Christine E. Duval, PhD
Associate Professor, Department of Chemical and Biomolecular Engineering
Case Western Reserve University, Cleveland OH 44106
Email: ced84@case.edu | Website: https://sites.google.com/case.edu/duval-lab/home

EDUCATION

Doctor of Philosophy in Chemical Engineering 2017
Clemson University, Clemson, SC

Bachelor of Science in Chemical Engineering 2011
University of Connecticut, Storrs, CT

APPOINTMENTS (ACADEMIC, GOVERNMENT, AND INDUSTRY)

2024-present	Associate Professor, Department of Chemical and Biomolecular Engineering Case Western Reserve University, Cleveland OH
2017-2024	Assistant Professor, Department of Chemical and Biomolecular Engineering Case Western Reserve University, Cleveland OH
Summer 2017	Department of Energy Scholar, Nuclear Materials Information Program, Office of Intelligence and Counterintelligence, US Department of Energy, Washington DC
2012-2017	Graduate Research Assistant, Department of Chemical and Biomolecular Engineering Clemson University, Clemson SC
2012	Director of Marketing, Amastan LLC Mansfield CT
2011-2012	Business Analyst, Innovation Accelerator Program Connecticut Center for Entrepreneurship and Innovation, East Hartford CT

PROFESSIONAL HONORS AND AWARDS (Duval)

Crains Cleveland Business: 40 under 40	2024
Case School of Engineering: Research Award	2024
CWRU John S. Diekhoff Award for Distinguished Graduate Student Mentoring	2024
Selected for 2023 National Academy of Engineering (NAE) US Frontiers in Eng. Workshop	2023
Selected for CWRU Veale Faculty Fellows Program	2023
NSF CAREER Award	2023
Nominated by DOE for the Presidential Early Career Award for Scientists & Engineers (PECASE: pending approval by White House Office of Science & Technology)	2022
North American Membrane Society: Young Membrane Scientist Award	2022
Case School of Engineering: Graduate Teaching Award	2022
DOE Early Career Research Award	2020
Case School of Engineering: Undergraduate Teaching Award	2020
Nominee for university-level awards at CWRU	
Gutti Memorial Teaching Award, Finalist	2024
J. Bruce Jackson, M.D. Award for Excellence in Undergraduate Mentoring	2020
Carl F. Wittke Award for Excellence in Undergraduate Teaching	2020
John S. Diekhoff Award for Distinguished Graduate Student Mentoring	2020-2022
Great Lakes Energy Institute, Faculty in Energy Program	2019-2020
Finalist (Top 10) for the K. Patricia Cross Future Leaders Award, AAC&U	2017

Prior to CWRU

AIChE Graduate Student Research Award: Separations Division	2016
Session's Best Paper at AIChE National Meeting	2016

AIChE TED-Sep Competition, second place 2016
Clemson University ChBE Research Symposium, best oral presentation 2016
Clemson University Professional Enrichment Grants Biannually 2013-2016
Outstanding Graduate Teaching Assistant Award
- College of Engineering and Science, Clemson University 2015
- Department of Chemical Engineering, Clemson University 2015

Poster awards
- Clemson Graduate Research & Discovery Symposium 2016
- American Filtration and Separation Society National Meeting Fall & Spring 2015
- Clemson ChBE Research Symposium 2014 & 2015

Specialized trainings
- Selected for the Next Generation Safeguards Initiative Workshop, SRNL 2014
- Selected for the Radiation Detection for Nuclear Security Summer School, PNNL 2013

MEMBERSHIPS

North American Membrane Society (Executive Board)
World Association of Membrane Societies (Steering Committee)
American Institute of Chemical Engineers: Separations (Area 2D Chair), Education Division
American Chemical Society: ENV, NUCL
Case Comprehensive Cancer Center, Imaging Group (Associate Member)

PROFESSIONAL HONORS AND AWARDS (Students)

(Key: CWRU graduate student, CWRU undergraduate student**)**

CWRU: Department, School and University

CWRU ChBE Graduate Student Teaching Assistant Award (Lianna Johnson) 2024
CWRU ChBE Graduate Student Research Award (Bethany Kersten) 2023
CWRU ChBE Graduate Student Teaching Assistant Award (Maura Sepesy) 2023
CWRU ChBE Graduate Student Teaching Assistant Award (Bethany Kersten) 2022
CWRU ChBE Graduate Student Service Award (Bethany Kersten) 2022
CWRU Graduate Student Appreciation Award (Priyanka Suresh) 2022
CWRU Elisa Lindsey International Student Award (Priyanka Suresh) 2022
CWRU ChBE Graduate Student Service Award (Maura Sepesy) 2020

US Department of Energy (DOE)

Nuclear Energy University Leadership Program Fellowship (Kayla Kent) 2024-2027
Nuclear Energy University Leadership Program Fellowship (Bethany Kersten) 2020-2023
DOE Innovations in Nuclear Energy R&D Student Award (Bethany Kersten) 2023
DOE Innovations in Nuclear Technology R&D Award (Bethany Kersten) 2022

American Institute of Chemical Engineers (AIChE)

AIChE Women's Initiative Committee Travel Award (Bethany Kersten) 2021
AIChE Women's Initiative Committee Travel Award (Priyanka Suresh) 2020

North American Membrane Society (NAMS)

Elias Klein Travel Supplement, NAMS (Lianna Johnson) 2024
Student Fellowship Honorable Mention, NAMS (Priyanka Suresh) 2022
Undergraduate Travel Award, NAMS (Joelle Scott) 2022
Elias Klein Travel Supplement, NAMS (Maura Sepesy) 2022

Elias Klein Travel Supplement, NAMS (Priyanka Suresh) 2021

Poster Awards

TechConnect World Innovation Conference & Expo (Lianna Johnson) 2024
NAMS Undergraduate Poster Award, First Place (Joelle Scott) 2022
AIChE North Central Regional Student Conference (Spencer Schmidt) 2021
AIChE National Student Conference: Separations Division (Dylan Kulbacki) 2020
AIChE National Student Conference: Separations Division (Joelle Scott) 2020
AIChE National Student Conference: Environmental Division (Kevin Pataroque) 2020
American Filtration Society National Meeting (Priyanka Suresh) 2019
American Filtration Society National Meeting (Maura Sepesy) 2019
Research ShowCASE (Maura Sepesy) 2019
AIChE National Student Conference: Environmental Division (Niko Kamlet) 2019
AIChE North Central Regional Student Conference (Niko Kamlet) 2019
CWRU Intersections (Kevin Pataroque) 2018

Competitive Undergraduate Research Fellowships at CWRU

SOURCE STEM Undergraduate Research Fellowship (Isabelle Wang) 2023
SOURCE STEM Undergraduate Research Fellowship (Christopher Yoon) 2022
SOURCE STEM Undergraduate Research Fellowship (Alec Johnson) 2021
SOURCE STEM Undergraduate Research Fellowship (Trent Kozar) 2021
SOURCE/WISER Undergraduate Research Fellowship (Joelle Scott) 2020
SOURCE Undergraduate Research Fellowship (Ben Fugate) 2020
Beckman Scholar (Kevin Pataroque) 2019
SOURCE Provost Scholars Undergraduate Research Grant (Kevin Pataroque) 2018

PUBLICATIONS

(Key: **Corresponding author**; CWRU graduate student, CWRU undergraduate student)

In preparation

28. Johnson, L; Driscoll, M; Lai, G; **Duval, CE**; "Removing Radioactivity from Simulated Phosphogypsum Digestate." *In preparation for the Journal of Radioanalytical and Nuclear Chemistry.*

27. Johnson, L; **Duval, CE**. "Rare Earth Element Adsorption Behavior in Membranes Functionalized with Lanmodulin-Derived Peptides." *In preparation for the Journal of Membrane Science.*

26. Sibley, M; Radhakrishnan, SK; Schneider, BL; Banik, T; Venturina, L; Sepesy, M; Kankanamalage, P.H.A.; Hatcher-Lamarre, J; Venturina, LAF; Yen, T; Damron, JT; Johnson, A; Ford, AG; Kozar, T; Zhou, W; Cutler, C; **Duval, CE.** "Towards rapid actinium-225 purification via membrane adsorbers with covalently tethered diglycolamide ligands." *In preparation for ACS Advanced Materials & Interfaces.*

25. Suresh, P; Sibley, M; Che, A; Ward, L; Weinman, ST; **Duval, CE**. ""Functionalizing polyethersulfone membranes: avoiding pitfalls when using UV-induced polymerization to 'graft from' surfaces." *Revising for Journal of Membrane Science.*

24. Sepesy, M; **Duval, CE.** "A beginner's guide to collecting and modeling membrane adsorber performance data." *In prep for AIChE Journal—Invited to submit as Feature Article by Editor.*

Under review

23. Monge Neria, R; Zeeshan, M; Kapoor, A; Gurkan, B; Duval, CE; Saylor, RA; **Kisley, L**. "Super-resolution imaging reveals resistance to mass transfer in functionalized stationary phases." *Second round of revisions with Science Advances.*

In print

2024

22. Kent, K; Dean-Kersten, W; Duval, CE; **Servis, A**. "Distributed Sustainable Metals Production: Opportunities for Intensifying Separations & Alternative Feedstocks" *Current Opinion in Chemical Engineering.* https://doi.org/10.1016/j.coche.2024.101075

21. Suresh, P; Johnson, L; **Duval, CE.** "Membrane adsorbers with copolymer coatings for the separation of actinides from lanthanides (UO_2^{2+} and La^{3+})." *ACS Industrial & Engineering Chemistry Research. Accepted and in press:* 10.1021/acs.iecr.4c03288

20. Johnson, L; Schneider, B; Mithaiwala, H ; Green, MD; Renner, JN; **Duval, CE**. "Electrospun Membranes Modified with Lanmodulin-Derived Peptides for Lanthanide Adsorption." *ACS Applied Engineering Materials,* 2024, 2, 10, 2441-2453. https://doi.org/10.1021/acsaenm.4c00510

19. Kersten, B; Hawthorne, K; Williamson, M; **Akolkar, R; Duval, CE**. "Insight into electrodeposition inefficiencies of Am from $AmCl_3$-LiCl-KCl through diffusion-reaction modeling, voltammetry and potentiometry." *Journal of the Electrochemical Society.* https://doi.org/10.1149/1945-7111/ad80d2

18. Verma, G; Hostert, J; Summerville, S; Robang, AS; Paravatsu, A; Getman, R; Duval, CE; **Renner, JN**. "Investigation of Rare Earth Element Binding to a Surface-Bound Affinity Peptide Derived from EF-Hand Loop I of Lanmodulin." *ACS Applied Materials & Interfaces*, 2024, 16, 13, 16912-16926. https://doi.org/10.1021/acsami.3c17565

2023

17. Kersten, B; **Akolkar, R**; **Duval, CE**. "An electrochemical technique for sensing uranium adsorption." *Analytica Chimica Acta.* 2023, 1284, 34200-342003. https://doi.org/10.1016/j.aca.2023.342003

16. Sepesy, M; Banik, T; Scott, J; Johnson, A; Schneider, BL; Sibley, MM; **Duval, CE**. "Chemically stable, styrenic electrospun membranes with tailorable surface chemistry." *Membranes.13(11), 870; "Women in Membrane Science" issue edited by Isabel Escobar.* https://doi.org/10.3390/membranes13110870

15. Hostert, JD; Sepesy, M; **Renner, JN**; **Duval, CE**. "Clickable polymer scaffolds enable Ce recovery with peptide ligands." *Soft Matter, 2023, 19, 2823-2831.* https://doi.org/10.1039/D2SM01664H

2022

14. Kersten, B; Hawthorne, K; Williamson, M; Akolkar, R; **Duval, CE**. "Synthesis of americium trichloride via chlorination of americium oxide using zirconium tetrachloride in LiCl-KCl molten salt." *J. Radioanalytical and Nuclear Chemistry, 2022, 331, 4913-4918.* https://doi.org/10.1007/s10967-022-08527-3

13. Suresh, P; Che, A; Yu, M; Pataroque, K; Kulbacki, D; **Duval, CE**. "Including non-binding 'spacer' monomers in polymeric phosphonate ligands can tune ligand-ion affinity for rare earth element, La." *ACS Applied Polymer Materials. 2022, 4, 9, 6710-6722.* https://doi.org/10.1021/acsapm.2c01065

12. Sepesy, M; Fugate, B; **Duval, CE**. "Amine-functionalized membranes to capture copper from acidic solutions." *ACS Applied Polymer Materials, 2022.* Special Issue: Early Career Forum (invited). https://doi.org/10.1021/acsapm.1c01512

2021

11. Kersten, B; Hawthorne, K; Williamson, M; Akolkar, R; **Duval, CE**. "Future of Nuclear Energy: Electrochemical Reprocessing of Fuel Takes Center Stage." *ECS Interface.* Fall 2021. (invited) https://iopscience.iop.org/article/10.1149/2.F06213F

2020

10. Suresh, P; **Duval, CE**. "Poly(acid) grafted membranes to sequester uranium from seawater." *Industrial & Engineering Chemistry Research,* 2020, 59, 26, 12212-12222. https://doi.org/10.1021/acs.iecr.0c01090

9. Yu, M; **Renner, JN**; **Duval, CE**. "A lysine-modified polyethersulfone (PES) membrane for lanthanide recovery." *Frontiers in Chemistry,* 2020. Special Edition for Women in Science: Chemistry. https://doi.org/10.3389/fchem.2020.00512

2019

8. Duval, CE; Hardy, W; Pellizzeri, S; DeVol, TA; **Husson, SM**. "Phosphonic acid and alkyl phosphate-derivitized resins for the simultaneous concentration and detection of uranium in environmental waters" *Reactive and Functional Polymers,* 2019 (137), 133-139. https://doi.org/10.1016/j.reactfunctpolym.2019.01.015

2018

7. Duval, CE; Darge, AW; Ruff, CL; DeVol, TA; **Husson, SM**. "Rapid sample preparation for alpha spectroscopy with ultrafiltration membranes" *Analytical Chemistry.* 2018 (90) 6, 4144-4149. https://doi.org/10.1021/acs.analchem.8b00135

Before August 2017

6. Duval, CE; DeVol, TA; **Husson, SM**. "Extractive scintillating polymer sensors for trace-level detection of uranium contaminated ground water" *Analytica Chimica Acta.* 2016 (947), 1-8. **Featured on cover* https://doi.org/10.1016/j.aca.2016.09.029

5. Thies, S; Duval, CE; DeVol, TA; **Husson, SM**. "Creating Monodisperse Polymer Microspheres Using Membrane Emulsification" *Journal of Applied Polymer Science.* 2016 (44593), 1-9. https://doi.org/10.1002/app.44593

4. **Duval, CE**; DeVol, TA; Wade, EC; Seliman, AF; Bliznyuk, VN; Husson, SM. "Stability of polymeric scintillating resins developed for ultra-trace level detection of alpha- and beta-emitting radionuclides" *Journal of Radioanalytical and Nuclear Chemistry.* 2016 310 (2), 583-588. https://doi.org/10.1007/s10967-016-4913-3

3. Duval, CE; DeVol, TA; **Husson, SM**. "Evaluation of resin radius and column diameter for the implementation of extractive scintillating resin in flow-cell detectors" *Journal of Radioanalytical and Nuclear Chemistry.* 2016 (307), 2253-2258.

2. Blyzniuk, VN; Duval, CE; Apul, OG; Seliman, AF; Husson, SM; **DeVol, TA**. "High porosity scintillating polymer resins for ionizing radiation sensor applications" *Polymer.* 2015 (56), 271-279.

1. D. Kim, D. Donahue, B. Kuncharam, C. Duval and **B. Wilhite**, "Toward an integrated ceramic micro-membrane network: Effect of Ethanol Reformate on Palladium Membranes" *Industrial & Engineering Chemistry Research.* 2010 49 (21), 10254-10261.

CONTRIBUTED ORAL PRESENTATIONS (CWRU graduate student, CWRU undergraduate student)

2024

32. Demoin, D; Sanders, V; Dopp, AR; Deri, MA; Gott, M; Duval, CE. "Hurdles & Triumps in Upholding Your LGBTQ+ Identity in Mid-Career" *American Chemical Society Fall Meeting.* Denver, CO, August 2024.

31. Schneider, B; Johnson, L; Mithaiwala, H ; Green, M ; Renner, JN; Duval, CE. "Peptide-modified electrospun polymer membranes for lanthanide adsorption." *American Chemical Society Fall Meeting.* Denver, CO, August 2024.

30. Schneider, B; Johnson, L; Mithaiwala, H ; Green, M ; Renner, JN; Duval, CE. « Electrospun Membrane Materials with Surface Bound Lanmodulin-Derived Peptides for Lanthanide Adsorption" *Gordon Research Seminar on Chemical Separations.* Galveston, TX, January 2024. *One of 2 talks selected from poster abstract submissions.

2023

29. Johnson, L; Schneider, B; Renner, JN; Duval, CE. "A click chemistry-based membrane platform for selective separations." *American Institute of Chemical Engineers Annual Meeting.* Orlando, FL, November 2023.

28. Duval, CE; Sibley, MM; Banik, T; Kankanamalage, P.H.A.; Sepesy, M; Ford, Alexa; Yen, T; Hatcher-Lamarre, J; Cuter, CS. "Chelating DGA membranes enable ion-ion selectivity in radiopharmaceutical processing." *North American Membrane Society.* Tuscaloosa, AL. May 2023.

2022

27. Sepesy, M; Fugate, B; Scott, J; Duval, CE. "Membrane adsorbers to capture Cu from mixed metal acidic solutions." *AIChE National Meeting*. Phoenix, AZ, November 2022.

26. Kersten, B; Hawthorne, K; Willamson, M; Akolkar, A; Duval, CE. "Probing Adsorption of Uranium Species at Electrochemical Interfaces in Support of Environmental Radiochemistry." *242nd Electrochemical Society Meeting,* Vancouver, Canada. October 2022.

25. Sibley, M; Sepesy, M; Scott, J, Ford, A; Yen, T; Banik, T; Johnson, A; Kozar, T. Duval, CE. "Ac-225 purification via membrane adsorbers with covalently tethered diglycolamide ligands." *ACS National Meeting.* Chicago, IL, August 2022.

24. Suresh, P; Che, A; Pataroque, K; Kulbacki, D; Duval, CE. "Including non-binding 'spacer' monomers in polyprotic polymeric ligands impacts ligand-ion affinity for lanthanum." *North American Membrane Society*. Tempe, AZ, May 2022.

23. Duval, CE; Suresh, P; Sibley, M; Ward, L; Weinman, S. "So you think you can graft? Avoiding pitfalls when grafting from PES." *North American Membrane Society*. Tempe, AZ, May 2022.

22. Kersten, B; Hawthrone, K; Williamson, M; Akolkar, R; Duval, CE. "Synthesis of americium trichloride in lithium chloride-potassium chloride molten salt and the study of the electrodeposition reaction of americium". *Methods and Applications of Radioanalytical Chemistry: MARC XII*. Kona, HI. March 2022.

21. Sibley, M; Sepesy, M; Suresh, P; Scott, J; Kozar, T; Ford, A; Yen, T; Johnson, A; Duval, CE. "Membrane adsorbers with covalently tethered diglycolamides ligands for actinium-225 purification". *Methods and Applications of Radioanalytical Chemistry: MARC XII*. Kona, HI. March 2022.

2021

20. Sibley, M; Sepesy, M; Suresh, P; Scott, J; Kozar, T; Ford, A; Yen, T; Johnson, A; Duval, CE. "Diglycolamide ligands for membrane adsorption purification of Ac-225". *The DOE Isotope Program's Virtual Seminar Series—On the Horizon: Novel Isotopes and Future Leaders." Online*, November 18, 2021.

19. Sepesy, M; Fugate, B; Duval, CE. "Cu-Selective Membrane Adsorbers for Medical Isotope Production." *AIChE National Meeting*, Boston, MA, November 2021.

18. Pataroque, K; Suresh, P; Duval, CE. "Affinity-based purification of actinides and lanthanides". *Intersections: Undergraduate Research Symposium*, Case Western Reserve University, Cleveland OH. May 2021.

2020

17. Suresh, P; Yu, M; Duval, CE. "Tuning La(III)-binding strength in membrane adsorbers using heterogeneous polymer brushes" *AIChE National Meeting*, San Francisco, CA, November 2020. Online due to COVID-19.

16. Sepesy, M; Fugate, B. "Membrane Adsorbers for Medical Isotope Production" *AIChE National Meeting*, San Francisco, CA, November 2020. Online due to COVID-19

15. Duval, CE; Suresh, P; Sepesy, M. "Membrane adsorbers for medical isotope purification" *North American Membrane Society National Meeting,* Online due to COVID-19. May 2020**.**

14. Suresh, P; Gupta, M; Duval, CE. "Membrane chromatography for lanthanides and actinides" *World Filtration Congress,* San Diego, CA, 2020. **Accepted but not presented due to COVID-19

13. Sepesy, M; Fugate, B; Duval, CE. "Membrane adsorbers for medical isotope purification" *World Filtration Congress,* San Diego, CA, 2020. **Accepted but not presented due to COVID-19

2019

12. Darge, AW; Duval, CE; Gera, Y; DeVol, TA; Husson, SM. "Uranium isolation and concentration using reactive membranes for quantitative analysis." *ACS National Meeting,* San Diego, CA. August 2019.

2018

11. Suresh, P; Duval, CE. "Phosphate-functionalized membranes for the selective sequestration of uranium from seawater." *AIChE National Meeting*, Pittsburgh, PA. October 2018.

10. DeVol, TA; Darge, AW; Duval, CE; Wu, Y; Watson, M; Jacobsohn, LG; Husson, SM. "Functional membranes for quantification of special nuclear material in natural water." *Radiobioassay and Radiochemical Measurements Conference.* Portland, ME. May 2018.

9. Husson, SM; Darge, AW; Duval, CE; Wu, Y; Watson, M; Jacobsohn, LG; DeVol, TA. "Development of Functional Membranes for Nuclear Forensics." *Methods and Applications of Radioanalytical Chemistry, XI*, Kaiulua-Kona, April 2018.

Before August 2017

8. Duval, CE; Ruff, C; Darge, A; DeVol, TA; Husson, SM. "Uranium-binding ultrafiltration membranes for use in nuclear forensics." *AIChE National Meeting* in Minneapolis, MN, November 2017.

7. Duval, CE; DeVol, TA; Husson, SM. "Rapid uranium isotopic analysis using ultrafiltration and alpha spectroscopy." *ACS National Meeting* in Philadelphia, PA, August 2016.

6. Duval, CE; DeVol, TA; Husson, SM. "Online trace-level quantification of uranium in environmental water." *ACS National Meeting* in Philadelphia, PA, August 2016.

5. Duval, CE; DeVol, TA; Husson, SM. “Rapid Uranium Isotopic Analysis using Ultrafiltration and Alpha Spectroscopy” *North American Membrane Society National Meeting*, Bellevue, WA, May 2016.

4. Duval, CE; DeVol, TA; Husson, SM. “Rapid Uranium Isotopic Analysis using Ultrafiltration and Alpha Spectroscopy” *American Filtration and Separation Society National Meeting*, Nashville, TN, October 2015.

3. Duval, CE; Seliman, AF; DeVol, TA; Husson, SM. “Extractive scintillating resin for the ultra-trace-level quantification of uranium in environmental waters*” Methods and Applications of Radioanalytical Chemistry X*, Kailua-Kona, April 2015.

2. Duval, CE; Seliman, AF; DeVol, TA; and Husson, SM. “Synthesis and Characterization of Extractive Scintillating Resin for Ultra-Trace-Level Quantification of Uranium in Aqueous Media.” *AIChE National Meeting*, Atlanta, GA. November 2014.

1. Duval, CE; Seliman, AF; Blyzniuk, VN; DeVol, TA and Husson, SM. “Synthesis and Characterization of Extractive Scintillating Resin for Ultra-Trace-Level Quantification of Uranium in Aqueous Media.” *ACS National Meeting*, San Francisco, CA, August 2014.

CONTRIBUTED POSTER PRESENTATIONS (CWRU grad students underlined, CWRU undergraduates)

2024

44. Krishna R, Shruti; Venturina, LAF; Lai, G; Sibley, M; Duval, CE. “Platform technology for purifying Ac-225 and other accelerator-produced isotopes*” Fall ACS Meeting*, Denver, CO August 2024.

43. Johnson, L; Schneider, B; Renner, JN ; Duval, CE; “Click-chemistry platform for selective lanthanide separations.” North American Membrane Society, Santa Fe, NM. May 2024.

42. Radhakrishnan, SK; Sibley, MM; Duval, CE. “A platform technology for purifying Ac-225 and other accelerator-produced isotopes” Case Center for Imaging Research Symposium. March 2024.

2023

41. Ford, A; Schneider, B; Duval, CE. “Peptide Functionalized Agarose Beads for Rare Earth Elements Separation “ SOURCE Intersections. May 2023.

40. Sepesy, M; Che, A; Duval, CE. “Upstream radiopharmaceutical purification: purifying metals in strong acids.” *North American Membrane Society,* Tuscaloosa, AL. May 2023.

39. Johnson, L; Schneider, B; Duval, CE. “Click chemistry-based platform for selective membrane separations.” *North American Membrane Society,* Tuscaloosa, AL. May 2023.

2022

38. Sepesy, M; Fugate, B; Duval, CE. “Amine-functionalized membrane adsorbers to capture Cu from acidic solutions.” *North American Membrane Society,* Tempe, AZ. May 2022.

37. Suresh, P; Sibley, M; Che, A; Ward, L; Weinman, ST; Duval, CE. “So you think you can graft? Avoiding pitfalls in characterization when “grafting from” PES membranes “ *North American Membrane Society,* Tempe, AZ. May 2022.

36. Scott, J; Duval, CE. “Synthesizing poly(styrene-co-chloromethyl styrene) to electrospun membranes.“ *North American Membrane Society,* Tempe, AZ. May 2022. ****Award Winner**

2021

35. Kersten, B; Hawthorne, K; Williamson, M; Akolkar, R; Duval, CE. "Recycling Americium from Spent Nuclear Fuel through Molten Salt Electrodeposition" *AIChE National Meeting*, Boston MA, November 2021.

34. Hostert, J; Sepesy, M; Duval, CE; Renner, JN "Rare earth element recovery is only a 'click' away: recovering lanthanides with peptide-functionalized polyvinylidene fluoride (PVDF) membranes." *North American Membrane Society*, Estes Park, CO August 28 2021.

33. Sepesy, M; Fugate, B; Johnson, A; Duval, CE. "Radiopharmaceutical Separation Using Membrane Adsorbers." North *American Membrane Society*, Estes Park, CO August 28 2021.

32. Suresh, P; Che, AC; Sibley, MM; Duval, CE. "So you think you can graft? Avoiding pitfalls in characterization when 'grafting from' membranes." *North American Membrane Society*, Estes Park, CO August 28 2021.

31. Scott, J; Johnson, A; Sepesy, M; Duval, CE. "Electrospun polystyrene membranes for use in radiopharmaceutical purification." *North American Membrane Society*, Estes Park, CO August 28 2021.

2020

30. Scott, J; Sepesy, S; Duval, CE "Electrospun Membrane Adsorbers for Radiochemical Separations."*AIChE Regional Conference,* Ohio State University, Columbus OH, April 17 2020, Online due to COVID-19.

29. Schmidt, S; Monge Negro, R; Kisley, L; Duval, CE. "Development of micron-thin polymer films to observe transport in the selective layer of membrane adsorbers using single molecule microscopy." *AIChE Regional Conference,* Ohio State University, Columbus OH, April 17 2020, Online due to COVID-19. **** Award winner**

28. Kulbacki, D; Duval, CE. "Membrane adsorbers for the rapid purification of medical isotopes." *AIChE National Meeting,* San Francisco, CA, November 2020, Online due to COVID-19. ****Award winner**

27. Fugate, B; Sepesy, M; Duval, CE. "Membrane separation of Cu-67 for use in theranostics." *AIChE National Meeting,* San Francisco, CA, November 2020, Online due to COVID-19.

26. Pataroque, K; Sankaran, M; Duval, CE. "Elucidation of radical species in an electrolytic non-equilibrium plasma-water system." *AIChE National Meeting,* San Francisco, CA, November 2020, Online due to COVID-19. ****Award winner**

25. Scott, J; Sepesy, M; Duval, CE. "Electrospun membrane adsorbers for radiochemical separations." *AIChE National Meeting,* San Francisco, CA, November 2020, Online due to COVID-19. ****Award winner**

24. Schmidt, S; Monge Nerla, R; Kisley, L; Duval, CE. "Sample preparation method to observe transport phenomena in membrane adsorbers using singe molecule microscopy." *AIChE National Meeting,* San Francisco, CA, November 2020, Online due to COVID-19

23. Suresh, P; Gupta, M; Duval, CE. "Membrane chromatography for lanthanides and actinides" *North American Membrane Society Meeting,* Online due to COVID-19, May 2020.

22. Sepesy, M; Fugate, B; Duval, CE. "Membrane adsorbers for medical isotope purification" *North American Membrane Society Meeting,* Online due to COVID-19, May 2020.

21. Fugate, B; Sepesy, M; Duval, CE "Membrane purification of Cu-67" *Intersections.* Case Western Reserve University, Online due to COVID-19, April 2020.

20. Pataroque, K; Sankaran, RM; Duval, CE. “Degradation of Perfluoroalkyl Compounds by Interfacial Reactions Between an Electrolytic Non-equilibrium Plasma and Water” *Intersections.* Case Western Reserve University, Online due to COVID-19, April 2020.

19. Suresh, P; Gupta, M; Duval, CE. “Membrane chromatography for lanthanides and actinides” *World Filtration Congress,* San Diego, CA, 2020. **Accepted but not presented due to COVID-19

18. Sepesy, M; Fugate, B; Duval, CE. “Membrane adsorbers for medical isotope purification” *World Filtration Congress,* San Diego, CA, 2020. **Accepted but not presented due to COVID-19

2019

17. Schmidt, S; Sankaran, RM; Duval, CE. “Surface modification of membranes using plasma.” *Intersections*, Case Western Reserve University, Cleveland OH, December 2019.

16. Kamlet, N; Duval, CE. “Multimodal resins for the adsorption of nitroaromatics.” *AIChE National Meeting,* Orlando FL, November 2019. ****Award winner**

15. Kamlet, N; Duval, CE. “Multimodal resins for the adsorption of nitroaromatics.” *AIChE Regional Student Conference,* University of Toledo, April 2019. ****Award winner**

14. Sepesy, M; Duval, CE. “Membrane-based purification of Cu-67 for use in theranostics.” American Filtration Society Meeting, Cleveland OH, September 2019. ****Award winner**

13. Suresh, P: Duval, CE. “Membrane adsorbers for radiochemical separations.” American Filtration Society Meeting, Cleveland OH, September 2019. ****Award winner**

12. Sepesy, M; Duval, CE. “Membrane-based purification of Cu-67 for use in theranostics.” *Research ShowCASE*, Case Western Reserve University, Cleveland OH, April 2019. ****Award winner**

11. Suresh, P; Duval, CE. “Extraction of uranium from seawater: A novel approach using phosphate-functionalized membrane adsorbers” *Research ShowCASE*, Case Western Reserve University, Cleveland OH, April 2019.

2018

10. Pataroque, K; Sankaran, M; Duval, CE. “Degradation of perfluoroalkyl compounds by interfacial reactions between non-equilibrium plasma and water” *Intersections Research Symposium*, Case Western Reserve University Cleveland OH, December 2018. ****Award winner**

9. Kamlet, N; Duval, CE. “Functionalization of poly(GMA-EGDMA) resins for nitroaromatic adsorption.” *AIChE National Meeting*, Pittsburgh, PA, October 2018.

2017

8. Duval, CE; Hardy, W; DeVol, TA; Husson, SM. “Uranium adsorption on phosphorous-derivitized extractive scintillating resins.” *AIChE National Meeting*, Minneapolis, MN, November 2017.

Before August 2017

7. Duval, CE; DeVol, TA; Husson, SM. “Online Trace-Level Quantification of Uranium in Environmental Waters” *IEEE Symposium on Radiation Measurements and Applications Conference*, Berkeley, CA, May 2016.

6. Duval, CE; DeVol, TA; Husson, SM. “Rapid Uranium Isotopic Analysis using Ultrafiltration and Alpha Spectroscopy” *IEEE Symposium on Radiation Measurements and Applications Conference*, Berkeley, CA, May 2016.

5. Duval, CE; DeVol, TA; Husson, SM. “Rapid Uranium Isotopic Analysis using Ultrafiltration and Alpha Spectroscopy” *Clemson University Graduate Research and Discovery Symposium*, Clemson, SC, April 8, 2016.

4. Duval, CE; DeVol, TA; Husson, SM. "Online Detection of Uranium with Extractive Scintillating Resin" *Defense Threat Reduction Agency Basic Technical Review*, Springfield, VA, July 2015.

3. Duval, CE; DeVol, TA; Husson, SM. “Rapid Uranium Isotopic Analysis using Ultrafiltration and Alpha Spectroscopy” *American Filtration and Separation Society Meeting*, Charlotte, NC, April 2015.

2. Duval, CE; DeVol, TA; Husson, SM. "Extractive Scintillating Resin for the ultra-trace-level detection of alpha- and beta-emitting radionuclides" *Defense Threat Reduction Agency Basic Technical Review*, Springfield, VA, July 2014.

1. Duval, CE; Bliznyuk, V; Meldrum, A; Seliman, AF; DeVol, TA; Husson, SM. "Extractive Scintillating Resin for the ultra-trace-level detection of alpha- and beta-emitting radionuclides" *Defense Threat Reduction Agency Basic Technical Review*, Springfield, VA, July 2013.

RESEARCH SUPPORT

Highlights

- Raised $3.1 million in external funds to CWRU since 2017 (Lead PI on $2.5 million to CWRU)
- Director of a $1.7 million multi-institution NSF ECO-CBET award ($848K to CWRU)
- NSF CAREER (2023), PECASE nominee (2022), DOE Early Career (2020)
- Established new fellowship program in Nuclear Science at CWRU through US Dept. of Energy
    - $330,000 in PhD fellowships thus far
- Established Master Framework Agreement with Bayer Pharmaceutical for ongoing nuclear medicine research at CWRU
    - $250,000 in funding thus far

Present Funding

16. Title: Zwitterionic Membranes for REE separations
    Sponsor: NSF RAISE
    Collaborators: Ayse Asatekin (Tufts), Venkat Ganesan (UT Austin)
    Role: co-PI
    Dollar Amounts: $1 million total ($320,000 to CWRU over 3 years)
    Dates: June 2024 to May 2027

15. Title: CAREER: Polymeric ligands for f-element separations
    Sponsor: NSF CAREER
    Collaborators: none
    Role: PI
    Dollar Amounts: $548,000
    Dates: January 2023 to January 2028

14. Title: Radioisotope Capture Intensification Using Rotating Packed Bed Contactors
    Sponsor: ARPA-E
    Collaborators: Anna Servis (ANL, PI)
    Role: co-PI
    Dollar amounts: $1,520,000 total ($414,000 federal to CWRU, $80K cost shared by CWRU)
    Dates: January 2023 to December 2025

13. Title: Collaborative Proposal: ECO-CBET: Putting entropy to work: Leveraging the role of water organization in peptide binding events to selectively recover rare earths
    Sponsor: National Science Foundation, ECO-CBET

Collaborators: Julie Renner (CWRU), Rui Shi (Penn State), Rachel Getman (Ohio State)
Role: Lead PI
Dollar amounts: $1,728,000 (4 years); $848,000 to CWRU
Dates: September 2021 to August 2025

12. Title: A membrane-based approach to purifying medical isotopes
Sponsor: DOE Early Career Program, Office of Nuclear Physics: The Isotope Program
Collaborators: None
Role: PI
Dollar amounts: $750,000 (5 years)
Dates: September 2020 to August 2025

11. Title: Nuclear Science at Case Western Reserve University
Sponsor: DOE Nuclear Engineering University Nuclear Leadership Program (formerly IUP)
Collaborators: Akolkar (CWRU), Monreal (CWRU Physics)
Role: PI
Dates: August 2020 to July 2031
Dollar amounts:
- Kayla Kent (ECHE), Sept 2024 – Aug 2027 : $169,000
- Bethany Kersten (ECHE), Sept 2020 - Aug 2023: $161,000

Past Funding at CWRU

10. Title: Americium electrorefining at Argonne National Laboratory
Sponsor: Argonne National Laboratory
Collaborators: Krista Hawthorne (host at ANL)
Dollar Amounts: $19,373
Dates: January 2023 to August 2023

9. Title: Single-molecule imaging of f-element separations to advance purification design
Sponsor: CWRU College of Arts and Sciences: Expanding Horizons Initiative
Collaborators: Lydia Kisley (CWRU Physics)
Role: co-PI
Dollar amounts: $30,000 (1 years)
Dates: July 2021 to June 2022

8. Title: Master Framework Agreement: Bayer Pharmaceutical and CWRU
Sponsor: Bayer Pharmaceuticals
Collaborators: none
Role: Lead PI
Dollar amounts: $237,000
- SOW 2: Radiation detectors for radiopharmaceuticals
- SOW 3: Extending the shelf-life of radiopharmaceuticals

7. Title: Design of a medical device for radiopharmaceuticals
Sponsor: Bayer Pharmaceuticals
Collaborators: John Volkar (Bayer)
Dollar amounts: $15,000
Dates: May 2021 to October 2021

6. Title: ThinkEnergy, ThinkNuclear: The next generation of Think Energy Scholars at CWRU
Sponsor: Nuclear Regulatory Commission: Scholarship Program
Collaborators: Rohan Akolkar (PI-CWRU), Great Lakes Energy Institute (CWRU)
Role: Senior Personnel
Dollar amounts: $212,893 to CWRU

Dates: September 2020 - August 2022

5. Title: Synthesis of a LiCl-KCl-UCl_3 Eutectic Salt
   Sponsor: Argonne National Laboratory
   Collaborators: Akolkar (CWRU), Hawthorne (ANL)
   Role: PI
   Dollar amounts: $13,271
   Dates: May 2020 – May 2021

4. Title: Girl Scouts of Northeast Ohio Get to Know Nuclear
   Sponsor: CWRU UCITE, Nord Grant
   Collaborators: none
   Role: PI
   Dollar amounts: $3,800
   Dates: May 2020 – April 2021 (extended to Dec 2021)

3. Title: Laboratory Course in Chemical Engineering Innovation
   Sponsor: VentureWell
   Collaborators: Dan Lacks (PI – CWRU)
   Role: co-PI
   Dollar amounts: $10,000
   Dates: May 2019 – April 2021

1. Title: Novel Treatment Train Development for Wastewater from Munitions Constituents
   Sponsor: CWRU Faculty Investment Fund (internal)
   Collaborators: Huichun (Judy) Zhang (CWRU Environmental Engineering)
   Role: co-PI
   Dollar amounts: $29,900
   Dates: April 1, 2018 – March 31, 2019

Before August 2017

0. Title: Membrane separation processes for clean water and energy
   Sponsor: Clemson University Creative Inquiry Fund
   Collaborators: none
   Role: PI
   Dollar Amounts: $11,500
   Dates: January 2015—May 2017

Pending (submitted in 2024)

4. Title: Centrifugal contactors packed with lanmodulin-derived adsorbents for rare earth element recovery from wastewater
   Sponsor: ARPA-E RECOVER
   Role: PI
   Collaborators: Anna Servis (Argonne National Lab), Julie Renner (CWRU)
   Dollar amounts: $2.5 million ($800,000 to CWRU)
   Status: *Pending as of December 31, 2024*

3. Title: Career-Life Balance Supplement for ECO-CBET award
   Sponsor: NSF Environmental Engineering
   Role: PI
   Collaborators: None

Dollar amounts: $18,000
Status: *Pending as of December 19, 2024*

2. Title: PLUS-UP: Rotating Packed Bed Contactors
Sponsor: ARPA-E
Role: co-PI
Collaborators: Anna Servis (Argonne National Lab), SHINE LLC
Dollar amounts: $1 million ($250,000 to CWRU)
Status: *Pending - negotiating SOPO with program officer before submission*

1. Title: SciTIDE: Science and Technology Center for Interface Design Excellence
Sponsor: NSF Science and Technology Center
Role: co-PI
Collaborators: Rachel Getman (Ohio State, Lead), Nicholas Brunelli (Ohio State), Julie Rener (CWRU), Lydia Kisley (CWRU)
Dollar amounts: LOI ($0), Full proposal ($15 million)
Status: *Pending as of November 1, 2024. Invitations to write full expected in February 2025*

Declined proposals (2017-present)

2024

20 Title: Radiotherapeutic for Tumor Detection and Treatment
Sponsor: SBIR, Phase I
Role: Key Personnel
Collaborators: Susann Brady-Kalnay (PI, CWRU SOM), T. Gastineau (co-PI, CWRU SOM)
Dollar amounts: Phase I: $371,943
Status: *Declined*

19 Title: Novel PSMA-targeted radioligand therapy (RLT)
Sponsor: NIH
Collaborators: Zhenghong Lee (SOM)
Role: Co-investigator
Dollar Amounts: $3,490,795 to CWRU
Status: *Declined*

18 Title: Beckman Scholars Program at Case Western Reserve University
Sponsor: The Beckman Foundation
Collaborators: Don Feke, Sheila Pedigo
Role: Key Personnel (mentor)
Dollar Amounts: to CWRU over 3 years
Status: *Declined*

17 Title: Immobilized peptide-ion interactions with lanthanides
Sponsor: Keck Foundation
Collaborators: Lydia Kisley (CWRU Physics)
Role: co-PI
Dollar Amounts: $1,000,000 to CWRU over 3 years
Status: *Declined*

2023

16. Title: Novel PSMA-targeted radioligand therapy (RLT)
Sponsor: NIH
Collaborators: Zhenghong Lee (SOM)
Role: senior personnel
Dollar Amounts: $3,595,000 to CWRU

15. Title: LOI: Process Adaptation X Intensification
    Sponsor: NSF ERC
    Collaborators: Penn State (Lead), University of Kentucky (Partner)
    Role: Co-PI (lead at CWRU)
    Dollar amounts: N/A

2022

14. Title: Upstream processing for radiopharmaceutical production
    Sponsor: 3M Non-Tenured Faculty Award
    Collaborators: none
    Role: Lead PI
    Dollar amounts: $45,000 (2 years)

13. Title: Zwitterionic Membranes for Rare Earth Element (REE) Separations
    Sponsor: DOE, Chemical and Materials Science to Advance Clean Energy Technologies & Low Carbon Manufacturing
    Collaborators: Ayse Asatekin (Tufts, Lead PI), Venkat Ganesan (University of Texas – Austin)
    Role: co-PI
    Dollar amounts: $1.5 million total ($462,093 to CWRU)

12. Title: Bio-inspired, REE-selective membranes: a low-carbon technology to support the clean energy supply chain
    Sponsor: DOE, Chemical and Materials Science to Advance Clean Energy Technologies & Low Carbon Manufacturing
    Collaborators: Julie Renner (CWRU), Lydia Kisley (CWRU), Lauren Greenlee (Penn State), Rachel Getman (Clemson), Simon Bare (SSRL/SLAC)
    Role: Lead PI
    Dollar amounts: $3.6 million total ($1.5 million to CWRU)

2021

11. Title: Bio-inspired, entropy-driven separation materials to purify critical lanthanides from waste streams: speciation and mechanisms
    Sponsor: Department of Energy, Office of Science: Critical Materials
    Collaborators: Julie Renner (CWRU), Lydia Kisley (CWRU), Lauren Greenlee (Penn State), Rachel Getman (Clemson), Simon Bare (SSRL/SLAC)
    Role: Lead PI
    Dollar amounts: $3,600,000 (3 years)

10. Title: Beckman Scholars Program at Case Western Reserve University
    Sponsor: The Beckman Foundation
    Collaborators: Done Feke (CWRU), Sheila Pedigo (CWRU)
    Role: Senior Personnel (mentor)

9. Title: Next generation materials for radiochemistry and f-element separations
    Sponsor: The Camille & Henry Dreyfus Foundation
    Collaborators: none
    Role: Lead PI
    Dollar amounts: $100,000 (5 years, unrestricted)

2020

8. Title: Chemically resistant membranes with tailorable surface chemistry
    Sponsor: Lubrizol Innovation Fund
    Collaborators: none
    Role: PI
    Dollar amounts: $39,698 (6 months)

7. Title: Patterned membrane adsorbers to remove radium from fracking wastewater
   Sponsor: NSF Environmental Engineering
   Collaborators: Steven Weinman (University of Alabama)
   Role: PI
   Dollar amounts: $420,000 over 3 years

2019

6. Title: Advanced Separation Materials for Radiopharmaceutical Production and Purification
   Sponsor: 3M, Non-tenured faculty program
   Collaborators: none
   Role: PI
   Dollar amounts $30,000 (3 years)

5. Title: Production and Rapid Purification of Radioisotope Pm-147
   Sponsor: DOE, Isotope Research and Production Program
   Collaborators: Vaibhav Sinha (PI: Ohio State University), Raymond Cao (co-PI: Ohio State University)
   Role: co-PI
   Dollar amounts: $339,366 to CWRU (2 years)

4. Title: Center for the science and engineering of plasma-water interactions
   Sponsor: DOE—Fusion Energy Sciences
   Collaborators: Mohan Sankaran (co-PI: CWRU), David Go (PI: Notre Dame)
   Role: co-PI
   Dollar amounts: $800,000 to CWRU (5 years)

3. Title: CAREER: Next generation membrane adsorbers for radiochemical separations
   Sponsor: NSF Molecular Separations
   Role: PI
   Dollar amounts: $558,046 (5 years)

2. Title: Automated high-throughput radiochromatography for medical isotope production
   Sponsor: DOE Early Career Program (Nuclear Physics – Isotope Program)
   Collaborators: none
   Role: PI
   Dollar amounts: $753,805 (5 years)

2018

1. Title: Novel Treatment Train Development for Wastewater from Munitions Constituents (MCs)
   Sponsor: Strategic Environmental Research and Development Program (SERDP)
   Collaborators: Huichun (Judy) Zhang (CWRU, PI), UIUC, UC-Riverside
   Role: co-PI Dollar amounts: $1.5 million (3 years)

INVITED TALKS

Scheduled for 2025

35. "Faster, smaller, stronger: applying chemical engineering principles to alleviate mass transport limitations in radiochemical separations." *Colorado School of Mines,* Department of Chemistry. Golden, CO. January 2025.

2024

34. "Bridging the Gap Between Coordination Chemistry and Membrane Science for REE Separations." *Gordon Research Conference on Membrane Materials & Processes*. New London, NH. August 2024.

33. “Strategies for imparting ion-ion selectivity in membrane separations.” *University of Connecticut,* Department of Chemical and Biomolecular Engineering. Storrs, CT. April 2024.

32. “Solid-phase adsorbents for lanthanide separations: does immobilizing ligands impact f-element adsorption?” *University of Iowa.* Department of Chemistry. Iowa City, IA. February 2024

31. “Moving from extractive resins to adsorptive filters: The impact ligand immobilization on f-element adsorption and desorption.” *American Chemical Society*. *NUCL Symposium on F-element reactivity at interfaces*. New Orleans, LA. March 2024.

30. “Lanmodulin-derived peptide functionalized surfaces & polymers for REE purification.” *American Chemical Society. ENVR Symposium on Rare Earth Element: Occurrences, Extraction Method Development, and Application*. New Orleans, LA. March 2024.

2023

29. “Polymer membranes for *f*-element separations.” *Department of Chemical and Biomolecular Engineering, Cleveland State University.* Cleveland, OH. November 2023.

28. “Polymer materials for extracting value from radioactive mining waste.” *American Chemical Society, Symposium on Early Career Women in Environmental Science & Engineering.* San Francisco, CA. August 2023.

27. “Lanmodulin peptide-functionalized separation materials for REE recovery.” *American Chemical Society, Symposium on Separations Chemistry for Critical Materials.* San Francisco, CA. August 2023.

25. “Developing new tools for rapid Ac-225 purification in support of targeted alpha therapy.” *University of Alabama Birmingham,* Department of Radiology Seminar. May 2023.

24. “DGA membrane adsorbers: developing a chemical engineering solution for rapid Ac/Ln separations.” *Angular Momentum: Online Symposium on f-elements.* April 2023, Online.

23. “Chelating membranes provide high selectivity for f-elements.” *American Chemical Society, PMSE Symposium on Membranes for Molecular Separations.* Indianapolis, IL. March 2023.

2022

22. “Membrane-based approaches for purifying medically relevant radionuclides.“ *University of Kentucky*, Department of Chemical and Materials Engineering, September 2022.

21. “Membrane adsorbers: a scalable technique for radionuclide purification.” *Colorado State University*. Department of Radiological and Health Sciences, April 2022.

20. “Opportunities for Membranes in Nuclear Medicine.” *North American Membrane Society*, Virtual Seminar Series, March 2022.

2021

19. “Moving beyond resins in radiochemistry: membranes can lead the way.“ *Tufts University*, Chemical and Biomolecular Engineering Seminar, December 2021.

18. “Moving beyond resins in radiochemistry: membranes can lead the way.” *University of Washington,* Chemical Engineering Seminar, October 2021.

17. “Membrane-based devices for medical isotope purification.” *2020 TechConnect World*, Washington, DC, October 2021.

16. “Radiopharmaceutical production and purification: opportunities for innovation.” *Vanderbilt University,* Chemical and Biomolecular Engineering Seminar, October 2021.

15. “Radiopharmaceuticals: a new frontier for membrane separations.” *University of Notre Dame,* Chemical and Biomolecular Engineering Seminar, May 2021.

14. “The role of separation science in nuclear medicine.” *Northeast Ohio American Chemical Society,* Keynote at Annual Award Ceremony*,* Cleveland OH, April 2021.

13. “Radiopharmaceuticals: a new frontier for membrane separations.” *University of Alabama,* Chemical and Biomolecular Engineering Seminar, April 2021.

12. “From nuclear forensics to medical isotopes: membranes enable rapid separations.” *University of Illinois Urbana Champaign*. Department of Nuclear, Plasma and Radiological Engineering Seminar, April 2021.

2019

11. “Countering Weapons of Mass Destruction with Advanced Separations.” *Case Western Reserve University,* Physics Department Colloquium, Cleveland, OH, Fall 2019.

10. “Moving beyond extractive resins in radiochemistry: membranes can lead the way.” *Lawrence Livermore National Laboratory,* August 2019.

9. “Moving beyond extractive resins in radiochemistry: membranes can lead the way.” *Argonne National Laboratory,* July 2019*.*

8. “Advanced materials for radiochemical separations.” *University of Toledo*, Chemical Engineering Seminar, Toledo, OH, Spring 2019.

7. “US and International Nuclear Policy.” *Science & Human Rights Coalition Meeting*, Case Western Reserve University, Cleveland OH, Spring 2019.

2018

6. “High-capacity membrane adsorbers for radiochemical separations.” *Cleveland State University*, Chemical Engineering Department Seminar, Cleveland, OH, Fall 2018.

5. “Nuclear Forensics: It’s like CSI except everything is radioactive.” *Rose Hulman Institute of Technology,* Chemical Engineering Department Seminar, Terre Haute, IN, May 2018.

Prior to 2017

4. “Uranium sorbent materials for environmental radiation monitoring.” Case Western Reserve University, Department of Chemical and Biomolecular Engineering Seminar, Cleveland, OH, January 2017.

3. “Membranes for the selective concentration of waterborne uranium.“ Bucknell University, Chemical Engineering Senior Seminar, Lewisburg, PA, January 2017.

2. “Uranium sorbent materials for environmental radiation monitoring.“ New Jersey Institute of Technology, Chemical and Materials Engineering Seminar, Newark, NJ, December 2016.

1. “Confocal microscopy as a tool in radiation sensor design.” *Focus on Microscopy Symposium*, Clemson University, Clemson, SC, April 2015.

TEACHING EXPERIENCE

Case Western Reserve University

ECHE 260: Introduction to Chemical Systems (Fall 2018-present)

- Implemented active learning techniques into course lectures. Introduced students to careers in chemical engineering, fundamentals of mass and energy balances for non-reactive and reactive systems. Incorporated examples of nuclear, pharmaceutical, and environmental engineering applications such as wastewater treatment, uranium enrichment, membrane separations, nuclear reactor cooling, and cosmetics production in homework and class exercises.
    - Fall 2024 instructor rating: (4.11/5.00), Course rating (3.81/5.00)
    - Fall 2023 instructor rating: (4.29/5.00), Course rating (3.82/5.00)
    - Fall 2022 instructor rating: (4.55/5.00), Course rating (4.29/5.00)
    - Fall 2021 instructor rating: (4.57/5.00), Course rating (4.40/5.00)
    - Fall 2020 Instructor rating: (4.91/5.00), Course rating (4.79/5.00)
    - Fall 2019 Instructor rating: (4.72/5.00), Course rating: (4.47/5.00)
    - Fall 2018 Instructor rating: (4.26/5.00), Course rating: (4.20/5.00)

ECHE 350/351: Undergraduate Research Project (2 students across 4 semesters since Fall 2019)

- Undergraduate students complete independent research projects for credit. The PI meets with the student weekly, provides feedback, aids the student in preparing funding applications for summer research. The student gives an oral presentation using powerpoint and a poster presentation at a CWRU symposium. The expected time commitment in the laboratory is 10 hours per week.

ECHE 478: Membrane Separations (New Graduate Course for Spring 2018)

- Developed a new graduate level course which covered transport phenomena in porous media, membrane manufacturing, reverse osmosis, microfiltration, ultrafiltration, nanofiltration, electrodialysis, fouling and special topics in membrane research.
    - Spring 2023 Instructor rating: (5.00/5.00), course rating: (4.00/5.00)
    - Spring 2020 Instructor rating: (4.67/5.00), course rating: (4.53/5.00)
    - Spring 2018 Instructor rating: (4.33/5.00), course rating: (4.33/5.00)

ECHE 479: Radiochemistry (New Graduate Course for Spring 2021)

- Developed a new graduate level course which covered fundamentals of radioactive decay, radioanalytical chemistry and radiometric methods. Homework assignments involved working with real radioanalytical data with applications in medical isotope production, nuclear forensics, and separations.
    - Spring 2022 Instructor rating: (4.80/5.00), course rating (4.80/5.00)
    - Spring 2021 Instructor rating: (4.17/5.00), course rating: (4.00/5.00)

ECHE 375: Chemical Engineering Design Laboratory (New Undergraduate Course for Spring 2019)

- Developed a new laboratory-based course in water filtration. Students were given an open-ended design problem and designed, constructed and evaluated a bench-top water treatment system to remove an emerging contaminant. This course was piloted in Spring 2019.
    - Spring 2019 Instructor rating: (4.00/5.00), course rating: (3.86/5.00)

Clemson University

CHE 499: Membrane Separation Processes for Clean Water and Energy *(Fall 2015-Spring 2017)*

- Role: Instructor
- Proposed and designed a hands-on course for membrane module design and construction
- Applied for and received $11,500 from Clemson University for supplies and materials

CHE 211: Introduction to Chemical Engineering *(Fall 2014 & 2015)*

- Role: Co-instructor
- Designed and presented lecture material twice per week to 120 students
- Aided the instructor in designing and grading all quizzes and exams

ChBE Honors Thesis Project *(Spring 2013-2015)*

- Role: Mentor to undergraduate student researcher
- Guidance resulted in 2 honors theses and 1 peer-reviewed publication

CHE 211: Introduction to Chemical Engineering *(Fall 2012)*

- Role: Teaching assistant
- Graded weekly homework assignments, proctored exams, led problem solving sessions

STUDENTS AND MENTORING

Current Research Mentees

Postdoctoral

1. Bernadette Schneider (October 2022 – present)
   Projects: Functionalized membranes for resource recovery and interfacial engineering
   Funding: NSF CAREER and NSF ECO-CBET

Doctoral

1. Lianna Johnson (August 2021 – present)
   Dissertation: Recovering rare earth elements from fertilizer tailings
   Funding: NSF ECO-CBET

2. Shruti Krishna Radhakrishnan (October 2023 – present)
   Dissertation: DGA membrane adsorbers for medical isotope purification
   Funding: DOE Early Career Research Award

3. Kayla Kent (October 2023 – present)
   Dissertation: Rotating packed beds for radiochemical separations
   Funding: ARPA-E CURIE and DOE UNLP Fellowship

4. Md Sarwar (October 2024 – present)
   Dissertation: Rotating packed beds for radiochemical separations
   Funding: NSF RAISE

5. Morgan Schuld (January 2025 – present)
   Dissertation: Rotating packed beds for radiochemical separations
   Funding: NSF CAREER

Masters

1. Marius Driscoll (September 2024 – present)
   Project: Membrane adsorbers to debulk Th-based spallation targets for Ac-225 production

2. Haozhuo Zheng (September 2024 – present)
   Project: Purifying rare earth elements with electrodialysis

Undergraduates

Isabelle Wang	CWRU Chemical Engineering (Class of 2025)	*SOURCE-funded 2023*
Gwyn Lai	CWRU Chemical Engineering (Class of 2025)	*DOE-funded project*
Eddie Liu	CWRU Chemical Engineering (Class of 2027)	*NSF CAREER*
Oscar Heft	CWRU Chemical Engineering (Class of 2026)	*NSF RAISE*
Sally Askalan	CWRU Chemical Engineering (Class of 2025)	*NSF RAISE*

Duval Lab Alumni and first destinations after CWRU

Postdoctoral Researchers

1.	Megan Sibley	(2021-2023)	Next: Postdoc at Oak Ridge National Lab

Doctoral Students

1.	Priyanka Suresh	PhD August 2022	Next: Associate Consultant, McKinsey & Co.
2.	Maura Sepesy	PhD August 2023	Next: Assistant Teaching Professor, U Buffalo
3.	Bethany Kersten	PhD December 2023	Next: Postdoc at Argonne National Lab

Masters' Students (non-thesis)

1.	Jialing Xu	MS Spring 2019	Next: Ph.D. student, University of Notre Dame
2.	Ming Yu	MS Spring 2020	Next: Ph.D. student, University of Melbourne
3.	Tuli Banik	MS Spring 2023	Next: Ph.D. student, Texas A&M University

Undergraduate Students

1.	Kevin Pataroque	BS May 2021	Next: Ph.D. student at Yale University, NSF GRFP
2.	Dylan Kulbacki	BS May 2021	Next: Engineer at RoviSys
3.	Manan Gupta	BS May 2021	Next: Engineer at Intel
4.	Spencer Schmidt	BS Dec 2021	Next: Post-bachelors' researcher at LLNL
5.	Joelle Scott	BS Dec 2021	Next: Ph.D. student at U. Washington
6.			
7.	Niko Kamlet	BS May 2022	Next: Engineer at Nike
8.	Alec Johnson	BS May 2022	Next: Ph.D. student at Carnegie Mellon
9.	Ben Fugate	BS Dec 2023	Next: Law student at CWRU
10.	Amy Che	BS May 2023	Next: Engineer at Regeneron
11.	Alexa Ford*	BS May 2023	Next: Ph.D. student at UC Berkely - Chemistry
12.	Timothy Yen	BS Dec 2023	Next: M.S. student at New Hope
13.	Luke Venturina		Next: Finishing BS at UNMT
14.	Chaeyoung Yoon	BS May 2024	Next: Engineer at Honda
15.	Sanaa Abu Asaad	BS May 2025	Next: Pursuing MS programs

*Alexa Ford was an undergraduate chemistry student who completed her Capstone research project in my research group. She also conducted research for credit in Fall 2022.

First proposition committee member: CWRU Chemical & Biomolecular Engineering

1. Charles Loney, Fall 2017
2. Yukun “Jack” Gong, Fall 2018
3. Yun-Yang Lee, Fall 2019
4. Sara Jorgenson, Spring 2021
5. Drace Penley, Spring 2021
6. Geeta Verma, Fall 2022
7. Hairou Yu, Fall 2022
8. KangJin Lee, Fall 2022
9. Zeynep Bagbudar, Fall 2023
10. Anar Badalbayli, Fall 2024
11. Fall 2024

Second proposition committee member: CWRU Chemical & Biomolecular Engineering

1. Kailash Venkatraman, Fall 2018
2. Nabiel Abuyazid, Fall 2019
3. Yukun “Jack” Gong, Spring 2020
4. Yun-Yang Lee, Spring 2021
5. Jacob Hostert, Spring 2021
6. Marola Issa, Fall 2022
7. Aidan Klemm, Spring 2023
8. Hairou Yu, Spring 2023
9. Geeta Verma, Fall 2023
10. Rebecca Ahn, Fall 2024

Dissertation committee member: CWRU

1. Kailash Venkatraman. “Electrochemical Atomic Layer Deposition of Metals for Applications in Semiconductor Interconnect Metallization.” October 2018, Advisor: Rohan Akolkar
   Department: Chemical and Biomolecular Engineering

2. Yukun “Jack” Gong. “Electrochemical Atomic Layer Etching of Copper and Ruthenium“ July 2021, Advisor: Rohan Akolkar (Chemical and Biomolecular Engineering)

3. Yun-Yang Lee. “Composite Materials of Reactive Ionic Liquids for Selective Separation of CO2 at Low Concentration.” Summer 2022, Advisor: Burcu Gurkan
   Department: Chemical and Biomolecular Engineering

4. Jacob Hostert. “Peptides for nutrient and rare earth recovery” April 2023, Advisor: Julie Renner
   Department: Chemical and Biomolecular Engineering

5. Marola Issa. “Dynamics of particles near interfaces” February 2024, Advisor: Christopher Wirth
   Department: Chemical and Biomolecular Engineering

6. Yu-Hao Sun. “Measuring the mass of neutrinos.” March 2024, Advisor: Benjamin Monreal
   Department: Physics

7. Yidan Gao. “Mechanism-Based or Machine Learning-Based Kinetic Modeling for Abiotic Chemical Transformation with Fe(II) or Mn Oxides” March 2024. Advisor: Huichun (Judy) Zhang
   Department: Civil & Environmental Engineering

8. Aidan Klemm. " " October 2024. Advisor: Burcu Gurkan

   Department: Chemical and Biomolecular Engineering

External Dissertation committee member

1. Luca Mazzaferro. "Charged Self-Assembled Membranes for Efficient Separations." April 2024. Tufts University, Advisor: Ayse Asatekin.

Masters' thesis committee: CWRU Chemical & Biomolecular Engineering

1. Blaire Volbers. "Vapor Deposition Method for Surface Modifications of Cotton Fabric in Waterproofing Applications." January 2021, Advisor: Dan Lacks

2. Jason Pickering. "Understanding Coulombic Efficiency Limitations in an Acid-Base Energy Storage System: Mass Transport Through Nafion." November 2017, Advisors: Jesse Wainright and Bob Savinell

CWRU candidacy exam committee member (outside of ECHE)

1. Yidan Gao. "Fe(II)-associated reductants and reduction of organic pollutants in anoxic environments." November 2020
   Department: Civil and Environmental Engineering
   Advisor: Judy Zhang

2. Ricardo Monge Neria. "Single molecule microscopy for f-element and chiral molecule separations." March 2022
   Department: Physics
   Advisor: Lydia Kisley

3. Yu-Hao Sun. "Updates on Project 8: measuring the mass of the neutrino." February 2024.
   Department: Physics
   Advisor: Benjamin Monreal

PROFESSIONAL SERVICE

American Institute of Chemical Engineers (AIChE)

- Separations Division
  - Chair of Programming for Area 2D: Membrane Separations 2024-2025
  - Co-Chair of Programming for Area 2D: Membrane Separations 2022-2023
  - Organizer: "Critical Minerals for the Clean Energy Transition" 2023-present
    Topical Conference for the Fall 2024 meeting
  - Member of the IDEAL Working Group 2023-2024
  - Chaired sessions in Area 2D: Membranes Separations 2017-2023
    - Highly selective membranes
    - Membranes for wastewater treatment and reuse
    - Charged membranes for water separations
  - TED-Sep competition judge 2017
- Education Division
  - Mentor for the Future Faculty Mentoring Program 2017-2023
  - Co-chair for 'Young Faculty Forum' session 2020-2021

    - National Student Paper Competition Judge 2019
- North Central Regional Student Conference
    - Panelist in “Is Graduate School a Choice for Me?” Workshop 2022

North American Membrane Society

- Board of Directors 2022-2024
    - Chair of Membership (DEI) committee 2024-2025
    - Member of DEI and Workshops committee 2022-2024
- Workshop: Membrane Metrology 2024
- Session chair: Membranes in Medicine & Public Health Fall 2021
- Session chair: Membrane Synthesis and Casting 2020-2022
- Organizer: Student Workshop on Careers in Industry August 2020

International Congress on Membranes (ICOM)

- Oral Programming Committee for ICOM 2026 2024-present

World Association of Membrane Societies

- Steering Committee 2023-present

Journal Reviewer

- Nature Photonics, ACS Macro Letters, ACS Analytical Chemistry, ACS Applied Materials and Interfaces, Cellulose, J of Radioanalytical and Nuclear Chemistry, Separation Science and Technology, ACS Applied Engineering Materials, AIChE Journal, ACS Industrial & Engineering Chemistry, Nature Nanotechnology

National Science Foundation

- CBET Panelist: Environmental Engineering, Interfacial Engineering
- Ad-hoc reviewer (Science and Technology Centers)

US Department of Energy

- DOE Office of Science Graduate Student Research Program (Heavy Elements, Isotope Program)
- DOE Early Career Research Award Program
- DOE RENEW
- DOE Isotope Program
- DOE Earnest O. Lawrence Award

Gordon Research Conference, Membranes: Materials and Processes

- Chair (elected), 2028
- Vice Chair (elected), 2026
- Invited speaker, 2024
- Discussion Leader, 2018

Phi Sigma Rho, National Engineering Sorority

- Scholarship Foundation Review Committee Member 2014-2018
- University of Connecticut Alumnae Association Representative 2012-2013
- Alumnae Organization Member 2011-present

INSTITUTIONAL SERVICE

Case Western Reserve University

University-level

- CWRU Working Group on Reproductive Health 2022-2023
- CWRU Radiation Safety Committee 2020-2023
- UCITE- and NSF-cosponsored Mobile Institute on Scientific Teaching
    - Participant 2018
    - Co-leader for workshop on Inclusive Teaching 2019
- CWRU Board of Trustees AASL Committee, Panelist 2018

School-level (CSE)

- CSE Graduate Studies Committee 2024-2025
- CSE Awards Committee 2021
- CSE The Engineering Game, Faculty Team 2021
- CSE Undergraduate Studies Committee 2019-2023
- CSE Dean's Welcome Event 2017-2020
- CSE Presentation to the Dean's Visiting Committee 2018

Department-level (Chemical & Biomolecular Engineering)

Seminar Coordinator 2020-2023

Invite and schedule 8-12 seminar speakers per semester with new streamlined workflow using googledocs. I developed templates to advertise seminars through Dept. Twitter Account & Lobby TV. I also arrange meals or meetings between Speakers and relevant identity-based groups (NSBE, WISE, oSTEM, etc.)

Current Students Committee 2021-present

In 2021, I wrote the initial version of graduate student manual which we now update annually. In 2022, I created the Canvas site for the graduate programs.

Ombudsperson for Graduate Students 2020-present

Meet with students seeking guidance ~ 6 times/semester and serve as a liaison between the students and the ChBE DEI committee.

Graduate Admissions Committee

Developed a rubric for admissions (2020); Developed & Implemented SOPs for department-level review using new Slate Software; Recruited 30 new PhD students over 3 years.

- Chair 2022-2024
- Member 2020-2024

Graduate Student Recruitment Committee

- Chair 2017-2019
- Member 2022-2023

As Chair, I organized the first open house visitation weekend (2018) where we hosted prospective students on campus. In 2022, I coordinated with University Marketing & Communications to get a dedicated webpage for PhD program applications. I prepared the original slides for AIChE open house and virtual open houses which are now edited annually.

Faculty Search Committee 2018-2019
Reviewed >200 applications and conducted 20 Zoom interviews for a process that yielded 8 on-site interviews and 1 accepted offer

Representative at Choice's Fair 2017-2019, 2022

Student life

- Faculty Advisor, Matcha Makers Club 2024-present
- Faculty Advisor, The Women's Network 2021-present
- Faculty Advisor, oSTEM, professional society for LGBTQ+ students in STEM 2021-present
- Faculty Advisor, Phi Sigma Rho, national engineering sorority 2018-2022
- Workshop, Applying to Graduate School, oSTEM 2022
- Judge, Student Drag Competition at oSTEM Rainbow Gala 2022
- Faculty Advisor, American Institute of Chemical Engineers Student Chapter 2017-2021
- Panelist, Women in STEM Career Panel, Phi Sigma Rho Eng. Sorority 2018-2020
- Workshop, Building Your Academic Online Presence, WISHED 2021
- Panelist, Engineering the Talk: Women in STEM panel, SWE and WISER 2021
- Workshop, How to get involved in research at CWRU, AIChE Student Chapter 2019
- Workshop, Applying to Graduate School, Phi Sigma Rho Eng. Sorority 2019
- Workshop, Applying to Graduate School, AIChE Student Chapter 2018

OUTREACH AND VOLUNTEERING EXPERIENCE

After Fall 2017

Girl Scouts of Northeast Ohio "Get to Know Nuclear" (40 total participants: 2020, 2023)

- Organized a workshop for middle school aged-girl scouts
- Coordinated CWRU graduate and undergraduate student volunteers to co-lead activities

CWRU Engineering Challenges Carnival (12 total participants: 2021, 100 attendees: 2020)

- Online radioactive mystery "Help me find my radioactive puppy" that taught elementary school students about nuclear forensics

Sciencepalooza: The Reverse Science Fair (30 total participants: 2020)

- Organized a virtual demonstration related to radiation detection for students at John Hay High School located in Cleveland, OH

Clemson Young Alumni Panel, (March 2020)

The Beaumont School, Junior Shadowing Day *(*1 participant: 2018)

- Sponsored a student from an all-women's high school for her professional shadowing experience to expose her to career options in chemical engineering

Before Fall 2017

Girl Scouts of the Upstate "Get to Know Nuclear" (30 total participants: 2016)

- Designed a two-day workshop for girls in 4^{th} - 8^{th} grade

- Coordinated activities with 10 graduate student volunteers across 2 departments

WISE "Introduce a Girl to Engineering and Science" Day (75 total participants: 2015)
- Organized and led a hands-on filtration experiment for middle school girls
-

Project WISE Activity Leader (30 total participants: 2015)
- Coordinated graduate and undergraduate student volunteers to lead hands-on chemical engineering separations through use of enzymes and filtration with middle school girls

PEER/WISE Summer School Leader for Chemical Engineering (20 total participants: 2014)
- Led underrepresented, incoming freshman in hands-on learning modules
- Taught students how to use radiation detectors and construct filtration units

Stone Academy "Science is Fun Day," Volunteer (40 total participants: 2014, 2015)
- Led science activities with groups of first grade students focused on filtration

Youth Soccer and Basketball Coach, **Pickens County YMCA** (60 total participants: 2013-2016)