

ASHLIE MARTINI
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Education and Training

2007	Ph.D.	Northwestern University	Mechanical Engineering
1998	B.S.	Northwestern University	Mechanical Engineering

Research and Professional Experience

7/21 - present	Chair, Mechanical Engineering, University of California Merced
7/17 - present	Professor, Mechanical Engineering, University of California Merced
7/13 - 6/17	Associate Professor, Mechanical Engineering, University of California Merced
8/11 - 6/13	Assistant Professor, Mechanical Engineering, University of California Merced
8/08 - 8/11	Assistant Professor, Mechanical Engineering, Purdue University
7/07 - 8/08	Visiting Assistant Professor, Purdue University
9/02 - 7/07	Graduate Research Assistant, Northwestern University
6/98 - 9/02	Information Technology Consultant, Deloitte Consulting

Honors and Awards

2020	Fellow, Society of Tribologists and Lubrication Engineers
2020	Edmond E. Bisson Award, Society of Tribologists and Lubrication Engineers
2019	Best Paper Award, ASME/Bath Symposium on Fluid Power and Motion Control
2018	Lloyd Hamilton Donnell Applied Mechanics Reviews Paper Award, ASME
2018	Senate Faculty Distinguished Undergraduate Teaching Award, UC Merced
2016	Senate Faculty Distinguished Graduate Teaching/Mentorship, UC Merced
2015	Young Investigator Award, UC Merced Sigma Xi
2012	AFOSR Young Investigator Award, Air Force Office of Sponsored Research
2012	Burt L. Newkirk Award, American Society of Mechanical Engineers
2011	Surface Engineering Technical Committee Best Paper Award, Society of Tribologists and Lubrication Engineers

Publications

Published over 180 articles in peer-reviewed journals (faculty.ucmerced.edu/amartini/publications.shtml).
The ten most-recent papers are listed below:

Khajeh A, Rahman MH, Liu T, Panwar P, Menezes PL, and Martini A (2022) "Thermal decomposition of phosphonium salicylate and phosphonium benzoate ionic liquids", J Molecular Liquids, 352, 118700.

Padilla Espinosa IM, Azadehranjbar S, Ding R, Baker AJ, Jacobs TDB, and Martini A (2021) "Platinum nanoparticle compression: Combining in situ TEM and atomistic modeling", Applied Physics Letters, 120, 013101.

Martini A and Kim SH, (2021) "Activation Volume in Shear-Driven Chemical Reactions", Tribology Letters, 69, 150.

Rahman MH, Khajeh A, Panwar P, Patel M, Martini A and Menezes PL, (2021) "Recent Progress on Phosphonium-based Room Temperature Ionic Liquid Lubricants: Synthesis, Properties, Performance, and Applications", *Tribology International*, 167, 107331.

Yang Q, Li W, Stober ST, Burns AB, Gopinadhan M and Martini A, (2021) "Molecular Dynamics Simulation of the Stress–Strain Behavior of Polyamide Crystals", *Macromolecules*, 54, 8289.

Hasz K, Vazirisereshk MR, Martini A and Carpick RW, (2021) "Bifurcation of nanoscale thermolubric friction behavior for sliding on MoS₂", *Physical Review Materials*, 5, 083607.

Ferrera ML, Ades MT, Sanchez Garrido D, Velasquez AC, Johnson DA, Siu J, Montalvo E, Zhou Z and Martini A, (2021) "Varnish Removal Efficiency of Commercial Cleaners", *Tribology Trans.*, 64, 813.

Padilla Espinosa I, Jacobs TDB and Martini A, (2021) "Evaluation of Force Fields for Molecular Dynamics Simulations of Platinum in Bulk and Nanoparticle Forms", *Journal of Chemical Theory and Computation*, 17, 7.

Sanchez Garrido D, Leventini S and Martini A, (2021) "Effect of Temperature and Surface Roughness on the Tribological Behavior of Electric Motor Greases for Hybrid Bearing Materials", *Lubricants*, 9, 59.

Vazirisereshk RM, Sumaiya SA, Chen R, Baykara MZ and Martini A, (2021) "Time-Dependent Electrical Contact Resistance at the Nanoscale", *Tribology Letters*, 69, 50.

Khajeh A, Bhuiyan FH, Mogonye J-E, Pesce-Rodriguez RA, Berkebile S and Martini A, (2021) "Thermal Decomposition of Tricresyl Phosphate on Ferrous Surfaces", *Journal of Physical Chemistry C*, 125, 5076.

Presentations

Given over 85 invited or keynote presentations at professional conferences as well as academic and industrial organizations (faculty.ucmerced.edu/amartini/presentations.shtml). Recent examples below:

- Virtual International Tribology Research Symposium, “Viscosity Modifiers: Molecular Mechanisms to Lubricant Additive Function,” Online (December 2021)
- University of Minnesota Mechanical Engineering Department Seminar, “Atomistic Insights into Friction on MoS₂ and Beyond,” Online (December 2021)
- Institute of Physics Tribology Group Webinar, “Molecular dynamics simulations: What are they and why tribologists should care,” Online (September 2021)
- World Chemistry Congress and Canadian Chemistry Conference and Exhibition, “Molecular Dynamics Simulations of Shear Stress-Driven Chemical Reactions, Online (August 2021)
- DuPont Tribology Community of Practice, "Tribochemistry and Shear-Driven Chemical Reactions," Online. (December 2020).
- Web Seminar Series on Tribology, "Reactive Molecular Dynamics Simulation of Tribochemical Reactions," Online. (June 2020).
- University of Nevada Reno, "Tribochemistry: Coupling of Mechanical Force and Chemical Reactions in Sliding Contacts," Reno, NV. (February 2020).
- Afton Chemical, "Tribology Research at UCM: Varnish Removal, Soot Nanoparticles and Film Formation," Richmond, VA. (September 2019).
- ECOTRIB Conference, "Recent progress, challenges and opportunities in reactive molecular dynamics simulations of tribochemistry," Vienna Austria. (June 2019).
- Tribology Frontiers Conference, "Coils in Oils: Molecular-Scale Mechanisms of Viscosity Modifier Function," Chicago IL. (October 2018).
- Argonne National Lab Center for Nanomaterials Seminar, "Tribochemistry: Shear-Induced Reaction Pathways Explored via Reactive Atomistic Simulation," Argonne IL. (September 2018).

- ExxonMobil Research and Engineering Company, "Mechanochemistry: Shear-Induced Reaction Pathways Explored via Reactive Atomistic Simulation," Annandale NJ. (September 2018).

Notable Recent News Coverage

November 2021 – BBC Science Podcast – The Slippery Situation
(<https://www.bbc.co.uk/sounds/play/m00114n5>)

February 2021 – ABC Fresno News – Mars rover landing (<https://abc30.com/society/uc-merced-engineers-help-test-rover-involved-in-mars-2020-mission/10351890/>)

January 2021 – Penn Engineering Today – New paper in ACS Nano (<https://blog.seas.upenn.edu/penn-and-uc-merced-research-reveals-an-unexpected-mechanism-behind-friction-for-2d-materials/>)

August 2020 – Merced Sun Star Newspaper – Mars 2020 project (<https://www.mercedsunstar.com/latest-news/article244616602.html>)

July 2020 – Sacramento (KCRA 3) and Fresno (ABC 30) News – Mars 2020 project
(<https://www.kcra.com/article/i-consider-myself-really-fortunate-uc-merced-students-professors-work-on-mars-rover/33477029>) and (<https://abc30.com/science/uc-merced-students-helped-with-design-research-on-nasa-rover/6345070/>)

May 2020 - Fuels & Lubes Magazine – Electric vehicle greases
(<https://www.fuelsandlubes.com/digital/flm/FLM-2020-Q2/FLM-2020-Q2.html#p=31>)

Teaching

Classroom-Based Instruction

- Undergraduate: Mechanical Design, Capstone Design, Tribology, Design Thinking, Fluid Mechanics
- Graduate courses: Tribology, Molecular Dynamics Simulations

Research Mentoring (Current and Previous)

- 7 postdoctoral researchers
- 25 PhD students
- 14 Masters students
- 53 undergraduate students

Notable Synergistic Activities

- Associate Director, Center for Mechanical Control of Chemistry (August 2020 - Present)
- Editor, Tribology Letters (January 2018 - Present)
- Associate Editor, Tribology Transactions (May 2016 - Present)
- Editorial Review Board Member, Computational Material Science (January 2014 - Present), Tribology International (January 2012 - Present), Lubricants (July 2020 - Present)
- Chair, Gordon Research Conference on Tribology (July 2016 - July 2018)
- Board of Directors, Society of Tribologists and Lubrication Engineering (May 2011 - May 2017)
- Chair, Tribology Frontiers Conference (October 2015 - November 2016)

