

# Varada Menon Palakkal

Baton Rouge, LA +1-(225)-916-9728, [varadamenon.p@gmail.com](mailto:varadamenon.p@gmail.com), [vpalak2@lsu.edu](mailto:vpalak2@lsu.edu)

## Summary

- Strong leadership skills and experience managing collaborative projects on water treatment, desalination and separations using electrochemistry with Argonne National Laboratory; helped secure nearly \$200k in sponsored research and collaborations.
- Knowledgeable innovator proficient in ion-exchange materials, polymer engineering and membrane technology demonstrated by 1 invention disclosure signed on new polymer material invention and 3-peer reviewed publications
- Goal-oriented and self-driven professional with excellent communication skills as evidenced by 4 oral presentations and 2 poster presentations at national and international meetings

## Work Experience

### Senior research assistant

Louisiana State University

2015 – Present

- Skilled materials developer with an expertise in ion-exchange membrane fabrication, design of ionic-polymers which show 50% increase in energy efficiency for desalination as evidenced by 2 publications.
- Innovative product development with an invention disclosure signed on a new ionomer binder resin wafer for improved electrodeionization (33% increase in energy efficiency and 40% faster separation)
- Experienced technology developer with skills on redox-flow batteries for energy storage; improved copper ammonia redox flow battery power production by 3.8X times resulting in 1 publication
- Trained and mentored 5 undergraduate student researchers and 3 graduate students in their respective research

### Energy Systems Consultant

Argonne National Laboratory, Illinois

June 2017 -January 2018

- Innovation and design of new materials development for a new class of ion-exchange resins using grafted polyelectrolyte brushes to silica supports and wafer fabrication for separations
- Excellent communication and teamworking abilities resulting in securing a 2-year (renewed again) collaboration between Argonne and LSU

### Summer research fellow

Ben Gurion University, Israel

May 2014 - July 2014

- New Product development by synthesis and characterization of modified reverse osmosis membranes by interfacial polymerization, with nano-diamond composites resulting in improved mechanical properties, surface hydrophilicity, water recovery and salt rejection.

## Education

Ph.D., Chemical Engineering, GPA: 3.77/4  
University Anticipated graduation date is Spring 2020

Louisiana State  
[ August 2015-Present]

**DISSERTATION:** “Low-resistant ion-exchange membranes and resin wafers for addressing ohmic resistances in electrochemical separations”

- Published three-peer reviewed publications, with another in revision, and another under submission
- Received Coates Graduate travel award, Graduate student association travel award
- Presented 4 oral presentations and 2 posters at national and international meetings- Beijing & Seoul

Bachelor's in Chemical Engineering, GPA: 8.23/10

National Institute of Technology Calicut, India

**THESIS: "Sulfonated polyether ether ketone membrane composites with titanium dioxide nanoparticles as highly conductive and low methanol permeable proton exchange membranes in Direct Methanol fuel cells"**

- Internships at PEPSICO, Fertilizers and Chemicals, Travancore Ltd.
- Presented research poster at International Conference on Green Technology for Environmental Pollution Prevention and Control, Trichy, India.

## Techniques, Software & Instrumentation

SEM	TGA/ DSC	Origin
XPS	Film applicator	MS Word, Excel, Powerpoint
NMR	X-ray tomography	Potentiostat/Galvanostat
UTM	UV-Vis	Chemdraw
FT-IR	LC/MS, ICPAES	Cyclic voltammetry
BET	Vacuum filtration/ Centrifuge	

## Publications

- V.M. Palakkal, L. Valentino, Q. Lei, S. Kole, Y.J. Lin, and C.G. Arges, Advancing electrodeionization with conductive ionomer binders that immobilize ion-1 exchange resin particles into porous wafer substrates (*manuscript in revision at npj Clean Water*)
- Z. Su, S. Kole, V.M. Palakkal, L. Harden, C.-o. Kim, G. Nair, C.G. Arges, J.N. Renner, Peptide-modified electrode surfaces for promoting anion exchange ionomer microphase separation and ionic conductivity <https://doi.org/10.1021/acsmaterialslett.9b00173>
- V.M. Palakkal, J.E. Rubio, Y.J. Lin, and C.G. Arges, Low resistant ion-exchange membranes for energy efficient membrane capacitive deionization, *ACS Sustainable Chemistry & Engineering*, **2018**, 6, 13778, <http://dx.doi.org/10.1021/acssuschemeng.8b01797>
- T. Lister, L. Diaz, M. Lilga, A. Padmaperuma, Y.J. Lin, V.M. Palakkal, and C.G. Arges, Low temperature electrochemical upgrading of bio-oils using polymer electrolyte membranes, *Energy and Fuels*, **2018**, 32, 5944, <http://dx.doi.org/10.1021/acs.energyfuels.8b00134>
- V.M. Palakkal and C.G. Arges, Alternative ion-exchange materials for membrane capacitive deionization, *ECS Transactions*, 2017, 77, 1997, <http://dx.doi.org/10.1149/07711.1997ecst>

## Affiliations &/ Hobbies

- Vice-President of Electrochemical Society student Chapter LSU (2016-2018)
- Vice President of Engineers without borders student chapter (2013-2014)
- Member of American Chemical Society, Volunteer at Louisiana Environmental Action Network
- Singer at Music club (Western vocals- NIT, India), enjoy hiking and traveling