

Stacy Irene Chamberlin, Ph.D.

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- Education** **University of North Carolina, Dept. of Chemistry**, Chapel Hill, NC *Ph.D., December 2001*
Research Advisor: Dr. Kevin M. Weeks
Ph.D. in Organic Chemistry; Biochemical and Bioorganic research
Thesis Title: A Novel Approach for Monitoring RNA Flexibility:
Acylation of 2-amine Substituted RNA
- Colorado College**, Colorado Springs, CO *B.A., May 1995*
Major: Chemistry
Cum Laude Distinction
- Teaching Experience** **Associate Professor, Regis Univ.**, Dept. of Chem., Denver, CO *August 2015 to present*
Expanding active, student-driven learning practices across all courses with an emphasis on inquiry based, General Chemistry laboratory curricula. Actively pursuing teaching opportunities in the Regis College core teaching across the foundational core and developing an integrative core course in ITI. Presented novel teaching pedagogies at multiple, national conferences leading to publication in the fall of 2019. Launched a Junior Chemistry Seminar course focusing on vocational discernment and professional development. Continuing rigorous, undergraduate research program in enzyme kinetics and protein biophysics presenting results with students at multiple national conferences. Serving as Department Chair (2017-2020) with goals met to expand instrument funding; made readjustments in pre-Nursing curricula to insure maximum seamless progression; managed ALC visit, cyber-attack, and department AUR and ACS reaccreditation; worked to improve department culture and diversity through a personalized faculty approach and a concerted effort to retain faculty; and represented our department needs within the College and across the University. Built strong community outreach with local elementary schools and Science Sunday. Continuing my strong commitment to serve as a leader at Regis giving my time and efforts to Faculty Senate, ITI, AAUW student salary training, and the Regis College Core Review Committee.
- Assistant Professor, Regis Univ.**, Dept. of Chem., Denver, CO *August 1, 2011 to August 2015*
Developed interactive lecture formats for Biochemistry and General Chemistry to include group problem solving, team-based learning modules, and experiential demonstrations. Actively incorporated Jesuit fundamentals with foundational chemical concepts in honors level General Chemistry courses. Formulated student led lectures and one on one interviews for the Biochemistry course series to develop presentation skills and enhance course rigor. Expanded independent, research-based projects in Biochemistry lab using current biochemical techniques and bioinformatics tools. Developed a Senior Capstone Seminar course that integrates the Jesuit values of reflection and *cura personalis*. Formulated professional development series for dept. majors. Rapidly expanded student research opportunities in the areas of RNA riboswitch regulation and alkaline phosphatase active site architecture. Served on faculty Senate, STEM strategic planning, chemistry and math faculty search committees, electronic portfolio development team; headed chemistry department assessment, expansion of peer tutoring services, and distinguished lecturer series.

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Teaching Experience (continued)

Term Professor, Regis Univ., Dept. of Chem., Denver, CO *August 1, 2010 to May 31, 2011*
Developed curricula for upper division Biochemistry and Principles of Chemistry lecture and laboratory. Formulated inquiry-based laboratories that required student driven design and execution. Honed students' scientific literacy and technical writing skills by introducing Principles students to the "news" sections of scientific journals and requiring biochemistry students to critically read and write about current research relevant to presented course materials. Developed an experimentally based Biochemistry laboratory where techniques are introduced and applied to student designed research projects. Developed assessment methods for Principles and Biochemistry courses and actively participating in a department-wide chemistry curriculum overhaul to meet ACS standards and produce competitive, resourceful and chemically literate students.

Visiting Professor, Univ. of N. Carolina, Dept. of Chem., Chapel Hill, NC *2006 to 2008*
Independently developed lectures, syllabi, assignments, quizzes and exams for General Chemistry I and II. Cultivated students' problem-solving skills using small, group sessions (6-10 hrs/week). Constructed problem-based exams and quizzes to fortify students' problem-solving skills. Developed on-line course materials, resource links, and nightly question/answer sessions using Blackboard. Formulated hands-on demonstrations to strengthen the link between formal lecture and laboratory. Managed 190 to 475 General Chemistry students, 5-12 graduate student teachers and a graduate teaching fellow each semester.

Research Mentor, Duke University, Department of Biochemistry, Durham, NC *2001 to 2005*
Assisted in experimental design, technique training, and data analysis. Mentored pre-doctoral and undergraduate students (~15 students).

Research Experience

Regis University, Department of Chemistry, Denver, CO *Summer 2020 to present*
Collaborators: Terrance G. Oas and Hashim M Al-Hashimi, Duke University
Investigating the structural dynamics of the SARS-CoV2, non-structural protein 9 (Nsp9) and the architectural and dynamic requirements for complexation with a pseudoknot in the 3'-untranslated region of the viral RNA. Investigating the role this interaction plays in switching from the translation to the replication of the viral RNA. Currently generating pure, single amino acid mutants of Nsp9 for fluorescent based binding studies to produce preliminary information for a NIH R15 and NSF RUI and ROA grant. Future experiments will detect breathing motions in this SARS-CoV2 complex via two- and three-dimensional NMR to better define drug targets and dosing requirements for inhibiting this complex and treating COVID19 infections.

Regis University, Department of Chemistry, Denver, CO *2015 to present*
Expanding our current understanding of catalytic promiscuity and its relationship to protein stability using the enzyme alkaline phosphatase. Undergraduate students generated and tested four intriguing mutants of alkaline phosphatase that exhibit increased catalytic efficiency while also exhibiting decreased structural stability. pH dependent studies have revealed interesting mechanistic changes yielding shifted pH profiles as a function of catalytic activity. Students have presented research at graduate level poster sessions at national, ACS conferences.

Regis University, Department of Chemistry, Denver, CO *2011 to 2015*
Investigated the role of vitamin B₁₂ in controlling gene expression through small RNA riboswitches. Developed structure, thermodynamic and kinetic studies to elucidate the structural requirements for B₁₂ binding in a variety of species. Investigated the role of B₁₂ riboswitches in eukaryotic gene control for the directed development of antibiotic

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therapeutics. Expanding research of the biochemical structure/function relationship to protein based systems, including multiple architectural and mechanistically relevant active site mutants of the ubiquitous enzyme alkaline phosphatase. Managing 4 to 12 undergraduate researchers across their four years of college. Developed a strong conduit for R01, summer undergraduate research experiences across the nation.

Duke University, Department of Biochemistry, Durham, NC 2001 to 2005
NIH Postdoctoral Research Fellow with Dr. Terrence G. Oas

Investigated the thermodynamics and kinetics of ribonucleoprotein (RNP) assembly using RNase P as a model system. Assessed the role of small anions in protein/RNA association by heteronuclear NMR spectroscopy, fluorescence, and mass spectrometry.

University of North Carolina, Department of Chemistry, Chapel Hill, NC 1996 to 2001

Thesis Research with Dr. Kevin Weeks: Developed a novel, chemical method for mapping local nucleotide flexibilities in RNA using single, 2-amine nucleotide substitutions as a selective, chemical handle for modification. Analyzed the structural and chemical requirements for this reaction using small molecule models. Showed direct evidence for 3'-phosphodiester catalysis in RNA. *This project is the foundation for SHAPE structural analysis that continues to be developed by Dr. Weeks and used by RNA structural researchers worldwide.* See https://en.wikipedia.org/wiki/Nucleic_acid_structure_determination#SHAPE

Publications and Patents

S. I. Chamberlin and L. M. Mier. *Creating a System of Integrated Support for General Chemistry Cohorts Utilizing Student-Driven Laboratory Curriculum*, In: *From General to Organic Chemistry: Courses and Curricula to Enhance Student Retention*; Kradtrap, Hartwell, and Gupta, Eds.; ACS Symposia Series, American Chemical Society: Washington, DC, 59-70 (2019).

C. H. Henkels, Y. Chang, S. I. Chamberlin and T. G. Oas, Dynamics of Backbone Conformational Heterogeneity in *Bacillus subtilis* Ribonuclease P Protein. *Biochemistry* **46**, 15062-15075 (2007).

S. I. Chamberlin and K. M. Weeks, Differential helix stabilities and sites pre-organized for tertiary interactions revealed by monitoring local nucleotide flexibility in the bI5 group I intron RNA. *Biochemistry* **42**, 901-909 (2003).

S. I. Chamberlin, E. J. Merino and K. M. Weeks, Catalysis of Amide Synthesis by RNA Phosphodiester and Hydroxyl Groups, *Proc. Natl. Acad. Sci. USA* **99** 14688-93 (2002).

S. I. Chamberlin and K. M. Weeks, Mapping Local Nucleotide Flexibility by Selective Acylation of 2'-Amine Substituted RNA. *J. Am. Chem. Soc.* **122**, 216-224 (2000).

K. M. Weeks, S. I. Chamberlin and D. M. John, Methods and Kits for Determining Mutations, Local Conformational Changes, and Amounts of Nucleic Acids by Selective Reaction of the 2'-ribose Position in Hybridized Oligonucleotides. Patent Applications submitted to USPTO and WTO (2000).

Presentations Chamberlin, Stacy and Kallan, Nicholas C. *Electrifying the capstone chemistry experience*, 254th ACS National Meeting & Exposition; Denver, CO, Mar. 31-Apr. 4, 2015.

Chamberlin, Stacy I. and Mier, Lynetta M. *Opening College Lab Doors to Grade Schoolers*, 25th Biennial Conference on Chemical Education, University of Notre Dame, July 29-Aug 2 (2018).

Chamberlin, Stacy I. *Building Laboratory Fundamentals and Fostering Undergraduate Research Utilizing Biochemical Promiscuity*, 25th Biennial Conference on Chemical Education, University of Notre Dame, July 29-Aug 2 (2018).

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Student Presentations	Kramer, Levi D., Hofmeister, Carolyn, Cutshall, Danica, Kilbarger, Olivia, Kim, Hyun, Benasutti, Halli and Chamberlin, Stacy I. <i>Why taking your vitamins is essential: The Importance of architecture in metabolite sensing by the B12 riboswitch</i> , 254 th ACS National Meeting & Exposition; Denver, CO, Mar. 31-Apr. 4, 2015.
	Moauero, Alexandra, Brown, Janna K., Wallerius, Katherine and Chamberlin, Stacy I. <i>Role of aspartic acid 101 in E. coli alkaline phosphatase architectural activity and stability</i> , 254 th ACS National Meeting & Exposition; Denver, CO, Mar. 31-Apr. 4, 2015.
	Kilbarger, Olivia, Anderson, Brittany J., Than, Dao A. and Chamberlin, Stacy I. <i>Increasing the activity of E. coli alkaline phosphatase through a structurally destabilizing mutation</i> , 254 th ACS National Meeting & Exposition; Denver, CO, Mar. 31-Apr. 4, 2015.
	Walz, MacKenzie, Johansen, Kristian and Chamberlin, Stacy I. <i>Designing a fast enzyme 101: D101H mutation of E. coli alkaline phosphatase</i> , 257 th ACS National Meeting & Exposition; Orlando, FL, Mar. 31-Apr. 4, 2019.
	Johansen, Kristian, Walz, MacKenzie, Wagner, Abigail and Chamberlin, Stacy I. <i>Kinky evolution of the alkaline phosphatase active site yields increased catalytic efficiency and promiscuity</i> , 257 th ACS National Meeting & Exposition; Orlando, FL, Mar. 31-Apr. 4, 2019.
	Vu, Angela Thien Thanh, and Chamberlin, Stacy I. <i>Altering the hydrophobic platform in the E. coli alkaline phosphatase active site</i> , 257 th ACS National Meeting & Exposition; Orlando, FL, Mar. 31-Apr. 4, 2019.
Honors	Outstanding Advising, Regis University 2018-2019
	Faculty Member of the Year, Regis University 2015-2016 and 2010-2011
	National Society of Collegiate Scholars 2014
	Nominated Faculty Member of the Year, Regis University 2012 to 2013 and 2011 to 2012
	Faculty Teaching Recognition, Robertson Scholars Program, Duke/UNC-CH 2007
	Ruth L. Kirschstein National Research Service Award, National Institute of Health 2002 to 2005 \$110,000 over three years to pay postdoctoral research salary and health benefits. \$5000 each year for supplies and equipment.
Service Positions of Special Note	Department Chair, Regis Chemistry 2017 to 2020
	Faculty/Staff Mentoring Program, Regis University Present
	Core Curricular Review Committee, Regis College Spring 2019 to present
	AAUW Salary Negotiation Facilitator, Regis University Spring 2019 to present
	Cyber-attack Instrument Computer Revival Coordinator, Regis University Fall 2019
	ACS Accreditation Specialist, Regis Chemistry 2015 to present
	Honors Thesis Advisor 2010- 2016, 2018-2019
Volunteer Activities	Elementary Science Education: Developing and teaching experiential science curriculum (preK-6), serve as science fair judge; Jeffco and DPS 2008 to present
	In Class Demonstrations at Ricardo Flores Magon Academy 2017 to 2019
	Science Sunday 2015 to 2019
	Summer STEM Program 2014 to 2017
	Experiential Science Experiences for Local Girl and Boy Scout Troops 2012 to 2017
	Preschool Science Development and Educator; Beth El Preschool, Durham, NC 2006 to 2008

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**Professional
References** Dr. Thomas Bowie
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