Zixiang (Zach) Tong

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SUMMARY

Ph.D. candidate in Engineering Mechanics focused on **hardware mechanics**, **experimental validation**, **full-field metrology**, and **simulation-informed analysis** for complex physical systems. Develops measurement and modeling workflows that connect mechanical testing, 3D imaging, numerical methods, and data-driven analysis. Experienced in Python, MATLAB, C/C++, PyTorch, COMSOL/ABAQUS simulation workflows, stereo vision, and automated engineering software development. Seeking hardware, product design, mechanical simulation, reliability, manufacturing design, and validation roles.

SKILLS

Hardware Mechanics: Experimental Mechanics, Mechanical Testing, Reliability, Failure/Deformation Analysis, Product Validation

Simulation & Modeling: FEA & Multiphysics (COMSOL, ABAQUS), Thermo-Mechanical Modeling, Simulation–Experiment Correlation, Parameter Studies

Metrology & Imaging: DIC/DVC, Stereo Vision, 3D Reconstruction, Camera Calibration, Full-field Deformation Measurement

Programming: Python, MATLAB, C/C++, PyTorch, CUDA, Git, Linux, GUI/Workflow Automation

EXPERIENCE

Advanced Data Analytics Intern — Tokyo Electron (TEL) *Austin, TX | Jun. 2026 – Aug. 2026*

- Developing confidential simulation-informed ML workflows to reconstruct **full-field physical responses** from sparse experimental measurements in complex semiconductor equipment systems.
- Building surrogate modeling pipelines that connect physics-based simulation data, sparse measurement inputs, and data-driven prediction for engineering analysis and calibration.
- Processing high-dimensional multiphysics simulation outputs to train models for rapid response-field reconstruction under varying system conditions.
- Completed **LEAN training** and applied structured problem-solving and workflow-standardization concepts within semiconductor engineering workflows.

Research Assistant — UT Austin *Austin, TX | 2023 – present*

3D Stereo Adaptive-Mesh Augmented Lagrangian DIC *2023 – 2025*

- Developed an open-source **3D full-field deformation measurement** framework for hardware testing, mechanical validation, and complex deformation analysis.
- Implemented stereo camera calibration, temporal matching, 3D reconstruction, and mesh-based displacement/strain estimation for large-deformation physical experiments.
- Designed an augmented-Lagrangian solver with adaptive mesh refinement to improve measurement resolution near large gradients, interfaces, and stress-concentration regions.
- Validated the workflow across rigid-body motion, thin-film bulging, tensile deformation, and underwater/biological measurement scenarios.

Chip-Level Thermal Warpage: Simulation–Experiment Correlation *2025 – present*

- Developed thermo-mechanical analysis workflows for package-level warpage and deformation behavior during temperature-dependent loading.
- Used full-field optical metrology to support simulation validation, deformation quantification, and reliability-oriented hardware assessment.
- Performed parameter studies on geometry, material properties, and loading conditions to identify dominant contributors to warpage and stress evolution.

RAFTcorr: Deep Learning Framework for Dense Displacement Tracking *2024 – present*

- Developed a Python/PyTorch framework for high-speed dense displacement estimation using optical-flow-inspired deep learning models for physical measurement.
- Built a GUI-enabled analysis pipeline for image ingestion, batch inference, visualization, post-processing, and repeatable engineering workflows.
- Curated >20k synthetic and experimental image pairs to benchmark accuracy, robustness to noise, and generalization across deformation modes.

Scientific Software Development for Mechanical Measurement *2023 – present*

- Built reusable Python/MATLAB frameworks for preprocessing, camera calibration, 3D reconstruction, dense registration, solver automation, and visualization.
- Developed open-source GUI tools for DIC/DVC analysis, ROI/mask generation, stereo-DIC workflows, and high-speed cavitation image analysis.
- Implemented modular, version-controlled analysis pipelines to improve reproducibility, reduce manual tuning, and accelerate experimental-mechanics workflows.

Computer Vision Engineer Intern — Orbbec Inc. *Shenzhen, China | 2022 Summer*

- Developed Python/C++ calibration and validation tools for production-grade **RGB-D structured-light camera systems**.
- Automated camera calibration, parameter sweeps, depth-accuracy evaluation, and batch-processing pipelines to improve measurement consistency and throughput.
- Built testing and visualization utilities to evaluate depth accuracy, detect imaging artifacts, and diagnose system-level issues under real hardware constraints.

Refraction-Corrected Stereo Vision and System Parameter Optimization *2020 – 2023*

- Developed a physics-based refraction correction model for stereo vision through multi-media optical interfaces, improving 3D reconstruction accuracy under non-standard imaging conditions.
- Designed a multi-camera vision system integrated with an underwater robotic platform for real-time structural inspection and defect measurement.

EDUCATION

Ph.D., Engineering Mechanics (expected June 2027) The University of Texas at Austin, 2023 – present
Advisor: Dr. Jin Yang

M.S., Solid Mechanics Southeast University, 2020 – 2023

B.Eng., Engineering Mechanics Southeast University, 2016 – 2020

SELECTED PUBLICATIONS & PRESENTATIONS

- **Zixiang Tong**, et al. 3D Stereo Adaptive Mesh Augmented Lagrangian Digital Image Correlation. *Experimental Mechanics*, 2025.
- **Zixiang Tong**, L. Gu, X. Shao. Refraction Error Analysis in Stereo Vision for System Parameters Optimization. *Measurement*, 222, 113650, 2023.
- **Zixiang Tong**, et al. RAFTcorr: An Open-Source, Deep Learning Digital Image Correlation Framework for Dense Displacement Measurement. *In preparation*, 2025.
- **Zixiang Tong**, et al. Digital Volume Correlation Challenge 2.0: A Comprehensive Dataset for Digital Volume Correlation Benchmarking. *Preprint*, 2026.
- **Zixiang Tong**†, et al. Machine Learning-Aided Spatial Adaptation for Improved Digital Image Correlation Analysis of Complex Geometries. *Strain*, 2025.
- Invited/selected presentations: International DIC Society Conference, SRC TECHCON, SEM Annual Conference.

† Co-first author

AWARDS

- **Semiconductor Research Corporation (SRC) Research Scholar**, 2025
- UT-Austin Graduate Recognition Award, 2025
- UT-Austin Graduate Excellence Fellowship, 2023–2026