

Nurshaun Sreedhar

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EDUCATION

University of Texas at Austin

PhD in Civil Engineering

(Environmental and water resource engineering Program)

Adivsor: Prof. Manish Kumar

Austin, TX, USA

September 2022 – Ongoing

Khalifa University of Science and Technology

MSc in Chemical Engineering

GPA: 3.63/4

Adivsor: Prof. Hassan Arafat

Thesis Topic: Novel 3D printed feed spacers based on triply periodic minimal surfaces (TPMS) to enhance reverse osmosis and ultrafiltration performance

Abu Dhabi, UAE

January 2016 – January 2018

Sathyabama University

B.Tech in Chemical Engineering

CGPA: 8.54/10

Chennai, India

August 2010 – April 2014

WORK EXPERIENCE

National Renewable Energy Laboratory (NREL)

Graduate intern

Golden, CO, USA

November 2022 – Ongoing

- Development of thin film composite membranes using interfacial polymerization for lithium separation from brines.
- Development of dense membranes using roll-2-roll process.

University of Texas at Austin

Graduate research assistant

Austin, TX, USA

September 2022 – Ongoing

Khalifa University of Science and Technology

Research Engineer

Abu Dhabi, UAE

April 2018 – August 2022

- Worked on collaborative project between Khalifa University, UAE and Korea University, South Korea, titled “Development of Low-energy Desalination Plant Technology Optimized for the Middle East” at the Center for membrane and advanced water technology (CMAT).
- Designed and tested process development techniques in photocatalytic membrane reactors as well as enhancement of membrane cleaning mechanisms.
- Assisted and collaborated on multiple projects to test novel mixed-matrix membranes to minimize organic fouling in ultrafiltration and development of static mixers for pretreatment processes in desalination plants.

- Developed novel 3D printed feed spacers for process enhancement and fouling mitigation in pressure-driven membrane systems such as RO and UF.
- Studied organic fouling, biofouling and scaling in RO, UF and MD systems and their potential mitigation techniques.
- Practiced various tools to visualize and quantify process parameters and fouling levels in various membrane processes.

PUBLICATIONS

Year	Journal Articles
2023	N. Sreedhar , N. Thomas, N. Ghaffour, H. A. Arafat, The evolution of feed spacer role in membrane applications for desalination and water treatment: A critical review and future perspective, <i>Desalination</i> , 554, 116505
2022	R. A. Ismail, M. Kumar, N. K. Khanzada, N. Thomas, N. Sreedhar , A. K. An, H. A. Arafat, Hybrid NF and UF membranes tailored using quaternized polydopamine for enhanced removal of salts and organic pollutants from water, <i>Desalination</i> , 539, 115954
2022	N. Sreedhar , M. Mavukkandy, T. M. Aminabhavi, SK Hong, H. A. Arafat, Fouling mechanisms in ultrafiltration under constant flux: Effect of feed spacer design, <i>Chemical Engineering J.</i> 136563
2022	N. Sreedhar , M. Kumar, S. Al Jitan, N. Thomas, G. Palmisano, H. A. Arafat, 3D printed photocatalytic feed spacers functionalized with β -FeOOH nanorods inducing pollutant degradation and membrane cleaning capabilities in water treatment, <i>Applied Catalysis B: Environmental</i> , 300, 120318
2021	M. Kumar, N. Sreedhar , N. Thomas, M. Mavukkandy, R. A. Ismail, T. M. Aminabhavi, H. A. Arafat, Polydopamine-coated graphene oxide nanosheets embedded in sulfonated poly(ether sulfone) hybrid UF membranes with superior antifouling properties for water treatment, <i>Chemical Engineering J.</i> 133526
2021	M. Kumar, H. Baniowda, N. Sreedhar , E. Curcio, H. A. Arafat, Fouling resistant, high flux, charge tunable hybrid ultrafiltration membranes using polymer chains grafted graphene oxide for NOM removal, <i>Chemical Engineering J.</i> , 408, 127300
2020	N. Sreedhar , N. Thomas, O. Al-Ketan, R. Rowshan, R. Abu Al-Rub, S. Hong, H. A. Arafat, Impacts of feed spacer design on UF membrane cleaning efficiency, <i>J. Membrane Science</i> , 616, 118571
2020	M. Ouda, O. Al-Ketan, N. Sreedhar , M. Hasan Ali, R. Abu Al-Rub, SK Hong, H. A. Arafat, Novel static mixers based on triply periodic minimal surface (TPMS) architectures, <i>J. Environmental Chemical Engineering</i> , 8, 104289
2020	M. Kumar, N. Sreedhar , M. Abi Jaoude, H. A. Arafat, High Flux, Antifouling hydrophilized ultrafiltration membranes with tunable charge density combining sulfonated polyethersulfone and aminated graphene oxide nanohybrid, <i>ACS Applied Materials & Interfaces</i> , 12(1), 1617-1627

- 2019 N. Thomas, **N. Sreedhar**, O. Al-Ketan, R. Rowshan, R. Abu Al-Rub, H. A. Arafat, 3D printed spacers based on TPMS architectures for scaling control in membrane distillation, *J. Membrane Science*, 581, 38-49
- 2018 N. Thomas, **N. Sreedhar**, O. Al-Ketan, R. Rowshan, R. Abu Al-Rub, H. A. Arafat, 3D printed triply periodic minimal surfaces as spacers for enhanced heat and mass transfer in membrane distillation, *Desalination*, 443, 256-271
- 2018 **N. Sreedhar**, N. Thomas, O. Al-Ketan, R. Rowshan, H. Hernandez, R. Abu Al-Rub, H. A. Arafat, Mass transfer analysis of ultrafiltration using spacers based on triply periodic minimal surfaces: Effects of spacer design, directionality and voidage, *J. Membrane Science*, 561, 89-98
- 2018 **N. Sreedhar**, N. Thomas, O. Al-Ketan, R. Rowshan, H. Hernandez, R. Abu Al-Rub, H. A. Arafat, 3D printed feed spacers based on triply periodic minimal surfaces for flux enhancement and biofouling mitigation in RO and UF, *Desalination*, 425, 12-21
- 2014 Renita A, **N. Sreedhar**, M. Peter D, Optimization of algal methyl esters using RSM and evaluation of biodiesel storage characteristics, *Bioresour. Bioprocess.* 1 (2014).
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Book Chapter:

- N. Thomas, **N. Sreedhar**, H. A. Arafat, Use of Antiscalants in Membrane Distillation, Ch. 6 in *Membrane Distillation: Materials and Processes*, Y. M. Lee and E. Drioli (Eds), pp. 137-167, Nova Science ISBN: 978-1-53617-448-9 (2020).
 - **N. Sreedhar**, M. Mavukkandy, J.A. Kharraz, Y. Liu, H. A. Arafat, 3D Printing in Membrane Technology, Ch. 3 in *Green Membrane Technology Towards Environmental Sustainability*, L. F. Dumee, M. Sadrzadeh and M. A. Shirazi (Eds), Elsevier (under review)
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PATENTS

- H. A. Arafat, R. Abu Al-Rub, **N. Sreedhar**, O. Al-Ketan, N. Thomas, "Novel Three-Dimensional Feed Spacers with Triply Periodic Minimal Surface Architectures for Membrane-based Systems", U.S. Patent Application No. 17/202,062. (Filed: 2021).
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CONFERENCE PRESENTATIONS (as Presenter)

- **N. Sreedhar**, M. Kumar, S. Al Jitan, N. Thomas, G. Palmisano, H. Arafat, Synthesis of β -FeOOH nanorods coating on 3D printed feed spacers and its application as efficient photocatalysts in membrane systems, 8th MSA Early Career Researcher Online Membrane Symposium, Australia, 25th Nov., 2021. (Online)
- **N. Sreedhar**, N. Thomas, O. Al-Ketan, R. Rowshan, R. Al-Rub, H. A. Arafat, Evaluating the influence of novel feed spacers on backwash and relaxation for enhancement of cleaning strategies, 4th Intl. Conf. on Desalination using Membrane Technology, Perth, Australia, 1-4 Dec., 2019.
- M. Ouda, O. Al-Ketan, **N. Sreedhar**, M. Ali, R. Alrub, H. A. Arafat, Determining the efficacy of novel static mixers based on TPMS architectures and their potential for membrane pretreatment,

4th Intl. Conf. on Desalination using Membrane Technology, Perth, Australia, 1-4 Dec., 2019 (poster).

- **N. Sreedhar**, N. Thomas, O. Al-Ketan, R. Rowshan, H. Hernandez, R. Abu Al-Rub, H. A. Arafat, Effect of 3D printed triply periodic minimal surface (TPMS) feed spacers on flux and fouling in ultrafiltration and reverse osmosis, 10th Intl. Desalination Workshop, Busan, Korea, 22-24 Nov., 2017.
- **N. Sreedhar**, N. Thomas, O. Al-Ketan, R. Abu Al-Rub, R. Rowshan, H. A. Arafat, Development of novel 3D-printed feed spacers for flux enhancement and fouling control, 9th Intl. Desalination Workshop, Abu Dhabi, UAE, 13-15 Nov., 2016.

AWARDS AND GRANTS

Graduate research assistanceship, EWRE program, UT Austin	September 2022 – Present
Cockrell school of engineering Fellowship, UT Austin	September 2022 – Present
Center for membrane and advanced water technology – travel grant	September 2019
Masdar Institute Student Support Grant	December 2015 – December 2017
MIT & MI Innovation Program	December 2015 – December 2017

SKILLS

Characterization & Analytical techniques: Experienced in using Microscopy (SEM, ESEM, UHR-SEM, AFM, 3D), EDX, Optical coherence tomography (OCT), ICP-OES, Goniometer, FTIR-ATR, XRD analysis, TGA, Fluorescence and optical microscopy, Capillary flow porometer, Membrane liquid entry pressure test equipment, Mullen burst pressure test equipment, UV-Visible spectrophotometer, Total organic carbon (TOC) analyzer.

Membrane Testing: Interfacial polymerization, dense membrane fabrication, porous membrane fabrication (NIPS), Experienced in setting up and operating Ultrafiltration, Reverse Osmosis, Membrane distillations units; Photocatalytic membrane tests and Biofouling studies

Computer Skills: CHEMCAD, ASPEN PLUS, ImageJ, Grapher, OriginPro.

Languages: English, Hindi, Tamil
