

Yang (Kristen) Meng

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Research interests: Robotics and AI-driven fabrication for sustainable and efficient construction.

Experienced in computational design and digital fabrication workflows bridging architecture and structural engineering.

EDUCATION

University of Pennsylvania

Aug 2023 - May 2024

M.S. in Design: Robotics and Autonomous Systems

- **Focus:** Focus: Robotic fabrication, computational design, structural design, and human-computer interaction.
- **GPA:** 3.82/ 4.00
- **Relevant Coursework:** Geometric Structural Design, Algorithmic Design, Advanced Ras Programming.

Beijing University of Technology

Sept 2018 - Jul 2023

B.Arch in Architecture

- **Focus:** Parametric design and structural optimization.
- **GPA:** 3.67/ 4.00

PUBLICATIONS

- **Meng, Y.,** Wang, S., Campuzano, C., Stuart-Smith, R., Anderson, J., King, N., Moriuchi, S., & Sideropoulos, N. (2025). *Localized Multi-Pass Thermoforming Through Robotic Manipulation: A gesture-based approach to moldless multi-draft angle PETG sheet forming*. *CAADRIA 2025 Proceedings*, Tokyo, Japan.
- https://papers.cumincad.org/cgi-bin/works/paper/caadria2025_864
- **Meng, Y., & Dai, J.** (2020). *Research and Thinking on the Path and Method of Relief for the Homeless in China Based on the Comparison between China and the U.S.* *China Architectural Education*, (2), 160–164. (In Chinese).

RESEARCH EXPERIENCE

Localized Multi-Pass Robotic Thermoforming

Researcher | Advisor: Robert Stuart-Smith | University of Pennsylvania | Jan-Jun 2024

- Developed a **trajectory-driven robotic thermoforming workflow** enabling moldless, multi-draft-angle PETG forming for custom panels.
- Designed a **dual-mode end-effector** integrating a localized heat gun, forming tip, and **Arduino-controlled** thermocouple sensor, with two calibrated TCPs and **90° automatic indexing** for tool switching.
- Implemented a **fabrication-aware simulation** (Grasshopper + Flexhopper + Python) predicting heat distribution and deformation, validated through 3D scans.
- Utilized **ABB IRB 4600-60** robots and **RobotStudio/RAPID** for automated forming; workflow supports **multi-robot coordination**, reducing manual repositioning and enabling parallel operations.
- Achieved **60% reduction in forming time** and average geometric deviation of 1.61 ± 1.18 mm across a **full-scale PETG prototype** (0.8×1.6 m / 31×63 in) composed of five panels, fabricated with AR-assisted assembly; results published in *CAADRIA 2025 Proceedings* (Tokyo).

3D Spatial Structures Through Graded Timber Laminas

Student Collaborator | Advisor: Alicia Nahmad | University of Pennsylvania | Oct-Dec 2023

- Investigated **lamination and bending strategies** for sustainable **3D timber structures**, focusing on curvature generation through two-stage planar bending.
- Programmed **ABB 6-axis robotic milling** to fabricate custom timber connectors and tree-like lamina assemblies; generated toolpaths in **Rhino/Grasshopper → RAPID**.

- Applied **AI-driven visualization** (*Stable Diffusion* + *ControlNet*) for rapid exploration of material and spatial effects, supporting design iteration and fabrication decision-making.
- Produced a **full-scale prototype** demonstrating improved fabrication precision and design adaptability.

Robotic 3D Clay Printing: Crafting Fused Polyhedra

Student Collaborator | Advisor: Andrew Saunders | University of Pennsylvania | Sept–Oct 2023

- Developed **polyhedral toolpaths** in **Rhino/Grasshopper** → **RAPID** for robotic clay extrusion; integrated computer vision (Pixy2) to trigger Arduino-controlled interactive lighting for in-situ feedback.
- Tuned **printing parameters** (nozzle diameter, flow rate, layer height, and travel speed) to minimize slump and seam formation; executed firing and glazing workflow for final material finish.
- Produced **full-scale prototypes**; documented joint offsets to reconcile nozzle width vs. digital contours; proposed **offset strategy** for **seamless assembly**.

Exploration of Compression-Only Floor Structures Using Cardboard Modules

Researcher | Advisor: Masoud Akbarzadeh | University of Pennsylvania | Sept–Dec 2023

- Explored **compression-only floor systems** using cardboard-based modules as a low-carbon structural alternative; analyzed load paths and stability through **graphic statics** and **parametric modeling**.
- Developed an **interactive structural simulation** in **Rhino/Grasshopper** with **Python** scripting, visualizing **real-time force equilibrium** and identifying required reinforcements at critical nodes.
- Conducted **small-scale prototypes** and failure-mode testing, revealing material limitations and opportunities for geometric and structural optimization.
- Learned to perform **structural analysis and optimization** in **Fusion 360**, reinforcing understanding of form-finding principles and compression-only behavior; insights will inform future robotic fabrication research.

TECHNICAL SKILLS

Robotics & Control	ABB IRB4600 IRC5 controller RobotStudio/RAPID Arduino (sensor integration) Pixy2 computer vision OpenCV basic ROS
Modeling & Simulation	Rhino/Grasshopper Fusion 360 (structural analysis) Kangaroo Flexhopper PolyFrame COMPAS (computational framework for architecture)
Programming	Python C# C Java
Fabrication & Visualization	3D printing (clay, PETG) CNC milling laser cutting AI-driven visualization (Stable Diffusion, ControlNet) AR (Unity) KeyShot

HONORS & AWARDS

Selected: Gaozhi Innovation Scholarship (2021–2022); 1st Prize, Beijing Structural Design Contest (2022); Best Creativity Award, Public Space Node Design (2020)

PROFESSIONAL EXPERIENCE

Architectural Designer | *Mei Architect PLLC, New York, NY* | 2024–Present

- Coordinate single- and two-family residential projects in New York from schematic design to DOB submission, including new constructions and additions, with a focus on **wood-frame structural systems**.
- Produce **construction and structural drawings** (framing plans, connection details) in AutoCAD and Rhino; apply NYC Building Code and zoning standards to ensure design feasibility.

Media Coordinator & Research Assistant | *University of Pennsylvania MSD-RAS Program* | 2024

- Supported **robotic fabrication** and material research through documentation, photography, and data organization. Contributed to visual layout of the final studio publication summarizing fabrication workflows and outcomes.