SHANTANU VYAS

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EDUCATION

Texas A&M University, College Station, TX — *Expected Graduation: May 2025*
Ph.D. Candidate - J. Mike Walker '66 Department of Mechanical Engineering — **GPA: 4.0/4.0**
Topic: *Conversational Interfaces for Reflective Design*
Advisor: Dr. Vinayak R. Krishnamurthy

Texas A&M University, College Station, TX — *May 2019*
M.Eng, 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/XR), Interaction Design, User Experience Design, Human Subjects Research, Interactive Prototype Development, Applied Machine Learning (ML), Data Analysis, Applied Natural Language Processing, Computer Vision, Computer-Aided Design, Generative AI & Design, Design Ideation and Conceptualization, Large Language Models, 3D Printing
Programming: Python, C#, MATLAB
Libraries/Frameworks: OpenCV, Scikit-Learn, SciPy, Pandas, PyTorch, Trimesh, Shapely, NLTK, Matplotlib
Programming Tools/Engines: Unity

WORK EXPERIENCE

Dolby Laboratories — *May 2024 - Aug 2024*
PhD Research Intern — *Sunnyvale, CA*

- **Project:** *Generative Immersive Virtual Environments*
- Designed and developed a multi-agent framework to aide game developers and content creators generate immersive 3D scenes in game engines through textual prompts.
- Leveraged vision and language models to understand user intentions, visual scenes, generate plans and execute tasks relevant to visual, spatial and audio immersiveness.
- Designed prompts and utilized techniques such as chain-of-thought, tree-of-thought, visual prompting and reflexion, to carry out complex audio-visual tasks.

RELEVANT RESEARCH EXPERIENCE

Texas A&M University | Mixed-Initiative Design Lab — *Sept 2020 - Present*
Graduate Researcher — *College Station, TX*

- **PI:** Dr. Vinayak R. Krishnamurthy
- **Project:** *Enabling Speech-based Iterative 3D Digital Design for Young Designers*
- Developed dynamic game-based workflows within Unity to facilitate speech-based 3D modeling tailored for young designers (K-12), prioritizing intuitive and accessible design interfaces. **[C4]**
- Designed mappings between language and geometric attributes of parts and objects to enable shapes (parametric curve-based modeling), dimensions and assembly-based changes through speech.
- Led a participatory design study with 10 high-school students to evaluate the workflow and capture reflective intents through in-depth 1:1 interviews.

- Utilized thematic analysis to categorize design intentions, providing nuanced insights into participants' motivations for shaping 3D models. **[J6]**
- Developed VR adaptation to address spatial UI challenges in 3D modeling, enhancing immersive user experience. **[D1]**

Texas A&M University | Neuroergonomics Lab | Mixed-Initiative Design Lab *Jan 2022 - Aug 2023*
Graduate Research Assistant *College Station, TX*

- **Project:** LEARNER: Learning Environments with Advanced Robotics for Next-generation Emergency Responders
- **PIs:** Dr. Ranjana K. Mehta, Dr. Vinayak R. Krishnamurthy
- **Funding Source:** NSF – Convergence Accelerator
- Led data analysis and model development team to create adaptive training programs for emergency responders in AR/VR environments.
- Designed and implemented adaptive training models utilizing unsupervised ML techniques, like clustering, to identify and support low-performing novices in fundamental AR interactions (poking and raycasting).
- Led statistical analysis of performance and neuro-physiological measures such as Heart Rate Variability (HRV), and brain-signals (fNIRS) to discern patterns between low and high performing users. **[J7]**
- Contributed to the design of a Unity-based VR application aimed at illustrating the significance of exoskeletons through virtual box lifting tasks and biomechanics-based infographics visualization.
- Trained a supervised adaptation model for VR-based exoskeleton training, leveraging eye-tracking metrics to enhance performance for low-performing users.
- Collaborated with multi-disciplinary teams and stakeholders on the design and implementation of multimodal feedback systems (audio-visual) in AR-based triage tasks. **[C5]**
- Designed and conducted user studies (n = > 50) to extract learning-specific data for the different ER training applications.
- Employed subjective surveys (NASA-TLX, System Usability Scale, Cognitive Load Theory, User Engagement) to test the usability of training applications and modules.

HONORS & AWARDS

Walker Impact Award *Fall 2024*
The Walker Impact Award is awarded to four graduate students in the Department of Mechanical Engineering for their demonstrated academic and innovative excellence.
Best Paper Award *Fall 2024*
ASME IDETC/CIE 2024 - Advanced Vehicle Technologies Technical Committee Best Paper Award
Continuing Student Fellowship - J George H Thompson Fellowship *Fall 2024*
MIDAS - Future Leaders Summit 2024 *Spring 2024*
Selected to attend the Responsible AI Summit hosted by the University of Michigan - Ann Arbor, centered on critical discussions about the ethical and responsible development & use of artificial intelligence.
Continuing Student Fellowship - J George H Thompson Fellowship *Fall 2023*
Best Poster Award *Spring 2023*
MEGSO Annual Poster Session
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*

REFEREED JOURNAL PUBLICATIONS

[J7] Shantanu Vyas, Shivangi Dwivedi,Lindsey Brenner, Isabella Pedron, Joseph L Gabbard, Vinayak R. Krishnamurthy, Ranjana K. Mehta.**Adaptive Training on Basic AR Interactions: Bi-Variate Metrics and Neuroergonomic Evaluation Paradigms.** International Journal of Human–Computer Interaction, 2023.

[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. June 2023; 23(3): 030905.

[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

[C6] Taimoor Daud Khan, **Shantanu Vyas**, and Vinayak R. Krishnamurthy. **A Geometrico-Statistical Representation for Off-Road Environments Captured by LiDAR** Proceedings of the ASME 2024 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Washington, D.C. August 25-28, 2024. ***Best Paper Award: Advanced Vehicle Technologies Technical Committee***

[C5] Ronak R. Mohanty, **Shantanu Vyas**, Lindsey Brenner, Peter Selly, Cassidy Nelson, Vinayak R. Krishnamurthy, Jason B. Moats, Joseph L. Gabbard, and Ranjana K. Mehta. **The Design and Evaluation of an AR-based Adaptive Triage Training for Emergency Responders** Proceedings of the 68th HFES International Annual Meeting.

[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. ***Best Paper Award: Computer-Aided Product and Process Development Technical Committee***

[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, POSTERS AND DEMOS

[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.

[D1] Shantanu Vyas.**ShapOrator VR: Speech-based Iterative Digital Design in Virtual Reality.** ASME 2023 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. August 20-23, 2023.

[D2] Shantanu Vyas, Taimoor Daud Khan, Matthew Ebert.**Creepers3D: Detailed Design Diversification on Product Forms.** ASME 2023 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. August 20-23, 2023.

OUTREACH ACTIVITIES

Peer Reviewer

· ACM CHI 2025, IEEE VR 2025, ACM TEI 2025, ACM SUI 2024, ACM CUI 2024, ASME IDETC 2024, DRS 2024, IEEE ISMAR 2023, ASME JCISE

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.