# Curriculum Vitae

*M. Christina White, Lycan Professor of Chemistry*
University of Illinois

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## *Current Appointment:*

**University of Illinois**, Urbana-Champaign, IL — August 2019-present
Lycan Professor of Chemistry

## *Previous Appointments:*

**University of Illinois**, Urbana-Champaign, IL
Professor of Chemistry — July 2011-August 2019
Assistant Professor of Chemistry — July 2005-July 2009
Associate Professor of Chemistry — August 2009-July 2011

**Harvard University**, Cambridge, MA — August 2002-June 2005
Assistant Professor of Chemistry

## *Education:*

NIH Postdoctoral Fellow
Dept. of Chemistry and Chemical Biology
Harvard University
**Advisor**: Professor Eric N. Jacobsen
January 1999-2002

Ph.D. in Organic Chemistry
ACS Predoctoral Fellow
Dept. of Chemistry
Johns Hopkins University
**Advisor**: Professor Gary H. Posner
January 1994-December 1998

Dept. of Biology
Johns Hopkins University
**Advisor**: Christian B. Anfinsen
August 1992-December 1993

B.A. with highest honors in Biochemistry
Smith College
**Advisor**: Professor Stuart Rosenfeld
August 1988-1992

## *Awards and Honors:*

- Lycan Professorship in Chemistry (2019)
- ACS Award for Creative Work in Synthetic Organic Chemistry (2018)
- Mitsui Chemicals Catalysis Science Award (2018)
- University Scholar, University of Illinois (2017)
- Mukaiyama Award, (2016)
- Fellow of the Royal Society of Chemistry (2014)
- Royal Society of Chemistry, Merck Award (2013)

- Fellow of AAAS (2012)
- Cope Scholar Award (2009)
- Roche Excellence in Chemistry Award (2009)
- Abbott Young Investigator Award (2008)
- AstraZeneca Excellence in Chemistry Award (2008)
- Camille Dreyfus Teacher-Scholar Award (2008)
- Boehringer Ingelheim Pharmaceuticals New Investigator Award (2008)
- Amgen Young Investigator Award (2008)
- Sanofi Aventis "Visions in Chemistry" (2008)
- Pfizer Award for Creativity in Organic Chemistry (2008-2009)
- BMS Unrestricted "Freedom to Discover" Grant (2008-2009)
- Eli Lilly Grantee Award (2007-2009)
- Alfred P. Sloan Research Fellow (2008-2010)
- Fellow, UIUC Center for Advanced Study (2006)
- NSF CAREER Award (2006-2010)
- Camille and Henry Dreyfus New Faculty Award (2002-2007)
- National Institutes of Health Postdoctoral Fellowship (1999-2002)
- American Chemical Society, Division of Medicinal Chemistry Predoctoral Fellowship (1997-1998)
- Sarah and Adolph Roseman Award for Outstanding Achievement in Chemistry, JHU (1997)
- Sigma Xi, Smith College (1992)
- First Group Scholar, Smith College (1992)
- Ford Foundation Summer Research Grant, Smith College (1991)
- Dean's List, Smith College (1988-1992)

*Biographical Sketch*

M. Christina White was born in Athens, Greece. She received a B.A. degree with highest honors in biochemistry from Smith College working with Stuart Rosenfeld in the area of host-guest chemistry. After a one-year stint in the biology graduate program working with Christian Anfinsen on thermophilic bacteria protein folding, she received her Ph. D. degree from Johns Hopkins University in chemistry with Gary Posner as an ACS Medicinal Chemistry Pre-Doctoral fellow. She was a NIH postdoctoral fellow at Harvard University with Eric Jacobsen from 1999-2002 and is currently the Lycan Professor of Chemistry at the University of Illinois at Urbana-Champaign. The White group's reactions have enabled strategic advances in synthesis, most notably the concept of late-stage C—H functionalization. The White group discovers and develops selective, intermolecular C—H oxidation reactions for broad use in chemical synthesis. They have contributed new reactions to intermolecularly functionalize all types pf C(sp3)—H bonds under preparative conditions with predictable and catalyst-controlled site-selectivities - without the requirement for directing groups. The White group has commercialized 5 catalysts that are broadly used academically and industrially to add oxygen, nitrogen and carbon to preformed hydrocarbon skeletons in every class of natural product and emerging classes of pharmaceuticals. These reactions provide fundamental insights into the selective reactivity possible among C—H bonds of the same bond type (for example, methylenes) based on subtle differences in their electronics, sterics, stereoelectronic environments in complex settings.

**Commercial Catalysts:**

1. 1,2-Bis(phenylsulfinyl)ethane palladium(II) acetate; Common name: White Catalyst; Uses: Allylic C—H Functionalizations, Oxidative Heck Reactions; Commercialized by Strem Chemicals, Sigma Aldrich, TCI.

2. ((2*S*,2′*S*-(–)-[*N*,*N*-Bis(2-pyridylmethyl)]-2,2′-bipyrrolidinebis(acetonitrile)iron(II) hexafluoroantimonate); Common name: White-Chen Catalyst; Uses: Aliphatic C—H Hydroxylations; Commercialized by Strem Chemicals, Sigma Aldrich, American Elements.
3. Manganese 2,9,16,23-tetra-*tert*-butyl-29*H*,31*H*-phthalocyanine chloride, [2,9,16,23-Tetra-*tert*-butyl-29*H*,31*H*-phthalocyanine]manganese(III) chloride, [Mn(t-BuPc)]Cl); Common Name: White-Paradine Catalyst; Uses: Intramolecular C—H Aminations; Commercialized by Sigma Aldrich.
4. Manganese (III) perchloro- phthalocyanine chloride, [Mn(ClPc)]Cl; Uses: Intermolecular C—H amination. Common name: White-Clark catalyst. Commercialized by Sigma Aldrich (product number: 901425).
5. (2*R*,2′*R*)-1,1'-bis((5-(2,6-bis(trifluoromethyl)phenyl)pyridin-2-yl)methyl)-2,2'-bipyrrolidinebis(acetonitrile)manganese(II) hexafluoroantimonate): Common name: White-Gormisky-Zhao: Commercialized by Strem.

**Features:** · *Video Interviews*: Eminent Organic Chemists Collection: Interviews with MCW by the ACS's Division of Organic Chemistry: http://layingthegroundwork.com/chemists/link/white.html; ChEFSInitiative by Arthur Winter at Iowa State University: http://winter.public.iastate.edu/chefs-initiative/hidden/index.html; ACS Award for Creative work in Synthetic Organic Chemistry by Merck KGaA, Darmstadt Germany: https://www.emdgroup.com/en/research/grants-and-awards/acs-award-for-creative-work-in-synthetic-organic-chemistry.html; MCW Investiture: https://www.youtube.com/watch?v=zcZXukYFT3w&t=332s; The Cyclo Edition Interview: https://www.youtube.com/watch?v=eIWIlGEZ3Bc

## *Services and Activities*

- Permanent member, NIH Study Section, Chemical Synthesis and Biosynthesis (CSB), 2024-2028.
- Ad Hoc member, NIH Study Section, Chemical Synthesis and Biosynthesis (CSB), 2024.
- NIH Study Section, Member Conflict Special Emphasis Panel (2023)
- Staff Committee, University of Illinois at Urbana-Champaign (2013-2023)
- SCS Director Search, University of Illinois at Urbana-Champaign (2022)
- Advisory Committee, University of Illinois at Urbana-Champaign (2021-2023), Chair 2022
- NIH study section, ZRG1 F04A-D, Pre- and Postdoctoral Fellowships (2019)
- UIUC LAS Faculty Appeals Committee (2019-2020).
- NIH study section, ZRG1 CB-Q, Maximizing Investigators' Research Award (2017)
- Research advisory board member, Carle Illinois College of Medicine (2017)
- Ad hoc member, NIH study section Synthetic and Biological Chemistry B (SBCB) (2017)
- ACS Award Selection Committee (2016), Chair (2017, 2018)
- Editorial Advisory Board: *Advanced Synthesis and Catalysis*; *Chemical Science*
- Permanent member, NIH study section Synthetic and Biological Chemistry A (SBCA), 2010-2015.
- Ad hoc member, NIH study section Synthetic and Biological Chemistry A (SBCA), 2009.
- Ad hoc member, NIH study section Synthetic and Biological Chemistry A (SBCA), 2007.
- Ad hoc member, NSF CAREER review panel, 2008.
- University of Illinois Department of Chemistry Fuson Travel Award Committee, 2007.
- University of Illinois Department of Chemistry Faculty Search Committee, 2016-present.
- University of Illinois Department of Chemistry Admissions Committee, 2005-2010.
- University of Illinois Department of Chemistry Recruiting Committee, 2005-2010.

*Citation Numbers taken from Google Scholar

**Total Publications & Patents**: 67 publications, 7 patents
**Independent Publications & Patents**: 60 publications, 6 patents; Primary independent papers (excluding perspectives) with >200 citations = 21; Average citation per paper > 181; H-index = 52

*Independent Career Publications & Patents (2002-2019)*

**Base Metal (oxo)-Catalyzed Aliphatic C—H Oxidations**

1. Chen, M.S.; White, M.C. "A Predictably Selective Aliphatic C—H Oxidation Reaction for Complex Molecule Synthesis." *Science*, **2007**, *318*, 783-787. (citations: 1344)
   - This paper has been included among advances in Streamlined Organic Synthesis ("Doing More with Less") in *Science's* "Breakthrough of the Year" Special Issue, **2007**, *318*, 1848.
   - This paper has been included among "Highlights of 2007" in *Chem. & Eng. News Highlights* **2007**, *85*(52), 17-18 and "Cutting-Edge Chemistry 2007" in *Chemistry World Highlights* Special Issues, **2008**, *5*(1), 24-37.
   - For perspectives on this work see: R.H. Crabtree, "No Protection Required." *Science*, **2007**, *21*, 7; M. Christmann, "Selective Oxidation of Aliphatic C—H Bonds in the Synthesis of Complex Molecules." *Angew. Chem. Int. Ed.* **2008**, *47*, 2740; Stephen K. Ritter, "Iron's Star Rising." *Chem. & Eng. News* **2008**, *86*(30), 53.
   - For highlights see: Jyllian Kemsley, "Catalyst Oxidizes Selectively." *Chem. Eng. News* **2007**, *85*(45), 8.; "Green Cleaver." *Nature* **2007**, *450* (8), 139.; Patrick Walter, "Green Catalyst Could Clean Up in Drug Production." *Chemistry & Industry* **2007**, *21*, 7.; Richard Van Noorden, "Step Change for Organic Synthesis." *Chemistry World*, **2007**, *4*(12), 25.; Kevin Bullis, "Drugs That are Easier on the Environment." *Technology Review*, **2008**, January/February issue, 85.
2. Vermeulen, N.V.; Chen, M.S.; White, M.C. "The Fe(PDP)-Catalyzed Aliphatic C—H Oxidation: A Slow Addition Protocol." *Tetrahedron*: *Symposium In Print Special Issue for Justin Du Bois*, **2009**, *65*, 3078. (citations: 114)
3. Chen, M.S.; White, M.C. "Combined Effects on Selectivity in Fe-Catalyzed Methylene Oxidation." *Science* **2010**, *327*, 566. (citations: 788)
   - For a highlight see: "Methylene magic." *Nature* **2010**, *463*, 590.
   - Stu Borman: "Choosing One Among Many." *Chem. & Eng. News* **2010**, *88*(6), 54.
   - Andrew Turley: "Targeted bond breakage." *Chemistry & Industry* **2010**, 11.
   - For a perspective see: Michael J. Haas: "Unlocking Ketones." *SciBX* **2010**, *3*(6), 1.
4. Bigi, M.A.; Reed, S.A.; White, M.C. "Diverting non-haem iron catalysed aliphatic C—H hydroxylations towards desaturations." *Nature Chemistry*, **2011**, *3*, 216. (citations: 211)
   - For a highlight see: News of the Week, Stu Borman: "Catalyst Makes a Novel Switch." *Chem. & Eng. News* **2011**, *89* (5), 10.
5. Bigi, M.A.; Reed, S.A.; White, M.C. "Directed Metal (Oxo) Aliphatic C—H Hydroxylations: Overriding Substrate Bias." *J. Am. Chem. Soc.* **2012**, *134*, 9721. (citations: 208)
6. Bigi, M.A.; Liu, P.; Zou, L.; Houk, K.N.; White, M.C. "Cafestol to Tricalysiolide B and Oxidized Analogues: Biosynthetic and Derivatization Studies Using Non-heme Iron Catalyst Fe(PDP)." *SYNLETT* (Special Cluster on C—H Oxidation) **2012**, *23*, 2768. (citations: 37).
7. Gormisky, P.E.; White, M.C. "Catalyst-Controlled Aliphatic C—H Oxidations with a Predictive Model for Site-Selectivity." *J. Am. Chem. Soc.* **2013**, *135*, 14052. (citations: 370)
   - For a highlight see: Jake Yeston "Tell O Where to Go", Editor's Choice *Science* **2013** *342*, 15.
   - For a highlight see: Kathryn Roberts, "Better than an Enzyme", *Chemistry & Industry* 2013, October 1st issue.

- For highlight see: Stu Borman, "Catalyst Calls the Shots", News of the Week, *C&E News* **2013** *91(40)*, 12.
- For a highlight see: JACS "Spotlight", *J. Am. Chem. Soc.* **2013**, *135*, 15269.
- For a highlight see: Karl Collins, "Oxidation Station", Opinions, *Chemistry World*, January 8, 2014.
- For News article see: Diana Yates, "New Small Molecule Catalyst Does Work of Many Enyzmes", UIUC News Bureau, e! Science News, Health Medicine Network.

8. Howell, J.M; Feng, K.; Clark, J.R.; Trzepkowski, L.J.; White, M.C. "Remote Oxidation of Aliphatic C—H Bonds in Nitrogen Containing Molecules." *J. Am. Chem. Soc.* **2015**, *137*, 14590. (citations: 199)
9. Osberger, T.J.; Rogness, D. C; Kohrt, J.T.; Stepan, A. F; White, M.C. "Oxidative Diversification of Amino Acids and Peptides by Small-Molecule Iron Catalysts." *Nature* **2016**, *537*, 214. (citations: 243)
    - For a highlight see: Stu Borman "Iron Catalysts Diversify Amino Acids and Peptides", News of the Week *C&E News* **2016** *94(32)*, 7.
    - For News article see: Liz Ahlberg, "Iron Catalysts Can Modify Amino Acids, Peptides to Create New Drug Candidates", UIUC News Bureau, Technology.org, (e)Science News, Scicasts, Health Medicine Network, News Medical, BioPortfolio, Physorg.com, Science Daily.
    - For a highlight see: Derek Lowe "Rip Up Your Prolines", In the Pipeline, *Science Translational Medicine*, August 3, 2016.
    - For News & Views see: Bartlett, S.; Spring, D.R. "Complex Peptides Made Simple." *Nature Chemistry* **2017**, *9*, 9.
10. Nanjo, T.; de Lucca Jr., E.C.; White, M.C. "Remote, Late-Stage Oxidation of Aliphatic C—H Bonds in Amide-Containing Molecules." *J. Am. Chem. Soc.* **2017**, *139*, 14586. (citations: 98)
11. Griffin, J.R.; Wendell, C.I.; Garwin, J.A.; White, M.C. "Catalytic C(sp3)—H Alkylation via an Iron Carbene Intermediate." *J. Am. Chem. Soc.* **2017**, *139*, 13624. (citations: 85)
12. Zhao, J.; Nanjo, T.; de Lucca Jr.. E.C.; White, M.C. "Chemoselective Methylene Oxidation in Aromatic Molecules." *Nature Chemistry* **2019**, *11*, 213. (citations: 90)
    - For a highlight see: Nina Notman "New Tools Direct Reactions at Specific C—H Bonds in Organic Molecules", Chemistry World 2019 published by the Royal Chemical Society.
    - For a highlight see: "Behind the Paper" in Nature Chemistry Community blog.
    - For News article see: Lois Yoksoulian, "Researchers Diversify Drug Development Options with New Metal Catalyst", *UIUC* News Bureau, Phys.org, EurekAlert by AAAS, Mindzilla, Bioengineer, DailyScience, Technology.org, Science Daily.
13. Chambers, R.K.; Zhao, J.; Delaney, C.P.; White, M.C. "Chemoselective Tertiary C—H Hydroxylation for Late-Stage Functionalization with Mn(PDP)/Chloroacetic Acid Catalysis." *Advanced Synthesis & Catalysis* **2020**, *362(2)*, 417-423. (citations: 25)
14. Feng, K.; Quevedo, R.E.; Kohrt, J.T.; Oderinde, M. S.; Reilly, U.; White, M.C. "Late-Stage Oxidative C(sp3)-H Methylation." *Nature* **2020**, *580*, 621-627. (citations: 140)
    - For News article see: "Manganses catalyst enables exploration of the magic methyl effect", *Nature* **2020**, *580*, 592-593.
    - For News article see: "Researchers finding ways to rapidly access the "magic methyl" effect", *UIUC* News Bureau, March 24, 2020.
    - For a News article see: Emily B. Corcoran and Danielle M. Schultz, "Medikamententwicklung mit Mangan zum 'magischen Methyleffekt'" *Spektrum* **2020**, (9), 32.
    - For a highlight see: Franziska Thomas, "Je später, desto lieber: C(sp3)-H-Hydroxylierung" Nachrichten aus der *Chemie* **2020**, 68, 72.
    - For a highlight see: Robert F. Service "Newly discovered 'magic methyl' reaction could turbocharge the potency of some drugs", *Science*, March 16, 2020.

- For a highlight see: "Late-stage oxidative C($sp^3$) – H methylation", *Nature* **2020**, *580*, 621-627.

15. Chambers, R.K.; Weaver, J.D.; Kim, J.; Hoar, J.; Krska, S.W.; White, M.C. "A preparative small. molecule mimic of liver CYP450 enzymes in the aliphatic C—H oxidation of N-heterocycles." *PNAS* **2023**, 120, 29, e2300315120, https://doi.org/10.1073/pnas.2300315120. (citations: 5)
    - For News article see: Tracy Crane, "Catalyst's ability to mimic liver enzyme could broaden scope of pharmaceutical drug discovery", Phys.org, News wise.

**Base Metal(nitrene & carbene)-Catalyzed C(sp3)—H Amination and Alkylations**

16. Paradine, S.M.; White, M.C. "Iron-Catalysed Intramolecular Allylic C—H Amination." *J. Am. Chem. Soc.* **2012**, *134*, 2036. (citations: 378)
17. Paradine, S.M.; Griffin, J.R.; Zhao, J.P.; Petronico, A.L.; Miller, S. M.; White, M.C. "A Manganese Catalyst for Highly Reactive Yet Chemoselective Intramolecular C(sp3)—H Aminations." *Nature Chemistry* **2015**, *7*, 987. (citations: 271)
    - For a highlight see: Stu Borman "Catalyst Converts Strong C—H Bonds to Amines Selectively", News of the Week *C&E News* **2015** *93(40)*, 11.
    - For a highlight see: Jake Yeston "Threading the Needle with Manganese", Editor's Choice *Science* **2015** *350*, 525.
    - For News article see: Liz Ahlberg, "Catalyst Combining Reactivity and Selectivity Could Speed Drug Development", UIUC News Bureau, Phys.org, RDMag, Globel News Connect, Technology.org, ChemEurope.com, Bionity.com.
    - Top Ten Chart, Nature Chemistry, Paper is #1
18. Griffin, J.R.; Wendell, C.I.; Garwin, J.A.; White, M.C. "Catalytic C(sp3)—H Alkylation via an Iron Carbene Intermediate." *J. Am. Chem. Soc.* **2017**, *139*, 13624. (citations: 85)
19. 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. (citations: 228)
    - For a highlight see: Stu Borman "Reaction aminates C—H bonds selectively", Synthesis Concentrate *C&E News* **2018** *96(19)*.
    - Nature Chemistry Cover, June 2018 issue.
20. Ide, T.; Feng, K.; Dixon, C.F.; Teng, D.; Clark, J. R.; Han, W.; Wendell, C.; Koch, V.; White, M.C. "Late-Stage Intermolecular Allylic C—H Amination." *J. Am. Chem. Soc.* **2021**, 143, 14969-14975. (citations: 26)

**Palladium-Catalyzed C—H Oxidations, Aminations, Alkylations, and Desaturations**

21. Chen, M.S.; White, M.C. "A Sulfoxide-Promoted, Catalytic Method for the Regioselective Synthesis of Allylic Acetates from Monosubstituted Olefins *via* C-H Oxidation." *J. Am. Chem. Soc.* **2004**, *126*, 1346-1347. (citations: 539)
22. Chen, M.S.; Prabagaran, N.; Labenz, N.; White, M.C. "Serial Ligand Catalysis: A Highly Selective Allylic C-H Oxidation." *J. Am. Chem. Soc.* **2005**, *127*, 6970-6971. (citations: 459)
    - For a highlight see: Science and Technology Concentrate "Catalysis with Serial Ligands." *Chem. & Eng. News* **2005**, *83* (18), 31.
23. Fraunhoffer, K.J.; Prabagaran, N.; Sirios, L.E.; White, M.C. "Macrolactonization via Hydrocarbon Oxidation." *J. Am. Chem. Soc.* **2006**, *128*, 9032-9033. (citations: 233)
24. Fraunhoffer, K.J.; White, M.C. "*syn*-1,2-Amino Alcohols via Diastereoselective Allylic C—H Amination." *J. Am. Chem. Soc.* **2007**, *129*, 7274-7276. (citations: 346)
    - For a highlight see: News of the Week, Stu Borman, "Amination Advance: New Reaction is First to Catalytically Convert Allylic C-H to C-N." *Chem. Eng. News*, **2007**, *85* (23), 7.

- This paper has been included among "Highlights of 2007" in *Chem. & Eng. News* **2007**, *85*(52), 17-18.
- This article is the most-accessed web article in *J. Am. Chem. Soc.* in April-June **2007**.

25. Reed, S.A.; White, M.C. "Catalytic Intermolecular Linear Allylic C—H Amination *via* Heterobimetallic Catalysis." *J. Am. Chem. Soc.,* **2008**, *130*, 3316. (citations: 335)
    - For commentary see: Science and Technology Concentrate "Revised Amination Skips Olefin Tether." *Chem. & Eng. News* **2008**, *86* (11), 42.
    - For a highlight see: Yamamoto, H.; Naodovic, N. "Heterobimetallic Catalyst for Intermolecular C—H Amination". *Synfacts*, **2008**, 603.
    - For a highlight see: "Allylic Amination by C—H Activation." *Nachrichten aus der Chemie*, **2008**, *5*, 508.
26. Covell, D.C.; White, M.C. "A Chiral Lewis Acid Strategy for Enantioselective Allylic C—H Oxidation." *Angew. Chem., Int. Ed. Engl.* **2008**,*47*, 6448. (citations: 265)
    - For a highlight see: Lautens, M.; Aureggi, V. "Asymmetric Allylic C—H Oxidation of Terminal Olefins". *Synfacts*, **2008**, 1059.
27. Young, A.Y.; White, M.C. "Catalytic Intermolecular Allylic C—H Alkylation." *J. Am. Chem. Soc.* **2008**, *130*, 14090. (citations: 272)
    - For a highlight see: Science and Technology Concentrate "Direct Allylic C—H Alkylation Solved." *Chem. & Eng. News* **2008**, *86* (41), 29.
28. Reed, S.A.; Mazzotti, A.R.; White, M.C. "A Catalytic, Bronsted Base Strategy for Intermolecula Allylic C—H Amination." *J. Am. Chem. Soc*. **2009**, *131*, 11701. (citations: 203)
29. Rice, G.T.; White, M.C. "Allylic C—H Amination for the Preparation of 1,3-Amino Alcohol Motifs." *J. Am. Chem. Soc*. **2009,** *131,* 11707. (citations: 240)
30. Qi, X.; Rice, G.T.; Lall, M.S.; Plummer, M.S.; White, M.C. "Diversification of a β-lactam pharmacophore via allylic C—H amination: accelerating effect of Lewis acid co-catalyst." *Tetrahedron*: *Symposium In Print Special Issue for Brian Stoltz*, **2010**, *66*, 4816. (citations: 75)
    - For a highlight see: Knochel, P.; Thaler, T. "Accelerating Effect of Lewis Acid Co-Catalyst on C—H Amination". *Synfacts*, **2010**, 1050.
31. Vermeulen, N.A.; Delcamp, J.H.; White, M.C. "Synthesis of Complex Allylic Esters via C—H Oxidation vs C—C Bond Formation." *J. Am. Chem. Soc*. **2010**, *132*, 11323. (citations: 107)
32. Young, A.J.; White, M.C. "Allylic C—H Alkylation of Unactivated α-Olefins: Serial Ligand Catalysis Resumed." *Angew. Chem., Int. Ed. Engl* **2011**, *50*, 6824. (citations: 125)
33. Gormisky, P.E.; White, M.C. "Synthetic Versatility in C—H Oxidation: A Rapid Approach to Differentiated Diols and Pyrans from Simple Olefins." *J. Am. Chem. Soc.* **2011**, *133*, 12584. (citations: 118)
    - For a highlight see: Lautens, M.; Zhang, L. "Palladium-Catalyzed Allylic C—H Oxidation". *Synfacts*, **2011**, *11*, 1207.
34. Stang, E.M.; White, M.C. "Molecular Complexity via C—H Activation: A Dehydrogenative Diels-Alder Reaction." *J. Am. Chem. Soc.* **2011**, *133*, 14892. (citations: 166)
    - For a highlight see: News of the Week, "Cyclization Shortcut." *Chem. & Eng. News* 2011, *89* (37), 9.
35. Jiang, C.; Covell, D.J.; Stepan, A.F.; Plummer, M.S.; White, M.C. "Sequential Allylic C—H Amination/Vinylic C—H Arylation: A Strategy for Unnatural Amino Acid Synthesis from α-Olefins." *Org. Lett.* **2012**, *14*, 1386. (citations: 77).
36. Bigi,M.A.; White, M.C. "Terminal Olefins to Linear α,β-Unsaturated Ketones: Pd(II)/Hypervalent Iodine Co-catalyzed Wacker Oxidation—Dehydrogenation." *J. Am. Chem. Soc.* **2013**, *135*, 7831. (citations: 78).

37. Strambeanu, I.S.; White, M.C. "Catalyst-Controlled C—O versus C—N Allylic Functionalization of Terminal Olefins." *J. Am. Chem. Soc.* **2013**, *135*, 12032. (citations: 116).
    - For a highlight see: Lautens, M.; Le C.M. "Catalyst Controlled C—O versus C—N Functionalization of Olefins". *Synfacts*, **2013**, 9 (11), 1200.
38. Howell, J.M.; Liu, W.; Young, A.J.; White, M.C. "General Allylic C—H Alkylation with Tertiary Nucleophiles." *J. Am. Chem. Soc.* **2014**, *136*, 5750. (citations: 98)
39. Amman, S. E; Rice, G.T.; White, M.C. "Terminal Olefins to Chromans, Isochromans, and Pyrans via Allylic C—H Oxidation." *J. Am. Chem. Soc.* **2014**, *136*, 10834. (citations: 118)
    - For a highlight see: Science & Technology Concentrates, Stu Borman: "Allylic C—H Oxidation Yields Cyclic Ethers" *Chem. & Eng. News* **2014**, *92* (28), 31.
40. Osberger, T.J.; White, M.C. "N-Boc Amines to Oxazolidonones via Pd(II)/Bis-Sulfoxide/Brønsted Acid Co-Catalyzed Allylic C—H Oxidation." *J. Am. Chem. Soc.* **2014**, *136*, 11176. (citations: 100)
41. Patillo, C.C.; Strambeanu, I.I.; Callaja, P.; Vermeulen, N.A.; Mizuno, T.; White, MC. "Aerobic Linear Allylic C—H Amination: Overcoming Benzoquinone Inhibition." *J. Am. Chem. Soc.* **2016**, *138*, 1265. (citations: 139)
42. Ammann, S.E.; Liu, W.; White, M.C. "Enantioselective Allylic C—H Oxidation of Terminal Olefins to Isochromans by Palladium(II)/Chiral Sulfoxide Catalysis." *Angew. Chem. Int. Ed.* **2016**,*55,* 9571. (citations: 125)
43. Ma, Rulin; White, M.C. "C—H to C—N Cross-Coupling of Sulfonamides with Olefins." *J. Am. Chem. Soc.* **2018**, *140*, 3202. (citation: 79)
44. Liu, W.; Ali, S.; Ammann, S. White, M.C. "Asymmetric Allylic C—H Alkylation via Palladium(II)/cis-ArSOX Catalysis." *J. Am. Chem. Soc.* **2018**, *140*, 10658. (citation: 78)
45. Ma, R.; Young, J.; Promontorio, R.; Dannheim, F.M.; Pattillo, C.C.; White, M.C. "Synthesis of anti-1,3 AminoAlcohol Motifs via Pd(II)/SOX Catalysis with the Capacity for Stereodivergence." *J. Am. Chem. Soc.* **2019**, 141, 9468. (citation: 30)
46. Ali, S.Z.; Budaitis, B.G.; Fontaine, D.F.A.; Pace, A.L.; Garwin, J.A.; White, M.C. "Allylic C—H Amination Cross-Coupling Furnishes Tertiary Amines by Electrophilic Metal Catalysis." *Science* **2022**, *376*, 276. (citation: 31)
    - For a highlight see: Leigh Boerner, "Quick and broad amine synthesis clears easier path to drug compounds." *Chem. Eng. News*, **2022**, *100* (14).
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50. Stang, E.M.; White, M.C. "Total Synthesis and Study of 6-deoxyerythronolide B via Late-Stage C—H Oxidation". *Nature Chemistry*, **2009**, *1*, 547. (citations: 256)
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**Oxidative Vinylic C—H Functionalizations (Heck)**

53. Delcamp, J.H.; White, M.C. "Sequential Hydrocarbon Functionalization: Allylic C—H Oxidation/Vinylic C—H Arylation." *J. Am. Chem. Soc.* **2006**, *128*, 15076-15077. (citations: 215)
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55. Delcamp, J.H.; Gormisky, P.E.; White, M.C. "Oxidative Heck Vinylation for the Synthesis of Complex Dienes and Polyenes." *J. Am. Chem. Soc*. **2013**, 135, 8460. (citations: 75)

**Perspectives on C—H Oxidation**

56. White, M.C. "Adding Aliphatic C—H Bond Oxidations to Synthesis." *Science* **2012**, *335*, 807. (citations: 666).
57. White, M.C. "C—H Bond Functionalization & Synthesis in the 21st Century: A Brief History and Prospectus." *SYNLETT* (Special Cluster on C—H Oxidation) **2012**, *23*, 2746 (citations: 99).
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59. White, M. C. "Base-Metal Catalysis: Embrace the Wild Side." *Adv. Synth. Catal., **2016**, 358,* 2364. (citations: 21)
60. White, M.C.; Zhao, J.P. "Aliphatic C—H Oxidations for Late-Stage Functionalization." *J. Am. Chem. Soc.* **2018**, *140*, 13988. Highlighted "Spotlights on Recent *JACS* Publications" in *J. Am. Chem. Soc.* **2018,** *140,* 12657 (citations: 347).
61. White, M.C. Reaction to New article on Selective C—H Functionalization, C&E News, March 20, 2021, Volume 99, issue 10.

**Patents**

1. White, M.C.; Chen, M.S. "Selective Aliphatic C—H Oxidation Using Metal Tetradentate Ligand Catalyst." U.S. Patent, **2010**, US 7,829,342 B2.
2. White, M.C.; Paradine, S.M.; Griffin, J.R.; Zhao, J.P.; Petronico, A.L. "General Catalyst for C—H Functionalization". US Patent, September 26, **2017** No. 9,770,711.
3. White, M.C.; Ammann, S.E.; Liu, W.; Ma, R. "Sulfoxide Ligand Metal Catalyzed Oxidation of Olefins". US Patent Application, May 24, **2017** No. 15/604,377. U.S. Patent **2019**, US 10266503 B1.
4. White, M.C.; Gormisky, P.E. "Catalyst-Controlled Aliphatic C—H Oxidations". U.S. Patent **2018**, US 9,925,528.
5. White, M.C.; Clark, J.; Feng, K. "Manganese-Catalyzed Benzylic C—H Amination for Late-Stage Functionalization". U.S. Patent **2020**, US 10,611, 786 B2.
6. White, M.C.; Zhao, J. "Chemoselective Methylene Hydroxylation in Aromatic Molecules." U.S. Patent no. 10,961,266.

**Postdoctoral Publication (NIH Predoctoral Fellow)**

62. White, M.C.; Doyle, A.G.; Jacobsen, E.N. "A Synthetically Useful, Self-Assembling MMO Mimic System for Catalytic Alkene Epoxidation with Aqueous $H_2O_2$." *J. Am. Chem. Soc.* **2001**, *123*, 7194-7195. (citations: 540)
    - For a highlight see: "News of the Week" *Chem. & Eng. News*, **2001**, *79*, 9.
    - This paper has been included among "Highlights of 2001" in *Chem. & Eng. News Highlights* **2001**, *79*, 51.

**Predoctoral Publications and Patent (ACS Medicinal Chemistry Fellow)**

63. White, M.C.; Burke, M.D.; Peleg, S.; Brem, H.; Posner, G.H. "Conformationally Restricted Hybrid Analogues of the Hormone 1 α ,25-Dihydroxyvitamin $D_3$: Design, Synthesis, and Biological Evaluation." *Bioorg. Med. Chem.* **2001**, *9*, 1691-1699. (citations: 13)
64. Posner, G.H.; Lee, J.K.; White, M.C., Hutchings, R.H.; Dai, H., Dolan, P.; Kensler, T.W. "Antiproliferative Hybrid Analogs of the Hormone 1 α ,25-Dihydroxyvitamin $D_3$: Design, Synthesis, and Preliminary Biological Evaluation." *J. Org. Chem.* **1997,** *62*, 3299-3314. (citations: 108)
65. Boyan, B.D.; Posner, G.H.; Greising, D.M.; White, M.C.; Sylvia, V.L.; Dean, D.D.; Schwartz, Z. "Structural Analogues of 1,25-$(OH)_2D_3$ Regulate Chondrocyte Proliferation and Proteoglycan Production as well as Protein Kinase C through a Nongenomic Pathway." *J. of Cellular Biochemistry* **1997**, *66,* 1-14. (citations: 35)
66. Peleg, S.; Lui, Y.-Y.; Reddy, S.; Horst, R.L.; White, M.C.; Posner, G.H. "A 20-Epi Side Chain Restores Growth-regulatory and Transcriptional Activities of an A Ring-Modified Hybrid Analog of 1α,25-dihydroxyvitamin $D_3$ Without Increasing its Affinity to the Vitamin D Receptor." *J. of Cellular Biochemistry*, **1996**, *63*, 149. (citations: 48)
67. Posner, G.H.; Li, Z.; White, M.C., Vinader, V.; Takeuchi, K.; Guggino, S.E.; Dolan, P.; Kensler, T.W. "1 α ,25-Dihydroxyvitamin D3 Analogs Featuring Aromatic and Heteroaromatic Rings: Design, Synthesis, and Preliminary Biological Testing." *J. Med. Chem.* **1995**, *38*, 4529-4537. (citations: 40)
68. Posner, G.H.; White, M.C.; Dolan, P.; Kensler, T.W.; Yukihiro, S.; Guggino, S.E. "1 α,25-Dihydroxyvitamin $D_3$ Hybrid Analogs with Structural Changes at Both the A-Ring and the C,D-Ring Side-chain." *Bioorg. Med. Chem. Lett.* **1994**, *4*, 2919-2924. (citations: 28)
    - For a Highlight see: ACS Meeting Brief in *Chem. & Eng. News* **2001**, *78*, 29.
69. White, M.C.; Anfinsen, C.B. "Biodegradation of Mustard Gas Hydrolysis Product, Thiodiglycol, By Cells and their Sonocates of the Hyperthermophilic Bacterium *Pyrococcus Furiosus.*" *Proceedings of the 1992 ERDEC Scientific Conference on Chemical Defense Research*, **1993**, 455. (citations: 4)

**Patents**

1. Posner, G.H.; White, M.C. "Vitamin $D_3$ Analogues." *U.S. Patent. No. 849-716*, **1995**, 24 pp.

***Previous Graduate Students and Postdoctoral Fellows*** (pub. # = publications they co-authored)

1. Brenna Budaitis 2024: Currrent position: AbbVie Pahrmaceuticals, Chicago, IL, Pub. # 46
2. Sven Kaster 2024: Current position: Postdoctoral Fellow, MacMillan Labs, Princeton University, Princeton , NJ. Pub # 47
3. Rachel Chambers 2023: Current position: Lilly Indianapolis, IN, Pub #15.
4. Raundi E. Quevedo 2022; Current position: Novartis Boston, MA Pub. # 17.
5. Siraj Ali PhD 2021; MIT, Postdoctoral Position, Radosevich Labs, M.I.T. Boston, MA. Pub. #42, #46

6. Kaibo Feng PhD 2020; Nanjing University, Current Position: Postdoctoral Fellow, Buchwald Labs, M.I.T. Boston, MA. Pub. #10, #14, #17
7. Jinpeng Zhao PhD 2019; Nankai University, Current Position: Corteva, Indianapolis, IN. Pub. #9, #15, #54
8. Rulin Ma PhD 2019; Fusan University, Current Position: BMS Boston, MA. Pub. #38, #40
9. Wei Liu PhD 2018; Hong Kong Babtist University, Postdoctoral Fellow, MacMillan labs, Princeton University, Princeton, NJ. Current Position: Janssen Pharmaceuticals, Springhouse, PA. Pub. #33, #37, #39
10. Stephen Ammann PhD 2017; Predoctoral Awards: NSF Fellow 2013; College of William and Mary; Current Position: Senior Research Scientits: Gilead. Pub. #34, #37, #39
11. Jennifer Griffin PhD 2017; Predoctoral Awards: NSF Fellow 2012, Springborn Fellow 2012; Occidental College; BMS, Current Position: Senior Scientist Neomorph, San Diego.. Pub. #9, #13
12. Thomas Osberger PhD 2016; Predoctoral Awards: Springborn Fellow, Reaxys PhD Prize Finalist; Postdoctoral Fellow: Spring Labs, Cambridge University, UK; Current Position: Assistant Prof. Cal Poly Pomona, Fall 2019. Pub. #11, #35
13. Shauna Paradine PhD 2015; Predoctoral Awards: NSF Fellow; NIH Postdoctoral Fellow, Jacobsen Labs, Harvard University; Current Position: Assistant Prof. University of Rochester, Fall 2018. Pub. #5, #9
14. Iulia Strambeanu PhD 2014; After Graduation: Process Chemistry, GlaxoSmithKline (GSK); Current Position: Discovery Chemistry, Janssen Pharmaceuticals. Pub. #32, #36
15. Marinus Bigi PhD 2013; Predoctoral Awards: Illinois Distingushed Fellow; Current Position: Process Development Scientist, Dow Chemical. Pub. #4, #6, #7, #31
16. Paul Gormisky PhD 2013; Predoctoral Awards: NSF Fellow, Synthetic Organic Fellow; Reaxys PhD Prize Finalist; After Graduation: Research Investigator, Discovery Chemistry, Novartis; BMS, Boston, Group Leader; Current Position: Senior Director Odyssey Therapeutics, Boston Pub. #8, #28, #48
17. Andrew Young PhD 2012; Predoctoral Awards: Abbott Fellow, Sigma-Aldrich Innovation Award; Current Position: Associate Chemist, Catalysis Discovery, Dow Chemical. Pub. #22, #27, #33, #40
18. Sean Reed PhD 2012, Predoctoral Awards: Fuson Fellow, Beck Fellow, Ullyot Fellow; After Graduation: NIH Postdoctoral Fellow Schultz Labs, Scripps; Current Position: Patent Agent at Wilson Sonsini Goodrich & Rosati. Pub. #4, #6, #20, #23
19. Grant Rice PhD 2012; Duke Law School, Current Position: Fish & Richardson, Boston, MA Pub. #24, #25, #34
20. Nicolaas Vermeulen PhD 2011; Predoctoral Awards: Pfizer Graduate Fellow; After Graduation: Postdoctoral Position: Stoddart Group Northwestern University; Corteva; Current Position: Lead Chemist, NuMat Technologies, Indianapolis, IN. Pub. #2, #26, #36, #42
21. Dustin Covell, PhD 2011, Predoctoral Awards: Marvel Fellow, Roger Adams Fellow, Fuson Graduate Fellow; After Graduation: Postdoctoral fellow: Lee Labs University of Pennsylvania; Current Position: Assistant Professor St John's University, New York City. Pub. #21, #30, #42, #45
22. Erik Stang PhD 2011; Predoctoral Awards: Roche Excellence in Chemistry Award, BMS Fellow; After Graduation: Discovery Investigator I, Bristol-Myers Squibb (BMS); Current Position: Patent Agent, Oblon Pub. #26, #43, #44
23. Jared Delcamp, PhD 2010, Predoctoral Awards: ACS Organic Division Fellow, Pytosh Fellow; After Graduation: NSF Postdoctoral Fellow, Graetzel Labs, Ecole Polytechnique Federale of Lausanne, Switzerland; Current Position: Associate Professor, University of Mississippi. Pub. #26, #46, #47, #48
24. Mark Chen, PhD 2009, Predoctoral Awards: Roche Excellence in Chemistry Award, BMS Fellow; After Graduation: Dreyfus Postdoctoral Fellow, Frechet labs, Berkeley; Current Position: Assistant Professor, Lehigh University. Pub. #1, #2, #3, #16, #17
25. Ken Fraunhoffer PhD 2007; Predoctoral Awards: Lilly Fellow; Current Position: Senior Research Investigator II, Bristol-Myers Squibb (BMS). Pub. #18, #19, #41
26. Dr. Takafumi Ide, Postdoctoral Fellow 2020; Current Position: Chugai Pharmaceuticals, Japan. Pub. #
27. Dr. Rossella Promontorio, Postdoctoral Fellow 2018; Current Position: Pfizer Pharmaceuticals

Singapore. Pub. # 42

28. Dr. Joseph Clark, NIH Postdoctoral Fellow. 2017; Current Position: Assistant Prof. Marquette University, Fall 2018. Pub. #10, #14
29. Dr. Emilio C. de Lucca Jr, Conselho Nacional de Desenvolvimento Científico e Tecnológico Postdoctoral Fellow 2017; Current Position: Assistant Professor, University of Campinas, Brazil, 2018. Pub. #12, #15
30. Dr. Takeshi Nanjo, Uehara Memorial Foundation Postdoctoral Fellow 2017; Assistant Prof. Kyoto University, Takemoto lab. Pub. #12, #15
31. Dr. Jennifer Howell, Postdoctoral Fellow 2015; Current Position: Senior Director, Synthetic Molecule Design and Development, Eli-Lilly. Pub. #10, #33
32. Dr. Don Rogness, Postdoctoral Fellow 2013; After Graduation: Research Scientist III, Archer Daniels Midland; Current Position: Drug Discovery, Vividion Therapeutics. Pub. #11
33. Dr. Tobias Thaler, DAAD Postdoctoral Fellow 2012; Current Position: Laboratory Head, Process Chemistry, Bayer, Germany.
34. Dr. Chao Jiang, Postdoctoral Fellow 2012; Current Postion: Associate Professor, Nanjing University of Science and Technology, Nanjing, China. Pub. #30
35. Dr. Prabagaran Narayanasamy, Postdoctoral Fellow 2005; After Graduation: Assistant Professor, University of Nebraska Medical Center, Department of Pathology and Microbiology; Current Position: President and CEO, Pvitalz. Pub. #17, #18

**Previous Undergraduate** (pub. # = publications they co-authored)

1. Andrew Yu, 2024, Current Position: Chemistry graduate student, Harvard University, Cambridge, MA.
2. William Lyon, 2021, Goldwater Fellow BS UIUC, NSF Fellow, Current Position: Graduate Student, MacMillan labs, Princeton University, Princeton, NJ.
3. Andria Pace, 2020, BS UIUC, Current Position: Graduate student, MacMillan labs, Princeton University, Princeton, NJ. Pub. # 45
4. Jacob Garwin, 2015-2018. BS UIUC, University of Illinois, IL. Current Position: Computer Science and Economics at UIUC. Pub. #13, 45
5. Friederik Dannheim, 2016, Univ. Sheffield, Graduate Student at Cambridge University, United Kingdom. Current Position: AstraZeneca, UK, Pub. # 44
6. Shannon Miller, 2015, BS UIUC, PhD Harvard University, Cambridge, MA; Current Position: Scripps Pub. #9
7. Matthew Kolaczkowski, 2012, BS UIUC, Graduate Student at University of California, Berkeley, Current Position: Senior research scientist, Coreshell Technologies.
8. Jeffrey Sayler, 2010, BS UIUC , Graduate Student at University of Chicago, Current position: Contamination control engineer, LASP.
9. Anthony Mazzotti, 2010, BS UIUC, PhD Harvard University, Current Position: Senior Scientist, PTC Therapeutics. Pub. #22
10. Alexandra Brucks, 2008, BS UIUC, PhD Columbia University, Current Position: Pfizer. Pub. #45
11. Daniel Bachovchin, 2004, BS Harvard University, PhD Scripps, Current Position: Associate Professor, Memorial Sloan Kettering. Pub. #39
12. Lauren Sirios, 2004, BS Harvard University, PhD Stanford University, Current Position: Principle Scientist, Genetech. Pub. #17
13. Nathan Labenz, 2004, BS Harvard University, Current Position: Founder Waymark, Pub. # 21

**Previous Visiting Scholars** (pub. # = publications they co-authored)

1. Dr. Jinho Kim, 2022, Fulbright Fellow, Associate Prof. Incheon National University, Korea.
2. Dr. Wei Han, 2019-2020, Professor of Chemistry Nanjing Normal University, China. Pub. # 19

3. Dr. Dawei Teng, 2019-2020, Professor of Chemistry Qingdao Univ. Science and Technology, China. Pub. # 19
4. Dr. Lei Zhu, 2018-2019, Distinguished Professor of Chemistry Hubei Engineering University
5. Pilar Calleja Ramos, 2015, Graduate student at ICIQ Terragona, Spain. Current position: Associate editor *Angewandte Chemie*, Pub. #40
6. Vanessa Koch, 2017, Graduate student at Karlsruhe Institute of Technology, Karlsruhe. Germany. Current Position: Wacker Chemie. Publication # 19.

## *Invited Lectures* (274 Lectures in USA, Canada, South America, Europe, and Asia)