

David J. Michaelis

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Education

University of Wisconsin–Madison 7/2005–12/2009
Pre-doctoral studies, Organic Division, Department of Chemistry

Brigham Young University 1999–2000, 2002–2005
B.S., *cum laude*, Chemistry, GPA 3.86/4.0; Minor: Humanities

Work Experience

Assistant Professor of Chemistry April 2013–Present
Department of Chemistry and Biochemistry, Brigham Young University, Provo, UT

Research Experience

Post-doctoral assistant in organic synthesis with Prof. Barry M. Trost 2010–2013
Stanford University, Palo Alto, California
– Developed an asymmetric allylic alkylations of ester-enolate equivalents
– Completed the total synthesis of Peloruside A analogue

Research assistant in organic synthesis with Prof. Tehshik P. Yoon 2005–2009
University of Wisconsin–Madison, Madison, Wisconsin
– Developed a copper(II)-catalyzed aminohydroxylation of olefins
– Developed an asymmetric variant of the aminohydroxylation of olefins

Intern in medicinal chemistry with Dr. Thomas A. Dineen Summer 2008
Medicinal Chemistry Division, Amgen, Cambridge, Massachusetts
– Developed an aziridine-opening reaction with ortho-halophenyl lithium reagents

Research assistant in organic synthesis with Prof. Paul B. Savage 2003–2005
Brigham Young University, Provo, Utah
– Constructed a surface-bound fluorescent chemosensor selective for cadmium ions
– Developed a new method for analyzing reaction progress via ToF-SIMS analysis of TLC plates in collaboration with Prof. D. Matthew Linford

Intern in organic synthesis with Dr. Reed Izatt 2004–2005
IBC Advanced Technologies, Inc., American Fork, Utah
– Synthesized fluorescent chemosensors for selective detection of target metal ions

Research assistant in library sciences with Randall K. Ward 2002–2003
Brigham Young University, Harold B. Lee Library, Provo, Utah
– Surveyed university/college libraries about strategies to address rising costs of scientific journals

Teaching Experience

Chemistry 552: Advanced Physical Organic Chemistry. Instructor F14, F15, F16
Chemistry 352: Organic Chemistry II. Instructor Su13, W18
Chemistry 351: Organic Chemistry I. Instructor W15, W17
Chemistry 659R: Organometallic Chemistry. Instructor W14, W16, W18

Awards and Honors

NIH Kirstein NRSA Postdoctoral Fellowship 2010-2013

Reaxys PhD Prize - Runner up and attendant at EuCheMS Chemistry Congress 2010

ACS Division of Organic Chemistry (DOC) Fellowship	2008–2009
Farrington Daniels Ethical Leadership Fellowship <i>Presented for outstanding performance and leadership in the chemistry department</i>	2009
Undergraduate Research Mentor Award	2009
Charles & Martha Casey Excellence in Organic Research Award <i>Presented to one student in each division for outstanding research progress</i>	2009
Sigma-Aldrich Graduate Student Innovation Award	2008
Graduate Student–Faculty Liaison Committee Divisional Representative <i>Served as elected co-chair, 2008–2009</i>	2007–2009
National Institute of Health Pre-doctoral Fellowship <i>Chemistry–Biology Interface Training Program</i>	2006–2008
Office of Research and Creative Activities Mentoring Grant (two time recipient) <i>Competitive undergraduate research award for original research proposal</i>	2003, 2005
Garth L. Lee Undergraduate Teaching Award <i>Given in recognition of excellent instructional work as a teaching assistant in chemistry</i>	2004
Best Presentation of Session <i>17th Annual Spring Research Conference (graduate and undergraduate participants)</i>	2004
Department of Chemistry Undergraduate Research Award (three semesters)	2003–2004

Publications

Independent Publications as PI:

- 23) Mohl, G.; Liddle, N.; Nygaard, J.; Dorius, A.; Lyons, N.; Hodek, J. Weber, J.; Michaelis, D. J.; Busath, D. D. “Novel Influenza Inhibitors Designed to Target PB1 Interactions with Host Importin RanBP5.” *Submitted*.
- 22) Nazari, S. H.; Tiempos-Flores, N.; Forson, K. G.; Bourdeau, J. E.; Michaelis, D. J. “C–N Bond Formation from Allylic Alcohols Via Cooperative Nickel and Titanium Catalysis.” *J. Org. Chem.* **2018**, *83*, *accepted*.
- 21) Valdivia-Berroeta, G. A.; Heki, L. K.; McMurray, E. A.; Foote, L. A.; Nazari, H. S.; Serafin, L.; Smith, S. J.; Michaelis, D. J.; Johnson, J. A. “Alkynyl Pyridinium Crystals for THz Generation.” *Adv. Opt. Mater.* **2018**, *6*, *In Press*.
- 20) Nazari, S. H.; Bourdeau, J. E.; Talley, M. R.; Valdivia-Berroeta, G. A.; Smith, S. J.; Michaelis, D. J. “Nickel-Catalyzed Suzuki Cross Couplings with Unprotected Allylic Alcohols Enabled by Bidentate NHC/Phosphine Ligands.” *ACS Catal.* **2018**, *8*, 86–89.
- 19) Kinghorn, M. J.; Valdivia-Berroeta, G. A.; Chantry, D. R.; Smith, M. S.; Ence, C. C.; Draper, S. R. E.; Duval, J. S.; Masino, B. M.; Cahoon, S. B.; Flansburg, R. R.; Conder, C. J.; Price, J. L.; Michaelis, D. J. “Proximity-Induced Reactivity and Selectivity with a Rationally Designed Bifunctional Helical Peptide Catalyst.” *ACS Catal.* **2017**, *7*, 7704–7708.
- 18) Tyler, J. H.; Patterson, R. H.; Nazari, S. H.; Udumula, V.; Smith, S. J.; Michaelis, D. J. Synthesis of N-Aryl “Hydroxylamines via Stalled Nitro Reductions with Soluble Ruthenium Nanoparticle Catalysts.” *Tetrahedron Lett.* **2017**, *58*, 82–86.

- 17) Talley, M. R.; Stokes, R. W.; Walker, W. K.; Michaelis, D. J. "Electrophilic Activation of Alkynes for Enyne Cycloisomerization Reactions with In Situ Generated Early/Late Heterobimetallic Pt–Ti Catalysts." *Dalton Trans.* **2016**, *45*, 9770–9773.
- 16) Udumula, V.; Nazari, S. H.; Burt, S. R.; Alfindee, M. N.; Michaelis, D. J. "Chemo- and Site-Selective Alkyl and Aryl Azide Reductions with Heterogeneous Nanoparticle Catalysts." *ACS Catal.* **2016**, *6*, 4423–4427.
- 15) Udumula, V.; Tyler, J. H.; Davis, D. A.; Wang, H.; Linford, M. R.; Minson, P. S.; Michaelis, D. J. "A Dual Optimization Approach to Bimetallic Nanoparticle Catalysis: Impact of M1:M2 Ratio and Supporting Polymer Structure on Reactivity." *ACS Catal.* **2015**, *5*, 3457–3462.
- 14) Walker, W. K.; Kay, B. M.; Michaelis, S. A.; Anderson, D. L.; Smith, S. J.; Ess, D. H.; Michaelis, D. J. "Origin of Fast Catalysis in Allylic Amination Reactions Catalyzed by Pd–Ti Heterobimetallic complexes." *J. Am. Chem. Soc.* **2015**, *137*, 7371–7378.
- 13) Walker, W. K.; Anderson, D. L.; Stokes, R. W.; Smith, S. L.; Michaelis, D. J. "Allylic Aminations with Hindered Secondary Amine Nucleophiles Catalyzed by Heterobimetallic Ti–Pd Complexes." *Org. Lett.* **2015**, *17*, 752–755.

Publications from Graduate and Postdoc Career

- 12) Williamson, K. S.; Michaelis, D. J.; Yoon, T. P. "Advances in the Chemistry of Oxaziridines." *Chem. Rev.* **2014**, *114*, 8016–8036.
- 11) Trost, B. M.; Michaelis, D. J.; Malhotra, S. "Total Synthesis of (–)-18-epi-peloruside A: An Alkyne Linchpin Strategy." *Org. Lett.* **2013**, *15*, 5274–5277.
- 10) Trost, B. M.; Michaelis, D. J.; Truica, M. "Dinuclear Zinc–ProPhenol-Catalyzed Enantioselective α -Hydroxyacetate Aldol Reaction with Activated Ester Equivalents." *Org. Lett.* **2013**, *15*, 4516–4519.
- 9) Trost, B. M.; Michaelis, D. J.; Charpentier, J.; Xu, J. "Palladium-catalyzed asymmetric allylic alkylation of carboxylic acid derivatives: *N*-acyloxazolinones as ester enolate equivalents." *Angew. Chem., Int. Ed.* **2012**, *54*, 204–208.
- 8) Trost, B. M.; Lehr, K.; Michaelis, D. J.; Xu, J.; Buckl, A. K. "Palladium-catalyzed asymmetric allylic alkylation of 2-acylimidazoles as ester enolate equivalents." *J. Am. Chem. Soc.* **2010**, *132*, 8915–8917.
- 7) Michaelis, D. J.; Williamson, K. S.; Yoon, T. P. "Oxaziridine-mediated enantioselective aminohydroxylation of styrenes catalyzed by copper(II) bis(oxazoline) complexes." *Tetrahedron* **2009**, *65*, 5118–5124, invited symposium in print. PMID: 20161136 [PubMed]
- 6) Michaelis, D. J.; Dineen, T. "Ring-opening of aziridines with *o*-halophenyllithium reagents: synthesis of 2-substituted chiral indolines." *Tetrahedron Lett.* **2009**, *50*, 1920–1923.
- 5) Michaelis, D. J.; Ischay, M. A.; Yoon, T. P. "Activation of *N*-sulfonyl oxaziridines using copper(II) catalysts: aminohydroxylations of styrenes and 1,3-dienes." *J. Am. Chem. Soc.* **2008**, *130*, 6610–6615.
- 4) Michaelis, D. J.; Shaffer, C. J.; Yoon, T. P. "Copper(II)-catalyzed aminohydroxylation of olefins." *J. Am. Chem. Soc.* **2007**, *129*, 1866–1867.

- 3) Parent, A. A.; Anderson, T. M.; Michaelis, D. J.; Jiang, G.; Savage, P. B.; Linford, M. R. "Direct ToF-SIMS analysis of organic halides and amines on TLC plates." *Applied Surface Science* **2006**, 252, 6746–6749.
- 2) Bronson, R. T.; Michaelis, D. J.; Lamb, R. D.; Husseini, G. A.; Farnsworth, P. B.; Linford, M. R.; Izatt, R. M.; Bradshaw, J. S.; Savage, P. B. "Construction of a surface bound metal ion sensor for Cadmium." *Org. Lett.* **2005**, 7, 1105–1108.
- 1) Ward, R. K.; Michaelis, D. J.; Murdoch, R.; Roberts, B.; Blixrud. "Widespread academic efforts address the scholarly communication crisis." *J. C&RL News* **2003**, 64(4), 382–383.

Provisional Patents Filed:

Title: Amino acid ester and salt for improving metabolic, cognitive, and muscle function. Benjamin Bikman, David Michaelis, David Thompson. June, 2018

Title: The use of medium-chain fatty acid or amino acid ester to improve physical and cognitive health. Benjamin Bikman, David Michaelis, David Thompson. May, 2018.

Title: Novel Influenza Chemotherapeutics: Nuclear Import Inhibitors of the Influenza Polymerase. David Busath, David Michaelis, Gregory Mohl. March, 2017.

Invited Conference Presentations

- 6) "Proximity-Induced Reactivity and Selectivity with a Rationally Designed Bifunctional Helical Peptide Catalyst." Michael J. Kinghorn, Gabriel A. Valdivia Berroeta, Donalee R. Chantry, Steven R. E. Draper, Jared S. Duval, Bryan M. Masino, Samuel B. Cahoon, Rachael R. Flansburg, Cory J. Conder, Mason S. Smith, Joshua L. Price, and David J. Michaelis Short talk and poster, Gordon Research Conference, Natural Products and Bioactive Compounds, Andover, NH, August 2017.
- 5) "A Rationally Designed Diels-Alder Peptide Catalyst that Displays Proximity-Induced Reactivity and Selectivity." Michael J. Kinghorn, Gabriel A. Valdivia Berroeta, Donalee R. Chantry, Steven R. E. Draper, Jared S. Duval, Bryan M. Masino, Samuel B. Cahoon, Rachael R. Flansburg, Cory J. Conder, Mason S. Smith, Joshua L. Price, and David J. Michaelis Poster presentation, Gordon Research Conference, Stereochemistry, Newport, RI, August 2016.
- 4) "A Rationally Designed Diels-Alder Peptide Catalyst that Displays Proximity-Induced Reactivity and Selectivity." Michael J. Kinghorn, Gabriel A. Valdivia Berroeta, Donalee R. Chantry, Steven R. E. Draper, Jared S. Duval, Bryan M. Masino, Samuel B. Cahoon, Rachael R. Flansburg, Cory J. Conder, Mason S. Smith, Joshua L. Price,* and David J. Michaelis. Poster presentation, Gordon Research Conference, Organic Reactions and Processes, North Easton, MA, July 2016.
- 3) "Heterocycle Synthesis with Ti–M Heterobimetallic Catalysts." Whitney K. Walker, Ryjul W. Stokes, Michael Talley, Diana Anderson, Benjamin Kay, Stacey J. Smith, Daniel H. Ess, David J. Michaelis. Invited talk and poster presentation, Gordon Research Conference, Heterocyclic Compounds, Newport, RI, June 2016.
- 2) "Heterobimetallic M–Ti Complexes as Catalysts for Electrophilic Transition Metal Catalysis." Walker, W. K.; Kay, B.; Andersen, D.; Talley, M.; Stokes, R. W.; Smith, S. J.; Ess, D. H.; Michaelis, D. J. Poster presentation, Gordon Research Conference, Organometallic Chemistry, Newport, RI, July 2015.

- 1) Invited short talk: "Early/Late Heterobimetallic Complexes for Enhanced Electrophilic Catalysts and Enantioselective Synthesis." Walker, W. K.; Stokes, R. W.; Smith, S. J.; Michaelis, D. J. and poster presentation of same title, Gordon Research Conference, Stereochemistry, Newport, RI, July 2014.

Invited Seminars:

University of Wisconsin (9/17), University of Minnesota (9/17), University of Michigan (10/17), Michigan State (10/17), Central Michigan (10/17), University of Illinois at Urbana Champaign (10/17), University of Illinois at Chicago (10/17), Abbvie (10/17), Caltech (10/17), UC Irvine (10/17), UC Santa Barbara (10/17), Princeton (11/17), University of Pennsylvania (11/17), Columbia (11/17), Stanford (11/17), Gilead (11/17), Scripps Research Institute (12/17), UC San Diego (12/17), University of Hawaii (12/17), Northwestern (1/18), University of Chicago (1/18), Temple University (2/18), University of Delaware (2/18), University of Houston (2/18), Rice University (2/18), University of Texas at Austin (2/18), University of Utah (11/18), Northern Arizona University (11/18).

Memberships

American Chemical Society

2005–Present

Reviewing Journals (# of articles reviewed):

Journal of the American Chemical Society (3); *Angewandte Chemie Int. Ed.* (2); *ACS Catalysis* (5); *Chemical Science* (1); *Organic Letters* (5); *Journal of Organic Chemistry* (1); *Chemical Communications* (1); *Tetrahedron Letters* (3); *ChemCatChem* (1), *Catalysis Reviews* (1); *Inorganic Chemistry* (1); *Catalysts* (1); *Polyhedron* (1); *Synlett* (1);

Funding Awards:

External Awards:

National Science Foundation Grant (CHE 1665015)

Title: Metal-Metal Cooperativity Effects in Synthesis and Catalysis

Total Funds: \$351,279, Dates: 7/1/2017–6/30/2020

ACS Petroleum Research Fund (PRF #56371-DN11)

Title: Early/Late Heterobimetallic Complexes for Catalytic Alkene and Alkyne Functionalization

Total Funds: \$110,000, Dates: 4/1/2016 – 8/31/2018

Internal Awards:

Earl Wooley Innovation Award, Department of Chemistry and Biochemistry

Title: Rational design of peptide-based multifunctional catalysts with enzyme-like reactivity and selectivity. Total Funds: \$25,000

Brigham Young University Mentoring Grant

Title: Rational design of multifunctional enzyme-like catalysts for assembly-line chemical synthesis
Total Funds: \$20,000, Dates: 12/2016–12/2018

College High Impact Research Proposal

Title: Rational Design of multifunctional enzyme-like catalysts for organic synthesis.

Dates: 12/1/2015–12/31/2016

Total Funds: \$28,200

High-Impact Teaching Support (HITS) Grant:

Title: Introduction of asymmetric synthesis and analysis into Advanced Org. Chem. lab course for Majors. Total Funds: \$3500, Dates: 11/2013–11/2014