

MANAS BHARGAVA

Researcher | Computational Design | Robotacist | Computer Vision | Digital Fabrication
Vienna, Austria | +43 664 88326289 | manas.bhargava@ist.ac.at | manas-avi.github.io



Professional Summary

Researcher with a PhD in Computational Design and Robotics and 7+ years designing, implementing, and optimizing advanced algorithms in C++ and Python. My work spans graph- and geometry-based methods over large triangle meshes, physics simulation, vision-based control, and machine learning. Published at top venues (SIGGRAPH, Computer Graphics Forum), with a track record of taking complex, algorithm-heavy systems from concept to working implementation and leading interdisciplinary research projects with international collaborators.

Technical Skills

Programming C++ (advanced), Python (advanced), MATLAB, embedded / microcontroller programming

Robotics & Control Closed-loop control, computer vision tracking, distributed actuation, inverse dynamics, rapid prototyping

ML & Simulation Reinforcement learning, deep learning (CNNs), Finite Element Method (FEM), OpenGL visualization pipelines

Digital Fabrication 3D printing, flexible PCB design, elastomer / soft-robotic actuators, CAD (Onshape)

Tools Git, Linux / Ubuntu, Blender, Inkscape

Languages English (proficient), Hindi (native), German (A2)

Experience

Postdoctoral Researcher *Institute of Science and Technology Austria (with Prof. Jeremie Palacci)* 2025 – Present

- Lead computational design and computer vision-assisted control of untethered elastomer robots, translating research prototypes toward robust, controllable systems.
- Developed image-processing workflows across multiple physical lab setups, improving reliability for downstream experiments.

PhD Researcher: Computational Design & Robotics *ISTA (Advisor: Prof. Bernd Bickel)* 2019 – 2025

- Designed and built a vision-tracked, closed-loop control system for distributed actuation, enabling programmable global deformation of soft robotic structures.
- Developed computational design pipelines for modular musculoskeletal robots (3D-printed bones + elastomer muscles), enabling active, untethered morphing and locomotion.
- Created a digital-fabrication framework for 3D-printed flexible PCBs with individually addressable LEDs, turning arbitrary 3D shapes into low-resolution surface screens (published at SIGGRAPH 2023).
- Built an algorithm to unfold 3D shapes isometrically into a single non-overlapping planar patch, powering both fabrication and a public art installation (published in Computer Graphics Forum 2025).
- Implemented forward- and inverse-dynamics simulation frameworks in C++/Python with integrated OpenGL visualization for design iteration and control validation.
- Led interdisciplinary projects with international academic and industry collaborators, coordinating design, fabrication, and controls across teams.

Selected Publications

- **Computational Design and Fabrication of Modular Robots with Untethered Control** — M. Bhargava et al. (under review, 2025).
- **PCBend: Light Up Your 3D Shapes With Foldable Circuit Boards** — M. Freire*, M. Bhargava* et al., *SIGGRAPH 2023*.
- **Mesh Simplification for Unfolding** — M. Bhargava et al., *Computer Graphics Forum*, 2024.

Detailed publication information available at manas-avi.github.io.

Education

- Ph.D., Computational Design & Robotics** ISTA, Austria 2019 – 2025
Thesis: Design and control of deformable structures: From PCB lighting displays to elastomer robots.
- B.Tech., Computer Science & Engineering (Hons.)** IIT Bombay 2015 – 2019
Minor in Electrical Engineering. Thesis: CNN architecture for 3D hand-shape estimation, mapping raw Kinect depth data of hand to high-quality meshes.

Leadership & Mentorship

- Supervised 3 theses (BSc/MSc) on computational design of origami structures, origami-robot simulation and fabrication, compatible triangulations for deformable structures, and mentored an intern on liquid-crystal-elastomer crawling robots.
- Taught and mentored across university courses: Introduction to Systems Engineering (SCARA robot: CAD, circuit assembly, closed-loop control), Python for Data Science, and AI/ML.
- Vice Graduate Student Representative, ISTA (2024–2025): mentored incoming students, organized community events, and represented student interests to administration.

Earlier Experience

- **Research Intern, Simon Fraser University (2018)** — GANs for logo generation by blending images across datasets.
- **Game Development Intern, Ubisoft Pune Studio (2017)** — gameplay/systems development in a professional studio environment.

References available on request.