MITHIL KUMAR NAYUNIGARI, Ph.D.,

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EDUCATION

Ph.D. in Polymer Science, Srikrishnadevaraya University, AP, India **Sep 2011**
Master of Science, Srikrishnadevaraya University, AP, India **May 2006**
Bachelor of Science, Srikrishnadevaraya University, AP, India. **May 2002**

PEER REVIEWED PUBLICATIONS

1. Kumar, N.M., Gupta, S. K., Mahmoud, N., Gangadhar, A., R.P.S., A. Maity, (2019) "Artificial neural network and cost estimation for Cr(VI) removal using polycationic composite adsorbent. Water and Environment Journal. DOI:10.1111/wej.12501
2. Gupta, S. K., Kumar, N.M., Guldhe, A., Ansari, F.A., Rawat, I., Mahmoud, N., Bux, F. (2018) Wastewater to biofuels: Comprehensive evaluation of various flocculants on biochemical composition and yield of microalgae. Ecological Engineering, 117, 62–68.

3. Gupta, S. K., Ansari, F.A., Mahmoud Nasr, Rawat, I., Kumar, N.M., Bux, F. (2017) Cultivation of Chlorella sorokiniana and Scenedesmus obliquus in wastewater: Fuzzy intelligence for evaluation of growth parameters and metabolites extraction. Journal of Cleaner Production, 147, 419-430.

4. Kumar, N.M. Das, R., A. Maity, Gupta. V.K. (2017) Folic acid modified cross-linked cationic polymer: Synthesis, characterization and application of the removal of Congo red dye from aqueous medium. Journal of Molecular Liquids, 227, 87-97

5. Sharista Raghunath, Anand Krishnan, R M Gengan, Kumar, N.M., A. Maity,(2016)Sorption isotherms, kinetic and optimization process of amino acid proline based polymer nanocomposite for the removal of selected textile dyes from industrial wastewater. Journal of Photochemistry & Photobiology, B: Biology, 165, 189-201.

6. Kumar, N.M., A. Maity, S. Agarwal, Gupta. V.K. (2016) Curcumin–malic acid based green copolymers for control of scale and microbiological growth applications in industrial cooling water treatment. Journal of Molecular Liquids. 214, 400-410.

7. Gupta, S. K., Kumar, N.M., Mishra, R., Ansari, F.A., Dionysiou, D., A. Maity., Bux, F.(2016) Synthesis and performance evaluation of a new polymeric composite for the treatment of textile wastewater. Industrial &Engineering Chemistry Research. 55, 13-20.

8. Kumar, N.M., kanny, K.(2015) Development of green dual Polymers for antibacterial applications. Polymer-Plastics Technology and Engineering. 54, 1715-1722.

9. Kumar, N.M., Gupta, S.K., Bux, F., Kanny, K. (2015) Development of poly(aspartic acid-co- malic acid) composites for calcium carbonate and sulphate scale inhibition. Environmental Technology. 36, 1281-1290.

10. Kumar, N.M., Gupta, S.K., Prasad, K.V., Kanny, K., Bux, F. (2014) Development of anti-scale poly (aspartic acid-citric acid) dual polymer systems for water treatment. Environmental Technology. 35, 2903-2909.

11. Gupta, S.K., Kumar, N.M., Guldhe, A., Ansari, F.A., Rawat, I., Kanney, K., Bux, F. (2014) Design and development of polyamine polymer for harvesting microalgae for biofuels. Energy Conservation and Management. 84, 537-544.

12. Vimala K, K. Kanny, K. Varaprasad, Kumar, N.M., G.S.M. Reddy (2014) Novel–Porous- Ag0 Nanocomposite Hydrogels via Green process for Advanced Antibacterial Applications., Journal of Biomedical Materials Research Part A. 102A, 4616–4624.

13. Kumar, N.M., Kanny. k., (2013) A novel biodegradable poly(hydroxybutanedioic acid-co-2- hydroxypropane-1,2,3-tricarboxylic acid) copolymer for water treatment applications. 3,53-58.

14. Kumar, N.M., Varaprasad, K., Naidu, S.V., (2012) A novel poly (L-Aspartic acid-Citric acid) copolymer for antimicrobial applications. Journal of polymers and the environment. 20, 17-22.

15. Kumar, N.M., Prasad, K.V., Reddy, G. R., Bharathi, Y.S., Reddy, G.V.S., Naidu, S.V., (2011) Biodegradable water soluble copolymer for antimicrobial applications. Journal of polymers and the environment. 19, 225-229.

16. Prasad, K.V., Reddy, N.N., Kumar, N.M., Vimala, K., Ravindra. S., Raju. K.M., (2010) Poly (acrylamide-chitosan) hydrogels: Interaction with surfactants. International Journal of Polymeric Materials, 59:981–993.

17. Kumar, N.M., Reddy, G.V., Naidu, S.V., (2009) Mechanical properties of Coir/Glass fiber phenolic resin based composites. Journal of Reinforced Plastics and Composites. 28, 2605-2613.

18. Dani Jagadeesh, K. Prashantha, Kumar, N.M., A. Maity.(2016) Effect of Gelatin Content on Potato Starch Green Composite films. Indian Journal of Advances in Chemical Science 4, 355-361.

PAPERS TO BE COMMUNICATED

19. Kumar, N.M., Gangadhar, A., R.P.S., (2019) Adsorption of PFCs from aqueous solutions by PANI. (Journal of Cleaner Production).

20. Kumar, N.M., Gangadhar, A., R.P.S., (2019) "Efficient removal of Selenium by magnetic-based βCDIL material. (To be communicated in Journal of Cleaner Production).

21. Kumar, N.M., Gangadhar, A., R.P.S., (2019) Microbial resistant cationic polymer: Catalytic activity for wastewater treatment system. (International Journal of Biological Macromolecules).

CONFERENCE PROCEEDINGS

22. **Kumar, N.M.,** Gupta, S.K., Bux, F. and Kanny, K. (2013) Evaluation of scale inhibition (calcium carbonate and calcium sulfate) efficiencies of newly developed poly (aspartic acid- citric acid) copolymers, (ICCBN), Dec 3-5, 2013. Durban University of Technology, South Africa.

23. Vimala K., Kanny. K., **Kumar, N.M.,** Padma, K., (2013) Fabrication of Sodium Alginate Silver Nanocomposites for Antimicrobial Applications, (ICCBN), Dec 3-5, 2013, Durban University of Technology, South Africa.

CONFERENCE PRESENTATIONS/PARTICIPATED

1**. Kumar, N.M**., R.P.S., "Development of a fast presence/absence method for PFAS" National Science Foundation Water and Environmental Technology Center (NSF WET Center) Annual Meeting, May 14-15, 2019, Horsham, PA, USA.

2. **Kumar, N.M.,** R.P.S., "Removal of Selenium, Dichlorobenzene and other co-contaminants from Water" (Project Tracking TU-18-03); National Science Foundation Water and Environmental Technology Center (NSF WET Center) Annual Meeting, May 14-15, 2019, 2018, Horsham, PA, USA (Presented Project progress report).

3. **Kumar, N.M.,** R.P.S., "Removal of Cyanotoxins & Glyphosate from Water using GAC and Select resins" National Science Foundation Water and Environmental Technology Center (NSF WET Center) Annual Meeting, May 14-15, 2019, Horsham, PA, USA (Presented Project proposal).

4. **Kumar, N.M.,** R.P.S., "Development of presence/absence, real-time sensor for PFAS (Project Tracking TU-18-01)" National Science Foundation Water and Environmental Technology Center (NSF WET Center) Annual Meeting, June 12-13, 2018, Horsham, PA, USA (Presented Project proposal).

5. **Kumar, N.M.,** R.P.S., "Removal of Selenium, dichlorobenzene and other co-contaminants from water (Project Tracking TU-18-03); National Science Foundation Water and Environmental Technology Center (NSF WET Center) Annual Meeting, June 12-13, 2018, Horsham, PA, USA (Presented Project proposal).

6. Participated in the National conference on advances in nanoscience and technology (NANOSAT- 10), April 22-23, 2010, Kanjirappally, Kerala.

7. **Kumar, N.M.,** Participated in the National Seminar on emerging materials and technologies (EMT 2010), 9- 10^{th} October- 2010, Anantapur. Andhra Pradesh.

8. **Kumar, N.M.,** Naidu, S.V., (2011) Biodegradable water-soluble copolymer for antimicrobial applications (Oral Presentation), Application of microbes in management of agriculture and environment (AMMAE), March 4-6.

9. **Kumar, N.M.,** Gupta, S.K., Bux, F. and Kanny, K. (2013) Evaluation of scale inhibition (calcium carbonate and calcium sulfate) efficiencies of newly developed poly (aspartic acid-citric acid) copolymers, (Oral Presentation) (ICCBN), Dec 3-5, 2013. Durban University of Technology, South Africa. Presented research paper to International Conference on Composites, Biocomposites, and nanocomposites (ICCBN-2013)

10. Gupta, S.K., **Kumar, N.M.,** Guldhe, A., Ansari, F.A., Rawat, I., Kanny, K., Bux, F. (2015) Development and effectiveness of low-cost cationic polymer for the harvesting of microalgae. 5^{th} International Conference on Plant and Environment Pollution (ICPEP-5), CSIR-National Botanical Research Institute and International Society of Environmental Botanists, Lucknow, India. Feb 24-27, 2015 (Abstract Book, SVIII/O-2, pp 255).

11. **Kumar, N.M.,** Participated in the National Seminar on "The 5th CSIR Conference ", 8-9 October 2015, Pretoria, South Africa.

12. **Kumar, N.M.,** Participated in the National Workshop on Water Research Workshop program- 28 March 2017, Auditorium, Room A2, Building 19B, CSIR Campus, and Pretoria, South Africa.

13. **Kumar, N.M.,** To participate in the event of "PFAS in surface water, sediment, and fish from the Delaware River" Philadelphia, PA, 09 Oct 2019.

14. **Kumar, N.M.,** To participate in the "Singh Center for Nanotechnology 2019 Annual User Meeting" at the University of Pennsylvania on October 28, 2019.

WORK EXPERIENCE

Postdoctoral Fellow Research Associate, Temple University, USA ***11/2017 – Current***

Initiate, lead and evaluate licensable innovations and improvements in materials, polymeric adsorbent products, and adsorption technologies, Identification of right process for the developing technology and without any limitation's identification of novel materials for various applications. Performing research on advanced water & wastewater treatment technologies including UV, Ion-exchange adsorbents processes (Polyamine, magnetic based cyclodextrin ionic liquid composites, conducting polymeric adsorbents, etc. Providing critical support to research and teaching activities in the Environmental Engineering department, and training to graduate (M.S & Ph.D.) and undergraduate students working on research and design projects, maintain chemical inventory and troubleshoot equipment issues. Establishing a safety culture in CEE labs via awareness, standards, policies, communications, and practices.

Teacher, Temple University ***08/2018 – current***

Teaching Gen-Ed course, The Environment (ENVT 0845). Taught two labs, Water and Wastewater Lab (EN-ENVE-BSEN 4722) & Water Quality and Analysis Lab (CEE 3725) for the undergraduate course.

Postdoctoral Fellow, University of South Africa (UNISA) ***7/2015 to 30/2017***

Visiting Research Scientist (Council for Scientific and Industrial Research (CSIR), South Africa) 1 st July 2015 to 30th June 2017

Performed research on polymeric adsorbents for the removal of dyes, heavy metals, and control of scale and microbiological growth-related wastewater treatment applications. Published 5 International journals in repeated journals.

NRF-Freestanding Postdoctoral fellow, DUT, South Africa ***04/2012 to 03/ 2015***

Design and development of novel nanomaterials for industrial wastewater purification. Design and development of novel water-soluble biodegradable polymers for antiscalant applications. Data acquisition and analysis, Perform preliminary and detailed techno-economic assessments of new technology concepts. Wrote technical reports, papers, and patents, Lead and supervise master's and Doctoral students. Performed research on advanced water & wastewater treatment technologies including Ion-exchange and adsorption processes.

Project Assistant-IV, National Chemical Laboratory ***11/2011 to 01/ 2012***

Performed research on polymeric solutions.

Ph.D., Srikrishnadevaraya University ***08/2007 to 12/2011***

Developed three types of water-soluble biodegradable polymers for industrial wastewater treatment. Assisted polymer science undergraduate students with performing laboratory experiments in Polymerization Chemistry Lab, and Reaction Lab.

M.Sc. Academic project course trainee, National Aerospace Laboratory ***11/2005 to 04/2006***

I developed the phenolic resin based coir/glass hybrid composites using compression molding followed by hand lay-up technique. Developed material was then investigated its mechanical properties such as tensile and flexural properties of coir based hybrid composites as a function of fiber content and fiber volume fraction. This study was focused on the mechanical performance of coir based and its hybrid composites.

Research Scientist, Ion Exchange (Ind) Limited ***07/ 2007 to 03/ 2010***

I have dealt with several projects in polymeric-related fields (quaternary polyamine, polyacrylic acid, and polymaliec anhydride) during these years. My job responsibilities including the formulate and synthesis water-soluble polymers in the lab for various wastewater treatment applications, the synthesized product was then being analyzed and characterized, the design of experiments (DOE) study was carried out to optimize the process parameters and formulation.

RESEARCH EXPERIENCE

PROFESSIONAL PROFILE: POLYMER CHEMIST

12 years of research and development experience in polymer chemistry, research and development experience in diverse industries including water soluble polymers (polyacrylic, quaternary ammonium salt-based cationic polyamine, polymaleic anhydride, and copolymeric products). Development of different technologies like cationic, anionic, solution, bulk, emulsion polymerizations, adsorption, ion exchange, and coir/glass-phenolic resin-based composite product development using different polymers, polymer composites, adsorbents, biodegradable materials for various applications, water purification technology methods using polymeric adsorbents. Sufficiently trained to solve unique problems within process environments based on broad experience in process development and improvement.

CORE SKILLS

Design of experiments (DoE), design and development of novel polymeric materials, synthesis of novel polymers, development of Nanomaterials, extraction, and purification of materials using purification methods. Handling of analytical, thermal, surface analysis instruments, Interpretation of research results, research problem solving, due diligence, production scheduling, standard operating procedures (SOPs), strong technical report writing and presentation, effective stakeholder engagement.

Notable Achievements:

Successfully developed polyamines, conducting polymers, polyacrylic based water soluble polymers, amino acid-based green polymers and Iron-based β-cyclodextrin- ionic liquid magnetic nanomaterials for removal of organic/inorganic pollutants from water/wastewater.

Successfully completed NRF funding (2012-2015) worth R 440,000 for design and development of polymeric materials for water purification.

Junior Research Fellowship - Research Fellowships in Science for Meritorious Students (RFSMS), University Grants Commission (UGC), New Delhi, Government of India. (June-2010 to May-2011).

Performed research under the guidance of PI on the following projects:

- Development of a fast presence/absence method for PFAS" sponsored by WET Center
- Developed advanced analytical test methods for the trace detection of more than 9 perfluorinated compounds
- Performed continuous improvement in the methods to reduce run time and achieve high-quality data
- Compiled the data to analyze and identify untreated waste sources in the watershed

- Removal of Perfluorinated chemicals from water/wastewater using adsorption processes
- Developing polyaniline based effective adsorption processes for the removal of PFC's
- Developed advanced analytical methods for the simultaneous detection of PFCs in water/wastewater

- Removal of selenium, dichlorobenzene and other co-contaminants from water, sponsored by WET Center

- Treatability studies for groundwater remediation using iron magnetic based ionic liquid cyclodextrin composites
- Designed & development of adsorbent
- Optimized adsorption process to meet the evolving discharge standards
- Performed cost analysis for scale-up of adsorbent & adsorption process
- Developed analytical methods for chlorinated VOCs and selenium metals

- Removal of cyanotoxins & glyphosate from water using GAC and select resins" sponsored by NSF WET Center)
- Developing analytical methods for analysis of cyanotoxins & glyphosate using GC/MS/MS and LC/MS/MS

- Developed, optimized and performed the **various adsorbents** in a batch scale level for removal of VOCs and selenium metals, dyes, chromium heavy metals, scale formation, inactivation of microorganisms and emerging contaminates (PFCs) from a water/wastewater
- Process optimization, capital cost savings, and operational cost savings in comparison to an existing treatment facility
- Developing adsorption treatment technologies for removal of dichlorobenzene, per-fluorinated compounds

PROFESSIONAL BODY MEBERSHIP

The South African Chemical Society (SACI) [Membership No: 11191] was awarded Professional Body Status in July 2017 by the South African Qualification Authority (SAQA).
He was awarded Professional Body Certificate from The South African Qualifications Authority (SAQA) in 2017 (Serial No: 774383).

Computer Literacy: MS Word, MS Excel, MS PowerPoint, GraphPad prism, Origin graphs.

Dear Director/Lab Manager/HR Officer ;

I am writing to apply for the position of **Research SScientist/ SeniorResearch Investigator - Polymer Chemistry/Suitable Position**. My graduate work at Srikrishnadevaraya University, India in Chemistry. Then, I completed my Master of Science degree at Srikrishnadevaraya University, India centered in polymer science focusing on mechanical properties of coir/glass fiber phenolic resin based composites. I held a Ph.D. degree in Polymer Science under the supervision of Late Prof. S. Venkata Naidu at Srikrishnadevaraya University in 2011.

I have worked as a project trainee in National Aerospace Laboratory (NAL), India for six months between 2005-2006 as part of my M.Sc. Academic project course. During this project, I developed the phenolic resin based coir/glass hybrid composites using compression molding followed by hand lay-up technique. Developed material was then investigated its mechanical properties such as tensile and flexural properties of coir based hybrid composites as a function of fiber content and fiber volume fraction. This study was focused on the mechanical performance of coir based and its hybrid composites. I was trained in the compression molding technique and UTM analysis. I had gone for Technical Training experience on Plastic Processing and Testing Technology at Central Institute for Plastic Engineering and Technology (CIPET), India for two months as a part of the M.Sc. course. The experience gained on Injection molding, Blow molding, Compression molding, Extrusion molding and etc. During NAL & CIPET academic research, he has worked with polymer scientists, chemists, and Research scholars and secured a valuable insight into the laboratory practices during. By the end of these academic experiences, he was succeeded to publish his research work in the Journal of reinforced plastics and composites (2009).

After my M.Sc. graduation, I worked as a Research scientist at Ion Exchange (Ind) Limited, between 2011-2010. While in industry, I have conducted many projects in polymeric-related fields (quaternary polyamine, polyacrylic acid, and polymaliec anhydride) during these years. My job responsibilities including the formulate and synthesis water-soluble polymers in the lab for various wastewater treatment applications, the synthesized product was then being analyzed and characterized, the design of experiments (DOE) study was carried out to optimize the process parameters and formulation. The deployment of available technologies and the development of new technologies for water and wastewater treatment and reuse, corrosion and scaling control, chemicals dosage monitoring and control, and mining process. Management of research projects and coaching of team colleagues and protection of developed technologies through patent deposit. I had the opportunity to learn the specialties of process development, process improvement, background of polymer chemistry, and water treatment. Additionally, I reviewed/developed technical specifications for wastewater systems which include oil-water separator, sewage treatment plant, water, and wastewater systems. Reviewed offers and documentation from suppliers. Supervised chemical dosing and water-steam cycle chemistry analysis for all BOP systems and boiler. Performed sampling/analysis of boiler and cooling water application-based polymers, wrote technical reports and made recommendations related to chemical treatment and operation of water systems and interacted with client process engineers, production teams, supervisors and plant operation personnel. Within Ion Exchange Ltd (IEL), I interacted with sales, distribution, production, lab, and the applied services departments. I trained an invoice application R&D projects in water treatment.

My doctoral dissertation was conducted under the guidance of Prof. Venkata Naidu, and tests at the use of relatively new polymeric materials for the design of antiscalants for wastewater system and bandage applications as antimicrobial agents. Developed two types of water soluble polymers for those applications in which both antiscalant and antimicrobial requirements are explicitly satisfied. This was delivered in a laboratory-based scale-up that could easily manufacture even in pilot levels to the community. This work has been published in "Journal of Polymers and the Environment". Since I had experienced only water treatment systems from industry, my dissertation was focused on both topics. Another area (antimicrobial) that interest motivated me for my future research stem from my goal of developing improved analytical models and methods for design, evaluation, and upgrade of polymeric structures subjected to microbial strains with both gram-positive and negative bacteria.

After moving to Postdoctoral study, DUT, South Africa, I have worked on synthesis, evaluation and improvement of accuracy of static analysis for calcium carbonate ($CaCO_3$) & calcium sulphate ($CaSO_4$) antiscalants and biodiesel production from algae and tested for the performance of polymers on different types of bacteria and fungi under the Prestigious fellowship of a project from the National Research Foundation (NRF), a national organization at Durban University of Technology (DUT), South Africa. For the period DUT post-doctoral (04/2012- 03/2015), he has published 6 articles and 2 conference papers.

After three years postdoc at the DUT, he spent two years as a postdoctoral research fellow at the University of South Africa (UNISA) for Civil and Chemical Engineering, Pretoria, South Africa. His research was focused on polymeric adsorbents for the removal of dyes, heavy metals, and control of scale and microbiological growth-

related wastewater treatment applications. He was mentoring at graduates and postgraduates' levels. He was successfully delivered 5 reputation journals during the UNISA postdoc period.

I currently work at Temple University, Civil and Environmental Engineering Department as a postdoctoral fellow research associate and lecturer. He is engaged in the development of several polymer-based advanced cationic-charged conducting polymeric composite adsorbents and their performance analysis/ iron magnetic-based polymer composites for removal of perfluoro compounds (PFCs) from surface/groundwater system. He is presently working with several industrial based projects including the "Development of a fast presence/absence method for PFAS", "Removal of selenium, dichlorobenzene and other co-contaminants from water"," "Removal of cyanotoxins & glyphosate from water using GAC and select resins". To date, he has completed two projects such as "highly effective re-usable conducting PANI adsorbent for removal of PFAS from aqueous systems' and "effect of water matrix on the removal of PFAS using various resins". So far at Temple University, he has published one journal, one is communicated, two more to be communicated soon. Apart from research at Temple University, I am also teaching "The Environment (ENVT 0845) course" for two years. I also taught two lab courses "Water and Wastewater Lab (EN-ENVE-BSEN 4722)" & "Water Quality and Analysis Lab (CEE 3725)" for the undergraduate section. He has two years of experience in teaching "The Environment" at Temple University.

For the periods of Ph.D. and post-doctoral, I have written 18 articles, 2 conference papers, 3 more to be communicated, and completed several projects. He also participated in national and international seminars on various fields of polymer science and water treatment technologies. His research program aims to address the above-mentioned aspects by coming up with new grades of environment-friendly polymers &/or building know-how of making biodegradable polymers with customized features for specific applications. During my postgraduate, doctoral and postdoctoral training, I have been fortunate enough to also serve as a teaching assistant/teacher and occasionally instruct for an intermediate level course on polymers for wastewater treatment technology. My ten years of professional experience as a scientist and researcher have provided me with a broad view that is useful in assisting students with projects and assignments. Through my participation as a teaching assistant, I have developed confidence and an interest in teaching and look forward to the opportunity to both teach assigned classes and to develop my own classes. His honors and awards: Prestigious award in South Africa nation "NRF Postdoctoral Research Fellow" (April 2012 –March 2015) for 3 years, and Junior Research Fellow (Meritorious Student fellowship, UGC, New Delhi, India) from June 2010 -May 2011.

As my curriculum vitae illustrates, I have pursued every available opportunity to teach. I currently teach the "Environment Course" for undergraduate students at Temple University. Besides, I have assisted in the development and instruction of many courses relevant to outlined in the job announcement including chemical, physical, and ecological processes and water resource sustainability. I have also conducted many M. Sc. thesis with my students helping to improve their academic writing skills and knowledge. Finally, I am dedicated to inspiring the lives of students outside the classroom. Through many years of facility in outdoor education, I helped many young students to achieve governance skills and self-confidence. Perhaps the most significantly, I am committed to improving science education.
I am looking forward to Research Investigator/Suitable Position and work in the frontier areas of water chemistry, environmental engineering and polymer chemistry. In this context, I feel privileged in seeking R**esearch Scientist/ SeniorResearch Investigator-Polymer Chemistry/water research/Suitable Position** in your esteemed industry. I am very much interested to carry out further research work in the area of materials & polymers for PFCs, dyes, and heavy metals remediation and catalyst applications. I have enclosed my curriculum vitae, a statement of research interests, a teaching statement, and references. If desired, I would be happy to provide any other requirements. I look forward to hearing from the committee and wish you the best of luck in selecting the ideal candidate.

Thank you for your consideration.
Sincerely,

Mithil Kumar Nayunigari, Ph.D.,
Postdoctoral Fellow Research Associate,
Civil & Environmental Engineering Department,
College of Engineering,
Water and Environmental Technology (WET) Center,
Temple University, USA.
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STATEMENT of RESEARCH

I have always viewed my career as an academician in Environmental and Chemical Engineering to be a lifelong learning commitment. It certainly did not end with my under graduation in 2002 but went on with several learning milestones in the academe and in professional roles that have enriched my competencies and widened my perspectives for a career that would lead me to my ambition of becoming a consummate educator and researcher in environmental engineering who can make a lasting legacy for future generations. It certainly helped that my ambition has clarified and focused on what I needed to learn to bring my career to a higher plane with each learning milestone I took. Hence, after my undergrad, I perused and completed my Masters in 2006 and my doctorate in 2011. Along the way, I have taken professional roles as a project trainee, research scientist, junior research fellow and project assistant that has led me to my current role as a post-doctoral fellow research associate, and lecturer at Temple University's Water and Environmental Technology Center. I am now looking to take my next learning milestone as a faculty member with a view to enriching the knowledge base in environmental engineering through more extensive research.

My research projects funded by governmental organizations over the last 9 years during and after Ph.D. have led me to publish various papers in several peer-reviewed journals, several of which I have presented in various international conferences. I have attached my detailed CV where my research works, and their publication has been detailed and listed, as they are too numerous to mention here. Suffice it say that my scholastic and research background speak volumes about my research passion for water and wastewater treatment, design, development of materials, adsorption processes, and water treatment technologies for removal of pollutants, and currently focused on emerging contaminants such as perfluorinated compounds, pharmaceuticals, among the major ones.

At this point in my career, I know I still have a long way to go to bring my profession as an academician in the environmental engineering area to the level where I can find the career fulfillment I seek. Moving forward, with my primary research interests in preserving the environment for our future generations, I am excited to continue with a more exhaustive study into the fundamentals of environmental engineering, water/wastewater treatment, water reuse, applications of adsorption processes and also chemical process in water, wastewater, and treatment of emerging pollutants.

As a faculty member, I plan to conduct deeper investigative research into advanced materials adsorption processes, the fate of pollutants, conservation of water resources. This would include research into more efficient and productive engineering solutions in addressing micropollutants, particularly pharmaceuticals, personal care products and perfluorinated compounds that have seeped into our natural water ecosystems, as well as their permanent removal from wastewater and identification of their highly destructive by-products.

Moving forward with research work that would open new frontiers in enriching the knowledge base of my profession, I hope to leverage on my competencies across three main research areas where I have currently accumulated my engineering expertise, as follows: (1) Water quality research in natural systems and process engineering research in water/wastewater treatment systems; (2) Greywater reuse systems based on modified natural polymeric-adsorbent chemical treatment. (3) green polymeric synthesis and

evaluation of their physical, chemical, biological properties and (4) remediation of selenium, dichlorobenzenes and other co-contaminants, cyanotoxins, emerging contaminants by conducting polymers developed by oxidation processes; (5) Development of presence/absence, real-time sensor for PFAS in water/soil.

These areas continue to bring challenges with more questions that seek answers with every research work I have conducted. As an academician, engineer, and researcher, I remain committed to focusing my energies in exploring options in applying adsorption chemistry and engineering solutions to address unmet environmental challenges facing practical applications in homes and industries, including both engineered and natural systems. Currently, I am involved in studying remediation of per-and poly-fluorinated compounds, selenium, dichlorobenzenes and other co-contaminants, cyanotoxins by adsorption processes. I now look to a faculty position to be the catalyst that will progressively bring my science and scholastic competencies to further shape the direction of research efforts in the university's mission to bring changes in the careless attitudes of businesses and industries in creating ecological imbalances with unabated exploitation and irresponsible use of natural resources that have threatened the world to near extinction in just the last decade.

I have always looked at engineered-chemical solutions as empowering the modern man with the means to make the homes and industries more convenient while bringing them to levels of productivity and efficiency without parallel in human history since the industrial revolution. However, technological advances have come at a price, a steep one that, unless corrected in my lifetime in collaboration with environmental engineers, chemists, biologists, technologists, and academicians around the world, the next generation will suffer a level of environmental degradation that will negate or reverse the advances we have achieved this far. I look forward to being among the emerging crop of professionals who have taken missionary advocacy with real world application to reverse the damage that modern technologies over the last 50 years have wrought on the planet. I hope to bring my competencies to bear on this mission. I am optimistic the damage can be reversed, and I hope my professional role as a member of the faculty will bring my career ever so closer to fulfilling this mission. Having done so, I would be happy to face my children as a caring and concerned professional who did something about the problem, one whose humble but purposive engineering and research competencies have made a lasting difference in reconstituting the world's environment and ecosystems to benefit future generations as they have benefited my generation with the abandon that almost ruined their future.

TEACHING STATEMENT

As a teacher, I do believe in the importance of fostering students' curiosity and helping their own natural feeling for learning. I also favor a participating attitude to the teaching of science; thus, students learn by direct participation in research from a possible opportunity. Another important part of my teaching strategy is to solve problems. At Temple University, graduate students have conducted research under my direction or projects and are fortified to contribute creatively to all stages of investigations. Since August 2017, I have also been working as a lecturer at Temple University, teaching the Environment course for undergraduate students. I also taught two lab courses: Water and Wastewater Lab (EN-ENVE-BSEN 4722) & Water Quality and Analysis Lab (CEE 3725) for the undergraduate section by 2018.

I always do my best to be a role model, showing my passion for science to excite the students' own enthusiasm. Being naturally bright and interested can make the students readily independence at work, and they can enjoy the challenges of problem-solving in this way. Finally, for me, teaching is an opportunity to widen my perception and to improve myself in areas of expertise and others.

Specific courses I teach every year include Polymer Science, Materials synthesis, Characterization, Evaluation of Performance, Chemical Processes in Water and Wastewater Treatment, Soil and Groundwater Remediation, and Chemical and Physicochemical Operations in Water and Wastewater Treatment Systems. Moreover, an introductory, graduate-level course on the chemistry of ecosystems and undergraduate-level courses: how natural processes and cycles are disturbed by human impacts is taught by me. A second fundamental course in Aquatic Chemistry, an advanced course on chemical equilibria in aquatic environments. The emphasis is on developing the capability to predict the aqueous chemistry of natural and disturbed systems based on knowledge of their structure and physical condition. I also frequently teach a seminar to improve student's skills in scientific literature, highlighting current topics in environmental engineering, polymer science, selection of monomers and initiators for polymerization reactions, material development, design of batch reactions, and water chemistry.