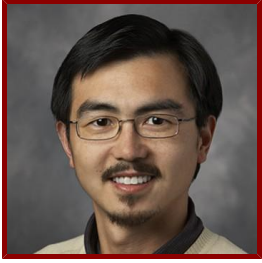


Stanford



Wei Cai

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

CONTACT INFORMATION

- **Administrator**

Kelly Chu - Administrative Associate

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Bio

BIO

Predicting mechanical strength of materials through theory and simulations of defect microstructures across atomic, mesoscopic and continuum scales. Developing new atomistic simulation methods for long time-scale processes, such as crystal growth and self-assembly. Introducing magnetic field in quantum simulations of electronic structure and transport.

ACADEMIC APPOINTMENTS

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

HONORS AND AWARDS

- Career Award, National Science Foundation (2006)
- Presidential Early Career Award, National Science and Technology Council (2004)
- Young Investigator Award, AFOSR (2006)
- Beer and Johnston Outstanding New Mechanics Educator Award, American Society for Engineering Education (2008)
- T. J. R. Hughes Young Investigator Award, ASME (2013)

PROFESSIONAL EDUCATION

- PhD, MIT, Nuclear Engineering (2001)

LINKS

- <http://www.stanford.edu/~caiwei>: <http://www.stanford.edu/~caiwei>

Teaching

COURSES

2018-19

- Advanced Techniques for Molecular Simulations: ME 346C (Sum)

- Introduction to Molecular Simulations: ME 346B (Spr)
- Mechanics - Elasticity and Inelasticity: ME 340 (Win)
- Mechanics of Materials: ME 80 (Aut)

2017-18

- Introduction to Statistical Mechanics: ME 346A (Spr)
- Mechanics - Elasticity and Inelasticity: ME 340 (Win)
- Mechanics of Materials: ME 80 (Aut)
- Seminar in Solid Mechanics: ME 395 (Spr)

2016-17

- Imperfections in Crystalline Solids: ME 209 (Aut)
- Mechanics - Elasticity and Inelasticity: ME 333B (Win)
- Mechanics of Materials: ME 80 (Spr)
- Seminar in Solid Mechanics: ME 395 (Aut, Spr)

2015-16

- Introduction to Statistical Mechanics: ME 346A (Spr)
- Mechanics - Elasticity and Inelasticity: ME 333B (Win)
- Mechanics of Materials: ME 80 (Aut)
- Seminar in Solid Mechanics: ME 395 (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Ottman Tertuliano

Doctoral Dissertation Advisor (AC)

Yikai Yin

Doctoral Dissertation Co-Advisor (AC)

Lin Fan

Master's Program Advisor

Siyuan Liu, Lydia Maria Tsiverioti, Yifan Wang

Publications

PUBLICATIONS

- **Spherical harmonics method for computing the image stress due to a spherical void** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
Wang, Y., Zhang, X., Cai, W.
2019; 126: 151–67
- **Strengthening Mechanism of a Single Precipitate in a Metallic Nanocube** *NANO LETTERS*
Kiani, M. T., Wang, Y., Bertin, N., Cai, W., Gu, X.
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- **High-Throughput Growth of Microscale Gold Bicrystals for Single-Grain-Boundary Studies.** *Advanced materials (Deerfield Beach, Fla.)*
Gan, L. T., Yang, R., Traylor, R., Cai, W., Nix, W. D., Fan, J. A.
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Barnett, D. M., Cai, W.
2018; 121: 71–80
- **Energy of periodic discrete dislocation networks** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
Bertin, N., Cai, W.
2018; 121: 133–46
- **Predicting stability of nanofin arrays against collapse by phase field modeling** *JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B*
Wang, Y., Woytowicz, P., Mui, D., Cai, W.
2018; 36 (5)
- **Dislocation Networks and the Microstructural Origin of Strain Hardening** *PHYSICAL REVIEW LETTERS*
Sills, R. B., Bertin, N., Aghaei, A., Cai, W.
2018; 121 (8)
- **A spectral approach for discrete dislocation dynamics simulations of nanoindentation** *MODELLING AND SIMULATION IN MATERIALS SCIENCE AND ENGINEERING*
Bertin, N., Glavas, V., Datta, D., Cai, W.
2018; 26 (5)
- **Computation of virtual X-ray diffraction patterns from discrete dislocation structures** *COMPUTATIONAL MATERIALS SCIENCE*
Bertin, N., Cai, W.
2018; 146: 268–77
- **Discrete shear band plasticity through dislocation activities in body-centered cubic tungsten nanowires** *SCIENTIFIC REPORTS*
Wang, J., Wang, Y., Cai, W., Li, J., Zhang, Z., Mao, S. X.
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- **Microstructural origin of resistance-strain hysteresis in carbon nanotube thin film conductors** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
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- **Reliability of Single Crystal Silver Nanowire-Based Systems: Stress Assisted Instabilities.** *ACS nano*
Ramachandramoorthy, R., Wang, Y., Aghaei, A., Richter, G., Cai, W., Espinosa, H. D.
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- **Phase Field Model for Morphological Transition in Nanowire Vapor-Liquid-Solid Growth** *CRYSTAL GROWTH & DESIGN*
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- **Stability of Eshelby dislocations in FCC crystalline nanowires** *INTERNATIONAL JOURNAL OF PLASTICITY*
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- Landinez Borda, E. J., Cai, W., de Koning, M.
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Ryu, I., Nix, W. D., Cai, W.
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 - **Energy barrier for homogeneous dislocation nucleation: Comparing atomistic and continuum models** *SCRIPTA MATERIALIA*
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 - **Entropic effect on the rate of dislocation nucleation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
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- **Entropic Effect on the Rate of Dislocation Nucleation**
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Almquist, B. D., Verma, P., Cai, W., Melosh, N. A.
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- **Analysis of the elastic strain energy driving force for grain boundary migration using phase field simulation** *SCRIPTA MATERIALIA*
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- **Atomistic simulations of surface segregation of defects in solid oxide electrolytes** *ACTA MATERIALIA*
Lee, H. B., Prinz, F. B., Cai, W.
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 - **Dislocation dynamics simulations in a cylinder** *International Conference on the Fundamentals of Plastic Deformation (DISLOCATIONS)*
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 - **Comparison of thermal properties predicted by interatomic potential models** *MODELLING AND SIMULATION IN MATERIALS SCIENCE AND ENGINEERING*
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 - **Torsion and bending periodic boundary conditions for modeling the intrinsic strength of nanowires** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
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