Andrew P. Carpenter, Ph.D.

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Education

Ph.D. Chemistry and Biochemistry June 2020
Advisor: Geraldine L. Richmond
University of Oregon, Eugene, OR

M.S. Chemistry June 2016
University of Oregon, Eugene, OR

B.A. Chemistry, Mathematics December 2012
Linfield College, McMinnville, OR

Research Experience

Postdoctoral Fellow (Oregon State University) January 2021 – Present
Advisor: Professor Joe E. Baio

Graduate Thesis Research (University of Oregon) June 2014 – January 2021
Advisor: Professor Geraldine L. Richmond
Dissertation: *Molecular Structure and Bonding at Nanoemulsion Interfaces*

Undergraduate Summer Research (Linfield College) June 2010 – August 2010
Advisor: Professor Elizabeth Atkinson
Electrochemical characterization of alkyl substituted polyoxometalates.

Teaching Activities

Bioengineering Guest Lecturer (1x BioE 351, 2x BioE 445) Spring 2022
Summer Institute on Scientific Teaching Summer 2019
Presidential Undergraduate Research Scholarship (PURS) March 2017 – June 2019
Physical Chemistry Laboratory Series (Chem 415, 416, 417) Fall 2013 – Winter 2015
Undergraduate TA Positions (General, Organic, Department Tutor) Fall 2009 – Fall 2012

Publications

†denotes corresponding authorship.
Drafts of manuscripts labeled "*In Preparation*" are available upon request.

[14] "Preservation of Dysferlin C2A Secondary-Structure during Vesicle Binding" **A.P. Carpenter**, P. Khuu, A. Chatterly, T.W. Golbek, S. Roeters, T. Weidner, C.P. Johnson, J.E. Baio (*In Preparation*)

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[13] "Mapping the Influence of Mutations on Dysferlin C2A-Lipid Binding Modes" **A.P. Carpenter**, P. Khuu, E. Kwok, C.P. Johnson, J.E. Baio (*In Preparation*)

[12] "What is "environmentally relevant"? Comparative Thermodynamic and Structural Analysis of PFAS Adsorption to River Water and Distilled Water surfaces" **A.P. Carpenter**†, J.N. White, A. Hasbrook, M. Reierson, J.E. Baio *(Under Review)*

[11] "The dysferlin C2A domain binds PI(4,5)P2, penetrates membranes, and clusters lipids" E. Kwok, S.C. Otto, P. Khuu, **A.P. Carpenter**, S. Codding, P.N. Reardon, J. Vanegas, T.M. Kumar, C.J. Kuykendall, R.A. Mehl, J. Baio, C.P. Johnson, *Journal of Molecular Biology* (*Under Review*)

[10] "Orientation of the Dysferlin C2A Domain is Responsive to the Composition of Lipid Membranes" **A.P. Carpenter**, P. Khuu, T. Weidner, C.P. Johnson, S. Roeters, J.E. Baio, *J. Phys. Chem. B*, 127, (5777-589) 2023

[9] "Choose Your Own Adventure: Picosecond versus Broadband Vibrational Sum-Frequency Generation Spectrometer" **A.P. Carpenter**†, J.E. Baio, *BioInterphases*, 17, (031201) 2022 (Scilight Feature)

[8] "Dynamic Duo: Vibrational Sum Frequency Scattering Investigation of pH-switchable Carboxylic Acid/carboxylate Surfactants at Nanodroplet Surfaces" M.J. Foster, **A.P. Carpenter**, G.L. Richmond, *J. Phys. Chem. B*, 125, (9629-9640) 2021

[7] "Effects of Salt-Induced Charge Screening on AOT Adsorption to the Planar and Nanoemulsion Oil-Water Interfaces." **A.P. Carpenter**, M.J. Foster, K.K. Jones, G.L. Richmond *Langmuir*, 37, (8658-8666) 2021

[6] "Assessing the Impact of Solvent Selection on Vibrational Sum-Frequency Scattering Spectroscopy Experiments." **A.P. Carpenter**, E.L. Christoffersen, A.N. Mapile, G.L. Richmond *J. Phys. Chem. B*, 125, (3216-3229) 2021.

[5] "Interfacial Molecular Characterization of pH-tunable Polyethylenimine at the Nanoemulsion Droplet Surface." E. Tran, **A.P. Carpenter**, G.L. Richmond, *Langmuir*, 36, (9081-9089) 2020.

[4] "How low can you go? Molecular characteristics of low charge nanoemulsion surfaces." **A.P. Carpenter**, R.M. Altman, E. Tran, G.L. Richmond, *J. Phys. Chem. B*, 124, (4234-4245) 2020.

[3] "Formation and surface-stabilizing contributions to bare nanoemulsions created with negligible surface charge." **A.P. Carpenter**, E. Tran, R.M. Altman, G.L. Richmond, *PNAS*, 116, (9214-9219) 2019.

[2] "Molecular Characterization of Water and Surfactant AOT at Nanoemulsion Surfaces" J.K. Hensel, **A.P. Carpenter**, R.K. Ciszewski, C.T. Kittredge, B.K. Schabes, F.G. Moore, G.L. Richmond, *PNAS*, 114, (13351-13356) 2017.

[1] "Metal Ion Induced Adsorption and Ordering of Charged Macromolecules at the Aqueous/Hydrophobic Liquid Interface", E.J. Robertson, **A.P. Carpenter**, C.M. Olson, R.K. Ciszewski, G.L. Richmond, *J. Phys. Chem. C.*, 118, (15260-15273) 2014.

Research Presentations

Oregon Bioengineering Symposium, Oregon State University, October 2022.
"Mapping the Molecular Scale Impact of Mutations Relevant to Late-Onset Muscular Dystrophies" (Oral, Poster)

263rd ACS National Meeting, San Diego, CA, March 2022.
"Influence of Lipid Specificity on Dysferlin-Lipid Binding Interactions." (Oral)

Oregon Bioengineering Symposium, Virtually hosted by University of Oregon, November 2021.
"Nonlinear Spectroscopic Evidence for Specific Binding Interactions Between the Dysferlin C2A Domain and PI(4,5)P2 in Biomimetic Lipid Membranes." (Poster, Virtual)

CBEE Seminar Series, Oregon State University, OR, October 11, 2021.
"A Surface Level Perspective of Cellular Membrane Repair and Biomimetic Surfaces." (Oral)

Seminar in Nano-engineered Systems, University of Washington, WA, April 22, 2021.
"Vibrational Sum-Frequency Scattering Spectroscopy of Liquid Colloid Interfaces." (Oral, Virtual)

Lewis and Clark Chemistry Department Seminar, Lewis and Clark College, OR, December 3, 2019.
"Why all the negativity? Spectroscopic investigations into the charging of aqueous-hydrophobic surfaces." (Oral)

258th ACS National Meeting, San Diego, CA, August 2019.
"Surfactant Induced Reorganization of the Hydrophobic Phase at Nanoemulsion Interfaces" (Oral)

"Molecular Properties of Low Charge Aqueous-Hydrophobic Nanoemulsion Interfaces" (Oral)

OSA Pacific Northwest Optics Workshop, Wilsonville, OR, May 4, 2019.
"Why so negative? Spectroscopic investigation into the accumulation of charge at nanoemulsion interfaces." (Oral)

Thompson Hall Science and Mathematics Seminar, University Puget Sound, WA, April 25, 2019.
"Untangling the Interfacial Details of Biologically and Environmentally Relevant Nanoemulsions" (Oral)

2018 Pauling Medal Award Symposium, Bothell, WA, November 2018.
"Fundamental to Applied: How Molecular Structure at Nanoemulsion Surfaces Govern Macroscopic Behavior" (Poster)

255th ACS National Meeting, New Orleans, LA, April 2018.
""Scattered" Thoughts on Understanding the Interfaces of Particle Dispersions" (Oral)

"Layer-by-Layer: Towards Understanding Surfactant-Polyelectrolyte Interactions of Nanoemulsions Interfaces" (Oral, last minute addition)

"Untangling the Details of Surfactant Adsorption at the Nanoemulsion Interface" (Poster)

253rd ACS National Meeting, San Francisco, CA, April 2017.

"Environmental Effects on the Structure of Nanoemulsions" (Oral)

252nd ACS National Meeting, Philadelphia, PA, August 2016.

"Molecular Insights into the Structure of Nanoemulsions" (Oral)

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University of Oregon Graduate Research Forum, Eugene, OR, March 2015.
"Counter-ion Effects on Surfactant Assembly at the Oil-Water Interface of Reverse Emulsions" (Poster)

Awards and Fellowships

NSF MPS-Ascend Postdoctoral Fellowship	2021 – 2024
University of Oregon CAS Dissertation Research Fellowship	2019 – 2020
Graduate Student Award for Excellence in the Teaching of Chemistry	2015

University Service

Department of Chemistry and Biochemistry Diversity, Equity, and Inclusion Committee	January 2017 – July 2020
Richmond Lab Safety Officer (EHS Contact)	Fall 2015 – Spring 2020
Chemistry and Biochemistry Graduate Representative Advisory Team	Fall 2017 – Fall 2018

External Service

Reviewing Activities

2023: Journal of Physical Chemistry Letters (ACS)

2022: Journal of Chemical Physics (AIP)

2021: ACS InFocus eBooks (ACS), ACS Nano (ACS), Nature Communications (SpringerNature)

Mentorship Activities

Graduate Students

First Year Rotation (UO) Students – Jess Fehrs, Evan Christofferson, Marc Foster, Zach Walbrun, Marium Haq, Luis Perez-Gonzales

Undergraduate Students

Huy Dien (OSU STEM Leaders, AY 2021-2022)

Christine Le (OSU STEM Leaders, Summer 2021)

Ashley Mapile (UO REU, Summer 2018) – University of Oregon (PhD Chemistry in progress)

Bryce Hickam (UO REU, Summer 2017) – California Institute of Technology (PhD Chemistry in progress)

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Affiliations/Memberships

American Chemical Society

Optica (Formerly OSA)