Aoyan Liang

aoyanliang@gmail.com · Personal Website

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EDUCATION

University of Southern California 8/2020-Present
Ph.D. in Materials Science, GPA: 4.0/4.0

University of Southern California 1/2022-Present
M.S. in Computer Science (Data Science), GPA: 4.0/4.0

University of Southern California 8/2018-5/2020
M.S. in Materials Science, GPA: 4.0/4.0

Southwest Jiaotong University, China 9/2014-6/2018
B.Eng. in Materials Science (Mao Yisheng Honors College), GPA: 3.64/4.0

Certifications
AI for Science on Supercomputers (Argonne National Laboratory) 12/2022
Fundamentals of Deep Learning (NVIDIA) 6/2021

RESEARCH INTERESTS

Atomistic simulations and machine learning methods for investigating nanoscale dynamical behavior, synthesis processes, structural correlations, and properties of advanced materials, with a specific focus on high entropy alloys, metallic glasses, and ceramics. Exploring colloid transport and retention processes in nanoporous structures.

RESEARCH EXPERIENCE

University of Southern California 8/2020-present
Graduate Research Assistant, Advisor: Prof. Paulo Branicio
Main Projects:

- **High Entropy Alloy Films Phase Formation during Physical Vapor Deposition**: Combine experiments, MD simulations, and ML methods to elucidate structure-property relationships in HEA thin films. Interpret and reveal the influence of atomic size differences on phase formation.
- **Colloid Transport in Nanoporous Media**: Perform dissipative particle dynamics simulations to study the colloid transport behavior in complex nanoporous media. Explore the effects of colloid concentration, flow rate, colloid-colloid and colloid-collector interactions.
- **Atomic Simulations of Hot-press Sintering for AlN Nanoceramics**: Conducted MD simulations using Fortran+MPI codes to investigate the effects of temperature, pressure, and particle size on the densification process and microstructural evolution of AlN nanoceramics.

Southwest Jiaotong University, China 4/2016-6/2018
Research Assistant, Advisor: Prof. Xiaosong Jiang
Main Project:

- **Microstructure and Properties of Graphene Reinforced Copper Matrix Composites**: Prepared three graphene strengthened copper matrix composites based on the Cu-Ti_3SiC_2-C system, and further processed high pressure torsion. Improved the mechanical properties of copper matrix through fine grain strengthening mechanism. Published a literature reviewed on dispersion methods and mechanisms of graphene.

PUBLICATIONS

ORCID: https://orcid.org/0000-0001-5100-6232
Google Scholar Profile: https://scholar.google.com/citations?user=OHhN9N_f6JoC&hl=en
Web of Science Profile: https://www.webofscience.com/wos/author/record/HKM-4861-2023

1. **Liang, A.**, Liu, C., & Branicio, P. S. Colloid Transport in Bicontinuous Nanoporous Media. (Under review)
2. Yuan, S., **Liang, A.**, Liu, C., Tian, L., Mousseau, N., & Branicio, P. S. (2023). The effect of heat treatment paths on the aging and rejuvenation of metallic glasses. *Physical Review Materials*, 7(12), 123603.
3. Yuan, S., **Liang, A.**, Liu, C., Nakano, A., Nomura, K., & Branicio, P. S. (2023). Uncovering hidden vacancy-like motifs in metallic glasses with machine learning. *Materials & Design*, 233, 112185.
4. **Liang, A.**, Goodelman, D. C., Hodge, A. M., Farkas, D., & Branicio, P. S. (2023). $CoFeNiTi_x$ and $CrFeNiTi_x$ high entropy alloy thin films microstructure formation. *Acta Materialia*, 257, 119163.
5. Guan, X., **Liang, A.**, & Branicio, P. S. (2022). High pressure shear induced microstructural evolution in nanocrystalline aluminum. *Computational Materials Science*, 203(15), 111105.
6. **Liang, A.**, Liu, C., & Branicio, P. S. (2021). Hot-press sintering of aluminum nitride nanoceramics. *Physical Review Materials*, 5(9), 096001.
7. **Liang, A.**, Jiang, X., Hong, X., Jiang, Y., Shao, Z., & Zhu, D. (2018). Recent developments concerning the dispersion methods and mechanisms of graphene. *Coatings*, 8(1), 33.

CONFERENCE PRESENTATIONS

1. **Liang, A.**, Hodge, A. M., Farkas D., & Branicio P. S. Atomistic modeling of physical vapor deposition and melt-quenching of $CoCrFeNiTi_x$ high entropy alloys. Poster presented at: 2023 TMS Annual Meeting & Exhibition; March 2023; San Diego, CA, USA.
2. **Liang, A.**, Liu, C., & Branicio, P. S. Atomistic Modeling of Hot-press Sintering of AlN Nanoceramics. Poster presented at: 2022 TMS Annual Meeting & Exhibition; February 2022; Anaheim, CA, USA.
3. **Liang, A.**, Liu, C., & Branicio, P. S. Atomistic Modeling of Hot-Press Sintering of AlN Ceramics. Poster presented at: 2021 MRS Fall Conference; November 2021; Boston, MA, USA.

TEACHING EXPERIENCE

University of Southern California
Teaching Assistant
Courses:

- MASC 575 - Basics of Atomistic Simulation of Materials — Spring 2022
- MASC 110L - Materials Science (Lab section) — Fall 2022
- MASC 520 - Mathematical Methods for Deep Learning — Spring 2023
- MASC 503 - Thermodynamics of Materials — Fall 2023
- CHE 499 - Confectionary Manufacturing - Science and Technology — Spring 2024

SKILLS

- **Software:** LAMMPS, OVITO, Activation Relaxation Technique (ARTn), Adobe Illustrator, SAS, Origin, Visual Studio, Microsoft Office.
- **Programming Languages:** Python (with ML packages), Fortran (with MPI), C/C++ (with MPI/OpenMP), Java, Spark, SQL (MySQL), R.
- **Operation Systems:** Linux, MacOS, Windows.

- **Other:** Machine Learning, Molecular Dynamics

PROFESSIONAL SERVICE

Reviewer for International Journals (Total: 10 journals, 16 reviews)

Acta Materialia, Applied Surface Science, Computational Materials Science, Computer Physics Communications, Journal of Alloys and Compounds, Journal of Non-Crystalline Solids, Progress in Materials Science, Scientific Reports, Surface and Interface Analysis, Thin Solid Films.

AWARDS & HONORS

First Place, USC Data Mining Competition (Link)	2023
Rank 17/6714, Modeling Earthquake Damage (DrivenData Competition Leaderboard)	2023
Nominee for 2021 MRS Fall Meeting Best Poster (Materials Research Society)	2021
Master's Student Achievement Award (University of Southern California) (Link)	5/2020
SAS Certified Base Programmer for SAS 9	6/2019
Outstanding Graduate of Southwest Jiaotong University	2018
China National Scholarship (1%)	2016-2017
Grand Comprehensive Scholarship (Southwest Jiaotong University)	2016-2017
First-Class Comprehensive Scholarship (4 times)	2014-2016
Honorable Mention in MCM/ICM	2017
Third Prize in Asia and Pacific Mathematical Contest in Modeling	2016