

Laura M. Lanni

ACADEMIC PREPARATION

2010	Ph.D. Organic Chemistry	University of South Carolina
1987	B.S. Engineering Chemistry	Oakland University

PROFESSIONAL EXPERIENCE

2020 – present	Instructor Organic Chemistry I and II	University of South Carolina
2016 – 2019	Senior Lecturer Director of Organic Chemistry	Clemson University
2011 – 2016	Associate Professor of Chemistry Supervisor of Science and Math Intern Student Teachers Chemistry Assessment Coordinator REMAST Noyce Scholarship Grant Co-PI	Newberry College
2010 - 2016	Adjunct Instructor Organic Chemistry I and II, General Chemistry I General Chemistry II General Chemistry and Laboratory	University of South Carolina University of South Carolina-Aiken Newberry College
2007-2010	Teaching and Research Assistant Teaching: Organic Chemistry I Lab, Organic Chemistry I and II Recitation Research: Synthesis and characterization of novel porous materials based on boronic ester linkages for use in molecular storage of gas and for molecular separations.	University of South Carolina
2007 - 2013	Advanced Placement Chemistry Reader	Educational Testing Services
1996-2007	High School Science and Mathematics Teacher Algebra, Pre-Calculus, Chemistry, Physics, Research, Advanced Placement Chemistry (1999, 2001-2007)	Dutch Fork High School
1987-1995	Development Chemist Electrocoat primer development, testing, scale-up; polymer resin synthesis and development; research and scale-up for electrocoat components; powder primer development and testing.	BASF Corporation

RESEARCH

- 2018-2019 Clemson University
Investigation of virtual labs and simulations for non-majors chemistry labs. A pilot program to incorporate PhET simulations in molecular shapes and gas properties into the non-majors chemistry labs. Funded by Clemson University College of Science. (\$42,000)
- 2012-2016 Newberry College Undergraduate Research in Organic Chemistry
Evaluation of aqueous stability and rates of hydrolysis of three boronate ester-linked Polymers of Intrinsic Microporosity (PIMs), with UV-Vis to monitor release of monomer, was completed over two years (2013-2015) by two undergraduate researchers during summers and CHE391 and/or CHE491 course. One research semester was funded by the American Chemical Society departmental grant. (\$500)
- Spartan Modeling of phthalocyanines and boronate ester small molecules and porous polymers was completed in my undergraduate research lab. EPSCoR IDeA funding for grant "Establishing South Carolina Computational Chemistry Consortium (SC4) to enhance research, education and participation broadening in the state (GEAR/CI)." (\$8500)
- Boronate ester-linked polymers of intrinsic microporosity (PIMs) have been produced in my undergraduate research lab which utilize a bis-diol spirobisindane as a kinked moiety. The future goal will be to trap a guest molecule within the porous polymer and release it by controlled degradation of the polymer upon hydrolysis of the boronate ester. Funded by Newberry College *SMART* program 2013 (\$5000).
- Synthesis and characterization of phthalocyanines by both standard reflux and microwave synthetic methods have been completed in the undergraduate research laboratory. Copper and zinc-centered phthalocyanines with sixteen exterior hydrogens or eight hydrogens and eight methoxy groups have been produced. Future studies to optimize microwave conditions are planned. Funded by Newberry College *SMART* program 2012 (\$5000).
- Robert Noyce Teacher Scholarship Program through the National Science Foundation. "REMAST" Recruit and Engage Math and Science Teachers, Co-PI from 2012-2016 at Newberry College. Identified and supported undergraduates in STEM fields for future positions as high school teachers with scholarships, coursework, supervision and mentoring during student teaching, teaching a science teaching methods course, and in-service training. (\$800,000).
- 2007-2010 Ph.D. research, University of South Carolina, Department of Chemistry and Biochemistry
Developed new boronate ester-linked porous covalent organic frameworks (COFs), polymers of intrinsic microporosity (PIMs), and coordination polymers. Investigated the hydrolytic stability of COFs, including development of kinetic tests which showed enhanced stability for frameworks with hydrophobic alkylation in the pores. From this work a series of hybrid COFs was designed, produced, and tested. This series demonstrated the feasibility of tailoring microporosity and hydrolytic stability side by side for targeted applications. Additionally, functionalization of COFs was achieved by introduction of a phthalocyanine monomer. These materials have potential semiconducting properties due to their face-to-face stacking of phthalocyanine units. Subsequent research produced an acetylene-centered diphenyl diboronic acid which was used to make novel COFs with potential post-functionalization in the pores.
- 2002, 2003 Research Experience for Teachers, University of South Carolina, Department of Engineering
(Summers)
Studied the adhesion properties and impact resistance of polymer reinforced fiberglass composites on various wood substrates. The purpose of the research was to determine the effective bond-strength between wood and the composite for potential use in bridge repairs. In a second project, the impact resistance of a carbon fiber-reinforced polymer composite on concrete was investigated. The purpose of the research was to incorporate crumb rubber as an additive to the composite polymer to improve impact resistance. The column concrete samples were prepared with two levels of two sizes of crumb rubber, impacted, and tested in compression.

ADDITIONAL TRAINING AND CERTIFICATION

2006	National Board Teaching Certification in Science/Chemistry	
2001	Advanced Placement AB Calculus Certification	Wake Forest University
2000	Engineering I Instructor Certification	University of South Carolina
1999	Advanced Placement Chemistry Certification	UNC-Charlotte
1998	South Carolina Teacher Certification in Math and Chemistry	Converse College

HONORS AND AWARDS

2015	William S Boyd Professorship for Teaching Excellence, Newberry College
2014	ACS <i>J. Chem. Ed.</i> recognition for publication in the Special Advanced Placement Edition
2011	2011 Outstanding First-Year Student Advocate Award Nominee
2008, 2009	Bouknight Outstanding Teaching Award, University of South Carolina
2007	Copenhaver Fellowship Recipient, University of South Carolina
2004	Teacher Award: Most Intelligent, Dutch Fork High School
2002	Teacher Award: Most Spontaneous, Dutch Fork High School
2001, 2002	Nominated for South Carolina Association of Chemistry Teachers Chemistry Teacher of the Year, Dutch Fork High School
2000, 2001	Nominated for Disney's American Teacher Awards, Dutch Fork High School
1999-2007	Who's Who Among America's High School Teachers, Dutch Fork High School
1997, 1998, 2002, 2004	Nominated for Teacher of the Year, Dutch Fork High School

RELEVANT LEADERSHIP AND VOLUNTEER EXPERIENCE

2015	Hosted Richland Northeast High School students in chemistry laboratory experiment (Food energy analysis)
2012-2013	Hosted Advanced Placement Chemistry Mid-Carolina High School students in laboratory experiments (Beer's Law and Kc measurement)
2011-2016	South Carolina Science Olympiad Judge, high school and middle level (every spring)
2003-2006	Developed curriculum and pioneered independent Research Class, Dutch Fork High School
2001-2007	Junior Varsity Engineering Team Coach, Dutch Fork High School
2001-2007	Juggling Club Sponsor, Dutch Fork High School
1999-2002	Science Team Assistant Coach, Dutch Fork High School
1999-2005	New Teacher Mentor, Dutch Fork High School
1993-1995	Odyssey of the Mind Coach, Cooley Elementary School

SPECIFIC SKILLS

Teaching

- Distributed learning (online) instructor—training through UofSC's Center for Teaching Excellence
- Contributing author on organic chemistry laboratory manuals
- Virtual laboratory experience and studies complete
- Mentored and supervised student teachers in math and science at middle and high school levels

Leadership

- Coordinated common organic chemistry exams for 2000 students and 10 professors
- Coordinated graduate teaching assistants for organic chemistry recitations and labs

Synthetic

- Organic synthesis, purification and characterization
- Use of dry box for water-sensitive materials

Analytical techniques

- UV-vis, IR, NMR, MS, GC, PXRD, BET, SEM, TGA, GPC

Industrial

- Polymer synthesis and emulsification
- Automotive coatings: application: electrocoat, spray (manual and robotic), powder electrostatic spray, formulation and preparation: electrocoat, solid powder extrusion and grinding, scale-up for production: electrocoat polymers and coating formulations

Other

- Spartan, SciFinder, ChemBio, ChemBio-3D, Autosorb-1, JANA
- Computer-based programs with CBL and TI-graphing calculators: interfaced with thermocouples, pH probes, pressure gauges, nitrate probes, motion detectors, accelerometers, conductivity probes
- Novelist, screenwriter, blogger, children's book author

PUBLICATIONS AND PRESENTATIONS

Lanni, L. *Dr. Lanni's Orgo I Lecture Notebook*, LMNO Press, SC, **2021**

Lanni, L. *Our Sour Flour Hour*; LMNO Press, SC, **2021**.

Lanni, L. *Dr. Lanni's Orgo II Lecture Notebook*, LMNO Press, SC, **2020**

Lanni, L. M., Atim, S. *Essentials of Organic Chemistry Laboratory for Chemistry Majors and Honor Students, First Semester*; QDE Press, SC, **2020**.

Lanni, L. M., Atim, S. *Essentials of Organic Chemistry Laboratory for Chemistry Majors and Honor Students, Second Semester*; QDE Press, SC, **2020**.

Lanni, L. *I Like Trees Like These*; LMNO Press, SC, **2018**.

Lanni, L. *Infinity Line*; LMNO Press, SC, **2018**.

Lanni, L. M. Synthesis, Modeling, and Hydrolytic Stability of Boronate Ester-linked Polymers of Intrinsic Microporosity (PIMs) by an Undergraduate Team, Biennial Conference on Chemical Education, University of Northern Colorado, August **2016**.

Lanni, L. M. Multistep Synthetic Schemes: A Culminating Activity for Organic Chemistry Students, *J. Chem. Ed.* (in preparation).

Lanni, L. M., *et al.* Development of Virtual Labs for Undergraduate General Chemistry, *J. Chem. Ed.* (in preparation).

Lanni, L. *Or Not to Be*; LMNO Press, SC, **2014**.

Lanni, L. M. Filling a Plastic Bag with Carbon Dioxide: A Student-Designed Guided-Inquiry Lab for Advanced Placement and College Chemistry Courses *J. Chem. Ed.* **2014**, *91*, 1390-1392.

Al-Hasan, S.; Lanni, L. M. SPARTAN Modeling of Boronate Ester- and dibenzodioxane-linked Polymers of Intrinsic Microporosity (PIMs), Southeastern Regional Meeting of the American Chemical Society, Nashville, TN, October **2014**. (Poster was awarded first prize at the Newberry College Research Day in September 2014.)

Putnam, A.; Santilli, A.; Lanni, L. M. Long-term Stability of Boronate Ester-linked Polymers of Intrinsic Microporosity (PIMs), Southeastern Regional Meeting of the American Chemical Society, Nashville, TN, October **2014**. (Poster was awarded second prize at the Newberry College Research Day in September 2014.)

- Lanni, L. M. Design and Presentation of a Multistep Synthetic Scheme: A Culminating Activity for Organic Chemistry Students, Biennial Conference on Chemical Education, Grand Valley State University, August **2014**.
- Santilli, A.; Lanni, L. M. Synthesis of Boronate Ester-linked Polymers of Intrinsic Microporosity (PIMs) Southeastern Regional Meeting of the American Chemical Society, Atlanta, GA, November **2013**.
(Poster was awarded second prize at the Newberry College Research Day in September 2013.)
- Lanni, L. M. The End of Cookbook Chemistry Experiments: Student-designed Procedures, Biennial Conference on Chemical Education, The Pennsylvania State University, July **2012**.
- Lanni, L. M. How (and Why) I Spent My Summer Vacation with a *SMART* Scholar: Synthesis and Characterization of Phthalocyanines for Photovoltaic Devices, Newberry College Faculty Lecture Series, September **2012**.
- Sexton, M. W. and Lanni, L. M. Synthesis Of Phthalocyanine Dyes For Use As Semiconducting Layers In Photovoltaic Cells, Southeastern Regional Meeting of the American Chemical Society, Raleigh, N. C. November **2012**.
- Lanni, L. M.; Daniel, S. D.; Lavigne, J. J. The Boronate Ester: Keystone for the Assembly of Innovative and Versatile Materials. In Preparation. (Invited Feature, *J. Mat. Chem.*)
- Lanni, L. M.; Tilford, R. W.; Bharathy, M.; Lavigne J. J. Enhanced Pore Stability and Hydrolytic Stability of Self-Assembling Alkylated 2-Dimensional Covalent Organic Frameworks. *J. Am. Chem. Soc.* **2011**, *133*, 13975-13983.
- Lanni, L. M.; Tilford, R. W.; Bharathy, M.; Pellechia, P. J.; Lavigne J. J. Hybrid Covalent Organic Frameworks with Heterogeneous Ethylation for Tailored Porosity and Hydrolytic Stability. In Preparation. (*J. Mat. Chem.*)
- Lanni, L. M.; Tilford, R. W.; Bharathy, M.; Link, J. E.; Lavigne J. J. Specializing Covalent Organic Frameworks: Incorporation of Phthalocyanine. In Preparation. (*Chem. Mater.*)
- Lanni, L. M.; Santilli, A.; Putnam, A.; Al-Hasan, S. Synthesis and Characterization of Boronate Ester-Linked Polymers of Intrinsic Microporosity in the Undergraduate Chemistry Research Laboratory. *J. Chem. Ed.* In Preparation.
- Zhang, Y.; Song, D.; Lanni, L. M.; Shimizu, K. D. Importance of Functional Monomer Dimerization in the Molecular Imprinting Process. *Macromolecules* **2010**, *43*, 6284-6294.
- Rambo, B. M.; Tilford, R. W.; Lanni, L. M.; Liu, J.; Lavigne, J. J. Boronate-Linked Materials: Ranging From Amorphous Assemblies to Highly Structured Networks; In *Macromolecules Containing Metals and Metal-Like Elements*, Vol. 8; Abd-El-Aziz, A. S.; Carraher, C. E.; Pittman, C. U.; Zeldin, M., Eds.; John Wiley & Sons: Hoboken, New Jersey, **2009**, Chapter 6.
- Tilford, R. W.; Rambo, B. M.; Liu, J.; Lanni, L. M.; Niu, W.; Lavigne, J. J. Self-assembling Boronate-linked Materials. Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-26, **2009**.
- Benefiel, J. W.; Clark, P. D.; Lanni, L. M. Electrocoating Epoxy Resin Composition Comprising a Solid Pigment Dispersion. *PCT Int. Appl.* **1993**, 22 pp. CODEN: PIXXD2 WO 9300402 A1 19930107 CAN 119:51441 AN 1993:451441.