Faraz Faruqi

(+1) 857-389-3870 | ffaruqi@mit.edu | www.farazfaruqi.com | FarazFaruqi | faraz-faruqi | Faraz Faruqi

Summary

PhD researcher at MIT CSAIL working at the intersection of generative 3D models, physical simulation, and XR interaction. I build systems that integrate 3D diffusion pipelines, latent-space manipulation, simulation (mechanical, thermal, tactile), and multimodal interfaces to enable intuitive creation and refinement of 3D content in XR. A core goal of my work is to develop interfaces that recreate not just visual appearance but also physical properties of objects, enabling more realistic, fabrication-ready, and expressive prototyping in XR. I have created systems such as InstructMesh, MechStyle, TactStyle, and Compos3D, supporting geometry editing, physical viability, tactile synthesis, and part-based composition. I have multiple first-author publications at CHI, UIST, and SCF, and active collaborations with Google Research XR and Autodesk Research on advanced 3D generative workflows.

Education

Massachusetts Institute of Technology — *Cambridge, MA*

Ph.D. in Computer Science (Concentration: Human-Computer Interaction and AI) — *2022 - 2026 (Expected)*

Massachusetts Institute of Technology — *Cambridge, MA*

M.S. in Electrical Engineering and Computer Science (Concentration: Artificial Intelligence) — *2020 - 2022*

Manipal Institute of Technology — *Karnataka, India*

B.Tech. in Computer Science and Engineering (Concentration: Artificial Intelligence) — *2015 - 2019*

Research Experience

Google Research (AI, XR, HCI, and UI/UX Teams) — *Mountain View, CA (Remote)*

Research Collaborator — *2022 – Present*

- **Generative AI and XR Systems for 3D Content Creation**: Collaborated with multiple Google Research teams on end-to-end 3D generative AI pipelines.
- Developed systems like **Style2Fab**, **TactStyle**, **MechStyle**, and **InstructMesh**, integrating 3D diffusion, multimodal manipulation, and physical-property modeling.
- Designed workflows for region-based editing, latent-space manipulation, tactile texture generation, and fabrication-aware refinement.
- **3D Generative AI for XR Prototyping**: Built multimodal XR interfaces that reconstruct both visual and physical object properties.
- Working on physical-viability checks, tactile-feedback modeling, and simulation-guided generation with Google XR and AI team.

Autodesk Research (AI Lab & Visualization/HCI Group) — *Toronto, Canada (Remote/Hybrid)*

Research Intern — *Summer 2025*

- **AI-Augmented 3D Modeling and B-Rep Workflows**: Developed structured generative pipelines for part-based and feature-based modeling.
- Implemented **latent-tree geometry editing**, semantic part assembly, and preference-guided composition.
- Contributed to Autodesk patent and CHI 2026 submission on part-based generative modeling interface.

Massachusetts Institute of Technology, CSAIL — *Cambridge, MA*

PhD Researcher (Advisor: Prof. Stefanie Mueller) — *2022 – Present*

- **InstructMesh**: Lead researcher on LLM-based text-guided, region-based refinement of 3D generative models through latent-space editing.
- Integrated SDF-based transformations, latent voxel editing, and fabrication-aware multimodal workflows.
- **MechStyle, TactStyle, Vis2Touch, Compos3D**: Developed tools combining generative AI with mechanical, thermal, and tactile simulation.
- Created part-based pipelines, tactile heightfields, and XR interfaces for fabrication-ready prototyping.
- Published multiple first-author papers at CHI, UIST, and SCF; led collaborations with Google Research and Autodesk Research.

Selected Publications

InstructMesh: Selective Refinement of Generative 3D Models for Fabrication

ACM CHI Conference on Human Factors in Computing Systems (CHI) (In Submission) — *2026*

Faruqi F., Katary A., Tas D., Hradilak T., Zhang N., Li J., Manhardt F., Nisser M.,

Phadnis V., Tombari F., Jampani V., Hofmann M., Mueller S.

Compos3D: Interactive Part-Based Composition for Creative Control in Generative 3D Models

ACM CHI Conference on Human Factors in Computing Systems (CHI) (In Submission) — *2026*

Faruqi F., Liu S., Fitzmaurice G., Matejka J.,

Vis2Touch: Perceptually Grounded 3D Printing of Depth and Texture from Images with Generative AI

ACM CHI Conference on Human Factors in Computing Systems (CHI) (In Submission) *2026*

Faruqi F., Sulaiman A., Yin J., Degraen D., Nisser M.

MechStyle: Augmenting Generative AI with Mechanical Simulation to Create Stylized and Structurally Viable 3D Models

ACM Symposium on Computational Fabrication (SCF 2025) *2025*

Faruqi F., Abdel-Rahman A., Tejedor L., Nisser M., Li J., Phadnis V., Jampani V., Gershenfeld N., Hofmann M., Mueller S.

TactStyle: Generating Tactile Textures with Generative AI for Digital Fabrication

ACM CHI Conference on Human Factors in Computing Systems (CHI 2025) *2025*

Faruqi F., Perroni-Scharf M., Walia J., Zhu Y., Feng S., Degraen D. Mueller S.

InteRecon: Towards Reconstructing Interactivity of Personal Memorable Items in Mixed Reality

ACM CHI Conference on Human Factors in Computing Systems (CHI 2025) *2025*

Li Z., Li J., Xiong Z., Zhang S., **Faruqi F.**, Mueller S., Liang C., Ma X., Fan M.,

Style2Fab: Functionality-Aware Manipulation for Fabricating Personalized 3D Models with Generative AI

ACM Symposium on User Interface Software and Technology (UIST 2023) *2023*

Faruqi F., Katary A., Hasic A., Abdel-Rahman A., Rahman N., Tejedor L., Hofmann M. Mueller S.

Selective Self-Assembly using Re-Programmable Magnetic Pixels *2022*

International Conference on Intelligent Robots and Systems (IROS 2022)

Nisser M., Makaram Y., **Faruqi F.**, Suzuki R., Mueller S.

Mixels: Fabricating Interfaces using Programmable Magnetic Pixels *2022*

ACM Symposium on User Interface Software and Technology (UIST 2022)

Nisser M., Makaram Y., Covarrubias L., Bah A., **Faruqi F.**, Suzuki R., Leake M., Mueller S.

Technical Skills Summary

Programming	Python, C, C++, C#, JavaScript (Node.js, React), MATLAB
Machine Learning	PyTorch, TensorFlow, JAX, NumPy, SciPy, scikit-learn, OpenCV, Diffusers
3D Geometry & Simulation	Trimesh, PyMeshLab, MeshLab, Blender API, Kaolin, Open3D, CUDA, WARP, FEM-style simulation
Generative Models	Diffusion Models, latent editing, 3D diffusion, NeRF/LRM, Gaussian Splatting
Graphics / XR	Unity, Three.js, WebXR, WebGL, OpenGL fundamentals
Fabrication & CAD	Fusion 360, Blender, Cura, PrusaSlicer, Formlabs PreForm
Developer Tools	Git, Docker, Linux Dev, REST APIs, GCP
Databases	SQL, MongoDB
Design / Prototyping	Adobe Suite, Figma, Processing

Invited Talks

Art You Can Touch: 2.5D Tactile Models for Inclusive Engagement *October, 2025*

(Exhibition) Henry Art Museum, Seattle

Featured in the Henry Art Museum's exhibition showcasing our 2.5D tactile modeling system (Vis2Touch/Text2Texture) for accessible, touch-based interpretation of visual artworks.

Shaping Realities: 3D Generative AI Tools for Physically Viable Design *June, 2025*

(Invited Talk) Google XR Labs

Invited by Google Research (XR) to present Style2Fab, TactStyle, and InstructMesh.

TactStyle for Tactile Interfaces in Robotics *June, 2025*

(Invited Speaker & Demo) RSS 2025 Workshop: Navigating Contact Dynamics in Robotics

Invited presentation and live demo highlighting tactile texture generation and applications in robotics.