “Nanocomposites”. [Nano Today 2018, 21, 18–40](#).
- 2017 (14) Salem, D. P.; Gong, X.; **Liu, A. T.**; Koman, V. B.; Dong, J.; Strano, M. S.† Ionic Strength Mediated Phase Transitions of Surface Adsorbed DNA on Signed-walled Carbon Nanotubes. [J. Am. Chem. Soc. 2017, 139, 16791–16802](#).
- 2017 (13) Bellisario, D. O.; **Liu, A. T.**; Kozawa, D.; Han, R.; Harris, J. K.; Zabala, R. B.; Wang, Q. H.; Agrawal, K. V.; Son, Y.; Strano, M. S.† Experimental Observation of Real Time Molecular Dynamics using Electromigrated Tunnel Junctions. [J. Phys. Chem. C 2017, 121, 22550–22558](#).
- 2017 (12) **Liu, A. T.***; Kunai, Y.*; Cottrill, A. L.; Koman, V. B.; Strano, M. S.† Observation of the Marcus Inverted Region of Electron Transfer from Asymmetric Chemical Doping of Pristine (*n, m*) Single-walled Carbon Nanotubes. [J. Am. Chem. Soc. 2017, 139, 15328–15336](#).
- 2017 (11) Son, Y.*; Kozawa, D.*; **Liu, A. T.**; Koman, V. B.; Wang, Q. H.; Strano, M. S.† A Study of Bilayer Phosphorene Stability under MoS₂ Passivation. [2D Materials 2017, 4, 025091](#).
- 2017 (10) Kwak, S.; Wong, M. H.; Lew, T. T. S.; Bisker, G.; Lee, M. A.; Kaplan, A.; Dong, J.; **Liu, A. T.**; Koman, V. B.; Sinclair, R. M.; Hamann, C.; Strano, M. S.† Nanosensor Technology Applied to Living Plant Systems. [Annu. Rev. Anal. Chem. 2017, 10, 113–140](#).
- 2016 (09) Schmidt, J.; Choi, J.; **Liu, A. T.**; Slusarczyk, M.; Fu, G. C.† A General, Modular Method for the Catalytic Asymmetric Synthesis of Alkylboronate Esters via Alkyl-Alkyl Cross-Coupling. [Science 2016, 354, 1265–1269](#).

- 2016 **(08)** Liu, A. T.*; Kunai, Y.*; Liu, P.; Kaplan, A.; Cottrill, A. L.; Smith-Dell, J. S.; Strano, M. S.† Electrical Energy Gene-ration via Reversible Chemical Doping on Carbon Nanotube Fibers. *Advanced Materials* **2016**, *28*, 9752–9757.
- 2016 **(07)** Liu, A. T.*; Mahajan, S. G.*; Cottrill, A. L.; Kunai, Y.; Bender, D.; Castillo, J.; Gibbs, S. L.; Strano, M. S.† Sustainable Power Sources Based on High Efficiency Thermopower Wave Devices. *Energy and Environmental Science* **2016**, *9*, 1290–1298.
- 2016 **(06)** Davis, T. M.†; Liu, A. T.; Lew, C. M.; Xie, D.; Benin, A. I.; Elomari, S.; Zones, S. I.; Deem, M. W. Computationally Guided Synthesis of SSZ-52: A Zeolite for Engine Exhaust Clean-up. *Chemistry of Materials* **2016**, *28*, 708–711.
- 2014 **(05)** Liu, A. T.; Zaveri, R. A.; Seinfeld, J. H.† Analytical Solution for Transient Partitioning and Reaction of a Condensing Vapor Species in a Droplet. *Atmospheric Environment* **2014**, *48*, 651–654.
- 2014 **(04)** Lai, H. W. H.; Liu, A. T.; Emenike, B. U.; Carroll W. R.; Roberts, J. D.† Conformational Preferences of N,N-Dimethylsuccinamate as a Function of Alkali and Alkaline Earth Metal Salts: Experimental Studies in DMSO and Water as Determined by ¹H-NMR Spectroscopy. *J. Phys. Chem. A* **2014**, *118*, 1965–1970.
- 2013 **(03)** Liu, A. T. Nag, M.; Carroll, W. R.; Roberts, J. D.† Conformational Analysis of N,N,N-Trimethyl-(3,3-dimethylbutyl)ammonium Iodide by NMR Spectroscopy: a Sterically Hindered Trans-standard. *Magn. Reson. Chem.* **2013**, *51*(11), 701–704.
- 2013 **(02)** Liu, A. T.; Emenike, B. U.; Carroll, W. R.; Roberts, J. D.† Conformational Equilibria of N,N-Dimethylsuccinamic Acid and Its Lithium Salt as a Function of Solvent. *Org. Lett.* **2013**, *15*(4), 760–763.
- 2013 **(01)** Emenike, B. U.; Liu, A. T.; Naveo, E. P.; Roberts, J. D.† Substituent Effects on Energetics of Peptide-Carboxylate Hydrogen Bonds as Studied by ¹H-NMR Spectroscopy: Implications for Enzyme Catalysis. *J. Org. Chem.* **2013**, *78*(23), 11765–11771.

BOOK CHAPTERS

- 2019 **(02)** Liu, A. T.; Ge, Z.; Strano, M. S. Energy Harvesting Techniques Mediated by Molecular Interactions with Nanostructured Carbon Materials. *Robotic Systems and Autonomous Platforms*, edited by Walsh, S. M.; Strano, M. S. (Elsevier [ISBN 978-0-08-102260-3](#), Woodhead Publishing in Materials **2019**, 389–424).
- 2019 **(01)** Yang, J. F.; Liu, P.; Koman, V. B.; Liu, A. T.; Strano, M. S. Synthetic Cells: Colloidal-Sized State Machines. *Robotic Systems and Autonomous Platforms*, edited by Walsh, S. M.; Strano, M. S. (Elsevier [ISBN 978-0-08-102260-3](#), Woodhead Publishing in Materials **2019**, 389–424).

INVITED SEMINARS AND CONFERENCE PROCEEDINGS

- 2019 Emergent Computation Enabled by Colloidal State Machines, **Army Research Office MURI Kickoff Meeting** (Aug. 22, 2019), *Georgia Tech, Atlanta, GA*
- 2019 Colloidal State Machines, **93rd ACS Colloidal and Surface Science Symposium** (Jun. 17, 2019), *Atlanta, GA*
- 2019 Microscale Energy Generation, **Applied Energy Symposium and Summit 2019** (May 23, 2019), *MIT*
- 2018 Microscale Energy Storage & Harvesting – Thermopower Wave and Asymmetric Chemical Doping, **2018 Materials Research Society Fall Meeting** (Nov. 30, 2018), *Boston, MA*
- 2018 Colloidal State Machines, **2018 AIChE Annual National Meeting** (Oct. 25, 2018), *Pittsburgh, PA*
- 2018 2D-Macromolecular Heterostructures Enabled Colloidal State Machines, **Macromolecular Science & Engineering Symposium** (Oct. 24, 2018), *University of Michigan*
- 2018 Foldable and Adaptive Two-dimensional Electronics, **Air Force Office of Scientific Research MURI Annual Review** (Sep. 21, 2018), *Cornell University*
- 2018 Single-walled Carbon Nanotube Mediated *in situ* Electrochemistry, **256th ACS National Meeting** (Aug. 23, 2018), *Boston, MA*
- 2018 From Asymmetric Doping to Colloidal Electronics – Concepts in Biosensing and Energy Generation using Low Dimensional Materials, **256th ACS National Meeting** (Aug. 21, 2018), *Boston, MA*
- 2018 Synthetic Cells – Colloidal Electronic Microparticles, **Boston Academic Researchers Symposium** (July. 19, 2018), *Northeastern University*
- 2018 From Thermopower Waves to Asymmetric Chemical Doping – New Concepts in Energy Storage and Generation Using Molecular Interactions with Single-Walled Carbon Nanotubes, **233rd ECS Meeting** (May. 14, 2018), *Seattle, WA*
- 2018 2D Materials Encapsulated Colloidal Electronic Cells, **MIT Polymer Day** (Apr. 11, 2018), *MIT*

- 2018 Autoperforation of 2D Materials for Generating Memristive Janus Particles, **255th ACS National Meeting** (Mar. 22, 2018), *New Orleans, LA*
- 2018 Electricity from Asymmetric Chemical Doping, **MIT Chemical Engineering Department Student Seminar** (Mar. 12, 2018), *MIT*
- 2018 Synthetic Electronic Cells: Distributed, Modular, Particulate Electronic Devices as Platform for Data Collection and Storage, **MIT Intelligent Quest 2018** (Mar. 01, 2018), *MIT*
- 2018 Autoperforation of 2D Materials for Self-Powered, Memresistive Microparticles, **2018 Microsystems Annual Research Conference** (Jan. 30, 2018), *Bretton Woods, NH*
- 2017 Towards a Modular Memristive Microparticle – Nanoscale Device Fabrication and Electricity Generation, **2017 Materials Research Society Fall Meeting** (Nov. 28, 2017), *Boston, MA*
- 2017 Nano-Materials Enabled 2D Colloidal Electronics and Electrical Energy Generation Processes, **2017 AIChE Annual National Meeting** (Oct. 31, 2017), *Minneapolis, MN*
- 2017 New Materials by Folding and Autoperforation of 2D Surfaces, **Air Force Office of Scientific Research MURI Annual Review** (Oct. 26, 2017), *MIT*
- 2017 Design and Fabrication of Colloidal State Machines for Petrochemical Applications, **E&P Technical Exchange at King Fahd University of Petroleum and Minerals** (Oct. 16, 2017), *Dhahran, Saudi Arabia*
- 2017 Chirality Associated Marcus Inverted Region Observed in Single-Walled Carbon Nanotubes via Asymmetric-doping Induced Electrical Potential (Aug. 22, 2017), **254th ACS National Meeting**, *Washington, DC*
- 2017 Conformational Analysis Guided Molecular Transformation and Energy Generation Processes, **Department Invited Seminar Series** (Jul. 17, 2017), *Zhejiang University, Hangzhou, China*
- 2017 Autoperforation of 2D Materials for Generating Two Terminal Memresistive Janus Particles, **2017 Sense.nano Symposium** (May 25, 2017), *MIT*
- 2017 Electrical Energy Generation via Asymmetric H₂O Doping (Mar. 22, 2017), **MIT Water Night**, *MIT*
- 2016 Sustainable Power Sources Based on High Efficiency Thermopower Wave Devices, **2016 AIChE Annual National Meeting** (Nov. 15, 2016), *San Francisco, CA*
- 2016 Electrical Energy Generation via Reversible Chemical Doping on Carbon Nanotube Fibers, **2016 AIChE Annual National Meeting** (Nov. 14, 2016), *San Francisco, CA*
- 2016 Ambient Energy Harvesting: Thermal Resonators, **MIT Energy Night** (Oct. 13, 2016), *MIT*
- 2016 Graphene Autoperforation: Mold-based Strain Controlled Crack Propagation, **Air Force Office of Scientific Research MURI Annual Review** (Sep. 22, 2016), *Cornell University*
- 2016 Novel Energy Sources Based on Excess Thermopower and Carbon Nanotube Fibers, **252nd ACS National Meeting** (Aug. 23, 2016), *Philadelphia, PA*
- 2016 Technologies for Performance Enhancement and Persistence of Low-Temperature Undersea Dives, **Office of Naval Research Neptune Program Annual Review** (May 23, 2016), *Arizona State University*
- 2016 Fascination towards Nanoscale Energy Generation using Thermopower Waves, **Material Processing Center Project Pitch**, Center for Material Science and Engineering (Jun. 10, 2016), *MIT*
- 2014 Development towards Facile Synthesis of Zeolite SSZ-52, **Chevron R&D Department Seminar**, *Richmond, CA*
- 2014 Nickel-Catalyzed Asymmetric Alkylation of α -Halo Boronic Esters, **Senior Thesis Defense**, *Caltech*
- 2012 Theoretical Study of the NO₂ Decomposition over a Modified Cu-FAU Zeolite, **244th ACS National Meeting**, *Philadelphia, PA*
- 2011 Determination of the Dihedral Angles in Predominantly *trans*-1,2-disubstituted Ethane Systems Using NMR Spectroscopy, **243rd ACS National Meeting**, *San Diego, CA*
- 2011 Substituent Effects on Energetics of Peptide-Carboxylate Hydrogen Bonds, **Summer Undergraduate Research Fellow Seminar**, *Caltech*
- 2011 Decomposition of NO₂ and N₂O gases on Cu-Al and Fe-Al Modified Zeolite Catalysts, **Undergraduate Research Symposium**, *University of Chicago*
- 2011 Oxime Cross-Metathesis towards Nitrones, **Student Research Seminar**, *Grinnell College*
- 2010 Computational Study of the Decomposition of NO₂ and N₂O gases on Fe-Al Modified Zeolite Catalysts, **Undergraduate Research Symposium**, *Washington University at Saint Louis*
- 2009 Computational Study of the Decomposition of NO₂ and N₂O gases on Cu-Al Modified Zeolite Catalysts, **Mentored Advanced Project Seminar**, *Grinnell College*

STUDENTS SUPERVISED

	<i>Undergraduate</i>	<i>Affiliation</i>	<i>Duration</i>	<i>Projects (contributed publications)</i>
2019	Lexy N. Lemar	<i>Caltech</i>	10 weeks	Emergent collective locomotion of active colloids
2019	Ian Timothy	<i>Newbury, MA</i>	8 weeks	Autoperforation – theory and experiments

2018	Paul A. Baynard	Westampton, NJ	8 weeks	Autoperforation of synthetic cells
2017	Yannick L. Eatmon	MIT	9 months	Electricity generation via SWNT/H ₂ O doping
2016-	Rafid S. Mollah	MIT	1.5 years	Electrochemistry using SWNT/CH ₃ CN electricity
2016-17	Linh Nguyen	MIT	1 year	Chemical doping of 2D materials
2016	Max A. Saccone	Dartmouth	3 months	MD simulation of graphene autoperforation (14)
2015-16	Jamila S. Smith-Dell	MIT	1 year	High efficiency Thermopower Wave Devices (08)
2015	Stephen L. Gibbs	U. Florida	10 weeks	Magnetic flux compression of Thermopower waves (07)

CONTRIBUTED GRANT PROPOSALS

written under the supervision of Prof. Michael S. Strano (PI)

- 2019 **Project Title:** MURI – Formal Foundations of Algorithmic Matter and Emergent Computation
Source of Support: U.S. Army Research Office (ARO)
Total Award Amount: \$6,250,000 (Jul. 01, 2019 – Jun. 30, 2022)
- 2018 **Project Title:** ISN4 – 1.2 Shock Mitigating and Reinforcing Molecular Nanocomposites
Award Number: W911NF-18-2-0048
Source of Support: ARO-ISN, University Affiliated Research Centers (UARC)
Total Award Amount: \$90,000 (Jan. 01, 2018 – Dec. 31, 2018)
- 2017 **Project Title:** Synthetic Routes to Graphamid and Grapheylene by High Pressure Control of In-Plane Polymerization and Activation
Source of Support: U.S. Army Research Office
Total Award Amount: \$500,000 (Jan. 16, 2018 – Jan. 15, 2021)
- 2015 **Project Title:** Thermal Management Technologies for Low-Temperature Undersea Drive Persistence
Award Number: N00014-16-1-2144
Source of Support: U.S. Navy Office of Naval Research (ONR)
Total Award Amount: \$497,246 (Jan. 01, 2016 – May. 31, 2018)
- 2015 **Project Title:** MURI – Foldable and Adaptive Two-dimensional Electronics (FATE)
Award Number: FA9550-15-1-0514
Source of Support: U.S. Air Force Office of Scientific Research (AFOSR)
Total Award Amount: \$534,746 (Sep. 30, 2015 – Sep. 29, 2018)

SERVICE AND ACTIVITIES

- 2019 **Bronze Medal** (Oct. 6th) • [Textile River Regatta](#), Mixed Masters 8x, MIT Rowing Club, Lowell, MA
- 2019 **Panelist** (Aug. 26th) • School of Engineering TA Panel, MIT 2019 [TA Day](#), MIT
- 2019 **Bronze Medal** (Aug. 24th - 25th) • [United States Dragon Boat Federation Club Crew National Championship](#), US Major League Dragon Boat, Premiere Mixed, CYPN Storm, Colorado Springs, Denver, CO
National Placement: 200M – **2nd Place**, 400M – **2nd Place**, 2000M – **1st Place**
 Qualified to represent United States in the [2020 IDBF Club Crew World Championships](#), Aix-les-Bains, France
- 2019 **Workshop** (with Felice Frankel, May 13th) • ‘Is Your Graphics the Best It Can Be?’, MIT
- 2019 **Panelist** (May 2nd) • [Nord Anglia School STEAM Week at MIT](#), ‘Using Visuals to Communicate Science’, MIT
- 2019 **Workshop** (Apr. 10th) • ‘Teaching & Mentoring Skills for English-as-Second-Language Speakers’, MIT
- 2018 **Gold Medal** (Oct. 14th) • [NH Championships George Dirth Memorial Regatta](#), Men’s Masters 8x, MIT Rowing Club, Memorial Field, Pembroke, NH
- 2018 **Gold Medal** (Aug. 18th) • [Riverfront Dragon Boat & Asian Festival](#), Team ACE, Hartford, CT
- 2018 **Bronze Medal** (Jul. 15th) • [Finger Lakes International Dragon Boat Festival](#), Team Speeding Turtle, Ithaca, NY
- 2018 **Team Leader** • Harvard Surgical Program in Innovation, [Medical Hackathon](#), Harvard Medical School
- 2018 **Lecturer** • Digital Play Day: New Ways to Interface with Technology, [Cambridge Science Festival](#), MIT
- 2011 **Violinist** • Recital at Sebring-Lewis Hall, Bucksbaum Center of Fine Arts
- 2010 **Student Advisor** • Hannibal Kershaw Residence Hall, Grinnell College
- 2010 **Volunteer** (Mar. 3rd – Mar. 27th, disaster and humanitarian relief) • Nashville Volunteer Center, Nashville, TN
- 2009 **Medical Intern** (Clinical diagnostic and surgery shadowing) • Supervisor: Guy McCaw, M.D., Grinnell Regional Medical Centre, Grinnell, IA
- 2009 **Champion** • Men’s Single, Collegiate Table-Tennis Tournament, Grinnell College
- 2006-09 **Gold Medals (5)** • Men’s 1500m track (for 5 consecutive seasons), Nanjing Foreign Language School
- 2004 **Host** • Nanjing Foreign Language School 2004 Art Festival
- 1999 **Level 10 (Highest Level) in Erhu Performance** • Chinese Academy of Music