

Elaine M. Marzluff

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Education

Post-Doctoral Research Associate, Structural Biology, 1995-1996, California Institute of Technology, Pasadena, CA.

Research Advisor: Stephen L. Mayo.

Ph.D. in Chemistry, 1995, California Institute of Technology, Pasadena, CA. Research Advisor: Jesse L. Beauchamp

A.B. with high honors in Chemistry, 1989, Harvard University, Cambridge, MA. Research Advisor: Joseph J. Grabowski

Recent Grants and Fellowships

HHMI, committee member (\$1,000,000) funded.

NSF-TUES (PI): "Collaborative Research: Collaborative Research: Transforming Undergraduate Physical Chemistry Education using a Context Rich Pedagogy to Teach Kinetics, Quantum Mechanics, and Spectroscopy, \$99,171, August 2012

NSF-MRI (PI): "Acquisition of Mass Spectrometry Instrumentation for Chemistry and Biology Research" (\$428,295) August 2009

Grinnell College Senior Faculty Research Leave (salary+benefits for ½ year), 2004-2005.

American Society of Mass Spectrometry Research Award (\$25,000) June 2000

Camille and Henry Dreyfus Faculty Start-Up Grant, (\$12,500) September 1997

Professional Societies

American Chemical Society (Secretary, Iowa Section 1999-2004, Webmaster 2005-present)

American Society of Mass Spectrometry (Education Committee 2013-present) Publications Committee 2005-2007, Fundamentals Interest Group Coordinator 2007-2009)

Council of Undergraduate Research

Midwestern Association of Chemistry Teachers at Liberal Arts Colleges

Project Kaleidoscope Faculty for the 21st Century

Recent Institutional Service

Committee on Academic Standing (2012-present), Subcommittee for Academic Honesty (2012-present)

Personnel Committee, at large representative (2012-present)

HHMI Committee, grant planning and execution (2011-present)

Physical Education Committee, Chair (2003-2004, 2008-present)

Faculty Athletic Representative to MWC (2003-2004, 2008-present)

Policy Studies Concentration Committee (2008-present)

Biological Chemistry Major Committee (1998-present), Chair (2010-2011)

Chair, Chemistry Department (2007-2010)

Presidential Search Committee (2009-2010)

Summer Faculty Workshop co-leader, "Policy Studies" (Summer 2009)

Director, Grinnell Science Project (formerly New Science Project) (2002-2004, 2006-2009)

Rosenfield Committee (2007-2009)

Personnel Committee, science division representative (2007-2009)

General Science Committee (1999-2004, 2007-2009) (Chair 2001-2004)

Executive Council, at large member (2005-2007)

Publications

John R. Engen, Thomas E. Wales, Shugui Chen, Elaine M. Marzluff, Kerry M. Hassell, David D. Weis, Thomas E. Smithgall, "Partial cooperative unfolding in proteins as observed by hydrogen exchange mass spectrometry", *International Reviews in Physical Chemistry*, **2013**, 32, 96-127.

Justine V Arrington, Rita N. Straus, Patrick F. Reynolds, Jennifer L. Poutsma, Elaine M. Marzluff, and John C. Poutsma "Gas-Phase Hydrogen Deuterium Exchange Behavior of Lysine and its Homologs" *International Journal of Mass Spectrometry*, **2012**, 330-332, 200-206.

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Elaine M. Marzluff, Mary A. Crawford and Helen Reynolds. "Study of the Kinetics of an S_N1 Reaction by Conductance Measurement" *Journal of Chemical Education*, **2011**, *88*, 1586–1588.

Laura Mertens and Elaine M. Marzluff. "Gas Phase Hydrogen/Deuterium Exchange of Arginine and Arginine Di-Peptides Complexed with Alkali Metals" *J. Phys. Chem. A*, **2011**, *115*, 9180–9187.

Timothy D. Vaden, Tjalling S. J. A. de Boer, Neil A. MacLeod, Elaine M. Marzluff, John P. Simons and Lavina C. Snoek "Infrared spectroscopy and structure of photochemically protonated biomolecules in the gas phase: a noradrenaline analogue, lysine and alanyl alanine" *Phys. Chem. Chem. Phys.*, **2007**, *9*, 2549–2555.

Hünig, I.; Painter, A.J.; Jockusch, R.A.; Çarçabal, P.; Marzluff, E.M.; Snoek, L.C.; Gamblin, D.P.; Davis, B.G.; Simons, J.P. "Adding water to sugar: A spectroscopic and computational study of alpha- and beta-phenylxyloside in the gas phase" *Phys. Chem. Chem. Phys.*, **2005**, *7*, 2474–2480.

Evans, S.E.; Lueck, N.; Marzluff, E. M. "Gas Phase H/D Exchange of Proteins in an Ion Trap Mass Spectrometer" *International Journal of Mass Spectrometry*, **2003**, *222*, 175-187.

Desai, Amish; Yang, Xing; Tai, Yu-Chong; Marzluff, Elaine; Boekenkamp, Dirk; Mayo, Stephen "Microfluidic sub-millisecond mixers" U.S. Patent #US5921678, **1998**.

Boekenkamp, D.; Desai, A.; Yang, X.; Tai, Y.-C.; Marzluff, E. M.; Mayo, S. L. "Microfabricated Silicon Mixers for Submillisecond Quench-Flow Analysis" *Anal. Chem.* **1998**, *70*(2), 232-236

Desai, A.; Boekenkamp, D.; Yang, X.; Tai, Y.C.; Marzluff, E.; Mayo, S.L. "Microfluidic Sub-millisecond Mixers for the Study of Chemical Reaction Kinetics," *Technical Digest, 1997 International Conference on Solid-State Sensors and Actuators (Transducers '97)*, **1997**, *1*, 167-170.

Marzluff, E.M.; Beauchamp, J.L. "Collisional Activation Studies of Large Molecules" in *Large Ions: Their Vaporization, Detection and Structural Analysis*, Tomas Baer, editor. John Wiley & Sons: **1996**.

Campbell, S.; Rodgers, M.T.; Marzluff, E.M.; Beauchamp, J.L. "Deuterium Exchange Reactions as a Probe of Biomolecule Structure. Fundamental Studies of Gas Phase H/D Exchange Reactions of Protonated Glycine Oligomers with D₂O, CD₃OD, CD₃CO₂D, ND₃." *J. Am. Chem. Soc.*, **1995**, *117*, 12840-12854.

Rodgers, M.T.; Campbell, S.; Marzluff, E.M.; Beauchamp, J.L. "Site Specific Protonation Directs Low-Energy Dissociation Pathways of Dinucleotides in the Gas Phase." *Int. J. Mass Spectrom. and Ion Proc.*, **1995**, *143*, 1-23.

Marzluff, E.M.; Campbell, S.; Rodgers, M.T.; Beauchamp, J.L. "Low Energy Dissociation Pathways of Deprotonated Peptides in the Gas Phase." *J. Am. Chem. Soc.*, **1994**, *116*, 7787-7796.

Marzluff, E.M.; Campbell, S.; Rodgers, M.T.; Beauchamp, J.L. "Collisional Activation of Large Molecules is an Efficient Process." *J. Am. Chem. Soc.*, **1994**, *116*, 6947-6948.

Campbell, S.; Rodgers, M.T.; Marzluff, E.M.; Beauchamp, J.L. "Structural and Energetic Constraints on Gas Phase Hydrogen/Deuterium Exchange Reactions of Protonated Peptides with D₂O, CD₃OD, CD₃CO₂D, and ND₃." *J. Am. Chem. Soc.* **1994**, *116*, 9765-9766.

Rodgers, M.T.; Campbell, S.; Marzluff, E.M.; Beauchamp, J.L. "Low Energy Collision-Induced Dissociation of Deprotonated Dinucleotides: Determination of the Energetically Favored Dissociation Pathways and the Relative Acidities of the Nucleic Acids." *Int. J. Mass Spec. Ion Proc.*, **1994**, *137*, 121-149.

Grabowski, J.J., Bertozzi, C.R., Jacobsen, J.R., Jain, A., Marzluff, E.M., Suh, A.Y. "Fluorescence Probes in Biochemistry: An Examination of the Non-Fluorescent Behavior of Dansylamide by Photoacoustic Calorimetry." *Anal. Biochem.*, **1992**, *207*, 214-226.

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Jain, A., Marzluff, E.M., Jacobsen, J.R., Whitesides, G.W., Grabowski, J.J. "A New General Method for the Determination of Binding Constants: Photoacoustic Titration of Dansylamide with Carbonic Anhydrase." *J. Chem. Soc. Chem. Commun.* **1989** 1557-1559.

Recent Conference Presentations (undergraduate co-authors underlined)

"Optimization of peptic digestion and hydrogen/deuterium exchange for liquid chromatography mass spectrometric analysis of proteins" Terry R. Schaid and Elaine M. Marzluff, presented by Terry Schaid at the 125th Meeting of Iowa Academy of Science, April 19-20, 2013.

Gas phase conformations and reactivities of glutidine and histidine fipeptides in the gas phase, Elaine M. Marzluff, Max Calenberg and Laura Mertans, presented at the "Gaseous Ions" Gordon Research Conference, Galveston, TX, Feb 24-28, 2013.

"Gas Phase conformations and reactivities of histidine and histidine dipeptides in the presence of alkali metals" Max Calenberg and Elaine M. Marzluff, Presented by Max Calenberg at the 243rd ACS National Meeting & Exposition, San Diego, CA, United States, March 25-29, 2012.

"Hydrogen/deuterium exchange and computational modeling of proline-containing peptides in the gas phase." Seth Heithaus and Elaine M. Marzluff, Presented by Seth Heithaus at the 243rd ACS National Meeting & Exposition, San Diego, CA, United States, March 25-29, 2012.

"Solution-phase hydrogen exchange followed by electron transfer dissociation for analysis of conformational features of proteins" Kerry M. Hassell, Billy Smith, Sean Marcisin, Elaine M. Marzluff, Jeffery M. Brown, Michael Morris, Jay Bradner, John R. Engen presented by Kerry Hassell at the 2012 Sanibel Conference on Mass Spectrometry Technologies for Structural Biology January 19 - 22, 2012.

Gas Phase H/D exchange behavior of lysing homologues." Rita Straus, Justine Arrington, Elaine Marzluff and John C. Poutsma. Presented by Rita Strauss at the 63rd Southeast Regional Meeting of the ACS, Richmond, VA Oct 26-29, 2011.

"Gas phase hydrogen/deuterium exchange of arginine-containing peptide alkali metal complexes", Laura A. Mertens and Elaine M. Marzluff. Presented by Laura Mertens at the 241st ACS National Meeting & Exposition, Anaheim, CA, United States, March 27-31, 2011.

"Hydrogen/deuterium exchange of gas phase serine-containing peptides", Alyssa K. Mezochow and Elaine M. Marzluff. Presented by Alyssa Mezochow at the 241st ACS National Meeting & Exposition, Anaheim, CA, United States, March 27-31, 2011.

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Recent Invited Seminars

- “Peptide Structure and Reactivity in the Gas Phase”, invited presentation at University of Nebraska, March 27, 2013.
- “Peptide Structure and Reactivity in the Gas Phase”, invited presentation at Connecticut College, February 21, 2012.
- “Peptide Structure and Reactivity in the Gas Phase”, invited presentation at Yale University, February 20, 2012.
- “Peptide Structure and Reactivity in the Gas Phase”, invited presentation at Amherst College, February 3, 2012.
- “Peptide Structure and Reactivity in the Gas Phase”, invited presentation at Wellesley College, November 14, 2011.
- “Gas Phase Peptide Structure and Reactivity”, invited presentation at University of Iowa, January 20, 2011.
- “Gas Phase Peptide Structure and Reactivity”, invited presentation at Gustavus Adolphus, March 19, 2010.

Other Presentations

- “Using a “SmartPen” to promote access and engagement” presented at the Grinnell College Faculty Teaching Fair, May 13, 2013.
- “Using iPads to promote engagement and interaction” presented at the Grinnell College Faculty Teaching Fair, May 13, 2013.
- “Modernizing the physical chemistry laboratory: Study of the kinetics of an S_N1 reaction by conductance measurement” Presented jointly with Mary Crawford at the 241st ACS National Meeting & Exposition, Anaheim, CA, United States, March 27-31, 2011.
- “Global Climate Change: Science and Politics”, presented jointly with Wayne Moyer at Alumni College, June 4, 2010.
- “NMR spectroscopy at Grinnell College: An open-access environment.” Mobley, T. Andrew; Sieck, Stephen R.; Erickson, Luther E.; Hernandez-Soto, Heriberto; Levandoski, Mark M.; Lindberg, James G.; Lyons, Leslie J.; Marzluff, Elaine M.; Minelli, Martin; Swartz, James E.; Trimmer, Elizabeth E. Presented by Andy Mobley at the 239th ACS National Meeting, San Francisco, CA, United States, March 21-25, 2010.
- “Gas Phase Proteins”, Presented at Grinnell Alumni College, May 30, 2007.
- “Grinnell College’s New Science Project: Welcoming the Under Represented into the Scientific Community” Clark Lindgren, James Swartz and Elaine Marzluff, presented by Elaine Marzluff at the PEW conference on Attracting and Retaining Majors in the Sciences, Chicago, March 7-9, 2003.