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## MATHEW M. MAYE, PH.D. PROFESSOR & CHAIR OF CHEMISTRY

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### EDUCATION

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- 2001-2005** Ph.D. in Materials Chemistry, State University of New York at Binghamton.  
Dissertation: “*Design, Synthesis, and Assembly of Functional NanoArchitectures*”  
Advisor: Professor Chuan-Jian Zhong
- 1997-2001** B.S. in Chemistry, State University of New York at Binghamton.
- 2005-2008** Goldhaber Distinguished Fellow, Center for Functional Nanomaterials  
Brookhaven National Laboratory, Upton, NY.  
Supervisor: Dr. Oleg Gang (Soft & Biological Nanomaterials Theme Leader)
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### PROFESSIONAL POSITIONS & FELLOWSHIPS

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- 2019-** Department Chair, Department of Chemistry, Syracuse University
- 2017-** Professor, Department of Chemistry, Syracuse University
- 2018** Executive Committee Member, Syracuse Soft & Living Matter (SLM) Institute
- 2015-2018** Deans Professor of Science, College of Arts & Sciences, Syracuse University
- 2014** Co-founder, Pelitex Inc.
- 2015-2019** CTO, Pelitex Inc.
- 2013-2017** Associate Professor, Department of Chemistry, Syracuse University
- 2008-2012** Executive Committee Member, Syracuse Biomaterials Institute (SBI)
- 2008-2013** Assistant Professor, Department of Chemistry, Syracuse University
- 2008-2018** Faculty Member, Syracuse Biomaterials Institute, Syracuse University
- 2005-2008** Goldhaber Distinguished Fellow, Center for Functional Nanomaterials, Syracuse University
- 2002-2005** DoD NDSEG Graduate Fellow, Sponsored by Army Research Office (ARO)
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### HONORS & AWARDS

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- Dean’s Professor of Science, College of Arts & Sciences, Syracuse University, 2016-2018
  - Promotion to Full Professor, 2017
  - Early Tenure & Promotion to Associate Professor, 2013.
  - White House Presidential Early Career Award for Scientists and Engineers (PECASE), Sponsored by the Air Force Office of Scientific Research (AFOSR).
  - Syracuse University Forensics and National Security Faculty Fellowship, 2012-2015.
  - Syracuse University Meredith Teaching Award, 2013.
  - Technologist of the Year for 2013, Central New York Technology Alliance.
  - ACS-PRF New Investigator Award, 2011.
  - DOE Gordon Battelle Prize, co-recipient with Oleg Gang & Niels *van der Lelie*, 2011.
  - Goldhaber Distinguished Fellowship, Brookhaven National Laboratory, U.S. Department of Energy, 2005-2008
  - Department of Defense: National Defense Science & Engineering Graduate Fellowship (NDSEG)-Sponsored by the Army Research Office, 2002-05.
  - ACS Zappert Award for Excellence in Research, Upstate New York Region, 2006.
  - University Award for Excellence in Graduate Research, SUNY-Binghamton, 2005.
  - MRS International Graduate Student *Gold* Award, 2002.
  - NSF Graduate Fellowship Honorable Mention, 2002 & 2001.
  - Outstanding Teaching Assistant Award, SUNY-Binghamton, 2002.
  - MRS Undergraduate Materials Research Initiative (MRS-UMRI) Award, 2000 & 2001.
  - ACS Undergraduate Analytical Chemistry Award, SUNY-Binghamton, 2000.
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### SUPPORT

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- Peter Thiel Foundation Breakout Labs Investment/Grant (at Pelitex), AFOSR PECASE 2010-2015 (PI); NSF-DMR 2014-2016 (PI); NSF-MRI 2015-2018 (co-PI); Industry Sub-contract 2015-2017 (PI); ACS-PRF 2011-2013 (PI); NSF-IGERT 2012-2015 (senior personnel, advisor), Syracuse Forensics Science & National Security Seed Grant, 2012-2015 (PI); NSF-REU 2013-2015 (senior personnel), NSF-MRI 2011-2016 (senior personnel), NSF-MRI 2011-2012 (senior personnel), EPA-CARTI 2009-2010 (co-PI).
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### SELECTED PUBLICATIONS SINCE 2008 (Postdoc, GRAD, UNDERGRAD, \*PI)

Summary: >130 peer reviewed publications, >6,999 citations, h-index = 42

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1. Y. Chen, E.G. Ripka, J.M. Franck, **M.M. Maye\*** "Ligand Surface Density Decreases with Quantum Rod Aspect Ratio" *J. Phys. Chem. C* **2019**, *123*, 23682
2. A.H. Davis, E. Hoffman, K. Chen, Z-J. Li, A. Khammang, H. Zamani, J.M. Franck, M.M. Maye, R.W. Meulenberg, W. Zheng\* "Exciton Energy Shifts and Tunable Dopant Emission in Manganese Doped Two-Dimensional CdS/ZnS Core/Shell Nanoplatelets" *Chem. Mater.* **2019**, *31*, 2516.
3. E.G. Ripka, C.R. Deschene, J.M. Franck, **M.M. Maye\*** "Understanding the Surface Properties of Haide Exchanged Cesium Lead Halide Nanoparticles" *Langmuir* **2018**, *34*, 11139-11146.
4. P.N. Njoki\*, M.E.D. Roots, M.M. Maye "The surface Composition of Au/Ag Core/Alloy Nanoparticles Influences the Methanol Oxidation Reaction" *ACS Applied Nano Materials* **2018**, *10*, 5640-5645
5. **T.L. Doane\***, **K.L. Ryan**, **L. Pathade**, **K.J. Cruz-Lopez**, M.M. Maye\*, "Using Perovskite Nanoparticles as Halide Reservoirs in Catalysis and as Spectrochemical Probes of Ions in Solution" *ACS Nano* **2016**, *10*, 1864-5872.
6. Z-J. Li, E. Hoffman, A. Davis, M.M. Maye, W. Zheng\* "General Strategy for the Growth of CsPbX<sub>3</sub> (X = Cl, Br, I) Perovskite Nanosheets from the Assembly of Nanorods" *Chem. Mater.* **2018**, *30*, 3854.
7. J-S. Chen, T.L Doane, M. Li, H. Zang, **M.M. Maye\***, M. Cotlet\* "0D-2D and 1D-2D Semiconductor Hybrids Composed of All Inorganic Perovskite Nanocrystals and Single-Layer Graphene with Improved Light Harvesting" *Particle* **2018**, *35*, 1700310.
8. R. Alam, L. Karam, T. Doane, K. Coopersmith, D. Fontaine, B.R. Branchini, **M.M. Maye\*** "Probing the High Bioluminescence Resonance Energy Transfer Efficiency in Quantum Rod – Luciferase Nanoconjugates" *ACS Nano* **2016**, *10*, 1969-1977
9. P.S. Lutz, I.T. Bae, **M.M. Maye\*** "Heterostructured Au/Pd-M (M = Au, Pd, Pt) Nanoparticles with Compartmentalized Composition, Morphology, and Electrocatalytic Activity" *Nanoscale* **2015**, *7*, 15748-15756.
10. K. Coopersmith, H. Han, **M.M. Maye\*** "Stepwise Assembly and Characterization of DNA Linked Two-Color Quantum Dot Clusters" *Langmuir* **2015**, *31*, 7463-7471
11. R.D. Slaton, I. Bae, P.S. Lutz, L. Pathade, **M.M. Maye\*** "The Transformation of  $\alpha$ -Fe Nanoparticles into Multi-Domain FeNi-M<sub>3</sub>O<sub>4</sub> (M = Fe, Ni) Heterostructures by Galvanic Exchange" *J. Mater. Chem. C*, **2015**, *3*, 6367-6375.
12. T. Doane, R. Alam, M.M. Maye\* "Functionalization of Quantum Rods with Oligonucleotides for Programmable Assembly with DNA Origami" *Nanoscale* **2015**, *7*, 2883-2888.
13. R. Alam, L.M. Karam, T.L. Doane, J. Zylstra, D.M. Fontaine, B.R. Branchini, **M.M. Maye\*** *Nanotechnology* **2014**, *25*, 495606.
14. J. Gooch, A.A. Jalan, S. Jones, C.R. Hine, R. Alam, S. Garai, **M.M. Maye\***, A. Muller, J. Zubietta\* "Keplerate cluster (Mo-132) mediated electrostatic assembly of nanoparticles" *J. Colloid Interface Sci.* **2014**, *432*, 144-150.
15. W. Wu, **M.M. Maye\*** "Void Coalescence in Core/Alloy Nanoparticles with Stainless Interfaces" *Small* **2014**, *10*, 271-276.
16. H. Zang, P.K. Routh, R. Alam, **M.M. Maye**, M. Cotlet\* "Core size dependent hole transfer from a photexcited CdSe/ZnS quantum dot to a conductive polymer" *Chemical Communications*, **2014**, *50*, 5958-5960. [Cover Article]
17. K.L. Hamner, C.M. Alexander, K. Coopersmith, D. Reishofer, C. Provenza, **M.M. Maye\*** "Using Temperature Sensitive Smart Polymers to Regulate DNA-Mediated Nanoassembly and Encoded Nanocarrier Drug Release" *ACS Nano* **2013**, *7*, 7011-7020.
18. C. M. Alexander, K. L. Hamner, **M.M. Maye\***, J.D. Dabrowiak\* "Multifunctional DNA-Gold Nanoparticles for Targeted Doxorubicin Delivery" *Bioconjugate Chem.* **2014**, *25*, 1261-1271.
19. S. Majumder, I.T. Bae, **M.M. Maye\*** "Investigating the role of polytypism in the growth of multi-shell CdSe/CdZnS quantum dots" *J. Mater. Chem. C* **2014**, *2*, 4659-4666.
20. Z. Xu, C. R. Hine, **M. M. Maye**, Q. Meng, M. Cotlet\* "Shell Thickness Dependent Photoinduced Hole Transfer in Hybrid Conjugated Polymer/Quantum Dot Nanocomposites: from Ensemble to Single Hybrid Level" *ACS Nano* **2012**, *6*, 4984-499
21. W. Wu, **M.M. Maye\*** "Discrete Dipole Approximation Analysis of Plasmonic Core/Alloy Nanoparticles" *ChemPhysChem* **2014**, *12*, 2582-2587.
22. K.L. Hamner, **M.M. Maye\*** "Thermal Aggregation Properties of Nanoparticles Modified with Temperature Sensitive Copolymers" *Langmuir* **2013**, *29*, 15217-15223
23. P. N. Njoki, W. Wu, **M.M. Maye\*** "Growth Characteristics and Optical Properties of Core/Alloy Nanoparticles Fabricated via the Layer-by-Layer Hydrothermal Route" *Chemistry of Materials* **2013**, *25*, 3105-3113.
24. R. Alam, J. Zylstra, D. Ablamsky, B. Branchini, **M.M. Maye\*** "Novel Multistep BRET-FRET Energy Transfer using Nanoconjugates of Firefly Proteins, Quantum Dots, and Red Fluorescent Proteins" *Nanoscale* **2013**, *5*, 5303-5306

25. **M.M. Maye\*** "Self-Assembly: En Route to patchy superlattices" [Nature Nanotechnology 2013, 8, 5-6.](#) (News & Views Review)
26. **H. Han, V. Valle, M.M. Maye\*** "Probing Resonance Energy Transfer and Inner Filter Effects in Qdot – Large Metal Nanoparticle Clusters using a DNA-mediated Quench and Release Mechanism" [Journal of Physical Chemistry C 2012 116, 22996-23003](#)
27. **H. Han, V. Valle, M.M. Maye\*** "Probing the quenching of CdSe/ZnS qdots by Au, Au/Ag, and Au/Pd Nanoparticles" [Nanotechnology 2012 23 435401](#)
28. **P.N. Njoki, P. Lutz, W. Wu, L. Solomon, M.M. Maye\*** "Exploiting Core/Shell and Core/Alloy Interfaces for Asymmetric Growth of Nanoparticles" [Chem. Commun., 2012,48, 10449-10451](#)
29. **R. Alam, D. Ablamsky, B. Branchini, M.M. Maye\*** "Designing Quantum Rods for Optimized BRET with Firefly Luciferase Enzymes" [Nano Letters 2012, 12, 3251-3156.](#)
30. **C. Alexander, J. Dabrowiak,\* M.M. Maye\*** "Investigation of the Drug Binding Properties and Cytotoxicity of DNA-Capped Nanoparticles Designed as Delivery Vehicles for the Anticancer Agents Doxorubicin and Actinomycin D" [Bioconjugate Chemistry 2012 23, 2061–2070.](#)
31. **P.N. Njoki, W. Wu, H. Zhao, L. Hutter, E. A. Schiff, M.M. Maye\*** "Layer-by-Layer Processing and Optical Properties of Core/Alloy Nanostructures" [J. Am. Chem. Soc., 2011, 133, 5224–5227\(Communication\)](#)
32. **P.N. Njoki, L. Solomon, W. Wu, R. Alam, M.M. Maye\*** "Attenuating Surface Plasmon Resonance using Core/Alloy Architectures" [Chem. Commun. 2011, 47, 10079-00081](#)
33. **W. Wu, P.N. Njoki, H. Han, H. Zhao, E. A. Schiff, P. S. Lutz, L. Solomon, S. Matthews, M. M. Maye\*** "Processing Core/Alloy/Shell Nanoparticles: Tunable Optical Properties and Evidence for Self-Limiting Alloy Growth" [J. Phys. Chem. C, 2011, 115, 9933–9942.](#)
34. **C. M. Alexander, M. M. Maye\*, J. C. Dabrowiak\*** "DNA-capped nanoparticles designed for doxorubicin drug delivery" [Chem. Commun., 2011, 47, 3418-3420.](#)
35. **J. Zylstra, J. Amey, N. J. Miska, L. Pang, C. R. Hine, J. Langer, R. P. Doyle, M. M. Maye\*** "A Modular Phase Transfer and Ligand Exchange Protocol for Quantum Dots" [Langmuir, 2011, 27, 4371–4379.](#)
36. **H. Han, G. Di Francesco, M.M. Maye\*** "Size Control and Photophysical Properties of Quantum Dots Prepared via a Novel Tunable Hydrothermal Route" [J. Phys. Chem. C 2010, 114, 19270.](#)
37. **M.M. Maye, K. Mudalige, D. Nykypanchuk, W. B. Sherman, O. Gang\*** "Switching binary states of nanoparticle superlattices and dimer clusters by DNA strands" [Nature Nanotechnology, 2010, 5, 116-120.](#)
38. **M.M. Maye, M. Cuisinier, D. Nykypanchuk, O. Gang\*** "High Throughput Assembly of DNA-linked Nanoparticle Clusters" [Nature Materials, 2009, 8, 388-391.](#)
39. **H. Zang, P.K. Routh, R. Alam, M.M. Maye, M. Cotlet\*** "Core size dependent hole transfer from a photoexcited CdSe/ZnS quantum dot to a conductive polymer" [Chemical Communications 2013, DOI:10.39/C3CC47975G](#)
40. **Z. Xu, C. R. Hine, M. M. Maye, Q. Meng, M. Cotlet\*** "Shell Thickness Dependent Photoinduced Hole Transfer in Hybrid Conjugated Polymer/Quantum Dot Nanocomposites: from Ensemble to Single Hybrid Level" [ACS Nano 2012, 6, 4984–499](#)

## SELECTED PATENTS

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1. M.M. Maye, W. Wu "Method to Control Void Formation in Nanomaterials Using Core/Alloy Nanoparticles with Stainless Interfaces" Continuation Patent, US10695831B2 (2013), Granted, \*Licensed
2. M.M. Maye, W.Wu "Method to Control Void Formation in Nanomaterials Using Core/Alloy Nanoparticles with Stainless Interfaces" US9604281B2 (2013), Granted, \*Licensed
3. M.M. Maye "Compositions of Nanoparticles with Radial Gradients and Methods of Use Thereof" W02017087744A1 (2015), Pending, \*Licensed
4. M.M. Maye, R. Alam "Bioluminescence Resonance Energy Transfer Between Bioluminescent Proteins and Semiconductive Nanomaterials" US9758808B1 (2012), Granted
5. M.M. Maye, T.Doane "System and Method for Visualizing Chemical Reactions in Real Time" US20180284086A1 (2015), Granted
6. M.M.Maye, J. Dabrowiak, C. Alexander "System and Method for Delivery of DNA-Binding Chemotherapy Drugs Using Nanoparticles" US8632789B2 (2010), Granted

## RESEARCH GROUP

**Postdoctoral Associates (\*4 Former):** \*Dr. Tennyson Doane ('13-'17, [Assistant Prof. Eastern Nazarene Univ.](#)); \*Dr. Raheim Davon Slaton ('15, [Defense](#)), \*Dr. Peter Njoki, ('10-'12, [Assistant Professor Hampton College](#)) \*Dr. Jennifer Amey, ('10, [Staff Scientist](#))

**Graduate Students (2 Current, \*17 former):** Hadiyah Zamani (PhD, 4th yr, [Synthesis](#)), Buddhini Vithanage (PhD, 3<sup>rd</sup> yr, [Self-Assembly](#)); \*Dr. Yuetian Chen (PhD, '19, Postdoc, [Shanghai Jiao Tong](#)), Dr. Emily Ripka (PhD, '19, [Scientist](#)), \*Dr. Laxmikant Pathade (PhD, '18, [Educator](#)), \*Dr. Liliانا Karam, (PhD '18, [Research Assistant Professor](#)), \*Dr. Alisha Lewis (PhD '17, Government), \*Kayla Ryan, (MS, '17, [Scientist](#)), \*Dr. R. Davon Slaton (PhD '15, [Defense](#)), \*Dr. Somak Majumder (PhD '15, [Los Alamos](#)), \*Dr. Kaitlin Coopersmith Lawrence (PhD '15, [Senior Scientist](#)), \*Dr. Patrick Lutz (PhD '15, [Industry](#)), \*Dr. Kristen Hamner (PhD '14, [Industry Management](#)) \*Dr. Colleen Alexander (PhD '13, [Scientist & Pharma Exec](#)), \*Dr. Rabeka Alam, (PhD '13, [Professor](#)), \*Dr. Josh Zylstra (PhD '13, [Scientist-Regeneron](#)), \*Dr. Alysia (Wenjie) Wu (PhD '13, [Software Engineer](#)), \*Dr. Hyunjoo Han (PhD '12, [Engineer-Samsung](#)), \*Jay Tinkelpaugh (Advisor, 2012-2015, [Postdoc](#)), Corey Hine (Advisor, 2008-2012, [Energy Industry](#))