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Education:

Ph.D.	Environmental Engineering, University of Windsor, Canada	Jun 2014
M.Tech.	Industrial Biotechnology (5 Year Integrated), SASTRA University, India	May 2009

Professional Experience:

- Assistant Research Professor, Department of Biosystems Engineering, Auburn University, Auburn, AL — 02/2023 –Present
- DST INSPIRE Faculty, School of Chemical & Biotechnology, SASTRA Deemed University, Thanjavur, TN, India — 05/2018 – 01/2023
- Post-Doctoral Fellow, Department of Biosystems Engineering, Auburn University, Auburn, AL — 04/2016 – 04/2018
- Associate Scientist, Ag-Biologicals R & D, AgraCity Crop & Nutrition Ltd., Wallaceburg, ON, Canada — 01/2015 – 04/2016
- Research Assistant, University of Windsor, Windsor, ON, Canada — 07/2014 – 01/2015
- Graduate Research Assistant, Department of Civil & Environmental Engineering, University of Windsor, ON, Canada — 09/2009 - 06/2014

Industrial Consultancy Experience:

1. Chameleon Specialty Chemicals, UK — 2021-2022
   Tasked with development of thermal paper developer and color former.
2. EID Parry Nutraceuticals, Karaikudi, India — 2021-2023
   Tasked with development of probiotic products from algae.
3. City Union Bank – Corporate Social Responsibility (CSR Fund) — 2021-2023
   Tasked with construction of a thermochemical conversion unit to generate energy from crop residues.

Startup Experience:

- Founded a start-up named "***ENVIROHIL Solutions***", currently incubated at ABLEST TBI, SASTRA, Thanjavur, TN, India
  - Focus is on upcycling of nutrients present in organic waste streams thereby minimizing environmental impacts, nuisance odors and pathogens.
  - Developed three products – shoe polish, grease, and antimicrobial soaps from upcycling of food wastes.

Grant Proposals:

Active Projects:

1. Upcycling of Nutrients from Poultry Slaughterhouse Solid Wastes (PSSW) into Value-added Products using Black Soldier Fly Larvae Cultivation**.** Brendan Higgins (PI), Dianna Bourassa (Co-PI), **Saravanan Ramiah Shanmugam (Co-PI)**. Alabama Agricultural Experimental Station Seed grant. Total Award Amount: $ 50,000 USD. Duration 2023-2025. Credit: 50 %, effort: 50 %

2. Valorization of Bio-oil Aqueous Phase from Pyrolysis of Marine biomass and Agriculture waste as a Novel sustainable disinfectant. Nithyanand Paramasivam (PI), **Saravanan Ramiah Shanmugam (Co-PI)**. Core Research Grant - Department of Science and Technology (DST), India. Total Award Amount: Rs. 2, 468, 400. Duration: 2023-2026. Credit: 50 %.

Completed Projects:

1. Investigating the effect of saponification on biogas production during anaerobic digestion of poultry slaughterhouse solid wastes to support an undergraduate student under the **NSF** Research Experience for Undergraduates (REU) program as a Co-investigator (Co-PI). Total Award Amount: Duration May-July 2024.

2. Turning biomass into Food, Fuel and Fertilizer: Surface Modification of Biochars for Energy and Environmental Applications. **Saravanan Ramiah Shanmugam (PI)**. Department of Science & Technology (DST)- INSPIRE. Total Award Amount: Rs. 11,700,000 (USD $ 140,964). Duration: 2018-2023.

3. Turning Organic Wastes into Food, Fuel and Fertilizer – An Insect Farming Approach. SASTRA Deemed University T.R. Rajagopalan Start-up Research Grant. **Saravanan Ramiah Shanmugam (PI)**. Duration: 2022-2023. Total Award amount: Rs. 300,000 (USD $ 3614).

4. Design and Fabrication of a Continuous Pyrolysis Reactor. SASTRA Deemed University Start-up Research Grant. **Saravanan Ramiah Shanmugam (PI)**. Duration: 2018-2019. Total Award amount: Rs. 500,000 (USD $ 6024).

5. Enhancing redox mediated reactions during anaerobic digestion: Role of Exoelectrogens. Auburn University – Ocean University of China (AU – OUC) research grant. Sushil Adhikari (PI), **Saravanan Ramiah Shanmugam (Co-PI)**, Xiaochong Shi (Co-PI). Duration: 2018-2021. Total Award amount: $ 80,000 USD. Contributed 80 % in developing this proposal.

6. Surface-modified biochar: Evaluation of its performance in anaerobic digestion, sorption of heavy metals and herbicides. Sushil Adhikari (PI), **Saravanan Ramiah Shanmugam (Co-PI)**. Alabama Agricultural Experimental Station Seed grant. Total Award Amount: $ 50,000 USD. Duration 2017-2019. Total award amount: $ 50,000 USD. Contributed 90 % in developing this proposal.

7. Turning Wastes into Fuel and Fertilizer: Evaluation of P and N Fluxes During Energy and Nutrient Recovery from Poultry Litter. Auburn University Intramural Grants Program (IGP). Sushil Adhikari (PI), **Saravanan Ramiah Shanmugam (Co-PI)**, Jeremaiah Davis (Co-PI). Duration: 2017-2019. Total Award amount: $ 50,000 USD. Contributed 80 % in developing this proposal.

Grant(s) Under Review:

1. Submitted a research proposal to **Auburn University Rural Partnership Institute (AURPI)** titled "Sustainable wood-based adhesive from dissolved air floatation residue collected from poultry slaughterhouses" as Principal Investigator (PI). Total funding requested = $ 50,000.
2. Submitted a research proposal to **Fats and Protein Research Foundation (FPRF)** titled "Pilot production of value-added nutraceuticals on stick water" as Co-Principal investigator (Co-PI). Total funding requested = $ 45,000.
3. Submitted a research proposal to **USDA-NIFA** titled "Upcycling nutrients from poultry slaughterhouse solid wastes into value-added bioproducts" under the Biorefining and Biomanufacturing Program as a Principal investigator (PI). Total funding requested = $ 650,000

(PI's cost share = 45%).

4. Submitted a research proposal to USDA-NIFA titled "Transforming Energy Landscapes in Rural America through Enhanced Biocarbon and Green Hydrogen Production for Decentralized Energy Distribution" under the Biorefining and Biomanufacturing Program as a Co-Principal investigator (Co-PI). Total funding requested = $ 799,998 (Co-PI's credit = 8%).
5. Submitted a research proposal to **NSF** titled "*Evaluation of alkali impregnated biochar on odour reduction during anaerobic digestion of DAF solids generated from poultry slaughterhouses*" under the Louis Stokes Alliance for Minority Participation (LSAMP) program (to support a minority undergraduate student) as a Co-investigator (Co-PI). Co-principal investigator's cost share = $ 41,200.

Unsuccessful Grant Applications:

1. Submitted a research proposal to **DoE** titled "C-FISHR: Sequestering CO_2 with algae for production of sustainable fish feed" under the DoE EERE funding program as a Co-investigator (Co-PI). Total funding requested = $ 3.2 million. Co-principal investigator's cost share = $ 72,987.

2. Non-Photosynthetic Biological CO_2 reduction to Chemicals and Fuels. Saravanan Ramiah Shanmugam (PI), Ponnusami Venkatachalam (Co-PI). Core Research Grant - Department of Science and Technology (DST), India. Year: 2019. Total funding requested = Rs. 35,00,000. Contributed 80 % in developing this proposal.

3. Upcycling of Nutrients from Poultry Slaughterhouse Solid Wastes (PSSW) into Value-added Products using Black Soldier Fly Larvae Cultivation. AU Research Support Program (RSP). Year: 2023. Total funding requested = $ 50,000 USD. Contributed 80 % in developing this proposal.

Awards and Scholarships:

- MITACS Global link Research Award* (6,000 CAD for 6 months) 2023-2024
- SASTRA Guru Shreshta Award for outstanding contributions in teaching and mentoring Aug 2022
- Dr. Ross H. Paul Scholarship for outstanding Graduate student ($ 1,000 CAD) 2013-2014
- Queen Elizabeth II Graduate Scholarship ($ 10,000 CAD) 2013-2014
- Doctoral student entrance Scholarship ($ 10,000 CAD/year) 2009-2013
- International Graduate student tuition Scholarship ($ 6,000 CAD/year) 2009-2012
- A.R. and E.G. Ferriss Award – Endowment Award ($ 1,000 CAD) 2012-2013
- Graduate student society Award – Outstanding Graduate Student Award ($ 500 CAD) 2011-2012
- Best Poster Award – International conference on HIV (1,000 INR) 2007-2008

*Awarded to my Ph.D. student from SASTRA to gain international research experience in University of Newfound land and Labrador, Canada

Patents Applications Filed and Granted:

1. **Saravanan Ramiah Shanmugam.**, Higgins, B. Upcycling animal slaughterhouse solid wastes into fortified black soldier fly larvae cultivation. (Filed provisional U.S. Patent Application No. 63/725,806).
2. Edward, Drabold, Brendan T. Higgins, Sushil Adhikari, **Saravanan Ramiah Shanmugam**, Manish Sakhakarmy. Hydrothermal pretreatment of Dissolved Air Flotation Solids for Microbial Nutraceuticals. (Filed Provisional U.S. Patent)
3. Srividhya Krishnan*, Nithyanand Paramasivam, **Saravanan Ramiah Shanmugam**, Subramaniyasharma Sivaraman, Ponnusami Venkatachalam. A synergistic and eco-friendly anti-fouling paint. (Application No: 1/96301/2023-CHE)
4. Bhuvaneshwari Veerapandian*, **Saravanan Ramiah Shanmugam**, Subramaniyasharma Sivaraman,

Srividhya Krishnan, Ponnusami Venkatachalam. A novel alternative nutrient source for biopolymer/levan production (Application No: 202341029345)

5. Subramaniyasharma Sivaraman*, **Saravanan Ramiah Shanmugam**, Devaraj Sappani, Ponnusami Venkatachalam, Bhuvaneshwari Veerapandian, Srividhya Krishnan. A method of synthesizing nitrogen-doped activated carbon for supercapacitor applications (**Granted Patent** No. 553496; Application No. 202341027604)

Patent from Ph.D. students supervised

Research Interests:

- Research interests include nutrient recovery from waste streams such as poultry processing wastes, aqueous phase generated during thermochemical conversion of biomass, energy generation from low-value biomass via anaerobic digestion, wastewater treatment and bio-fertilizer production for cultivation of crops.
- Instrumental in developing five Rhizobial based inoculants (bio-fertilizers) for Peas, Lentils, Soybean cultivation during my tenure at AgraCity Crop & Nutrition Ltd.
- Played a key role in development of dossier for product registration with Canadian Food Inspection Agency (CFIA). Successful in registering two biofertilizer products for commercialization and three products under review.

Courses taught:

- Revised the curriculum for Bioprocessing Engineering, Bioreactor Engineering, Introduction to Biotechnology and taught these junior level courses during my tenure as DST Inspire Faculty as SASTRA Deemed University between May 2018-Jan 2023
- Handled Fluid Mechanics and Downstream Processing laboratory course for undergraduate Seniors between May 2018-Jan 2023
- Taught the following courses - Fluid Mechanics I, Thermodynamics, Hydrology, Engineering and Environment, Transport Phenomena, Engineering Mechanics I, Heat & Mass Transfer, Life Cycle Analysis (LCA) as a graduate/teaching assistant during my tenure at University of Windsor and Auburn University.

Student Supervision Experience:

- Currently, I am supervising one Ph.D. student from Auburn University and two other Ph.D. students from SASTRA Deemed University.
- I am also serving as a doctoral committee member for one Auburn University student from Biosystems Engineering and 5 other Ph.D. students from SASTRA Deemed University.
- I have supervised 6 Master's thesis and 10 undergraduate student's final year project work (capstone project) at SASTRA Deemed University.
- I have also experience in training an undergraduate student to gain hands-on-experience in working with yeast fermentation between May 2023- Dec 2023 at Auburn University.
- I have also trained 3 MITACS research interns and 1 Canadian Commonwealth Scholar during my Ph.D.

Book Chapters

1. Selvasembian, R., Wan Azelee, N. I. B., **Shanmugam, S. R.**, Ponnusami, V., Mishra, A. K. 2023. Valorization of Wastes for Sustainable Development (**Editors**). eBook ISBN: 9780323958721. Elsevier, August 08, 2023.
2. Govindarajan, R., **Shanmugam, S. R.**, Sivaramakrishnan, R. Role of Thermophilic Microorganisms and Thermostable Enzymes (Chapter 12). In: Lignocellulosic Biomass Refining for Second Generation Biofuel Production. eBook ISBN: 9781003203452. CRC Press, July 14, 2023.
3. Sivaraman, S., Veerapandian, B., Dhayavathi, Venkatachalam, P., **Shanmugam, S.R.**, Reactor

Configurations for Thermochemical Conversion of Lignocellulosic Biomass (Chapter 6). In: Lignocellulosic Biomass Refining for Second Generation of Second Generation. CRC Press, July 14, 2023.

4. Govindarajan, G., **Shanmugam, S.R.**, Selvaraj, T. k. R. Demonstration and Industrial Scale-up. In: Basic Biotechniques and Bioentrepreneurship, 1st edition. ISBN: 9780128161098. Elsevier, 2021.
5. **Shanmugam, S.R.**, Jegadeesan, G.B., Venkatachalam, P. Application of Nanomaterials for Groundwater Treatment (Chapter 2). In: Nanotechnology in Beverage Industry. Elsevier, 2020.
6. Veeravalli, S.S., **Shanmugam, S.R.**, Lalman, J.A., Ray, S., Biswas, N. Biohydrogen production from renewable resources. In: Handbook of Biotechnology for Renewable Fuels: Technology Assessments, Emerging Industrial Applications, and Future Outlooks. Woodhead Publishing, 2019.

Books under preparation:

1. Selvasembian, R., Mahmoud, A. E. D., **Shanmugam, S. R.**, Mishra, A. K., Singh, P. (**Editors**) 2024. Wastewater as a Resource – Sustainable solutions and circular paradigms. Publisher: Springer Nature (Under preparation)
2. Venkatachalam, P., Xu, C. C., **Shanmugam, S. R.**, Uppuluri, K. B., Saady, N. (**Editors**) 2024. Waste Biorefinery Technologies for Sustainable Development. Volume 2: Biological Processes. Publisher: Elsevier (Under Preparation)

Referred Journal Articles:

1. Shanmugam, S. R., Farahmanzdad, N., Drabold, E. T., Rudar, M., Bourassa, D., Higgins, B. T. 2025. Upcycling Nutrients from Poultry Slaughterhouse Solid Waste into Value-added Bioproducts using Black Soldier Fly Larvae Cultivation. Journal of Environmental Management, Accepted Manuscript. (IF – 8.0).
2. Krishnan, S., Venkatachalam, P., Shanmugam, S. R., Paramasivam, N. 2025. Fractional inhibitory concentration of bio-actives from agricultural waste disassembles biofilms and quenches virulence of nosocomial pathogens. Journal of Medical Microbiology, Accepted Manuscript. (IF – 2.5).
3. Drabold, E. T., Sakhakarmy, M., Shanmugam, S. R., Adhikari, S., Arthur, W., Rudar, M., Boersma, M., Wang, Q., Higgins, B. T. 2025. Thermal hydrolysis of poultry byproducts for the production of microbial media. Nature Scientific Reports, 15 (1), Article Number: 6107. DOI: https://doi.org/10.1038/s41598-025-90411-7. (IF – 3.8).
4. Veerapandian, B., Krishnan, S., Sivaraman, S., Immanuel, A., Shanmugam, S. R., Oner, E. T., Venkatachalam, P., Ulaganathan, V. 2025. Bacillus spp. as microbial factories for levan and fructooligosaccharide production – Recent trends. International Journal of Biological Macromolecules, 300, 140252. DOI: 10.1016/j.ijbiomac.2025.140252. (IF – 7.7).
5. Sivaraman, S., Shanmugam, S. R., Venkatachalam, P., Shanmugam, S. R. 2025. Effect of pretreatment type on the physico-chemical properties of activated carbons derived from an invasive weed prosopis juliflora: potential applications. Materials Research Express, 12 (1), 015601. DOI: 10.1088/2053-1591/ada5c4. (IF – 1.8)
6. Shanmugam, S. R., Schorer, R., Arthur, W., Drabold, E., Rudar, M., Higgins, B. 2024. Upcycling nutrients from poultry slaughterhouse wastewater through cultivation of nutritional yeast, Yarrowia lipolytica, Journal of Environmental Chemical Engineering, 13 (1), 115245. DOI: 10.1016/j.jece.2024.115245. (IF – 7.4)
7. Krishnan, S., Prarath, N., Jothipandian, S., Sivaraman, S., Abdul Azeez, M. K., Nagarajan, D., Satish, L., Venkatachalam, P., Shanmugam, S. R., Paramasivam, N. 2024. Valorization of seaweed aqueous phase against nosocomial pathogens. Waste and Biomass Valorization, DOI: 10.1007/s12649-024-02830-8 (IF – 2.6)
8. Sivaraman, S., Subramaniam, T., Shanmugam, S. R., Sappani, D., Venkatachalam, P., Saady, N. M. C. Valorization of Prosopis juliflora biochar for supercapacitor application: Techno-economic and lifecycle analysis. Journal of Cleaner Production, 471, September 2024, 143409. DOI:

https://doi.org/10.1016/j.jclepro.2024.143409 (IF - 9.7)

9. Kumarappan, A., Sujatha, S. K. V. B., Krishnan, S., Vellingiri, K., Jothipandiyan, S., Venkatachalam, P., Satish, L., **Shanmugam, S. R.**, Paramasivam, N. 2024. Exploring bio-oil aqueous phase (BOAP) from seaweed biomass as biofilm disruptive agents against foodborne pathogens. Food Bioscience, 61, 104579. DOI: 10.1016/j.fbio.2024.104579. (IF- 4.8)
10. Sadhana, S. L., Dharshini, K. P., Devi, D. R., Naryanan, V. H. B., Veerapandian, B., Luo, R-H., Yang, J-X., **Shanmugam, S. R.**, Venkatachalam, P., Brzezinski, M., Zheng, Y-T. 2024. Investigation of levan-derived nanoparticles of Dolutegravir: A promising approach for the delivery of anti-HIV drug as milk admixture. Journal of Pharmaceutical Sciences, 113 (8), 2513-2523. DOI: 10.1016/j.xphs.2024.05.019. (IF- 3.8)
11. Gwenzi, W., Gufe, C., Alufasi, R., Makuvara, Z., Marumure, J., **Shanmugam, S. R.**, Selvasembian, R., Halabowski, D. 2024. Insects to the rescue? Insights into applications, mechanisms, and prospects of insect-driven remediation of organic contaminants. Science of the Total Environment, 925, 171116. DOI: 10.1016/j.scitotenv.2024.171116. (IF- 9.8)
12. Saady, N. M. C., Sivaraman, S., Venkatachalam, P., Zendehboudi, S., Zhang, Y., Palma, R. Y., **Shanmugam, S. R.**, Espinoza, J. E. R. 2024. Effect of veterinary antibiotics on methane yield from livestock manure anaerobic digestion: an analytical review of the evidence. Reviews in Environmental Science and Bio/Technology, 23, 133-161. DOI: 10.1007/s11157-024-09683-6. (IF- 14.4)
13. Venkatachalam, P., Sriariyanun, M., **Shanmugam, S. R.**, Selvasembian, R. 2024. Biochar as a catalyst in Biorefineries: A sustainable recovery of waste materials. Applied Science and Engineering Progress, 17 (2), 7290. DOI: 10.14416/j.asep.2023.11.008. (IF- 2.700)
14. Sivaraman, S.*, **Shanmugam, S. R.**, Veerapandian, B., Venkatachalam, P. 2023. Understanding the pyrolysis kinetics, thermodynamic, and environmental sustainability parameters of *Sesamum indicum* crop residue. Environmental Research Communications, 5, Article No. 125013. DOI: 10.1088/2515-7620/ad16f2 (IF- 3.200)
15. Veerapandian, B.*, Kumara Raja, T., **Shanmugam, S. R.**, Saraweddy, K. K., Mani, K. P., Venkatachalam, P. 2023. In vitro drug release and stability assessment of tailored Levan-Chitosan biocomposite hydrogel. Iranian Polymer Journal, 33, 11-23. https://doi.org/10.1007/s13726-023-01229-x (IF-2.485)
16. Veerapandian, B.*, **Shanmugam, S.R.**, Sivaraman, S., Sriariyanun, M., Karuppiah, S., Venkatachalam, P. Production and Characterization of Microbial Levan Using Sugarcane (Saccharum spp.) juice and Chicken Feather Peptone as a Low-cost Alternate Medium. *Heliyon* (2023), 9 (6), June 2023, e17424. (IF-3.776)
17. Krishnan, S.**, Gupta, K., Sivaraman, S., Venkatachalam, P., Yennamalli, R. M., **Shanmugam, S. R.** Waste to Drugs: Identification of Pyrolysis by-products as antifungal agents using *Cryptococcus neoformans*, *Journal of Biomolecular Structure and Dynamics* (2023), 16, 1-14, doi: 10.1080/07391102.2023.2188960. (IF-5.235)
18. Krishnan, S.**, Sivaraman, S., Jothipandian, S., Venkatachalam, P., **Shanmugam, S.R.**, Paramasivam, N. Bioprospecting of aqueous phase from pyrolysis of plant waste residues to disrupt MRSA biofilms. *Biofouling* (2023), 39 (2), 231-243. doi: 10.1080/08927014.2023.2207461 (IF-3.209)
19. Subramaniyasharma, S.*, **Shanmugam, S. R.**, Bhuvaneswari, V., Ponnusami, V., Rangabhashiyam, S. 2023. Pyrolysis of an invasive weed *Prosopis juliflora* wood biomass for the adsorptive removal of ciproflaxicin. *Biomass Conversion and Biorefinery*, 13, 9435-9450. https://doi.org/10.1007/s13399-023-03799-5 (IF-4.987)
20. Sivaraman, S.*, Anbuselvan, N.M., Venkatachalam, P., **Shanmugam, S.R.**, Selvasembian, R. Waste tire particles as efficient materials towards hexavalent chromium removal: Characterization, adsorption behaviour, equilibrium, and kinetic modelling. *Chemosphere* (2022), 295, 133797. (IF-8.943)
21. Veerapandian, B.*, **Shanmugam, S.R.**, Varadhan, S., Sarareddy, K.K., Mani, K.P., Venkatachalam,

P. Levan production from sucrose using chicken feather as a low-cost supplement nutrient source. *Carbohydrate Polymers* (2020), 227, 115361. (IF-10.723)

22. Nam, H., Wang, S., Won Seo, M., Adhikari, S., Shakya, R., Lee, D., **Shanmugam, S.R.** Enriched hydrogen production over air-steam fluidized bed gasification in a bubbling fluidized bed reactor with CaO: Effects of biomass and bed material catalyst. *Energy Conversion and Management* (2020), 225, 113408, (IF-11.533)
23. Jyothi Sailaja, C.A.C., Veerapandian, B., Seawards, K.K., Mani, K.P., **Shanmugam, S.R.**, Venkatachalam, P. Studies on solvent precipitation of levan synthesized using Bacillus subtilis MTCC 441. *Heliyon* (2019), 5 (9), e02414. (IF-3.776)
24. **Shanmugam, S.R.**, Adhikari, S., Nam, H., Patil, V. Adsorption and desorption behavior of herbicide using bio-based materials. *Transactions of ASABE* (2019), 62 (6), 1435-45. (IF-1.188)
25. Shojaeiarani, J., Bajwa, S.G., Pandey, P., **Shanmugam S.R.**, Adhikari, S., Bajwa, D. Characterization of bio-carbon and lingo-cellulosic fiber reinforced bio-composites with compatibilizer. *Construction and Building Materials* (2019), 204, 193-202. (IF- 7.693)
26. Chaump, K., Preisser, M., **Shanmugam S.R.**, Prasad, R., Adhikari, S., Higgins, B. T. Leaching and anaerobic digestion of poultry litter for biogas production and nutrient transformation. *Waste Management* (2019), 84, 413-422. (IF- 8.816)
27. Nam, H., Zhouhong, W., **Shanmugam S.R.**, Adhikari, S., Nourredine Abdoulmoumine. Chemical looping dry reforming of benzene as a gasification tar model compound with Ni- and Fe-based oxygen carriers in a fluidized bed reactor. *International Journal of Hydrogen Energy* (2018), 43 (41), 18790-18800. (IF- 7.139)
28. **Shanmugam, S.R.**, Adhikari, S., Nam, H., Sajib, S.K. Effect of biochar on methane generation from glucose and aqueous phase of algae liquefaction using mixed anaerobic cultures. *Biomass and Bioenergy* (2018), 108, pp. 479-486. (IF- 5.774)
29. Shakya, R., Adhikari, S., Mahadevan, R., **Shanmugam, S.R.**, Nam, H., Hassan, B., Dempster, T. Influence of Biochemical Composition during Hydrothermal Liquefaction of Algae on Product Yields and Fuel Properties. *Bioresource Technology* (2017), 243, pp. 1112-1120. (IF- 11.889)
30. **Shanmugam, S.R.**, Adhikari, S., Shakya, R. Nutrient removal and energy production from aqueous phase of bio-oil generated via hydrothermal liquefaction of algae. *Bioresource Technology* (2017). 230, pp. 43-48. (IF- 11.889)
31. **Shanmugam, S.R.**, Adhikari, S., Wang, Z., Shakya, R. Treatment of aqueous phase of bio-oil by granular activated carbon and evaluation of biogas production. *Bioresource Technology* (2017). 223, pp. 115-120. (IF- 11.889)
32. **Shanmugam, S.R.**, Chaganti, S.R., Lalman, J.A., Heath, D.D., Lau, P.C.K., Shewa, W.A. Long term effect of stressing agents on fermentative hydrogen production: Effect on hydrogenase fluxes and population diversity. *Renewable Energy* (2016), 88, pp. 483-493. (IF- 8.634)
33. Moon, C., Singh, R., Veeravalli, S.S., **Shanmugam, S.R.**, Chaganti, S.R., Lalman, J.A., Heath, D. D. Effect of COD: SO_4^{2-} ratio, HRT and linoleic acid on mesophilic sulfate reduction: Reactor performance and microbial population dynamics. *Water* (2015) 7 (5), pp.2275-2292. (IF- 3.530)
34. Singh, R., Moon, C., Veeravalli, S.S., **Shanmugam, S.R.**, Chaganti, S.R., Lalman, J.A. Using a statistical model to examine the effect of COD: SO_4^{2-} ratio, HRT and LA concentration on sulfate reduction in an anaerobic sequencing batch reactor. *Water* (2014) 6 (11), pp.3478-3494. (IF- 3.530)
35. **Shanmugam, S.R.**, Chaganti, S.R., Lalman, J.A., Heath, D.D. Statistical optimization of conditions for minimum H_2 consumption in mixed anaerobic cultures: Effect on homoacetogenesis and methanogenesis. *International Journal of Hydrogen Energy* (2014) 39 (28), pp.15433-15445. (IF-7.139)
36. Choquette-Labbé, M., Shewa, W.A., Lalman, J.A., **Shanmugam, S. R**. Photocatalytic degradation of phenol and phenol derivatives using a nano-TiO_2 catalyst: Integrating quantitative and qualitative factors using response surface methodology. *Water* (2014) 6 (6), pp.1785-1806. (IF-3.530)
37. **Shanmugam, S.R**., Chaganti, S.R., Lalman, J.A., Heath, D.D. Using a statistical approach to model

hydrogen production from a steam exploded corn stalk hydrolysate fed to mixed anaerobic cultures in an ASBR. *International Journal of Hydrogen Energy* (2014) 39 (19), pp. 10003-10015. (IF- 7.139)

38. **Shanmugam, S.R**., Chaganti, S.R., Lalman, J.A., Heath, D.D. Effect of inhibitors on hydrogen consumption and microbial population dynamics in mixed anaerobic cultures. *International Journal of Hydrogen Energy* (2014) 39 (1), pp. 249-257. (IF- 7.139)
39. Pendyala, B., Chaganti, S.R., Lalman, J.A., Heath, D.D., **Shanmugam, S.R.**, Veeravalli, S.S. Using a food and paper-cardboard waste blend as a novel feedstock for hydrogen production: Influence of key process parameters on microbial diversity. *International Journal of Hydrogen Energy* (2013) 38 (15), pp. 6357-6367. (IF- 7.139)
40. Pendyala, B., Chaganti, S.R., Lalman, J.A., **Shanmugam, S.R**., Heath, D.D., Lau, P.C.K. Pretreating mixed anaerobic communities from different sources: Correlating the hydrogen yield with hydrogenase activity and microbial diversity. *International Journal of Hydrogen Energy* (2012) 37 (17), pp. 12175- 12186. (IF- 7.139)
41. Saady, N.M.C., Chaganti, SR., Lalman, J.A., Veeravalli, S.S., **Shanmugam, S.R**., Heath, D.D. Effects of linoleic acid and its degradation byproducts on mesophilic hydrogen production using flocculated and granular mixed anaerobic cultures. *International Journal of Hydrogen Energy* (2012) 37 (24), pp. 18747- 18760. (IF- 7.139)
42. Saady, N.M.C., Chaganti, SR., Lalman, J.A., Veeravalli, S.S., **Shanmugam, S.R**., Heath, D.D. Assessing the impact of palmitic, myristic and lauric acids on hydrogen production from glucose fermentation by mixed anaerobic granular cultures. *International Journal of Hydrogen Energy* (2012) 37 (24), pp. 18761- 18772. (IF- 7.139)
43. Sanoop, P.K., Anas, S., Ananthakumar, S., Gunasekar, V., **Saravanan, R**., Ponnusami, V. Synthesis of yttrium doped nanocrystalline ZnO and its photocatalytic activity in methylene blue degradation. *Arabian Journal of Chemistry* (2016), 9 (2), S1618-S1626. (IF- 5.3)

Publications from Ph.D. students Supervised; **Publications from Master's student supervised

Publications under review:

1. Drabold, E., Melissa, B., Shanmugam, S. R., Wang, Q., Wellington, A., Rudar, M., Higgins, B. 2025. Chemical factors governing the growth of nutraceutical Chlorella sorokiniana on thermal hydrolysate of poultry processing solids. Submitted to ACS Environmental Science and Technology (Manuscript Ref. No. ee-2025-00176h) (IF- 7.5).
2. Gopinathan, S., Krishnan, S., Jothipandian, S., Sivaraman, S., Lakkakula, S., Venkatachalam, P., **Shanmugam, S. R.** Bioprospecting seaweed derived bio-oil as marine biofouling mitigating agent. Submitted to Algal Research Journal (Manuscript Ref. No. ALGAL-D-24-01068) (IF 5.1).
3. Mayilswami, S., Raval, N. P., Tomar, R., Sharma, S., Praveena, S. M., Kataria, N., Selvasembian, R., **Shanmugam, S. R.** Potential human health effects of per- and polyfluoroalkyl substances (PFAS) prevalent in aquatic environment: a review. Submitted to Environmental Toxicology and Pharmacology (Manuscript Ref. No. ETAP-D-24-01131) (IF 4.2)

Ph.D. student(s) Supervised; **Master's student supervised

Conference Papers, Posters and invited talks:

1. **Shanmugam, S. R.**, Higgins, B. T., Bourassa, D. 2024. Valorization of Poultry Slaughterhouse Solid Wastes into Animal Feed Using Black Soldier Fly Larvae Cultivation. American Society of Agricultural and Biological Engineers Annual International Meeting. Anaheim, CA. July 28-31 (Oral Presentation)
2. **Shanmugam, S. R.**, Schorer, R.**, Arthur, W., Higgins, B. T., Rudar, M. 2024. Upcycling Nutrients

from Abattoir Wastewater into Nutritional Yeast Cultivation. American Society of Agricultural and Biological Engineers Annual International Meeting. Anaheim, CA. July 28-31 (Oral Presentation).

3. Farahmanzdad, N.*, **Shanmugam, S. R.**, Higgins, B. T. 2024. Effect of Biochar on Methane production and Odor Reduction During Anaerobic Digestion of DAF solids collected from Poultry Slaughterhouse Facility in Alabama. American Society of Agricultural and Biological Engineers Annual International Meeting. Anaheim, CA. July 28-31 (Oral Presentation).
4. Farahmanzdad, N.*, **Shanmugam, S. R.**, Higgins, B. T., Bourassa, D. 2024. Valorization of Abattoir Wastes into Value-added Bioproduct Using Black Soldier Fly Larvae Cultivation. 2024 Auburn Research Symposium, March 26, 2024 (Oral Presentation).
5. Krishnan, S.*, **Shanmugam, S. R.**, Paramasivam, N. 2024. Bioprospecting of aqueous phase from pyrolysis of agricultural waste to combat nosocomial infections. International Conclave on Anti-Microbial Resistance, PSGRKCW, Coimbatore, India, Mar 4-5, 2024 (Oral Presentation).
6. **Shanmugam, S. R.** 2024. Waste Valorization for a Circular Economy. International Conference on "Being Eco-spiritual: A way of Sustainable Living" funded by SHASTRI INDO-CANADA INSTITUTE (SICI), Mar 1-2, 2024. (Invited Speaker- Oral Presentation).
7. **Shanmugam, S. R.** 2024. Valorization of Wastes for a Circular Bioeconomy. ECO TALK 2.0: Global Expert Lecture Series, SRM University- AP, India, Jan 31, 2024 (Invited Talk- Oral Presentation).
8. Sivaraman, S.*, **Shanmugam, S. R.**, Paramasivam, N., Venkatachalam, P., Saady N. M. C. 2023. Valorization of Bio-oil Aqueous phase from pyrolysis of Sesamum indicum biomass as a novel sustainable disinfectant. 24th Aldrich Multidisciplinary Conference, Memorial University of Newfoundland, Canada, November 18-19, 2023 (Oral Presentation).
9. Krishnan, S.*, Venkatachalam, P., **Shanmugam, S. R.**, Paramasivam, N. 2023. Exploring bio-oil aqueous phase compounds as an effective biocontrol agent against *Ralstonia solanacearum* - an in-silico approach. Prof. M. Vijayan memorial annual symposium on structural biology and bioinformatics of infectious diseases (SSBBID 2023) Thanjavur, India, October 2023 (Poster presentation).
10. Farahmandzad, N.*, **Shanmugam, S. R.**, Higgins, B. 2023. Identification of malodorous compounds produced in anaerobic digestion of DAF solids. Auburn Graduate Engineering Research Showcase, Oct 12, 2023, Auburn University, Auburn, AL, USA (Poster Presentation)
11. **Shanmugam, S. R.** 2023. Thermochemical and Biochemical Valorization of Lignocellulosic Biomass. International conference on "Biotechnological Emergence in Science and Technology (ICBEST-2023)" on October 5 & 6, 2023, SRM University, Tamil Nadu, India (Oral Presentation).
12. Veerapandian, B.*, **Shanmugam, S. R.,** Krishnan, S., Sivaraman, S., Ponnusami, V. 2023. Levan production using shake flask and fermenter: Influence of feeding strategy on levan yield and molecular weight distributions. Research, Invention, and Innovation Congress (RI^2C 2023) Bangkok, Thailand, August 2023. E3S Web of Conferences, 428, 02005. https://doi.org/10.1051/e3sconf/202342802005 (Oral Presentation).
13. **Shanmugam, S. R.** 2023. Upcycling Nutrients from Dissolved Air Flotation (DAF) Solids Collected from Poultry Slaughterhouse Wastewater (PSSW) into Value-added Products. Auburn University – University of Tsukuba Joint Seminar on "Bioprocess and Sustainability", July 27, 2023 (Oral Presentation)
14. **Shanmugam, S. R.**, Smith, J., Higgins, B. T. Fermentation of Dissolved Air Floatation (DAF) Solid Wastes collected from Poultry Slaughterhouses using Nutritional Yeasts. American Society of Agricultural and Biological Engineers Annual International Meeting. Omaha, NE. July 10-12 (Poster Presentation)
15. **Shanmugam, S. R.** Gave a talk on "Algae for Nutraceuticals" during the India-Canada bilateral Virtual Conference organized by the SHASTRI Indo-Canada Institute on 'Waste to Wealth' held between Feb 24-26, 2021, at SASTRA Deemed University, Thanjavur, TN, India (Invited talk)
16. **Shanmugam, S. R.** Gave a talk on "Municipal Solid Wastes in Developing Countries: Issues and Opportunities" during the five-day Faculty Development Programme (FDP) on 'Green and Sustainable

Technologies for Zero Emissions' held between May 26-31, 2019, at SASTRA Deemed University, Thanjavur, TN, India (Invited talk)

17. Veerapandian , B., Praveen Kumar, **Shanmugam, S. R.**, Venkatachalam, P. Bacterial based eco-friendly self-healing concrete using Bacillus subtilis MTCC 441. SAMHITHA National Symposium, Feb 15-16, 2019, at SASTRA Deemed University, Thanjavur, TN, India (Oral Presentation). https://www.sastra.edu/samhitha19/
18. Natarajan, S.S.**, **Shanmugam, S.R.**, Venkatachalam, P. (Jan 21-23, 2019). Insights into a new class of emerging pollutants: Environmentally persistent free radicals. Selected for poster presentation in International Conference on Emerging Contaminants in Water and Environment (ECWE-2019), Coimbatore, TamilNadu, India (poster presentation)
19. Sivaraman, S.S.*, **Shanmugam, S.R.**, Venkatachalam, P. (Jan 21-23, 2019). Need for detection and quantification of persistent Organic Wastewater Compounds (OWCs) in India. Selected for poster presentation in International Conference on Emerging Contaminants in Water and Environment (ECWE- 2019), Coimbatore, TamilNadu, India (poster presentation)
20. **Shanmugam, S.R.**, Adhikari, S., Shakya, R. (Jul 17-19, 2017). Nutrient and energy recovery from aqueous phase of bio-oil generated via hydrothermal liquefaction of algae. Selected for oral presentation in 2017 ASABE Annual International Meeting, Spokane, Washington, USA (oral presentation)
21. **Shanmugam, S.R.**, Adhikari, S., Nam, H., Sajib, S.K. (Jul 17-19, 2017). Effect of adsorbents on methane generation during anaerobic digestion of glucose using mixed anaerobic cultures: Evaluation of microbial community dynamics. Selected for oral presentation in 2017 ASABE Annual International Meeting, Spokane, Washington, USA (oral presentation)
22. **Shanmugam, S.R.**, Chaganti, S.R., Veeravalli, S.S., Lalman, J.A., Heath, D.D. (Oct 20-22, 2014). Influence of hydraulic retention time on continuous biohydrogen production in upflow anaerobic sludge blanket reactors (UASBRs). Selected for oral presentation in 3rd International Conference & Exhibition Clean Energy, Quebec, Canada (Conference paper)
23. Veeravalli, S.S., Chaganti, S.R., **Shanmugam, S.R.**, Lalman, J.A., Heath, D.D. (Oct 20-22, 2014). Continuous biological hydrogen production from steam exploded corn stover liquor. Selected for oral presentation in 3rd International Conference & Exhibition Clean Energy, Quebec, Canada (Conference paper)
24. **Shanmugam, S.R.**, Chaganti, S.R., Veeravalli, S.S., Lalman, J.A., Heath, D.D. (Nov 16-21, 2014). Assessing the influence of hydraulic retention time on microbial community dynamics during fermentative hydrogen production. Selected for oral presentation in AIChE 2014 Annual meeting, Atlanta, USA (oral presentation, conference paper)
25. Veeravalli, S. S., Chaganti, S. R., Shanmugam, S. R., Lalman, J. A., Heath, D. D. (Nov 16-21, 2014). Assessing the impact of organic loading rate on hydrogen production and mixed anaerobic culture community dynamics. Selected for oral presentation in AIChE 2014 Annual meeting, Atlanta, USA (oral presentation, conference paper)
26. **Shanmugam, S.R.**, Chaganti, S.R., Veeravalli, S.S., Lalman, J.A., Heath, D.D. (Aug 5-7, 2013). Long term effects of stress treatments on biohydrogen production using mixed anaerobic communities. International conference on "BioH2", Montreal, QC, Canada (Oral presentation)
27. Veeravalli, S.S., **Shanmugam, S.R.**, Chaganti, S.R., Lalman, J.A., Heath, D.D. (Aug 5-7, 2013). Hydrogen production from switchgrass in continuously fed anaerobic bioreactors. Effect of operational conditions. International conference on "BioH2", Montreal, QC, Canada (Oral presentation)
28. **Shanmugam, S.R.**, Chaganti, S.R., Lalman, J.A., Heath, D.D. (Jun 2013). Effect of pH and Linoleic acid on Mesophilic hydrogen consumption by mixed anaerobic cultures. International conference on "World congress on Industrial Biotechnology and Bio processing", Montreal, QC, Canada. (Poster presentation)
29. **Shanmugam, S.R.**, Chaganti, S.R., Veeravalli, S.S., Lalman, J.A., Heath, D.D. (May 8-11, 2011). Effect of hydraulic retention time (HRT) on Biohydrogen production using mixed anaerobic communities in sequencing batch reactors (SBRs). International conference on "World congress on

Industrial Biotechnology and Bio processing", Toronto, ON, Canada. (Poster presentation)

30. **Shanmugam, S.R.**, Cata Saady, N.N.M., Veeravalli, S.S., Lalman, J.A. (Jan 2011). Effects of Lauric, Myristic and Palmitic acids on Fermentative Hydrogen Production. "Bringing together communities", student research conference University of Windsor, Windsor, Canada. (Poster presentation)
31. Veeravalli, S.S., **Shanmugam, S.R.**, Thiagarajan, K., Lalman, J.A. (Jan 2011). Impact of Furfural on Fermentative Biohydrogen Production from Glucose. "Bringing together communities", student research conference University of Windsor, Windsor, Canada. (Oral presentation)
32. Chaganti, S.R., Veeravalli, S.S., **Shanmugam, S.R.**, Thiagarajan, K., Lalman, J.A. (Jan 2011). Effect of Furfural on mixed anaerobic communities during glucose fermentation to hydrogen. "Exploitation of agro-industrial biomass for integrated biofuel and novel products through novel production systems". Indo-Canada Workshop at IICT-Hyderabad, India. (Oral presentation)
33. Anbalagan, S., **Shanmugam, S.R.** (Feb 2008). Tre recombinase loaded Immunoenzymosomes for targeted HIV-1 proviral DNA excision. Proceedings of International Conference on Biotechnology "INCOB", Vellore Institute of Technology (VIT), Vellore, India. (Poster presentation)
34. Anbalagan, S., **Shanmugam, S.R.**, Balaganessin, C. (Jan 2007). A Novel approach to Prevent HIV Infection Using Immunoliposomes. Proceedings of International Conference on Molecular and Cellular Biology & Therapeutics of HIV and Associated Viral Infections "Combat HIV", University of Hyderabad, Hyderabad. (Poster presentation)
35. Anbalagan, S., Veeravalli, S.S., **Shanmugam, S.R.**, Balaganessin, C. (Mar 2007). Nano biosensors & Alzheimer's Disease- An Idea to Diagonise & prevent Alzheimer's. National level technical symposium organized by Pavendar Bharathidasan College of Engineering & Technology, Tiruchirappalli, India. (Poster presentation)

Presentations from Ph.D. student Supervised; **Presentations from Master student supervised

Professional Memberships

1. Member, American Society for Agricultural and Biological Engineers (ASABE)
2. Member, Ontario Society for Professional Engineers (OSPE)
3. Member, International Association of Hydrogen Energy (IAHE)

Reviewer

1. **Grant application for *MITACS Elevate research program*, Canada.**
2. Nature Scientific Reports
3. Journal of Water Process Engineering
4. Applied Science and Engineering
5. Energy Conversion and Management
6. Adsorption Science and Technology
7. Biofuels
8. Journal of Environmental Chemical Engineering
9. Bioprocess and Biosystems Engineering
10. Applied Sciences
11. American Society for Agricultural and Biological Engineers (ASABE) journals
12. International Journal of Environmental Science and Technology
13. Journal of Renewable Energy
14. African journal of Biotechnology
15. Journal of Sol-Gel Science and Technology (JSST)
16. Applied Engineering in Agriculture
17. Applied Energy
18. Brazilian Journal of Chemical Engineering
19. HELIYON
20. Biotechnology Reports
21. Applied Science and Engineering Progress

22. MDPI journals – Water, Bioengineering, Microorganisms, Materials, Applied Science, Sustainability, Energy, Coatings

Extracurricular Activities

1. Judge for 2024 Auburn Research Symposium, Mar 26, 2024.
2. Judge for student presentation sessions at the ASABE AIM held at Omaha, Nebraska Jul 10-12, 2023.
3. Judge for Alabama Science & Engineering Fair held at Auburn University April 01, 2023
4. Advisor for Biosystems Engineering Graduate Group (BSEN) at Auburn University Jan 2018-Apr 2018
5. Judge for Graduate Engineering research showcase at Auburn University, 2016 & 2017
6. Judge for Poster presentation at College of Agriculture, Auburn University, 2016 & 2017
7. President of American Society for Microbiology (ASM), University of Windsor Student Chapter Jan 2014 – Jan 2015
8. Judge for Clean Tech Competition, 2014
9. Environmental Engineering Graduate Student Representative at AAU Council Sep 2013 - May 2014
10. Departmental Graduate Student Society (GSS) representative 2011-2012
11. Volunteer at Student Orienting Students (SOS) at University of Windsor 2011-2012

Curricular Contributions (Pedagogical Activities)

1. Naren, P. R. and **Shanmugam, S. R.** "Learning log" in Fluid Mechanics Laboratory Course. Volume 03, Issue 01, February 2023. https://scbt.sastra.edu/downloads/teaching_learning_newsletter/STL_Feb2023-17.pdf
2. **Shanmugam, S. R.** "ePortfolio as a Pedagogical Tool to Enhance Learning Outcomes". Volume 02, Issue 02, August 2022. https://scbt.sastra.edu/downloads/teaching_learning_newsletter/STL_Jul2022-11Aug_U.pdf