

**Michael W. Beck, Ph.D.**  
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Department of Chemistry and Biochemistry  
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### **Research and Educational Interests**

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Our laboratory is interested in the design, development, and utilization of small molecule chemical tools to interrogate biological processes in living systems at the molecular level. Combining new chemical tools with more traditional chemical, biochemical, and molecular biology techniques, allows us to uncover novel biological processes and mechanisms related to human health. We leverage our research program to create a robust training platform for student scientists, where relating their classroom knowledge of chemical and biological principles to real-world research problems gives students a broad set of skills and experiences to prepare them for the next stage of their scientific training or career.

### **Professional Experience and Positions**

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- Assistant Professor** August 2019–Present  
**Eastern Illinois University (EIU), Charleston, IL, USA**
- Postdoctoral Scholar** July 2015–July 2019  
**University of Chicago (UC), Chicago, IL, USA**  
Advisor: Professor Bryan Dickinson, Department of Chemistry  
Project: Development of Small Molecule Fluorescent Probes to Study “Eraser”  
Enzymes of Cysteine Post-Translational Modifications in Living Systems
- Graduate Student** May 2011–June 2015  
**University of Michigan (UM), Ann Arbor, MI, USA**  
Advisor: Professor Mi Hee Lim, Life Sciences Institute  
Project: Development of Small Molecules as Chemical Tools for Investigating  
the Role of Metal-Protein Interactions in Neurodegenerative Diseases
- Visiting Research Scholar** Jan. 2014–Feb. 2015  
**Ulsan National Institute of Science and Technology (UNIST), Ulsan, South Korea**  
Advisor: Professor Mi Hee Lim, Department of Chemistry  
Project: Development of Small Molecules as Chemical Tools for Investigating  
the Role of Metal-Protein Interactions in Neurodegenerative Diseases
- Undergraduate Research Assistant** Dec. 2007–May 2011  
**Tennessee Technological University (TTU), Cookeville, TN, USA**  
Advisor: Professor Edward Liscic, Department of Chemistry  
Project: Synthesis, Characterization, and Antimicrobial Studies of Cu(II)  
and Pd(II) Thiosemicarbazone Complexes
- 2010 Global Research and Development Summer Intern** June 2010–Aug. 2010  
**Colgate-Palmolive Company, Piscataway, NJ, USA**  
Project: Development of Near-IR Spectroscopy Methods for Analyzing Soap  
Bar Constituents and Deposition of Active Ingredients on to Skin

### **Education**

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- Ph.D., Chemistry, University of Michigan (UM), Ann Arbor, MI, USA** May 2011–August 2015  
Advisor: Professor Mi Hee Lim
- B.S., Chemistry, Tennessee Technological University (TTU), Cookeville, TN, USA** Aug. 2007–May 2011  
*Cum Laude*, Biochemistry Concentration with American Chemical Society Certification

## Honors, Awards, and Scholarships

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2018	Poster Award at the Gordon Research Conference on Bioorganic Chemistry
2015	ASBMB 2015 Graduate and Postdoctoral Travel Award
2015	Rackham (UM) Conference Travel Grant Recipient
2014	Best Poster Presentation Award, Second International Symposium for Molecular Neurodegenerative Disease Research
2014	Best Poster Presentation Award, Korean Chemical Society Summer Bioinorganic Chemistry Symposium
2011	Who's Who Among Students in American Universities and Colleges
2011	Distinction in Undergraduate Research (TTU)
2011	Faculty Senior Achievement Award (TTU)
2011	Outstanding Senior Award (TTU)
2010	First Place Poster Presentation in Chemistry Section Award, 120 <sup>th</sup> Meeting of the Tennessee Academy of Science
2010	ACS Undergraduate Chemistry Award in Inorganic Chemistry
2010	McDowell-Blankenship Memorial Scholarship (TTU)
2010	Earl McDonald University Academic Service Scholarship (TTU)
2010	Student Research Award (TTU)
2009	TTU Chemistry Department Scholarship

## Teaching Experience

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### Primary Instructor

<b>Eastern Illinois University (EIU), Charleston, IL, USA</b>	
Biochemistry I (CHM 3450), Undergraduate	Fall 2019
General Chemistry I (CHM 1310G), Undergraduate	Fall 2019
General Chemistry I Laboratory (CHM 1315G), Undergraduate	Fall 2019

## Mentoring Experience

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### University of Chicago

- 1 Master Degree Student
- 1 Post-Baccalaureate Student
- 3 Undergraduate Students

### Ulsan National Institute of Science and Technology

- 1 Undergraduate Student

### University of Michigan

- 2 Undergraduate Students

## Professional Activities and Service

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### Manuscript Referee

<i>Metallomics</i>	2018
<i>RSC Advances</i>	2015–2016
<i>Current Opinion in Chemical Biology</i>	2014

## Professional Affiliations

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Member, American Chemical Society	2007–Present
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## Professional Development

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<b>Course Design and College Teaching</b>	Autumn 2018
Chicago Center for Teaching, University of Chicago (UC), Chicago, IL, USA	

## Peer-Reviewed Publications

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\*Denotes Equal Contribution #Denotes Undergraduate Author

8. Qiu, T.\*; Kathayat, R. S.\*; Cao, Y.\*; **Beck, M. W.**; Dickinson, B. C. *Biochemistry* **2018**, *57*, 221. "A Fluorescent Probe with Improved Water Solubility Permits the Analysis of Protein S-Depalmitoylation Activity in Live Cells"
7. **Beck, M. W.**; Derrick, J.S.; Suh, J.-M.; Kim, M.; Korshavn, K. J.; Kerr, R. A.; Cho, W. J.; Larsen, S. D.; Ruotolo, B. T.; Ramamoorthy, A.; Lim, M. H. *ChemMedChem* **2017**, *12*, 1828. "Minor Structural Variations of Small Molecules Tune Regulatory Activities Toward Pathological Factors in Alzheimer's Disease"  
\*Featured on Front Cover
6. **Beck, M. W.**; Kathayat, R. S.; Cham, C. M.; Chang, E. B.; Dickinson, B. C. *Chem. Sci.* **2017**, *8*, 7588. "Michael Addition-Based Probes for Ratiometric Fluorescence Imaging of Protein S-Depalmitoylases in Live Cells and Tissues"
5. **Beck, M. W.\***; Derrick, J. S.\*; Kerr, R. A.; Oh, S. B.; Cho, W. J.; Lee, S. J. C.; Ji, Y.; Han, J.#; Tehrani, Z. A.; Suh, N.; Kim, S.; Larsen, S. D.; Kim, K. S.; Lee, J.-Y.; Ruotolo, B. T.; Lim, M. H. *Nature Commun.* **2016**, *7*, 13115. "Structure-Mechanism-Based Engineering of Chemical Regulators Targeting Distinct Pathological Factors in Alzheimer's Disease"
4. **Beck, M. W.\***; Oh, S. B.\*; Kerr, R. A.; Lee, H. J.; Kim, S. H.; Kim, S.; Jang, M.; Ruotolo, B. T.; Lee, J.-Y.; Lim, M. H. *Chem. Sci.*, **2015**, *6*, 1879. "A Rationally Designed Small Molecule for Identifying an *In Vivo* Link of Metal-Amyloid- $\beta$  Complexes to the Pathogenesis of Alzheimer's Disease"  
\*Recommended as "Very Good" on Faculty of 1000 DOI: 10.3410/f.725725194.793509037.
3. **Beck, M. W.**; Pithadia, A. S.; DeToma, A. S.; Korshavn, K. J.; Lim, M. H. Chapter 10: Ligand Design to Target and Modulate Metal-Protein Interactions in Neurodegenerative Diseases. In *Ligand Design in Medicinal Inorganic Chemistry* John Wiley & Sons: Chichester, West Sussex, **2014**, pp 256-286.  
\*Featured in *Angew. Chem. Int. Ed.*, **2015**, *54*, 2324.
2. Liu, Y.\*#; Kochi, A.\*; Pithadia, A. S.; Lee, S.; Nam, Y.; **Beck, M. W.**; He, X.; Lee, D.; Lim, M. H. *Inorg. Chem.*, **2013**, *52*, 8121. "Tuning Reactivity of Diphenylpropynone Derivatives with Metal-Associated Amyloid- $\beta$  Species via Structural Modifications"
1. Pithadia, A. S.\*; Kochi, A.\*; Soper, M. T.; **Beck, M. W.**; Liu, Y.; Lee, S.; DeToma, A. S.; Ruotolo, B. T.; Lim, M. H. *Inorg. Chem.* **2012**, *51*, 12959. "Reactivity of Diphenylpropynone Derivatives Toward Metal-Associated Amyloid- $\beta$  Species"

## Patents

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1. Dickinson, B.C.; Kathayat, R.S.; **Beck, M.W.** "Synthetic Substrates for Enzymes That Catalyze Reactions of Modified Cysteines and Related Methods." *Patent Pending* US 20180147250 2018.

## Presentations

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### Invited Presentations

2. **1<sup>st</sup> Symposium on Chemistry and Life**, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea, August 2, 2018  
"Chemical Tools to Interrogate Biology at the Molecular Level"
1. **TTU ACS Student Affiliate Chapter Meeting**, Cookeville, TN, December 3, 2013  
"A Brief Overview of Applying to a PhD Program in Chemistry" and  
"Structure-Reactivity Relationship of Diphenylpropynone Derivatives as Bifunctional Chemical Tools to Study Alzheimer's Disease"

### Oral Presentations

2. **Oral Dissertation Defense**, University of Michigan, Ann Arbor, MI, May 6, 2015

“Development of Small Molecules as Chemical Tools for Investigating the Role of Metal-Protein Interactions in Neurodegenerative Diseases”

1. **3<sup>rd</sup> Annual TTU Chemistry Department Distinction in Research Seminar**, Cookeville, TN, April 21, 2011.

“Synthesis and Antimicrobial Studies of Acetylpyrazine-Thiosemicarbazone Compounds”

#### Poster Presentations

11. **2018 Gordon Research Conference on Bioorganic Chemistry**, Andover, NH, June 10-15, 2018. **Beck, M. W.**; Trotzuk, E. F.; Azizi, S.-A.; Choi, W.; Dickinson, B. C.

“Ratiometric Fluorescent Probes to Interrogate the Regulation of Cell Signaling by Protein S-Depalmitoylases.”

\*Received Poster Award

10. **Experimental Biology 2015**, Boston, MA, March 31, 2015. **Beck, M. W.**; Oh, S. B.; Kerr, R. A.; Lee, H. J.; Kim, S. H.; Kim, S.; Jang, M.; Ruotolo, B. T.; Lee, J.-Y.; Lim, M. H.

“Modulation of Metal-Amyloid- $\beta$  Reactivity by a Rationally Designed Small Molecule for Elucidating the In Vivo Link of Metal-Amyloid- $\beta$  Complexes to the Pathogenesis of Alzheimer's Disease.”

9. **The 2<sup>nd</sup> International Symposium for Molecular Neurodegenerative Disease Research**, KAIST, Daejeon, South Korea, August 22, 2014. **Beck, M. W.**; Oh, S.B.; Kerr, R.; Lee, H. J.; Kim, S. H.; Kim, S.; Jang, M.; Ruotolo, B. T.; Lee, J.-Y.; Lim, M. H.

“Metamorphosizing the Reactivity of Metal-Amyloid- $\beta$  Complexes to Profile Their Relation to the Pathology of Alzheimer's Disease.”

\*Awarded Best Poster Presentation

8. **The 2014 Korean Chemical Society Summer Bioinorganic Chemistry Symposium**, Suanbo, South Korea, July 11, 2014. **Beck, M. W.**; Oh, S.B.; Kerr, R.; Lee, H. J.; Kim, S. H.; Kim, S.; Jang, M.; Ruotolo, B. T.; Lee, J.-Y.; Lim, M. H.

“Metamorphosizing the Reactivity of Metal-Amyloid- $\beta$  Complexes to Profile Their Relation to the Pathology of Alzheimer's Disease.”

\*Awarded Best Poster Presentation

7. **The 2013 Vaughn Symposium**, Ann Arbor, MI, August 8, 2013. **Beck, M. W.**; Charon, J. P.; Ghosh, A.; Lim, M. H.

“Design and Development of Pyridinylmethylamine Derivatives as Chemical Tools to Study the Role of Metal Amyloid- $\beta$  Species in Alzheimer's Disease.”

6. **The 241<sup>st</sup> National Meeting of the American Chemical Society**, Anaheim, CA, March 28, 2011. **Beck, M. W.**; Beck, C. N.; Reilly, S. W.; Carr, M.; Holcomb, V. L.; Ventrice, J.; Lisic, E. C.

“Synthesis and Antimicrobial Studies of Acetylpyrazine-Thiosemicarbazone Compounds.”

5. **The 120<sup>th</sup> Meeting of the Tennessee Academy of Science**, Cookeville, TN, November 19, 2010. **Beck, M. W.**; Reilly, S. W.; Swindle, R. L.; Lisic, E. C.

“Synthesis and Biological Studies of Palladium (II) Acetylpyrazine Thiosemicarbazone Complexes.”

\*Awarded First Place Poster Presentation in Chemistry Section

4. **The 5<sup>th</sup> Annual Tennessee Tech University Student Research Day**, Cookeville, TN, April 15, 2010. **Beck, M. W.**; Reilly, S. W.; Swindle, R. L.; Lisic, E. C.

“Synthesis and Biological Studies of Palladium (II) Acetylpyrazine Thiosemicarbazone Complexes.”

3. **The 239<sup>th</sup> National Meeting of the American Chemical Society**, San Francisco, CA, March 22, 2010. **Beck, M. W.**; Reilly, S. W.; Swindle, R. L.; Lisic, E. C.

“Synthesis and Biological Studies of Palladium (II) Acetylpyrazine Thiosemicarbazone Complexes.”

2. **The 4<sup>th</sup> Annual Tennessee Tech University Student Research Day**, Cookeville, TN, March 31, 2009. **Beck, M. W.**; Steelman, K; and Lisic, E. C.

“Synthesis and Characterization of New Acetylpyrazine Thiosemicarbazones.”

Michael W. Beck, Ph.D.

1. **The 237<sup>th</sup> National Meeting of the American Chemical Society**, Salt Lake City, UT, March 23, 2009.  
**Beck, M. W.**; Steelman, K; Lisic, E. C.  
"Synthesis and Characterization of New Acetylpyrazine Thiosemicarbazones."