Jeffery A. Byers

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Education

2001-2007 Doctor of Philosophy, Chemistry
California Institute of Technology, Pasadena, CA
Thesis Title: "Synthetic and mechanistic studies into the kinetic resolution of α-olefins using C_1- and C_2- symmetric zirconocene polymerization catalysts"
Advisor: Prof. John E. Bercaw

1996-2000 Bachelors of Arts in Chemistry, minor in English (Summa Cum Laude)
Washington University in St. Louis

Research Experience

2017-present Associate Professor of Chemistry
Boston College

2011-2017 Assistant Professor of Chemistry
Boston College

Fundamental and applied organometallic chemistry with applications that vary from catalytic applications relevant to the pharmaceutical industry to catalyst development for the production of useful and green polymer materials to catalytic applications relevant to renewable energy (currently mentoring 8 graduate students and 1 undergraduate student)

2007-2011 Postdoctoral Fellow
Massachusetts Institute of Technology
with Prof. Timothy F. Jamison

Carried out mechanistic studies into the epoxide opening cascade reactions directed towards the synthesis of ladder polyether natural products. Developed novel nickel-catalyzed reductive coupling between alkynes and epoxides for the construction of homoallylic epoxides.

2001-2007 Graduate Research
California Institute of Technology
with Prof. John E. Bercaw

Probed the origin of stereocontrol during the kinetic resolution of racemic α-olefins by polymerization catalyzed by C_1-symmetric zirconocenes. Synthesized enantiopure C_2-symmetric zirconocenes and applied them towards the kinetic resolution of racemic α-olefins by polymerization.

2000-2001 Research Scientist
Stereotaxis Inc.
www.stereotaxis.com

Designed a magnetic embolic intended for the intravenous treatment of brain aneurysms.

1998-2000 Undergraduate Research
Washington University in St. Louis
with Prof

of scientists (FL2018 (joint with Prof. Matthias Waegele), FL2019 (joint with Prof. Marc Snapper), FL2020).

2001-2006 California Institute of Technology

Served as teaching assistant for undergraduate courses in General Chemistry (twice) and General Chemistry Laboratory (three times) as well as graduate level courses in Organometallic Chemistry (three times) and Inorganic Chemistry (twice). Designed problem sets and exams and lectured while serving as the head teaching assistant for both Inorganic Chemistry and Organometallic Chemistry

Fall 1999 Washington University in St. Louis

Served as teaching assistant for Organic Chemistry Lab, a course for undergraduates.

Honors, Appointments, and Professional Societies

Member of Sigma Xi Scientific Research Honor Society	2019-present
Invited to Journal of Physical Chemistry Young Scientist Special Issue	2018
American Chemical Society PMSE Young Investigator Award	2017
Research Corporation Cottrell Scholar	2015
National Science Foundation CAREER award	2015
Invited to Chemical Communications Emerging Investigator Issue	2015
Invited to Dalton Transactions Young American Talent Issue	2015
Invited to Inorganic Chemistry Frontiers Emerging Investigator Issue	2015
Invited to Journal of Coordination Chemistry Emerging Leaders Issue	2015
Vice-Chair Organometallics Gordon Research Seminar	2012
Member of the American Chemical Society	2000-present
Member of the Phi Beta Kappa National Honors Society	2000
Member of the Golden Key National Honors Society	2000
Recipient of Sigma Xi Research Fellowship	1999
Pfizer Summer Undergraduate Research Fellowship	1998
Waldo Semon Undergraduate Research Award	1998
Lunar Planetary Institute Intern	1998
Recipient of a Target National Scholarship	1996
Recipient of a White Sands Missile Range Community Scholarship	1996
Recipient of a Society of American Military Engineers Scholarship	1996

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2020 National Science Foundation, Center for Chemical Innovations (CHE-2023955) ÒCCI Phase I: NSF Center for Integrated Catalysis (CIC)Ó, $1,800,000 over 3 years, co-PI.

2019 Petroleum Research Fund, New Directions, American Chemical Society (59542-ND1) ÒIron-Based Catalysts for Suzuki-Miyaura Cross Coupling and C-H Functionalization ReactionsÓ, $110,000 over 2 years, PI.

2018 Department of Energy, Basic Energy Science (BES), Catalysis Science (DE-SC0019055) ÒOrganometallic Catalysis from Molecular Catalysts Non-Covalently Confined in Metal-Organic FrameworksÓ, $650,000 over 3 years, PI.

2015 Army Research Office Basic and Applied Scientific Research Grant (66672-CH (W911NF-15-1-0454)) ÒRedox-Switchable Polymerization for the Synthesis of High Performance PolymersÓ, $375,000 over 3 years (no cost extension October 2021), PI.

Competitive Grants, Secured and Completed

2018 Beckman Institute, Beckman Scholars Program (PCO), $156,000 over three years, co-PI.

36. Rayder, Thomas M.; Bensalah, Adam T.; Li, Banruo; Byers, Jeffery A.*; Tsung, Chia-Kuang* "Engineering Second Sphere Interactions in a Host-Guest Multicomponent Catalyst System for the Hydrogenation of Carbon Dioxide to Methanol" Journal of the American Chemical Society, 2021, 143, 3, 1630-1640, DOI:10.1021/jacs.0c08957

35. Tyrol, Chet C.; Yone, Nang; Gallin, Connor P.; Byers, Jeffery A.* "Synthesizing Enantiomerically Enriched 1,1-Diarylalkanes Using a Suzuki-Miyaura Reaction Catalyzed by an Iron-

15. Tamburini, Fiona; Kelly, Thomas; Weerapana, Eranthie; Byers, Jeffery A.* "Paper to Plastics: An Interdisciplinary Summer Outreach Project in Sustainability" Journal of Chemical Education, 2014, 91, 10, 1574-1579. DOI: 10.1021/ed400892t

14. Drake, Jessica L.; Manna, Cesar M.; Bo; Byers, Jeffery A.* "Enhanced Carbon Dioxide Hydrogenation Facilitated by Catalytic Quantities of Bicarbonate and Other Inorganic Salts" Organometallics, 2013, 32(23), 6891-6894, DOI: 10.1021/om401057p

13. Biernesser, Ashley B.; Li, Bo; Byers, Jeffery A.* "The redox-controllable polymerization of lactide catalyzed by bis(imino)pyridine iron alkoxide complexes" Journal of the American Chemical Society, 2013, 135(44), 16553-16560, DOI: 10.1021/ja407920d

12. Byers, Jeffery A.*; Jamison, Timothy F.* "Entropic Factors Provide Unusual Reactivity and Selectivity in Water-Promoted Epoxide-Opening Reactions" Proceedings of the National Academy of Science, 2013, 110(42), 16724-16729. DOI: 10.1073/pnas.1311133110

11. Kaplan, Hilan Z.; Li, Bo; Byers, Jeffery A.* "Synthesis and Characterization of a Bis(imino)-N-heterocyclic Carbene Analogue to Bis(imino)pyridine Iron Complexes" Organometallics, 2012, 31, 7343-7350. DOI: 10.1021/om300885d.

10. Morten, Christopher J.; Byers, Jeffery A.; Jamison, Timothy F. "Evidence That Epoxide-Opening Cascades Promoted by Water Are Stepwise and Become Faster and More Selective After the First Cyclization" Journal of the American Chemical Society, 2011, 133, 6, 1902-1908. DOI: 10.1021/ja1088748.

9. Morten, Christopher J.; Byers, Jeffery A.; Van Dyke, Aaron R.; Vilotijevic, Ivan; Jamison, Timothy F. "The development of endo-selective epoxide-opening cascades in water" Chemical Society Reviews, 2009, 38, 11, 3175-3192. DOI: 10.1039/b816697h.

8. Byers, Jeffery A.; Jamison, Timothy, F. "On the Synergism Between an sp^2 and a Tetrahydropyran Template in the Regioselective Cyclization of an Epoxy Alcohol" Journal of the American Chemical Society, 2009, 131(18), 6383-6385. DOI: 10.1021/ja9004909.

7. Min, Endy Y.-J.; Byers, Jeffery A.

2. O'Connor, Robert D.; Poliks, Barbara; Bolton, Daniel H.; Goetz, Jon; Byers, Jeffery A.; Wooley, Karen L.; Schaefer, Jacob. ÒChain Packing in Linear Phenyl Polycarbonate by $^{13}C\{^{2}H\}$ REDORÓ *Macromolecules* **2002**, 35(7), 2608-2617. DOI: 10.1021/ma010919i.

1. O'Connor, Robert D.;

86. Byers, Jeffery A.*; "Logical Catalyst Design for Improved Performance in Iron-Catalyzed Suzuki-Miyaura Cross Coupling Reactions", 24th ACS Green Chemistry and Engineering Conference, virtual conference, June 12, 2020, oral presentation.

85. Qi, Miao; Zhang, Haochuan; Dong, Qi; Li, Jingyi; Musgrave, Rebecca; Zhao, Yanyan; Dulock, Nicholas; Wang, Dunwei*; Byers, Jeffery A.*; "Using Redox-Switchable Catalysis for Surface Initiated Polymerization", Beckman New England Macromolecular Science Workshop, virtual symposia, June 9, 2020, oral presentation.

84. Byers, Jeffery A.*; Crockett, Michael P.; Wong, Alexander S.; Tyrol, Chet C; Gallin, Connor F.; Yone, Nang; "Iron-Based Catalysis for Suzuki-Miyaura Cross Coupling Reactions Involving Alkyl Electrophiles", Pfizer Pharmaceutical Inc., Groton, CT, November 20, 2019, oral presentation.

83. Byers, Jeffery A.*; Crockett, Michael P.; Wong, Alexander S.; Tyrol, Chet C; Gallin, Connor F.; Yone, Nang; "Suzuki-Miyaura Cross-Coupling Reactions with Iron-Based Complexes", Pfizer Green Chemistry Symposium, Boston College, Chestnut Hill, MA, November 2, 2019, oral presentation.

82. Byers, Jeffery A.*; "Redox-Switchable Ring-Opening Polymerization Catalysis", Carnegie Mellon University, October 23, 2019, oral presentation.

81. Byers, Jeffery A.*; "Mechanistically-Driven Development of Iron-Based Catalysts for Suzuki Miyaura Cross Coupling Reactions" 50

74.

61.

99th Canadian Chemistry Conference, Halifax, Nova Scotia, Canada, June 2016, IN 1286, oral presentation.

Curriculum Vitae

77. Byers, Jeffery A.*; Tsung, Chia-Kuang*; Li, Zhehui; Rayder, Thomas M.; Adillon, Enric

Research Conference, Newport, RI, July 11, 2016, poster presentation.

53. Byers, Jeffery A.*; Kaur, Aman; Manna, Cesar M.; Yablon, Lauren L.; Li, Bo; Haefner, Fredrick "Synthesis of Stereoregular and Cyclic Poly(lactic acid) Using a Base Catalyst" 251st ACS National Meeting, San Diego, CA, March 16, 2016, INOR-1104, oral presentation.

52. Byers, Jeffery A.; Tsung, Chia-Kuang; Li, Zhehui; Morabito, Joseph; Chou, Li-Yang "Linker exchange reaction mechanisms in MOFs and its application toward the synthesis of hybrid catalyst systems" Pacifichem 2015, Honolulu, HI; December 20, 2015, INOR-1977, oral presentation.

51. Byers, Jeffery A.; Biernesser, Ashley B.; Manna, Cesar M.; Delle Chiaie, Kayla R.; Kaur, Aman; Kehl, Jeffrey; Curley, Julia "Versatile iron-based catalysts for the control of tacticity, architecture, and composition in biodegradable polymers" Pacifichem 2015, Honolulu, HI; December 18, 2015, INOR-292, oral presentation.

50. Kehl, Jeffrey; Byers, Jeffery A.*; Manna, Cesar M.; Yablon, Lauren L. "Application of axial, sterically constrained bis(imino)pyridine iron complexes for the stereoregular polymerization of lactide, a mechanistic study" 250th ACS National Meeting, Boston, MA: August 19, 2015, INOR-764, poster presentation.

49. Mako, Teresa M.; Drake, Jessica L.; Byers, Jeffery A.* "Alkyl-aryl and alkyl-alkyl cross coupling reactions catalyzed by iron bis(imino)pyridine complexes" 250th ACS National Meeting, Boston, MA: August 17, 2015, ORGN-517, poster presentation.

48. Delle Chiaie, Kayla; Yablon, Lauren L.; Biernesser, Ashley B.; Byers, Jeffery A.* "Redoxswitchable crosslinking polymerization", 250th ACS National Meeting, Boston, MA: August 18, 2015, POLY-336, poster presentation.

47. Biernesser, Ashley B.; Delle Chiaie, Kayla; Curley, Julia; Byers, Jeffery A.* "Redox switchable block copolymerization of lactide and epoxide catalyzed by bis(imino)pyridine iron(II/III) alkoxide complexes", 250th ACS National Meeting, Boston, MA: August 18, 2015, POLY-213, oral presentation.

46. Byers, Jeffery A.*; Tsung, Chia-Kuang*; Morabito, Joseph; Li, Zhehui; Kyada, Rutvin; Nero, Maria "Mechanistic features of linker exchange in ZIF-8 and UiO-66", 250

42. Charles Wolstenholme, Kaplan, Hilan Z; Byers, Jeffery A.* ÒSynthesis of bis(amidinato) heterocycliccarbene iron complexes with increased solubility and their application as catalysts for the hydrogenation of alkenesÓ, 250th ACS National Meeting, Boston, MA: August 17, 2015, CHED-285, poster presentation.

41. Curley, Julia; Biernesser, Ashley B.; Delle Chiaie, Kayla, Byers, Jeffery A.* ÒExploiting redox switchable polymerization reactions to study electron transfer self-exchange reactionsÓ, 250th ACS National Meeting, Boston, MA: August 17, 2015, CHED-282, poster presentation.

40. Byers, Jeffery A.*; Biernesser, Ashley B.; Delle Chiaie, Kayla; Kaur, Aman; Kehl, Jeffrey A.; Manna, Cesar M.; Curley, Julia; Yablon, Lauren L.; Michalowski, Gregory; ÒVersatile Iron Catalysts for the Control of Tacticity, Architecture, and Composition of Biodegradable PolymersÓ, 38th Organometallic Chemistry Gordon Research Conference, Newport, RI, July 2, 2015, poster presentation.

39. Kaur, Aman; Manna, Cesar M.; Yablon, Lauren L.; Li, Bo; Haeffner, Fredrick; Byers, Jeffery A.* ÒControlling the Stereoregularity of Biodegradable Polymer through in situ Desymmetrization of an Achiral Iron Catalyst PrecursorÓ, Chirality Conference, Boston, MA, June 25, 2015, poster presentation.

30. Biernesser, Ashley B.; Manna, Cesar M.; Delle Chiaie, Kayla; Drake, Jessica L.;

225th ACS National Meeting, New Orleans, LA; March,

- Journal of Polymer Science, Part A
- Comments on Inorganic Chemistry
-

Duke designed to promote a more interactive classroom. This program was presented at the Cottrell Scholars conference, which resulted in further funding from Research Corporation to make the competition a nationwide competition, 2015-2019.

- Inventor of ÒSymmLabÓ, an iPad application designed to teach students about molecular symmetry, 2017.
- Presenter for family days at the American Academy for the Advancement of Science (AAAS) National Meeting, January 2013.
- Hoover School Science Fair. Served as judge and carried out scientific demonstrations illustrating principles of germane to catalysis and polymer chemistry, 2012-2014.
- Presenter at the Center for Talented Youth, Boston College, 2014.
- Participant in academic career panel at M.I.T., 2015.
- Participated in several symposia at National American Chemical Society meetings to promote STEM education, 2014-present.

Current Collaborators

Kehl (Ph. D., 2019), Zhehui Li (Ph. D. 2019, joint with Prof. Chi-Kuang Tsung), Miao Qi (Ph. D. 2020, La Mattina Fellow in Chemical Synthesis, postdoctoral scholar, Texas A&M), Thomas M. Rayder (Ph. D. 2020, joint with Prof. Chi-Kuang Tsung, postdoctoral scholar, Ohio State University), Chet Tyrol (Ph. D. 2021, La Mattina Fellow in Chemical Synthesis, Pfizer Pharmaceuticals)

Undergraduate Students (19)

current (1): Carolina Battle

past (18): Enric Adillon (B.S., Boston College 2020, Beckman Scholar, graduate student, Caltech), Kelton Beal (B.S., Boston College 2016), Gretchon Brown (B.S., Boston College 2021, graduate student, University of California at Berkeley