

# LANGDON J. MARTIN, Ph.D.

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## Professional Experience

2012– Warren Wilson College, Swannanoa, NC

Current titles: **Associate Professor of Chemistry**  
**Chair**, Department of Chemistry and Physics (2017–2020; 2022–)

Past position: **2014–2019 Director of General Education**

## Education

2008–2012 **Postdoctoral Fellow** in Biochemistry  
University of Wisconsin–Madison, Madison, WI

2003–2008 **Ph.D.** in Organic Chemistry  
Massachusetts Institute of Technology, Cambridge, MA  
Thesis: *Development of Lanthanide-Binding Tags (LBTs) as Powerful and Versatile Peptides for Use in Studies of Proteins and Protein Interactions*

1999–2003 **B.A., Magna Cum Laude**, with Honors in Chemistry  
Kalamazoo College, Kalamazoo, MI  
Thesis: *Synthesis and Polymerization with a Cycloaliphatic Epoxide*

2001–2002 **Study Abroad** at Waseda University, Tokyo, Japan

## Teaching Experience

2012– **Professor**, Warren Wilson College Dept. of Chemistry

- Organic Chemistry I (CHM 2250)
- Organic Chemistry I Lab (CHM 2251)
- Organic Chemistry II (CHM 3201)
- Organic Chemistry II Lab (CHM 3202)
- Instrumental Methods (CHM 3210)
- General Chemistry I (CHM 1160)
- General Chemistry I Lab (CHM 1150)
- General Chemistry II Lab (CHM 1180)

- Principles of Chemistry (CHM 1030)
- Research Design (SCI 3900)
- Peer-Led Team Learning (CHM 3180)
- First-Year Seminar (FYS 1200)

**2012** **Instructor**, UW–Madison Dept. of Biochemistry

- Biochem 651: Biochemical Methods

**2009–2010** HHMI Wisconsin Program for Scientific Teaching, UW–Madison

- **Teaching Fellow.** *Developed, implemented, and disseminated a Teachable Unit (TU). The TU is freely available at [http://biology.wisc.edu/documents/goingviraltu\\_ljm.pdf](http://biology.wisc.edu/documents/goingviraltu_ljm.pdf)*
- **Instructor**, Dept. of Bacteriology: Case Studies in Microbiology (Microbiology 375)
- **Scientific Teaching Postdoc.** *Facilitator for the National Academies Summer Institute on Undergraduate Education in Biology*

**2003, '04, '07** **Teaching Assistant**, M.I.T. Dept. of Chemistry

- Biological Chemistry, (5.07) Fall 2007
- Organic Chemistry I, (5.12) Fall 2004: *Head Teaching Assistant*
- Chemistry Laboratory Techniques, (5.301) January-term 2004
- Organic Chemistry I, (5.12) Fall 2003

## Research & Mentoring Experience

**2013–** **Undergraduate Research Mentor** Natural Sciences Undergraduate Research Sequence (NSURS) Program at Warren Wilson College\*

- Mason Hopkins\* (2021) *Establishing methods for decarboxylation of CBDA in industrial hemp at Warren Wilson College*
- James Mayer\* (2021) *Upcycling in the brewing industry: Characterization of essential oils of hops from spent brewer's yeast*
- Ashley Pacheco-Lujano\* (2021) *Examining the role of hydrogen in the production of methane by rumen microbes*
- Grace M. Girardeau\* (2020) *Establishing methods for quantifying the  $\Delta^9$ -THC and CBD content of Warren Wilson College hemp using high-performance liquid chromatography*
- Allyson Nestler (2020) *Aragonite saturation state in the southwest Pacific*
- Dakang “DK” Zhang (2019) *Investigating how substituents on a conjugated Schiff base affect the strength of the push–pull effect and the color of the compound*
- Brianne Goff (2018) *The effects of steeping time on Assam black tea*
- Neil Kessler (2018) *The effect of propiconazole on beer fermentation*
- Morgan Kearney (2018) *Towards a synthetic method for the preparation of anionic tetra-substituted zinc phthalocyanine*
- Benjamin Hatch (2018) *Microbial quantification and design optimization of anaerobic digesters for increased biogas production*

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\* Students with an Asterix applied for and received additional research funding (generally \$200–\$1,000) from a Warren Wilson College Pugh Grant or Sutherland Grant.

- Emily “Rhys” Burns\* (2017) *Effects of spent craft brewer’s yeast on methane and ammonia production by rumen microbes*
- Christopher Feidler-Cree (2017) *Analyzing hop acid content in spent brewers’ yeast*
- Emily Tierney (2017) *Synthesis and analysis of nanoscale zero valent iron (nZVI)*
- India Waller (2017) *Quantifying the antioxidant capacity in traditionally brewed yerba mate tea*
- Francis Morton (2017) *Exploring imidacloprid uptake by Pleurotis ostreatus*
- Mathilde Meyenberg (2016) *Design of antiviral compounds acting against the nucleoprotein of H1N1 and H5N1 influenza virus using Naproxen-CO as lead compound*
- James DeMarco (2016) *Analysis of 4-methylimidazole in beer*
- Austen Casey\* (2016) *Peptide synthesis: A renewable method*
- Virginia Pszczolkowski\* (2016) *Reducing methane and ammonia production in whole rumen fluid with spent craft brewers’ yeast*
- Rebecca J. Truitt\* (2015) *Cultivating anaerobic equine gut flora at Warren Wilson College*
- Evan Muir (2015) *In silico rational drug design: An investigation of potential drug leads derived from opioid alkaloids present in Mitragyna speciosa*
- Mary Roerty (2014) *The efficiency of solid-phase extraction for detecting phthalates in aqueous standard samples*
- Hannah Edwards (2014) *Comparison of antioxidant constituent content of home-gardened, organically grown, and conventionally grown spinach*
- Chin-pu “Jason” Chen (2014) *Maximizing the yield of Fmoc-MeCys(StBu)-OH through reduction of an oxazolidinone intermediate*
- Chau Siu (2014) *The antioxidant properties of banana flower vary with cooking method*
- Nick Stuer (2014) *A comparison of berberine concentrations in Hydrastis canadensis (goldenseal) and Xanthorhiza simplicissima (yellowroot)*
- Davis Jones (2013) *Extraction and analysis of oil and biodiesel produced from spent coffee grounds*

## 2008–2012

### **Postdoctoral Research** with Professor Ronald T. Raines

University of Wisconsin–Madison, Madison, WI

*Study of the Ubiquitin–Proteasome System through chemical biology, utilizing techniques including organic synthesis, cysteine-labeling reagents, intein chemistry, and aqueous traceless Staudinger ligation*

- Undergraduate Joel M. Prince (2009–2012). *Molecular biology techniques including cloning, mutagenesis, and protein manipulation; Organic syntheses*
- Undergraduate Sappho Z. Gilbert (10-week summer R.E.U. internship, 2009). *Molecular biology techniques including cloning and mutagenesis*
- Graduate student Kristen A. Anderson (2011–2012). *Trained to take over all aspects of my postdoctoral research projects*
- Lab manager Gregory J. Jakubczak (intermittently). *Organic synthesis*

## 2003–2008

### **Doctoral Research** with Professor Barbara Imperiali

Massachusetts Institute of Technology, Cambridge, MA

*Generation of LBT (Lanthanide-Binding Tag) peptides and peptide-libraries by solid-phase peptide synthesis; cloning, expression, and purification of LBT–protein fusion constructs; characterization of LBTs and LBT–protein constructs by luminescence spectroscopy including LRET*

**2002**            **Undergraduate Research** (10-week summer R.E.U.) with Professor Dean C. Webster  
North Dakota State University, Fargo, ND  
*Small-molecule synthesis; polymerization; characterization of synthetic polymers*

## Awards, Honors, and Grants

- 2019**            **Work Colleges Consortium grant**, collaboration between the WWC Chemistry Crew, Writing Studio Crew, and Social Sciences Crew: *A Student-Led Editorial Community to Enhance College Publications*
- 2018**            **Work Colleges Consortium grant**, collaboration between the WWC Department of Chemistry & Physics and the College Farm: *Chemistry on the College Farm: Improving ovine health through analysis of iodine levels in hay and ELISA detection of pregnancy-specific protein B in bred ewes*
- 2018**            **USDA SBIR grant**, collaboration between Highland Brewing, NC State University Agricultural Center, and Warren Wilson College: *Spent hops, yeast, and trub from craft breweries for promotion of animal growth and methane reduction in ruminants*
- 2016**            **Commendation in Teaching**, Warren Wilson College
- 2014**            **PCMNCG** (Pittsburg Conference Memorial National College Grant)  
*Used to purchase a Tecan Fluorescence Microplate Reader*
- 2012**            **Teaching Innovation Grant**, Warren Wilson College
- 2009–2011**    **National Institutes of Health NRSA Postdoctoral Fellowship**
- 2010**            **National Academies Education Mentor in the Life Sciences**
- 2007**            **Wyeth Scholar**
- 2005**            **Department of Chemistry Award for Teaching**
- 2003**            **Phi Beta Kappa**, Kalamazoo College
- 2003**            **Kalamazoo College American Chemical Society Award**
- 1998**            **Eagle Scout**, Boy Scouts of America

## Publications

- (11)            R. W. Bryant, E. E. R. Burns, C. Feidler-Cree, D. Carlton, M. D. Flythe, L. J. Martin, “Spent Craft Brewer’s Yeast Reduces Production of Methane and Ammonia by Bovine Rumen Microbes.” **2021**, *Frontiers in Animal Science*, 2  
doi:10.3389/fanim.2021.720646

- (10) L. J. Martin, “Impress your boss and outsmart your rival: Rhetorical contexts in post-laboratory writing prompts.” **2021**, *Engaging Students in Organic Chemistry*. [ISBN 9780841298446] *Ch. 11*, 131–146
- (9) L. J. Martin, “Introducing Components of Specifications Grading to a General Chemistry I Course.” **2019**, *Enhancing Student Retention in Introductory Chemistry Courses: Teaching Practices and Assessments*. [ISBN 978084123529] *Ch. 7*, 105–119
- (8) V. L. Pszczolkowski, R. W. Bryant, B. E. Harlow, G. E. Aiken, L. J. Martin, M. D. Flythe, “Effect of spent craft brewers’ yeast on fermentation and methane production by rumen microorganisms.” *Advances in Microbiology*, **2016**, *6*, 716–723
- (7) L. J. Martin, B. Imperiali. “The Best and the Brightest: Exploiting Tryptophan-Sensitized Tb<sup>3+</sup> Luminescence to Engineer Lanthanide-Binding Tags.” **2015**, Chapter in *Peptide Libraries, Methods in Molecular Biology (Springer) 1248*, 201–220
- (6) K. A. Andersen, L. J. Martin, J. M. Prince, R. T. Raines. “Intrinsic site-selectivity of ubiquitin dimer formation.” *Protein Science*, **2015**, *24*, 182–189
- (5) K. D. Daughtry, L. J. Martin, A. Surraju, B. Imperiali, K. N. Allen. “Tailoring Encodable Lanthanide-Binding Tags as MRI Contrast Agents.” *ChemBioChem*, **2012**, *13*, 2567–2574
- (4) L. J. Martin, R. T. Raines. “Carpe Diubiquitin.” *Angew. Chem. Int. Ed.* **2010**, *49*, 9042–9044
- (3) N. R. Silvaggi, L. J. Martin, H. Schwalbe, B. Imperiali, K. N. Allen. “Double-Lanthanide-Binding Tags for Macromolecular Crystallographic Structural Determination.” *J. Am. Chem. Soc.* **2007**, *129*, 7114–7120
- Highlighted in *C&E News*, 16 May 2007, *85 (21)*, p.31
- (2) L. J. Martin, M. J. Hähnke, M. Nitz, J. Wöhnert, N. R. Silvaggi, K. N. Allen, H. Schwalbe, B. Imperiali. “Double-Lanthanide-Binding Tags: Design, Photophysical Properties, and NMR Applications.” *J. Am. Chem. Soc.* **2007**, *129*, 7106–7113
- Highlighted in *C&E News*, 16 May 2007, *85 (21)*, p.31
  - Featured in Faculty of 1000 Biology, F1000 Factor 6.4:  
<http://www.f1000biology.com/article/id/1087761/evaluation>
- (1) L. J. Martin, B. R. Sculimbrene, M. Nitz, B. Imperiali. “Rapid Combinatorial Screening of Peptide Libraries for the Selection of Lanthanide-Binding Tags (LBTs).” *QSAR Comb. Sci.* **2005**, *24*, 1149–1157

## Posters and Presentations

- 2021** Workshop L.J. Martin, B. Millsaps, A. Jonas, “*Civic Identity Assessment in the First-Year Seminar: Reader and Rubric Reliability*” IUPUI Assessment Institute
- 2021** Talk L.J. Martin, “*Let’s ‘Hop’ To It: Investigating brewery waste as a methane-reducing feed supplement for ruminants*” Warren Wilson College NSURS Seminar

- 2021**  
Talk L.J. Martin, “*Who’s Reading this Lab Report Anyway?: Rhetoric and Writing in Organic Chemistry*” Northwest Central Ohio ACS Section Zoom Seminar
- 2020**  
Talk L.J. Martin, “*Reduce Agricultural Methane? Let’s ‘Hop’ To It!*” Asheville Science Tavern: Zoom Seminar
- 2020**  
Talk<sup>†</sup> L.J. Martin, K. Borges, “*Informing farm management decisions through the chemistry lab: Collaborations in experiential learning.*” 2020 Biennial Conference on Chemical Education<sup>†</sup>
- 2020**  
Talk<sup>†</sup> L.J. Martin. “*Getting to mastery: Adapting specifications grading to a general chemistry course.*” 2020 Biennial Conference on Chemical Education<sup>†</sup>
- 2019**  
Workshop C. Reitz-Krueger, L. J. Martin, “*Prompting Learning: Brief Writing Assignments to Deepen Understanding.*” Writing Across the Curriculum Workshop: Warren Wilson College
- 2019**  
Talk A. Jonas, L. Martin, K. Borges, M. Knight-Oakley, C. Reitz-Krueger, “*Infusing Civic Identity Development in the Major: A Faculty-Led Initiative.*” NC Campus Compact’s Pathways to Achieving Civic Engagement Conference: Greensboro, NC
- 2018**  
Talk L.J. Martin. “*Components of Specifications Grading in General Chemistry: Lessons Learned.*” Biennial Conference on Chemical Education: Notre Dame, IN
- 2018**  
Talk L.J. Martin. “*Still Not Perfect: Ongoing Challenges in a Flipped Organic Classroom.*” Biennial Conference on Chemical Education: Notre Dame, IN
- 2018**  
Talk L.J. Martin. “*Rhetorical Context in Organic Chemistry I Lab Reports.*” Biennial Conference on Chemical Education: Notre Dame, IN
- 2018**  
Poster R.W. Bryant, E. Burns, C. Feidler-Cree, L.J. Martin, “*Spent Craft Brewer’s Yeast Inhibits Rumen Methane Production: An Association with High Hop Acid Content.*” Molecules in the Mountains: Cullowhee, NC
- 2018**  
Poster L.J. Martin, A. Jonas, B. Millsaps. “*Assessment of General Education Within the Civic Identity Outcome.*” AAC&U Conference on General Education: Philadelphia, PA
- 2018**  
Talk A. Jonas, B. Millsaps, L.J. Martin. “*Campus-Wide Integration of Civic Identity at Warren Wilson College.*” NC Campus Compact’s Pathways to Achieving Civic Engagement Conference: Elon, NC
- 2017**  
Poster E. Burns, R.W. Bryant, L.J. Martin. “*Effects of Spent Craft Brewers’ Yeast on Methane and Ammonia Production in Rumen Microbes*” SERMACS: Charlotte, NC

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<sup>†</sup> Abstract accepted March 31, 2020. Because of the COVID-19 pandemic, the 2020 BCCE was terminated by the Executive Committee of the Division of Chemical Education, American Chemical Society; and, therefore, this presentation could not be given as intended.

- 2016** Talk D.M. Emmert, L.J. Martin. “*Collaboration between Organic Chemistry II and Biochemistry Laboratory Courses*” Biennial Conference on Chemical Education: Greely, CO
- 2016** Talk L.J. Martin. “*Writing in Organic Chemistry*” Biennial Conference on Chemical Education: Greely, CO
- 2016** Talk L.J. Martin “*Organic Chemistry is Enhanced by Writing*” SLAC–WPA [Small Liberal Arts Colleges–Writing Program Administrators]: Memphis Tennessee
- 2015** Poster R.W. Bryant, M.D. Flythe, B.E. Harlow, S.P. O’Connel, R.J. Truitt, L.J. Martin. “*Hop Acid-Rich Spent Craft Brewer’s Yeast Modulates Gut Bacterial Growth*” Molecules in the Mountains: Cullowhee, NC
- 2015** Poster R.J. Truitt, B.E. Harlow, M.D. Flythe, R.W. Bryant, L.J. Martin. “*Anaerobic Growth of Equine GI Bacteria at Warren Wilson College*” Molecules in the Mountains: Cullowhee, NC
- 2015** Talk “Writing as a tool for Active Learning in Organic Chemistry,” *Active Learning in Organic Chemistry*: Washington D.C. (via Skype)
- 2014** Talk L.J. Martin. “*Peer Supplemental Instruction for General Chemistry P*” Biennial Conference on Chemical Education: Grand Rapids, MI
- 2010** Workshop “Scientific Teaching Workshop.” *UW–Madison Postdoctoral Conference on Professional Development*: Madison, WI
- 2010** Talk “Imperatives of Ubiquitin-Mediated Protein Degradation.” *Biology Seminar Series*, Lawrence University: Appleton, WI
- 2010** Poster L.J. Martin, J.-H. Yu, S. Miller. “*Going Viral: Influenza-Influenced Changes in Student Behavior*” UW Teaching and Learning Symposium: Madison, WI
- 2008** Poster L.J. Martin, N.R. Silvaggi, K.N. Allen, B. Imperiali. “*Lanthanide-Binding Tags: Protean Tools for Protein Studies*” Gordon Research Conference *Chemistry and Biology of Peptides*: Ventura, CA
- 2007** Poster L.J. Martin, N.R. Silvaggi, K.N. Allen, B. Imperiali. “*Double-Lanthanide-Binding Tags: Powerful and Versatile Protein Probes*” 234<sup>th</sup> National ACS Meeting: Boston, MA

## Outreach and Service-Learning

- 2017 – 2019** **States of Matter Demo Show**  
Led a ~60-minute demonstration about solids, liquids, and gasses for third-graders at ArtSpace Charter School (Swannanoa NC)
- 2017 & 2018** **Verner Summer Camp Field Trip**  
(July) Hosted a ~90-minute program of demonstrations hands-on chemical experiments for about 20 pre-K children attending Verner Summer Camp
- 2017** **Service-Learning Component of First-Year Seminar**

At the Dr. John Wilson Community Garden (Black Mountain, NC), as part of “Chemical Features (And Where to Find Them)”

**2014 – 2015 Warren Wilson College Chemistry Road Show**, in collaboration with The Science House of NC State University.

*One-hour shows for middle school students that include demonstrations and explanations of chemistry experiments*

- Valley Springs Middle School (Asheville, NC)
- East McDowell Middle School (Marion, NC)
- Enka Middle School (Buncombe County, NC)

**2004 – 2007 M.I.T. Chemistry Outreach program**

*At high schools in New England (nine schools over four summers)*

## Professional Development

- 2021** IUPUI Assessment Institute, Remote Conference
- 2021** Manuscript referee for *J. Am. Chem. Soc.*
- 2021** Grant reviewer for DOE
- 2020** Manuscript referee for *J. Chem. Ed.*
- 2019** Service-Learning Fellow, Warren Wilson College
- 2019** NC Campus Compact’s Pathways to Achieving Civic Engagement Conference, Greensboro, NC
- 2018** Biennial Conference on Chemical Education, Notre Dame, IN
- 2018** AAC&U Conference on General Education, Philadelphia, PA
- 2018** NC Campus Compact’s Pathways to Achieving Civic Engagement Conference, Elon, NC
- 2017** SERMACS (Southeastern Regional Meeting of the American Chemical Society), Charlotte, NC
- 2016** Biennial Conference on Chemical Education, Greeley, CO
- 2016** SLAC–WPA [Small Liberal Arts Colleges–Writing Program Administrators]: Memphis, TN
- 2015** AAC&U Institute on Integrative Learning and the Departments, Newark, DE  
*Team leader*
- 2015** POGIL [Process-oriented guided-inquiry learning] Workshop, Asheville, NC
- 2014** Biennial Conference on Chemical Education, Grand Rapids, MI



- 2014**            The 2014 Institute on Quality Enhancement and Accreditation, New Orleans, LA
- 2013**            Active Learning in Organic Chemistry, Charlotte, NC
- 2012**            Facilitator, National Academies Yale-Specific Summer Institute on Undergraduate Education. New Haven, CT
- 2011, 2010**    UW–Madison Postdoctoral Conference on Professional Development, Madison, WI
- 2011**            CIRTL Forum, Madison, WI
- 2011**            P3 Workshop: Postdoc to PUI Professor, Holland, MI
- 2010**            Facilitator, National Academies Summer Institute on Undergraduate Education in Biology. Madison, WI
- 2003 – Present** Member, American Chemical Society