



Wendy Gu

Associate Professor of Mechanical Engineering and, by courtesy, of Materials Science and Engineering

Bio

BIO

The Gu Group studies the mechanical behavior and advanced fabrication of metals and ceramics. Current areas of research include the mechanics of solid-state battery materials, soft magnetic alloys and composites, and structural alloys in extreme environments.

ACADEMIC APPOINTMENTS

- Associate Professor, Mechanical Engineering
- Associate Professor (By courtesy), Materials Science and Engineering
- Member, Bio-X

HONORS AND AWARDS

- ARO Young Investigator Program Award, Army Research Office (2020)
- DOE Early Career Award, Department of Energy (2020)
- Doctoral New Investigator Award, ACS Petroleum Research Fund (2020)
- Hellman Fellow, Hellman Foundation (2019)
- Terman Faculty Fellow, Stanford Engineering (2017)
- National Defense Science and Engineering Graduate Fellowship, DoD (2011)
- Fulbright Award, Fulbright (2009)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Symposium organizer, Society of Engineering Sciences (2018 - present)
- Member, Metals, Minerals and Materials Society (2017 - present)
- Member, Materials Research Society (2017 - present)

PROFESSIONAL EDUCATION

- BS, University of California, Berkeley (2009)
- MS/PhD, California Institute of Technology (2014)

PATENTS

- Mehrdad T. Kiani, X. Wendy Gu. "United States Patent 62/914089 Solution processed metallic nano-glass films", Leland Stanford Junior University, Oct 11, 0019

LINKS

- My Lab Site: gulab.stanford.edu
- Google Scholar: https://scholar.google.com/citations?user=EZ3_dV8AAAAJ&hl=en

Teaching

COURSES

2025-26

- Introduction to Solid Mechanics: OSPHONGK 85 (Aut)
- Mechanical Measurements: ME 149 (Spr)

2024-25

- Mechanical Measurements: ME 149 (Spr)
- Mechanics - Elasticity and Inelasticity: ME 340 (Win)

2023-24

- Intro to Solid Mechanics: ENGR 14 (Win)
- Mechanical Measurements: ME 149 (Spr)

2022-23

- Intro to Solid Mechanics: ENGR 14 (Win)
- Mechanical Measurements: ME 149 (Spr)
- Mechanics - Elasticity and Inelasticity: ME 340 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Philip DePond, Dongjae Kong, Nick Montes

Orals Chair

Sanzeeda Baig Shuchi

Doctoral Dissertation Advisor (AC)

Adam Barsotti, Sammi Cheung, Luis Delfin Manriquez, Daniel Delghandi, Alice Kutsyy, Samuel Lee, Madison Morrison, Mingqi Shuai

Master's Program Advisor

Enzo Andreacchio, Katelyn Kramer, Bea Lim, Joanne Low, Brody Todd, Chia-Ling Weng, Richard Yuan, Alan Zhao, Junyu Zhou

Doctoral Dissertation Co-Advisor (AC)

Joshua Cheung, Sydney Richardson

Postdoctoral Research Mentor

Coleman Fincher

Doctoral (Program)

Michael Kim, Michael Larson, Sophia Sonnert

Publications

PUBLICATIONS

- **Mechanical and Optical Properties of Nanocluster-Silica Metamaterials.** *Advanced materials (Deerfield Beach, Fla.)*
Cheung, S., Delghandi, D., Wu, C., Peng, Y. H., Martin, P., Gu, X. W.
2026: e21526
- **Heterogeneous doping via nanoscale coating impacts the mechanics of Li intrusion in brittle solid electrolytes.** *Nature materials*
Xu, X., Cui, T., McConohy, G., Jagad, H. D., Lee, S. S., Wang, S., Melamed, C., Yang, Y., Barks, E., Kaeli, E., Narun, L., Cui, Y., Zhang, et al
2026
- **3D cellular scaffolds reveal a hidden sensitivity to fluid-solid coupling.** *Biophysical journal*
Cheung, S., Gu, X. W.
2025
- **Unravelling electro-chemo-mechanical interplay in layered oxide cathode degradation in solid-state batteries.** *Science advances*
Zheng, X., Xue, Z., Hao, H., Cho, Y., Li, Y., Kim, C., Czaja, P., Lee, S. S., Bone, S., Spielman-Sun, E., Jiang, Z., Gu, X. W., Weker, et al
2025; 11 (41): eady7189
- **Upconverting microgauges reveal intraluminal force dynamics in vivo.** *ArXiv*
Casar, J. R., McLellan, C. A., Shi, C., Stiber, A., Lay, A., Siefe, C., Parakh, A., Gaerlan, M., Gu, W., Goodman, M. B., Dionne, J. A.
2025
- **Upconverting microgauges reveal intraluminal force dynamics in vivo.** *ArXiv*
Casar, J. R., McLellan, C. A., Shi, C., Stiber, A., Lay, A., Siefe, C., Parakh, A., Gaerlan, M., Gu, W., Goodman, M. B., Dionne, J. A.
2025
- **Mechanical Behavior of Nanocluster-Based Nanocomposites Made Using Two-Photon Lithography.** *ACS applied materials & interfaces*
Kulikowski, J., Delghandi, D., Wu, C., Figueroa, S. D., Cunningham, W. S., Gianola, D. S., Portela, C. M., Gu, X. W.
2025
- **Characterization of 3D printed micro-blades for cutting tissue-embedding material.** *Extreme Mechanics Letters*
Koppaka, S., Doan, D., Cai, W., Gu, W., Tang, S. K.
2025; 75
- **Nanotwinned alloys under high pressure** *ACTA MATERIALIA*
Wang, M. M., Dang, R., Parakh, A., Lee, A. C., Li, Z., Chariton, S., Prakapenka, V. B., Kang, J., Zhang, Y., Hodge, A. M., Gao, H., Gu, W.
2025; 285
- **Triply periodic minimal surfaces for thermo-mechanical protection.** *Scientific reports*
Cheung, S., Kang, J., Lin, Y., Goodson, K. E., Asheghi, M., Gu, X. W.
2025; 15 (1): 1688
- **Upconverting microgauges reveal intraluminal force dynamics in vivo.** *Nature*
Casar, J. R., McLellan, C. A., Shi, C., Stiber, A., Lay, A., Siefe, C., Parakh, A., Gaerlan, M., Gu, X. W., Goodman, M. B., Dionne, J. A.
2025; 637 (8044): 76-83
- **High absorptivity nanotextured powders for additive manufacturing.** *Science advances*
Tertuliano, O. A., DePond, P. J., Lee, A. C., Hong, J., Doan, D., Capaldi, L., Brongersma, M., Gu, X. W., Matthews, M. J., Cai, W., Lew, A. J.
2024; 10 (36): eadp0003
- **Direct observation of phase transitions in truncated tetrahedral microparticles under quasi-2D confinement.** *Nature communications*
Doan, D., Kulikowski, J., Gu, X. W.
2024; 15 (1): 1954
- **Synthesis of multifunctional amorphous metallic shell on crystalline metallic nanoparticles.** *RSC advances*
Parakh, A., Kiani, M. T., Lindgren, E., Colmenares, A., Lee, A. C., Suzuki, Y., Gu, X. W.
2023; 13 (43): 30491-30498

- **Size-Induced Ferroelectricity in Antiferroelectric Oxide Membranes.** *Advanced materials (Deerfield Beach, Fla.)*
Xu, R., Crust, K. J., Harbola, V., Arras, R., Patel, K. Y., Prosandeev, S., Cao, H., Shao, Y. T., Behera, P., Caretta, L., Kim, W. J., Khandelwal, A., Acharya, et al
2023: e2210562
- **Direct Observation of the Pressure-Induced Structural Variation in Gold Nanoclusters and the Correlated Optical Response.** *Nano letters*
Li, Q., Zeman, C. J., Kalkan, B., Kirschbaum, K., Gianopoulos, C. G., Parakh, A., Doan, D., Lee, A. C., Kulikowski, J., Schatz, G. C., Shen, G., Kunz, M., Gu, et al
2022
- **Mechanical nanolattices printed using nanocluster-based photoresists.** *Science (New York, N.Y.)*
Li, Q., Kulikowski, J., Doan, D., Tertuliano, O. A., Zeman, C. J., Wang, M. M., Schatz, G. C., Gu, X. W.
2022; 378 (6621): 768-773
- **Extraordinary Strain Hardening from Dislocation Loops in Defect-Free Al Nanocubes.** *Nano letters*
Kiani, M. T., Aitken, Z. H., Parakh, A., Zhang, Y., Gu, X. W.
2022
- **Nanoparticle-enhanced absorptivity of copper during laser powder bed fusion** *ADDITIVE MANUFACTURING*
Tertuliano, O. A., DePond, P. J., Doan, D., Matthews, M. J., Gu, X., Cai, W., Lew, A. J.
2022; 51
- **Cluster-based acoustic emission signal processing and loading rate effects study of nanoindentation on thin film stack structures** *MECHANICAL SYSTEMS AND SIGNAL PROCESSING*
Liu, C., Nagler, O., Tremmel, F., Unterreitmeier, M., Frick, J. J., Patil, R. P., Gu, X., Senesky, D. G.
2022; 165
- **Machine learning analysis of self-assembled colloidal cones.** *Soft matter*
Doan, D., Echeveste, D. J., Kulikowski, J., Gu, X. W.
2022
- **Engineering Bright and Mechanosensitive Alkaline-Earth Rare-Earth Upconverting Nanoparticles.** *The journal of physical chemistry letters*
McLellan, C. A., Siefe, C., Casar, J. R., Peng, C. S., Fischer, S., Lay, A., Parakh, A., Ke, F., Gu, X. W., Mao, W., Chu, S., Goodman, M. B., Dionne, et al
2022: 1547-1553
- **Ultrafine-grained Ni-rich layered cathode for advanced Li-ion batteries** *ENERGY & ENVIRONMENTAL SCIENCE*
Park, G., Yoon, D., Kim, U., Namkoong, B., Lee, J., Wang, M. M., Lee, A. C., Gu, X., Chueh, W. C., Yoon, C. S., Sun, Y.
2021
- **Effect of strain rate on the deformation of hollow CoS nanoboxes and doubly porous self-assembled films** *EXTREME MECHANICS LETTERS*
Patil, R. P., Kiani, M. T., Gu, X.
2021; 47
- **Diffusion of Anisotropic Colloidal Microparticles Fabricated Using Two-Photon Lithography** *PARTICLE & PARTICLE SYSTEMS CHARACTERIZATION*
Doan, D., Kulikowski, J., Gu, X.
2021
- **Anomalous pressure-dependence in surface-modified silicon-derived nanoparticles** *NANO RESEARCH*
Li, Q., Parakh, A., Jin, R., Gu, X.
2021
- **Bright NIR-II Photoluminescence in Rod-Shaped Icosahedral Gold Nanoclusters.** *Small (Weinheim an der Bergstrasse, Germany)*
Li, Q., Zeman, C. J., Ma, Z., Schatz, G. C., Gu, X. W.
2021: e2007992
- **From Nanocrystals to Nanocrystalline Metals** *Chem*
Wang, M. M., Gu, X. W.

2021

- **Source of Bright Near-Infrared Luminescence in Gold Nanoclusters.** *ACS nano*

Li, Q., Zeman, C. J., Schatz, G. C., Gu, X. W.

2021

- **In Situ TEM Study of Radiation Resistance of Metallic Glass-Metal Core-Shell Nanocubes.** *ACS applied materials & interfaces*

Kiani, M. T., Hattar, K., Gu, X. W.

2020

- **Ductile Metallic Glass Nanoparticles via Colloidal Synthesis.** *Nano letters*

Kiani, M. T., Barr, C. M., Xu, S., Doan, D., Wang, Z., Parakh, A., Hattar, K., Gu, X. W.

2020

- **Hardening in Au-Ag nanoboxes from stacking fault-dislocation interactions.** *Nature communications*

Patil, R. P., Doan, D., Aitken, Z. H., Chen, S., Kiani, M. T., Barr, C. M., Hattar, K., Zhang, Y., Gu, X. W.

2020; 11 (1): 2923

- **Structural distortion and electron redistribution in dual-emitting gold nanoclusters.** *Nature communications*

Li, Q., Zhou, D., Chai, J., So, W. Y., Cai, T., Li, M., Peteanu, L. A., Chen, O., Cotlet, M., Wendy Gu, X., Zhu, H., Jin, R.

2020; 11 (1): 2897

- **Deformation of a nanocube with a single incoherent precipitate: role of precipitate size and dislocation looping** *PHILOSOPHICAL MAGAZINE*

Kiani, M. T., Murayama, M., Gu, X.

2020

- **Stress-Induced Structural Transformations in Au Nanocrystals.** *Nano letters*

Parakh, A. n., Lee, S. n., Kiani, M. T., Doan, D. n., Kunz, M. n., Doran, A. n., Ryu, S. n., Gu, X. W.

2020

- **Packing State Management to Realize Dense and Semiconducting Lead Sulfide Nanocrystals Film via a Single-Step Deposition** *Packing State Management to Realize Dense and Semiconducting Lead Sulfide Nanocrystals Film via a Single-Step Deposition*

Lu, K., Meng, X., Liu, Z., Chen, J., Wang, Y., Zhang, Y., Zhang, X., Sarnello, E., Shi, G., Patil, R. P., Deng, W., Zhou, S., Gu, et al

2020

- **Design and synthesis of multigrain nanocrystals via geometric misfit strain.** *Nature*

Oh, M. H., Cho, M. G., Chung, D. Y., Park, I. n., Kwon, Y. P., Ophus, C. n., Kim, D. n., Kim, M. G., Jeong, B. n., Gu, X. W., Jo, J. n., Yoo, J. M., Hong, et al

2020; 577 (7790): 359–63

- **Pressure-Induced Optical Transitions in Metal Nanoclusters.** *ACS nano*

Li, Q. n., Mosquera, M. A., Jones, L. O., Parakh, A. n., Chai, J. n., Jin, R. n., Schatz, G. C., Gu, X. W.

2020

- **Nucleation of Dislocations in 3.9 nm Nanocrystals at High Pressure.** *Physical review letters*

Parakh, A. n., Lee, S. n., Harkins, K. A., Kiani, M. T., Doan, D. n., Kunz, M. n., Doran, A. n., Hanson, L. A., Ryu, S. n., Gu, X. W.

2020; 124 (10): 106104

- **Dislocation surface nucleation in surfactant-passivated metallic nanocubes** *MRS COMMUNICATIONS*

Kiani, M. T., Patil, R. P., Gu, X.

2019; 9 (3): 1029–33

- **Strengthening Mechanism of a Single Precipitate in a Metallic Nanocube** *NANO LETTERS*

Kiani, M. T., Wang, Y., Bertin, N., Cai, W., Gu, X.

2019; 19 (1): 255–60

- **Pseudoelasticity at Large Strains in Au Nanocrystals.** *Physical review letters*

Gu, X. W., Hanson, L. A., Eisler, C. N., Koc, M. A., Alivisatos, A. P.

2018; 121 (5): 056102

- **Mechanical Properties of Architected Nanomaterials Made from Organic-Inorganic Nanocrystals** *Mechanical Properties of Architected Nanomaterials Made from Organic-Inorganic Nanocrystals*
Gu, X. W.
2018: 2205-2217
- **Tolerance to structural disorder and tunable mechanical behavior in self-assembled superlattices of polymer-grafted nanocrystals.** *Proceedings of the National Academy of Sciences of the United States of America*
Gu, X. W., Ye, X., Koshy, D. M., Vachhani, S., Hosemann, P., Alivisatos, A. P.
2017
- **In Situ Lithiation-Delithiation of Mechanically Robust Cu-Si Core-Shell Nanolattices in a Scanning Electron Microscope** *ACS ENERGY LETTERS*
Xia, X., Di Leo, C. V., Gu, X. W., Greer, J. R.
2016; 1 (3): 492-499
- **Tailoring of Interfacial Mechanical Shear Strength by Surface Chemical Modification of Silicon Microwires Embedded in Nafion Membranes** *ACS NANO*
Gallant, B. M., Gu, X., Chen, D. Z., Greer, J. R., Lewis, N. S.
2015; 9 (5): 5143-53
- **Ductility and work hardening in nano-sized metallic glasses** *APPLIED PHYSICS LETTERS*
Chen, D. Z., Gu, X. W., An, Q., Goddard, W. A., Greer, J. R.
2015; 106 (6)
- **Ultra-strong Architected Cu Meso-lattices** *Extreme Mechanics Letters*
Gu, X. W., Greer, J. R.
2015: 7-14
- **Mechanisms of Failure in Nanoscale Metallic Glass** *NANO LETTERS*
Gu, X. W., Jafary-Zadeh, M., Chen, D. Z., Wu, Z., Zhang, Y., Srolovitz, D. J., Greer, J. R.
2014; 14 (10): 5858-5864
- **Effects of Helium Implantation on the Tensile Properties and Microstructure of Ni73P27 Metallic Glass Nanostructures** *NANO LETTERS*
Liontas, R., Gu, X., Fu, E., Wang, Y., Li, N., Mara, N., Greer, J. R.
2014; 14 (9): 5176-83
- **Microstructure versus Flaw: Mechanisms of Failure and Strength in Nanostructures** *NANO LETTERS*
Gu, X. W., Wu, Z., Zhang, Y., Srolovitz, D. J., Greer, J. R.
2013; 13 (11): 5703-5709
- **Size-Dependent Deformation of Nanocrystalline Pt Nanopillars** *NANO LETTERS*
Gu, X. W., Loynachan, C. N., Wu, Z., Zhang, Y., Srolovitz, D. J., Greer, J. R.
2012; 12 (12): 6385-6392
- **Exploring Deformation Mechanisms in Nanostructured Materials** *JOM*
Greer, J. R., Jang, D., Gu, X.
2012; 64 (10): 1241-52
- **Photoconductive CdSe Nanowire Arrays, Serpentine, and Loops Formed by Electrodeposition on Self-Organized Carbon Nanotubes** *JOURNAL OF PHYSICAL CHEMISTRY C*
Gu, X., Shadmi, N., Yarden, T. S., Cohen, H., Joselevich, E.
2012; 116 (37): 20121-26
- **Suppression of Catastrophic Failure in Metallic Glass-Polyisoprene Nanolaminate Containing Nanopillars** *ADVANCED FUNCTIONAL MATERIALS*
Kim, J., Gu, X., Wraith, M., Uhl, J. T., Dahmen, K. A., Greer, J. R.
2012; 22 (9): 1972-80
- **Liquid Crystalline Orientation of Rod Blocks within Lamellar Nanostructures from Rod Coil Diblock Copolymers** *MACROMOLECULES*
Olsen, B. D., Gu, X., Hexemer, A., Gann, E., Segalman, R. A.

2010; 43 (16): 6531–34

● **A Universal and Solution-Processable Precursor to Bismuth Chalcogenide Thermoelectrics** *Chemistry of Materials*

Wang, R. Y., Feser, J. P., Gu, X., Yau, K. M., Segalman, R. A., Majumdar, A., Milliron, D. J., Urban, J. J.

2010: 1943-1945