

# LAXMICHARAN SAMINENI (CHARAN)

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## EDUCATION

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- **Ph.D. Candidate, Chemical engineering** August 2019 – Summer 2022  
The University of Texas at Austin  
Advisors: Prof. Manish Kumar and Prof. Thomas Truskett
- **Ph.D. Candidate, Chemical engineering** August 2017 – August 2019  
Pennsylvania State University  
Advisors: Prof. Manish Kumar, Dr. Stephanie Velegol, and Prof. Darrell Velegol
- **M. Tech, Chemical engineering** July 2013 – July 2015  
Indian Institute of Technology Kanpur  
Advisor: Prof. Viswanathan Shankar
- **B. Tech, Chemical engineering** July 2007 – April 2011  
National Institute of Technology Warangal

## HONORS AND AWARDS

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- Phillips 66 Fellowship 2022
- Second place in AIChE Environmental division graduate student paper award 2021
- Finalist in the 3M three-minute thesis competition, University of Texas at Austin 2020
- Third prize in PPG Millennium Cafe Elevator pitch competition 2019
- Outstanding candidacy exam award, Chemical engineering, Penn State 2018
- Pennsylvania state university graduate fellowship 2017
- Academic excellence award, Chemical engineering, IIT Kanpur 2015

## PUBLICATIONS ([GOOGLE SCHOLAR](#))

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- 1) **Samineni, L.**, Wachlmayr, J., Barta, T., Knyazev, D. et. al., Biophysical quantification of unitary solute and solvent permeabilities to enable translation to membrane science. *Journal of Membrane Science* (In preparation – Invited paper)
- 2) **Samineni, L.**, Wachlmayr, J., Oh, H., Yao, C. et. al., Biophysical principles for membrane science. *ACS Nano* (In preparation - Invited paper)
- 3) **Samineni, L.**, De Respino, S., Tu, Y. M., Mohanty, P. R. et.al., Sustainable natural fiber Moringa filters. *npj Clean water* (Accepted)
- 4) Oh, C., Chowdhury, R., **Samineni, L.**, Shisler, J. L., Kumar, M., & Nguyen, T. H. (2022). Inactivation mechanism and efficacy of grape seed extract for Human Norovirus surrogate. *Applied and environmental microbiology*, 88(9), e02247-21.
- 5) **Samineni, L.**, & Kumar, M. (2022). Harnessing blue energy with COF membranes. *Nature Nanotechnology*, 1-2.
- 6) Shen, J., Roy, A., Joshi, H., **Samineni, L.**, Ye, R., Tu, Y. M., ... & Zeng, H. (2022). Fluorofoldamer-Based Salt-and Proton-Rejecting Artificial Water Channels for Ultrafast Water Transport. *Nano Letters*.

- 7) **Samineni, L.**, Xiong, B., Chowdhury, R., Pei, A., Kuehster, L., Wang, H., ... & Velegol, S. (2019). 7 log virus removal in a simple functionalized sand filter. *Environmental science & technology*, 53(21), 12706-12714.
- 8) De Respino, S., **Samineni, L.**, Tu, Y. M., Oh, H., & Kumar, M. (2021). Simultaneous Removal of Oil and Bacteria in a Natural Fiber Filter. *Environmental Science & Technology Letters*.
- 9) Tu, Y.M., Song, W., Ren, T., Shen, Y.X., Chowdhury, R., Rajapaksha, P., Culp, T.E., **Samineni, L.**, Lang, C., Thokkadam, A. and Carson, D., 2020. Rapid fabrication of precise high-throughput filters from membrane protein nanosheets. *Nature materials*, 19(3), pp.347-354.
- 10) Tu, Y. M., **Samineni, L.**, Ren, T., Schantz, A. B., Song, W., Sharma, S., & Kumar, M. (2021). Prospective applications of nanometer-scale pore size biomimetic and bioinspired membranes. *Journal of Membrane Science*, 620, 118968.
- 11) Song, W., Tu, Y. M., Oh, H., **Samineni, L.**, & Kumar, M. (2018). Hierarchical optimization of high-performance biomimetic and bioinspired membranes. *Langmuir*, 35(3), 589-607.
- 12) Xiong, B., Purswani, P., Pawlik, T., **Samineni, L.**, Karpyn, Z. T., Zydney, A. L., & Kumar, M. (2020). Mechanical degradation of polyacrylamide at ultra-high deformation rates during hydraulic fracturing. *Environmental Science: Water Research & Technology*, 6(1), 166-172.

## GRANT WRITING

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- 1) Collaborative research: Plant-based Pathogen Filters, Funded by **National Science Foundation CBET, Award number - 2022971**, Awarded for 09/01/2020-08/31/2023. Wrote the first draft and made the figures with inputs from the faculty advisor. Coordinated the final edits with feedback from collaborators. Total amount - ~\$425,000. The proposed research is based on my thesis project.
- 2) RAPID proposal: Accessible Surfaces for Interrupting Sustained Coronavirus Transmission (ASsIST), Funded by **National Science Foundation CBET, Award number - 2027731**, Awarded for 04/24/2020-04/30/2022. Found a potential collaborator, wrote, and finalized all the drafts and figures by coordinating with collaborators in the submission. Award amount- \$198,345

## PATENTS

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- 1) Crystalline form of Retigabine and processes for mixture of Retigabine crystalline modifications, United States Patent, **WO/2013/008250 A3**

## CONFERENCE PRESENTATIONS

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- 1) Samineni, L., Energy-Efficient Nanoparticle Contamination Control Using Functionalized Fiber Filters, **AICHE annual meeting**, Boston, MA, USA, November 2021 (Oral presentation)
- 2) Samineni, L., Energy-Efficient Functionalized Filters with Easily Accessible Materials for Nanoparticle Removal from Water, **AICHE annual meeting**, Boston, MA, USA, November 2021 (Poster presentation at Meet the faculty and post-doc candidates' session)
- 3) Samineni, L., Energy-Efficient Virus removal with Cotton-based DIY water filters, **AICHE annual meeting**, Virtual, November 2020 (Oral presentation)
- 4) Samineni, L., Xiong, B., Kumar, M., Velegol, D., Velegol, S. Enhanced virus removal in a practical sand filter 2019 **ACS Chemistry and Water national meeting**, San Diego, CA, USA, Aug. 2019 (Oral presentation)
- 5) Samineni, L., Xiong, B., Pei, A., Wang, H., Kumar, M., Velegol, D., Velegol, S. Moringa ole era seed sand filter for wastewater treatment. 2018 **Environmental Chemistry and Microbiology Student Symposium**, University Park, PA, USA, Apr. 2018 (Oral presentation)
- 6) Samineni, L., Xiong, B., Kumar, M., Velegol, D., Velegol, S. Measurement of nanoparticle sticking coefficients for Moringa-coated sand filters. 2018 **ACS Colloid and Surface Science Symposium**, University Park, PA, USA, Jun. 2018 (Oral presentation)

## RESEARCH EXPERIENCE

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- **Pathogen removal using plant peptide enhanced media filters**

Advisors: Prof. Manish Kumar and Prof. Thomas Truskett

University of Texas at Austin

August 2019 – Summer 2022

- Currently working on purifying the individual proteins from *Moringa oleifera* seed water extract and by overexpression in bacterial systems to develop a fundamental understanding of the interaction between Moringa proteins and virus particles
- Showed the effectiveness of the proposed plant-protein functionalized filters for application in comprehensive removal of engineered and incidental nanoparticles from drinking water
- Established the feasibility of using easily accessible natural fibers such as cotton, silk, and flax fibers to build energy-efficient virus removal filters
- Designing a data-driven computational platform for shortlisting potential plant peptides for developing targeted virus removal filters

- **Biomimetic and Bioinspired membranes for highly selective separations**

Advisor: Prof. Manish Kumar and Prof. Thomas Truskett

University of Texas at Austin

August 2019 – Summer 2022

- Measured the single channel water, proton, and chloride ion permeabilities of aqua-foldamer based artificial water channels in polymer vesicle systems
- Fabricated polymer vesicles and incorporated the artificial channels to perform stopped-flow analysis and use other molecular analysis to understand transport across the water channel
- Worked on standardizing the data analysis and interpretation of stopped-flow experiments to accurately calculate the single channel permeability

- **Pathogen removal using plant peptide enhanced media filters**

Advisors: Prof. Manish Kumar, Dr. Stephanie Velegol, Prof. Darrell Velegol

Pennsylvania State University

August 2017 – August 2019

- Used molecular docking simulations, protein characterization, and competitive binding experiments to identify the specific interaction causing the removal of MS2 bacteriophage
- Established the virus removal capability of a plant antimicrobial peptide coated sand filter for removal of pathogens from drinking water
- Developed a microscopy-based assay to quantify the sticking coefficient of colloidal particles on a protein-amended surface

- **Inviscid instabilities in plane Couette flow past a flexible surface**

Advisors: Prof. Viswanathan Shankar

Indian Institute of Technology Kanpur

July 2013 – July 2015

- Developed a linear stability analysis for 2-D and 3-D perturbations for Plane Couette flow past a flexible surface by modelling the flexible surface as a linear visco-elastic solid
- Applied spectral collocation methods to gain insights into the underlying physics of inviscid modes in Plane Couette flow past a flexible surface

## TEACHING AND OUTREACH

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- Teaching assistant, Water, and Wastewater treatment, Civil Architectural and Environmental Engineering, the University of Texas at Austin Spring 2022  
**Individually taught some class and prepared materials that are still being used for practice as exam/HW question banks**
- Teaching assistant, Distillation lab, Chemical Engineering, University of Texas at Austin  
**Student rating (4.81/5.0)** Spring 2020
- Teaching assistant, Fluid Mechanics, Pennsylvania State University Spring 2019  
**Prepared materials that are still being used for practice as exam/HW question banks**
- Teaching assistant, Biomolecular engineering, Pennsylvania State University Fall 2018
- Teaching assistant Process Dynamics, and Control, IIT Kanpur Spring 2015
- Teaching assistant, Process Dynamics, and Control lab, IIT Kanpur Spring 2014
- Volunteer, Girls Day UT Austin Fall 2020
- Volunteer, Science U water Heroes Summer Camp Summer 2019

## MENTORING (9 UNDERGRADS AND 2 EARLY PH.D. STUDENTS)

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- 1) Sophie DeRespino (2019- Ongoing), Ph.D., Civil and Environmental Engineering, University of Texas at Austin
- 2) Mekayla Depaolis (2020- Ongoing), Ph.D., Civil and Environmental Engineering, University of Texas at Austin
- 3) Paula Espinoza Soto (2018-2019), B.S, Chemical Engineering, Pennsylvania State University, Class of 2020, currently working as an engineer at Eli Lilly and Company
- 4) Huiran Wang (2018-2019), B.S, Chemical Engineering, Pennsylvania State University, Class of 2019, currently pursuing his PhD at the University of Pittsburgh
- 5) Roman Dickey (2018-2019), B.S, Chemical Engineering, Pennsylvania State University, Class of 2020, currently pursuing his PhD at the University of Delaware
- 6) Louise Kuehster (Summer Intern, 2018), B.S, Chemical Engineering, University of Oklahoma, Class of 2019, currently pursuing her PhD at the University of Texas at Austin
- 7) Andrew Pei (2018-2019), B.S, Chemical Engineering, Pennsylvania State University, Class of 2021
- 8) Camila Lemus (2018-2019), B.S, Chemical Engineering, Pennsylvania State University, Class of 2021
- 9) Abigail Roman White (Summer, 2019), B.S, Chemical Engineering, Pennsylvania State University, Class of 2021
- 10) Sarine McKenzie (Summer, 2019), B.S, Agricultural and Biological Engineering, Pennsylvania State University, Class of 2022
- 11) Joy Massey (Summer Intern, 2019), B.S, Chemical Engineering, Tuskegee University, Class of 2021

## CONFERENCE PRESENTATIONS BY UNDERGRADUATE MENTEES

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- Pei, Andrew, et al. Effective Virus Removal Using *Moringa oleifera* Coated Sand Filters." 2018 AIChE Annual Meeting. AIChE, 2018.
- Dickey, Roman, et al. Scale-up of *Moringa oleifera* coated Sand Filters to Remove Bacteria from Wastewater." 2018 AIChE Annual Meeting. AIChE, 2018.
- Wang, Huiran, et al. Sticking Coefficient of Negatively Charged Particles on Positively-Charged *Moringa* Coated Slide." 2018 AIChE Annual Meeting. AIChE, 2018.
- Pei, Andrew, et al. Enhanced Virus Removal in a Practical Sand Filter." 2019 AIChE Annual Meeting. AIChE, 2019.
- Massey, Joy, et al. E. coli Removal in *Moringa*-Coated Sand Using Binary Mixtures." 2019 AIChE Annual Meeting. AIChE, 2019.

- Espinoza, Paula, et al. Scale-up of Moringa Coated Sand Filters." 2019 AIChE Annual Meeting. AIChE, 2019.

## **INDUSTRY EXPERIENCE**

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- **Crystallization process development for Active Pharmaceutical Ingredients (API)**  
Dr. Reddys' laboratories, Polymorphism lab July 2015 – July 2017
  - Spray drying process development to yield amorphous product - translated processes for two products to manufacturing scale
  - Solvent mediated crystallization process development - translated processes for one product to manufacturing scale
- **Crystallization process development for Active Pharmaceutical Ingredients (API)**  
Dr. Reddys' laboratories, Polymorphism lab July 2011 – July 2013
  - Applied solubility modelling to choose apt solvent system to overcome filtration issues and this resulted in significant cost reduction during downstream processing. This novel crystallization process for isolating the specific polymorph was published as part of a process patent.

## **PROFESSIONAL AFFILIATIONS**

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- Member of American Chemical Society 2017-present
- Member of American Institute of Chemical Engineers 2018-present
- Member of American Water Works Association 2020-present
- Member of Association of Environmental Engineers & Science Professors 2021-present

## REFERENCES

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### **Manish Kumar, Ph.D.**

Relationship: Ph.D. advisor

Associate Professor, Department of Civil and Environmental Engineering and Chemical Engineering, University of Texas at Austin

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### **Darrell Velegol, Ph.D.**

Relationship: Former Co-advisor (Pennsylvania State University)

Distinguished Professor, Department of Chemical Engineering, Pennsylvania State University  
225 Chemical and Biomedical Engineering Building, University Park, PA, 16802

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### **Stephanie Velegol, Ph.D.**

Relationship: Formal Co-advisor (Pennsylvania State University)

Teaching Professor, Department of Chemical Engineering, Pennsylvania State University  
224 Chemical and Biomedical Engineering Building, University Park, PA, 16802

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### **Thomas Truskett, Ph.D.**

Relationship: Current Co-advisor (University of Texas at Austin)

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