TAO Yuhao

EDUCATION

ETH Zürich, Switzerland — Sept. 2023-present
M.Sc. in Robotics, Systems and Control — **Grade**: 5.73/6.0
- ➢ **Core Courses**: Microrobotics, Nanorobotics, Introduction to Machine Learning, Image Analysis and Computer Vision, Dynamic Programming and Optimal Control, Linear System Theory, Recursive Estimation, Biomedical Imaging.

RWTH Aachen University, Germany — Oct. 2018-Jul. 2023
B.Sc. in Mechanical Engineering (Graduation with distinction) — **Grade**: 1.1/1.0 (Ranking: 2/1885)
- ➢ **Awards**: Dean's List 2019/2020, 2020/2021 (Top 5%); Germany Scholarship 2020/2021, 2022/2023
- ➢ **Core Courses**: Mechanics, Material Science, Machine Design, Simulation Methods in Engineering, Automatic Control, Numerical Mathematics, Fluid Mechanics, Thermodynamics, etc.
- ➢ **GRE on-site**: 336 (Verbal 166, Quantitative 170) + 3.5 (Writing); **TOEFL on-site**: 112 (Reading 30, Listening 28, Speaking 28, Writing 26)

RESEARCH EXPERIENCE

Design and Fabrication of An Smart Millirobot with On-board Sensing and Control — Apr. 2024-present
(Semester Project @ Multi-Scale Robotics Lab**)** — **ETH Zürich**
Supervisor: Dr. Bradley Nelson, Professor / **Advisor**: Quan Gao, Ph.D. Candidate
- ➢ Designed, fabricated and optimized the umbrella structure of the robot based on Pop-up MEMS fabrication technique
- ➢ Designed, optimized and characterized the 3D antenna and integrated it onto the robot structure
- ➢ Designed the on-board PCB for control and sensing, and implemented the code for MCU
- ➢ Developed a simulation platform based on ABAQUS using Python and Fortran for simulating interactions between mobile cube magnets

Design and Fabrication of An Untethered Adhesive Patch Robot with On-board Power and Sensing — Sept. 2024-present
(Master Thesis @ Multi-Scale Robotics Lab**)** — **ETH Zürich**
Supervisor: Dr. Bradley Nelson, Professor / **Advisor**: Quan Gao, Ph.D. Candidate
- ➢ Optimized and calibrated the on-board PCB for low power consumption, and precise voltage measurement and data transmission
- ➢ Fabricated the adhesive patches based on different recipes and compared their performance using peeling force test
- ➢ Fabricated the magnetic PDMS layer and integrated it with the adhesive patch

Modeling and simulation of deformable Kolmogorov-sized bubbles and droplets in turbulent flows — Jan. 2023-Apr. 2023
(Bachelor Thesis @ Institute of Aerodynamics**)** — **RWTH Aachen University**
Supervisor: Dr. Wolfgang Schröder, Professor / **Advisor**: Julian Vorspohl, Ph.D. Candidate
- ➢ Extended the Lagrangian Particle Tracking (LPT) solver of the in-house flow solver in AIA using C++ to account for particle deformability
- ➢ Tested the implemented module in relaxation, shear flow, vortex, and rising bubble test cases
- ➢ Studied the influence of the density ratio, particle size, and deformability on bubble/droplet-laden decaying isotropic turbulence flow

Atomistic Simulations of Tensile Deformation in A CrCoNi Medium-Entropy Alloy — Dec. 2021-Nov. 2022
(External Research Project @ State Key Laboratory of Nonlinear Mechanics**)** — **Institute of Mechanics, CAS**
Supervisor: Dr. Xiaolei Wu, Professor / **Advisor**: Wenqiang Cheng, Ph.D. Candidate
- ➢ Designed the simulation process and modeled the initial atom arrangements using the Voronoi method on MATLAB
- ➢ Conducted the molecular dynamics simulations with LAMMPS
- ➢ Developed algorithms to investigate the structural and strain features of simulation results utilizing OVITO and MATLAB

Simulation of Electric Current Assisted Sintering of Oxide Ceramics — Nov. 2021-May 2022
(Semester Project @ Institute for Materials Applications in Mechanical Engineering**)** — **RWTH Aachen University**
Supervisor: Dr. Christoph Broeckmann, Professor / **Advisor**: Shufan Wang, Ph.D. Candidate
- ➢ Simulated the Flash sintering process on MATLAB via Skorohold-Olevsky Viscous Sintering (SOVS) model
- ➢ Simulated the UHS- and Flash sintering process using finite element method on ABAQUS with user subroutine of SOVS model
- ➢ Applied the Parameter Calibration on MATLAB using damped Newton's method

Phase-Field Simulation of Sintering Process — Sept. 2020-Feb. 2021
(Undergraduate Research Assistant @ Institute for Materials Applications in Mechanical Engineering**)** — **RWTH Aachen University**
Supervisor: Dr. Christoph Broeckmann, Professor / **Advisor**: Shufan Wang, Ph.D. Candidate
- ➢ Built a distributed-parameter Phase Field model considering grain orientation and rigid body motion on MATLAB
- ➢ Simulated the sintering process on MATLAB utilizing the developed Phase-Field model and on MOOSE

PUBLICATION

Tao Y, Cheng W and Wang W (2023) Atomistic tensile deformation mechanisms in a CrCoNi medium-entropy alloy with gradient nano-grained structure at cryogenic temperature. *Front. Mater*. 9:1118952. doi: 10.3389/fmats.2022.1118952

INTERNSHIP

Mercedes-Benz Group | Research & Development Intern | Untertürkheim, Stuttgart, Germany — Jul. 2022-Jan. 2023
- ➢ Developed numerical algorithms for 2D~3D scattering points interpolation on MATLAB to improve the battery cell models
- ➢ Optimized the distribution of test points utilizing the Monte Carlo method to minimize the interpolation error of the battery cell model
- ➢ Developed graphical user interfaces (GUI) on MATLAB for visualization and post-processing of experimental data of battery cells

SKILLS

Language: Chinese (Native); English (Fluent); German (Fluent); Russian (Elementary)
Software: Siemens NX, MATLAB, ABAQUS, Ansys HFSS, LAMMPS, MOOSE, OVITO, Origin, Blender, Keil, CubeMX
Programming language: C++, Python, MATLAB, Fortran, Java