

# Ashish A. Kulkarni, Ph.D.

(6-20-23)

Department of Chemical Engineering  
University of Massachusetts, Amherst  
N565 Life Sciences Laboratories  
240 Thatcher Rd, Amherst, MA-01003

Web: [www.kulkarnigroup.com](http://www.kulkarnigroup.com), Email: [akulkarni@engin.umass.edu](mailto:akulkarni@engin.umass.edu)

## RESEARCH INTERESTS:

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My research has been focused on three areas: (1) *develop novel microscale platforms to elucidate the interactions between the disease cells and immune cells and identify novel targets*; (2) *design drug delivery approaches in an in-silico manner to spatially and temporally regulate the immune system* and (3) *develop nanotechnology tools and techniques that allow us to monitor the efficacy of the treatments in real-time*. We integrate multiple interdisciplinary fields, including microscale engineering, supramolecular nanotechnology, drug delivery, cancer immunology, mathematical modeling, computational chemistry and *in vivo* biology, to gain fundamental knowledge of nanomaterials-immune cell interactions and develop translational drug delivery technologies to overcome critical clinical challenges in cancer and other diseases.

## A. CURRENT POSITION:

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Associate Professor, Department of Chemical Engineering 2023 – present  
Adjunct Associate Professor, Department of Chemistry  
Adjunct Associate Professor, Department of Biomedical Engineering  
Faculty Member, Center for Bioactive Delivery, Institute for Applied Life Sciences  
Faculty Member, Molecular and Cellular Biology Graduate Program  
University of Massachusetts, Amherst, MA

Co-Founder and Chief Scientific Advisor 2019 – present  
Volvox Therapeutics

Co-Founder and Chief Scientific Officer 2023 – present  
Quaesar Biosciences  
*Award*: Winner of the Lever's Western Massachusetts Health Tech Challenge

## B. PREVIOUS POSITIONS:

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Assistant Professor, Department of Chemical Engineering 2017 – 2023  
University of Massachusetts, Amherst, MA

Instructor in Medicine 2015 - 2017  
Department of Medicine  
Harvard Medical School, Boston, MA

Associate Bioengineer 2015 - 2017  
Division of Engineering in Medicine  
Brigham and Women's Hospital, Boston, MA

## C. ACADEMIC TRAINING:

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Postdoctoral Research Fellowship 2011 - 2014  
*Division of Engineering in Medicine*  
*Department of Medicine*  
Harvard Medical School  
Brigham and Women's Hospital

Harvard-MIT Division of Health Sciences and Technology  
Research area: “Nanoscience in cancer biology”  
Advisor: Prof. Shiladitya Sengupta

Ph.D. in Organic Chemistry 2006 - 2010  
*Department of Chemistry*  
University of Cincinnati

Dissertation title: “Tailored glycans as unique recognition motifs to probe carbohydrate-protein interactions”  
Advisor: Prof. Suri Iyer

B. Tech., Chemical Technology 1999 - 2003  
*Institute of Chemical Technology*  
University of Mumbai

Thesis title: “Process design and development of 6-amino-2-(4-aminophenyl)-1H-benzimidazole”  
Advisor: Prof. V. R. Kanetkar

#### **D. WORK EXPERIENCE:**

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Graduate Intern, UES Inc., Dayton, Ohio 2010

- Development of a spectroelectrochemical-based biosensor for the detection of *pathogens and viruses*.

Technical Officer (Process Engineer), NOCIL, Mumbai, India 2003 – 2006

- Process Design and Scale-up of the lab process to pilot plant scale and then to production plant scale.
- Supervised over 40 employees. Responsibilities included training a team of production workers and engineers, overseeing and troubleshooting daily unit operations.
- Participated in process development of hexamethylene-1, 6-bis (thiosulphate) disodium salt.
- Conducted an in-depth literature survey and a series of experiments in the lab.
- Performed material balances, energy balances and costing of the projects.
- Performed HAZOP analysis to study the safety aspects of the process.
- Prepared piping and instrumentation diagrams and process flow diagrams.
- Prepared engineering drawing review of chemical equipment.
- Performed analysis of raw materials, intermediates, and products by analytical techniques.

Undergraduate Intern, Metropolitan Eximchem Ltd., Mumbai, India 2002

- Learned Process Engineering and Production operations in an industrial setting

#### **E. AWARDS AND HONORS:**

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- Biomaterials Science *Emerging Investigator* 2022
- *R35 Outstanding Investigator Award (MIRA)* 2022  
National Institute of General Medical Sciences (NIGMS), NIH
- *Early-Career Development (CAREER) Award* 2022  
National Science Foundation
- *Manning/IALS Innovation Award* 2021  
Institute for Applied Life Sciences, UMass Amherst
- *Research Scholar Award* 2019  
American Cancer Society
- *Young Investigator Award, Finalist* 2019  
Arnold and Mabel Beckman Foundation
- *Young Innovator Award* 2019  
Cellular and Molecular Bioengineering
- *NextGen Star in Cancer Research* 2019  
American Association for Cancer Research.

- *Best Oral Presentation Award* 2018  
The Controlled Release Society Annual Meeting in New York
- *Technology Impact Award* 2018  
Cancer Research Institute
- *C&EN's Talented 12* 2017  
Chosen as one of the Top 12 Rising Stars in Chemistry by ACS Chemical & Engineering News
- *Young Investigator Award* 2017  
Melanoma Research Alliance
- *Hearst Young Investigator Award* 2016  
Department of Medicine, Brigham and Women's Hospital.
- *Dana-Farber/Harvard Cancer Center Career Development Award* 2016  
Dana-Farber Cancer Institute, Harvard Medical School.
- *Center for Faculty Development and Diversity Pillar Award* 2016  
Junior Faculty Mentor Award, Brigham and Women's Hospital.
- *AACR-Bristol-Myers-Squibb Scholar-In-Training Award* 2015  
American Association for Cancer Research.
- *Young Scientist Travel Award* 2015  
American Society for Pharmacology and Experimental Therapeutics.
- *Career Awards at the Scientific Interface, Semi-finalist* 2014  
Burroughs Wellcome Fund.
- *Nominated for Postdoctoral Research Fellow Leadership Award* 2014  
Brigham and Women's Hospital.
- *AACR-Millennium Scholar-In-Training Award* 2014  
American Association for Cancer Research.
- *Young Scientist Travel Award* 2014  
American Society for Pharmacology and Experimental Therapeutics.
- *Travel Study Grant* 2010  
The Cincinnati Branch of the English-Speaking Union.
- *University Research Council Fellowship* 2010  
The University of Cincinnati.
- *Best Poster Award* 2010  
Graduate Poster Forum, University of Cincinnati.
- *Travel Award* 2009  
The Society for Glycobiology Meeting in San Diego.
- *Harry B. Mark, Jr. Advanced Standing Research Associate Award* 2009  
Department of Chemistry, University of Cincinnati.
- *Dover Publishing Award for Outstanding Communication Skills in Organic Chemistry* 2009  
Department of Chemistry, University of Cincinnati.
- *Best poster Award* 2008  
4<sup>th</sup> Annual Midwest Carbohydrate and Glycobiology Symposium.

## F. CONTRIBUTION TO SCIENCE:

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**F1. Assistant Professor, Department of Chemical Engineering** 2017 –present  
**University of Massachusetts, Amherst**

### *Scientific Contributions:*

- Designed the first 'Granzyme-B Nanoreporter' for real-time monitoring of cancer immunotherapy response and shown that this platform can be used to distinguish between immunotherapy-responsive and non-responsive tumors.

- Developed the first ‘computationally-designed immunotherapeutics’ to enhance macrophage immunotherapy by efficiently repolarizing tumor-associated ‘M2’ macrophages to antitumor ‘M1’ phenotype and inhibit the ‘don’t eat me’ signal.
- Developed a rational combination strategy for targeted therapies with immunotherapy. We have shown that combinations of kinase-inhibiting supramolecular therapeutics with immune checkpoint inhibitors (PD-L1 and PD-1 inhibitors) exerted enhanced antitumor outcomes in melanoma and breast cancers.
- Developed the first nitric oxide (NO)-based nanoreporter for real-time monitoring of macrophage immunotherapy. We have demonstrated that NO reporter can monitor the kinetics of different macrophage immunotherapy agents non-invasively and in real-time in tumor models.
- Designed polymeric and lipid-based nanomaterials to elicit predictable degrees of inflammasome activation for various biological applications. We have engineered a library of polymeric and lipid-based supramolecular nanoparticles and identified nanoparticle properties that induce inflammasome activation. We have also designed novel imaging probes to monitor the inflammasome activation in real-time in disease models. In addition, we have developed a novel combination strategy to inhibit inflammasome activation in inflammatory disease models such as the Gouty Arthritis model and Dextran Sodium Sulfate (DSS)-induced Colitis and Lipopolysaccharide (LPS) peritonitis sepsis shock model.

*Mentoring/Teaching:* I have mentored/am currently mentoring 3 postdoctoral fellows, 9 graduate students and 42 undergraduate students. I have designed and taught 2 undergraduate and graduate-level courses.

**F2. Instructor (Junior faculty position), Harvard Medical School, USA** 2015 –2017  
**Associate Bioengineer, Brigham and Women’s Hospital**

*Scientific Contributions:*

- Developed the first ‘reporter’ nanoparticle that delivers a cytotoxic or an immunotherapy payload to the tumor and reports back on its efficacy in real-time. This is the first platform technology to enable an early read-out of immunotherapy response in cancer.
- Developed the first computational algorithm, based on quantum mechanical-all atomistic simulations, to design supramolecular structures. We have demonstrated the utility of this platform to engineer supramolecular nanotherapeutics with anti-cancer agents, including cytotoxic drugs, kinase inhibitors, epigenetic modulators and immunotherapy drugs.
- Developed a ‘2-in-1 hybrid nanoparticle’ strategy to overcome tumor-induced adaptive resistance. We have demonstrated that deterministic spatially constrained delivery of two drugs to target cells using 2-in-1 nanomedicine is more effective than a combination of nanoparticles carrying individual drugs.

*Mentoring/Teaching:* I have mentored 2 visiting professors, 2 postdoctoral fellows, 20 undergraduate students and 2 research technicians since 2015.

**F3. Research Fellow, Harvard Medical School, USA** 2011 - 2014  
**Postdoctoral Research Fellow, Brigham and Women’s Hospital**

*Scientific Contributions:*

- Elucidated the role of physical nanobridges in metastasis. We discovered a direct communication between metastatic cancer and endothelial cells mediated through physical nanoscale connections, which we termed nanobridges.
- Developed structure-activity relationship-inspired nanomedicine. We have worked on rationally modifying anticancer drugs based on structure-activity relationships to facilitate self-assembly into supramolecular nanoparticles. We have used this strategy to develop mechanism-inspired

multifunctional nanoparticles to overcome drug-induced adaptive resistance arising as a function of phenotypic cell state shift.

- Developed mathematical models for optimizing the temporal sequence of administration of drugs. We have shown that a mathematical model can predict optimal drug dosing sequence and significantly impact the anti-tumor outcome.

*Mentoring/Teaching:* I mentored 1 postdoctoral fellow, 1 research technician, 7 MS and Ph.D. students and 13 undergraduate students from 2011- 2014.

#### **F4. Graduate Research Assistant, University of Cincinnati, USA**

2006 – 2010

##### *Scientific Contribution:*

- Designed biologically inspired glycans for diagnostic and therapeutic applications. I focused on designing and developing biologically inspired and chemically-defined synthetic glycans for diagnostic and therapeutic applications.
- Developed synthetic methodologies for the synthesis of complex glycans. I synthesized a library of tailored synthetic glycans (over 24 different types of glycans, most of which include over 20-25 steps of synthesis with precise regiocontrol and stereocontrol) to develop structure-activity relationship profiles with strains of toxins and pathogens.
- Identified and studied the factors that govern glycan-receptor recognition events at a molecular level in toxins (Shiga toxin and Ricin toxin), viruses (Influenza) and bacteria (*E.coli*). Specifically, I studied the effect of valency and architecture of glycans to understand how these factors affect the discrimination between closely related toxins and pathogens. For the first time, these comprehensive studies showed that biologically inspired synthetic glycans with small structural changes could be used as highly selective recognition elements for detecting structurally similar toxins and pathogens in real-world samples.

*Mentoring/Teaching:* I mentored 4 graduate and 5 undergraduate students from 2006-2011. I also taught undergraduate-level courses and part of graduate-level courses.

### **G. PUBLICATIONS AND PATENTS:**

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#### **G1. Peer-Reviewed Publications:**

(\* Corresponding author; # equal contribution)

1. Nandi D., Forster J., Ramesh A., Nguyen A., Bharadwaj H., Fitzgerald K., Kulkarni A. A.\*, “*Caspase-1 Responsive Nanoplatfom for In-vivo Monitoring of Inflammasome Immunotherapy*”, **Advanced Science**, 2023; 10(6): 2204900.
2. Nguyen A., Kumar S., Kulkarni A. A.\*, “*Nanotheranostic strategies for cancer immunotherapy*”, **Small Methods**, 2022; 6(12): e2200718.
3. Forster J., Nandi D., Kulkarni A. A.\*, “*mRNA carrying Lipid Nanoparticles that Induce Lysosomal Rupture Activates Inflammasome and Reduces mRNA Transfection Efficiency*”, **Biomaterials Science**, 2022, 10: 5566-5582 (Invited for the Biomaterials Science Emerging Investigator Issue).
4. Ramesh A., Malik V., Kulkarni A. A.\*, “*Supramolecular Nanotherapeutics Enable Metabolic reprogramming of Tumor-Associated Macrophages to Inhibit Tumor Growth*”, **Journal of Biomedical Materials Research: Part A**, 2022;110(8):1448-1459 (As a part of the SFB Student Outstanding Research Award to Ramesh A.).
5. Dipika Nandi, Noorul Shaheen Sheikh Farida, Hayat Anu Ranjani Karuppiyah, Kulkarni A. A.\*, “*Imaging approaches to monitor inflammasome activation*”, **Journal of Molecular Biology**, 2021; 167251.

6. Dipika Nandi, Manisha Shivrayan, Jingjing Gao, Jithu Krishna, Ritam Das, Bin Liu, S. Thayumanavan\*, Kulkarni A. A.\*, “*Core Hydrophobicity of Supramolecular Nanoparticles Induces NLRP3 Inflammasome Activation*”, **ACS Appl. Mater. Interfaces**, 2021; 13 (38): 45300–45314.
7. Ramesh A., Malik V., Ranjani H., Smith H., Kulkarni A. A.\*, “*Rational combination of an immune checkpoint inhibitor with CSF1R inhibitor–loaded nanoparticle enhances anticancer efficacy*”, **Drug Delivery and Translational Research**, 2021; 11: 2317–2327.
8. Malik V., Ramesh A., Kulkarni A. A.\*, “*TLR7/8 Agonist and SHP2 Inhibitor Loaded Nanoparticle Enhances Macrophage Immunotherapy Efficacy*”, **Advanced Therapeutics**, 2021; 4(8): 2100086.
9. Ramesh A., Brouillard A., Kulkarni A. A.\*, “*Supramolecular Nanotherapeutics for Macrophage Immunotherapy*”, **ACS Applied Bio Materials**, 2021; 4, 6: 4653–4666.
10. Brouillard A.#, Deshpande N.#, Kulkarni A. A.\*, “*Engineered multifunctional nano- and biological materials for cancer immunotherapy*”, **Advanced Healthcare Materials**, 2021; 10(6): 2001680.
11. Nguyen A., Ramesh A., Kumar S., Nandi D., Brouillard A., Wells A., Pobezinsky L., Osborne B., Kulkarni A. A.\*, “*Granzyme-B nanoreporter for early monitoring of tumor response to immunotherapy*”, **Science Advances**, 2020, 4(40): eabc2777.
12. Ramesh A., Kumar S., Brouillard A., Nandi D., Kulkarni A. A.\*, “*Nitric Oxide (NO) Nanoreporter for non-invasive real-time imaging of macrophage immunotherapy*”, **Advanced Materials**, 2020, 32 (24), 2000648.
13. Deshpande N., Ramesh A., Nandi D., Nguyen A., Brouillard A., Kulkarni A. A.\*, “*Supramolecular polysaccharide nanotheranostics that inhibit cancer cells growth and monitor targeted therapy response*”, **Nanotheranostics**, 2020, 4(3):156-172.
14. Kumar S., Ramesh A., Kulkarni A. A.\*, “*Targeting macrophages: a novel avenue for cancer drug discovery*”, **Expert Opinion on Drug Discovery**, 2020, 15: 561-574.
15. Ramesh A., Kumar S., Nguyen A., Brouillard A., Kulkarni A. A.\*, “*Lipid-based phagocytosis nanoenhancer for macrophage immunotherapy*”, **Nanoscale**, 2020; 12:1875-1885.
16. Ramesh A. #, Brouillard A. #, Kumar S., Nandi D., Kulkarni A. A.\*, “*Dual inhibition of CSF1R and MAPK pathways using supramolecular nanoparticles enhances macrophage immunotherapy*”, **Biomaterials**, 2020; 227:119559.
17. Ramesh A., Kumar S., Nandi D., Kulkarni A. A.\*, “*CSF1R and SHP2 Inhibitors Loaded Nanoparticle Enhances Cytotoxic Activity and Phagocytosis in Tumor-Associated Macrophages*”, **Advanced Materials**, 2019, 31 (51), 1904364.
18. Ramesh A., Natarajan S. K., Nandi D., Kulkarni A. A.\*, “*Dual inhibitors-loaded nanotherapeutics that target kinase signaling pathways synergize with immune checkpoint inhibitor*”, **Cellular and Molecular Bioengineering**, 2019; 12, 357-373.
19. Kulkarni A. A.\*, Chandrasekar V., Natarajan S. K., Pandey P, Nirgud J., Bhatnagar H., Ashok D., Ajay A., Sengupta S.\*, “*A designer self-assembled supramolecule with signal-inhibition activity amplifies macrophage immune responses against aggressive cancer*”, **Nature Biomedical Engineering**, 2018; 2, 589-599.

*Top 5 Most viewed Article in Nature Biomedical Engineering*

*Highlighted in Nature Biomedical Engineering as a perspective*

*Nature Research Highlights: [Smart molecule aids natural cancer defenses](#)*

*UMass News : [New Cancer Immunotherapy Shows Promise in Early Tests](#)*

*BBC News: [Drug gets body cells to ‘eat and destroy’ cancer](#)*

*Boston Globe: [Brigham and Women’s researchers take another step toward using immune system to fight cancer](#)*

*Boston Herald: [Drug to block weapon used by cancer cells](#)*

Science Daily: [Eat 'em up: Next-generation therapeutic helps immune cells detect, destroy cancer](#)

The Naked Scientists: [Harnessing the immune system to combat cancer](#)

Interview in the Naked Scientists: [Can we use the immune system to combat cancer?](#)

Physics World: [Supramolecule joins the battle against cancer](#)

### **Prior to joining UMass Amherst:**

20. Pandya H. J., Dhingra K., Prabhakar D.#, Chandrasekar V.#, Natarajan S. K.#, Vasana A. S., Kulkarni A. A.\*, Shafiee H.\*, “A microfluidic platform for drug screening in a 3D cancer microenvironment”, **Biosensors and Bioelectronics**, 2017; 94: 632-42.

21. Kulkarni A. A.\*, Rao P., Natarajan S., Goldman A., Sabbiseti V., Khater Y., Korimerla N., Chandrasekar V., Mashelkar R.\*, Sengupta S.\*, “Reporter nanoparticle that monitors its anticancer efficacy in real time”, **Proc Natl Acad Sci U S A**, 2016; 1(15): E2104-13.

*Among top 5% Most Viewed articles in PNAS*

*Highlighted in over 140 news outlets including:*

*Science News: [Cancer killers send signal of success](#)*

*NDTV.com: [Indian Scientists In US Develop Technology For Effective Cancer Treatment](#)*

*The Scientist: [Dying Light Marks the Spot](#)*

*Medical News Today: [New nanoparticle reveals cancer treatment effectiveness in real time](#)*

*The Economic Times: [Indian-origin researchers find a method to watch cancer cell die in real time](#)*

*Daily Mail: [Revolutionary new test could reveal if chemotherapy is working just 8 HOURS after treatment](#)*

22. Kulkarni A. A., Natarajan S. K., Chandrasekar V., Pandey P, Sengupta S.\*, “Combining immune checkpoint inhibitors and kinase-inhibiting supramolecular therapeutics for enhanced anti-cancer efficacy”, **ACS Nano**, 2016; 10(10): 9227-42.

23. Kulkarni A. A., Pandey P, Rao P., Mahmoud A., Goldman A., Sabbiseti V., Parcha S., Natarajan S., Chandrasekar V., Dinulescu D., Sengupta S.\*, “Algorithm for designing nanoscale supramolecular therapeutics with increased anticancer efficacy”, **ACS Nano**, 2016; 10(9): 8154-68.

*ACS Nano Perspective: [Facilitating the Clinical Integration of Nanomedicines: The Roles of Theoretical and Computational Scientists](#)*

*Nanotechnology Now: [First multicellular organism inspires the design of better cancer drugs](#)*

*Health Medicine Network: [First multicellular organism inspires the design of better cancer drugs](#)*

*Medindia: [First Multicellular Organism Inspires a Novel Approach for Treating Cancer](#)*

*PhysOrg: [First multicellular organism inspires the design of better cancer drugs](#)*

*NanoWerk: [First multicellular organism inspires the design of better cancer drugs](#)*

24. Kulkarni A. A. #, Goldman A. #, Kohandel M., Pandey PR., Natarajan S., Ravi S., Sabbiseti S., Sengupta S.\*, “Rationally designed 2-in-1 nanoparticles can overcome adaptive resistance in cancer”, **ACS Nano**, 2016; 10(6): 5823-5824.

*Highlighted in over 20 news outlets including:*

*NanoWerk: [Nanotechnology and math deliver two-in-one punch for cancer therapy resistance](#)*

*Science News: [Nanotechnology, math deliver two-in-one punch for cancer therapy resistance](#)*

*Scicasts: [Researchers Develop New Method that Delivers Two-in-One Punch for Cancer Therapy Resistance](#)*

*Medindia: [Math, Biology, Nanotechnology Deliver 2-in-1 Punch for Cancer Therapy Resistance](#)*

*ecancer news: [Nanotechnology and math ‘deliver two-in-one punch’ for cancer therapy resistance](#)*

*Health Medicine Network: [Researchers engineer revolutionary new approach to combat cancer treatment resistance](#)*

GEN News: [Resistant Cancer May Lose Tetris-Like Multidrug Challenge](#)

25. Kulkarni A. A.\*, Vijaykumar V. E., Natarajan S. K., Sengupta S., Sabbiseti V. S.\*, “Sustained inhibition of cMET-VEGFR2 signaling using liposome-mediated delivery increases efficacy and reduces toxicity in kidney cancer”, **Nanomedicine: Nanotechnology, Biology and Medicine**, 2016; 12(7): 1853-1861.
26. Connor Y., Tekleab S., Husain A., Walls C., Kulkarni A. A., Zetter B., Dvorak H., Sengupta S.\*, “Physical nanoscale conduits-mediated communication between tumor cells and endothelium modulates endothelial phenotype”, **Nature Communications**, 2015; 16(6): 8671.  
(Highlighted in over 20 news outlets including *The Scientist*, *MIT News*, *Harvard News*, *NanoWerk*, *Health Medicinet*, *eCancer*, *The Telegraph* and *The Tech Times*.)
27. Gaharwar A.K. , Mihaila S. M., Kulkarni A. A., Patel A., Di Luca A., Reis R. L., Gomes M. E., van Blitterswijk C., Moroni L., Khademhosseini A.\*, “Amphiphilic beads as depots for sustained drug release integrated into fibrillar scaffolds”, **Journal of Controlled Release**, 2014; 187: 66-73.
28. Kulkarni A. A.\*, Roy B., Rao P. S., Wyant G. A., Mahmoud A., Sengupta S.\*, “Supramolecular nanoparticles that target phosphoinositide-3-kinase overcome insulin resistance and exert pronounced antitumor efficacy”, **Cancer Research**, 2013; 73(23): 6987-97.
29. Pandey A., Kulkarni A. A., Roy B., Goldman A. J., Sarangi S., Sengupta P., Sengupta S.\*, “Sequential application of a cytotoxic nanoparticle and a PI3K inhibitor enhances antitumor efficacy”, **Cancer Research**, 2014; 74(3): 675-85.
30. Sengupta P., Basu S., Soni S., Pandey A., Kulkarni A. A. et.al. “A cholesterol-tethered platinum II-based supramolecular nanoparticle increases antitumor efficacy and reduces nephrotoxicity”, **Proc Natl Acad Sci U S A**, 2012; 109(28): 11294-11299.
31. Sengupta S., Kulkarni A. A.\*, “Design principles for clinical efficacy of cancer nanomedicine: a look into the basics”, **ACS Nano**, 2013; 7(4): 2878-82.
32. Kulkarni A. A., Fuller C., Weiss A. A., Iyer S. S.\*, “Glycan encapsulated gold nanoparticles selectively inhibit Shiga toxins 1 and 2”, **Bioconjugate Chemistry**, 2010; 21(8): 1486-93.
33. Kulkarni A. A., Weiss A. A., Iyer S. S.\*, “Detection of carbohydrate-binding proteins using magnetic relaxation switches”, **Analytical Chemistry**, 2010; 82 (17): 7430-7435.
34. Guo X., Kulkarni A. A., Doepke A. Halsall H. B., Iyer S. S., Heineman W. R.\*, “Carbohydrate-based label-free detection of *Escherichia coli* ORN 178 using electrochemical impedance spectroscopy”, **Analytical Chemistry**, 2012; 84 (1): 241-246.
35. Flagler M. J., Mahajan S. S., Kulkarni A. A., Weiss A. A., Iyer S. S.\*, “Comparison of binding platform yields insights into receptor binding differences between Shiga toxins 1 and 2”, **Biochemistry**, 2010; 49(8): 1649-1657.
36. Kulkarni A. A., Weiss A. A., Iyer S. S.\*, “Glycan based high affinity ligands for toxins and pathogen receptors”, **Medicinal Research Reviews**, 2010; 30(2): 327-393.

## G2. Books:

“*Fundamentals of Immune Engineering*”, Editors: Kulkarni A. A., Lewis J. (University of Florida), Collier J. (Duke University). *Springer Nature Publishers* (UK). Anticipated Publication: June 2023. We are developing this inaugural immune engineering textbook to be published by Springer Nature. We expect this book to be widely utilized within immune engineering courses and by researchers at all levels across the world.

## G3. Book Chapters:



- Ramesh A., Kulkarni A. A.\*, “*Delivery strategies for tumor-associated macrophage reprogramming*”, In: Amiji M. and Milane L. editors. *Delivery Strategies and Engineering Technologies in Cancer Immunotherapy*, Volumes 1, 2 and 3. *Elsevier Publishers* (UK); 2021.
- Kulkarni A. A.\*, Rao P. S., “*Synthesis of polymeric nanomaterials for biomedical applications*” In: Gaharwar A. K., Sant S., Hancock M., Hacking A., editors. *Nanomaterials in tissue engineering: characterization, fabrication and applications*. *Elsevier Publishers* (UK); 2013. p. 27-56.

#### **G5. Patents/Reports of Invention:**

1. Kulkarni A. A., Rao P. S., Sengupta S. S., “*Compositions for treating Cancer and methods for making the same*”, US Patent Application, PCT/US2013/045893, filed June 14, 2013.
2. Goldman A. J., Kulkarni A. A., Sengupta S. S., “*Methods and compositions relating to the treatment of Cancer*”, US Patent Application, PCT/US14/15957, filed February 12, 2014.
3. Kulkarni A. A., Sengupta S. S., “*A reporter platform for real time monitoring of drug efficacy*”, US Patent Application, PCT/US2017/020440, filed March 2, 2017.
4. Kulkarni A. A., Sengupta S. S., “*Cellular signaling inhibitors, their formulations and methods thereof*”, US Patent Application, PCT/IB2017/050770, filed February 11, 2017.
5. Kulkarni A. A., “*Dual-inhibitors loaded supramolecular nanoparticles for macrophage immunotherapy*”, US Patent Application, PCT/IB2017/050771, filed February 11, 2017.
6. Ramesh A., Kulkarni A. A., “*Nanoparticle to Enhance Cytotoxic Activity and Phagocytosis in Tumor-Associated Macrophages*”, Patent application filed October 23, 2020. Appl. No. 17/077,041.
7. Ramesh A. Kulkarni A. A., “*Engineered multivalent CD47 protein for macrophage immunotherapy*”, Provisional Patent filed May 2022. U.S. Patent Application Serial No.: 63/364,221.

#### **H. PRESENTATIONS:**

**(Selected : 2017 – present)**

#### **H1. Invited Seminars and Symposium Presentations:**

**(‡ Presenting author)**

1. Kulkarni A. A.‡, “*Diversity, Equity and Inclusion Efforts in the UMass Amherst Chemical Engineering Department*”, Department of Chemical Engineering, Tufts University, November 20, 2022.
2. Forster .‡, Kulkarni A. A., “*mRNA Lipid Nanoparticles That Activate NLRP3 Inflammasomes Reduce mRNA Transfection Efficiency*”, Biomedical Engineering Society Meeting, San Antonio, TX, October 2022.
3. Kulkarni A. A.‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, Department of Chemical Engineering, Virginia Tech, September 30, 2022.
4. Kulkarni A. A.‡, “*Diversity, Equity and Inclusion Efforts in the UMass Amherst Chemical Engineering Department*”, 2022 AIChE Southeast Region Chemical Engineering Department Heads and Chairs Meeting, St. Pete Beach, FL, June 2022. (As a chair of the DEI committee, I was invited to share our departmental efforts in DEI).
5. Ramesh A.‡, Kulkarni A. A., “*Supramolecular Nanotherapeutics Enables Metabolic reprogramming of Tumor Associated Macrophages to Inhibit Tumor Growth*”, 2022 Society for Biomaterials Annual Meeting, Baltimore, MD, April 2022 (SFB Student Outstanding Research Award Presentation). Invited.
6. Kulkarni A. A.‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, Department of Pharmaceutical Sciences, School of Pharmacy, University of Pittsburgh, January 2022 (Virtual). Invited.

7. Kulkarni A. A.<sup>‡</sup>, “Nanoscale Approaches for Therapeutic Immune Modulation”, END2Cancer Conference, The University of Oklahoma, December 2021 (Virtual). Invited.
8. Kulkarni A. A.<sup>‡</sup>, “Nanoscale Approaches for Therapeutic Immune Modulation”, Regional Centre For Biotechnology, NCR Biotech Science Cluster, India, September 2021 (Virtual). Invited.
9. Kulkarni A. A.<sup>‡</sup>, “Nanoscale Approaches for Therapeutic Immune Modulation”, Molecular Pharmacology Program of Memorial Sloan Kettering Cancer Center, July 2021 (Virtual). Invited.
10. Kulkarni A. A.<sup>‡</sup>, “Nanoscale Approaches for Therapeutic Immune Modulation”, School of Matter, Transport and Energy, Arizona State University, April 2021 (Virtual). Invited.
11. Kulkarni A. A.<sup>‡</sup>, “*Engineering Supramolecular Nanoparticles to Probe Innate Immunity*”, American Institute of Chemical Engineers 2021 Annual Meeting, November 2021, Boston. Invited.
12. Ramesh A.<sup>‡</sup>, Kulkarni A. A., “*Real-time Imaging of Macrophage Immunotherapy Using a Novel Nitric Oxide Nanoreporter*”, American Institute of Chemical Engineers 2021 Annual Meeting, November 2021, Boston.
13. Nguyen A.<sup>‡</sup>, Kulkarni A. A., “*Stimuli-responsive Nanoreporter for Early Monitoring of Tumor Response to Immunotherapy*”, American Institute of Chemical Engineers 2021 Annual Meeting, November 2021, Boston.
14. Brouillard A.<sup>‡</sup>, Ramesh A., Kulkarni A. A., “*Enhancing Macrophage Immunotherapy Via Supramolecular Nanoparticles for Dual Inhibition of CSF1R and MAPK Pathways*”, American Institute of Chemical Engineers 2021 Annual Meeting, November 2021, Boston.
15. Nandi D.<sup>‡</sup>, Kulkarni A. A., “*Nanoscale Platform for Real-time Inflammasome Monitoring*”, 2021 BMES Annual Meeting, Orlando Florida, October 2021.
16. Nandi D.<sup>‡</sup>, Kulkarni A. A., “*Reporter nanoplatform for real-time monitoring of inflammasome activity*”, Cytokine 2021: 9th Annual Meeting of the International Cytokine & Interferon Society, October 2021, Lightning Talk (Virtual).
17. Nandi D.<sup>‡</sup>, Kulkarni A. A., “*Reporter Nanoparticle for Real-time Inflammasome Monitoring during a Disease-progression*”, EMBO Workshop 2021- The inflammasomes: The next frontier, September 2021, Lightning Talk (Virtual). Invited.
18. Brouillard A.<sup>‡</sup>, Ramesh A., Kulkarni A. A., “*Dual Inhibition of CSF1R and MAPK Pathways Using Supramolecular Nanoparticles Enhances Macrophage Immunotherapy*”, Society for Biomaterials (SFB) 2021 Annual Meeting, April 2021 (Virtual).
19. Ramesh A.<sup>‡</sup>, Kulkarni A. A., “*Real-time Imaging of Macrophage Immunotherapy Using a Novel Nitric Oxide Nanoreporter*”, Society for Biomaterials (SFB) 2021 Annual Meeting, April 2021 (Virtual).
20. Nguyen A.<sup>‡</sup>, Kulkarni A. A., “*Stimuli-responsive Nanoreporter for Early Monitoring of Tumor Response to Immunotherapy*”, Society for Biomaterials (SFB) 2021 Annual Meeting, April 2021 (Virtual).
21. Ramesh A.<sup>‡</sup>, Kulkarni A. A., “*Real-time Imaging of Macrophage Immunotherapy Using a Novel Nitric Oxide Nanoreporter*”, Virtual Research Symposium, University of Massachusetts Amherst, December 2020, Invited.
22. Kulkarni A. A.<sup>‡</sup>, “*Nanoscale Approaches for Targeting Tumor-associated Macrophages*”, American Institute for Chemical Engineering Annual Meeting, November 2020 (Virtual), Invited.
23. Kulkarni A. A.<sup>‡</sup>, “*Targeting Tumor-associated Macrophages using Self-assembled Supramolecule*”, Macrophage-directed Therapies Summit, October 2020 (Virtual), Invited.

24. Brouillard A.<sup>‡</sup>, Kulkarni A. A., “*Multifunctional nanomaterial platforms for cancer immunotherapy*”, Polymer Science and Engineering Department and SMLS-NRT Virtual Symposium, November 2020, Invited.
25. Ramesh A.<sup>‡</sup>, Kulkarni A. A., “*Real-time Imaging of Macrophage Immunotherapy Using a Novel Nitric Oxide Nanoreporter*”, BMES 2020 Virtual Annual Meeting, October 2020, Invited.
26. Nandi D.<sup>‡</sup>, Kulkarni A. A., “*Reporter Probe for real time monitoring of inflammasome activity*”, Lightning talk at Cytokines 2020 (8th Annual Meeting of the International Cytokine & Interferon Society), October 2020, Invited.
27. Kulkarni A. A.<sup>‡</sup>, “*Stimuli-responsive Nanomaterials for Imaging Immunotherapy Response*”, 7<sup>th</sup> Virtual SBI<sup>2</sup> 2020 Annual Meeting, September 2020 (Virtual), Invited.
28. Kulkarni A. A.<sup>‡</sup>, “*From small to Big: Engineering Nanotechnologies for Cancer Immunotherapy Applications*”, Virtual International Conference on Basic and Transitional Cancer Research, June 2020 (Virtual), Invited.
29. Nandi D.<sup>‡</sup>, Kulkarni A. A., “*Inflammation Tracker Expediates the Diagnosis and Treatment of Chronic Illness*”, 3MT Thesis Presentation, University of Massachusetts Amherst, March 2020.
30. Ramesh A., Kulkarni A. A.<sup>‡</sup>, “*Nanoscale Approaches for Targeting Tumor-associated Macrophages*”, 2020 Melanoma Research Alliance Annual Retreat, Washington DC, 2020. Invited.
31. Kulkarni A. A.<sup>‡</sup>, “*Computationally-designed Nanomaterials for Cancer Immunotherapy*”, American Institute for Chemical Engineering Annual Meeting, Orlando FL, November 2019. Invited.
32. Ramesh A.<sup>‡</sup>, Kulkarni A. A., “*Dual-drug Loaded Nanoparticles for Macrophage Immunotherapy*”, Life Science Graduate Research Symposium, University of Massachusetts Amherst, November 2019, Invited.
33. Nguyen A.<sup>‡</sup>, Kulkarni A. A., “*Stimuli-responsive Nanomaterials for Monitoring Immunotherapy Response*”, Life Science Graduate Research Symposium, University of Massachusetts Amherst, November 2019, Invited. Best Presentation Award.
34. Brouillard, A.<sup>‡</sup>, Kulkarni A. A., “*Multifunctional nanoparticles for cancer immunotherapy*”, Nipmuc Regional High School ICED Epic Challenge Convention, Upton, MA, October 2019, Invited.
35. Kulkarni A. A.<sup>‡</sup>, “*Chimeric Nanotherapeutics that Target Kinase Signaling Pathways Synergize with Immune Checkpoint Inhibitor*”, Biomedical Engineering Society Annual Meeting, Philadelphia, PA, October 2019. Invited. CMBE Young Innovator Award.
36. Nandi D.<sup>‡</sup>, Kulkarni A. A., “*Reporter Probe for real time monitoring of inflammasome activity*”, Department of Veterinary and Animal Sciences Seminar, University of Massachusetts Amherst, October 2019, Invited.
37. Nandi D.<sup>‡</sup>, Kulkarni A. A., “*Reporter Probe for real time monitoring of inflammasome activity*”, Biomaterials for Devices and Regenerative Medicine Mixer, University of Massachusetts Amherst, July 2019, Invited.
38. Kulkarni A. A.<sup>‡</sup>, “*Immunotheranostic probes for monitoring cancer immunotherapy response*”, Society for Biomaterials Annual Meeting, Seattle, WA, April 2019.
39. Kulkarni A. A.<sup>‡</sup>, “*Immunotheranostic probes for monitoring cancer immunotherapy response*”, American Association for Cancer Research Annual Meeting, Atlanta, GA, April 2019. Invited. NextGen Star Award.
40. Brouillard, A.<sup>‡</sup>, Kulkarni A. A., “*Bifunctional nanoengagers for adaptive T cell immunotherapy*”, UMass Amherst Chemical Engineering Graduate Open House, Amherst, March 2019, Invited.

41. Brouillard, A. ‡, Kulkarni A. A., “*Bifunctional nanoengagers for adaptive T cell immunotherapy*”, UMass Amherst Biomedical Devices and Regenerative Medicine Spring Meeting, Amherst, March 2019, Invited.
42. Brouillard, A. ‡, Kulkarni A. A., “*Bifunctional nanotherapeutics for macrophage immunotherapy*”, UMass Amherst Center for Bioactive Delivery: Cell-Based Therapies Fall Meeting, Amherst, November 2018, Invited.
43. Kulkarni A. A. ‡, “*Computationally-designed Supramolecular Nanotherapeutics for Immune Modulation in Cancer*”, Biomedical Engineering Society Annual Meeting, Atlanta, GA, October 2018.
44. Kulkarni A. A. ‡, “*Computationally-designed Nanotherapeutics for Targeting Immunosuppressive Cells in the Tumor*”, Controlled Release Society Annual Meeting, New York, NY, July 2018, Best Oral Presentation Award.
45. Kulkarni A. A. ‡, “*Supramolecular Nanotherapeutic for Preferential Immune Modulation of the Tumor Microenvironment*”, Society for Biomaterials Annual Meeting, Atlanta, GA, April 2018.
46. Kulkarni A. A. ‡, “*Engineering Approaches for Modulating Immunity*”, Soft Materials for Life Sciences National Research Traineeship at the University of Massachusetts, Amherst, November 2017, Invited.
47. Kulkarni A. A. ‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, The Pioneer Valley Life Sciences institute, November 2017, Invited.
48. Kulkarni A. A. ‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, October 2017, Invited.
49. Kulkarni A. A. ‡, “*Nanoscale Platform Technology for Monitoring Immunotherapeutic Responses*”, Institute for Applied Life Sciences, University of Massachusetts, Amherst, October 2017, Invited.
50. Kulkarni A. A. ‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, October 2017, Invited.
51. Kulkarni A. A. ‡, “*Immunotheranostics: Early Monitoring of Immunotherapy Response*”, 247th ACS National Meeting and Exposition, Washington, DC, March 2016, August 2017, Invited.
52. Kulkarni A. A. ‡, “*Imaging an Immunotherapy Response in Real-time*”, ASPET Annual Meeting at EB2017, Chicago, IL, April 2017, Invited.
53. Kulkarni A. A. ‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, Thayer School of Engineering, Dartmouth College, New Hampshire, Hanover, March 2017, Invited.
54. Kulkarni A. A. ‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, Department of Chemical Engineering, University of Massachusetts, Amherst, February 2017, Invited.
55. Kulkarni A. A. ‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, School of Biomedical Engineering, University of Oklahoma, Norman, February 2017, Invited.
56. Kulkarni A. A. ‡, “*Nanoscale Approaches for Therapeutic Immune Modulation*”, Department of Pharmaceutics, Virginia Commonwealth University, Richmond, January 2017, Invited.

## **H2. Symposium Poster Presentations:**

**(‡ Presenting author)**

1. Forster ‡, Kulkarni A. A., “*A Molecular Level Analysis of Lipid-Composition Dependent NLRP3 Inflammasome Activation by mRNA-Lipid Nanoparticles*”, Society for Biomaterials Annual Meeting, San Diego, CA, April 2023.
2. Ramesh A. ‡, Kulkarni A. A., “*Novel Nano-reporters that can detect macrophage polarization states to predict the prognosis of cancers and inflammatory diseases*”, GRC Immunoengineering, Ventura, CA, July 2022.

3. Nandi D., Kulkarni A. A.<sup>‡</sup>, “Nanoscale Platform for Real-time Inflammasome Monitoring”, GRC Immunoengineering, Ventura, CA, July 2022.
4. Nandi D.<sup>‡</sup>, Kulkarni A. A., “Reporter nanoplatform for real-time monitoring of inflammasome activity”, Cytokine 2021: 9th Annual Meeting of the International Cytokine & Interferon Society, October 2021 (Virtual)
5. Nandi D.<sup>‡</sup>, Kulkarni A. A., “Reporter Nanoparticle for Real-time Inflammasome Monitoring during a Disease-progression”, EMBO Workshop 2021- The inflammasomes: The next frontier, September 2021 (Virtual).
6. Nandi D.<sup>‡</sup>, Kulkarni A. A., “Nanoscale Platform for Real-time Inflammasome Monitoring”, Keystone eSymposia: DAMPs Across the Tree of Life Inducing Innate Immunity, May 2021 (Virtual).
7. Nguyen A., Ramesh A., Kulkarni A. A.<sup>‡</sup>, “Stimuli-responsive Nanomaterials for Monitoring Immunotherapy Response”, 2020 Melanoma Research Alliance Annual Retreat, Washington DC, February 2020. Invited.
8. Nguyen N., Ramesh A., Kulkarni A. A.<sup>‡</sup>, “Immunotheranostic Nanoprobes for Tracking Immunotherapy Response”, Cancer Nanotechnology Gordon Research Conference, Mt. Snow, VT, June 2019.
9. Nguyen N., Kulkarni A. A.<sup>‡</sup>, “Stimuli-responsive Nanomaterials for Monitoring Immunotherapy Response”, Cancer Nanotechnology Gordon Research Conference, Mt. Snow, VT, June 2019.
10. Nguyen N., Ramesh A., Kulkarni A. A.<sup>‡</sup>, “Immunotheranostic Nanomaterials for Monitoring Immunotherapy Response”, Melanoma Research Alliance Annual Retreat, Washington DC, February 2019.
11. Kulkarni A. A.<sup>‡</sup>, Sengupta S., “Computationally-Designed Nanotherapeutics for Immune Modulation of the Tumor Microenvironment”, Biomedical Engineering Society Meeting, Phoenix, AZ, 2017.

## I. CURRENT AND COMPLETED FUNDING

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### **Funded Research Grants:**

1. National Institutes of Health, NIGMS MIRA Award 2022 – 2027  
Title: “Polymeric Nanomaterials for Probing and Modulating Innate Immune Responses”, A. A. Kulkarni (PI).
2. National Science Foundation, CAREER Award 2022 – 2027  
Title: “*CAREER: Elucidating structure-function relationships of inflammasome-activating nanomaterials*”, A. A. Kulkarni (PI).
3. Manning/IALS Innovation Award 2022 – 2023  
Title: “Novel Macrophage NanoImmunotherapy for Cancer”, A. A. Kulkarni (PI),
4. Department of Defense, Peer-Reviewed Cancer Research Program Idea Award 2020 - 2022  
Title: “*Locoregional Irreversible Electroporation for Macrophage Mediated Immunotherapy of Early-Stage Bladder Cancer*”, A. A. Kulkarni (Co-PI), G. Srimathveeravalli (PI).
5. Research Scholar Award, American Cancer Society 2019 - 2023  
Title: “*Nanoscale combination immunotherapy for bladder carcinoma*”, A. A. Kulkarni (PI).
6. Cancer Research Institute, Technology Impact Award 2018 - 2020  
Title: “*Nanoscale Platform Technology for Monitoring Immunotherapeutic Responses*”, A. A. Kulkarni (PI).
7. University of Massachusetts- IALS Seed Grant 2018 - 2019

Title: “A nanoscale platform technology for early monitoring of immunotherapy response”, A. A. Kulkarni (PI), B. Osborne (Co-PI), L. Pobeziński (Co-PI).

8. Melanoma Research Alliance Young Investigator Award 2017 - 2020  
Title: “A nanoscale technology for real-time tracking of immunotherapy response”, A. A. Kulkarni (PI).
9. Dana-Faber/Harvard Cancer Center Research Grant 2016 - 2017  
Title: “Supramolecular nanotherapeutics for preferential immune modulation of the tumor microenvironment”, A. A. Kulkarni (PI).
10. Hearst Young Investigator in Medicine Award 2016 - 2017  
Title: “A self-reporting nanoscale technology for direct imaging of immunotherapy response”, A. A. Kulkarni (PI).

## **J. RESEARCH ADVISING AND MENTORING ACTIVITIES:**

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### **J1. Mentoring Experience, University of Massachusetts Amherst**

I have recruited and mentored a diverse set of students and promoted a collegial environment conducive to learning and working together as a team. Since joining UMass, I have mentored or am currently mentoring over 50 students, >50% are female, and 13% are minorities. Furthermore, I have taken initial steps to engage women and underrepresented groups in the Immunoengineering Program, including research opportunities, course work, workshops and summer internships to increase participation from a diverse group of students and maintain a well-balanced team.

#### **• Postdoctoral Fellow (3 total, 2 current)**

1. Mehak Malhotra, Chemical Engineering 2022-present  
Project Description: Engineering polymeric nanoparticles to target inflammasomes.
2. Dhanashree Surve, Chemical Engineering 2023-present  
Project Description: Engineering lipid nanoparticles to deliver mRNA for enhancing macrophage immunotherapy.
3. Nilesh Deshpande, Chemical Engineering (Current: University of Miami) 2019- 2020  
Project Description: Designed and synthesized stimuli-responsive polymeric nanotheranostics for enhancing efficacy and monitoring cancer immunotherapy response.

#### **• Ph.D. Students (9 total, 5 current)**

1. Anh Nguyen, Chemical Engineering 2017- 2022  
(Current Position: Bristol Myers Squibb as Senior Scientist)  
Project Description: Developed Granzyme-B and Caspase-1 responsive imaging nanoreporter to monitor cancer immunotherapy response.  
*Awards:* NIH Biotechnology Training Program Fellowship  
*Awards:* 2<sup>nd</sup> place Honorable mention, UMass Amherst Chemical Engineering Seminar Series  
*Awards:* Department of Chemical Engineering GS Travel Award  
*Awards:* Best Talk Award in the 9<sup>th</sup> UMass Life Science Graduate Research Symposium  
*Awards:* Fourth Place in Chemical Engineering Graduate Recruiting Poster Session
2. Anthony Brouillard, Chemical Engineering 2017- 2022  
(Current Position: Generation Bio as a Scientist)  
Project Description: Designed lipid and polymer-based multifunctional nanoparticles for delivery of a combination of drugs to the tumor microenvironment and developed bifunctional nanoengagers for activating cancer immunotherapy response.  
*Awards:* Trainee - Soft Materials for Life Sciences, an NSF Research Traineeship Program  
*Awards:* Trainee - Soft Materials for Life Sciences NRT Travel Grant  
*Awards:* Eldridge Award for Best Talk, UMass Amherst Chemical Engineering Seminar Series
3. Dipika Nandi, Biomedical Sciences 2018- 2022

(Current: Scientist, Takeda Pharmaceuticals)

Project Description: Developed cell-based assays for the fundamental understanding of inflammasome biology and designed imaging nanoprobe and nanotherapeutics to target inflammasomes in the disease models.

*Awards:* Love of Learning Award, Phi Kappa Phi Honor Society

*Awards:* The Frances and Chou-Chu Hong Graduate Fellowship, Department of VASCI

*Awards:* First position in IALS Showcase Research Image Competition

*Awards:* Inducted into The Honor Society of Phi Kappa Phi

*Awards:* 3MT 2020 Finalist (Campus-wide competition)

*Awards:* Department of VASCI Travel Award

4. Anujan Ramesh, Biomedical Engineering 2019- 2023  
(Current: Postdoctoral Fellow with Prof. Samir Mitragotri, Harvard University)  
Project Description: Engineered self-assembled nanoparticles to enable rational combination strategies for targeting and reprogramming of tumor-associated macrophages and developed imaging probes for real-time tracking of macrophage immunotherapy.  
*Awards:* Graduate School Dissertation Research Award  
*Awards:* 1<sup>st</sup> place, Business Plan Competition, 2022 Society for Biomaterials Annual Meeting  
*Awards:* 2022 Student Award for Outstanding Research, Society for Biomaterials  
*Awards:* Biomedical Engineering Society Career Development Award  
*Awards:* Biomedical Engineering Society Travel Award  
*Awards:* UMass Engineering Teaching Fellowship  
*Awards:* Department of Biomedical Engineering Travel Award
5. James Forster, Chemical Engineering 2021-present  
Project Description: Working on the engineering of lipid nanoparticles for gene therapy, specifically mRNA and microRNA delivery for inflammatory diseases.  
*Awards:* NIH Biotechnology Training Program Fellowship  
*Awards:* PPG Fellowship
6. Adam Fish, Chemical Engineering 2022-present  
Project Description: Working on engineering an organ-on-a-chip system to evaluate how different immune cells communicate to induce inflammasome activation and lead to disease progression.  
*Awards:* NIH Biotechnology Training Program Fellowship
7. Maharshi Debnath, Chemical Engineering 2022-present  
Project Description: Working on elucidating structure-activity relationships of nanomaterials on inflammasome activation and designing next-generation inflammasome-activating nanomaterials.  
*Awards:* Graduate School Pre-dissertation Research Award  
*Awards:* Department of Chemical Engineering Outstanding TA Award
8. Aniruddha Pinjari, Chemical Engineering 2023- present  
Project Description: Working on designing polymer-based nanoparticle adjuvants for cancer vaccine delivery.
9. Sarmishta Thodur, Chemical Engineering 2023- present  
Project Description: Working on designing lipid-based inflammasome inhibiting nanoparticles for inflammatory diseases.  
*Awards:* 2022 Brady/Shah Award for Outstanding 1<sup>st</sup> Year Graduate Student

• **Masters Students (3 total, 1 current)**

- Harshavardhan Savitrinarayana, Chemical Engineering (Co-mentored with Peng Bai) 2022-  
Project Description: Develop a computational algorithm for the design of nanomaterials.
- Aishwarya Menon, Chemical Engineering 2020-2021  
(Current: Research Scientist, BioNTech)

Project Description: Synthesis and characterization of Reconstituted HDL nanoparticles to target Tumor-Associated Macrophages for cancer immunotherapy.

- Vaishali Malik, Molecular and Cellular Biology 2020-2021  
(Current: Graduate Student, Biomedical Engineering, University of Massachusetts Amherst)  
Project Description: Macrophage receptor with collagenous structure (MARCO) targeted lipid nanoparticles to deliver a combination of SHP2 inhibitor and R848 to tumor-associated macrophages.
  
- **Research Scholars (2 total)**
  1. Sahana Kumar (Current: Graduate student, University of Maryland College Park) 2018- 2020  
Project Description: Elucidating the mechanisms behind sustained inhibition of SHP-2 pathway in tumor-associated macrophages.
  2. Hayat Ranjani (Current: Graduate student, University of Edinburgh) 2019- 2020  
Project Description: Designing a combinational approach to blocking PDL-1 using anti-PDL-1 monoclonal antibody while simultaneously inhibiting the activation of CSF1R by nanoparticle-mediated delivery of the drug BLZ945.
  
- **Undergraduate Students (42 total, 7 current)**
  1. Emily Ishak, Biochem. & Molecular Biol. 2017- 2019  
*Awards:* Spring 2018 Commonwealth Honors College Research Assistant Fellowship  
*Awards:* Fall 2019 Commonwealth Honors College Research Assistant Fellowship  
*Awards:* Department of Biochemistry and Molecular Biology Jessica Haynes Scholarship  
*Current position:* Medical Student, Columbia University
  2. William McInerney, Chemical Engineering (Honors Thesis) 2017- 2019  
*Awards:* Fall 2018 Commonwealth Honors College Research Grant  
*Awards:* Spring 2019 Commonwealth Honors College Research Grant  
*Current position:* R&D Engineer II at Giner Inc.
  3. Maximilian Marek, Chemical Engineering 2017- 2019  
*Current position:* Scientist I at Moderna Therapeutics
  4. William Paing, Chemical Engineering 2018-2019  
*Current position:* Scientist at Editas Medicine based in Cambridge, MA
  5. Harriet Smith, Chemical Engineering 2018- 2020  
*Current position:* Masters Student in School of Public Policy at UMass Amherst
  6. Daniel Ssozi, Biochem. & Molecular Biol. 2017- 2020  
*Current position:* Research Scientist at Dana Farber Cancer Institute
  7. Nanlan Yang, Chemical Engineering 2018- 2020  
*Current position:* Graduate student, Johns Hopkins University
  8. Thomas Douglas, Chemical Engineering 2018
  9. Sahana Kumar, SASTRA University 2018  
*Current position:* Graduate student, University of Maryland College Park
  10. Mathangi Lakshmipathi, SRM University 2018  
*Current position:* Masters Student in Wageningen University & Research (WUR)
  11. Mahak Samdaria, SRM University 2018
  12. Seanu Meena Sangeetha, SASTRA University 2018  
*Current position:* Research Scientist at MD Anderson Cancer Center, Texas
  13. Hayat Anu Ranjani, SRM University 2019  
*Current position:* Graduate student, University of Edinburgh
  14. Shankara Narayanan, SASTRA University 2019



15. Shruthi Polla Ravi, SASTRA University 2019  
*Current position:* Graduate student, Western Ontario University
16. Anup Chauhan, Chemical Engineering 2019
17. Hanna Scher, Chemical Engineering 2019- 2020  
*Current position:* Associate Scientist II at Strand Therapeutics
18. Dhiren Mistry, Chemical Engineering 2019- 2020
19. Syed Shahzad, Chemical Engineering 2019- 2020
20. Claire Kang, Chemical Engineering 2019- 2020  
*Current position:* Graduate student, Georgia Institute of Technology
21. Hong Nguyen, Chemical Engineering 2019- 2022
22. Anna Boloyan, Chemical Engineering 2019- 2022  
*Awards:* Spring 2020 Commonwealth Honors College Research Assistant Fellowship  
*Awards:* Fall 2020 Commonwealth Honors College Research Assistant Fellowship
23. Kaleb Seifert, Chemical Engineering 2019- 2021
24. Dezyre Akins, Chemical Engineering 2019- 2020
25. Abigail Cabral, Biomedical Engineering 2019- 2021
26. AnnMarie Marquis, Chemical Engineering (Honors Thesis) 2019- 2021  
*Awards:* Spring 2020 Commonwealth Honors College Research Assistant Fellowship  
*Awards:* Fall 2020 Commonwealth Honors College Research Assistant Fellowship  
*Current position:* Medical Technologist, Beth Israel Deaconess Medical Center, Boston
27. Krishna Shah, Chemical Engineering (Honors Thesis) 2019- 2021  
*Current position:* Process Engineer, Bristol Myers Squibb
28. Sri Vidya S, SRM University 2020
29. Noorul Shaheen, SRM University 2020
30. Amrish Prabakaran, SRM University 2020  
*Current position:* Graduate student, Indian Institute of Technology, Madras
31. Simran Singh, Chemical Engineering 2020- 2022  
*Awards:* Spring/Fall 2021 Junior Fellow  
*Awards:* Chancellor's Award  
*Current position:* Scientist, Pfizer Inc., Cambridge MA (Start Date: June 2022)
32. McLean Taggart, Chemical Engineering 2020- 2022  
*Current position:* Research Technician, Massachusetts General Hospital and Harvard Medical School, Boston, MA (Start Date: June 2022)
33. Nathan Piligian, Chemical Engineering 2021- 2023
34. Rohan Goyal, Chemical Engineering 2022- 2023
35. Dhruv Chotaliya, Chemical Engineering 2022- present
36. Mark Doucette, Chemical Engineering 2022- present
37. Alistaire Rauch, Chemical Engineering 2021- 2023  
(Co-mentored with Prof. Sarah Perry)
38. Netra Shevale, Biochemistry and Molecular Biology 2022- present
39. Vedant Madabushi, Biochemistry and Molecular Biology 2022- present
40. Aniruthan Saravanan, SASTRA University 2023- present
41. Jaivarsini Johnson, SASTRA University 2023- present
42. Riya Khadilkar, Biochemistry and Molecular Biology 2023- present

**J2. Doctoral Committee Mentorship, University of Massachusetts Amherst**  
**(19 total, 12 current)**

1.	Whitney Blocher McTigue (Chemical Engineering, Advisor- Prof. Sarah Perry)	2018 – 2020
2.	Shoshana Bloom (Chemical Engineering, Advisor- Prof. Neil Forbes)	2018 – 2022
3.	Prerana Rathore (Chemical Engineering, Advisor- Prof. Jessica Schiffman)	2019 – present
4.	Akash Gupta (Chemistry, Advisor- Prof. Vincent Rotello)	2018 – 2019
5.	Bishnu Joshi (Chemistry, Advisor- Prof. Michelle Farkas)	2018 – 2022
6.	Aarohi Gupta (Chemistry, Advisor- Prof. Vincent Rotello)	2019 – present
7.	Uyen Huynh (Chemistry, Advisor- Prof. S. Thayumanavan)	2019 – present
8.	Rui Huang (Chemistry, Advisor- Prof. Vincent Rotello)	2019 – present
9.	Esengul Akkus (VASCI, Advisor- Prof. Leonid Pobeziński)	2018 – 2019
10.	Taewon Jeon (Chemistry, Advisor- Prof. Vincent Rotello)	2020 – present
11.	Khat Margossian (Polymer Science & Engineering, Advisor: Prof. Muthukumar)	2020 – 2022
12.	Jingyi Qiu (Biomedical Engineering, Advisor- Prof. S. Thayumanavan)	2021 – present
13.	Akaansha Rampal (Chemical Engineering, Advisor- Prof. Shelly Peyton)	2021 – present
14.	Rebecca Huber (Chemical Engineering, Advisor- Prof. Shelly Peyton)	2021 – present
15.	Lars Howell (Chemical Engineering, Advisor- Prof. Neil Forbes)	2021 – present
16.	Hung-Hsun (Ryan) Lu (Chemistry, Advisor- Prof. S. Thayumanavan)	2022 – present
17.	Natthapong (Feem) Sueviriyapan (Chemical Engineering, Prof. Henson)	2021 – 2022
18.	Xueting (Darren) Liang (VASCI, Advisor: Prof. Leonid Pobeziński)	2022 – present
19.	Shradha Khanduja (Chemical Engineering, Advisor- Prof. Neil Forbes)	2023 – present

### **J3. Masters Committee Mentorship, University of Massachusetts Amherst (2 total)**

1.	Paige Liu (Chemical Engineering, Advisor- Prof. Peter Beltramo)	2019 – 2020
2.	Yingjie Hang (Chemical Engineering, Advisor- Prof. Nianqiang Wu)	2020 – present

### **J4. Honors Thesis Committee Mentorship, University of Massachusetts Amherst (5 total)**

1.	Wells Burrell (Mechanical Engineering, Advisor- Prof. G. Srimathveeravalli)	2020 – 2021
2.	Krishna Shah (Chemical Engineering)	2020 – 2021
3.	McLean Taggart (Chemical Engineering)	2020 – 2022
4.	Simran Singh (Chemical Engineering)	2020 – 2022
5.	Anna Boloyan (Chemical Engineering)	2020 – 2022

### **J5. Mentoring Experience, Harvard Medical School** (Student name, Current Position, Year)

#### **• Graduate students and postdoctoral fellows (11 total)**

1.	Poornima Rao, Scientist, EMD Millipore, Burlington, MA	2011 - 2013
2.	Ayaat Mahmoud, Graduate Student, the American University in Cairo, Egypt	2011 - 2013
3.	Shyam Srivatsa, Postdoctoral Fellow, University of California, San Francisco, CA	2011
4.	Navya Korimerla, Graduate Student, Stony Brook University, Buffalo, NY	2013
5.	Maral Llewellyn, Senior Scientist, Formex LLC, San Diego, CA	2013
6.	Ishrat Bano, Scientist, Pakistan	2013
7.	V. Jayashree, Biotechnology, SASTRA University	2015
8.	B. Harishankar, Biological Engineering and Nanotechnology, SASTRA University	2015
9.	Seema Sehrawat, Associate Professor, Shiv Nadar University, India	2015 - 2017
10.	Rajani Madan, Visiting professor, Emanuel College, Boston	2016
11.	Hardik Pandya, Assistant Professor, Indian Institute of Science	2016

#### **• Undergraduate students (39 total)**

1.	Zaid Zayyad, Biological Engineering, MIT, Cambridge, MA	2011 - 2013
2.	Abin Biswas, Graduate Student, University of Heidelberg, Germany	2012
3.	Madhumitha Ramachandran, Graduate Student, University of Oklahoma, OK	2012
4.	Saranya Radhakrishnan, Graduate Student, Purdue University, IN	2012
5.	Pooja Vasudevan, Materials Engineering, Massachusetts Institute of Technology, MA	2012
6.	Yashika Khater, Research Assistant, Indian Institute of Science, Bangalore, India.	2013
7.	Prachi Desai, Research Assistant, Texas A & M University, College Station, TX	2013
8.	Suproteem Sarkar, Undergraduate Student, Harvard University, Cambridge, MA	2013

9. Neeraja Setlur, Undergraduate Student, the University of Texas at Austin, TX	2013
10. Divya Murali, Graduate Student, University of California San Diego, CA	2014
11. Niranjana Sudhakar, Graduate Student, University of Waterloo, Canada	2014
12. Siva Natarajan, Graduate Student, University of Michigan, Ann Arbor, MI	2014 - 2016
13. Sankaranarayanan R., Graduate Student, SASTRA University	2014
14. Ashwin Iyer, Research Associate, Brigham and Women's Hospital, Boston, MA	2015
15. Anand Murali, Biological Engineering, SASTRA University	2015
16. Ramya R., Biotechnology, SASTRA University	2015
17. Vishruti Vaikundan, Biotechnology, SRM University	2015
18. Rupasree Srikumar, Bioengineering, SRM University	2015
19. Aparna Chakravarty, Research Associate, University of Kansas, KS	2015
20. Vineeth Chandrasekar, Invictus Oncology, India	2015 - 2016
21. K. R. Sri Aishvarya, Biotechnology, SRM University	2016
22. Christy Charles, Biotechnology, SRM University	2016
23. Samyuktha Suresh, Biotechnology, SRM University	2016
24. Harshangda Bhatnagar, Biotechnology, SRM University	2016
25. Anuradha Subramanian, Bioengineering, SASTRA University	2016
26. Sharada Swaminathan, University of Montreal, Canada	2016
27. Sushmetha Ananthanarayanan, Bioengineering, SASTRA University	2016
28. Somesh Mohapatra, Materials Engineering, IIT Roorkee	2016
29. Aditya Chindhade, Chemical Engineering, BITS, Pilani	2016
30. Shreya Kumar, Electrical Engineering, BITS, Pilani	2016
31. Tanmaye N, Electrical Engineering, BITS, Pilani	2016
32. Driti Ashok, Genetic Engineering, SRM University	2016
33. Preethi Kesavan, Genetic Engineering, SRM University	2016
34. Anvita S., Biomedical Engineering, SRM University	2016
35. Lavanya Ranganathan, Biomedical Engineering, SRM University	2016
36. Anujan Ramesh, Bioengineering, SASTRA University	2017
37. Sheetal Sreeram, Bioengineering, SASTRA University	2017
38. Ramya C., Biotechnology, SASTRA University	2017
39. Srikar N., Biotechnology, SASTRA University	2017

## K. TEACHING EXPERIENCE:

### Teaching Experience, University of Massachusetts

2017- present

- *Designed and taught a new Senior/Graduate level course in Immunoengineering (Spring 2018, 2019, 2020, 2021, 2022, 2023)*

Immunoengineering is an emerging field where engineering principles are used to design and develop tools and platform technologies. These platforms are used to understand and modulate the immune system to prevent, treat and cure diseases. This senior and graduate-level course will extensively cover basic concepts of immunology and explore different engineering approaches, including nanomaterials for vaccine delivery, immune cell engineering, cancer immunotherapy, T cell therapy, combination immunotherapy, monitoring immune response etc.

In Spring 2020, I converted the course to fully online from March, including lecture materials, project reports and presentations conducted remotely.

- *Taught an undergraduate-level course, Chemical Engineering Principles in Biological System (Fall 2018, 2019, 2020, 2021, 2022)*

This course is an introduction to many core Chemical Engineering principles within the context of mammalian cell biology and human physiology. The course covers biological topics, including cell division, the fundamentals of DNA, RNA, and protein structure, and tissue engineering, using a quantitative engineering perspective. Students learn the basic principles of mass and energy balances, thermodynamics, kinetics, and transport within this biological framework.

In Fall 2020, I converted the course to fully online, including lecture materials, exams, assignments and project reports, and presentations conducted remotely.

### **Other Teaching Experience, University of Massachusetts**

- *NIH Biotechnology Program (T32) Lab Module: Assessment of Macrophage Repolarization using Flow Cytometry (Fall 2022, 2023).*
- *Soft Materials for Life Sciences National Research Traineeship and Polymer Science and Engineering Department Foundations I course (Fall 2018, 2019, 2020)*  
Title: Engineering approaches for modulating immunity

### **L. PROFESSIONAL AFFILIATION AND SERVICE: NATIONAL AND INTERNATIONAL**

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#### **L1. Professional Affiliations:**

- American Association for Cancer Research (AACR) 2011 – present
- American Institute of Chemical Engineers (AIChE) 2017 - present
- Biomedical Engineering Society (BMES) 2017 – present
- Controlled Release Society (CRS) 2017 - present
- Society for Biomaterials (SFB) 2017 – present
- Massachusetts Society of Professors (MSP) 2017 – present
- Materials Research Society (MRS) 2017 – present
- American Society for Pharmacology and Experimental Therapeutics (ASPET) 2013 – 2018
- American Society of Clinical Oncology 2014 – 2017
- National Postdoctoral Association 2011 – 2014
- Sigma Xi Society 2010 – 2014
- Society for Glycobiology (SFB) 2009 - 2011
- American Chemical Society (ACS) 2009 – present
- Indian Institute of Chemical Engineers 2002 – 2003

#### **L2. Collaborative and Research Affiliations:**

- Institute for Applied Life Sciences (IALS)
  - Models to Medicine (M2M)
  - Center for Bioactive Delivery (CBD)
- Center for Clinical and Translational Science (CCTS)
- UMass Cancer Center
- Soft Materials for Life Sciences: An NSF Research Traineeship Program (SMLS-NRT)
- UMass Biotechnology Training Program (BTP)
- MURALS (Materials-focused Undergraduate Research Applied to the Life Sciences): An NSF funded REU program at UMass Amherst (Led by Prof. Shelly Peyton)

#### **L3. Departmental Service:**

- *Department Personnel Committee (Chemical Engineering)* 2019 – 2020  
Non-tenured committee member, participation in evaluating tenure and promotion and annual faculty reviews.
- *Department Head Search Committee (Chemical Engineering)* 2020  
Responsible for evaluation and selection of department head candidates.
- *Chairperson, Distinguished Seminar Committee (Chemical Engineering)* 2018 – 2022  
Responsible for invitation and coordination of the department's invited Alumni and ExxonMobil Lectures.
- *Seminar Coordinator (Chemical Engineering)* 2018 – 2022  
Responsible for organizing and coordinating speakers for the weekly departmental seminar.
- *PhD Qualifying Exam Committee (Chemical Engineering)* 2017 – 2019 and 2022  
Evaluated the written and oral performance of Ph.D. students in the department.

- *Departmental Diversity, Equity and Inclusion Committee (Chemical Engineering)* 2020 – present  
Worked with the DEI committee members to evaluate the best practices and set action items to improve the department’s culture. Organized monthly DEI forums to discuss different DEI-related topics.
- *Graduate Program Committee (Chemical Engineering)* 2021 – present  
Served as a member of the graduate program committee from 2021. This committee met approximately monthly, discussing TA assignments, curriculum requirements, admissions, and the qualifying examination.
- *Graduate Admissions Committee* 2020 – present  
Evaluate the applications from Ph.D. and MS applicants (mainly international applicants from India) and make recommendations to the Graduate Program Director.
- *Chair, Diversity, Equity and Inclusion Committee (Chemical Engineering)* Spring and Fall 2022  
Working with the DEI committee members to evaluate the progress of the DEI efforts and organize monthly DEI forums to discuss different DEI-related topics.
- *Participated in the College-level Destination Days* Spring 2022  
Working with faculty and students to provide more information to the admitted students about the campus, the department or the college.

#### **L4. College and University Service:**

- *UMass ADVANCE Faculty Fellowship (Funded by NSF)* 2021 – 2022 and 2022 -2023  
Participated in university-wide efforts to build guidelines to support women faculty in STEM fields. Provided suggestions in the departmental equity and inclusion initiatives, shared my role and experience as a DEI committee chair/member, discussed initiatives to improve service assignments at the departmental level, suggested strategies to include DEI statements in the annual faculty review process, provided information about the pandemic impact statements, DEI statements in tenure and promotion to the college-level committee.
- *NIH Biotechnology Program (BTP) Educational Committee Member* 2021 – present  
Recommend appropriate courses for each semester for BTP students and answer any questions the students or the instructors have about the BTP curriculum.
- *Member of the college level “Tiger Team”* 2021 – present  
Part of multi-departmental leadership committee tasked with developing strategies to enhance outreach efforts at the departmental and college level to increase undergraduate student applications and enrollment.
- *Summer Mini Engineering Workshop Series* 2021  
Conducted the workshop for the incoming first-year students, particularly students from the underprivileged groups.
- *New Student Orientation* 2018 – present  
Advising of new students admitted and transferring into the College of Engineering
- *Biomedical Engineering Faculty Search Committee* 2018 - 2019  
Responsible for recruitment, evaluation, and selection of faculty candidates.
- *Leading International Outreach Activities for Research and Teaching* 2018 – present  
Efforts in catalyzing research collaboration between UMass Faculty and faculty/researcher from India. Curriculum Integration - working with the International Programs Office to diversify efforts on curriculum integration and education abroad opportunities.
- *Soft Materials for Life Sciences NRT Leadership Team (UMass-Amherst)* 2017 – present
- *Institute for Applied Life Sciences Center for Bioactive Delivery Steering Committee* 2018 – present  
Responsible for the vision, oversight, and growth of center activities.

- *Co-Lead Cell-based Therapies Theme, Center for Bioactive Delivery* 2018 - present  
Institute for Applied Life Sciences  
Responsibilities include defining the mission for the theme and organizing theme workshops and inviting faculty and students.
- *Participating Faculty - UMass Biotechnology Training Program* 2019 – present  
Organize/attend inter-departmental events such as Biotech tales, UMass BTP Symposium etc.
- *Departmental Representative on the UMass Biotechnology Training Program (BTP) Educational Committee* 2021 – present  
Select appropriate courses for the BTP trainees and suggest additional lecture-based and lab-based courses.

#### **L5. Outreach Activities:**

- *American Cancer Society Mission in Action* November 2019  
Shared the lab research and the work of the American Cancer Society in the local community, including cancer survivors, families and attendees
- *YESC Acton Science Club, Acton, MA* Fall 2018- Spring 2019  
Served as a coach for the elementary school kids (grades 2-5) on their science project and poster presentations.

#### **L6. Professional Service**

##### **• Grant Review:**

- Review Panel Member, *American Heart Association, Career Development Award* 2018 – 2019
- Review Panel Member, *National Science Foundation, Division of Materials Research* 2020
- Review Panel Member, *National Institutes of Health, DT Study Section* 2020
- Review Panel Member, *Department of Defense (DoD), Melanoma Research Program*  
Technology Development Partnership Award mechanism (TDPA) 2020
- Review Committee Member, Scholarships and Fellowships Division, *Natural Sciences and Engineering Research Council of Canada* (3-year term) 2020 – 2023
- Review Panel Member, *National Science Foundation, Directorate of Engineering, Division of Chemical, Bioengineering, Environmental, and Transport Systems* 2021
- Review Panel Member, *Department of Defense (DoD), Melanoma Research Program* 2021
- Review Panel Member, *Department of Defense (DoD), Melanoma Research Program* 2021
- Review Panel Member, *Human Frontier Science Program (HFSP), France* 2021
- Grant Reviewer, *Armstrong Fund for Science Program, UMass Amherst* 2021
- Review Panel Member, *National Science Foundation, Directorate of Engineering, Division of Industrial Innovation and Partnerships (IIP)* 2022

##### **• Journal Editor:**

- Guest Associate Editor, *Bioengineering & Translational Medicine* 2020
- Review Editor, *Frontiers in Immunology* 2022 - present

##### **• Conference Service:**

- Co-chair/Session Organizer, *ASPET Conference, Chicago, IL* 2017
- Abstracts Reviewer, *BMES Annual Meeting, Phoenix, AZ* 2017
- Co-chair/Session Organizer, *BMES Annual Meeting, Phoenix, AZ* 2017
- Co-leader, *Cell-based Therapies Theme, Center for Bioactive Delivery, Institute for Applied Life Sciences, University of Massachusetts, Amherst* 2018
- Abstracts Reviewer, *BMES Annual Meeting, Atlanta, GA* 2018
- Abstracts Reviewer, *Society for Biomaterials Annual Meeting, Seattle, WA* 2019
- Co-chair/Session Organizer, *Society for Biomaterials Annual Meeting, Seattle, WA* 2019
- Abstracts Reviewer, *BMES Annual Meeting, Philadelphia, PA* 2019

- Co-chair/Session Organizer, BMES Annual Meeting, Philadelphia, PA 2019
- Co-chair/Session Organizer, AIChE Annual Meeting, Orlando, FL 2019
- Co-chair/Organizer, NIH/UMass Biotechnology Training Program Annual Symposium 2019
- Abstracts Reviewer, BMES Annual Meeting, Virtual 2020
- Co-chair/Session Organizer, BMES Annual Meeting, Virtual 2020
- Co-Organizer, UNMET NEEDS: A Virtual Seminar Series, Center for Bioactive Delivery-IALS, UMass Amherst 2020
- Session Co-chair, Macrophage-directed Therapies Summit, Virtual 2020
- Panel Discussion Member, Macrophage-directed Therapies Summit, Virtual 2020
- Abstract Reviewer, AIChE Virtual Annual Meeting 2020
- Co-chair/Session Organizer, AIChE Virtual Annual Meeting 2020
- Abstracts Reviewer, Society for Biomaterials Annual Meeting, Virtual 2021
- Co-chair/Session Organizer, Society for Biomaterials Annual Meeting, Virtual 2021
- Track Chair, Nano and Microtechnologies Track, BMES Annual Meeting, FL 2021
- Abstracts Reviewer, BMES Annual Meeting, Orlando, FL 2021
- Co-chair/Session Organizer, BMES Annual Meeting, Orlando, FL 2021
- Track chair, AIChE Annual Meeting, Boston, MA 2021
- Abstract Reviewer, AIChE Annual Meeting, Boston, MA 2021
- Co-chair/Session Organizer, AIChE Annual Meeting, Boston, MA 2021
- Abstracts Reviewer, Society for Biomaterials Annual Meeting, Baltimore, MD 2022
- Co-chair/Session Organizer, Society for Biomaterials Annual Meeting, Baltimore, MD 2022
- Abstract Reviewer, AIChE Annual Meeting, Phoenix, AZ 2022
- Co-chair/Session Organizer, AIChE Annual Meeting, Phoenix, AZ 2022
- Abstracts Reviewer, Society for Biomaterials Annual Meeting, San Diego, CA 2019
- Co-chair/Session Organizer, Society for Biomaterials Annual Meeting, San Diego, CA 2019

• **Journal Reviewer:**

2017- present

- ACS Applied Bio Materials
- ACS Applied Materials and Interfaces
- ACS Biomaterials Science and Engineering
- ACS Macro Letters
- ACS Nano
- Acta Biomaterialia
- Advanced Functional Materials
- Advanced Healthcare Materials
- Advanced Materials
- Advanced NanoBiomed Research
- Advanced Science
- Advanced Therapeutics
- Annals of Virology
- Applied Nanoscience
- Bioconjugate Chemistry
- Bioengineering and Translational Medicine
- Biomaterials
- Biomaterials Science
- Clinical Immunology
- Drug Delivery and Translational Research
- European Journal of Pharmaceutics and Biopharmaceutics
- Expert Opinion on Drug Discovery
- Expert Opinion on Therapeutic Targets
- Frontiers in Immunology

- International Journal of Nanomedicine
- International Immunopharmacology
- Journal for ImmunoTherapy of Cancer
- Journal of Controlled Release
- Journal of Healthcare Engineering
- Journal of Nanobiotechnology
- Lab on a chip
- Molecular Pharmaceutics
- Nano Letters
- Nanomedicine
- Nanomedicine: Nanotechnology, Biology, and Medicine
- Nanoscale
- Nanotheranostics
- Nature Communications
- Nature Nanotechnology
- Pharmaceutical Research
- Proceedings of the National Academy of Sciences (PNAS)
- Science Advances
- Scientific Reports
- Small
- The International Journal of Biochemistry & Cell Biology
- Theranostics