Dr. Eric Victor, Ph. D.

Contact Information

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Brown University
Department of Chemistry
324 Brook St, Room 451
Providence, RI 02912

Education

Massachusetts Institute of Technology — Cambridge, MA
Ph.D. Inorganic Chemistry, Sep 2014
Thesis: Reactions of *S*-nitrosothiols with biomimetic iron complexes and other transition metals.
Thesis Advisor: Prof. Stephen J. Lippard

University of Wisconsin – Madison — Madison, WI
B.Sc. Chemistry (Honors), May 2009
Thesis: Synthesis of [CrMo(dpa)$_4$] as an axial ligand to first row transition metals
Thesis Advisor: Prof. John F. Berry

Heidelberg American High School — Heidelberg, Germany
High School Diploma, June 2002

Professional Appointments

2018 – Present	Lecturer of Chemistry, Brown University
2017 – 2018	Director of Graduate Studies, Chemistry Department; Brown University
2015 – 2018	Adjunct Lecturer of Chemistry; Brown University
2014	Visiting Professor of Chemistry; Brown University

Academic Awards

Brown University Teaching with Technology: Model Course Award (Spring 2017)
MIT Department of Chemistry Awards for Outstanding Teaching by a Graduate Student (August 2010)
National Chemical and Starch Foundation Scholar (SY 2008-2009)
Edwin M. and Kathryn M. Larsen Scholar (Summer 2008)
Dean's List F'06 (December 2006)

Teaching Experience

Brown University, Department of Chemistry — Providence, RI

CHEM 332 Equilibrium, Rate, and Structure — Spring 2018
Lecturer
Course Description: Undergraduate-level course to reinforce concepts and topics from CHEM 330 and to prepare the students for organic chemistry courses. Course was taught as a flipped-classroom that relied focused on problem solving and directly incorporating laboratory experiments into teaching and supplementing course topics.

CHEM 2870 Graduate Student Colloquium — Spring 2018
Lecturer
Course Description: Graduate-level course focused on further developing skills necessary for junior graduate researchers to succeed in an R01 chemistry research group. Students were given assignments to improve their skills in writing scholarly articles and funding proposals and performing literature research in areas beyond their immediate thesis topics. Students were taught about proper ethical conduct and behavior as a researcher.

CHEM 360 Organic Chemistry 2 Group Problem Solving Sessions — Fall 2017
Supervisor
Course Description: Sequel course to CHEM 350 that continues to explore organic reactions and mechanisms. Developed and implemented problem sets that were administered as additional practice during group problem sessions in the evenings throughout the semester.

CHEM 100 Introductory Chemistry Conferences Fall 2015 – 18
Lecturer
Course Description: Introductory undergraduate course exploring stoichiometry, atomic and molecular structure, chemical bonding, solutions, gases, chemical reaction equilibria, and thermochemistry. Served as a group problem facilitator for two conference sections to assist and guide students through problem-based learning and knowledge retention activities.

CHEM 350 Organic Chemistry 1 Summer 2017
Lecturer
Course Description: Undergraduate-level course investigating the constitution and properties of different organic compound classes, with considerable attention focused on reaction mechanisms. Topics covered include organic acid-base chemistry, isomerism, alkene and alkyne addition/elimination reactions, nucleophilic substitution, and conformational analysis.

CHEM 400 Bioinorganic and Biophysical Chemistry Spring 2017
Lecturer
Course Description: Undergraduate-level course focused on transition metal chemistry in biological contexts and their characterization using physical methods. Students learned group theory, qualitative molecular orbital theory, metal reactivity, spectroscopic characterization methods, metal-protein interactions, and enzyme kinetics. They developed an intuition to identify the purposes and reactivities of metal active sites based on metal-protein bonds and second-sphere interactions.

CHEM 1450L Advanced Organic Chemistry Laboratory Spring 2017
Lecturer
Course Description: Upper level-undergraduate course designed to teach and practice chemical synthesis techniques typically employed in organic chemistry research laboratories. Students used multiple synthetic techniques, including air-sensitive, photochemical, and high-pressure synthesis, in multiple steps over multiple weeks to prepare target sugar compounds for further use in departmental research.

CHEM 2410 Physical Organic Chemistry Fall 2016
Lecturer
Course Description: Graduate-level course focused on applications of molecular orbital theory for understanding organic molecule reactivity, chemical reaction kinetics and mechanisms, and characterization methods. Students developed an intuition for experimental design necessary to probe and validate reaction mechanisms, structure-function relationships, or propose alternative mechanisms.

CHEM 1060L Advanced Inorganic Chemistry Laboratory Fall 2014, 15, 16
Lecturer
Course Description: Upper undergraduate-level laboratory course designed to teach and develop air-sensitive inorganic chemical synthesis techniques. Students prepare and spectroscopically characterize three inorganic chemical complexes using Schlenk-line and glove box techniques, ^{1}H NMR, FT-IR, and UV-Visible spectroscopy.

CHEM 330 Equilibrium, Rate, and Structure Summer 2016
Lecturer
Course Description: Undergraduate-level course exploring the electronic structure of atoms and molecules, thermochemistry, equilibrium, electrochemistry, chemical kinetics, and reaction mechanisms. Course was taught as a flipped-classroom that relied focused on problem solving and directly incorporating laboratory experiments into teaching and supplementing course topics.

CHEM 0500 Inorganic Chemistry Spring 2016
Lecturer
Course Description: Undergraduate-level course focused on main group and transition metal elements. Molecular orbital theory is expanded to include multi-atomic molecules using group theory and ligand field theory. Inorganic reaction mechanisms are explored using molecular orbital theory to further develop chemical intuition along with associated spectroscopic methods useful in molecular characterization.

CHEM 0400L Bioinorganic and Biophysical Chemistry Laboratory Spring 2016
Lecturer
Course Description: Undergraduate-level laboratory course reinforcing bioinorganic chemistry concepts from the associated lecture. Principles and applications of bioinorganic and biophysical laboratory techniques, including preparation and analysis of biomimetic complexes, reaction kinetics, protein characterization, incorporation of natural and unnatural enzyme active sites, and preparation of chemotherapeutics.

CHEM 2310 Advanced Inorganic Chemistry Fall 2015
Lecturer
Course Description: Graduate-level course on organometallic bonding, reactivity, and characterization. Student population was comprised of first-year graduate students and upper-level undergraduates. Utilized seminal and recently published scientific articles to highlight topics presented in the course.

CHEM 1060 Advanced Inorganic Chemistry Fall 2014
Lecturer
Course Description: Upper undergraduate/graduate-level course focused on group theory, and the electronic and chemical properties of transition metal compounds. Course further develops the student's understanding of orbital bonding interactions and the probing of the underlying electronic structure using spectroscopic and magnetochemical techniques. Student population is comprised of upper-level undergraduates and first-year graduate students.

MIT, Department of Chemistry Cambridge, MA
5.04 Inorganic Chemistry II Fall 2013
Teaching Assistant
Profs. Mircea Dincă and Yogesh Surendraneth
Course description: Undergraduate-level course focused on the systematic presentation of the chemical applications of group theory. Emphasis on the formal development of the subject and its applications to the physical methods of inorganic chemical compounds; against the backdrop of electronic structure, the electronic, vibrational, and magnetic properties of transition metal complexes are presented and their investigation by the appropriate spectroscopy described.
Duties: Prepared and graded problem sets and three course exams. Prepared and lectured two weekly recitation sections. Assisted students with course material and problem sets outside of regularly scheduled meetings.

5.068 Physical Inorganic Methods
Teaching Assistant Spring 2011
Prof. Stephen J. Lippard
Course description: Graduate-level course discussing the physical methods used to probe the electronic and geometric structures of inorganic compounds, with additional techniques employed in the characterization of inorganic solids and surfaces. Topics include vibrational spectroscopy, solid state and solution magnetochemical methods, Mössbauer spectroscopy, electron paramagnetic resonance techniques, and electrochemical methods.
Duties: Prepared and graded problem sets and three course exams.

5.310 Laboratory Chemistry
Teaching Assistant Fall 2009/Spring 2010
Dr. John J. Dolhun
Course description: Undergraduate-level laboratory course introducing experimental chemistry for students not majoring in chemistry. Principles and applications of chemical laboratory techniques, including preparation and analysis of chemical materials, measurement of pH, gas and liquid chromatography, UV-Visible spectrophotometry, Infrared spectroscopy, kinetics, data analysis, and elementary synthesis.
Duties: Taught laboratory techniques to non-chemistry majors. Prepared course module quizzes. Graded laboratory reports for each module.

Research Experience

Brown University, Department of Chemistry Providence, RI
Project 1: Leverage recent technological advances in the digital media space to enhance the general, organic, and inorganic chemistry curricula. We use 3D printing and augmented reality technologies to provide students with visualization tools to teach molecular orbital theory, VSEPR, molecular geometry, and isomerism. These tools are applied in group problem solving environments. The small group activities allow for direct interactions with the student population in their application of the technologies, which in turn allows for easy assessment of student learning and determination of pedagogical refinements necessary to apply these techniques in future courses. Qualitative student assessments are currently used to measure the efficacy of these tools in their pedagogical applications.

Project 2: Group problem solving exercises improve chemical skills development in the general and organic chemistry curricula. However, many students have a difficulty of seeing the impact of the studied chemical concepts in their daily lives or their relation to other scientific disciplines. This project develops new problems for these collaborative learning experiences that directly tie real-world consequences of chemical topics to known phenomena or subjects taught in other scientific fields. The developed exercises have included colonization of Mars, impacts of climate change on ocean acidification, and biochemistry.

Massachusetts Institute of Technology, Department of Chemistry Cambridge, MA

Advisor: Prof. Stephen J. Lippard

Researched reactivity of nitrogen oxides and *S*-nitrosothiols with biomimetic iron, and other transition metal complexes. Employed glove box and Schlenk-line techniques to synthesize air-sensitive compounds and perform small-molecule reactions. Characterization techniques that were employed include X-ray crystallography, Mössbauer, FT-IR, EPR, UV-Vis, and proton/multi-nuclear NMR spectroscopy, cyclic voltammetry, DFT, GC-MS, MALDI-TOF MS, and ESI-MS.

UW-Madison, Department of Chemistry Madison, WI

Advisor: Prof. John F. Berry

Synthesized multiply-bonded group six dimetallic complexes to serve as pentadentate ligands for first-row transition metals. Employed glove box and Schlenk-line techniques to synthesize air-sensitive compounds. Characterization techniques that were employed include X-ray crystallography, FT-IR, UV-Vis, and ^{1}H NMR spectroscopy, cyclic voltammetry, and MALDI-TOF MS.

Advisor: Prof. Bassam Shakhashiri

Tested classroom demonstrations for *Chemical Demonstrations: A Handbook for Teachers of Chemistry Vol. 5*. Performed chemical demonstrations at local events for a wide range of age groups. Adapted the word play *NO* by Carl Djerassi into a theatrical play for college-level pedagogical purposes to explain the science behind nitric oxide and the funding of science.

Advisor: Philipp Simon

Sequenced gDNA of the CHXE gene in *Daucus carota* and compared the sequences of wild types exhibiting different phenotypic colors as part of the US Department of Agriculture – Agricultural Research Service's vegetable crops unit. Over the course of this research PCR, DNA sequencing, bioinformatics, and BAC sub-cloning was employed.

University Service

Brown University Chemistry Department, Recruiting Committee (2017 – present)
Brown Chemistry Department, Safety Committee (2017 – present)
Brown Chemistry Department, Website Committee (2017 – present)
Brown University, Dean's Committee on Undergraduate Problem Solving Fellows (2017 – 2018)
MIT, MIT Presidential Committee on Toxic Chemicals, Graduate Student Representative (Sep 2011 –14)
MIT, ROTC Oversight Committee, Graduate Student Representative (Sep 2012 – 14)
MIT, ChemREFS (Jan 2012 – June 2014)
MIT, Graduate Student Council, Treasurer (May 2012 – 13)
MIT, Chemistry Graduate Student Committee, President (Aug 2011 – 12)
MIT, MIT Veterans Organization, Co-Founder

Refereed Publications

5. **Victor, Eric**; Kim, Sunghee; Lippard, Stephen. J. Synthesis of Bis(imidazole) Metal Complexes and Their Use in Rapid NO Detection and Quantification Devices *Inorganic Chemistry*, **2014**, *53*, 12809-12821.

4. **Victor, Eric**; Minier, Mikael A.; Lippard, Stephen J. Synthesis and Characterization of a Linear Dinitrosyl-Triiron Complex *European Journal of Inorganic Chemistry*, **2014**, *53*, 5640-5645.

3. **Victor, Eric**; Lippard, Stephen J. A tetranitrosyl [4Fe-4S] cluster forms en route to Roussin's Black Anion: Nitric Oxide reactivity of $[Fe_4S_4(LS_3)L']^{2-}$ *Inorganic Chemistry*, **2014**, *53*, 5311-5320.

2. Nippe, Michael; **Victor, Eric**; Berry, John F. Oxidation Chemistry of Axially Protected Mo_2 and W_2 Quadruply Bonded Compounds *Inorganic Chemistry*, **2009**, *48*, 11889-11895.

1. Nippe, Michael; **Victor, Eric**; Berry, John F. Do Metal-Metal Multiply-Bonded Ligands Have a *trans* Influence? Structural and Magnetic Comparisons of Heterometallic CrCr···Co and MoMo···Co Interactions *European Journal of Inorganic Chemistry,* **2008**, *36*, 5569-5572.

Presentations

Victor, Eric Pokemon Go learn some chemistry: Applications of augmented reality to a general chemistry active-learning course. 256th Meeting of the American Chemical Society; Boston, MA, CHED-354.

Victor Eric Ceding control and adjusting on the fly: Experiences implementing an active-learning organic chemistry course during the summer session for the first time. Biennial Conference on Chemical Education 2018; Notre Dame, IN; August 30, 2018.

Victor, Eric Understanding the biological role of nitric oxide using synthetic inorganic molecules. Fitchburg State University; Fitchburg, MA; January 21, 2015.

Victor, Eric; Lippard, Stephen J. Nitric Oxide reactivity of the site-differentiated cluster $[Fe_4S_4(LS_3)L']^{2-}$. 247th Meeting of the American Chemical Society, Dallas, TX; INOR−43.

Victor, Eric NO reactivity of different irons: Site-differentiated multi-iron complexes and reactive nitrogen oxide species. MIT Department of Chemistry Inorganic Seminar Series; Cambridge, MA; March 6, 2013.

Victor, Eric; Schreiner, Rodney; Shakhashiri, Bassam Z. NO: Presenting real-world scientific research and problems in an artistic way. 240th Meeting of the American Chemical Society; Boston, MA; CHED−77.

Victor, Eric; Nippe, Michael; Berry, John F. Group Six Metal-Metal multiply-bonded complexes as axial ligands for first-row transition metals. University of Wisconsin – Madison Undergraduate Chemistry Department Symposium 2009; Madison, WI; April 9, 2009.

Victor, Eric; Simon, Philipp W. Sequencing and Subcloning of the CHXE gene in a Carrot (*Daucus carota*) BAC. University of Wisconsin – Madison Undergraduate Symposium 2008; Madison, WI; April 16, 2008.

Military Experience

92nd Chemical Company, 3rd Infantry Division Ft. Stewart, GA

Served as a team and squad leader. Supervised, trained, and mentored a team of four soldiers in the execution of chemical, biological, radiological, and nuclear decontamination operations, tactical motorized patrols, and perimeter guard operations during Operation Iraqi Freedom III with zero casualties. Maintained accountability of over $400,000 worth of equipment with zero loss. Monitored and maintained accountability in the transfer of over $2.2 million worth of raw construction materials between Iraqi national companies and the military at the Baghdad International Airport complex. Established the standard operating procedure and mission statement for sample team operations as part of the Baghdad-area hazardous materials assessment team. Developed and implemented security operations procedures for the Baghdad International Airport complex transload site.

Military Awards

Presidential Unit Citation
Army Commendation Medal with one oak cluster (2nd award)
Army Achievement Medal with one oak cluster (2nd award)
Army Good Conduct Medal
National Defense Service Medal
Iraq Campaign Medal
Global War on Terrorism Expeditionary Medal
Global War on Terrorism Service Medal
Commandant's Inspection Awardee PLDC cycle 08/04
Commandant's List PLDC cycle 08/04

Professional Affiliations

American Chemical Society
Alpha Chi Sigma
National Society of Collegiate Scholars
Veterans of Foreign Wars
Iraq and Afghanistan Veterans of America
Disabled Veterans of America