

Kaci Lee Kuntz, PhD

CONTACT INFORMATION	Department of Chemistry University of Utah	<i>E-mail:</i> kaci.kuntz@utah.edu <i>Phone:</i> (801) 585-3419
EDUCATION	PhD in Chemistry , University of North Carolina at Chapel Hill “ <i>Altering the Surface and Interlayer Composition of 2D Materials</i> ” Advisor: Dr. Scott Warren B.S. in Chemistry , New Mexico Institute of Mining and Technology “ <i>Detecting Elemental Mercury using Reduced Silver Nanoparticle Polymer Suspensions</i> ” Advisor: Dr. Peng Zhang B.S. in Mathematics , New Mexico Institute of Mining and Technology Concentration: Probability and Statistics	July 2019 Dec. 2009 Dec. 2009
TEACHING EXPERIENCE	University of Utah , Salt Lake City, UT Assistant Professor - Lecturer General Chemistry I Lecture & Lab, General Chemistry II Lab Rowland Hall Upper School , Salt Lake City, UT Science Educator Research Science, Advanced Topics Chemistry, Honors Chemistry, Physics University of Utah , Salt Lake City, UT Associate Instructor Quantitative Analysis & Lab University of North Carolina at Chapel Hill , Chapel Hill, NC Instructor General Chemistry II	Aug. 2021 - Present Aug. 2019 to July 2021 Summer 2020, Summer 2021 Jan. 2019 to May 2019
GUEST LECTURER	General Chemistry II—UNC General Chemistry I—UNC Coursera Course: Nanomakers—Optical Spectroscopy Demonstration Analytical Chemistry—UNM	Spring 2018 Spring 2017 Filmed Oct. 2016 Spring 2011
INTERNAL SERVICE	Faculty Advisor — UoU ACS Student Chapter <i>Sustainability Committee</i> Member — UoU Chemistry Department Safety Committee Member — UoU Chemistry Undergraduate Curriculum Committee	Fall 2022 - Present Spring 2022 - Present Spring 2022 - Present
INVITED TALKS	“Exploring the Current Applications & Research of General Chemistry Topics” Presented at • University of Utah High School Chemistry Teachers Workshop “Improving General Chemistry Labs: The Stop Light Reaction” Presented at • University of Utah Access Scholars Program “Improving General Chemistry Labs through Green Chemistry” Presented at • University of Utah ACS Student Chapter Green Chemistry Event	October 8, 2022 June 29, 2022 April 8, 2022

STUDENT & SUSTAINABILITY INITIATIVES	Shared Lab Coat Program	Fall 2022 - Present
	<ul style="list-style-type: none"> Developed and piloted a lab coat program for CHEM 1130, 1215, and 1225 students. This program allows 1000 lab coats to be shared among 1600 students each semester, saving each student \$30 and preventing lab coats entering landfills after lab requirements are completed. 	
	Faculty Advisor for the ACS Student Chapter Green Chemistry Glove Recycling Initiative	
	<ul style="list-style-type: none"> Grant awarded from the Sustainable Campus Initiative Fund 	Dec. 2022
	Retrofit of CHEM 1130, 1215, and 1225 Lab Equipment	
	<ul style="list-style-type: none"> Grant awarded by the Center for Teaching and Learning 	Spring 2022
EDUCATOR TRAINING	UPSTEM (UoU)	Fall 2022 - Present
	Mentor Training (MRS)	May 2022
	Anti-racism Training (Rowland Hall)	July 2020
	QPR Training	Nov. 2019
	Morehead Science Ambassador (UNC)	May 2017
	Mental Health First Aid	Oct. 2016
	Morehead Science IMPACTS (UNC)	Oct. 2016
	Safe Zone Ally (UNC)	Oct. 2016
	Green Zone Training (UNC)	Sept. 2016
	Pre-Level 1 Teaching License (NM)	Fall 2011 - Spring 2012
HONORS AND AWARDS	National Society off Leadership and Success Impact Leader Award	Nov 2022
	Thomas L. Isenhour and E. A. Booth Chemistry Graduate Excellence Award	April 2019
	Teaching/Research Assistantship, UNC	Aug. 2014 to July 2019
	Teaching/Research Assistantship, UNM	Aug. 2010 to May 2011
	New Mexico Tech High Honors Graduate, NMT	Dec. 2009
	Kay Brower Outstanding Junior Chemist of the Year, NMT	May 2008
	Tech Scholar, NMT	May 2008
SCIENCE OUTREACH	Science Sneak Peak – Rowland Hall*	April 2021
	Chemistry Club Advisor – Rowland Hall	Jan 2021 - May 2021
	NC Museum of Life & Science–Adult Space Camp*	April 2019
	Wonder Connection – Visiting Scientist*	April 2019
	NC Museum of Life & Science–Science of Beer	Oct. 2018
	UNC Science Exposition	April 2018
	NC Museum of Life & Science–Science of Wine*	Feb. 2018
	NC Museum of Life & Science–Science of Beer	Sept. 2017
	NC Museum of Life & Science–Science of Eats*	June 2017
	UNC Science Exposition*	April 2017
	STEMville*	April 2017
	Invite-a-Scientist*	March 2017
	NC Museum of Life & Science–Science of Wine*	Feb. 2017
	NC Museum of Life & Science–Tinker & Taste*	Nov. 2016
	NC Museum of Life & Science–Science of Beer	Sept. 2016
	NC Museum of Life & Science–Science of Wine: Part Deux	July 2016
	NC Museum of Life & Science–Science of Eats	June 2016
	UNC Science Exposition	April 2016
	NC Museum of Life & Science–Science of Wine	Feb. 2016
	Teen Science Cafe, Morehead Planetarium & Science Center*	Jan. 2016
NC Museum of Life & Science–Science of Beer	Sept. 2015	
UNC Science Exposition*	April 2015	
	*Developed demonstration	

Science Department, Rowland Hall, Salt Lake City, UT

Deep-learning for Intercalation: Learning from 3D & predicting 2D properties

Principle Investigator, Curriculum Developer

March 2020 to Present

Developing an interdisciplinary, hands-on, research-intensive course as high school science curriculum. We employ machine-learning to elucidate structure-property relationships in bulk graphite intercalation compounds with donor, acceptor, and neutral guests, in order to more easily identify sustainable/renewable guest/host candidates for batteries.

Department of Chemistry, UNC, Chapel Hill, NC

Engineering & Simulating Optical, Plasmonic, and Electronic Properties of 2D Nanomaterials

Graduate Research Assistant

June 2014 to July 2019

Research includes the synthesis, exfoliation, modification, and characterization of two-dimensional (2D) materials, as well as assemblies of 2D nanosheets including solid thin films and van der Waals heterostructures. 2D materials are modified through surface reactions and intercalation; the resulting optical and electronic properties and composition are characterized. Moreover, *in-situ* optical and electronic properties of 2D intercalation compounds are investigated. Additionally, simulations are used to verify and predict optical properties, to improve understanding of electronic behavior, and to predict packing and electrical properties of solid thin films.

Institute for Complex Additive Systems Analysis, NMT, Socorro, NM

Mathematical Simulations—Exploring Electric Power Grids

Research Scientist I

June 2012 to May 2014

Research focused on reviewing current academic literature on electric power grids and developing ideas. Projects include developing new methodologies and mathematical approaches, as well as optimizations, to improve understanding of the electric power grid and its susceptibilities. Multi-disciplinary tasks include collaborating with people to aid in their research endeavors by quickly responding to questions, developing documents to aid in understanding research tasks, and designing tutorials. Clearly articulated reports and well-designed presentations are provided to employers and customers.

Suntek, LP, Albuquerque, NM

Cloud Gel—Temperature-dependent, Optically-smart Windows

Chemical Technician & Researcher

May 2011 to Nov. 2011

A contracted project creating a memory polymer with temperature dependent phase transitions. Nucleation sites suspended within the co-polymer undergo a change of state at a desired temperature, causing the window coating to transition from transparent to opaque. Through procedure modifications, control of the temperature range at which the optical change occurred was achieved. The energy-efficient windows are tested with heat and ultra-violet aging to ensure durability.

Center for High Tech Materials, UNM, Albuquerque, NM

“Ultra-bright Light” Quantum Dots—Multi-coat Encapsulation

Chemist

Oct. 2010 to Mar. 2011

Provide chemistry knowledge and experimental expertise on a multi-disciplinary project to develop fluorescent, non-toxic, non-reactive quantum dots for biological applications. Quantum dots are coated in silica, functionalized with amine groups, and encapsulated in a thin shell of reduced gold nanoparticles to enhance fluorescence after infrared excitation.

Petroleum Recovery Research Center, NMT, Socorro, NM

Silver Nanoparticle Coated Optical Fibers

Laboratory Researcher

May 2009 to Aug. 2009

Develop and implement a procedure for externally coating optical fibers with reduced silver nanoparticles for a collaboration.

Department of Chemistry, NMT, Socorro, NM

Detecting Elemental Mercury Using Reduced Silver Nanoparticles Polymer Suspensions

Laboratory Researcher

Aug. 2008 to May 2009

Undergraduate senior research project developing a procedure to produce stable reduced silver nanoparticles for trace elemental mercury detection. Reduced silver nanoparticles are suspended in polyethylene glycol (PEG), extending the stability of the nanoparticles and preventing particle aggregation; the suspension successfully detects trace amounts of elemental mercury measured in real time with UV-Vis spectroscopy.

Senspex, Inc., Socorro, NM

Surface Enhanced Raman Spectroscopy (SERS) Activity of Periodic Nanoparticle Assemblies

Contracted Researcher

Mar. 2008 to Aug. 2008

A contracted research project investigating the SERS activity of a 100 nm periodic grating with rows of reduced gold nanoparticles. Reduced silver nanoparticles are assembled in between the gold rows to enhance the SERS activity of the resulting periodic structure.

Department of Chemistry, NMT, Socorro, NM

SERS Activity of Zeolite Surfaces Coated with Reduced Silver Nanoparticles

Laboratory Researcher

May 2007 to Aug. 2008

A collaborative study investigating the SERS activity of zeolite surfaces coated with reduced silver nanoparticles. We determined that the zeolite surface thickness did not affect the resulting SERS activity of the silver nanoparticles.

Department of Chemistry, NMT, Socorro, NM

SERS-active Reduced Silver Nanoparticles by Reverse Micelle Synthesis

Laboratory Assistant

Feb. 2006 to May 2007

Using reverse micelle synthesis of reduced silver nanoparticles, this research improved the procedure to yield consistent sizes of nanoparticles with SERS activity. The stability of the silver nanoparticles was extended by silica coatings to prevent aggregation and extend the shelf-life of the material.

PATENTS

Two-dimensional Electride Nanomaterials. US Patent Pending 62/344774. Filed 2015.

PUBLICATIONS

Stark, M. S.; Cheng, J.; Kim, H.; **Kuntz, K. L.**; Warren, S. C. Electrolyte-free spectroscopy and imaging of graphite intercalation. *Small*, **2020**, 2004823.

Stark, M. S.; **Kuntz, K.**; Martens, S. J., Warren, S. C. Intercalation of layered materials from bulk to 2D. *ACS Adv. Mater.*, **2019**, 31, 1808213.

Alcorn, F. A.; **Kuntz, K.**; Druffel, D.; Warren, S. C. Aqueous intercalation of graphite at a near-neutral pH. *ACS Applied Energy Materials*, **2018**, 1 (9) 5062–5067.

Druffel, D. L., Woomer, A. H.; **Kuntz, K. L.**; Pawlik, J. T.; Warren, S. C. Electrons on the surface of 2D materials: From layered electrides to 2D electrenes. *Journal of Materials Chemistry C*, **2017**, 5 (43) 11196–11213.

Kuntz, K. L.; Wells, R.; Hu, J.; Yang, T.; Dong, B.; Guo, H.; Woomer, A.; Druffel, D.; Alabanza, A.; Tománek, D.; Warren, S. C. Control of surface and edge oxidation on phosphorene. *ACS Appl. Mater. Interfaces*, **2017**, 9 (10) 9126–9135.

- *Featured in Carolina Scientific, April 2017*

Druffel, D. L. ; **Kuntz, K. L.;** Woomer, A. H.; Alcorn, F. M.; Hu, J.; Donley, C. L.; Warren, S. C. Experimental demonstration of an electride as a 2D material. *JACS*. **2016**, 138 (49) 16089–16094.

- *Featured in C&EN, Dec. 2016*

Yang, T.; Dong, B.; Wang, J.; Zhang, Z.; Guan, J.; **Kuntz, K.;** Warren, S. C.; Tománek, D. Interpreting core-level spectra of oxidizing phosphorene: Theory and experiment. *Phys. Rev. B*. **2015**, 92 (12) 125412.

Kuntz, K.; Smith, M.; Wedeward, K.; Collins, M. Detecting, locating, & quantifying false data injections utilizing grid topology through optimized D-FACTS device placement. *46th North Amer. Power Symp. (NAPS)*, **2014**.

Li, W.; Guo, Y.; **McGill, K.;** Zhang, P. A facile synthesis of Ag nanoparticles for mercury ion detection with high sensitivity and selectivity. *New J. of Chem.*, **2010**, 34 (6) 1148-1152.

ORAL
PRESENTATIONS

Kuntz, K. Teaching high school materials science through research. Presented at the *Mater. Research Symp.* virtually, April 18, 2021.

Kuntz, K.; Wells, R.; Hu, J.; Yang, T.; Dong, B.; Guo, H.; Woomer, A.; Druffel, D.; Tománek, D.; Warren, S. C. 2D black phosphorus: Control of edge and surface chemistry in 2D black phosphorus and oxides. Presented at the *Mater. Research Symp.* at Phoenix, Arizona, April 19, 2017.

Kuntz, K.; Wells, R.; Hu, J.; Yang, T.; Dong, B.; Guo, H.; Woomer, A.; Druffel, D.; Tománek, D.; Warren, S. C. 2D black phosphorus: Oxidative control of edge and surface chemistry in 2D black phosphorus. Presented at the *Int. Symp. of Sci. and Technol. of 2D Mater.* at University of Central Florida, Feb. 3, 2017.

Kuntz, K.; Wells, R.; Hu, J.; Warren, S. C. 2D black phosphorus: Controlling and characterizing oxides. Presented at the *Research Triangle Nanotech. Network (RTNN) Symp.* at North Carolina State University, March 22, 2016.

Kuntz, K.; Wells, R.; Yang, T.; Dong, B.; Wang, J.; Zhang, Z.; Guan, J.; Tománek, D.; Warren, S. C. Understanding the effect of oxygen and water on 2D black phosphorus from photoemission spectroscopy. Presented at the *Intl. Phosphorene Symp.* at Michigan State University, Aug. 14, 2015.

Kuntz, K.; Smith, M.; Wedeward, K.; Collins, M. Detecting, locating, & quantifying false data injections utilizing grid topology through optimized D-FACTS device placement. Presented at the *46th North Amer. Power Symp. (NAPS)* at Washington State University, Sept. 2014.

POSTER
PRESENTATIONS

Kuntz, K.; Stark, M. S.; Kovilak, E. A.; Martens, S.; Chen, C.; Cheng, J.; Warren, S. C. Tunable plasmons in few-layer graphene anti-dot lattices for ultra-fast batteries and sensors. Poster presented at:

- *Gordon Research Conference* in Ventura, California, February 26-27, 2019.

Kuntz, K.; Wells, R.; Hu, J.; Yang, T.; Dong, B.; Guo, H.; Woomer, A.; Tománek, D.; Warren, S. C. Oxidative Control of Edge and Surface Chemistry in 2D Black Phosphorus. Poster presented at:

- *Materials Research Conference* in Boston, Massachusetts, November 30, 2017.

Kuntz, K.; Woomer, A.; Druffel, D.; Warren, S. C. Designing 0D/2D Hybrid Structures for Visible and Near-infrared Plasmonics. Poster presented at:

· *Materials Research Conference* in Boston, Massachusetts, November 29, 2017.

Kuntz, K.; Druffel, D.; Woomeer, A.; Warren, S. C. 0D/2D Hybrid Structures: Nanoparticles on Electrenes. Poster presented at:

· *Triangle Student Research Competition* at Research Triangle Park, October 4, 2017.

Kuntz, K.; Wells, R.; Yang, T.; Dong, B.; Wang, J.; Zhang, Z.; Guan, J.; Tománek, D.; Warren, S. C. 2D black phosphorus oxidation intermediates: Understanding and interpreting XPS & UPS spectra. Poster presented at:

· *Materials Research Conference* in Boston, Massachusetts, November 30, 2015.

Kuntz, K.; Wells, R.; Yang, T.; Dong, B.; Wang, J.; Zhang, Z.; Guan, J.; Tománek, D.; Warren, S. C. Understanding the effect of oxygen and water on 2D black phosphorus from photoemission spectroscopy. Poster presented at:

· *Roger E. Miller Symposium* at University of North Carolina, October 23, 2015.

· *Triangle Student Research Competition* at Research Triangle Park, September 22, 2015.

· *International Phosphorene Symposium* at Michigan State University, August 10, 2015.

MENTORSHIP

Rowland Hall Research Science—O. Milavetz, S. Lehman Aug. 2021 - May 2022
Z. Baughman, M. Dagar, F. Hodgkins, H. Hunt, D. Lang, F. Hodgkins
Rowland Hall Research Science—Y. Yang, M. Eatchel, Jan. 2020 - May 2021
M. Dagar, D. Carlebach, A. Jiricko, E. Barker, T. Gerstein
UNC Undergraduate Research Mentor—C. Chen May 2017 to July 2019
UNC Undergraduate Research Mentor—E. Kovalik March 2016 to May 2018
Pre-Graduate Education Advising Program—Advisor Aug. 2016 to Dec. 2017
UNC Undergraduate Research Mentor—B. Lee March 2015 to May 2016
NCSSM/UNC Mentorship Program Mentor—J. Zou June 2015 to Oct. 2015
NMT Peer Facilitator for Physical Sciences—Course Instructor Aug. 2008 to Dec. 2008
Upward Bound Summer Program—Course Instructor Summer 2008

PROFESSIONAL MENTORSHIP POSTERS

Gerstein, T. L.; Dagar, M.; Hodgkins, F. J.; Lehman, S. B.; Baughman, Z. H.; Hunt, H. L.; Lang, D.; Locke, P. M.; Milavetz, O. F.; Barker, E. K.; Carlebach, D.; Eatchel, M. K.; Jiricko, A. K.; Yang, Y.; Knowlton, N.; **Kuntz, K.** Discovery of Structure-Property Relationships of Intercalated Graphite Compounds using Machine Learning. Student poster presented at:

· *Materials Research Symposium* at Honolulu, HI, May 11, 2022.

Yang, Y.; Barker, E. K.; Carlebach, D. C.; Dagar, M.; Eatchel, M. K.; Gerstein, T. L.; Jiricko, A. K.; **Kuntz, K.** Machine & deep-learning for intercalation compounds: Elucidating structure-property relationships. Student poster presented at:

· *Materials Research Symposium* virtually, April 23, 2021.

Chen, C.; **Kuntz, K.**; Warren, S. C. Electrochemical intercalation of FeCl₃ in few-layer graphite. Student poster presented at:

· *Triangle Student Research Competition* at Research Triangle Park, September 19, 2018.

Chen, C.; **Kuntz, K.**; Kovalik, E.; Warren, S. C. Electrochemical Intercalation of Bulk & 2D Graphite with Bisulfate Anions. Student poster presented at:

· *Triangle Student Research Competition* at Research Triangle Park, October 4, 2017.

Kovalik, E.; **Kuntz, K.**; Lee, B.; Zou, J.; Warren, S. C. Modeling optical properties in few-layer intercalated graphene: Drude model approach. Student poster presented at:

· *Triangle Student Research Competition* at Research Triangle Park, October 5, 2016.

First Place in *Modeling and Theoretical Simulations*

Lee, B.; **Kuntz, K.**; Warren, S. C. Mechanical exfoliation techniques. Student poster presented at:

- *Triangle Student Research Competition* at Research Triangle Park, September 22, 2015.

Zou, J.; **Kuntz, K.** Reverse engineering heat-reflecting window coatings: Novel materials for improved design. Student poster presented at:

- *Southeastern Regional Meeting of the American Chemical Society* at Memphis, TN, November 5, 2015.