SHANTANU VYAS

College Station, Texas
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EDUCATION

Texas A&M University, College Station, TX — *Expected Graduation: May 2025*
Doctor of Philosophy, Specialization: Human-Computer Interaction (HCI) — **GPA: 4.0/4.0**
Advisor: Dr. Vinayak R. Krishnamurthy

Texas A&M University, College Station, TX — *May 2019*
Master of Engineering, Mechanical Engineering — **GPA: 3.7/4.0**

SRM University, Kattankulathur, India — *May 2017*
Bachelor of Technology, Mechanical Engineering — **GPA: 3.5/4.0**

SKILLS

Knowledge Domains: Augmented/Virtual Reality (AR/VR), Geometric Modeling, Interaction Design, User Experience Design, Human Subjects Research, Applied Machine Learning (ML), Data Analysis, Applied Natural Language Processing, Computer Vision, Computer-Aided Design, Design Ideation and Conceptualization
Programming: Python, C#, MATLAB, (Moderate) C++, JavaScript, HTML/CSS
Libraries/Frameworks: OpenCV, NumPy, Scikit-Learn, Pandas, Scipy, Scikit-Image, PyTorch, Trimesh, Shapely, NLTK, Matplotlib
Programming Tools/Engines: Unity, Visual Studio Code
Design Tools: SolidWorks, Pro/Engineer, Blender

RESEARCH EXPERIENCE

Texas A&M University | Neuroergonomics Lab | Mixed-Initiative Design Lab — *Jan 2022 - Present*
Graduate Research Assistant — *College Station, TX*

- **Project:** LEARNER: Learning Environments with Advanced Robotics for Next-generation Emergency Responders
- **PIs:** Dr. Ranjana Mehta, Dr. Vinayak R. Krishnamurthy
- **Funding Source:** NSF – Convergence Accelerator
- Lead data analysis and model development team for adaptive training of emergency responders in AR/VR environments.
- Developed adaptive training models to identify low-performing novices in AR interactions and provide additional training using unsupervised ML techniques such as clustering.
- Assisted in designing a VR application that trains users on exoskeleton importance via a virtual box lifting task and biomechanics-based infographics visualization.
- Developed a supervised adaptation model for VR-based exoskeleton training using gaze-based metrics to identify and improve performance of low-performing users.
- Analyzed features affecting user performance on web-based Triage courses using web analytics.
- Designed and conducted user studies (n = > 50) to extract learning-specific data for the different ER training applications.
- Collaborate with multi-university teams to integrate different training modules into the adaptive learning system.

Texas A&M University | Mixed-Initiative Design Lab — *May 2021 - Dec 2021*
Graduate Research Assistant — *College Station, TX*

- **Project:** DARES: Distributed Autonomous Robotic Experiments and Simulations
- **PI:** Dr. Vinayak R. Krishnamurthy
- **Funding Source:** DOD - Army Research Laboratory
- Designed and implemented a multi-level of detail framework for natural scene reconstruction using multi-modal datasets including segmented point clouds and images

- Utilized skeletonization via Voronoi decomposition to extract shape features from segmented images, which were then projected into 3D point-cloud space
- Conducted an analysis and optimization of feature extraction methods for improved time and memory efficiency.

Texas A&M University | Mixed-Initiative Design Lab *Jan 2021 - May 2021*
Graduate Research Assistant *College Station, TX*

- **Project:** Fracture Fixation Training using a Hybrid Simulator with Data Visualization
- **PIs:** Dr. Vinayak R. Krishnamurthy, Dr. Bruce Tai
- **Funding Source:** The Orthopaedic Research and Education Foundation (OREF)
- Developed models for assessing orthopedic bone-drilling data through Laplacian-based trajectory noise characterization.
- Developed ML models to predict expertise of users in bone-drilling tasks.

ACADEMIC EXPERIENCE

Texas A&M University *Aug 2020 - Dec 2020*
Graduate Teaching Assistant *College Station, TX*

Course: MEEN 210 Geometric Modeling (100 students)

- Utilized SolidWorks expertise to mentor students for 3D modeling assignments and course projects on product design.
- Assisted students in the conceptualization and design phases of their course projects, providing valuable insights and feedback to enhance their final deliverables.

REFEREED JOURNAL PUBLICATIONS

[J6] Shantanu Vyas, Ting-Ju Chen, Jay Woodward, Vinayak R. Krishnamurthy. **Reflect-Express-Transform: Investigating Speech-based Iterative Digital Design for Young Designers.** (*Invited*) ASME Journal of Computing and Information Science in Engineering. *(Submitted: July 31, 2022)*

[J5] Shantanu Vyas, Ting-Ju Chen, Ronak R. Mohanty, Vinayak R. Krishnamurthy. **Making-A-Scene: A Preliminary Case Study on Speech-based 3D Shape Exploration through Scene Modeling.** ASME Journal of Computing and Information Science in Engineering, 2022.

[J4] Shantanu Vyas, Ting-Ju Chen, Ronak R. Mohanty, Peng Jiang, Vinayak R. Krishnamurthy. **Latent Embedded Graphs for Image and Shape Interpolation.** Computer-Aided Design, Volume 140, 2021.

[J3] Marta Revilla-León, Miguel Gómez-Polo, **Shantanu Vyas**, Basir A. Barmak, German O. Gallucci, Wael Att, Mutlu Özcan, Vinayak R. Krishnamurthy. **Artificial intelligence models for tooth-supported fixed and removable prosthodontics: A systematic review.** The Journal of Prosthetic Dentistry, 2021.

[J2] Marta Revilla-León, Miguel Gómez-Polo, **Shantanu Vyas**, Basir A. Barmak, German O. Galluci, Wael Att, Vinayak R. Krishnamurthy. **Artificial intelligence applications in implant dentistry: A systematic review.** The Journal of Prosthetic Dentistry, 2021.

[J1] Marta Revilla-León, Miguel Gómez-Polo, **Shantanu Vyas**, Basir A. Barmak, Mutlu Özcan, Wael Att, Vinayak R. Krishnamurthy. **Artificial intelligence applications in restorative dentistry: A systematic review.** The Journal of Prosthetic Dentistry, 2021.

PEER-REVIEWED CONFERENCE PUBLICATIONS

[C4] Shantanu Vyas, Ting-Ju Chen, Jay Woodward and Vinayak R. Krishnamurthy. **ShapOrator: Enabling Design Iteration for Young Designers Through Shape Verbalization** Proceedings of the ASME 2022 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. St. Louis, Missouri. August 14-17, 2022. *Computer-Aided Product and Process Development Technical Committee Best Paper Award*

[C3] Abhijeet Singh Raina, **Shantanu Vyas**, Matthew Ebert, and Vinayak R. Krishnamurthy. **QuickProbe: Quick Physical Prototyping-in-Context Using Physical Scaffolds in Digital Environments.** Proceedings of the ASME 2022 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. St. Louis, Missouri. August 14-17, 2022.

[C2] Ronak R. Mohanty, **Shantanu Vyas**, Aman Nigam, Bruce L. Tai and Vinayak R. Krishnamurthy. **Orthopedic Bone-Drilling Assessment Through Laplacian-based Trajectory Noise Characterization.** Proceedings of the ASME 2021 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Virtual, Online. August 17-20, 2021.

[C1] Ting-Ju Chen, **Shantanu Vyas**, and Vinayak R. Krishnamurthy. **Investigating Mind-Mapping as a Tool for Problem Exploration in Early Design.** Proceedings of the ASME 2021 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Virtual, Online. August 17-20, 2021.

EXTENDED ABSTRACTS AND POSTERS

[EA1] Shivangi Dwivedi, **Shantanu Vyas**, John Hayes, Isabella Pedron, Vinayak R. Krishnamurthy, Ranjana K. Mehta. **Neurophysiological and Perceptual Evaluation of Adaptive Augmented Reality-Based Training.** 2022 Neuroergonomics and NYC Neuromodulation Conferences.

HONORS & AWARDS

Best Paper Award *Fall 2022*
ASME IDETC/CIE 2022 - Computer-Aided Product and Process Development Technical Committee Best Paper Award
Continuing Student Fellowship - Byron Anderson '54 Fellowship *Fall 2022*
Byron Anderson '54 Fellowship *Spring 2021*

OUTREACH ACTIVITIES

Youth Adventure Program (YAP) *July 2021*
Student Assistant *College Station, TX*

- Assisted in conducting an two-day summer camp for high-school students at Texas A&M University.
- Assisted in designing interactive learning experiences to teach students about the engineering design process.
- Co-taught rapid prototyping and 3D modeling sessions.

ACM SIGCHI TAMU Chapter *Jan. 2021 - Aug. 2021*
Communications Officer *College Station, TX*

- In-charge of communicating with university as well as industrial point-of-contacts to organize HCI related events at Texas A&M University.