

Joseph R. Clark

Assistant Professor

Marquette University

TheClarkLab.com

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Education

- 09/2014 – 01/2018 **NIH Ruth Kirschstein Postdoctoral Fellow** with Prof. M. Christina White
University of Illinois, Urbana-Champaign, IL
- 09/2009 - 08/2014 **Ph.D. in Chemistry** with Prof. Steven T. Diver
University at Buffalo, Buffalo, NY
- 09/2004 - 05/2008 **B.Sc. in Chemistry**
Minor in Mathematics
St. John Fisher College, Rochester, NY

Research Experience and Training

- 08/2018 - present **Assistant Professor of Chemistry**, Marquette University, Milwaukee, WI
- 09/2014 – 01/2018 **University of Illinois**, Urbana-Champaign, IL
Postdoctoral fellow, advisor: Prof. M. Christina White
- Catalyst discovery, reaction development and mechanistic investigation for a general and highly selective late-stage manganese-catalyzed benzylic C(sp³)-H amination of natural products and bioactive molecules
 - Development of nitrogen complexation strategies enabling C(sp³)-H oxidation at C-H sites remote from nitrogen functionality in bioactive molecules
 - Initiated a highly selective and general intermolecular allylic C-H amination project
- 09/2009 - 08/2014 **University at Buffalo (SUNY)**, Buffalo, NY
Graduate student, advisor: Prof. Steven T. Diver
- Investigated Grubbs generation II decomposition species as catalysts towards the development of a stereoconvergent and first report of a well-defined metal-hydride catalyzed dienyl isomerization
 - Designed a relay-strategy to accomplish germinal alkene-alkyne cross metathesis
 - Developed alkene metathesis strategies to access β -unsubstituted *anti*-allylic alcohols
 - Achieved a truly atom-economical ene-yne metathesis
 - Co-authored an enyne metathesis chapter in Comprehensive Organic Synthesis II
- 06/2007 - 08/2007 **University at Buffalo (SUNY)**, Buffalo, NY
NSF-Research Experiences for Undergraduates, advisor: Prof. Steven T. Diver
- Reaction development and substrate scope elaboration for an alkenol-alkyne cross metathesis
- 09/2004 - 05/2008 **St. John Fisher College**, Rochester, NY
Undergraduate student, advisor: Prof. Daniel E. Piccolo
- Investigation of carbene insertion into arene oxides

Teaching Experience

Spring 2022	CHEM 6102 Organic Reactions , Marquette University
Fall 2021	CHEM 2113 Organic Chemistry for Majors , Marquette University
Spring 2021	CHEM 4130/5130 Characterization of Organic Compounds , Marquette Univ.
Fall 2020	CHEM 2113 Organic Chemistry for Majors , Marquette University
Spring 2020	CHEM 6931 Organic Synthesis and Reactions , Marquette University
Fall 2019	CHEM 2113 Organic Chemistry for Majors , Marquette University
Fall 2018	CHEM 2113 Organic Chemistry for Majors , Marquette University
Spring 2016 and 2017	Organometallics Graduate Class , University of Illinois Taught 2 lectures in Spring 2016 and 5 lectures in Spring 2017
2009 - 2011	Organic Laboratory Graduate Teaching Assistant , University at Buffalo Organize, teach, and supervise two laboratory and recitation sections of 16-32 undergraduates Grade lab assignments, exams, hold weekly office hours, and hold optional exam review sessions
Spring 2008	General Chemistry Teaching Assistant , St. John Fisher College
2007 - 2008	Peer Tutor , for chemistry and calculus I, II, and III, St. John Fisher College

Publications

16. Reyes, A.; Rivera Torres, E.; Vang, Z. P.; Clark, J. R. "Highly Regioselective Copper-Catalyzed Transfer Hydrodeuteration of Unactivated Terminal Alkenes" *Chem. Eur. J.* **2022**, *28*, e202104340.
15. Sloane, S. E.; Behlow, K. T.; Mills, M. D.; Clark, J. R. "Three-Component Coupling Reactions that Generate 1,3-Dienes" Accepted for publication, **2021**, (invited submission as part of the Science of Synthesis II Series).
14. Mills, M. D.; Clark, J. R. "Conjugated Diene Synthesis by Rearrangement of 1,3-Dienes to 1,3-Dienes" Accepted for publication, **2021**, (invited submission as part of the Science of Synthesis II Series).
13. Vang, Z. P.; Reyes, A.; Sonstrom, R. E.; Holdren, M. S.; Sloane, S. E.; Alansari, I. Y.; Neill, J. L.; Pate, B. H.; Clark, J. R., "Copper-Catalyzed Transfer Hydrodeuteration of Aryl Alkenes with Quantitative Isotopomer Purity Analysis by Molecular Rotational Resonance Spectroscopy." *J. Am. Chem. Soc.* **2021**, *143*, 7707-7718.
12. Vang, Z. P.; Hintzsche, S. J.; Clark, J. R., "Catalytic Transfer Deuteration and Hydrodeuteration: Emerging Techniques to Selectively Transform Alkenes and Alkynes to Deuterated Alkanes." *Chem. Eur. J.* **2021**, *27*, 9988-10000.
11. Sloane, S. E.; Reyes, A.; Vang, Z. P.; Li, L.; Behlow, K. T.; Clark, J. R. "Copper-Catalyzed Formal Transfer Hydrogenation/Deuteration of Aryl Alkynes" *Org. Lett.* **2020**, *22*, 9139-9144
10. Clark, J. R. "Challenges Facing Young Scientists in Academia and Industry in the United States from the Lens of a Millennial Academic" *Chem. Eur. J.* **2020**, *26*, 15759-15762.

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Publications from Postdoctoral, Graduate and Undergraduate Research

- Ide, T.; Feng, K.; Dixon, C.F.; Teng, D.; Clark, J.R.; Han, W.; Wendell, C.I.; Koch, V.; White, M.C. "Late-Stage Intermolecular Allylic C-H Amination. *J. Am. Chem. Soc.* **2021**, *143*, 14969-14975.
- Clark, J. R.; Feng, K.; Sookezian, A.; White, M. C. "Manganese-Catalyzed Benzylic C(sp³)—H Amination for Late-Stage Functionalization." *Nature Chemistry* **2018**, *10*, 583-591 (Featured on the cover of Nature Chemistry. Also featured in *Chemical and Engineering News* May 7, 2018 p 11).
- Howell, J. M.; Feng, K.; Clark, J. R.; Trzepakowski, L. J.; White, M. C. "Remote Oxidation of Aliphatic C—H Bonds in Nitrogen-Containing Molecules." *J. Am. Chem. Soc.* **2015**, *137*, 14590-14593.
- Diver, S. T.; Clark, J. R. "Ene-Yne Metathesis." *Comp. Org. Synth II.* **2014**, *5*, 1302-1356.
- Clark, J. R.; Griffith, J. R.; Diver, S. T. "Ruthenium Hydride Promoted Dienyl Isomerization: Access to Highly Substituted 1,3 Dienes." *J. Am. Chem. Soc.* **2013**, *135*, 3327-3330.
- Clark, J. R.; French, J. M.; Jecs, E.; Diver, S. T. "Geminal Alkene-Alkyne Cross Metathesis Using a Relay Strategy." *Org. Lett.* **2012**, *14*, 4178-4181.
- Clark, J. R.; French, J. M.; Diver, S. T. "Alkene Metathesis Approach to β -Unsubstituted Anti-Allylic Alcohols and Their Use in Ene-Yne Metathesis." *J. Org. Chem.* **2012**, *77*, 1599-1604.
- Clark, J. R.; Diver, S. T. "Atom Economy in the Metathesis Cross-Coupling of Alkenes and Alkynes." *Org. Lett.* **2011**, *13*, 2896-2899.
- Clark, D. A.; Clark, J. R.; Diver, S. T. "Alkenol-Alkyne Cross Metathesis." *Org. Lett.* **2008**, *10*, 2055-2058.

Ongoing, Pending and Completed Research Grants

"Development of Selective Cu-Catalyzed Alkene and Alkyne Functionalization Reactions." American Chemical Society Petroleum Research Fund: Awarded \$110,000. 7/01/2022-8/31/2024 (Ongoing)

"Highly Selective Cu-Catalyzed Reactions for Precision Deuteration and Alkyne Hydrofunctionalization." NIH ESI MIRA: Requested \$1,848,854. 7/01/2022-6/30/2027 (Pending).

"New Method Development Towards the Synthesis of Bioactive Myrioneuron Alkaloid Natural Product." Marquette University Regular Research Grant: Awarded \$6,000. 1/01/2020-6/30/2021 (Completed)

Patents

Clark, J. R.; Vang, Z.P.; Mills, M.; Reyes, A.; Sloane, S. E.; Rivera Torres, E.; "Selective Transition Metal Catalyzed Deuterium Incorporation Into Alkyne and Alkene Functionalities." PCT/US2021/057608, *Submitted Nov. 2021*

Clark, J. R.; Feng, K.; Sookezian, A.; White, M. C. "Manganese (III) catalyzed C—H aminations." *US Patent # 10611786*. 04/07/2020.

Honors

February 2022

Way-Klinger Early Career Award. An award given by Marquette University Committee on Research for the primary purpose of advancing promising young scholars research programs.

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May 2019	Senior Award. Presented by CheMU (Marquette Chemistry). An award given by undergraduate chemistry majors to one professor in recognition of teaching excellence and developmental guidance of future scientists.
February 2018	Poster Award. 11 th CaRLa Winter School. One of three attendees selected by the CaRLa committee for the best verbal and poster presentation at the conference.
November 2017	Dr. T. M. Balthazor Poster Award. Beak-Pines Allerton Conference, UIUC. Awarded to the individual with an outstanding poster presentation.
October 2017	C. S. Marvel Postdoctoral Travel Award, UIUC A departmental travel award given to exceptional postdoctoral researchers to present their research at an ACS conference or Gordon Research Conference.
Spring - Summer 2013	Silbert Fellowship, University at Buffalo Awarded to one outstanding Chemistry doctoral student in their last year of study and covers full tuition and stipend
Summer - Fall 2012	Speyer Fellowship, University at Buffalo Awarded to exceptional doctoral students for outstanding character and scholarship and covers full tuition and stipend
Fall 2010	Mattern-Tyler Teaching Award, University at Buffalo Awarded for excellence in teaching
Spring 2007	American Chemical Society Analytical Chemistry Student of the Year Awarded for excellence in analytical chemistry at St. John Fisher College

Selected Presentations

Clark, J.R. "Synthesis and Characterization of Selectively Deuterated Small Molecules." *2021 MRR Symposium and Workshop*. March 30, 2021. Invited lecture. <http://www.brightspec.com/mrr-symposium-and-workshop/>

Clark, J.R. "New Transition Metal Catalysis to Expand the Drug Discovery Toolbox" *University of Puerto Rico NIH RISE Program Circulo de Quimica*. University of Puerto Rico Cayey. Cayey, Puerto Rico. November 24, 2020. Invited lecture.

Clark, J.R. "Research Opportunities at Marquette University." *ACCA Collaborative Meeting*, Benedictine University, Lisle, IL. February, 29, 2020. Invited lecture.

Clark, J.R. "Research Opportunities at Marquette University." *University of Puerto Rico NIH RISE Program Circulo de Quimica*. University of Puerto Rico Cayey. Cayey, Puerto Rico. November 26, 2019. Invited lecture.

Clark, J.R. "Choosing a Career in Chemistry and Research and New Organic Chemistry Method Development and Synthesis." St. Catherine University. St. Paul, Minnesota. November 8, 2019. Invited lecture.

Clark, J.R. "First-Row Transition Metal Catalysis: Site-Selective Copper-Catalyzed Deuterium Incorporation Into Small Molecules." Alfred R. Bader Award Keynote Lecturer. The keynote speaker for the prestigious Bader Award in synthetic organic chemistry at MilliporeSigma located Milwaukee, WI. September 12, 2019. Invited lecture

Clark, J.R. "Exploring Bioactive Molecule Synthesis and Modification to Develop New Medicines." *University of Puerto Rico NIH RISE Program Circulo de Quimica*. University of Puerto Rico Cayey. Cayey, Puerto Rico. November 27, 2018. Invited lecture.

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Clark, J. R.; Feng, K.; Sookezian, A.; White, M. C. "Manganese-Catalyzed Benzylic C(sp³)—H Amination for Late-Stage Functionalization." *Natural Products and Bioactive Compounds Gordon Research Conference*. Proctor Academy. Andover, NH, July 29-August 3 2018. (Poster Presentation) This presentation was selected for a flash presentation on July 30.

Clark, J.R. "Exploring Bioactive Molecule Synthesis and Modification to Develop New Medicines." *Future Pharmacists Association*. University of Puerto Rico Cayey. Cayey, Puerto Rico, May 17, 2018. Invited lecture.

Clark, J.R.; Santiago Capeles, L. "How Pursuing an Advanced Degree in Chemistry Can Open the Doors to a Career in Academics or the Pharmaceutical Industry." *University of Puerto Rico NIH RISE Program Círculo de Quimica*. University of Puerto Rico Cayey. Cayey, Puerto Rico, March 20, 2018. Invited lecture.

Clark, J. R.; White, M. C. "Manganese-Catalyzed Benzylic C(sp³)—H Amination for Late-Stage Functionalization." *C.S. Marvel Postdoctoral Travel Award*. University of Illinois Urbana-Champaign, IL, March 1, 2018. Invited lecture to receive the travel award.

Clark, J. R.; Feng, K.; Sookezian, A.; White, M. C. "Manganese-Catalyzed Benzylic C(sp³)—H Amination for Late-Stage Functionalization." *11th CaRLa Winter School*. Heidelberg, Germany, February 18-23, 2018. (Poster Presentation)

Clark, J. R.; Feng, K.; Sookezian, A.; White, M. C. "Manganese-Catalyzed Benzylic C(sp³)—H Amination for Late-Stage Functionalization." *Beak-Pines Allerton Conference*, University of Illinois Urbana-Champaign, Champaign, IL, November 11, 2017. (Received Award for Best Poster Presentation)

Clark, J. R.; Diver, S. T.; White, M. C. "From Ruthenium Carbenes to Base Metal Oxos and Nitrenes: Using Transition Metal Catalysis to Advance Synthetic Methods." *Invited lecture*. Organic Chemistry Seminar Series, University at Buffalo SUNY, Buffalo, NY, October 10, 2017. (Oral Presentation)

Clark, J. R.; Howell, J. M.; Feng, K.; Trzepakowski, L. J.; White, M. C. "Oxidizing Fishy Compounds." *Invited lecture*. The Burkett Lecture Series, DePauw University, IN, September 2016. (Oral Presentation)

Clark, J. R.; Diver, S. T. "Progress Toward Advancing the Utility of Cross Ene-Yne Metathesis for Broader Use in Complex Molecule Design," *245th ACS National Meeting*, New Orleans, LA, April 2013. (Oral Presentation)

Clark, J. R.; Diver, S. T. "Relay Strategies for Olefin and Ene-yne Metathesis to Access New Compounds" *Invited talk*. St. John Fisher College, February 2013. (Oral Presentation)

Clark, J. R.; Diver, S. T. "Progress Toward Advancing the Utility of Cross Ene-Yne Metathesis for Broader Use in Complex Molecule Design" *UB Graduate Student Symposium (GSS)*, Buffalo, NY. Spring 2012, (Oral Presentation)

Clark, J. R.; Diver, S. T. "Atom Economy in the Metathesis Cross-Coupling of Alkenes and Alkynes." *UB Graduate Student Symposium (GSS)*, Buffalo, NY. Spring 2011, (Oral Presentation)

Clark, J. R.; Diver, S. T. "Achieving True Atom Economy in Ene-Yne Metathesis." *UB Graduate Student Symposium (GSS)*, Buffalo, NY. Spring 2010, (Poster Presentation)

Mentoring Experience

Marquette University, Current Research Group

- Graduate Researchers: Samantha Sloane, Zoua Pa Vang, Mitchell Mills, Sam Hintzsche, Emanuel Rivera Torres, Lihan Qi, Dana Stambekova
- Undergraduate Researchers: Isabella Alansari, Katie Smith, Mykaela Podoski
- Previous Research Associates: Albert Reyes, Emanuel Rivera Torres
- Previous Postdoctoral Researchers: Dr. Lingzi Li
- Previous Undergraduate Researchers: Elisabeth Solis, Chrissy Fox, Maria Velarde Villalaz, Aniel J Rivera

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Arzola, Nicole Colón Rosa, Emanuel Rivera Torres, Sam Hintzsche, Nick Hansen, Genesis Chase, Jordan McCurdy, Albert Reyes, Priyanka Trivedi, Olivia Flores, Raul Diaz Santiago

- Previous Milwaukee High School Researchers: Olivia Starich
- Graduated Students: Kiera Behlow MS (2021)

University of Illinois Urbana-Champaign, White Research Group

- PhD Students (6): Kaibo Feng, Chloe Wendell, Rachel Chambers, Jon Young, Vanessa Koch, Tyler Smolczyk

University at Buffalo, Diver Research Group

- PhD Students (2): Justin R. Griffiths, Synthia Gratia
- Undergraduate Students (4): Victoria Jaynes, Almedina Redzematovic, Nellieane Figueroa, Enzo Benfanti.

University at Buffalo, Department of Chemistry

- Research Experience for Undergraduates (NSF-REU) Coordinator (Summer 2014)

Service

Volunteer for abstract review for the Annual Biomedical Research Conference for Minority Students (ABRCMS) 2020

Undergraduate Committee: July 2020 – July 2021

NMR oversight committee: July 2020 – Present

Faculty Search Committee (Department of Chemistry): Fall 2019, Spring 2021

Chemistry Undergraduate Advisor: July 2019 – Present

Graduate Recruiting Committee (GRAC): July 2018 – July 2021

CheMU Advisor: Fall 2018 – Fall 2019, July 2021-present

Chemistry demonstration for elementary school students in the city of Milwaukee school district. September 25, 2019 and October 3, 2018

External Reviewing

Funding Agencies: ACS PRF ad hoc reviewer

Journals:

Wiley-VCH, *Angewandte Chemie* (3x)

Wiley-VCH, *Chemistry a European Journal* (2x)

Wiley-VCH, *Asian Journal of Organic Chemistry* (1x)

Wiley-VCH, *European Journal of Organic Chemistry* (1x)

Wiley-VCH, *ChemistrySelect* (1x)

Royal Society of Chemistry, *RSC Advances* (1x)

American Chemical Society, *Organic Letters* (1x)

American Chemical Society, *ACS Catalysis* (1x)

Languages

English: Native speaker

Spanish: fluent in conversation