

Andrea D. Merg, Ph.D.

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PROFESSIONAL APPOINTMENTS

Assistant Professor, University of California, Merced **2020 - present**
Department of Chemistry and Biochemistry

EDUCATION

Postdoctoral Fellow, Emory University, Atlanta, GA **2017 - 2020**

Advisor: Prof. Vincent P. Conticello

Research: Synthesis of crystalline nanoarchitectures from collagen-mimetic peptides

Ph.D., Chemistry, University of Pittsburgh, Pittsburgh, PA **2017**

Advisor: Prof. Nathaniel L. Rosi

Research: Peptide-directed assembly of gold nanoparticle superstructures

B.S., Chemistry, Winthrop University, Rock Hill, SC **2010**

Advisor: Prof. Aaron M. Hartel

Research: Investigated the Mukaiyama aldol reaction of β -hydroxy silylenolethers

RESEARCH INTERESTS

Nanoarchitectonics, Supramolecular Chemistry, Biomolecular Self-Assembly, Nanoparticle Assembly, Reticular Chemistry, Peptide Synthesis, Bioconjugation, Biomaterials, Materials Chemistry

PEER-REVIEWED PUBLICATIONS

Publications listed in reverse chronological order (# denotes co-first authorship and underlined author indicates undergraduate student mentee).

10. **A. D. Merg**,[#] G. Touponse,[#] E. van Genderen, T. B. Blum, X. Zuo, A. Bazrafshan, H. Siaw, A. McCanna, R. B. Dyer, K. Salaita, J. P. Abrahams, V. P. Conticello. "Shape-Shifting Peptide Nanomaterials: Surface Asymmetry Enables pH Dependent Formation and Interconversion of Collagen Tubes and Sheets." *J. Am. Chem. Soc.* **2020**, *142*, 19956-19968.
9. **A. D. Merg**, E. van Genderen, A. Bazrafshan, H. Su, X. Zuo, G. Touponse, T. B. Blum, K. Salaita, J. P. Abrahams, V. P. Conticello. "Seeded Heteroepitaxial Growth of Crystallizable Collagen Triple Helices: Engineering Multifunctional Two-Dimensional Core-Shell Nanostructures." *J. Am. Chem. Soc.* **2019**, *141*, 20107-20117.
8. **A. D. Merg**, G. Touponse, E. van Genderen, X. Zuo, A. Bazrafshan, T. Blum, S. Hughes, K. Salaita, J. P. Abrahams, V. P. Conticello. "2D Crystal Engineering of Nanosheets Assembled from Helical Peptide Building Blocks." *Angew. Chem. Int. Ed.* **2019**, *58*, 13507-13512.
7. **A. D. Merg**, R. V. Thaner, S. Mokashi-Punekar, S. T. Nguyen, N. L. Rosi. "Triblock peptide-oligonucleotide chimeras (POCs): programmable biomolecules for the assembly of morphologically tunable and responsive hybrid materials." *Chem. Commun.* **2017**, *53*, 12221-12224.
6. S. Mokashi-Punekar, **A. D. Merg**, N. L. Rosi. "Systematic Adjustment of Pitch and Particle Dimensions within a Family of Chiral Plasmonic Gold Nanoparticle Single Helices." *J. Am. Chem. Soc.* **2017**, *139*, 15043-15048.
5. **A. D. Merg**, Y. Zhou, A. M. Smith, J. E. Millstone, N. L. Rosi. "Ligand Exchange for Controlling the Surface Chemistry and Properties of Nanoparticle Superstructures." *ChemNanoMat* **2017**, *3*, 745-749. (**Cover Feature**)

4. **A. D. Merg**, J. C. Boatz, A. Mandal, G. Zhao, S. Mokashi-Punekar, C. Liu, X. Wang, P. Zhang, P. C. A. van der Wel, N. L. Rosi. "Peptide-Directed Assembly of Single-Helical Gold Nanoparticle Superstructures Exhibiting Intense Chiroptical Activity." *J. Am. Chem. Soc.* **2016**, *138*, 13655-13663.
3. C. Liu, C. Zeng, T-Y. Luo, **A. D. Merg**, R. Jin, N. L. Rosi. "Establishing Porosity Gradients within Metal-Organic Frameworks using Partial Postsynthetic Ligand Exchange." *J. Am. Chem. Soc.* **2016**, *138*, 12045-12048.
2. **A. D. Merg**, J. Slocik, M. G. Blaber, G. C. Schatz, R. Naik, N. L. Rosi. "Adjusting the Metrics of 1-D Helical Gold Nanoparticle Superstructures Using Multivalent Peptide Conjugates." *Langmuir* **2015**, *31*, 9492-9501.
1. C. Zhang, Y. Zhou, **A. Merg**, C. Song, G. C. Schatz, N. L. Rosi. "Hollow spherical gold nanoparticle superstructures with tunable diameters and visible to near-infrared extinction." *Nanoscale* **2014**, *6*, 12328-12332.

PATENTS

3. V. P. Conticello, A. D. Merg, G. Touponse "Self-Assembling Collagen-Like Polypeptides for Applications and Uses Related Thereto." Filed 2021, US Patent: 17/140,449.
2. N. L. Rosi, A. D. Merg, R. V. Thaner, S. T. Nguyen, "Peptide-oligonucleotide chimeras (POCs) as programmable biomolecular constructs for the assembly of morphologically tunable soft materials." Filed 2018, US Patent: 15/941626.
1. N. L. Rosi, A. D. Merg, "Single-helical gold nanoparticle superstructures and methods of making." Filed 2018, US Patent: 15/842625.

PRESENTATIONS

At UC Merced

A. D. Merg, "Biomolecular Self-Assembly of Designer 2D and 3D Peptide/Protein-Based Nanoarchitectures." California State University, Sacramento, Department of Chemistry, Sacramento, CA, February 5, 2021. (Invited seminar)

A. D. Merg, "Biomolecular Self-Assembly of Designer 2D and 3D Peptide/Protein-Based Nanoarchitectures." California State University, Fresno, Department of Chemistry and Biochemistry, Fresno, CA, December 4, 2020. (Invited seminar)

A. D. Merg, "Biomolecular Self-Assembly of Designer 2D and 3D Peptide/Protein-Based Nanoarchitectures." California State Polytechnic University, Pomona, Department of Chemistry and Biochemistry, Pomona, CA, October 30, 2020. (Invited seminar)

Before UC Merced

A. D. Merg, G. Touponse, A. Bazrafshan, H. Su, K. Salaita, V. P. Conticello, "2D Multicomponent Core-Shell Nanosheets Derived from Designed Collagen-Mimetic Peptides." American Chemical Society National Meeting, Orlando, FL, April 3, 2019.

A. D. Merg, R. V. Thaner, S. Mokashi-Punekar, S. T. Nguyen, N. L. Rosi. "Peptide-Oligonucleotide Chimeras (POCs): Programmable Building Blocks for the Construction of Soft Nanoscale Matter." American Chemical Society National Meeting, San Francisco, CA, April 2017. (Poster)

A. D. Merg, J. C. Boatz, A. Mandal, G. Zhao, S. Mokashi-Punekar, C. Liu, X. Wang, P. C. A. van der Wel, P. Zhang, N. L. Rosi, "Peptide-Directed Assembly of Single-Helical Gold Nanoparticle Superstructures Exhibiting Intense Chiroptical Activity." American Chemical Society National Meeting, Philadelphia, PA, August 20, 2016.

A. D. Merg, G. Zhao, S. Mokashi-Punekar, A. Mandal, J. Boatz, X. Wang, P. van der Wel, P. Zhang, N. L. Rosi. "Peptide-Based Synthesis of Single-Helical Gold Nanoparticle Superstructures," American Chemical Society Regional Meeting (CERM), Covington, KY, May 20, 2016.

A. D. Merg, G. Zhao, S. Mokashi-Punekar, A. Mandal, J. Boatz, X. Wang, P. van der Wel, P. Zhang, N. L. Rosi. "Peptide-Based Approach for Directing the Synthesis of Helical Gold Nanoparticle Superstructures," Innovations in Materials Chemistry, sponsored by PPG, Pittsburgh, PA, May 6, 2016. (Invited seminar)

A. D. Merg, G. Zhao, P. Zhang, N. L. Rosi. "Examining the Role of Methionine Oxidation on the Preparation of Single Helical Nanoparticle Superstructures." Pacificchem, Honolulu, HI, December 2015. (Poster)

C. Zhang, Y. Zhou, A. Merg, C. Song, G. C. Schatz, N. L. Rosi, "Hollow spherical gold nanoparticle superstructures with tunable diameters and visible to near-infrared extinction." Materials Research Society Fall Meeting, Boston, MA, December 2014.

A. D. Merg, N. L. Rosi. "Multivalent Peptide Conjugates for Rationally Controlling the Structure and Assembly of Chiral Nanoparticle Double Helices." Gordon Research Conference, South Hadley, MA, June 2014. (Poster)

A. D. Merg, N. L. Rosi. "Multivalent Peptide Conjugates for Rationally Controlling the Structure and Assembly of Chiral Nanoparticle Double Helices." Pitt-PPG "Innovations in Materials Chemistry" Symposium, Pittsburgh, PA, May 2014. (Poster)

A. R. Benavides, A. D. Merg, A. M. Hartel. "Mukaiyama Aldol Additions of Simple and β -Hydroxy Methylphenylsilyl Enol Ethers." American Chemical Society National Meeting, San Francisco, CA, March 2010. (Poster)

AFFILIATIONS AND SERVICE

Member, American Chemical Society

Affiliate Member, Center for Cellular and Biomolecular Machines (CCBM), UC Merced **2021 - present**

Co-Organizer, ACS Project SEED, UC Merced **2022 - present**

Session Co-Chair, Biological and Biomimetic Materials, 2022 AACGE-West Conference **2022**

AWARDS AND HONORS

UC Merced Remote Instruction Excellence Award **2020**

TEACHING EXPERIENCE

Instructor, University of California, Merced

- CHEM 290: Supramolecular Materials Chemistry **Spring 2022**
- CHEM 002: General Chemistry I **Fall 2020**

Teaching Assistant, University of Pittsburgh **2011 - 2013, 2017**

- CHEM 0110: General Chemistry I Lab
- CHEM 0120: General Chemistry II Lab
- CHEM 1140: Advanced Inorganic Lab

Chemistry Tutor, Winthrop University **2010**

- Weekly tutor in Chem dept.