

SHAMBHAVIPATASKAR

Biomedical Engineer · 3D Printing & Medical Applications · CAD & Visualization
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SUMMARY

Biomedical engineer with hands-on experience across the full medical device pipeline - from patient CT/MRI/DICOM data through image segmentation, anatomical reconstruction, and CAD design to multi-process additive manufacturing output - alongside real-time 3D visualization and surgical simulation work. Experienced with FDM, SLA, SLS, DMLS, PolyJet, and Color Jet Printing across cranial, maxillofacial, orthopaedic, and spinal clinical applications, with additional experience scoping and delivering independent client projects end-to-end.

EXPERIENCE

- Freelance 3D Medical Design Consultant** | Independent Jul 2026
- Designed and modelled a hyperrealistic, anatomically accurate tactile mouth model for an independent client, built from real CT/DICOM segmentation data to help blind and deaf children learn oral anatomy by touch.
 - Matched real human measurements (teeth, gums, tongue, palate, uvula, and palate-to-uvula distance) and hand-sculpted palate rugae detail; designed a tool-free, hinge-based two-part assembly and delivered a 3D-printed working prototype.

- 3D Medical Visualization Engineer** | AstroMediComp - **Pune, India** Dec 2023 – Jan 2025
- Developed 3D visualization and design assets for cranial and maxillofacial medical applications using Blender and OpenGL, producing high-fidelity anatomical renders and real-time surgical simulations for surgeons and medical educators across 6 platforms.
 - Built 3D models and anatomical visualizations for cranial and maxillofacial surgical contexts using Materialise Mimics, 3-matic, 3D Slicer, Meshmixer, and Blender.

- Biomedical Design Engineer** | Anatomiz3D Medtech Pvt. Ltd. - **Mumbai, India** Mar 2023 – Nov 2023
- Applied FDM, SLA, SLS, DMLS, PolyJet, and Color Jet Printing across 90+ clinical cases, selecting the appropriate process per material and clinical requirement, producing Titanium, PEEK, PMMA, and Bone Cement implants validated and cleared for surgical use.
 - Managed the complete DICOM-to-manufacturing pipeline: CT/MRI image segmentation and anatomical reconstruction in Materialise Mimics, CAD design in 3-matic, STL output, and print-ready file delivery across cranial, maxillofacial, orthopaedic, and spinal cases with 24-hour turnaround.
 - Designed patient-specific implants across cranial, orthopaedic, maxillofacial, paediatric, and spinal cases including cranial helmets, with additional experience in tumour segmentation from CT/MRI data.
 - Designed surgical instruments and guides - stents, jigs, cutting drills, and assembly components - used directly in the operating room to improve surgical precision.

- Biomedical Engineer Intern** | Gleneagles Global Hospitals - **Mumbai, India** Jun 2019 – Jul 2019
- Gained hands-on exposure across 50+ medical device types; assisted in orthopaedic surgeries, transplants, and clinical procedures.

EDUCATION

- B.E. Biomedical Engineering** · Vidyalkar Institute of Technology, **Mumbai** 2018 – 2021
- Diploma in Metallurgical Engineering** · Government Polytechnic, **Pune** 2015 – 2018

PROJECTS

- Tactile Rubik's Cube for Visually Impaired Users** Nov 2024 – Jan 2025
- Designed and fabricated a tactile Rubik's Cube with distinct geometric surface patterns for blind and colourblind users. Used FDM 3D printing to produce raised, Braille-inspired surface textures, combining Blender for ergonomic surface design and Fusion 360 for mechanical tolerancing and assembly. Validated through user testing.
- Blood Group Detection Using Image Processing** | IIT Bombay Mar 2020 – Jun 2021
- Built a mobile-based blood analysis system achieving ~67% accuracy through quantitative image processing and data analysis in Python - grayscale conversion, Canny edge detection, and image segmentation. FDM 3D printing was used to make a custom sample tray for the imaging and diagnostic system.

SKILLS

- 3D Printing & Additive Manufacturing** - FDM · SLA · SLS · DMLS · EBM · PolyJet · Color Jet Printing · Titanium · PEEK · PMMA · Bone Cement
- Medical Imaging & Segmentation** - DICOM Segmentation · CT/MRI Reconstruction · Anatomical Reconstruction Workflows · Materialise Mimics · Materialise 3-matic · 3D Slicer · Meshmixer
- 3D CAD & Design** - Blender · SolidWorks · AutoCAD · Fusion 360 · InVesalius · Adobe Photoshop
- 3D Visualization & Surgical Simulation** - Real-time rendering · OpenGL · Direct3D · HLSL/GLSL · Cross-platform (Win, Linux, macOS, Android, iOS, Web)
- Programming** - Python · C · C++ · NumPy · OpenCV · Scikit-image
- Experimental Design & Validation** - Quantitative data analysis, user testing, iterative prototyping
- Client & Project Delivery** - Independent client scoping, end-to-end project delivery, technical documentation, presenting results