

Arpita Iddya

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Education

University of California, Los Angeles (UCLA) *Mar 2022*

PhD, Civil and Environmental Engineering, (Minor: Chemical Engineering)

Thesis: “Facilitating Interfacial Processes for Specific Ion/Molecule Recovery”

Advisor: Prof. David Jassby

Committee: Prof. David Jassby (Chair), Prof. Eric Hoek, Prof. Jenny Jay, Prof. Sanjay Mohanty

Carnegie Mellon University *Dec 2015*

MSc, Chemical Engineering

Thesis: “Modelling Mass Transport Limitations in Capacitive Deionization”

Advisor: Prof. Meagan Mauter

B.M.S. College of Engineering *May 2013*

Visvesvaraya Technological University

B.E., Chemical Engineering

Research Experience

Postdoctoral Scholar | University of California, Los Angeles *2022- Present*

Advised by: Prof. David Jassby

Electrochemical transformation of high energy compounds and hexavalent chromium in Ammonium Nitrate Solution

Developed a platform membrane-based treatment technology for the oxidation of high energy compounds, such as RDX, HMX, and amine nitrates, and electrochemical reduction of hexavalent chromium present in ammonium nitrate solution (ANSOL). Electrically conductive membranes developed were also used to facilitate ammonia recovery.

Ph.D. Researcher | University of California, Los Angeles *2016-2022*

Advised by: Prof. David Jassby

High precision ion selective membranes for nutrient recovery

Developed novel ion exchange mixed matrix membranes that exploit outer-sphere coordination interaction for selective ion transport. Highly selective phosphate recovery achieved using a modified cation exchange membrane.

Nutrient Recovery Using Modified Polymeric Membranes

Developed novel membranes to extract nutrients from food and agricultural wastewater, specifically nitrogen and phosphorus. Produced electrically conducting gas separation membranes to recover nitrogen, and modified cation exchange membranes to recover phosphate ions. Improved nutrient recovery over traditional processes.

Mathematical Model for Carbon Nanotube Coated Electrically Conductive Membrane

Developed a mathematical model based on the extended Nernst Plank model to predict Cr(VI) rejection due to electromigration. The model successfully predicted Cr(VI) rejection at high cell potentials.

Developed a mathematical model based on vapor pressure difference to study flux differences between the coated and uncoated membranes as a function of the temperature.

Masters' Student | Carnegie Mellon University *Feb – Dec 2015*

Advised by: Prof. Meagan Mauter,

Modelling Mass Transport Limitations in Capacitive Deionization

Developed a two-dimensional model on COMSOL multiphysics to study the mass and charge transport effects ions in a capacitive deionization cell. Extended the model to three dimensions and solved the governing equations to study the effect of operational parameters on the ion movement. Model qualitatively predicted salt adsorption capacity.

Academic Project | Carnegie Mellon University

Jan – May 2015

Process optimization of propylene manufacture by propane dehydrogenation

Addressed optimization of propylene production by propane dehydrogenation. Performed optimization on number of trays in a distillation column as a function of cost in GAMS, to minimize the cost of equipment.

Undergraduate Researcher | B.M.S.C.E., VTU, India

Aug 2012 – Apr 2013

Advised by: Dr. Srivatsa Bettahalli, B.M.S. College of Engineering

Mono-Dispersed Macro Fluidic Droplet Formation and Encapsulation

Engineered formation of a continuous process to produce even sized droplets with liquid encapsulated within each globule. Optimized the residence time of the formed globules in reactive bath by applying principles of molecular gastronomy and fluid flow. Developed a model for the process using COMSOL multiphysics.

Publications

H index: 8 Total Citations: 435

Papers

Iddya, A., Zarzycki, P.; Kingsbury, R.; Khor, C.M.; Ma, S.; Wang, J.; Wheeldon, I.; Ren, Z.; Hoek, E.; Jassby, D. A reverse-selective ion exchange membrane for the selective transport of phosphates via an outer-sphere complexation–diffusion pathway. *Nature Nano.* **2022** (journal impact factor = 39.2)

Rao, U.; **Iddya, A.**; Jung, B.; Khor, C. M.; Hendren, Z.; Turchi, C.; Cath, T.; Hoek, E.; Ramon, G.; Jassby, D. Mineral scale prevention on electrically conducting membrane distillation membranes using induced electrophoretic mixing. *Environ. Sci. Technol.* **2020**, *54* (6), 3678–3690.

Iddya, A.; Hou, D.; Khor, C.M.; Ren, Z.; Tester, J.; Posmanik, R.; Gross, A.; Jassby, D. Efficient ammonia recovery from wastewater using electrically conducting gas stripping membranes. *Environmental Science: Nano* **2020**, *7* (6), 1759-1771

Hou, D.; Li, T.; Chen, X.; He, S.; Dai, J.; Mofid, S. A.; Hou, D.; **Iddya, A.**; Jassby, D.; Yang, R.; Hu, L.; Ren, Z. Hydrophobic nanostructured wood membrane for thermally efficient distillation. *Science Advances.* *Vol 5 no.8* **2019**

Hou, D.; **Iddya, A.**; Chen, X.; Wang, M.; Zhang, W.; Ding, Y.; Jassby, D.; Ren, Z. Nickel-based membrane electrodes enable high-rate electrochemical ammonia recovery. *Environmental Science & Technology* **2018** *52* (15), 8930-8938

Tang, L.; **Iddya, A.**; Zhu, X.; Dudchenko, A. V; Duan, W.; Turchi, C.; Vanneste, J.; Cath, T. Y.; Jassby, D. Enhanced flux and electrochemical cleaning of silicate scaling on carbon nanotube-coated membrane distillation membranes treating geothermal brines. *ACS Appl. Mater. Interfaces* **2017**, acsami.7b12615.

Duan, W.; Chen, G.; Chen, C.; Sanghvi, R.; **Iddya, A.**; Walker, S.; Liu, H.; Ronen, A.; Jassby, D. Electrochemical removal of hexavalent chromium using electrically conducting carbon nanotube/polymer composite ultrafiltration membranes. *J. Memb. Sci.* **2017**, *531* (March), 160–171.

Book Chapters

Iddya, A.; Rao, U.; Wang, J.; Su, Y.; Jassby, D. *Advances in Water Desalination Technologies*. **2021**, 529-581.

Papers In preparation

Iddya, A.; Schwabe, K.; Jassby, D. Electrochemical membranes for Ammonium Nitrate Solution (ANSOL) treatment: RDX oxidation and hexavalent chromium reduction. (*In preparation*)

Iddya, A.; Jassby, D. Facilitated transport for ion selectivity. (*In preparation*)

Patents

Jassby, D.; **Iddya, A.;** Hoek, E. Membranes for the targeted extraction of phosphate. US Patent application #17/903567

Presentations

Oral presentations

Iddya, A.; Zarzycki, P.; Kingsbury, R.; Khor, C.M.; Ma, S.; Wang, J.; Wheeldon, I.; Ren, Z.; Hoek, E.; Jassby, D. A reverse-selective ion exchange membrane for the selective transport of phosphates via an outer-sphere complexation–diffusion pathway. *American Chemical Society Spring Meeting; August 2022; San Diego, CA.*

Iddya, A.; Hou, D.; Khor, C.M.; Ren, Z.; Tester, J.; Posmanik, R.; Gross, A.; Jassby, D. Highly Efficient Ammonia Recovery from Wastewater using Electrically Conducting Gas Stripping Membranes. *American Chemical Society Spring Meeting; August 2019; San Diego, CA.*

Poster presentations

Iddya, A.; Shanbhag, S.; Mauter, M. Modeling convective and diffusive mass transport in capacitive deionization electrodes. *American Chemical Society Fall Meeting; August 2016; Pittsburgh, PA.*

Iddya, A.; Schwabe, K.; Jassby, D. Electrochemical transformation of ANSOL using electrically conductive membranes. *SERDP, ESTCP & OE-Innovation Symposium; December 2022; Arlington, VA.*

Panelist presentations

Women in STEM Panel: “What to do after graduation?” *Apr 2021*

American Association of University Women: Panel and workshop *Oct 2017*

Reviewer for Journals

Separation and Purification Technology (*Elsevier*), Environmental Science: Water Research & Technology (*Royal Society of Chemistry Journals*), Membranes (*Multidisciplinary Digital Publishing Institute*), Processes (*Multidisciplinary Digital Publishing Institute*), Sustainability (*Multidisciplinary Digital Publishing Institute*), Water (*Multidisciplinary Digital Publishing Institute*)

Fellowships

University Fellowship *2020-2021*
Graduate division, UCLA

Industry Experience

Shell Technology Centre Bangalore *Feb – July 2014*
Laboratory Research Intern
Tested oil-water separation in ceramic membranes, in support of experiments performed on-site at Oman to implement polymer flooding in oil wells

Designed experiments and operated pilot plant to reduce the number and cost of experiments

Intellectual Ventures

Sep 2013 – Feb 2014

Technical Intern

Designed experimental procedure to up-scale production of novelty chemicals

Produced products which were marketed as prototype to targeted market

Himadri Chemicals

Summer 2011

Laboratory Intern

Assisted and demonstrated successful pilot-scale SNFC (sulphonated naphthalene formaldehyde condensate) production

Teaching Experience

Department of Civil and Environmental Engineering | UCLA

Winter 2018

Teaching Assistant

C&EE 255A: Physical and Chemical Processes for Water and Wastewater Treatment

Department of Chemical and Environmental Engineering | UC, Riverside

Winter 2017

Teaching Assistant

ENV142: Water Quality Engineering

Mentoring Experience

Clean Water Science Network Mentoring

2022-2023 Cohort

Mentored environmental engineering undergraduate students from Latin America on water-related research and different environmental issues

Planned one-on-one zoom sessions to help students with applying to graduate school in the United States

Graduate Research Mentoring

Mark Nguyen (Masters Student, UCLA)

Aug 2021- Jun 2022

Project: Electrochemical Cr (VI) reduction using electrically conducting polymeric membranes

Undergraduate Research Mentoring

Ingrid Spielbauer

Feb 2019- Jun 2019

Project: Ammonia recovery from wastewater using electrically conducting gas stripping membranes

Claire Ko

April 2019- Jun 2020

Project: Ammonia recovery from wastewater using electrically conducting gas stripping membranes

Volunteering Experience

Nanoscience Summer Outreach

Summer 2018 & 2019

Designed experiments for workshop-style instruction

Mentored high school students on science projects

SACNAS Outreach

May 2018

Volunteered for Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS): Math and Science Academy Outreach

Designed and planned experiments to explain chemical and environmental engineering to high school students

Confluence '13

Mar 2013

Organized and coordinated the undergraduate research seminar for the department of Chemical Engineering, B.M.S. College of Engineering, India
Liaised with colleagues for advertising events at various other undergraduate institutions
Primary point of contact for several sponsors- drafted and negotiated sponsorship agreements
Responsible for all logistics, including registration, travel, hospitality, photography, and various non-technical events

Confluence '12 and '11

Summer 2011 & 2012

Volunteered for the undergraduate research seminar for the department of Chemical Engineering, B.M.S. College of Engineering, India
Planned and organized events for annual technical symposia, including poster and oral presentations

Leadership Experience

Graduate Student Association | UCLA

Sep 2019 – May 2020

Elections Commissioner

Led a group of graduate students with a 13-person board and 14000+ members

Planned and organized logistics for a social event for 5000+ students

Increased student involvement in GSA elections by ~14%

Graduate Society of Women Engineers | UCLA

Sep 2018-May 2019

Director

Organized and led networking night with the industry and social events for 2000+ graduate students

Facilitated 20+ annual events including women in engineering discussion panels and lunch with the dean

Graduate Society of Women Engineers | UCLA

Jan 2018-May 2018

Treasurer

Structured budget and allocated funds for student networking and professional development

Spearheaded collaboration with other student led organizations to arrange joint professional and social events

Professional Affiliations

American Chemical Society (ACS)

Association of Environmental Engineering and Science Professors (AEESP)

North American Membrane Society (NAMS)

American Society of Civil Engineers (ASCE)

National Alliance for Water Innovation (NAWI)

Skills and Interests

Software Skills: Proficient in programming with Python, Matlab; Adobe Illustrator, Aspen plus, COMSOL Multiphysics, Adobe Illustrator

Analytical instruments: Scanning Electron Microscopy (SEM) with Energy Dispersive X-ray Spectroscopy (EDS), Atomic Force Microscopy (AFM), X-ray Photoelectron Spectroscopy (XPS), contact angle goniometer, Fourier Transform Infrared spectroscopy (FTIR), High Pressure Liquid Chromatography (HPLC), Ion Chromatography (IC), Ultraviolet-visible (UV-Vis) spectroscopy.

Languages: English (native), Kannada (native), Hindi (native), Spanish (beginner)