Michelle L. Kovarik, PhD

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EDUCATION

2009 **PhD**, Analytical Chemistry, Indiana University, Bloomington, IN
Dissertation: "Electrokinetic Transport, Trapping, and Sensing in Integrated Micro- and Nanofluidic Devices"

2004 **BS**, Chemistry, Saint Louis University, St. Louis, MO

PROFESSIONAL APPOINTMENTS

2013-present **Assistant Professor of Chemistry**
Trinity College, Hartford, CT

2010-2013 **Postdoctoral Scholar**
University of North Carolina, Chapel Hill, NC

RESEARCH EXPERIENCE AND INTERESTS

Current Research
Interests: microchip electrophoresis with laser-induced fluorescence detection, lipid-based coatings for microfluidics, kinase and peptidase assays in *Dictyostelium discoideum*

2010-2013 **Postdoctoral Research**
Advisor: Prof. Nancy L. Allbritton, University of North Carolina – Chapel Hill
Project: single-cell enzyme assays on a microfluidic platform

2004-2009 **Graduate Research**
Advisor: Prof. Stephen C. Jacobson, Indiana University – Bloomington
Project: transport in and applications of nanofluidic devices

2002-2004 **Undergraduate Research**
Advisors: Profs. Dana M. Spence and R. Scott Martin, Saint Louis University
Project: amperometric detection for a microvasculature biomimic

Advisor: Prof. Michael Jay, University of Kentucky
Project: optimization of aqueous nanosuspensions for liquid scintillation counting

TEACHING EXPERIENCE

Assistant Professor, Trinity College, Hartford, CT

- Introductory Chemistry I (Fall 2015)
- Introductory Chemistry II (Spring 2014)
- Analytical Chemistry (Fall: 2013, 2014)

- Instrumental Methods of Chemical Analysis (Spring: 2014-2016)
- Biological Chemistry (Spring 2016)
- Independent Study – Chemistry and Chemical Analysis of Wine (Spring: 2014, 2015)
- First Year Seminar – $cience: Intersections of Money and Discovery (Fall 2015)

Visiting Instructor, North Carolina A&T State University, Greensboro, NC

- Quantitative Analysis II (Fall 2011)
- General Chemistry VI (Spring 2011)

UNDERGRADUATE RESEARCH MENTORSHIP

Trinity College, Hartford, CT

- Senior Thesis
  - Lorena Lazo de la Vega ’14
- Science Research Apprenticeship
  - Eleanor Clerc ’17 (Spring 2014)
- Undergraduate Research
  - Livia Shehaj ’15 (Fall 2013-Spring 2015)
  - Berjana Nazarko IDP (Summer 2014)
  - Eleanor Clerc ’17 (Fall 2014)
  - Kunwei Yang ’17 (Fall 2014-Fall 2015)
  - Allison Tierney ’17 (Spring-Fall 2015)
  - Zachary Garber ’16 (Summer 2015)
  - Jessica Duong ’19 (Spring 2016)
  - Casey Crowley ’19 (Spring 2016)
  - Kathy Rodogiannis ’17 (Summer 2016)

University of North Carolina, Chapel Hill, NC

- Senior Thesis
  - Ranjit Poonnen (2012-2013)
- Undergraduate Research
  - Uduak Udoeyo (2012) *while enrolled at Temple University
  - Ronald Smith (2011) *while enrolled at North Carolina A&T State University
  - Jessie Xiong (2010-2011)

Indiana University, Bloomington, IN

- Undergraduate Research
  - Graham Erwin (2008-2009)
  - Samuel Sudhoff (2006)
  - Noah Herron (2005)

ACADEMIC HONORS, AWARDS, AND FELLOWSHIPS

2010-2012 SPIRE Postdoctoral Fellowship, University of North Carolina-Chapel Hill, funded by the National Institutes of General Medical Sciences (NIGMS) at NIH

2008	Merck Research Laboratories Fellowship in Analytical/Physical Chemistry
	2nd place student poster in materials science, Indiana Microscopy Society Spring Meeting
	1st place in natural science, Indiana University Women in Science Research Conference
	Academic Travel Award to attend LabAutomation 2008, ALA
2005-2008	Graduate Research Fellowship, National Science Foundation
2007	Felix Haurowitz Award for outstanding performance through the candidacy exam, Indiana University Chemistry Department
	1st place in math/technology, Indiana University Women in Science Research Day
2005	Merck Graduate Analytical/Physical Travel Award
2004	Women in Science Fellowship, Indiana University-Bloomington
	Outstanding Senior Chemistry Student, American Institute of Chemists
	Coryell Award for Undergraduate Research, ACS Division of Nuclear Chemistry & Technology
	I. M. Kolthoff Award for Undergraduate Research, ACS Division of Analytical Chemistry
2003	Saint Louis Rubber Group Scholarship
	Outstanding Junior Chemistry Student, Saint Louis University
	Alpha Sigma Nu (Jesuit Honor Society)
	Phi Beta Kappa

PROFESSIONAL MEMBERSHIPS

- American Association for the Advancement of Science (AAAS)
- American Chemical Society (ACS)
    - Division of Analytical Chemistry
    - Subdivision of Chromatography and Separations Chemistry
- Curriculum development team for the Analytical Sciences Digital Library Active Learning site (June 2014-present)

SERVICE

Committee Member

2015-present	Executive Committee Member of the ACS Division of Analytical Chemistry's Subdivision of Chromatography and Separations Chemistry (SCSC)
2015-present	Individualized Degree Program (IDP) Council, Trinity College
2015-present	Faculty Diversity Working Group, Trinity College
2012-2013	Scientific Review Committee, North Carolina Science & Engineering Fair

2011	Planning & Budget Committees, Biennial Chemical Sciences Symposium, North Carolina A&T State University
2010-2011	Undergraduate Committee, SPIRE Distinguished Scholar Seminar, University of North Carolina

Panelist

2014 Establishing Your Voice in the Classroom, Trinity College
Winter Institute on Technology and Teaching, Trinity College
2013 Finding Teaching Faculty Positions, University of North Carolina
2011 Teaching Your First Undergraduate Course, University of North Carolina
2010 How to Have a Successful Summer Research Experience, University of North Carolina
2009 Introduction to the Postdoc Application Process, Indiana University
How to Make a Successful Research Poster, Indiana University

Other Service

- Reviewer for *Analytical Chemistry*, *Lab on a Chip*, *Electrophoresis*, *Analytical Methods*, *Analytica Chimica Acta*, *Journal of Micromechanics and Microengineering*, and *Journal of Applied Polymer Science*
- Judge for 8 science fairs at the local, regional, and state levels since 2009

GRANTS FUNDED

2016 "RUI: Substrate Reporters and Microelectrophoretic Tools for Lysate and Single-Cell Studies of PKB Activity in *Dictyostelium discoideum*" National Science Foundation, Molecular and Cellular Biosciences, Award No. 1615482, $212,253.

2013 "Analyses of water samples from the Connecticut River watershed: A collaboration between Trinity College instrumental analysis students and 6th graders at Hartford Magnet Trinity College Academy," ACS Division of Analytical Chemistry 75th Anniversary Grant, $500.

2011 "Pesticide Detection: A Joint Project between NCATSU Instrumental Analysis Students and the Rankin Elementary School 5th Grade Class," ACS Division of Analytical Chemistry International Year of Chemistry Grant, $500.

2010 "Giant Unilamellar Vesicles as Proxy Cells in Microfluidic Analyses," SPIRE program, University of North Carolina-Chapel Hill, $2000.

INVITED LECTURES

2016 "Using the Primary Literature in Analytical Chemistry Teaching," Canadian Chemistry Conference and Exhibition (CSC), Halifax, Nova Scotia.

"Microfluidic and peptide-based tools for biochemical investigations of social amoebae," Wesleyan University, Middletown, CT.

2015 "Probing the biochemistry of cellular heterogeneity," Hartwick College, Oneonta, NY.

2014 "Bringing instrumental analysis into the K-12 classroom: Service learning projects and laboratory coursework," Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Chicago, IL.

2013 "Small scale for a large audience: Outreach projects on microfabrication and microfluidics," Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Philadelphia, PA.

2012 "Microfabrication as a tool for biomedical sciences," Oakwood University, Huntsville, AL.

2010 "Understanding cellular heterogeneity through single-cell analyses," North Carolina A&T State University, Greensboro, NC.

2009 "Nanofluidic devices for bacterial chemotaxis assays," DePauw University, Greencastle, IN.

2008 "Integrated micro- and nanofluidic systems for chemical analysis," Saint Louis University, St. Louis, MO.

SELECTED RECENT PRESENTATIONS

30 submitted presentations since 2004, including 8 talks and 22 posters at local, regional, national and international meetings.

2016 "Quantitation of kinase activity in a social amoeba using capillary electrophoresis and a peptide substrate reporter" (podium), the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Atlanta, GA

2015 "Implementing a Peptide Reporter Substrate in *Dictyostelium discoideum*" (poster), the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), New Orleans, LA

2013 "Signaling in single cancer cells" (podium), Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Philadelphia, PA.

"Chemical cytometry of peptidase activity in acute myeloid leukemia cells" (poster), Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Philadelphia, PA.

"Microtechnology to interrogate signaling in single cells" (podium), Symposium on Single Cell/Single Molecule Biology, Albuquerque, NM.

2012 "Incorporating service learning in a laboratory course: A practical guide" (poster), Institutional Research and Academic Career Development Awards Conference, Philadelphia, PA.

"Characterizing sample injection on a microfluidic device for chemical cytometry" (podium) Biomedical Engineering Department Retreat, Raleigh, NC.

Additionally, Trinity undergraduate research students have given 12 submitted poster and podium presentations on our work at local, regional, and national meetings since 2014.

PUBLICATIONS

Undergraduate co-authors are underlined. Equal contribution indicated by *.

Peer-Reviewed Research Articles

13. **ML Kovarik**, AJ Dickinson, P Roy, RA Poonnen, JP Fine, NL Allbritton, "Response of single leukemic cells to peptidase inhibitor therapy across time and dose using a microfluidic device," *Integrative Biology*, **2014**, *6*, 164-174.

12. **ML Kovarik**, PK Shah, PM Armistead, and NL Allbritton, "Microfluidic chemical cytometry of peptide degradation in single drug-treated acute myeloid leukemia cells," *Analytical Chemistry*, **2013**, *85*, 4991–4997.

11. **ML Kovarik**, HH Lai, JC Xiong, and NL Allbritton, "Sample transport and electrokinetic injection in a microchip device for chemical cytometry," *Electrophoresis*, **2011**, *32*, 3180-3187.

10. **ML Kovarik**, PJB Brown, DT Kysela, C Berne, AC Kinsella, YV Brun, and SC Jacobson, "A microchannel-nanopore device for bacterial chemotaxis assays," *Analytical Chemistry*, **2010**, *82*, 9357–9364.

9. **ML Kovarik**, K Zhou,* and SC Jacobson, "Effect of conical nanopore diameter on ion current rectification," *Journal of Physical Chemistry B*, **2009**, *113*, 15960-15966.

8. K Zhou, **ML Kovarik**, and SC Jacobson, "Surface-charge-induced ion depletion and sample stacking near single nanopores in microfluidic devices," *Journal of the American Chemical Society*, **2008**, *130*, 8614-8616.

7. **ML Kovarik** and SC Jacobson, "Integrated nanopore/microchannel devices for ac electrokinetic trapping of particles," *Analytical Chemistry*, **2008**, *80*, 657-664.

6. **ML Kovarik** and SC Jacobson, "Attoliter-scale dispensing in nanofluidic channels," *Analytical Chemistry*, **2007**, *79*, 1655-1660.

5. D Zhu, Z Mu, C Mooty, **M Kovarik**, and M Jay, "Suspensions of fluor-containing nanoparticles for quantifying β-emitting radionuclides in non-hazardous media," *Journal of Pharmaceutical Innovation*, **2006**, *Sept/Oct*, 76-82.

4. **ML Kovarik** and SC Jacobson, "Fabrication of three-dimensional micro- and nanoscale features with single-exposure photolithography," *Analytical Chemistry*, **2006**, *78*, 5214-5217.

3. **ML Kovarik,** MW Li, and RS Martin, "Integration of a carbon microelectrode with a fabricated palladium decoupler for use in microchip capillary electrophoresis/electrochemistry," *Electrophoresis*, **2005**, *26*, 202-210.

2. DM Spence, NJ Torrence, **ML Kovarik**, and RS Martin, "Amperometric determination of nitric oxide derived from pulmonary artery endothelial cells immobilized in a microchip channel," *Analyst*, **2004**, 995-1000.

1. **ML Kovarik**, NJ Torrence, DM Spence, and RS Martin, "Fabrication of carbon microelectrodes with a micromolding technique and their use in microchip-based flow analyses," *Analyst*, **2004**, 400-405.

Review Articles & Book Chapters

7. **ML Kovarik**, "Use of primary literature in the undergraduate analytical class," *Analytical and Bioanalytical Chemistry*, **2016**, *408*, 3045-3049.
6. L Shehaj, L Lazo de la Vega, **ML Kovarik**, "Microfluidic Chemical Cytometry for Enzyme Assays of Single Cells," Chapter 15 in *Single Cell Protein Analysis: Methods and Protocols*, eds. A Singh and A Chandrasekaran, vol. 1346, Methods in Molecular Biology, Humana Press, 2015.
5. **ML Kovarik**, "Analytical chemistry research at primarily undergraduate institutions: training tomorrow's investigators," *Analytical Methods*, **2015**, *7*, 6960-6966.
4. **ML Kovarik**, DM Ornoff, AT Melvin, NC Dobes, Y Wang, AJ Dickinson, PG Gach, PK Shah, and NL Allbritton, "Micro total analysis systems: Fundamental advances and applications in the laboratory, clinic, and field," *Analytical Chemistry*, **2013**, *85*, 451-472.
3. **ML Kovarik,** PC Gach, DM Ornoff, Y Wang, J Balowski, L Farrag, and NL Allbritton, "Micro total analysis systems for cell biology and biochemical analysis," *Analytical Chemistry*, **2012**, *84*, 516-540.
2. **ML Kovarik** and NL Allbritton, "Measuring enzyme activity in single cells," *Trends in Biotechnology*, **2011**, *29*, 222-230.
1. **ML Kovarik** and SC Jacobson, "Nanofluidics in lab-on-a-chip devices," *Analytical Chemistry*, **2009**, *81*, 7133-7140.