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Appointments

Department of Chemistry
University of Illinois, Urbana-Champaign
Assistant Professor: July 2005 to 2008
Associate Professor: August 2009-2011
Professor: July 2011-present
Lycan Professor of Chemistry: August 2019

Dept. of Chemistry & Chemical Biology
Harvard University, Cambridge
Assistant Professor: August 2002 to July 2005

Education

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

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

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

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

Awards

ACS Award for Creative Work in Synthetic Organic Chemistry (2019), 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), American Association for the Advancement of Science Fellow (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 at Johns Hopkins University working with Christian Anfinsen on thermophilic bacteria protein folding, she received her Ph. D. degree in chemistry initiating the area of hybrid Vitamin D3 analogues 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 where she discovered the first preparative non-heme iron catalyst for epoxidations. Christina started her independent career at Harvard University in 2002 and 2005 she moved to the University of Illinois at Urbana-Champaign where is currently the Lycan Professor of Chemistry. The White group aims to study and develop selective, catalytic, sustainable C—H oxidation reactions for broad use in organic synthesis that do not require use of directing groups. They have contributed novel palladium/sulfoxide, iron and manganese PDP, and manganese phthalocyanine catalysts that are now commercially available (Aldrich,Strem, TCI). These catalysts are used academically and industrially to functionalize all types of C(sp³)—H bonds, including aliphatics, under preparative conditions with predictable and catalyst-controlled site-selectivities in complex molecule settings. The reactions and quantitative models developed by the White group to understand and predict site-selectivities for aliphatic C—H hydroxylations have provided fundamental insights into the physical organic properties of C—H bonds that govern their differential reactivity in C—H aminations, alkylations, halogenations and azidations. Collectively, these reactions have led to strategic advances synthesis, most notably the

concept of late-stage C—H functionalization. Professor White has given over 200 lectures worldwide in North and South America, Asia, Australia, Europe, and the Middle East.

Commercial Catalysts:

- 1,2-Bis(phenylsulfanyl)ethane palladium(II) acetate; Common name: White Catalyst; Uses: Allylic C—H Functionalizations, Oxidative Heck Reactions; Commercialized by Strem Chemicals, Sigma Aldrich, TCI.
- ((2*S*,2'*S*-(–)-[*N,N*-Bis(2-pyridylmethyl)]-2,2'-bipyrrrolidinebis(acetonitrile)iron(II)hexafluoroantimonate), Fe(PDP); Common name: White-Chen Catalyst; Uses: Aliphatic C—H Hydroxylations; Commercialized by Strem Chemicals, Sigma Aldrich, American Elements.
- Manganese(III) tetra-*tert*-butyl-phthalocyanine chloride, [Mn(*t*-BuPc)]Cl; Common Name: White-Paradine Catalyst; Uses: Intramolecular C—H Aminations; Commercialized by Sigma Aldrich.
- Manganese (III) perchloro- phthalocyanine chloride, [Mn(ClPc)]Cl; Uses: Intermolecular C—H amination. Is being commercialized by Aldrich (expected product number: 901425).

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>; ChEFS Initiative by Arthur Winter at Iowa State University: <http://winter.public.iastate.edu/chefs-initiative/hidden/index.html>

Notable Publications in Sustainable Metal Catalysis

- Chen, M.S.; White, M.C. "A Predictably Selective Aliphatic C—H Oxidation Reaction for Complex Molecule Synthesis." *Science*, **2007**, *318*, 783-787. (citations: 956)
- 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: 212)
- Chen, M.S.; White, M.C. "Combined Effects on Selectivity in Fe-Catalyzed Methylene Oxidation." *Science* **2010**, *327*, 566. (citations: 530)
- 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: 147)
- Paradine, S.M.; White, M.C. "Iron-Catalysed Intramolecular Allylic C—H Amination." *J. Am. Chem. Soc.* **2012**, *134*, 2036. (citations: 240)
- 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: 91)
- 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: 122)
- 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. (citation: 23)
- 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. (citation: 19)
- Zhao, J.; Nanjo, T.; de Lucca Jr. E.C.; White, M.C. "Chemoselective Methylene Oxidation in Aromatic Molecules." *Nature Chemistry* **2019**, *11*, 213.

Notable Publications and Perspectives in Late-Stage Functionalization

- Fraunhofer, K. J.; Bachovchin, D.A.; White, M.C. "Hydrocarbon Oxidation vs. C-C Bond Forming Approaches for Efficient Syntheses of Oxygenated Molecules." *Org. Lett.* **2005**, *7*, 223-226. (citations: 102)
- 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: 181)
- White, M.C. "Adding Aliphatic C—H Bond Oxidations to Synthesis." *Science* **2012**, *335*, 807. (citations: 476).
- White, M.C.; Zhao, J.P. "Aliphatic C—H Oxidations for Late-Stage Functionalization." *J. Am. Chem. Soc.* **2018**, *140*, 13988 (citations: 12). Highlighted "Spotlights on Recent *JACS* Publications" in *J. Am. Chem. Soc.* **2018**, *140*, 12657.

Notable Publications in C—H Cross-Couplings

- Ma, Rulin; White, M.C. "C—H to C—N Cross-Coupling of Sulfonamides with Olefins." *J. Am. Chem. Soc.* **2018**, *140*, 3202. (citation: 13)

Total Publications & Patents: 60 publications, 5 patents

Independent Publications & Patents: 53 publications, 4 patents; Primary papers with >200 citations = 10