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RESEARCH EXPERIENCE

Since December 2014 - working as a **Researcher** in King Abdullah Institute for Nanotechnology, King Saud University, Kingdom of Saudi Arabia.

December 2009 to March 2014 - worked as **Project Associate** in a project entitled “*Ultrafiltration Membrane for Arsenic, Chromium and Nitrate Rejection and Remediation of Arsenic using Sulphate Reducing Bacteria (SRB) Consortia*” Sponsored by Ministry of Drinking Water & Sanitation (MDWS), Government of India, under the guidance of Prof. Gopal P. Agarwal, Downstream Processing Lab, Department of Biochemical Engineering and Biotechnology, Indian Institute of Technology Delhi, New Delhi. India.

RESPONSIBILITIES & DUTIES

Membrane Separation Process

- ✚ Preparation of nanocomposite flat-sheet and hollow fibers membrane for RO, NF, UF, FO and VMD application.
- ✚ Improving the membrane surface properties using different technique.
- ✚ Membrane characterization in the terms of thermal and mechanical stability, morphology (SEM & AFM), spectral analysis (ATR-FTIR & XRD), spectroscopic analysis, contact angle, water content, porosity, zeta potential, MWCO, surface free energy and water permeability.
- ✚ The standard elements performance test is used to determine the solute rejection and the permeate flow rate of different membranes.
- ✚ Separation and determines of ions presence in water and wastewater.
- ✚ Study the membrane fouling resistance with different foulants such as protein and bacteria.
- ✚ The effect of physical & engineering parameters (like cross flow velocity, fouling, concentration polarization, pressure and temperature) as well as chemical parameters (pH and ionic strength).

- ✚ Separation of inhibitors such as acetic acid, ferulic acid, lignin and concentration of enzymes and monosaccharide's from pre-treated rice straw by using ultrafiltration and nanofiltration membranes.

Environmental Biotechnology

- ✚ Bioremediation of Arsenic by using Sulphate Reducing Bacteria and Optimization of various parameters such as pH, Temperature and Sulphate consumption rate (COD/Sulphate ratio).

Project Management

Involvement in different running research projects and delivering the output associated to the research.

- ✚ Polymer nanocomposite membrane for water treatment (RG 1439-085) funded by Deanship of Scientific Research (DSR), King Saud University, Kingdom of Saudi Arabia.
- ✚ Mixed matrix dual-layer nanocomposite hollow-fiber membranes for desalination (12-ADV2611-02) funded by King Abdul Aziz City for Science and Technology (KACST) under the National Plan for Science and Technology (NPST), Kingdom of Saudi Arabia

EDUCATION BACKGROUND

- ❖ **Doctor of Philosophy in Engineering**, National Institute of Technology Agartala, India.
Thesis title: *Investigation of Novel Nanomaterials for Enhanced Performance of Polyphenylsulfone Membranes in Pollutant Removal from Wastewater*
- ❖ **Master of Technology in Biotechnology (Bioprocess Technology)**
Sam Higginbottom Institute of Agriculture, Technology & Sciences, Uttar Pradesh, India.
- ❖ **Bachelor of Technology in Biotechnology (Industrial Microbiology)**
Allahabad Agricultural Institute (Deemed University), Uttar Pradesh, India.

AREA OF INTEREST

- Membrane Separation Technology
- Nanomaterial Synthesis
- Nanomaterial application
- Membrane Bio-reactor for wastewater treatment
- Biological Wastewater Treatment

ACADEMIC/PROFESSIONAL SUPERVISION

Supervision of:

- Co-supervision of 5 MS students in their research projects.
- Ten undergraduate students were supervised in their final year research and design projects.

PATENTS

- 1) Javed Alam, Fekri Abdulraqeb Ahmed Ali, Arun Kumar Shukla, Mansour Alhoshan, “Hydrogel Nanobeads for Adsorption of Pollutants from Wastewater”, *US Patent (2023) Attorney Docket No. 33092.53U*.
- 2) Javed Alam, **Arun Kumar Shukla**, Ali Kanakhir Aldalbahi, Mansour Alhoshan, “Method of making an asymmetric polyvinylidene difluoride membrane”, *US Patent US10576429B1 (2020)*.
- 3) Gopal P. Agarwal, Muthumareeswaran M.R, **Arun Kumar Shukla**, Y.Luka Thuyavan, Ulhas Kharul, Harshada Lohokare, “Polyacrylonitrile based ultrafiltration membrane for facilitating removal of arsenic and chromium ions from water, has module for facilitating rejection of metals at specific concentration, where membrane produces high rejection percentage”, *IN201502470-II (17 Feb 2017)*.

BOOK CHAPTERS

- 1) **Arun Kumar Shukla**, Javed Alam, and Mansour Alhoshan (2024) Microplastics Pollutants—Potential Impact on Ecosystems. In: *Microplastic Pollutants in Biotic Systems: Environmental Impact and Remediation Techniques ACS Symposium Series, Vol. 1482, 123-141 SE-5*; American Chemical Society. Retrieved from <https://doi.org/10.1021/bk-2024-1482.ch005>
- 2) Javed Alam, **Arun Kumar Shukla**, Fekri Abdulraqeb Ahmed Ali, Omar Daoud, Mansour Alhoshan, 12 - Natural polymer-based sustainable adsorbents for pharmaceutical wastewater treatment, Editor(s): Afzal Husain Khan, Nadeem A. Khan, Mu. Naushad, Hamidi Abdul Aziz, *The Treatment of Pharmaceutical Wastewater*, Elsevier, 2023, Pages 347-365, <https://doi.org/10.1016/B978-0-323-99160-5.00007-2>.
- 3) Tijo Cherian, Saad Alghamdi, Mohammad Azam Ansari, Khursheed Ali, Nashwa Talaat Shesha, **Arun Kumar Shukla**, Hanan A. Al-Dossary, 11 - Microbial nanotechnology, Editor(s): Chaudhery Mustansar Hussain, Nashaat N. Nassar, *Nanoremediation*, Elsevier, 2023, Pages 313-340, <https://doi.org/10.1016/B978-0-12-823874-5.00003-6>.
- 4) Srinivasa, Chandrashekar, G. C. Kavitha, M. Pallavi, Chandan Shivamallu, P. Sushma, Shiva Prasad Kollur, Mohammed Aiyaz, **Arun Kumar Shukla**, M. Murali, and Mohammad Azam Ansari. "Role of Viruses in Nanoparticles Synthesis." In *Microbial Nanotechnology: Green Synthesis and Applications*, pp. 103-119. Springer, Singapore, (2021). https://doi.org/10.1007/978-981-16-1923-6_6
- 5) **Arun Kumar Shukla**, Mohammad Azam Ansari, Javed Alam, Ali Aldalbahi and Mansour Alhoshan “Recent Advances in Preparation and Characterization of Graphene-Based

Nanocomposite Membranes for Water Purification. In: Jawaid M., Ahmad A., Ismail N., Rafatullah M. (eds) Environmental Remediation Through Carbon Based Nano Composites. *Green Energy and Technology*. Springer, Singapore. (2020) https://doi.org/10.1007/978-981-15-6699-8_19

PUBLICATIONS

- 1) **Arun Kumar Shukla**, Javed Alam, Santanu Mallik, Janne Ruokolainen, Kavindra Kumar Kesari, Mansour Alhoshan “Optimization and prediction of dye adsorption utilising cross-linked chitosan-activated charcoal: Response Surface Methodology and machine learning” *Journal of Molecular Liquids* 411 (2024) 125745.
- 2) **Arun Kumar Shukla**, Javed Alam, Mansour Alhoshan “Rheological behavior of polyphenylsulfone-organic additives solutions: a key factor in membrane fabrication process” *Polymer-Plastics Technology and Materials* (2024) 1-21.
- 3) Javed Alam, Fekri Abdulraqueb Ahmed Ali, **Arun Kumar Shukla**, Sajjad Haider, Ufana Riaz, Mansour Alhoshan “Crosslinked Chitosan-Sulfonated Polyphenylsulfone Electrospun Nanofibers: A Highly Water-Stable and Versatile Adsorbent for Organic Dye Removal” *Fibers and Polymers* 25 (2024) 3307–3321.
- 4) Fekri Abdulraqueb Ahmed Ali, Javed Alam, Saif MH Qaid, **Arun Kumar Shukla**, Ahmed S Al-Fatesh, Ahmad M Alghamdi, Farid Fadhillah, Ahmed I Osman, Mansour Alhoshan “Fluoride Removal Using Nanofiltration-Ranged Polyamide Thin-Film Nanocomposite Membrane Incorporated Titanium Oxide Nanosheets” *Nanomaterials* 14 92024) 731.
- 5) Turki Hussain Mana, Javed Alam, **Arun Kumar Shukla**, Abdullah Alkhudhiri, Abdullah Najib Mohammed, Mansour Alhoshan “Performance investigation of poly(vinylidene fluoride-cohexafluoropropylene) membranes containing SiO₂ nanoparticles in a newly designed single vacuum membrane distillation system” *Water Environment Research* 96 (2024) e10980.
- 6) Mansour Alhoshan, **Arun Kumar Shukla**, Javed Alam, Ali Awadh Hamid “Graphene Oxide–Polyphenylsulfone Nanocomposite Beads for Paracetamol Removal from Aqueous Solution” *Membranes* 14 (2023) 9
- 7) **Arun Kumar Shukla**, Javed Alam, Umesh Mishra, Mansour Alhoshan, “A sustainable approach for the removal of pharmaceutical contaminants from effluent using polyamide thin-film composite membranes integrated with Zn-based metal organic frameworks” *Environmental Science and Pollution Research* (2023) 1-15.
- 8) **Arun Kumar Shukla**, Javed Alam, Umesh Mishra, Kavindra Kesari, “Investigating the efficiency of a ceramic-based thin-film composite nanofiltration membrane for dyes removal” *Ceramics International* 49 (2023) 37670–37679.
- 9) Javed Alam, Omar A Daoud, **Arun Kumar Shukla**, Fekri Abdulraqueb Ahmed Ali, Mansour Alhoshan, Simulation of a Solar-Powered Reverse Osmosis System Integrated with Vacuum Membrane Distillation for Desalination Brine Treatment, *Arabian Journal for Science and Engineering* (2023) 1-15.
- 10) Khalid M Alotaibi, **Arun K Shukla**, Elham Bajuayfir, Abdullah A Alotaibi, Mohamed H Mrad, Fatma A Gomaa, Abdullah M Alswieleh, “Ultrasound-Assisted Synthesis of

- MSNs/PS Nanocomposite Membranes for Effective Removal of Cd²⁺ and Pb²⁺ ions from Aqueous Solutions”, *Ultrasonics Sonochemistry* (2023) 98: 106497.
- 11) Ali A Hamid, Javed Alam, **Arun Kumar Shukla**, Fekri Abdurqeb Ahmed Ali, Mansour Alhoshan, “Sustainable removal of phenol from wastewater using a biopolymer hydrogel adsorbent comprising crosslinked chitosan and κ-carrageenan”, *International Journal of Biological Macromolecules* (2023) 126340.
 - 12) Javed Alam, **Arun Kumar Shukla**, Lawrence Arockiasamy, Mansour Alhoshan, “Scale Design of Dual-Layer Polyphenylsulfone/Sulfonated Polyphenylsulfone Hollow Fiber Membranes for Nanofiltration”, *Membranes* 13 (8) (2023) 714.
 - 13) Mansour Alhoshan, **Arun Kumar Shukla**, Javed Alam, “Preparation of Zn–Metal Organic Framework–Based Poly (vinylidene fluoride-co-hexafluoro-propylene) Ultrafiltration Membrane with Improved Antifouling Properties” *Water, Air, & Soil Pollution*, 234 (7) (2023) 448.
 - 14) **Arun Kumar Shukla**, Javed Alam, Umesh Mishra, Mansour Alhoshan “Effect of Cu-doped GO Nanoparticles on Polyphenylsulfone Nanocomposite Membrane Surface and Its Application for The Removal of Organic Pollutants and Antibacterial Analysis” *Materials Today Communications*, (2023)106326
 - 15) Mansour Alhoshan, Javed Alam, **Arun Kumar Shukla**, Ali Awadh Hamid, “ Polyphenylsulfone membrane blended with polyaniline for nanofiltration promising for removing heavy metals (Cd²⁺/Pb²⁺) from wastewater” *Journal of Materials Research and Technology*, 24 (2023) 6034-6047.
 - 16) Mansour Alhoshan, **Arun Kumar Shukla**, Turki Hussain Mana, Fekri Abdurqeb Ahmed Ali, Javed Alam, “An Evolving MOF Thin-Film Nanocomposite Tubular Ceramic Membrane for Desalination Pretreatment” *Journal of Inorganic and Organometallic Polymers and Materials*, (2022) 1-16.
 - 17) **Arun Kumar Shukla**, Javed Alam, Mansour Alhoshan, “Recent Advancements in Polyphenylsulfone Membrane Modification Methods for Separation Applications” *Membranes* 12(2), (2022) 247.
 - 18) Fekri Abdurqeb Ahmed Ali, Javed Alam, **Arun Kumar Shukla**, Zeyad A Almutairi, Mansour Alhoshan, Assessing the properties of Thin-Film Nanocomposite Membrane embedded with GO Nanosheets using the DSPM-DE Model, *Journal of Materials Research and Technology* 19 (2022) 74-90.
 - 19) **Arun Kumar Shukla**, Javed Alam, Mansour Alhoshan, Fekri Abdurqeb Ahmed Ali, Umesh Mishra, and Ali Awadh Hamid “Thin-Film Nanocomposite Membrane Incorporated with Porous Zn-Based Metal – Organic Frameworks: Toward Enhancement of Desalination Performance and Chlorine Resistance” *ACS Appl. Mater. Interfaces* 13, (2021) 28818–28831.
 - 20) Abdullah A Alotaibi, **Arun Kumar Shukla**, Mohamed Habib Mrad, Abdullah M Alswieleh, Khalid M Alotaibi “Fabrication of Polysulfone-Surface Functionalized Mesoporous Silica Nanocomposite Membranes for Removal of Heavy Metal Ions from Wastewater” *Membranes*, 11(12), (2021) 935.
 - 21) Virendra Kumar Yadav, Krishna Kumar Yadav, Javed Alam, Marina Cabral-Pinto, Govindhan Gnanamoorthy, Mansour Alhoshan, Hesam Kamyab, Ali Awadh Hamid, Fekri Abdurqeb Ahmed Ali, **Arun Kumar Shukla** “Transformation of hazardous sacred incense sticks ash waste into less toxic product by sequential approach prior to their disposal into the water bodies” *Environ Sci Pollut Res* (2021).

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- 24) Javed Alam, Virendra Kumar Yadav, Krishna Kumar Yadav Marina MS Cabral-Pinto, Neha Tavker, Nisha Choudhary, **Arun Kumar Shukla**, Fekri Abdurraqeb Ahmed Ali, Mansour Alhoshan and Ali Awadh Hamid "Recent Advances in Methods for the Recovery of Carbon Nanominerals and Polyaromatic Hydrocarbons from Coal Fly Ash and Their Emerging Applications". *Crystals*, 11(2021) 88.
- 25) Neha Tavker, Virendra Kumar Yadav, Krishna Kumar Yadav, Marina MS Cabral-Pinto, Javed Alam, **Arun Kumar Shukla**, Fekri Abdurraqeb Ahmed Ali and Mansour Alhoshan "Removal of Cadmium and Chromium by Mixture of Silver Nanoparticles and Nano-Fibrillated Cellulose Isolated from Waste Peels of Citrus Sinensis" *Polymers* 13 (2021)234.
- 26) Javed Alam, **Arun Kumar Shukla**, Mohammad Azam Ansari, Fekri Abdurraqeb Ahmed Ali, and Mansour Alhoshan "Dye Separation and Antibacterial Activities of Polyaniline Thin Film-Coated Poly(phenyl sulfone) Membranes" *Membranes* 11(2021), 25-39.
- 27) **Arun Kumar Shukla**, Javed Alam, Fekri Abdurraqeb Ahmed Ali, Mansour Alhoshan "Efficient soluble anionic dye removal and antimicrobial properties of ZnO embedded-Polyphenylsulfone membrane" *Water and Environment Journal* 35(2020) 670-684.
- 28) **Arun Kumar Shukla**, Javed Alam, Fekri Abdurraqeb Ahmed Ali, Mansour Alhoshan "A highly permeable zinc-based MOF/polyphenylsulfone composite membrane with elevated antifouling properties" *Chemical Communications* 56 (39), (2020) 5231-5234.
- 29) **Arun Kumar Shukla**, Javed Alam, Mostafizur Rahaman, Abdulaziz Alrehaili, Mansour Alhoshan, Ali Aldalbahi "A Facile Approach for Elimination of Electroneutral/Anionic Organic Dyes from Water Using a Developed Carbon-Based Polymer Nanocomposite Membrane" *Water, Air, & Soil Pollution* 231 (2020) 104.
- 30) Fekri Abdurraqeb Ahmed Ali, Javed Alam, **Arun Kumar Shukla**, Mansour Alhoshan, Basem M.A.Abdo and Waheed A. Al-Masry; "A Novel Approach To Optimize the Fabrication Conditions of Thin Film Composite RO Membranes Using Multi-Objective Genetic Algorithm II" *Polymers* 12(2020)494.
- 31) Khalid Alzahrani, **Arun Kumar Shukla**, Javed Alam, Abdurahman A.Niazy, Abdullah M.Alsouwaileh, Mansour Alhoshan, Jamal Khalid, Hamdan S.Alghamadi, "Probing the surface ultrastructure of *Brevibacillus laterosporus* using atomic force microscopy" *Micron* 131 (2020) 102827.
- 32) **Arun Kumar Shukla**, Javed Alam, Mohammad Azam Ansari, Mansour Alhoshan, Manawwer Alam, Ajeet Kaushik "Selective ion removal and antibacterial activity of silver-doped multi-walled carbon nanotube / polyphenylsulfone nanocomposite membranes" *Materials Chemistry and Physics* 233 (2019) 102-112.
- 33) Fekri Abdurraqeb Ahmed Ali, Javed Alam, **Arun Kumar Shukla**, Mansour Alhoshan, Jamal M. Khaled, Waheed A. Al-Masry, Naiyaf S. Alharbi, Manawwer Alam; "Graphene oxide-silver nanosheet-incorporated polyamide thin-film composite membranes for

- antifouling and antibacterial action against Escherichia coli and bovine serum albumin” *Journal of Industrial and Engineering Chemistry* 80 (2019) 227–238.
- 34) Javed Alam, Mansour Alhoshan, **Arun Kumar Shukla**, Ali Aldalbahi, Fekri Abdulraqeb Ahmed Ali “k-Carrageenan – A versatile biopolymer for the preparation of a hydrophilic PVDF composite membrane” *European Polymer Journal* 120 (2019) 109219.
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- 36) **Arun Kumar Shukla**, Javed Alam, Mohammad Azam Ansari, Mansour Alhoshan, Fekri Abdulraqeb Ahmed Ali “Antimicrobial and antifouling properties of versatile PPSU/carboxylated GO nanocomposite membrane against Gram-positive and Gram-negative bacteria and protein” *Environmental Science and Pollution Research* (2018) 25:34103–34113.
- 37) **Arun Kumar Shukla**, Javed Alam, Mansour Alhoshan, Lawrence Arockiasamy Dass, Fekri Abdulraqeb Ahmed Ali, Muthumareeswaran M. R, Umesh Mishra and Mohammad Azam Ansari “Removal of heavy metal ions using a carboxylated graphene oxide-incorporated polyphenylsulfone nanofiltration membrane” *Environmental Science Water Research & Technology* (2018) 4:438–448.
- 38) Javed Alam, **Arun Kumar Shukla**, Mansour Alhoshan, Lawrence Arockiasamy Dass, Muthu Ramamoorthy Muthumareeswaran, Aslam Khan, Fekri Abdulraqeb Ahmed Ali “Graphene oxide, an effective nanoadditive for a development of hollow fiber nanocomposite membrane with antifouling properties” *Advances in Polymer Technology*, (2018) 37:2597–2608.
- 39) Javed Alam, Mansour Alhoshan, **Arun Kumar Shukla**, Ali Aldalbahi, Fekri Abdulraqeb Ahmed Ali, Lawrence Arockiasamy Dass, M.R. Muthumareeswaran “K-Carrageenan as a promising pore-former for the preparation of a highly porous polyphenylsulfone membrane” *Materials Letters* (2017) 204: 108–111.
- 40) **Arun Kumar Shukla**, Javed Alam, Mansour Alhoshan, Lawrence Arockiasamy Dass & M. R. Muthumareeswaran “Development of a nanocomposite ultrafiltration membrane based on polyphenylsulfone blended with graphene oxide” *Scientific Reports* (2017) 7: 41976
- 41) Lawrence Arockiasamy Dass, Mansour Alhoshan, Javed Alam, Muthumareeswaran MR, Alberto Figoli, **Arun Kumar Shukla** “Separation of proteins and antifouling properties of polyphenylsulfone based mixed matrix hollow fiber membranes”, *Separation and Purification Technology* (2017) 174: 529–543.
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- 43) Jothi Ramalingam Rajabathar, **Arun K. Shukla**, Aldalbahi Ali, Hamad A. Al-Lohedan, “Silver nanoparticle/r-graphene oxide deposited mesoporous-manganese oxide nanocomposite for pollutant removal and supercapacitor applications” *International Journal of Hydrogen Energy* (2017) 42 : 15679 -15688
- 44) Varish Ahmad, Qazi Mohammad Sajid Jamal, **Arun K. Shukla**, Javed Alam, Ahamad Imran, Usama Mohamed Abaza, “Bacilli as Biological Nano-factories Intended for

- Synthesis of Silver Nanoparticles and Its Application in Human Welfare” *J Clust Sci.* (2017) 28:1775–1802,
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