Matthew A. Ray

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SUMMARY

- Professor of Chemistry with past industrial research and management experience
- Effective at teaching complex material in an easy to understand and engaging way
- Project leader with strong ability to work in cross-functional teams and drive research progress
- Excellent understanding of polymer mechanics, colloidal dynamics, and surface interactions
- Demonstrated ability with product design, development, and commercialization

EXPERIENCE

University of Wisconsin – Stout, Department of Chemistry and Physics, *Menomonie WI*
Professor of Chemistry, 2019 – Present
Associate Professor, 2014 – 2019
Assistant Professor, 2010 – 2014

- Laboratory and lecture curriculum development for the following courses: Chemistry of Materials, Chemistry of Polymers, Industrial Chemistry, Nanotechnology Applications, Physical Chemistry, and General Chemistry
- Served as the Materials and Nanoscience concentration coordinator for the B.S. Applied Science program, 2017 - Present
- Mentored and supervised 19 undergraduate research students in the past 9 years
- Advisory board member for the Plastics Engineering and Manufacturing Engineering Programs
- Industrial consulting for multiple companies through the UW-Stout Manufacturing Outreach Center in a variety of technical areas including, polymer coated frac sand, polymeric food additives, paints and coatings, rheology of ophthalmological drug suspensions, and safety shoe manufacture.

Thermo Fisher Scientific, Particle Technology Division*, Indianapolis IN*
R&D Manager, 2008 – 2010

- Led a research and development group in the discovery and commercialization process of multiple products and procedures in an FDA regulated environment (medical device – ISO 13485)
- Designed and optimized particle coupling protocols for proteins and small molecules, including monoclonal antibodies, protein A/G, and streptavidin
- Developed a proprietary magnetic particle blocking layer to greatly reduce non-specific binding of matrix proteins leading to a new family of products
- Managed a variety of customer driven projects to develop particle based assay components for applications including prion detection and genome sequencing

R&D Scientist, 2006 – 2008

- Expanded upon patented technology to produce Next Generation SeraMag SpeedBead Magnetic Particles with superior size distribution and performance characteristics
- Routinely offered technical expertise to troubleshoot internal production issues and customer application challenges, chaired customer teleconferences and traveled for on-site customer visits
- Trained in Practical Process Improvement (PPI) and initiated a manufacturing process optimization project that resulted in a cost savings of greater than $140,000 per year

Lehigh University, Department of Chemistry and Emulsion Polymers Institute, *Bethlehem PA*

Research Assistant and Amstutz Fellow, 2002 – 2006

- Discovered and published new methods for promoting self-assembly of colloidal particles and depositing the resulting particle arrays onto solid substrates in an highly ordered fashion
- Frequently utilized organosilane self-assembled monolayers for surface functionalization
- Designed and constructed a modified Langmuir-Blodgett trough for particle monolayer deposition
- Proficient with emulsion and dispersion polymerization, monomer and polymer synthesis including anionic and transition metal catalyzed co-polymerization, and inorganic nanoparticle synthesis
- Experienced in dry box and air-free Schlenk line techniques for organic and organometallic synthesis

Teaching Assistant, 2001 – 2002

- Led Advanced General Chemistry laboratories and lecture course recitations

EDUCATION

PhD, Chemistry*, Lehigh University, Bethlehem PA,* ***2007***

- Dissertation: “Bottom-Up Surface Self-Assembly of Polymer Colloids to Form Patterned Arrays”
- Advisers: Li Jia, Greg Ferguson

MS, Chemistry*, Lehigh University, Bethlehem PA,* ***2005***

- Thesis: “Dynamic Self-Assembly of Polymer Colloids to Form Linear Patterns”
- Adviser: Li Jia

BS, Chemistry*, (magna cum laude), Bob Jones University, Greenville SC,* ***2001***

- Minor: Physics, Major-Minor GPA: 4.00, Cumulative GPA: 3.88
- Thesis: “Synthesis of a Novel Cross-Linking Monomer for Fuel Cell Membrane Applications”
- Adviser: George Matzko (Clemson REU-SURP Adviser: Darryl DesMarteau)

AFFILIATIONS

- Emulsion Polymers Institute, Lehigh University
- American Chemical Society
- Sigma Xi
- American Association of Clinical Chemists

PUBLICATIONS AND PATENTS

- Holzman, N.J.; Ray, M.A. “Photopolymerization of Methylmethacrylate: An Inexpensive, Open-Source Approach for the Undergraduate Lab.” *University of Wisconsin-Stout Journal of Student Research*, **2015**, 15, 152-164.
- Jia, L.; Ray, M.A. “Method of Transferring Patterned Non-Densely Packed Interfacial Particle Films onto Substrates.” US Patent 7,939,133, May 10, **2011**.
- Ray, M.A.; Shewmon, N; Bhawalkar, S.; Jia, L.; Yang, Y.; Daniels, E.S. “Submicron Surface Patterning Using Interfacial Colloidal Particle Self-Assembly.” *Langmuir*, **2009**, 25, 7265-7270.
- Ray, M.A.; Jia, L. “Micropatterning by Non-Densely Packed Interfacial Colloidal Crystals.” *Adv. Mater*, **2007**, 19, 2020-2022.
- Ray, M.A.; Kim, H.; Jia, L. “Dynamic Self-Assembly of Polymer Colloids to Form Linear Patterns.” *Langmuir*, **2005**, 21, 4786-4789.

SELECTED PRESENTATIONS

- In addition to the external presentations listed below, my research group students have presented **18 Research Day** posters and my students doing in-class research have presented **58 STEM EXPO** posters at University of Wisconsin-Stout.
- Wentz, M.; Rodriguez, G.; Seaver, J.E.; Ray, M.A. "Developing Cross-Institutional Research Partnerships Focusing on The UN Sustainable Development Goals." *Polytechnic Summit 2019, Menomonie WI*, June 3, **2019**.
- Manuele, D.; Mkwandwire, H.; Miller, J,; Doctor, C.; Hullen, E.; Finder, B.; Lacksonen, T.; Ray, M.A. "Increasing the Efficiency of a Hydroelectric Generator Built and Designed for Malawi Africa." *16th Annual Research in the Rotunda, Madison WI*, April 17, **2019**.
- Hirsch, T.; O'Brien, R.; Deeg, N.; Ray, M.A.; Kramschuster, A. "Color Matching for Low Volume Plastics Processing." SPE Poster Number: 2018-UG39. *Society of Plastics Engineers Annual Technical Conference, Orlando FL,* May 7-10, **2018**.
- Manuele, D.; Ray, M.A.; Finder, B.; Lacksonen, T. "Increasing the Efficiency of a Hydroelectric Generator Produced and Operated in Malawi Africa." *(Devon Manuele won 1st prize in the Student Researchers Competition, Engineering and Technology category). 18th National Role Models Conference, Washington DC*, Sept. 29-Oct. 1, **2017**.
- Moehring, N.; Marra-Mateus, F.; Ray, M.A. "Photoluminescent Borosilicate Glass: A Material with a Bright Future." *Regional Materials and Manufacturing Network (RM^{2}N) Fall Symposium, Menomonie WI*, Oct. 17, **2016**.
- Holzman, N.; Ray, M.A. "Photochemistry for Paupers: The Quest to Fabricate a Photochemical Reactor." *Upper Midwest Regional Honors Conference, Waverly IA*, April 24-26, **2014**.
- Raethke, E.; Ray, M.A. "Protein Assisted Particle Self-Assembly for Multiplex Analyte Detection" *UW System Symposium for Undergraduate Research and Creative Activity, Milwaukee WI*, April 11, **2014**.
- Marra-Mateus, F.; Ray, M.A. "Photoluminescent Borosilicate Glass: A Material with a Bright Future." *7th Annual Wisconsin Science and Technology Symposium, Eau Claire WI*, July 21-22, **2014**.
- Barrix, C.; Ramirez, D.; Woellner, M.; Ray, M.A. "From Synthesis to Injection Molding, a 360° Polymer Lab Experience." *UW System Office of Professional and Instructional Development (OPID) 2014 Spring Conference, Green Lake WI*, April 18, **2014**.
- Barrix, C.; Ramirez, D.; Woellner, M.; Ray, M.A. "From Synthesis to Injection Molding, a 360° Polymer Lab Experience." *40th UW System Chemistry Faculties Meeting, River Falls WI*, Oct. 25, **2013**.
- Yungbauer, T.; Smith, K.; Woellner, M.; Ray, M.A. "Protein Assisted Particle Self-Assembly for Multiplex Analyte Detection." *8th Annual Minnesota Nanotechnology Workshop, University of Minnesota, Minneapolis MN,* November 7-8, **2012**.
- Doyle, J.; Ray, M.; Ouyang, A.; Benton, B.; Bell, P.A. "High throughput proteomic applications using protein A/G magnetic beads." Abstract 4877, DOI: 10.1158/1538-7445.AM2011-4877, *American Association for Cancer Research (AACR) 102nd Annual Meeting, Orlando FL,* April 2-6, **2011**.
- Ray, M.A.; Kim, H.; Jia, L. "Dynamic Self-Assembly of Polymer Colloids To Form Linear Patterns." *230th ACS National Meeting, Washington DC*, Aug. 28-Sept. 1, **2005**, COLL-415.
- Ray, M.A.; Kim, H.; Jia, L. "Dynamic Self-Assembly of Polymer Colloids To Form Linear Patterns." *Gordon Research Conference on Polymer Colloids, Tilton NH*, July 3-8, **2005**.
- Ray, M.A.; Jia, L. "Patterning of Functionalized Polymer Colloids by Self-Assembly." *228th ACS National Meeting, Philadelphia PA*, Aug. 22-26, **2004**, COLL-151.

SELECTED CONFERENCES AND SEMINARS ATTENDED

- ***Polytechnic Summit 2019***, University of Wisconsin-Stout, Menomonie WI, June 3-5, **2019**
- ***Effective Teaching: A Workshop***, presented by Dr. Rebecca Brent, President of Education Designs Inc. and Dr. Richard M. Felder, Professor Emeritus, North Carolina State University, hosted by the UW-Stout Nakatani Teaching and Learning Center, Menomonie WI, January 16-17, **2019**
- ***Global Partners European Alliance Research Symposium***, Coventry University, Coventry, United Kingdom, October 23, **2018**
- ***42nd UW System Chemistry Faculties Meeting***, Madison WI, Oct. 23–24, **2015**

- ***7th Annual Wisconsin Science and Technology Symposium***, Eau Claire WI, July 21-22, **2014**
- ***Transforming Student Learning with Undergraduate Research Workshop***, Research Skill Development Framework, presented by Dr. John Willison from the University of Adelaide, hosted by the UW-Stout Nakatani Teaching and Learning Center, Menomonie WI, July 2, **2014**
- ***UW System Office of Professional and Instructional Development (OPID) 2014 Spring Conference***, Green Lake WI, April 17-18, **2014**
- ***40th UW System Chemistry Faculties Meeting****, River Falls WI*, Oct. 25, **2013**
- ***8th Annual Minnesota Nanotechnology Workshop***, University of Minnesota, Minneapolis MN, November 7-8, **2012**
- ***6th Annual Minnesota Nanotechnology Workshop***, University of Minnesota, Minneapolis MN, October 7-8, **2010**
- ***Opening Workshop for New STEM Educators: Inclusive Teaching Methods***, Clearwaters Hotel & Convention Center, Marshfield WI, Sept. 30-Oct. 1, **2010**
- ***Emulsion Polymers Liaison Program Annual Review Meeting and Workshop***, Lehigh University, Bethlehem PA, May 6-7, **2010**
- ***Supervising and Managing People Workshop***, presented by Phil Thompson, Comprehensive Performance Systems, hosted by the Indiana Chamber of Commerce, Indianapolis IN, Sept. 18-19, **2008**
- ***Harnessing New Technology for Clinical Diagnostics***, 39th Annual AACC Oak Ridge Conference, St. Louis MO, April 19-20, **2007**
- ***Enabling Targeted Therapies and Non-Invasive Imaging***, 7th Annual Targeted Nanodelivery Conference, presented by Cambridge Health Institute, Baltimore MD, Oct. 12-13, **2006**