

# Rebecca Lahti Matz

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## Education

**Ph.D. in Chemistry**, University of Michigan at Ann Arbor, MI

*In Progress: Began 09/07, Expected Graduation 08/12*

*Advisor: Prof. Mark M. Banaszak Holl*

*Thesis: Effect of Polyplex Exposure on Cell Division and Gene Regulation & Impact of Concurrent Enrollment in Lecture and Laboratory on Student Performance and Retention*

**M.S. in Post-Secondary Science Education**, University of Michigan at Ann Arbor, MI

*In Progress: Began 01/08, Expected Graduation 08/12*

*Advisor: Prof. Joseph S. Krajcik*

12/10 **Certificate of Graduate Studies in Nanobiology**, University of Michigan at Ann Arbor, MI

05/07 **B.S. in Chemistry**, University of Illinois at Urbana-Champaign, IL

Graduated with High Distinction in Chemistry

GPA: 3.56/4.00 in Chemistry, 3.61/4.00 overall

*Advisor: Prof. Scott K. Silverman*

*Thesis: Towards DNA as a Catalyst for RNA Ligation with Adenylated RNA as a Substrate*

## Research Experience

09/07–present **Graduate Student Research Asst.**, U. of Michigan (with Prof. Mark M. Banaszak Holl)

- investigate nanomaterials for and mechanisms of gene delivery using *in vitro* transfection experiments, flow cytometry, dynamic light scattering, gel electrophoresis, PCR arrays, and statistical methods
- analyze chemical education data using SPSS and interpret results

09/05–06/07 **Undergraduate Research Asst.**, U. of Illinois (with Prof. Scott K. Silverman)

- investigated DNA as a catalyst for bioorganic chemical reactions
- synthesized, purified, and determined the integrity of substrates
- imaged results quantitatively with a PhosphorImager system

05/05–08/05 **Nitriles R&D Intern**, BP Petrochemicals, Warrenville, IL (with Dr. Christos Pappas)

- tested ammoxidation catalysts for acrylonitrile production in a small-scale reactor
- analyzed products with spectroscopic methods
- observed large-scale catalyst production in pilot plants

05/04–08/04 **Nitriles R&D Intern**, BP Petrochemicals, Warrenville, IL (with Dr. Eric J. Moore)

- optimized conditions for acetonitrile purification
- engineered an accurate model of real plant conditions
- tested parameters affecting product composition

## Awards & Fellowships

05/10	<b>Wakonse Fellow, Wakonse Conference on College Teaching</b> , U. of Missouri
11/08–06/11	<b>Graduate Fellow, Center for Faith and Scholarship</b> , \$500/yr, Campus Chapel, Ann Arbor, MI
09/08–05/09	<b>Graduate Multicultural Fellow, Colloquium on the Science of Learning</b> , \$1500, Center for Research on Learning and Teaching, U. of Michigan
05/07	<b>Reynold Clayton Fuson Award</b> , \$500, Department of Chemistry, U. of Illinois
08/03	<b>Merit Recognition Scholarship Award</b> , \$1000, U. of Illinois

## Funding Obtained

05/10–04/11	U. of Michigan Center for Research on Learning and Teaching Investigating Student Learning grant, \$4000 <i>Concurrent Versus Non-Concurrent Enrollment in Natural and Physical Science Lecture and Laboratory Courses</i> Rebecca L. Matz and Mark M. Banaszak Holl
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## Publications

3. Khmaladze, A.; **Matz, R.L.**; Epstein, T.; Jasensky, J.; Zhang, C.; Banaszak Holl, M.M.; Chen, Z. "Cell Volume Changes During Apoptosis Monitored in Real Time Using Digital Holographic Microscopy", **2011**, submitted to Journal of Structural Biology.
2. **Matz, R.L.**; Rothman, E.D.; Krajcik, J.S.; Banaszak Holl, M.M. "Does Concurrent Enrollment in Lecture and Laboratory Impact Student Performance and Retention?" **2011**, submitted to the Journal of Research in Science Teaching.
1. Khmaladze, A.; **Matz, R.L.**; Zhang, C.; Wang, T.; Banaszak Holl, M.M.; Chen, Z. "Dual-Wavelength Linear Regression Phase Unwrapping in Three-Dimensional Microscopic Images of Cancer Cells", *Opt. Lett.* **2011**, *36*, 912–914.

Selected for publication in the Optical Society of America's *Virtual Journal for Biomedical Optics* **2011**, *6* (4).

## Teaching & Professional Development as a Graduate Student Instructor

10/10	<b>Completed U-M Graduate Teacher Certificate</b> , Center for Research on Learning and Teaching, U. of Michigan <ul style="list-style-type: none"><li>- reflected and obtained feedback on teaching of organic laboratory classes</li><li>- participated as a mentee in a faculty mentorship on teaching</li><li>- prepared and received feedback on teaching philosophy statement</li></ul>
2009 (fall)	Chem 216 ( <b>Organic II Lab</b> ), Synthesis and Characterization of Organic Compounds, 24 students
2009 (winter)	Chem 211 ( <b>Organic I Lab</b> ), Investigations in Chemistry, 18 students
2008 (fall)	Chem 125/126/130 ( <b>General Chemistry Lab and Discussion</b> ), Macroscopic Investigations and Reaction Principles, 24 students
2008 (winter)	Chem 211 ( <b>Organic I Lab</b> ), Investigations in Chemistry, 12 students
2007 (fall)	Chem 211 ( <b>Organic I Lab</b> ), Investigations in Chemistry, 40 students

## Mentoring

### Undergraduate students mentored

- 02/11–present **Erika M. Kamp**, sophomore in 2010-2011 at U. of Michigan
- 06/10–08/10 **Matthew R. Lozier**, junior in 2010-2011 at Albion College, Albion, MI
- 10/09–07/10 **Jimmy J. Li**, sophomore in 2010-2011 at U. of Michigan  
(for all students)  
- developed projects and guided students' experiments  
- trained in cell culture and flow cytometry techniques, and supervised daily work
- 09/09–04/10 **Graduate Student Mentor**, Department of Chemistry, U. of Michigan  
- participated in consulting training at the Center for Research on Learning and Teaching  
- consulted 16 graduate student instructors each semester on their midterm feedback and was available for follow-up consultations  
- met twice each semester with other mentors and faculty person to plan and debrief

## Academic Service

- 10/10–05/11 **Faculty Classroom Observation Committee**, Department of Chemistry, U. of Michigan  
- piloted a novel classroom observation method for faculty teaching assessment  
- selected by Associate Chair as one of two graduate student committee members
- 05/09–08/09 **Vaughan Symposium Organizing Committee**, Department of Chemistry, U. of Michigan  
- met twice monthly with committee for annual symposium planning, \$10,000+ budget  
- responsible for advertising designs, promotion, and email communication with department  
- updated and maintained symposium website
- 03/09–present **Wiley-Blackwell Scientific Advisory Panel**, John Wiley & Sons, Hoboken, NJ  
- provide feedback and ideas six times yearly regarding scientific publishing via surveys, focus groups, and teleconferences
- 10/06–04/07 **External Publicity Committee**, Engineering Open House, U. of Illinois  
- met weekly to organize various publicity initiatives for the student-organized 2-day event

## Memberships

- 07/09 National Association of Research in Science Teaching
- 05/09 American Chemical Society
- 03/05 Order of Omega Leadership Honor Society

## Oral Presentations

6. Khmaladze, A.; **Matz, R.L.**; Jasensky, J.; Epstein, T.; Zhang, C.; Banaszak Holl, M.M.; Chen, Z. "Dynamic Cellular Volume Measurements by Single and Dual-Wavelength Digital Holographic Microscopy", presented at the Optical Society of America's Digital Holography and Three Dimensional Imaging Topic Meeting, Tokyo, Japan, 05/2011.
5. Khmaladze, A.; **Matz, R.L.**; Zhang, C.; Jasensky, J.; Zhang, C.; Banaszak Holl, M.M.; Chen, Z. "Dual Wavelength Digital Holography Phase Unwrapping by Linear Regression", presented at the SPIE Conference on Defense, Security, and Sensing, Orlando, FL, 04/2011.
4. **Matz, R.L.** "Research in Graduate School and A Bit of Gene Delivery", presented at an Undergraduate Research Opportunity Program (UROP) Seminar, University of Michigan, 09/2010.
3. **Matz, R.L.**; Banaszak Holl, M.M. "Concurrent Versus Nonconcurrent Enrollment in General Chemistry Lecture and Laboratory Courses", presented at the Biennial Conference on Chemical Education, Laboratory Innovations and Investigations Session, Denton, TX, 08/2010.
2. **Matz, R.L.**; Rothman, E.D.; Krajcik, J.S.; Banaszak Holl, M.M. "Concurrent Enrollment in General Chemistry Lecture and Laboratory Decreases Withdrawal Rates and Increases Final Grades in the Lecture", presented at the National Association of Research in Science Teaching Annual Conference, Strand of College Science Teaching and Learning (Grades 13-20), Philadelphia, PA, 03/2010.
1. **Matz, R.L.** "Establishing if Transfection Requires Degradation of the Nuclear Membrane that Occurs During Mitosis", presented at the Michigan Nanotechnology Institute for Medicine and Biological Sciences' Institute-Wide Meeting, University of Michigan, 03/2009.

## Poster Presentations

7. **Matz, R.L.**; Banaszak Holl, M.M. "Polyplex Exposure Decreases HeLa Cell Division Rate and Affects Expression of Cell Cycle and Inflammatory Response Genes", presented at the Department of Chemistry's Vaughan Symposium, University of Michigan, 07/2011.
6. Khmaladze, A.; **Matz, R.L.**; Jasensky, J.; Epstein, T.; Zhang, C.; Banaszak Holl, M.M.; Chen, Z. "The Study of Apoptotic Morphological Changes by Dual-Wavelength Holographic Microscopy", presented at the Conference on Lasers and Electro-Optics, Division of Science and Innovations, Baltimore, MD, 05/2011.
5. **Matz, R.L.**; Banaszak Holl, M.M. "Concurrent Versus Nonconcurrent Enrollment in Physical Science Lecture and Laboratory Courses", presented at the Center for Research on Learning and Teaching's Investigating Student Learning Fair, University of Michigan, 05/2011.
4. **Matz, R.L.**; Erickson, B.; Li, J.J.; Baker, Jr., J.R.; Orr, B.G.; Banaszak Holl, M.M. "Effect of Polyplex Exposure on Cell Division and Gene Regulation", presented at the Michigan Nanotechnology Institute for Medicine and Biological Sciences' Herbert D. Doan Symposium on Nanotechnology, University of Michigan, 04/2011.
3. **Matz, R.L.**; Erickson, B.; Li, J.J.; Orr, B.G.; Baker, Jr., J.R.; Banaszak Holl, M.M. "Polyplex Exposure and Protein Expression Inhibit Cell Division", presented at the Gordon Research Conference on Drug Carriers in Medicine and Biology, Waterville Valley, NH, 08/2010.

## Poster Presentations, cont.

2. **Matz, R.L.**; Banaszak Holl, M.M. "Establishing if Transfection Requires Degradation of the Nuclear Membrane that Occurs During Mitosis", presented at the (a) Department of Chemistry's Vaughan Symposium, University of Michigan, 08/2009; (b) American Chemical Society National Meeting, Division of Biological Chemistry, Washington, D.C., 08/2009; and (c) Michigan Nanotechnology Institute for Medicine and Biological Sciences' Herbert D. Doan Symposium on Nanomaterials and Nanotechniques for Biology, University of Michigan, 09/2009.
1. Kelly, C.V.; **Matz, R.L.**; Baker, Jr., J.R.; Banaszak Holl, M.M.; Orr, B.G. "How Nanoparticles Interact with Living Cells", presented at the Michigan Student Assembly's Environmental Issues Commission Sustainability Fair, University of Michigan, 02/2009.

## Extracurricular Service

05/11–present	<b>Small Group Coordinator</b> , Graduate Christian Fellowship, U. of Michigan
05/10–04/11	<b>President</b> , Graduate Christian Fellowship, U. of Michigan
03/10–present	<b>Nursery Staff</b> , Huron Hills Church, Ann Arbor, MI
01/10–present	<b>Small Group Ministry Team</b> , Huron Hills Church, Ann Arbor, MI
08/09–04/10	<b>New Student Outreach Coordinator</b> , Graduate Christian Fellowship, U. of Michigan
09/08–05/11	<b>Bible Study Leader and Host</b> , Graduate Christian Fellowship, U. of Michigan
11/07–06/08	<b>Big Brothers Big Sisters Mentor</b> , Washtenaw County, MI
06/07–08/07	<b>English Camp Global Project</b> , InterVarsity Christian Fellowship, Satic, Romania
08/06–09/06	<b>Recruitment Counselor</b> , Panhellenic Council, U. of Illinois
01/05–12/05	<b>New Member Educator</b> , Phi Mu Sorority, U. of Illinois
09/04–05/07	<b>Bible Study Leader</b> , Greek InterVarsity, U. of Illinois

## References

### Professor Mark M. Banaszak Holl

*Ph.D. Advisor*

Professor of Chemistry and Macromolecular Science & Engineering  
Associate Vice President for Physical & Natural Sciences

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### Professor Joseph S. Krajcik

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Co-Director of the IDEA Institute

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### Professor Bradford G. Orr

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### Professor James R. Baker, Jr., M.D.

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Professor of Internal Medicine and Biomedical Engineering  
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