

Michelle R. Bond, Ph.D.

8 Center Dr. Bldg 8, B1-23
Bethesda, MD 20890

work (301) 443-3468
bondmr@mail.nih.gov

EDUCATION

- Ph.D., Organic Chemistry**, *Department of Chemistry* **July 2010**
Stanford University, Stanford, CA
- B.S., Organic Chemistry**, *summa cum laude* with Honors, *Department of Chemistry* **December 2004**
Gettysburg College, Gettysburg, PA

PROFESSIONAL EXPERIENCE

Staff Scientist, *National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)*
National Institutes of Health (NIH), Bethesda, MD
Supervisor John A. Hanover, Ph.D.

Brief summary of research accomplishments: **February 2015 – present**

- Discovered relationship between evolutionarily conserved genes required for segmentation & nutrition.
- Exploring utility of bioorthogonal probes to define O-GlcNAc in nucleolar & ribosome function.
- 1 peer-reviewed review article published (primary author), 2 research manuscripts in preparation.

Development, strategic planning, building partnerships, and staff management:

- Facilitating collaborations:
 - Utilize bioorthogonal probes in *Drosophila* to determine glycan patterning.
 - Define how O-GlcNAc functionally modifies DNA.
 - Determine O-GlcNAcome of *C. elegans*.
 - Probe O-GlcNAc localization and turnover via Raman spectroscopy.
 - Produce CRISPR deletions and fusions of O-GlcNAc enzymes in *C. elegans*.
- Direct partnership with Undiagnosed Diseases Program and NIAID to define glycoconjugates, protein expression, & enzyme activity levels in diverse clinical patient samples.
- **Co-chair**, NIH & FDA Glycoscience Research Day (**2016**).
- Co-hosted R. Woods (UGA, Complex Carbohydrate Research Center) for modeling course (**2015**).
- **Member**, NIH & FDA Glycoscience Steering Committee (**2015**).
- Directed and managed progress of scientific projects for post-baccalaureate fellow (NIH Academy Enrichment Program, 1).
- Mentoring postdoctoral fellows (5), graduate students (1), & technicians (1).
- Facilitated annual laboratory safety inspection.

Postdoctoral fellow, *National Institute of Diabetes and Digestive and Kidney Diseases*
National Institutes of Health, Bethesda, MD
Supervisor John A. Hanover, Ph.D.

Brief summary of research accomplishments: **October 2010 – February 2015**

- Exploited genetic model system (*C. elegans*) to identify signaling pathways regulated by O-GlcNAc cycling in innate immunity to pathogens including *S. aureus* and *P. aeruginosa*.
- Collaborated to:
 - Define the role O-GlcNAc plays in insulin signaling.
 - Optimize selectivity of bioorthogonal chemical reagents.
 - Establish a versatile microplate assay to detect OGT enzyme activity.
- 7 peer-reviewed research and review articles published, of both primary and middle authorship.

Development, strategic planning, building partnerships, and staff management:

- Directed "Clean Sweep" initiative for laboratory (**2015**).

- Spearheaded transition of inventory management to new technology platform (2015).
- Featured on LabTV as early researcher (<https://www.labtv.com/Profiles/Researcher?Id=686#/>) (2015).
- Responsible for coordinating laboratory meetings (2014 - 2015).
- **Guest Lecturer and Coordinator** for *Special Topics in the Glycosciences*, NIH: developed curriculum, established criteria and policy standards, and coordinated lectures, 2012 & 2013.
- **Contributing Editor**, *NIH Visiting Fellows Newsletter*: edited articles, 2012 & 2013.
- **Organizer, Judge, and Session Moderator**, *NIDDK Fellows Advisory Board*, NIH: organized and executed 3 conferences for 150+ pre- and post-doctoral fellows. Planned detailed schedule for 2-day event, budgeted for refreshments/awards/honorarium, supervised judging sessions, 2010, 2011, & 2012.
- **Science Policy Intern**, *Office of Intramural Training and Education*, NIH, 2010 - 2011.
- Directed and managed progress of scientific projects for interns (5) and mentored postdoctoral fellows (6), graduate students (1), technicians (1), post-baccalaureate fellow (1).
- Facilitated annual laboratory safety inspection.

Graduate Student, *Department of Chemistry* **2005 – 2010**
Stanford University, Stanford, CA

Research Assistant, *Department of Internal Medicine, Division of Translational Research* **2007 – 2010**
UTSouthwestern Medical Center, Dallas, TX (move due to supervisor relocation)

Supervisor Jennifer J. Kohler, Ph.D. (moved from Stanford University to UTSouthwestern in 2007)

- Explored biologically relevant glycan interactions by covalently capturing via bioorthogonal sugars. Efforts resulted in 9 peer-reviewed research and review articles, of both primary and middle authorship.
- Teaching Assistant for 4 classes at Stanford University: managed teaching assistants, disseminated class information, ensured effective demonstrations, structured grading sessions, and managed grades.
- Directed and managed progress of scientific projects for interns (2).

Chemist, *Alcohol and Tobacco Tax and Trade Bureau* **2005**
U.S. Department of the Treasury, Beltsville, MD

- Characterized alcohol samples to determine beverage fitness and tobacco samples for nicotine content. Researched method for separating primary alkaloids in tobacco by HPLC.

Undergraduate Research Assistant, *Gettysburg College Chemistry Department* **2003 – 2004**
Gettysburg College, Gettysburg, PA

- Explored the catalytic competency of quaternary ammonium catalysts for amino acid alkylations and Michael additions in thesis: "Synthesis and competency of a novel dicationic phase-transfer catalyst".
- Efforts resulted in peer-reviewed research articles (2), of both primary and middle authorship.
- Conducted bi-weekly evening problem sessions for undergraduate students and managed intern (1).

Research Intern, *Nitriles Business Unit* **2002**
BP Amoco, Naperville, IL

- Identified catalysts to be used in the propylene ammoxidation process.

SELECTED GRANTS, HONORS, & AWARDS

Imaging Probe Development Center Grant	2015, 2016
<i>Awarded on a competitive basis to selected laboratories for developing state-of-the-art probes for imaging.</i>	
NIH & FDA Glycosciences Research Day, NIH Glycobiology SIG Scientific Poster Award	2015
NIDDK Nancy Nossal Fellowship Award	2011 – 2015
<i>Awarded to the top 10% of NIDDK postdoctoral fellows via NRSA-based application.</i>	
National Institutes of Health Summer Research Mentor Award	2014
<i>Awarded to top 10% of applicants to provide summer intern through a central funding source.</i>	
National Institutes of Health Fellows Award for Research Excellence	2013
<i>Awarded to top 25% of submitted abstracts (received \$1000 travel stipend).</i>	
NIDDK Fellows Retreat Travel Award	2013
<i>Awarded to the top 6 fellows presenting research at the annual Fellows Retreat (received \$1000 travel grant).</i>	

NIH & FDA Glycosciences Research Day, The NEB Best Poster Award	2011
The 25 th International Carbohydrate Symposium Travel Grant Award	2010
National Science Foundation Graduate Research Fellowship	2006 – 2009
The American Society for Biochemistry and Molecular Biology Conference Poster Prize	2008
Science, Mathematics and Research for Transformation Program Fellowship (declined award offer)	2006
Southeastern Pennsylvania ACS Award & Society of Analytical Chemists of Pittsburg Award	2005
American Chemical Society Certification	2005
Phi Beta Kappa and Omicron Delta Kappa	inducted 2004
American Chemical Society Polymer Division Award for Organic Chemistry	2003

STRATEGIC PLANNING, PARTNERSHIP BUILDING, & STAFF MANAGEMENT EXPERIENCE

Member, Board of Directors, <i>The Children's Science Center</i>	2011 – present
<ul style="list-style-type: none"> - Advise the Center on strategic direction. Support mission to instill a love of learning science, technology, engineering, and math by providing unique opportunities to explore, create, and inspire. - Manage volunteer recruitment, retention, and coordination of volunteer support for 60+ events/year. - Direct the work of 8+ volunteers assigned to support the Volunteer Committee. - Award Recipient, Fairfax County Volunteer Service Awards, Adult Volunteer (2015). - Directed #ElementCampaign social media taskforce: assigned ~20 volunteers with writing Tweets and Facebook posts for each periodic table element. Confirmed fact accuracy and amended (2014). - Spearheaded volunteer management to new technology platform for 700+ volunteers (2013). - Directed growth of volunteer support by 1000% over 2.5 years (2013). - Infrastructure development directly impacted: visitors served increased from 3k (2010) to 20k+ (2014). - Authored "Volunteer Handbook and Volunteer Committee Policy Guide": detailed instructions for volunteers and committee members for day-to-day running of volunteer events, etc. (2014). 	
News & Information Committee Chair, <i>The Junior League of Northern Virginia</i>	2013 – 2014
<ul style="list-style-type: none"> - Directed editing and publishing of quarterly "League Loop" magazine to disseminate information about the Junior League's character-building and self-esteem development programs. - Managed team of 8 volunteers and mentored them as Editor in Chief. 	
Education Advisory Board, <i>The Children's Science Center</i>	2010 – 2013
<ul style="list-style-type: none"> - Reviewed educational curriculum and advised development of event exhibits and activities. - Developed curriculum and print collateral for Museum Without Walls activities. 	

PROFESSIONAL DEVELOPMENT & OTHER ACTIVITIES

Reviewer of manuscripts, journals including <i>PLOS GENETICS, PLOS ONE</i>	ongoing
Co-reviewer of manuscripts, journals including <i>Science, Chemistry & Biology, Curr. Biol., PNAS, eLIFE</i>	ongoing
Budget management, recommend funding allocation for laboratory projects	ongoing
Member, American Chemical Society	ongoing
Lab coordinator, <i>Take Your Child to Work Day</i>, NIH	ongoing
Instructor, <i>NIH Summer Intern Science Skills Bootcamp</i>, NIH	2015
Co-reviewer of grants, National Science Foundation	2015
Panelist, <i>Faculty Breakout Session</i>, NIH Community College Day, NIH	2014
Panelist, <i>STEMinist Career Panel</i>, Gettysburg College, Gettysburg, PA	2014
Attendee, <i>Management Bootcamp & Workplace Dynamics Workshops</i>, NIH	2014
Attendee, <i>Scientists Teaching Science</i>	2013
Member, <i>NIH LAB Challenge</i> and <i>NHGRI Genomic Literacy Focus Groups</i>	2011
Invited Career Speaker, <i>The New School, Century High School, and American Jr. Acad. of Sciences, NIH</i>	2011

INVITED PRESENTATIONS

- "A little sugar goes a long way" 2015 NIDDK Administrative Speaker Series, NIH (2015)
- "O-GlcNAc transferase is required for the *C. elegans* innate immune response to *S. aureus*" Gettysburg College Department of Biochemistry and Molecular Biology, Gettysburg, PA (2014)

- "Conserved nutrient sensor O-GlcNAc transferase is important for development" NIDDK Fellows Retreat, NIH, Bethesda, MD (2014)
- "Conserved nutrient sensor O-GlcNAc transferase is integral to the *C. elegans* pathogen-specific immune response" National Institutes of Standards and Technology, Gaithersburg, MD (2014)
- "The nutrient sensor O-GlcNAc transferase is a critical component of the *C. elegans* innate immune system" NIH Research Festival, Bethesda, MD (2013)
- "O-linked N-acetylglucosamine is critical for the *Caenorhabditis elegans* innate immune response to *S. aureus*," NIH & FDA Glycosciences Research Day, Bethesda, MD (2013)
- "The *C. elegans* innate immune response to *S. aureus* is modulated by O-GlcNAc transferase." NIDDK Fellows Retreat, NIH, Bethesda, MD (2013)
- "Metabolic labeling and applications of bioorthogonal carbohydrate chemistry in living systems." Special Topics in the Glycosciences, NIH, Bethesda, MD, (2012, 2013).
- "O-GlcNAc is critical for the *C. elegans* innate immune response to pathogenic bacteria." NIDDK Fellows Retreat, NIH, Bethesda, MD (2012)
- "Using bioorthogonal sugar analogs to discover protein interactions." Gettysburg College Chemistry Department, Gettysburg College, Gettysburg, PA (2008)

SELECTED POSTER PRESENTATIONS

Poster Presentation, Annual Meeting of the Society for Glycobiology, San Francisco, CA	2015
Poster Presentation, Glyco23, Split, Croatia	2015
Poster Presentation, NIH & FDA Glycosciences Research Day, Bethesda, MD	2012
Poster Presentation, Consortium for Functional Glycomics Participating Investigators Meeting, NIH	2011
Poster Presentation, The Genetics Society of America, 18 th International <i>C. elegans</i> Meeting, UCLA	2011
Poster Presentation, The 25 th International Carbohydrate Symposium, Tokyo, Japan	2010
Poster Presentation, 2009 Bioorganic Gordon Conference, Andover, NH	2009
Poster Presentation, Annual Meeting of the Society for Glycobiology, Fort Worth, TX	2008
Poster Presentation, 227 th , 228 th , and 232 nd American Chemical Society National Meetings	2004-2006

SELECTED PUBLICATIONS

Research and review articles:

Synthesis and Measurement of Kinetic Parameters of PNP-6AzGlcNAc for OGA
EJ Kim, **MR Bond**, JA Hanover (manuscript in preparation)

Trithorax, Ash1 and Set1 epigenetic activators are O-GlcNAc modified in *Drosophila*
I Akan, DC Love, K Harwood, **MR Bond**, JL Brown, JA Kassis, and JA Hanover (manuscript in revision)

Fucosylation and protein glycosylation create functional receptors for cholera toxin
AM Wands, A Fujita, JE McCombs, J Nygren, AC Rodriguez, N Nischan, **MR Bond**, M Mettlen, CR Reis, DC Trudgian, A Lemoff, C Steentoft, H Clausen, H Mirzaei, U Yrlid, and JJ Kohler
eLIFE (2015) 10.7554/eLife.09545

A little sugar goes a long way: the cell biology of O-GlcNAcylation (review article)
MR Bond & JA Hanover
Journal of Cell Biology (2015) 208: 869-880

Nutrient sensor O-GlcNAc transferase is critical for the *C. elegans* innate immune response to *S. aureus*
MR Bond, S Ghosh, P Wang, M Krause, & JA Hanover
PLOS ONE (2014) 9: e113231

Altered O-GlcNAc cycling deregulates the nutrient-sensing hexosamine biosynthetic pathway in *C. elegans*
SK Ghosh, **MR Bond**, DC Love, GG Ashwell, MW Krause, & JA Hanover
Frontiers in Endocrinology (2014) 5: 1-7

Versatile O-GlcNAc transferase assay for high-throughput identification of enzyme variants, substrates, and inhibitors
EJ Kim, L Arawomitz, **MR Bond**, D Love, DW Kang, HF Leucke, DW Kang, J-s Ahn, & JA Hanover
Bioconjugate Chemistry (2014) 25: 1025-1030

Chemical tools to explore nutrient-driven O-GlcNAc cycling (review article)
EJ Kim, **MR Bond**, D Love, & JA Hanover
Critical Reviews in Biochemistry and Molecular Biology (2014) 49: 327-342

O-GlcNAc cycling: A link between metabolism and chronic disease (review article)
MR Bond & JA Hanover
Annual Review of Nutrition (2013) 33: 205-229

Optimizing the selectivity of DIFO-based reagents for intracellular bioorthogonal applications
EJ Kim, DW Kang, HF Leucke, **MR Bond**, S Ghosh, D Love, J-s Ahn, DW Kang, & JA Hanover
Carbohydrate Research (2013) 377: 18-27

Metabolic labeling enables selective photocrosslinking of O-GlcNAc-modified proteins to their binding partners
S-H Yu, M Boyce, **MR Bond**, CR Bertozzi, & JJ Kohler
PNAS (2012) 109: 4834-4839

Metabolism of diazirine-modified N-acetylmannosamine analogs to photocrosslinking sialosides
MR Bond, H Zhang, J Kim, S-H Yu, F Yang, SM Patrie, & JJ Kohler
Bioconjugate Chemistry (2011) 22: 1811-1823

O-GlcNAc cycling and insulin signaling are required for the glucose stress response in *Caenorhabditis elegans*
MA Mondoux, DC Love, SK Ghosh, T Fukushige, **M Bond**, GR Weerasinghe, JA Hanover, & MW Krause
Genetics (2011) 188: 369-382

Metabolically incorporated photocrosslinking sialic acid covalently captures a ganglioside-protein complex
MR Bond, CM Whitman, & JJ Kohler
Molecular BioSystems (2010) 6: 1796-1799

Metabolic labeling of glycoconjugates with photocrosslinking sugars
S-H Yu, **MR Bond**, CM Whitman, & JJ Kohler
Methods in Enzymology (2010) 478: 541-562

Chemical glycobiology (book chapter)
CM Whitman, **MR Bond**, & JJ Kohler
Comprehensive Natural Products II (2010) 6: 175-224

Photocrosslinking of glycoconjugates using metabolically incorporated diazirine-containing sugars
MR Bond, H Zhang, PD Vu, & JJ Kohler
Nature Protocols (2009) 4: 1044-1063

Photocrosslinkers illuminate interactions in living cells (review article)
Y Tanaka, **MR Bond**, & JJ Kohler
Molecular Biosystems (2008) 4: 473-480

Chemical methods for glycoprotein discovery (review article)

MR Bond & JJ Kohler

Current Opinion in Chemical Biology (2007) 11: 52-58

Synthesis and competency of a tartrate-derived dicationic solid-liquid phase-transfer catalyst

***ME Rueffer**, DK MacFarland, & LK Fort

Tetrahedron: Asymmetry (2004) 15: 3297-3300

Synthesis and competency of a novel dicationic phase-transfer catalyst

WE Kowtoniuk, ***ME Rueffer**, & DK MacFarland

Tetrahedron: Asymmetry (2004) 15: 151-154

*Michelle R. Bond maiden name

‡These authors contributed equally to this work.