

Atharva Shetye

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EDUCATION

University of California, Los Angeles (UCLA)

Sep 2023 - Present

MS/PhD in Mechanical Engineering - Area of Focus in Ocular Biomechanics

GPA: 3.90/4.00

National Institute of Technology (NIT) Tiruchirappalli, India

Jul 2016 - May 2020

B. Tech in Production Engineering (with Honors) | Minor Degree in Mechanical Engineering

GPA: 3.93/4.00

SKILLS & CORE COMPETENCIES

Mechanical Design: 3D CAD (CATIA 3DEXperience, SolidWorks, Creo) | GD&T | Tolerance Stack up | DFM/DFA | Injection Molding | Systems Engineering

FEA, Simulation & Mechanics: ABAQUS | Dynamic Non-Linear FEA | Structural Analysis | Continuum Mechanics | Constitutive Modeling | Viscoelasticity (Prony Series, Maxwell Models)

Computer Vision & Data Pipelines: Python | PyTorch (DeepLabV3+, RAFT Optical Flow) | MATLAB | Image Processing | Signal Processing (FFT, Lomb-Scargle) | Machine Learning | Statistical Modeling

Experimental Testing: Uniaxial Tensile & Stress-Relaxation Testing | Biomechanical Testing

Medical Device Quality & Process: ISO 13485 Design Controls | ISO 14971 Risk Management | DFMEA | Waterfall Method | Root Cause Analysis

ADVANCED R&D EXPERIENCE

Jules Stein Eye Institute, UCLA | Doctoral Researcher

Aug 2024 - Present

Ocular Strain and Tissue Dynamics Tracking Pipeline ([MDPI Bioengineering 2026](#))

Aug 2024 - Present

- Trained and deployed deep learning-based segmentation and optical flow models (DeepLabV3+ and RAFT) to enable sub-pixel level motion tracking of ocular structures from high resolution cSLO images.
- Applied continuum mechanics to convert dense displacement fields into Green-Lagrangian strain maps, quantifying tissue deformation during gaze shifts.
- Developed an end-to-end image processing pipeline to analyze cardiac pulse-induced strain, using FFT and Lomb-Scargle periodogram spectral analysis to extract dominant deformation frequencies.

Anatomical 3D System Modeling & Dynamic FEA Simulation

Jan 2026 - Present

- Reconstructed anatomically accurate 3D CAD assemblies of complex ocular structures and extraocular muscle architecture (including oblique muscles) in CATIA 3DEXperience.
- Developing an ABAQUS FEA simulation framework incorporating experimentally derived viscoelastic material parameters to model dynamic loading and saccadic eye movements.
- Quantifying time-series strain fields via high-speed imaging to derive in vivo viscoelastic properties of retina for future FEA simulations.

Viscoelastic material characterization of ocular tissues ([IOVS 2026](#))

Apr 2025- May 2026

- Characterized regional viscoelastic properties of human ocular tissues (sclera, optic nerve, optic nerve sheath) using uniaxial tensile stress relaxation testing under controlled physiological conditions.
- Implemented a generalized Maxwell model with Prony series fitting to extract regional moduli and relaxation times from linear viscoelastic data.
- Derived validated material constitutive parameters across 6 anatomical regions for dynamic non-linear FEA simulations.

PROFESSIONAL R&D EXPERIENCE

Becton Dickinson and Company (BD) | R&D Design Engineer II

Jul 2020 - Aug 2023

- Inventor on 8 US Patent filings and 21 invention disclosures while leading end-to-end mechanical design across 9 hypodermic product lines, supporting an \$80M BD revenue portfolio.
- Redesigned luer lock and slip taper geometries using SolidWorks, GD&T tolerance stack-ups, and ABAQUS FEA simulations to ensure ISO compliance, actively collaborating with manufacturing plants to optimize design using DFM for minimal tooling modifications.
- Executed waterfall design control methodology for the design process and led cross-functional risk assessments, root cause investigations to develop ISO 14971 compliant FMEAs for the newly designed components.
- Directed cross-functional design reviews and phase-gate approvals across Medical Affairs, Regulatory, Quality, and Manufacturing engineering teams.