Lorenzo Mangolini

Professor
Chair, Department of Mechanical Engineering
Materials Science and Engineering Program
University of California, Riverside
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Co-Founder, SiLi-ion Inc. https://siliion.com/

Research Interests

Plasma synthesis and processing of nanomaterials; functional nanomaterials for energy and health; plasma-driven chemical conversion; plasma-surface interaction; materials in extreme environments.

Education

Ph.D. University of Minnesota, Minneapolis, Mechanical Engineering	January 2007
Laurea degree, Polytechnic University of Milan – Milan, Italy	July 2003
M.S. University of Minnesota, Minneapolis, Mechanical Engineering	October 2002

Employment

Professor, University of California Riverside — July 2022 to present
Mechanical Engineering Department, Materials Science and Engineering Program

Associate Professor, University of California Riverside — July 2016 to June 2022
Mechanical Engineering Department, Materials Science and Engineering Program

Assistant Professor, University of California Riverside — July 2010 to June 2016
Mechanical Engineering Department, Materials Science and Engineering Program

Senior Researcher — October 2007 – July 2010
Cima Nanotech Inc.

Postdoctoral Researcher, University of Minnesota, Minneapolis — January 2007 – September 2007
Department of Chemical Engineering and Materials Science

Awards, Honors

- Chair-elect, 2024 Gordon Research Conference (GRC) on Plasma Processing Science (https://www.grc.org/plasma-processing-science-conference/2024/)
- DOE Early Career Research Program Award (2015)
- Outstanding teaching award – UCR Mechanical Engineering Department (2015)
- NSF CAREER Award (2014)
- 3M Non-Tenured Faculty Award (2012)
- Inventor Recognition Award, Patents and Technology Marketing, University of Minnesota (2005)
- Doctoral Dissertation Fellowship, University of Minnesota (2005)
- Best Paper Award, ISPC 17th International Symposium on Plasma Chemistry (2005)
- Ente Nazionale Idrocarburi (E.N.I. S.p.A.) National Study Abroad Scholarship (2000-2002)

Grants/Gifts

- NSF "ECLIPSE-CHIPS: Plasma-produced materials to investigate laser-produced plasmas for microelectronics manufacturing", PI, $532K, 09/2025 to 08/2028
- Winston Chung Global Energy Research Center – Seed Grant – "A novel process for the conversion of natural gas to battery-grade graphite", PI, $22K, 07/2025 to 12/2025
- Oasis grant – UCR Office of Research - Ammonia as a Hydrogen Carrier: Processing and Feasibility, PI, $200K, 07/2023 to 09/2024
- SiLi-ion Inc. "Plasma synthesis of silicon particles for application in energy storage", PI, $25K, 7/1/22 to 6/30/23
- NSF LEAP HI "Manufacturing of silicon-based hybrid organic-inorganic quantum building blocks", active, PI, $2M, 7/1/21 to 6/30/26
- DOE "Harnessing Plasma Experiments with Quantum Calculations for Low-Cost Hydrogen Production"*, PI, $400K, 8/1/21 to 7/31/24*
- DTRA MSEE URA – "Materials Science in Extreme Environments University Research Alliance", https://hemi.jhu.edu/mseeura/, *active, co-PI, $5.5M total, 7/1/20 to 12/31/27*
- NSF Engineering Research Center for Advanced Technologies for Preservation of Biological Systems (ATP-Bio), https://www.atp-bio.org/*, co-PI, $26M total, 8/3/20 to 8/31/26*
- NSF PFI, "Paving the way to the commercialization of additives that boost battery performance"*, PI, $299K, 5/1/20 to 2/1/23*
- NSF iCorps, "Composite materials enabling batteries with high energy density"*, PI, $50K, 7/1/18 to 10/1/18*
- Department of Education GAANN (Graduate Assistance in Areas of National Need) Fellowship in Mechanical Engineering*; co-PI, $895K total, 9/1/18 to 8/31/21*
- Army Research Office, "Quantitative and mechanistic analyses of bond selective chemistry via non-thermal excitation of metal nanostructures"*, PI, $1.95M total, 5/1/17 to 09/31/21*
- Proof of Concept UCR Office of Research, "Nanocomposites with superior electrochemical energy storage performance"*, PI, total $35K*
- Department of Education GAANN (Graduate Assistance in Areas of National Need) Fellowship in Mechanical Engineering*; PI, $885K total, 9/1/15 to 8/31/18*
- NSF Partnership for International Research & Education (PIRE) "Synthesis of optical materials for bioapplications: research, education, recruitment and outreach"*, co-PI, $3.6M total, 8/1/15 to 9/30/22*
- **DOE Early Career Research Program** "On the interaction between non-thermal plasmas and small metallic particles: plasmonic plasmas"*; PI, $750K, 7/1/15 to 6/30/21*
- **NSF CAREER** "Synthesis of bulk nanostructured materials from semiconductor quantum dots"*, PI, $400K, 7/1/14 to 12/31/19*
- DOE-BES "Non-equilibrium effects in the processing of materials using plasmas"*, PI, $300K, 9/1/12 to 12/31/15*
- NSF-BRIGE "Nanoparticle-based photovoltaic cells from earth-abundant materials", *PI, $175K, 8/1/11 to 9/1/14*
- Winston Chung Award "Silicon quantum dot – graphene composite as anode for lithium-ion batteries"*, PI, $200K, 9/30/11 to 9/30/13*
- Chancellor's Strategic Initiatives "Opto-ceramic cranial implants for brain laser imaging and therapy"*, co-PI, $110K, funds used for the acquisition of a femtosecond laser*
- **3M Non-Tenured Faculty Award***, PI, $45K, 3/12 to 3/15*
- Seed Grant UCR Office of Research "Nanomaterials design, synthesis and validation for autonomous water splitting"*, co-PI, total $62.5K*
- Seed Grant UCR Office of Research "Center for innovative manufacturing of next generation rechargeable batteries"*, co-PI, total $12K*
- Seed Grant UCR Office of Research "Design and synthesis of DNA-Si quantum dot heterogeneous dynamic nanostructures"*, PI, total $17K*
- Seed Grant UCR Office of Research "Advanced manufacturing technologies for next-generation rechargeable battery materials"*, co-PI, total $70K*
- UC Riverside Regents Faculty Fellowship*, $3K*

Journal Publications

92 peer-reviewed publication, Google Scholar: >7000 citations, h-index = 37, link to profile;

1. Alvarez, C., C. Berrospe-Rodriguez, J.A. Sarabia-Alonso, S. Kavian, M.J. Powell-Palm, L. Mangolini, and G. Aguilar, "Digital holography interferometry for temperature mapping of thermocavitation induced by Continuous-Wave laser." Optics & Laser Technology, 2026. **201**: p. 115295.
2. Lewis, S.G., K. Wang, N.Q. Nguyen, A. Gonzalez, H. Wang, T.C. Siu, L. Mangolini, S.T. Roberts, T.A. Su, J. Eaves, and M.L. Tang, "Flexible Dimethylsilylene Bridges in Silicon Quantum Dot-Anthracene Adducts Promote Triplet Energy Transfer." Chemical Science, 2026.
3. Chowdhury, M., L. Yang, B. Wagner, Y. Zhou, L. Mangolini, and M.R. Zachariah, "Intermetallic reaction and eutectic transitions tune the reactivity in core–shell Mg/Ni nanoparticles." Physical Chemistry Chemical Physics, 2026.
4. Vidales Pasos, E., B. Wagner, Y. Zhou, G. Ospina, P. Suke, M.R. Zachariah, and L. Mangolini, "Core–Shell Magnesium–Fluorocarbon Particles with Enhanced Ignition via a Plasma-Driven In-Flight Coating Process." ACS Applied Nano Materials, 2026
5. Ghildiyal, P., B. Wagner, J. Chen, T. Nguyen, A. Belamkar, J. Guo, and L. Mangolini, "Highly Stable Silicon Anodes Enabled by Sub-10 nm Pores and Particles." Small, 2025. **21**(42): p. e05792.
6. Belamkar, A., R. Rosser, B. Wagner, A. Dogariu, and L. Mangolini, "Non-Equilibrium in a Dust-Forming Low-Temperature Plasma: A CARS Study." Plasma Chemistry and Plasma Processing, 2025. **45**(5): p. 1567-1580.
7. Chowdhury, M., B. Wagner, Y. Wang, K. Shi, I. Tran, M.M. Dickson, L. Mangolini, and M.R. Zachariah, "Energetic Characteristics and Reaction Mechanism of Hydrogenated Magnesium Nanoparticles: The Role of Condensed-Phase Reaction". ACS Applied Materials & Interfaces, 2025.
8. Nguyen, N.Q., S.G. Lewis, K. Wang, H. Wang, A. Gonzalez, L. Mangolini, S.T. Roberts, M.L. Tang, J.D. Eaves, and T.A. Su, "Intermediate Electronic Coupling via Silane and Germane Bridges in Silicon Quantum Dot–Molecular Hybrid Systems". Nano Letters, 2025.
9. Aurelio Sarabia-Alonso, J., E. Vidales Pasos, A. Belamkar, B. Wagner, and L. Mangolini, "Titanium nitride nanoparticles as plasmonic nanothermometers". Optics Express, 2025. **33**(4): p. 6758-6770.
10. Vidales Pasos, E., B. Wagner, F. Xu, Y. Wang, M. Kim, M. Zachariah, and L. Mangolini, "Enhancing the combustion of silicon nanoparticles via plasma-assisted fluorocarbon surface modification". Chemical Engineering Journal, 2024. **500**: p. 156997.
11. Wang, Y., F. Xu, G. Issac Paul, E. Vidales Pasos, K. Shi, B. Wagner, L. Mangolini, and M.R. Zachariah, "Role of Surface Tension on Heat Feedback and Power from Energetic Composites". ACS Applied Materials & Interfaces, 2024. **16**(32): p. 42100-42108.
12. Kim, M., S. Biswas, I. Barraza Alvarez, P. Christopher, B.M. Wong, and L. Mangolini, "Nonthermal Plasma Activation of Adsorbates: The Case of CO on Pt." JACS Au, 2024. **4**(8): p. 2979-2988.
13. Belamkar, A., B. Wagner, M. Kim, F. Bermudez, and L. Mangolini, "Conversion of Methane to Graphite-Like Carbon Nanoparticles Using a Low-Temperature Dusty Plasma." ACS Applied Nano Materials, 2024. **7**(10): p. 11053-11058.
14. Kim, M., and L. Mangolini, "Using Surface-Enhanced Raman Spectroscopy to Probe Surface-Localized Nonthermal Plasma Activation." The Journal of Physical Chemistry Letters, 2024: p. 4136-4141.
15. Wagner, B., M. Kim, M. Chowdhury, E. Vidales Pasos, K. Hizon, P. Ghildiyal, M.R. Zachariah, and L. Mangolini, "Enhancing the Combustion of Magnesium Nanoparticles via Low-Temperature Plasma-Induced Hydrogenation." ACS Applied Materials & Interfaces, 2023.
16. Wang, K., R.P. Cline, J. Schwan, J.M. Strain, S.T. Roberts, L. Mangolini, J.D. Eaves, and M.L. Tang, "Efficient photon upconversion enabled by strong coupling between silicon quantum dots and anthracene." Nature Chemistry, 2023.
17. Herzberg, S., S.N. Mathaudhu, and L. Mangolini, "Nonthermal plasma synthesis of silicon carbonitride." Plasma Processes and Polymers, 2023. **n/a**(n/a): p. e2300021.
18. Xu, F., B. Wagner, P. Ghildiyal, L. Mangolini, and M.R. Zachariah, "Low temperature oxidation of amorphous silicon nanoparticles." Physical Review Materials, 2023. **7**(4): p. 045403.

19. Wagner, B., P. Ghildiyal, P. Biswas, M. Chowdhury, M.R. Zachariah, and L. Mangolini, “In-Flight Synthesis of Core–Shell Mg/Si–SiO_x Particles with Greatly Reduced Ignition Temperature.” Advanced Functional Materials, 2023. p. 2212805.
20. Schwan, J., K. Wang, M.L. Tang, and L. Mangolini, “Gas-phase grafting for the multifunctional surface modification of silicon quantum dots.” Nanoscale, 2022. **14**(46): p. 17385-17391.
21. Kim, M., S. Biswas, G. Nava, B.M. Wong, and L. Mangolini, “Reduced Energy Cost of Ammonia Synthesis Via RF Plasma Pulsing.” ACS Sustainable Chemistry & Engineering, 2022. **10**(46): p. 15135-15147.
22. Sabzeghabae, A.N., C. Berrospe-Rodriguez, C. Wu, L. Mangolini, and G. Aguilar, “Nonlinear Absorption in Plasmonic Titanium Nitride Nanocrystals.” Advanced Optical Materials. 2022, p. 2201290.
23. Alvarez, C., C. Berrospe-Rodriguez, C. Wu, J. Pasek-Allen, K. Khosla, J. Bischof, L. Mangolini, and G. Aguilar “Photothermal heating of titanium nitride nanomaterials for fast and uniform laser warming of cryopreserved biomaterials.” Frontiers in bioengineering and biotechnology, 2022. **10**, 957481.
24. Chen, S., D. Coleman, D.L. Abernathy, A. Banerjee, L. Mangolini, and C. Li, “Distinct Acoustic and Optical Phonon Dependences on Particle Size, Oxidation, and Temperature in Silicon Nanocrystals.” The Journal of Physical Chemistry C, 2022. **126**(30): p. 12704-12711.
25. Hosseini, S.A., D. Coleman, S. Bux, P.A. Greaney, and L. Mangolini, “Enhanced thermoelectric ZT in the tails of the Fermi distribution via electron filtering by nanoinclusions: Model electron transport in nanocomposites.” Physical Review Materials, 2022. **6**(7): p. 075401.
26. Xu, C., G. Uahengo, C. Rudnicki, C. Hung, A. Huang, Q. Xu, Y. Chen, D.L. Halaney, J.E. Garay, L. Mangolini, G. Aguilar, and H.H. Liu, “Nanocrystalline Yttria-Stabilized Zirconia Ceramics for Cranial Window Applications.” ACS Applied Bio Materials, 2022. **5**(6): p. 2664-2675.
27. Xu, F., G. Nava, P. Biswas, I. Dulalia, H. Wang, Z. Alibay, M. Gale, D.J. Kline, B. Wagner, L. Mangolini, and M.R. Zachariah, “Energetic characteristics of hydrogenated amorphous silicon nanoparticles.” Chemical Engineering Journal, 2022. **430**: p. 133140.
28. Schwan, J., B. Wagner, M. Kim, and L. Mangolini, “Controlled growth of silicon particles via plasma pulsing and their application as battery material.” Journal of Physics D: Applied Physics, 2021. **55**(9): p. 094002.
29. Schwan, J., T.R. Alva, G. Nava, C.B. Rodriguez, Z.S. Dunn, J.W. Chartron, J. Morgan, P. Wang, and L. Mangolini, “Efficient facemask decontamination via forced ozone convection”. Scientific Reports, 2021. **11**(1): p. 12263.
30. Sabzeghabae, A.N., C. Berrospe-Rodriguez, L. Mangolini, and G. Aguilar, “Laser-induced cavitation in plasmonic nanoparticle solutions: A comparative study between gold and titanium nitride”. Journal of Biomedical Materials Research Part A, 2021. **109**(12): p. 2483-2492.
31. Xia, P., J. Schwan, T.W. Dugger, L. Mangolini, and M.L. Tang, “Air-Stable Silicon Nanocrystal-Based Photon Upconversion”. Advanced Optical Materials, 2021. **9**(17): p. 2100453.
32. Shojaei, K. and L. Mangolini, “Application of machine learning for the estimation of electron energy distribution from optical emission spectra”. Journal of Physics D: Applied Physics, 2021. **54**(26): p. 265202.
33. Huang, T., T.T. Koh, J. Schwan, T.T.T. Tran, P. Xia, K. Wang, L. Mangolini, M.L. Tang, and S.T. Roberts, “Bidirectional triplet exciton transfer between silicon nanocrystals and perylene”. Chemical Science, 2021.
34. Berrospe-Rodriguez, C., J. Schwan, G. Nava, F. Kargar, A.A. Balandin, and L. Mangolini, “Interaction between a Low-Temperature Plasma and Graphene: An in-situ Raman Thermometry Study”. Physical Review Applied, 2021. **15**(2): p. 024018.
35. Xu, F., P. Biswas, G. Nava, J. Schwan, D.J. Kline, M.C. Rehwoldt, L. Mangolini, and M.R. Zachariah, “Tuning the reactivity and energy release rate of I_2O_5 based ternary thermite systems”. Combustion and Flame, 2021. **228**: p. 210-217.
36. P. Ghildiyal, X. Ke, P. Biswas, G. Nava, J. Schwan, F. Xu, D. J. Kline, H. Wang, L. Mangolini, and M. R. Zachariah, “Silicon Nanoparticles for the Reactivity and Energetic Density Enhancement of Energetic-Biocidal Mesoparticle Composites”, ACS Applied Materials & Interfaces, 2021, 13, 458.
37. S. S. R. K. C. Yamijala, G. Nava, Z. A. Ali, D. Beretta, B. M. Wong, and L. Mangolini, “Harnessing Plasma Environments for Ammonia Catalysis: Mechanistic Insights from Experiments and Large-Scale Ab Initio Molecular Dynamics”, The Journal of Physical Chemistry Letters, 2020, 11, 10469.

38. Schwan, J.; Nava, G.; Mangolini, L., "Critical barriers to the large scale commercialization of silicon-containing batteries", Nanoscale Advances, 2020, 2(10), 4368-4389. (*invited review*)
39. Berrospe Rogriguez, C., A.A. Barragan, G. Nava, S. Exarhos, L. Mangolini, "Stabilizing the plasmonic response of titanium nitride nanocrystals with a silicon oxynitride shell: implications for refractory optical materials", ACS Applied Nano Materials, 2020, 3 (5), 4504-4511
40. Rudnicki, C., S. Exarhos, C. Mariano, and L. Mangolini, "Spray pyrolysis of yttria-stabilized zirconia nanoparticles and their densification into bulk transparent windows." Journal of Nanoparticle Research, 2020. 22: p. 51.
41. Chen, S., Coleman, D., Abernathy, D.L., Banerjee, A., Daemen, L.L., Mangolini, L., Chen Li, "Giant low-temperature anharmonicity in silicon nanocrystals", Physical Review Materials, 2020.
42. Koh, T.T., T. Huang, J. Schwan, P. Xia, S.T. Roberts, L. Mangolini, and Ming Lee Tang, "Low temperature radical initiated hydrosilylation of silicon quantum dots." Faraday Discussions, 2020.
43. Woodard, A., K. Shojaei, C. Berrospe-Rodriguez, G. Nava, L. Mangolini, "Electron emission from particles strongly affects the electron energy distribution in dusty plasma", Journal of Vacuum Science and Technology A, 2020, 023005
44. Xia, P., E.K. Raulerson, D. Coleman, C.S. Gerke, L. Mangolini, M.L. Tang, S.T. Roberts, "Achieving spin-triplet exciton transfer between silicon and molecular acceptors for photon upconversion". Nature Chemistry, 2019, 12: p. 137-144
45. Nava, G., J. Schwan, M.G. Boebinger, M.T. McDowell, and L. Mangolini, "Silicon-Core–Carbon-Shell Nanoparticles for Lithium-Ion Batteries: Rational Comparison between Amorphous and Graphitic Carbon Coatings". Nano Letters, 2019. 19(10): p. 7236-7245.
46. Barragan, A.A., S. Hanukovich, K. Bozhilov, S.S.R.K.C. Yamijala, B.M. Wong, P. Christopher, and L. Mangolini, "Photochemistry of Plasmonic Titanium Nitride Nanocrystals". The Journal of Physical Chemistry C, 2019. 123(35): p. 21796-21804.
47. Barani, Z., A. Mohammadzadeh, A. Geremew, C.-Y. Huang, D. Coleman, L. Mangolini, F. Kargar, and A.A. Balandin, "Thermal Properties of the Binary-Filler Hybrid Composites with Graphene and Copper Nanoparticles". Advanced Functional Materials, 2019: p. 1904008.
48. Rutherford, D., S. Exarhos, C. Xu, M. Niacaris, C. Mariano, B. Dayap, L. Mangolini, and H. Liu, "Synthesis, characterization, and cytocompatibility of yttria stabilized zirconia nanopowders for creating a window to the brain". Journal of Biomedical Materials Research Part B: Applied Biomaterials, 2019: p. 1-14.
49. Coleman, D., L. Mangolini, "Plasmonic core-shell silicon carbide-graphene nanoparticles". ACS Omega, 2019. 4(6), p. 10089-10093.
50. Exarhos, S., E. Palmes, L. Mangolini, "Structural homogeneization and cation ordering in CZTS films during sulfurization as probed via *in-situ* Raman". Thin Solid Films, 2019. 684, p. 21-30.
51. Woodard S., K. Shojaei, G. Nava, L. Mangolini, "Langmuir probe characterization of an Ar-H_2 plasma loaded with carbon nanoparticles". Plasma Sources, Science and Technology, 2018. 27(10), 104003
52. Exarhos, S., A. Alvarez Barragan, E. Aytan, A. Balandin, L. Mangolini, "Plasmonic core-shell zirconium nitride – silicon oxynitride nanoparticles". ACS Energy Letters, 2018. 3(10), p. 2349-2356.
53. Coleman, D., T. Lopez, S. Exarhos, M. Mecklenburg, S. Bux, L. Mangolini, "Thermoelectric performance of silicon with oxide nanoinclusions". Materials Research Letters, 2018. 6(8), p. 419-425.
54. Woodard, A., K. Shojaei, G. Nava, L. Mangolini, "Graphitization of carbon particles in a non-thermal plasma process". Plasma Chemistry Plasma Processing, 2018. 38(4), p. 683-694
55. Alvarez Barragan, A., G. Nava, N. Wagner, L. Mangolini, "Silicon-carbon composites for lithium-ion batteries: a comparative study of different carbon deposition approaches". Journal of Vacuum Science and Technology B, 2018. p. 011402.
56. Woodard, A., L. Xu, A.A. Barragan, G. Nava, B.M. Wong, and L. Mangolini, "On the non-thermal plasma synthesis of nickel nanoparticles". Plasma Processes and Polymers, 2017: p. 1700104.
57. Su, H., A.A. Barragan, L. Geng, D. Long, L. Ling, K.N. Bozhilov, L. Mangolini, and J. Guo, "Colloidal Synthesis of Silicon–Carbon Composite Material for Lithium-Ion Batteries". Angewandte Chemie, 2017. 129(36): p. 10920-10925.
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60. Alvarez Barragan, A. and L. Mangolini, “Non-Thermal Plasmas for the Production of Sustainable Functional Materials”. ECS Transactions, 2017. 77(3): p. 63-69.
61. Alvarez Barragan, A., N.V. Ilawe, L. Zhong, B.M. Wong, and L. Mangolini, “A Non-Thermal Plasma Route to Plasmonic TiN Nanoparticles”. The Journal of Physical Chemistry C, 2017. 121(4): p. 2316-2322.
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63. Alvarez Barragan, A., H. Malekpour, S. Exarhos, A.A. Balandin, and L. Mangolini, “Grain-to-Grain Compositional Variations and Phase Segregation in Copper–Zinc–Tin–Sulfide Films”. ACS Applied Materials & Interfaces, 2016. 8(35): p. 22971-22976.
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65. Alvarez, A., S. Exarhos, and L. Mangolini, “Tin disulfide segregation on CZTS films sulfurized at high pressure”. Materials Letters, 2016. 165: p. 41-44.
66. Zhong, L. and L. Mangolini, “Nanomaterials in Anodes for Lithium Ion Batteries: Science and Manufacturability”. Nanoscience & Nanotechnology-Asia, 2015. 5(2): p. 68-89. *(invited review)*
67. Yasar-Inceoglu, O., L. Zhong, and L. Mangolini, “Core/shell silicon/polyaniline particles via in-flight plasma-induced polymerization”, Journal of Physics D: Applied Physics, 2015. 48. p. 314009
68. Coleman, D., T. Lopez, O. Yasar-Inceoglu, and L. Mangolini, “Hollow silicon carbide nanoparticles from a non-thermal plasma process”, Journal of Applied Physics, 2015. 117(19): p. 193301.
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70. Zhong, L., J. Guo, and L. Mangolini, “A stable silicon anode based on the uniform dispersion of quantum dots in a polymer matrix”, Journal of Power Sources, 2015. 273(0): p. 638-644.
71. Lopez, T. and L. Mangolini, “On the nucleation and crystallization of nanoparticles in continuous-flow nonthermal plasma reactors”, Journal of Vacuum Science & Technology B, 2014. 32(6): p. 061802.
72. Exarhos, S., K.N. Bozhilov, and L. Mangolini, “Spray pyrolysis of CZTS nanoplatelets”, Chemical Communications, 2014. 50(77): p. 11366-11369.
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75. Mangolini, L. "Synthesis, properties, and applications of silicon nanocrystals", Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures, 2013, 31(2): 020801. *(invited review)*
76. Davis, P. and L. Mangolini, “Single precursor synthesis of copper sulfide nanocrystals using aerosol spray pyrolysis”, MRS Communications, 2013. 3(01): p. 57-60.
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78. Mangolini, L. and U. Kortshagen (2009). "Selective nanoparticle heating: another form of nonequilibrium in dusty plasmas", Physical Review E 79: 026405 1-8.
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92. L. Mangolini, K. Orlov, U. Kortshagen, J. Heberlein, U. Kogelschatz, “Radial structure of a low-frequency atmospheric pressure glow discharge in helium”, Applied Physics Letters, 2002, 80, 1722

Book Chapters

- Mangolini, L., Wagner, N. 2019. Plasma synthesis of nanomaterials. Handbook of synthetic methodologies and protocols of nanomaterials. World Scientific Press. (Refereed, Invited)
- Kortshagen, U., Mangolini, L. 2011. Non-thermal plasma synthesis of silicon nanocrystals. Plasma processing of Nanomaterials. Editors: R.M. Sankaran. CRC Press. p.432. (Refereed, Invited)
- Mangolini, L., Kortshagen, U. 2010. Non-thermal plasma synthesis of silicon nanocrystals. Silicon Nanocrystals. Editors: L. Pavesi and R.Turan. Wiley VCH. p.40. (Refereed, Invited)

Patents and Patent Applications

4 issued patents, 5 patent applications

- U. Kortshagen, E.J. Thimsen, L. Mangolini, A. Bapat, D. Jurbergs, Process and apparatus for forming semiconductor nanoparticles using radio frequency plasma CVD. US Pat. No. 7446335.
- V. Rosendand, E.L. Granstrom, L. Mangolini, Process for producing powders of germanium, US Pat. No. 8500844.
- A. Garbar, F. De La Vega, E.L. Granstrom, L. Mangolini, Transparent conductive coating with filler material, US Pat. No. 8795462.
- L. Mangolini, U. Kortshagen, R.J. Anthony, D. Jurbergs, X. Li, E. Rogojina, Nanoparticles with grafted organic molecules, US Pat. No. 8945673B2.
- Mangolini, L. and L. Zhong. Conformal coating of nano-porous material with group IV semiconductor using nanoparticle ink. 2014. The Regents of the University Of California. US 14/243,845.
- J. Masrud, L. Mangolini, E.L. Granstrom, A. Garbar, D. Lekhtman, D. Zamir, Process for producing patterned coatings. WO/2012/170684
- E.L. Granstrom, A. Garbar, L.Mangolini, Conductive networks on patterned substrates. WO/2013/061160.
- Lanlan Zhong, L. Mangolini, 2019, Modified silicon particle electrodes and methods. US 64/343,702

- Mangolini, L., G. Nava, and J. Schwan, 2022, Synthesis of graphitic shells on silicon nanoparticles, The Regents of the University of California, US 2022/0052323 A1

Invited seminars

- 2025 Materials Research Society (MRS) Fall meeting, *Plasma-Enabled Next-Generation Battery Material*, November 2025, Boston MA
- Department of Mechanical Engineering, University of Minnesota, *Opportunities at the Plasma-Material Interface*, Minneapolis MN, January 2025
- National Renewable Energy Laboratory (NREL), *New Opportunities in Low-Temperature Plasma Science and Technology*, Golden CO, January 2025
- Caltech, Materials Science Research Lecture, *What's Next for Low-Temperature Plasma Science and Technology?* Pasadena CA, October 2024
- 2024 Dusty Plasma Workshop, May 2024, *Engineering the Surface of Nanoparticles with Plasmas to Enable Enhanced Functionalities*, Minnesota MN, USA
- 2023 US Low-Temperature Plasma Science Summer School, June 2023, *Bringing Plasma-Produced Materials to the Market: An Ongoing Learning Process*, Ann Arbor MI, USA
- Department of Mechanical Engineering, UCSD, *Non-thermal plasma activation pathways for chemical and materials synthesis*, January 2023, San Diego CA, USA
- 2022 American Chemical Society (ACS) meeting, August 2022, *Low-temperature plasma processing of ammonia: status and outlook*, Chicago IL, USA
- Department of Chemical Engineering and Materials Science, University of Southern California, *Non-thermal plasma activation pathways for chemical and materials synthesis*, April 2022, Los Angeles CA, USA.
- 2021 Fall Materials Research Society (MRS) meeting, *Plasma synthesis of nanoparticles for applications in photonics and energetics*, December 2021
- 2021 American Chemical Society (ACS) meeting, *Progress towards a microscopic-level understanding of the plasma synthesis of ammonia*, April 2021, Virtual Meeting
- 2020 Spring-Fall Materials Research Society (MRS) meeting, *Towards applications of plasma-synthesized plasmonic TiN nanoparticles as an alternative to gold and silver*, November 2020, Virtual Meeting
- Mechanical Engineering Department, University of California *San Diego, Research at the intersection of plasma and materials science: fundamentals and applications*, November 2019, San Diego CA, USA.
- 2019 American Chemical Society (ACS) meeting, *Plasmas for catalysis: from surface activation to synthesis of novel nanomaterials*, May 2019, Orlando Florida, USA – (MEETING CANCELLED DUE TO COVID)
- 79th meeting of the Japanese Society of Applied Physics, *Low temperature plasma synthesis of novel materials*, September 2018, Nagoya, Japan
- 2018 iPlasma Nano-IX, *Low temperature plasmas for nanoparticle synthesis: fundamentals and applications*, August 2018, New Buffalo MI, USA
- 2018 Gordon Research Conference on Plasma Processing Science (GRC), *Plasma-nanoparticle interaction: from materials processing to catalysis*, August 2018, Smithfield RI, USA
- 2017 Fall Materials Research Society (MRS) meeting, *Processing refractory materials with low-temperature plasmas*, November 12-17, Boston MA, USA.
- 23rd International Symposium on Plasma Chemistry (ISPC), *Functional nano-ceramics from non-thermal plasma processes*, August 2017, Montreal, Canada.
- 231st Electrochemical Society meeting (ECS), *Non-thermal plasmas for the production of sustainable functional nanomaterials*, May 2017, New Orleans LA, USA.
- 34th International Battery Seminar and Exhibit, *Nanocomposites as next-generation anode materials for lithium-ion batteries*, March 2017, Fort Lauderdale FL, USA
- iPlasma Nano VII, International Symposium on Plasma Nanoscience, *Non-thermal plasma processing of functional nanopowders*, October 2016, Vavrona, Greece

- 43rd International Conference on Metallurgical Coatings and Thin Films (ICMCTF), *Plasma Synthesized Si Nanoparticles for Energy Storage and Conversion*, April 2016, San Diego CA, USA.
- 2016 Spring Materials Research Society meeting (MRS), *Non-thermal plasma synthesis of silicon-based nanopowders*, March 2016, Phoenix AZ, USA.
- Department of Energy, Environmental and Chemical Engineering, Washington University, *Non-thermal plasma synthesis of nanopowders*, October 2015, St.Louis MO, USA.
- 24th International Materials Research Congress (IMRC), *Non-thermal plasma synthesis of nanopowders*, August 2015, Cancun Mexico.
- Mechanical Engineering Department seminar, Michigan State University Lansing, *Non-equilibrium plasma processing of materials,* January 2015, Lansing MI, USA.
- NanoEngineering Department seminar, UC San Diego, *Non-equilibrium plasma processing of materials,* December 2014, San Diego CA, USA.
- AVS 61st International Symposium and Exhibition, American Vacuum Society, *Plasma-produced nanomaterials for energy recovery and storage*, November 2014, Baltimore MA USA
- Chemical Engineering Department seminar, Colorado School of Mines, *Plasma-produced nanomaterials for energy recovery and storage*, March 2014, Boulder CO, USA.
- Mechanical Engineering Department seminar, UC Irvine, *Plasma-produced nanomaterials for energy recovery and storage*, November 2013, Irvine CA, USA.
- iPlasma Nano IV, International Symposium on Plasma Nanoscience, *Plasma-produced nanomaterials for energy recovery and storage*, August 2013, Asilomar CA, USA
- 3M Science and Engineering Faculty Day, November 2012, *Scalable manufacturing of nanomaterials for the solution of energy-related issues,* Saint Paul MN, USA
- Physical Chemistry Seminar, University of California Riverside, September 2011, *Plasma synthesis of group IV nanocrystals.*
- Italian Institute of Technology, Milan Italy, May 2011, *Plasma synthesis of quantum dots.*
- IGNOIE-COE06 “System Construction of Global-Network-Oriented Information Electronics”, January 2007, Sendai, Japan, *Non-thermal plasma synthesis and passivation of luminescent silicon nanocrystals.*

Teaching

- ME 100A - Intro to Thermodynamics
- ME 113 - Fluid Mechanics
- ME 100B - Thermodynamics
- ME 135 - Transport Phenomena
- ME 243A - Advanced Mechanical Engineering Thermodynamics
- ME 266 – Mechanics and Physics of Materials
- ME 274 - Plasma-Aided Manufacturing and Materials Processing

Supervisory experience

Current Post-doctoral Researchers:

- Li-Ren – March 2026 to present

Current Graduate Students:

- Emmanuel Vidales Pasos – Ph.D. ME, September 2022 – present
  Research topic: Energetic materials
- Pushkar Suke – Ph.D. MSE, May 2025 – present
  Research topic: Energetic materials
- Oluwaseyi Omoniyi – Ph.D. ME, September 2025 – present
  Research topic: Plasma processing of functional materials

Alumni Postdocs

- Brandon Wagner – September 2024 to August 2025
- Feiyu Xu – May 2023 to May 2025
- Julio Sarabia – April 2023 to August 2025

- Carla Berrospe Rodriguez – February 2018 to March 2023
  Currently at *Inaoe (MX)*
- Giorgio Nava – February 2017 to March 2020
  Currently at *Intel Corporation*
- Davide Beretta – March 2018 to May 2019
  Currently a Research Scientist at *EMPA, Switzerland*

Alumni Graduate Students (13 Ph.D., 3 M.S.):

- Aishwarya Belamkar – Ph.D. ME, September 2022 – July 2026
  Thesis: "Harnessing Non-equilibrium in Low-Temperature Plasmas: Methane Valorization to Carbon and Ammonia Cracking for Hydrogen"
  Currently a Process Engineer at *Lam Research*
- Brandon Wagner – Ph.D. MSE, September 2020 – September 2024
  Thesis: "Plasma-Induced Surface Engineering of Nanoparticles for Designing Energetics with Specific Chemistry "
  Currently a Senior Researcher at *4th State Energies*
- Minseok Kim – Ph.D. ME, September 2020 – July 2024
  Thesis: "Nonthermal Plasma Surface Activation: Ammonia Synthesis, Selective Desorption of Carbon Monoxide, and Thermalization of Phenyl phosphonic Acid"
  Currently at *Intel Corporation*
- Steven Herzberg – Ph.D. ME, August 2017 – June 2024
  Thesis: "A Novel Combination of Non-Thermal Plasma Synthesis and Spark Plasma Sintering for the Creation of Non-Equilibrium Materials" (co-advised with Suveen Mathaudhu)
- Christopher Rudnicki – Ph.D. ME, August 2017 – June 2023
  Theis: "Nanoscience for Public Health: Applications for ZrN and YSZ"
  Currently at *University of Wisconsin La Crosse*
- Joseph Schwan – Ph.D. ME, August 2017 – December 2022
  Thesis: "Non-Thermal Plasmas and Material Synthesis: Applications in Quantum Dots, Lithium-Ion Batteries, and Pathogen Decontamination"
  Currently at *Soane Technologies*
- Kamran Shojaei – Ph.D. ME, August 2017 – April 2021
  Thesis: "Experimental and Numerical Characterization of Dusty and Pristine, Non-Thermal Plasmas"
  Currently at *Intel Corporation*
- Austin Woodard – Ph.D. MSE, July 2015 – June 2020
  Thesis: "Langmuir probe diagnostics in dusty, non-thermal plasmas"
  Currently at *Intel Corporation*
- Alejandro Alvarez - Ph.D. ME, September 2014 – June 2019
  Thesis: "Nanomaterials for energy applications: from photovoltaics to plasmonic catalysis"
  Currently at *Intel Corporation*
- Devin Coleman - Ph.D. MSE, September 2014 – March 2019
  Thesis: "Plasma synthesis of silicon carbide nanoparticles: applications for plasmonics and thermoelectrics"
  Currently at *Intel Corporation*
- Stephen Exarhos – Ph.D. ME, August 2015 – August 2018
  Thesis: "Nanoparticle matter: synthesis, characterization, control and application of YSZ, CZTS and ZrN"
  (Stephen completed a thesis-M.S. before continuing his Ph.D. under my supervision)
  Currently at *Seagate Technology*
- Thomas Lopez - Ph.D. ME, June 2011 – December 2015
  Thesis: "Analysis and application of silicon nanoparticles produced via continuous flow non-thermal plasmas"
  Currently: Entrepreneur
- Lanlan Zhong - Ph.D., MSE, September 2011 – January 2016
  Thesis: "Investigation of anode materials for lithium ion batteries"

Currently at *Applied Materials*
- Stephen Exarhos – M.S. ME, September 2013 – August 2015
  Thesis: "Aerosol spray pyrolysis synthesis of CZTS nanostructures for photovoltaic applications"
  (Stephen continued as a Ph.D. student in my group after his thesis M.S.)
- Ozgul Yasar-Inceoglu - Ph.D. ME, September 2012 – June 2015
  Thesis: "Synthesis and surface modification of group IV nanoparticles using non-thermal plasmas"
  Currently *Associate Professor at Cal State University, Chico*
- Patrick Davis – M.S. ME, September 2011 – August 2013
  Thesis: "Synthesis and characterization of earth abundant and nontoxic metal chalcogenides produced via aerosol spray pyrolysis for photovoltaic applications"
  Currently at *Ford Motor Company*
- Ebrahim Farshihagro – M.S. ME, August 2011 – October 2013
  Thesis: "Pyrolysis of yttria stabilized zirconia and its characterization"

University Service

- **Chair, Mechanical Engineering Department, University of California Riverside** – 07/2026 to present
- Member, Conflict of Interest (COI) committee – 09/2024 to present
- Member, Committee on Educational Policy – 09/2020 to 06/2023
  - **Chair of the Committee of Educational Policy for AY2022/2023**
- Member, Strategic Committee of the Bourns College of Engineering – 01/2020 to 10/2020
- Member, Executive Committee of the Bourns College of Engineering – 09/2015 to 06/2018
- Member of Search Committee, ME Department – 09/2014 to 06/2016
- Member of Graduate Committee, ME Department – 09/2012 to present
  - **Grad Advisor for the ME Department - 09/2016 to 07/2021**
- Member of MSE Course Assessment Committee – 10/2012 to present
- Member of MSE ad-hoc Review Committee – 11/2012 to present
- Member, ad-hoc ABET Committee, ME Department – 02/2012 to 11/2012
- Preparer/grader of ME thermodynamics qualifying exam – 09/2010 to present
- Member of the Undergraduate Committee, ME Department – 09/2010 to 09/2013

Professional Service

- Member of the Editorial Board – Plasma Chemistry and Plasma Processing (Springer) – 12/2024 to present.
- Symposium Organizer – *Plasmas for Materials Science – Opportunities at the Interface* – MRS Fall Meeting 2024.
- Chair, 2024 Gordon Research Conference on Plasma Processing Science – *Addressing Global Challenges with Plasmas*.
- Symposium Organizer – *Expanding the Frontiers of Plasma Technology in Materials Science and Engineering* – MRS Fall Meeting 2023.
- Symposium Organizer – *Group IV Nanostructures for Emerging Optoelectronic Applications* – MRS Spring Meeting 2023.
- Discussion Leader – *Synthesis of Nanoscale Materials for Energy* – 2023 Gordon Research Conference (GRC) on Nanomaterials for Applications in Energy Technology.
- Vice-Chair, 2022 Gordon Research Conference on Plasma Processing Science – *Plasmas and Their Interactions with Matter*.
- Member of the Board of Directors of the International Plasma Chemistry Society (IPCS).
- Member of the Materials Research Society (MRS) and American Chemical Society (ACS).
- Panel reviewer for NSF, ad-hoc reviewer for DOE and NSF
- Reviewer for several journals in the broad areas of materials synthesis and processing, physical chemistry, plasma physics, and battery technologies.