

Johnna A. Birbeck

Education

Ph.D., Analytical Chemistry, Wayne State University, Detroit, MI
August 2008 – July 2013

- Advisor/Mentor: Tiffany A. Mathews, Ph.D.

B.S., Chemistry & Forensic Chemistry, Lake Superior State University, Sault Ste. Marie, MI
August 2003 – May 2008

- Advisor/Mentor: Judy Westrick, Ph.D.

Experience

Senior Research Scientist, Wayne State University, Detroit, MI
December 2015 – Current

- Works with students and staff from Wayne State University, as well as non-academic customers to the Lumigen Instrument Center (LIC) using an ultra-high performance liquid chromatography (UPLC) triple quadrupole mass spectrometry (MS) to achieve method development or refine methods to fit their specific research interest.
- Project manager in LIC Mass Spectrometry core for environmental projects where samples are run on UPLC-MS/MS and inductively coupled plasma mass spectrometry (ICP-MS).
- Complete data analysis and written scientific results for all analysis that are run.
- Synthesize internal/surrogate standard used by the US EPA for Method 544.

LC-MS Lead Operator, Great Lakes Medical Laboratory, Farmington Hills, MI
September 2015 – December 2015

- Validate drug panels on LC-MS for urine and oral samples for compliance with CLIA and COLA standards.
- Prepare, analyze, and interpret urine and saliva samples for drug confirmation.
- Organized and implemented new procedures for instrument maintenance and upkeep.

Post-Doctoral/Research Associate, Wayne State/Oakland University, Detroit/Rochester, MI
August 2013 – September 2015

- Validated and improved upon methods for cyanotoxin detection using UPLC-ESI-MS/MS and a quadrupole-time of flight (Q-TOF) LC-MS.
- Analyzed environmental water samples (source waters, drinking water facility treatment train samples, etc.) for cyanotoxins using HPLC-PDA, LC-MS/MS and Q-TOF LC-MS to determine federal compliance.
- Instructed undergraduate students how to properly conduct themselves in a laboratory setting. These tasks included laboratory safety, literature searches, laboratory techniques, data collection and interpretation, analytical methodologies, and report writing.
- Operate, maintain, and train users on analytical instrumentation such as UPLC triple quadrupole MS, gas chromatography TOF-MS, ICP-MS, and UV/VIS spectrophotometry in Wayne State Universities LIC.
- Assessed and validated new chemistry based methods, techniques, and technologies for academic research collaboration and non-academic research needs including generic food supplements.
- Used quality control protocols for the assessment of samples, and analysis of data, and performed written scientific reports.

Graduate Researcher, Wayne State University, Detroit, MI
September 2008 – August 2013

- Developed and validated an analytical method for simultaneous detection of purine and monoamine neurotransmitters using HPLC-boron-doped diamond electrode.
- Investigated and characterized the interaction between BDNF and dopamine in BDNF-deficient mice using analytical techniques such as *in vivo* microdialysis and locomotor behavior monitoring with the use of pharmacological manipulations.

Assistant Laboratory Technician, University of Michigan Biological Station, Pellston, MI
May 2007 – August 2007 and May 2008 – August 2008

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- Analyzed environmental water samples (lake, river, and golf course run off) for nutrients such as ammonium, nitrates, phosphates, chloride, silica, and total organic phosphates using continuous flow Auto Analyzers.
- Prepared samples for a CHN elemental analyzer that examined carbon 13 and nitrogen 15 isotopic levels in various dried sample substances.

Field Technician, RTI International, Dearborn, MI

July 2006 – August 2006

- Worked on the USEPA's Detroit Exposure and Aerosol Research Study (DEARS).
- Prepared and deployed certified air monitoring technologies for environmental air sampling.

Student Researcher, Lake Superior State University, Sault Ste. Marie, MI

May 2005 – August 2005

- Worked on the USEPA grant (GL-96538301-0) studying the health of the St. Mary's river.
- Collected environmental samples such as water, sediment, and fish from selected sites on St. Mary's River.
- Performed solid phase extraction techniques for analysis of semi-volatile organic compounds.
- Performed microwave acid digestion techniques for metals in fish, sediment, and water samples that were analyzed using an ICP-MS.

Student Laboratory Technician, Lake Superior State University, Sault Ste. Marie, MI

October 2004 – May 2008

- Prepared, organized and neutralized chemicals and waste for freshmen Chemistry labs.

Teaching Experience

Recitation or Laboratory Teaching Assistant, Wayne State University, Detroit, MI

September 2008 – August 2013

- Main objectives were the formulation lesson plans, quizzes, and exam questions for general and analytical chemistry courses.
- Taught general and analytical chemistry students in two to four classes of 30 students in an informal lecture/problem solving setting, and laboratory settings.
- Instructed instrumental laboratory section to 25 senior undergraduate students. Instrumentation includes: gas chromatography, triple quadrupole MS, atomic absorption, cyclic voltammetry, and chronoamperometry.

Awards, Scholarships, & Fellowships

- Herbert K. Livingston Award for Excellence in Teaching (2013)
- Presentation Award from the Detroit Electrochemistry Society (2012)
- Esther and Stanley Kirschner General Chemistry Teaching Award (2012)
- Summer Dissertation Fellowship (2012)
- Graduate School Professional Travel Award (2012)
- Graduate Assistant Teaching Honor Citation (2009 – 2010)
- Outstanding Forensic Chemist award (2008)
- Outstanding Undergraduate Poster Award - Wayne State University (2007)
- Society of Toxicology Undergraduate Toxicology Education Award (Travel; 2006)
- Alpha Chi Honors (2005)

Services & Affiliations

- Chemistry club president (2006 – 2008)
- Society of Electroanalytical Chemistry (2011 – 2013)
- American Chemical Society (2011 – present)

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Manuscripts & Presentations

- Five written published manuscripts in recognized scientific journals and a scientific book.
- Presented at 12 different local, national, and international conferences.

Publications

(Note: Publications are under both Birbeck and Courneya.)

Birbeck, JA, Maina, FK, Bowen, SE, and Mathews, TA Normalized striatal dopamine dynamics in aged BDNF deficient mice. *In revision to Neurobiology of Aging*, Submitting 2017.

Birbeck, J. A.; Khalid, M.; Mathews, T. A., Potentiated striatal dopamine release leads to hyperdopaminergia in female brain-derived neurotrophic factor heterozygous mice. *ACS Chem Neurosci* 2014, 5 (4), 275-81.

Birbeck, J. A.; Mathews, T. A., Simultaneous detection of monoamine and purine molecules using high-performance liquid chromatography with a boron-doped diamond electrode. *Anal Chem* 2013, 85 (15), 7398-404.

Bosse, K. E.; **Birbeck, J. A.**; Newman, B. E.; Mathews, T. A., Analysis of Neurotransmitters and their Metabolites by Liquid Chromatography. In *Liquid Chromatography: Applications*, Elsevier: 2013; pp 542-609.

Bosse, K. E.; Maina, F. K.; **Birbeck, J. A.**; France, M. M.; Roberts, J. J.; Colombo, M. L.; Mathews, T. A., Aberrant striatal dopamine transmitter dynamics in brain-derived neurotrophic factor-deficient mice. *J Neurochem* 2012, 120 (3), 385-95.

Keller, B. J.; Back, R. C.; Westrick, J.; Werner, M.; Evans, B.; Moerke, A.; Zimmerman, G.; Wright, D. D.; Grenfell, E.; **Courneya, J.**, Sediment quality at select sites in the St. Marys River Area of Concern. *J Great Lakes Res* 2011, 37, 12-20.

Presentations

(Note: Presentations under both Birbeck and Courneya.)

Johnna A. Birbeck* and Judy Westrick “Detection techniques used for microcystin quantification.” OTCO Water Analyst Workshop, Deer Creek, OH. May 14th, 2015. (Talk)

Johnna A. Birbeck* and Tiffany A. Mathews, “Simultaneous detection of monoamine and purine neurotransmitters with a boron-doped diamond electrode.” Abstract submitted to Monitoring Molecules in Neuroscience 14th International Conference on In Vivo Methods. London, England. 9-18-2012. (Poster)

Johnna A. Birbeck* and Tiffany A. Mathews, “Simultaneous detection of dopamine and adenosine using a boron-doped diamond electrode,” ECS, Ypsilanti, MI. 6-12-2012. (Talk) ***Oral Presentation Winner***

Johnna A. Birbeck* and Tiffany A. Mathews, “Simultaneous detection of dopamine and adenosine using a boron-doped diamond electrode,” ACS CERM, Dearborn, MI. 6-7-2012. (Talk)

Johnna A. Birbeck* and Tiffany A. Mathews, “Simultaneous detection of dopamine and adenosine using a boron-doped diamond electrode,” Pittcon, Orlando, FL. 3-13- 2012. (Talk)

Johnna A. Birbeck* and Tiffany A. Mathews, “Simultaneous detection of dopamine and adenosine using a boron-doped diamond electrode,” ANACHEM/SAS Detroit section symposium, Livonia, MI. 11-3-2011. (Talk)

Johnna A. Birbeck*, Francis Maina, and Tiffany A. Mathews, “Altered striatal dopamine dynamics in aged BDNF^{+/-} mice,” Wayne State University Chemistry Graduate Symposium, Detroit, MI. 9-19-2011. (Poster)

Johnna A. Birbeck* and Tiffany A. Mathews, “Detection of adenosine and dopamine using HPLC with boron-doped diamond working electrode,” Pittcon, Atlanta, GA. 3-14-2011. (Poster)

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Johnna A. Birbeck*, Kelly E. Bosse, Francis Maina, M. M. France, J. J. P. Roberts, and Tiffany A. Mathews. “Alterations in striatal dopamine neurotransmission in BDNF deficient mice: No involvement of dopamine metabolism or synthesis,” Wayne State University Chemistry Graduate Symposium, Detroit, MI. 10-9-2010. (*Poster*)

Johnna A. Birbeck*, Kelly E. Bosse, Francis Maina, M. M. France, J. J. P. Roberts, and Tiffany A. Mathews, “Alterations in striatal dopamine neurotransmission in BDNF deficient mice: No involvement of dopamine metabolism or synthesis,” Wayne State University Chemistry graduate symposium, Detroit, MI. 10-10-2009. (*Poster*)

Johnna A. Courneva* and Judy Westrick, “The investigation of trace inorganic element levels in water and sediment sample from the St. Marys River,” Wayne State University Chemistry graduate symposium, Detroit, MI. 10-6-2007. (*Poster*) ****Undergraduate Student Poster Winner****

Johnna A. Courneva* and Judy Westrick, “The investigation of trace inorganic element levels in water and sediment sample from the St. Marys River” Argonne National Laboratory, Chicago, IL. 11-3-2006. (*Talk*)