

RÉSUMÉ:

Sabarish V. Babu

### **PERSONAL DATA**

Professor  
Visual Computing and Computational Media  
Associate Director, PhD Visual Computing and Interactive Media  
College of Performance, Visualization and Fine Arts  
Texas A&M University  
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### **EDUCATION**

- Post-Doctoral Fellowship, University of Iowa, 2008, Computer Science
- Ph.D., University of North Carolina at Charlotte, 2007, Computer Science
- M.S., University of North Carolina at Charlotte, 2002, Information Technology
- B.S., University of North Carolina at Charlotte, 2000, Biology (Concentration Microbiology)

### **PROFESSIONAL EXPERIENCE**

- Associate Director, 2026-Present, PhD Visual Computing and Interactive Media program, Texas A&M University
- Texas A&M University, 2026-Present, Tenured Full Professor, College of Performance, Visualization and Fine Arts
- Clemson University, 2025-2025, Tenured Full Professor, School of Computing
- Clemson University, 2016-2025, Tenured Associate Professor, School of Computing
- National Chiao Tung University (Taiwan), Jan 2018 – July 2018, Visiting Professor (on Sabbatical from Clemson), College of Computer Science
- Clemson University, 2010-2016, Assistant Professor, School of Computing
- University of Iowa, 2008-2009, Assistant Research Scientist, Department of Computer Science

### **MEMBERSHIPS**

- *Senior Member*, Institute of Electrical and Electronics Engineers, IEEE (2023)
- Member, Association of Computing Machinery, ACM (2008-Present)
- Member, Phi Beta Delta – Honor Society for International Scholars, (2005-Present)

### **HONORS AND AWARDS**

#### **Fellowships**

- *Faculty Fellow*: Watt Family Center for Innovation, 2019-Present
- *Faculty Scholar*: Clemson University School of Health Research (CUSHR), 2018-Present
- *NVIDIA Professorship Award*: 2010-2011

#### **Best Paper/Presentation Awards**

1. *Best Presentation Award*: IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2024
  - For paper titled, “The Effects of Secondary Task Demands on Cybersickness in Active Exploration Virtual Reality Experiences.”
2. *Best Presentation Award*: IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2024

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- For paper titled, “The Effects of Auditory, Visual, and Cognitive Distractions on Cybersickness in Virtual Reality.”
- 3. *Honorable Mention for Best Presentation Award:* IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2024
  - For paper titled, “Investigating the Effects of Avatarization and Interaction Techniques on Near-Field Mixed Reality Interactions with Physical Components.”
- 4. *Honorable Mention for Best Presentation Award:* IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2024
  - For paper titled, “An Empirical Evaluation of the Calibration of Auditory Distance Perception Under Different Levels of Virtual Environment Visibilities.”
- 5. *Best Paper Award:* IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2023
  - For paper titled, “How Virtual Hand Representations Affect the Perceptions of Dynamic Affordances in Virtual Reality.”
- 6. *Honorable Mention for Best Paper Award:* IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2023
  - For paper titled, “Give Me a Hand: Improving the Effectiveness of Near-field Augmented Reality Interactions By Avatarizing Users' End Effectors.”
- 7. *Best Paper Award:* ACM Symposium on Applied Perception (ACM SAP) 2022
  - For paper titled, “Investigating a Combination of Input Modalities, Canvas Geometries, and Inking Triggers on On-Air Handwriting in Virtual Reality.”
- 8. *Best Presentation Award:* ACM Symposium on Applied Perception (ACM SAP) 2021
  - For paper titled, “Using Audio Reverberation to Compensate Distance Compression in Virtual Reality.”
- 9. *Best Paper Award:* ACM Symposium on Applied Perception (ACM SAP) 2020
  - For paper titled, “How the Presence and Size of Static Peripheral Blur Affects Cybersickness in Virtual Reality.”
- 10. *Honorable Mention for Best Paper:* ACM Symposium on Applied Perception (ACM SAP) 2020
  - For paper titled, “A Fitts’ Law Evaluation of Visuo-Haptic Fidelity and Sensory Mismatch on User Performance in a Near-field Disc Transfer Task in Virtual Reality.”
- 11. *Honorable Mention for Best Presentation:* ACM Symposium on Applied Perception (ACM SAP) 2020
  - For paper titled, “How the Presence and Size of Static Peripheral Blur Affects Cybersickness in Virtual Reality.”
- 12. *Best Conference Paper Award:* IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2018
  - For paper titled, “Investigating the Effects of Anthropomorphic Fidelity of Self-Avatars on Near Field Depth Perception in Immersive Virtual Environments.”
- 13. *Best Paper Award:* ACM Symposium on Applied Perception (ACM SAP) 2016

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- For paper titled, “An empirical evaluation of visuo-haptic feedback on physical reaching behaviors during 3D interaction in real and immersive virtual environments.”
14. *Best Poster Award*: IEEE International Symposium on 3D User Interfaces (IEEE 3DUI) 2016
    - For paper titled, “Towards a Comparative Evaluation of Visually Guided Physical Reaching Motions during 3D Interaction in Real and Virtual Environments.”
  15. *Best Paper Award*: IEEE International Conference on Healthcare Informatics (IEEE ICHI) 2013
    - For paper titled, “Empirical Evaluation of Traditional vs. Hybrid Interaction Metaphors in a Multitask Healthcare Simulation.”
  16. *Best Paper Award*: IEEE Symposium on 3D User Interfaces (IEEE 3DUI) 2007
    - For paper titled, “Comparison of Travel Techniques in a Complex, Multi-level 3D Environment.”

## PUBLICATIONS

**Google Scholar, Citations:** >3,600; **H-Index:** 36; **i10-Index:** 77

‘\*’ after names, denote student authors.

### Refereed Journal Publications

#### Published

1. Murmu, C.\*, Venkatakrishnan, R., Venkatakrishnan, R., Lin, W.C., Robb, A.C., Pagano, C. and Babu, S.V., 2025. “An Empirical Evaluation of How Virtual Hand Visibility Affects Near-Field Size Perception and Reporting of Tangible Objects in Virtual Reality,” *IEEE Transactions on Visualization and Computer Graphics*. (Impact Factor 6.5)
2. Six, S.\*, Schlesener, E.\*, Hill, V.\*, Babu, S.V. and Byrne, K., 2025. Impact of Conversational and Animation Features of a Mental Health App Virtual Agent on Depressive Symptoms and User Experience Among College Students: Randomized Controlled Trial. *JMIR Mental Health*, 12(1), p.e67381. (Impact Factor 4.8)
3. Venkatakrishnan, R.\*, Venkatakrishnan, R.\*, Canales, R.\*, Raveendranath, B.\*, Pagano, C.C., Robb, A.C., Lin, W.C. and Babu, S.V., 2024. “Investigating the effects of avatarization and interaction techniques on near-field mixed reality interactions with physical components,” *IEEE Transactions on Visualization and Computer Graphics*, 30(5), pp.2756-2766. (Impact Factor 6.5)
4. Venkatakrishnan, R.\*, Venkatakrishnan, R.\*, Raveendranath, B.\*, Canales, R.\*, Sarno, D.M., Robb, A.C., Lin, W.C. and Babu, S.V., 2024. “The effects of secondary task demands on cybersickness in active exploration virtual reality experiences,” *IEEE Transactions on Visualization and Computer Graphics*, 30(5), pp.2745-2755. (Impact Factor 6.5)
5. Hsieh, W.A.\*, Chien, H.Y.\*, Brickler, D.\*, Babu, S.V. and Chuang, J.H., 2024, February. “Comparing and Contrasting Near-Field, Object Space, and a Novel Hybrid Interaction Technique for Distant Object Manipulation in VR.” In *Virtual Worlds* (Vol. 3, No. 1, pp. 94-114). MDPI.
6. Chang, H.M.\*, Hsu, T.W.\*, Tsai, M.H.\*, Babu, S.V. and Chuang, J.H., 2023, December. “Design and Evaluation of an Asynchronous VR Exploration System for Architectural Design Discussion Content.” In *Virtual Worlds* (Vol. 3, No. 1, pp. 1-20). MDPI.

7. Huang, W.C.\*, Wong, S.K., Volonte, M.\* and Babu, S.V., 2023. “Impact of Socio-Demographic Attributes and Mutual Gaze of Virtual Humans on Users’ Visual Attention and Collision Avoidance in VR,” *IEEE Transactions on Visualization and Computer Graphics*, 30(9), pp.6146-6163.. (Impact Factor 6.5)
8. Wu, X.L.\* , Hung, H.C.\* , Babu, S.V. and Chuang, J.H., 2023. “Novel design and evaluation of redirection controllers using optimized alignment and artificial potential field,” *IEEE Transactions on Visualization and Computer Graphics*, 29(11), pp.4556-4566. (Impact Factor 6.5)
9. Venkatakrishnan, R.\* , Venkatakrishnan, R.\* , Raveendranath, B.\* , Sarno, D.M., Robb, A.C., Lin, W.C. and Babu, S.V., 2023. “The effects of auditory, visual, and cognitive distractions on cybersickness in virtual reality,” *IEEE Transactions on Visualization and Computer Graphics*, 30(8), pp.5350-5369. (Impact Factor 6.5)
10. Venkatakrishnan, R.\* , Venkatakrishnan, R.\* , Raveendranath, B.\* , Pagano, C.C., Robb, A.C., Lin, W.C. and Babu, S.V., 2023. “How Virtual Hand Representations Affect the Perceptions of Dynamic Affordances in Virtual Reality,” in *IEEE Transactions on Visualization and Computer Graphics*, 29(5), pp. 2258-2268. (BEST PAPER AWARD, IEEE VR 2023 – Journal Paper Track, Acceptance Rate ~10%, Impact Factor 6.5)
11. Venkatakrishnan, R.\* , Venkatakrishnan, R.\* , Raveendranath, B.\* , Pagano, C.C., Robb, A.C., Lin, W.C. and Babu, S.V., 2023. “Give Me a Hand: Improving the Effectiveness of Near-field Augmented Reality Interactions By Avatarizing Users' End Effectors,” in *IEEE Transactions on Visualization and Computer Graphics*, 29(5), pp. 2412-2422. (HONORABLE MENTION FOR BEST PAPER, IEEE VR 2023 – Journal Paper Track, Acceptance Rate ~10%, Impact Factor 6.5)
12. Bhargava, A.\* , Venkatakrishnan, R.\* , Venkatakrishnan, R.\* , Lucaites, K.\* , Solini, H.\* , Robb, A.C., Pagano, C.C. and Babu, S.V., 2023. “Can I Squeeze Through? Effects of Self-Avatars and Calibration in a Person-Plus-Virtual-Object System on Perceived Lateral Passability in VR,” in *IEEE Transactions on Visualization and Computer Graphics*, 29(5), pp. 2348-2357. (IEEE VR 2023 – Journal Paper Track, Acceptance Rate ~10%, Impact Factor 6.5)
13. Wijayanto, I.A.\* , Babu, S.V., Pagano, C.C. and Chuang, J.H., 2023. “Comparing the Effects of Visual Realism on Size Perception in VR versus Real World Viewing through Physical and Verbal Judgments,” in *IEEE Transactions on Visualization and Computer Graphics*, 29(5), pp. 2721-2731. (IEEE VR 2023 – Journal Paper Track, Acceptance Rate ~10%, Impact Factor 6.5).
14. Raveendranath, B.\* , Pagano, C.C.\* , Nasiri, M., Robb, A.C. and Babu, S.V., 2023. “Effect of Texture on the Perception of Axis of Rotation of Rotating Panels.” *Ecological Psychology*, 35(1-2), pp.1-30. (Impact Factor 1.23).
15. Venkatakrishnan, R.\* , Venkatakrishnan, R.\* , Chung, C.H.\* , Wang, Y.S. and Babu, S.V., 2022. “Investigating a combination of input modalities, canvas geometries, and inking triggers on on-air handwriting in virtual reality.” *ACM Transactions on Applied Perception*, 19(4), pp.1-19. (BEST PAPER AWARD, ACM SAP 2022, Acceptance Rate ~10%).
16. Jhan, X.D.\* , Wong, S.K., Ebrahimi, E., Lai, Y., Huang, W.C., and Babu, S.V., 2022. “Effects of Small Talk With a Crowd of Virtual Humans on Users' Emotional and Behavioral

- Responses,” *IEEE Transactions on Visualization and Computer Graphics*, 28(11), pp.3767-3777. (Impact Factor 6.5)
17. Kohm, K.\*, Babu, S.V., Pagano, C. and Robb, A., 2022. “Objects may be farther than they appear: depth compression diminishes over time with repeated calibration in virtual reality,” *IEEE Transactions on Visualization and Computer Graphics*, 28(11), pp.3907-3916. (Impact Factor 6.5)
  18. Parmar, D.\*, Lin, L.\*, DSouza, N.\*, Jörg, S., Leonard, A.E., Daily, S.B. and Babu, S.V., 2022. “How immersion and self-avatars in VR affect learning programming and computational thinking in middle school education,” *IEEE Transactions on Visualization and Computer Graphics*, 29(8), pp.3698-3713. (Impact Factor 6.5)
  19. Brickler, D.\*, and Babu, S.V., 2021. “An evaluation of screen parallax, haptic feedback, and sensory-motor mismatch on near-field perception-action coordination in VR,” *ACM Transactions on Applied Perception (TAP)*, 18(4), pp.1-16. (Impact Factor 2.64, Special Issue on the best papers of ACM SAP 2021, Acceptance Rate 10%).
  20. Raveendranath, B.\*, Nasiri, M.\*, Pagano, C.C. and Babu, S.V. (2021) “Factors affecting the perception of axis of rotation of pivot doors,” in *Journal of Vision*, 21(9), pp.2405-2405. (Impact Factor 2.10)
  21. Bhargava, A.\*, Venkatakrisnan, R.\*, Venkatakrisnan, R.\*, Solini, H.\*, Lucaites, K.\*, Robb, A.C., Pagano, C.C. and Babu, S.V., 2021. “Did I hit the door? Effects of self-avatars and calibration in a person-plus-virtual-object system on perceived frontal passability in VR,” *IEEE Transactions on Visualization and Computer Graphics*, 28(12), pp.4198-4210. (Impact Factor 6.5)
  22. Horing, B.\*, Beadle, S.C.\*, Inks, Z.\*, Robb, A., Muth, E.R. and Babu, S.V. (2020) “A virtual experimenter does not increase placebo hypoalgesia when delivering an interactive expectancy manipulation,” *Nature: Scientific Reports*, 10(1), pp.1-14. (Impact Factor 4.0)
  23. Brickler, D.\*, Teather, R.J., Duchowski, A.T. and Babu, S.V. (2020) “A Fitts’ Law Evaluation of Visuo-haptic Fidelity and Sensory Mismatch on User Performance in a Near-field Disc Transfer Task in Virtual Reality,” in the *ACM Transactions on Applied Perception (TAP)*, 17(4), pp.1-20. (Impact Factor 2.64, Received Honorable Mention for Best Paper and Best Presentation ACM SAP 2018)
  24. Lin, Y.X.\*, Venkatakrisnan, R.\*, Venkatakrisnan, R.\*, Ebrahimi, E.\*, Lin, W.C. and Babu, S.V. (2020) “How the Presence and Size of Static Peripheral Blur Affects Cybersickness in Virtual Reality,” in the *ACM Transactions on Applied Perception (TAP)*, 17(4), pp.1-18. (Impact Factor 2.64, Received Best Paper Award ACM SAP)
  25. Volonte, M.\*, Anaraky, R.G.\*, Venkatakrisnan, R.\*, Venkatakrisnan, R.\*, Knijnenburg, B.P., Duchowski, A.T. and Babu, S.V. (2020) “Empirical evaluation and pathway modeling of visual attention to virtual humans in an appearance fidelity continuum,” in the *Journal on Multimodal User Interfaces*, pp.1-11. (Impact Factor 1.51)
  26. Leonard, A.E., Daily, S.B., Jörg, S. and Babu, S.V. (2021) “Coding moves: Design and research of teaching computational thinking through dance choreography and virtual

- interactions,” in the *Journal of Research on Technology in Education*, 53(2), pp.159-177. (Impact Factor 2.73)
27. Bhargava, A. \*, Lucaites, K.M. \*, Hartman, L.S. \*, Solini, H. \*, Bertrand, J.W., Robb, A.C., Pagano, C.C. and Babu, S.V. (2020) “Revisiting affordance perception in contemporary virtual reality,” in the *Springer Journal of Virtual Reality*, pp.1-12. (Impact Factor 3.63)
  28. Bhargava, A. \*, Martin, J. and Babu, S.V. (2019) “Comparative evaluation of user perceived quality assessment of design strategies for HTTP-based adaptive streaming,” in the *ACM Transactions on Applied Perception (TAP)*, 16(4), pp.1-20. (Impact Factor 2.64)
  29. Liu, K.Y. \*, Volonte, M. \*, Hsu, Y.C. \*, Babu, S.V. and Wong, S.K. (2019) “Interaction with proactive and reactive agents in box manipulation tasks in virtual environments,” in the *Computer Animation and Virtual Worlds Journal*, 30(3-4), p.e1881. (Impact Factor 1.65)
  30. Day, B. \*, Ebrahimi, E. \*, Hartman, L.S. \*, Pagano, C.C., Robb, A.C. and Babu, S.V. (2019) “Examining the effects of altered avatars on perception-action in virtual reality,” in the *Journal of Experimental Psychology: Applied*, 25(1), p.1. (Impact Factor 2.96)
  31. Zhang, L., Babu, S.V., Jindal, M., Williams, J.E. and Gimbel, R.W. (2019) “A Patient-Centered Mobile Phone App (iHeartU) With a Virtual Human Assistant for Self-Management of Heart Failure: Protocol for a Usability Assessment Study,” in *JMIR research protocols*, 8(5), p.e13502. (Impact Factor 5.03)
  32. Bhargava, A. \*, Bertrand, J.W. \*, Gramopadhye, A.K., Madathil, K.C., and Babu, S.V. (2018). “Evaluating Multiple Levels of an Interaction Fidelity Continuum on Performance and Learning in Near-Field Training Simulations,” in the *IEEE Transactions on Visualization and Computer Graphics (IEEE TVCG) 2018 (Special Issue IEEE VR 2018 Journal Papers)*, 24(4), 1418-1427. (Acceptance Rate 11%, Impact Factor 6.5)
  33. Day, B. \*, Ebrahimi, E. \*, Hartwell, L. \*, Babu, S.V., and Pagano, C. (2018). “Calibration to Tool Use During Visually-Guided Reaching,” in the *Acta Psychologica Journal*, Vol. 181, p. 27-39. (Impact Factor 1.38)
  34. Ebrahimi, E. \*, Jorg, S., Pagano, C.C., and Babu, S.V. (2016). “An Empirical Evaluation of Visuo-Haptic Feedback on Physical Reaching Behaviors During 3D Interaction in Real and Immersive Virtual Environments,” in *ACM Transactions on Applied Perception (TAP)*, 13(4), 19. (Impact Factor 2.64, *Received Best Paper Award ACM SAP 2016*)
  35. Volonte, M. \*, Chaturvedi, H. \*, Babu, S.V., Newsome, N., Roy, T., Shani, D., Ebrahimi, E., and Fasolino, T. (2016). “Effects of Virtual Human Appearance Fidelity on Emotion Contagion in Affective Inter-Personal Simulations”, in the *IEEE Transactions on Visualization and Computer Graphics (IEEE TVCG) (Special Issue IEEE VR 2016 Journal Papers)*, 22(4), pp. 1326-1335. (Acceptance rate 12.6%, Impact Factor 6.5)
  36. Parmar, D.K. \*, Bertrand, J. \*, Babu, S.V., Madathil, K., Zelaya, M., Wang, T., Wagner, J., Gramopadhye, A.K. and Frady, K. (2016). “A Comparative Evaluation of Viewing Metaphors on Psycho-physical Skills Education in an Interactive Virtual Environment”, in the *Springer Journal of Virtual Reality (VIRE)*, 20(3), pp. 141-157. (Impact Factor 3.63)

37. Daily, S.B., Leonard, A.E., Joerg, S., Babu, S.V., Gunderson, K., Parmar, D. (2015) “Embodying and Programming a ‘Constellation’ of Multimodal Literacy Practices: Computational Thinking, Creative Movement, Biology, and Virtual Environment Interactions,” in the *Journal of Language and Literacy Education (JoLLE)*, 11(2), pp. 64-93.
38. Horing, B.\* , Newsome, N.N.\* , Enck, P., Babu, S.V., and Muth, E.R. (2015) “A Virtual Experimenter to Increase Standardization for the Investigation of Placebo Effects”, in the *BMC Medical Research Methodology Journal*, 16(1), 84. (Impact Factor 3.41)
39. Daily, S.B., Leonard, A.E., Joerg, S.\* , Babu, S.V., Gunderson, K., Parmar, D. (2015) “Embodying Computational Thinking: Initial Design of an Emerging Technological Learning Tool”, in the *Springer Journal on Technology, Knowledge and Learning*, 20(1), p. 79-84. (Impact Factor 3.35)
40. Wu, Y.\* , Babu, S.V., Armstrong, R., Bertrand, J.W., Luo, J., Roy, T., Daily, S.B., Dukes, L.C., Hodges, L.F., and Fasolino, T. (2014) “Effects of Virtual Human Animation on Emotion Contagion in Simulated Inter-Personal Experiences”, in the *IEEE Transactions on Visualization and Computer Graphics (Special Issue IEEE VR 2014 Journal Papers)*, Vol. 20(4), p. 626-635. (Acceptance Rate 15%, Impact Factor 6.5)
41. Napieralski, P.E.\* , Hu, J.\* , Fadel, G., and Babu, S.V. (2013). “An Evaluation of Immersive Viewing on Spatial Knowledge Acquisition in Spherical Panoramic Environments”, in the *Springer Journal of Virtual Reality (VIRE)*, p. 1-13. (Impact Factor 3.63)
42. Babu, S.V., Suma, E., Hodges, L.F., and Barnes, T. (2011). “Learning Cultural Conversational Protocols with Immersive Interactive Virtual Humans”, in the *International Journal of Virtual Reality (IJVR)*, Vol. 10(4), p. 25-35.
43. Napieralski, P.E.\* , Altenhoff, B.M.\* , Bertrand, J.W.\* , Long, L.O.\* , Babu, S.V., Pagano, C.C., Kern, J., and Davis, T.A. (2011). “Near Field Distance Perception in Real and Virtual Environments Using Both Verbal and Action Responses”, in the *ACM Transactions on Applied Perception (ACM TAP)*, Vol. 8, p.18:1 – 18:19. (Impact Factor 2.64)
44. Babu, S., Grechkin, T., Ziemer, C., Chihak, B., Cremer, J., Kearney, J., and Plumert, J. (2011). “An Immersive Virtual Peer for Studying Social Influences on Child Cyclists’ Road-Crossing Behavior”, in the *IEEE Transactions on Visualization and Computer Graphics (Special Issue IEEE VR 2011 Selected Paper)*, Vol. 17, p. 14-25. (Impact Factor 6.5)
45. Chihak, B. J., Plumert, J. M., Ziemer, C. J., Babu, S., Grechkin, T., Cremer, J. F., & Kearney, J. K. (2010). “Synchronizing self and object movement: How child and adult cyclists intercept moving gaps in a virtual environment,” in the *APA Journal on Experimental Psychology*, Vol 36(6), p. 1535-1552. (Impact Factor 3.17)
46. Suma, E., Finkelstein, S., Reid, M., Babu, S., Ulinski, A., and Hodges, L.F. (2010). "Evaluation of the Cognitive Effects of Travel Technique in Complex Real and Virtual Environments," in the *IEEE Transactions on Visualization and Computer Graphics*, Vol. 16(4), p. 690-702. (Impact Factor 6.5)
47. Cutler, B.L., Daugherty, B., Babu, S., Hodges, L. and Van Wallendael, L., 2009. “Creating blind photoarrays using virtual human technology: A feasibility test,” in the *Police Quarterly Journal*, 12(3), p.289-300. (Impact Factor 4.56)

48. Daugherty, B., Babu, S., Cutler, B., and Hodges, L. F. (2008). “Comparison of Virtual Human versus Human Administration of Police Lineups”, in the *IEEE Journal on Computer Graphics and Applications (IEEE CG&A)*, Vol. 28(6), p. 65-75. (Impact Factor 1.895)
49. Babu, S., Liao, P.-C., Shin, M.C., and Tsap, L.V. (2006). “Recovery and Visualization of 3D Structure of Chromosomes from Tomographic Reconstruction Images,” in the *EURASIP Journal on Applied Signal Processing*, vol. 2006, p.57-70. (Impact Factor 1.73)
50. Zambaka, C., Lok, B., Babu, S., Ulinski, A., Hodges, L. F. (2006). “Comparison of Path Visualizations and Cognitive Measures relative to Travel Technique in a Virtual Environment,” in *IEEE Transactions on Visualization and Computer Graphics (IEEE TVCG)*, 11. 6. pp. 694-705. (Impact Factor 6.5)
51. Whitney, S.L., Sparto, P.J., Hodges, L.F., Babu, S.V., Furman, J.M., and Redfern, M.S. (2006) “Responses to a Virtual Reality Grocery Store in Persons with and without Vestibular Dysfunction”, in the *Journal on CyberPsychology and Behavior*, 9(2), p. 152-156. (Impact Factor 2.35)

#### Conference Proceedings (Reviewed)

##### Published

1. Kohm, K.\*, Robb, A., Babu, S.V. and Pagano, C., 2025, August. It Is Only Eco-Logical: Direct Perception for XR Research. In *ACM Symposium on Applied Perception 2025* (pp. 1-10). (Acceptance rate 40%)
2. Schlesener, E.A.\*, Six, S.\*, Byrne, K. and Babu, S.V., 2025, August. Talk to Me': Comparing the Effects of Virtual Character Interaction Fidelity on Perceived Usability, User Experience, and Acceptance in a Mental Health Application. In *ACM Symposium on Applied Perception 2025* (pp. 1-11). (Acceptance rate 40%)
3. Westermeier, F.\*, Murmu, C.\*, Kohm, K.\*, Pagano, C., Wienrich, C., Babu, S.V. and Latoschik, M.E., 2025, March. Interpupillary to Inter-Camera Distance of Video See-Through AR and its Impact on Depth Perception. In *2025 IEEE Conference Virtual Reality and 3D User Interfaces (VR)* (pp. 537-547). IEEE. (Acceptance rate 20%)
4. Schlesener, E.A.\*, Shivakumar, V.\*, Breeze, D., Rennison, B., Sohmelioglu, B. and Babu, S.V., 2025, March. ‘Age Isn’t Just a Number’: Effects of Virtual Human Age and Gender on Persuasion, Social Presence and Influence in Interpersonal Social Encounters in VR. In *2025 IEEE Conference Virtual Reality and 3D User Interfaces (VR)* (pp. 82-92). IEEE. (Acceptance rate 20%)
5. Hsu, P.C.\*, Babu, S.V. and Chuang, J.H., 2025, March. Comparative Evaluation of Differing Levels of Information Presentation in 3D Mini-Maps on Spatial Knowledge Acquisition in VR. In *2025 IEEE Conference Virtual Reality and 3D User Interfaces (VR)* (pp. 526-536). IEEE. (Acceptance rate 20%)
6. Chiu, C.K.\*, Chuang, J.H., Pagano, C.C. and Babu, S.V., 2025, March. Comparing Absolute Size Perception in Optical See-Through Augmented Reality and Real World Viewing Using

- Verbal and Physical Judgments. In *2025 IEEE Conference Virtual Reality and 3D User Interfaces (VR)* (pp. 307-317). IEEE. (Acceptance rate 20%)
7. Diaz, D., Duchowski, A.T., Volonte, M., Robb, A., Pagano, C.C. and Babu, S.V., 2024, November. The Impact of Color and Object Size on Spatial Cognition and Object Recognition in Virtual Reality. In *Proceedings of the 17th ACM SIGGRAPH Conference on Motion, Interaction, and Games (ACM MIG)* (pp. 1-11). ACM.
  8. Chen, Y.A.\*, Wong, S.K., Chao, Y.T.\* and Babu, S.V., 2024, October. Effects of Organizational and Behavioral Reactions of Virtual Crowds on Users' Affect and Behavior in a Simulated Stressful Situation. In *2024 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)* (pp. 1107-1116). IEEE. (Acceptance rate 20%)
  9. Wu, D.R.\*, Duffrin, T.\*, Venkatakrishnan, R., Venkatakrishnan, R., Babu, S.V., Pagano, C. and Lin, W.C., 2024, October. Room Size Perception in Virtual Reality by Means of Sound and Vision: The Role of Perception-Action Calibration. In *2024 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)* (pp. 426-435). IEEE. (Acceptance rate 20%)
  10. Chiu, C.K.\*, Chuang, J.H., Pagano, C.C. and Babu, S.V., 2024, October. Investigating the Carryover Effects of Calibration of Size Perception in Augmented Reality to the Real World. In *2024 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)* (pp. 806-815). IEEE. (Acceptance rate 20%)
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85. Whitney, S.L., Sparto, P.J., Babu, S.V., Hodges, L.F., and Furman, J.M., Redfern, M.S. (2007) "Perceived Anxiety and Simulator Sickness in a Virtual Grocery Store in Persons with and without Vestibular Dysfunction," in *International Conference on CyberTherapy and Telemedicine 2007*, 5, pp. 173-178, Washington, DC.
86. Babu, S., Suma, E., Barnes, T., and Hodges, L.F. (2007). "Can Immersive Virtual Humans teach Social Conversational Protocols?" in *Proceedings of the IEEE International Conference on Virtual Reality 2007*, p. 215-218, Charlotte, NC. (Acceptance Rate 20%)
87. Suma, E., Babu, S., and Hodges, L. F. (2007). "Comparison of Travel Technique in a Complex, Multi-Level 3D Environment", in *IEEE International Symposium on 3D User Interfaces 2007*, p. 1-8, Charlotte, N.C. (Acceptance Rate 22%, Student First Author, Received Best Paper Award IEEE 3DUI 2007)
88. Babu, S., Schmutz, S., Barnes, T., and Hodges, L.F. (2006). "What would you like to talk about?" An evaluation of social conversations with a virtual receptionist. In the *Lecture Notes in Computer Science: Intelligent Virtual Agents* (Springer Berlin/Heidelberg, ISBN 0302-9743) Vol. 4133/2006), pp. 169-180. Also published in the *Proceedings of the 6th International Conference on Intelligent Virtual Agents* (Los Angeles, U.S.A, August 2006, J. Gratch et al.(Eds.) Springer-Verlag). (Acceptance rate 28%)
89. Babu, S., Schmutz, S., Inugala, R., Rao, S., Barnes, T., Hodges, L.F. (2005). "Marve: a prototype virtual human interface framework for studying human-virtual human interaction," in the *Lecture Notes on Artificial Intelligence LNAI*, (T. Panayiotopoulos et al.(Eds.) Springer-Verlag). Also published in the *Proceedings of the 5th International Working Conference on Intelligent Virtual Agents* (Kos, Greece, September 2005, T. Panayiotopoulos et al.(Eds.) Springer-Verlag), p.120-133. (Acceptance rate 30%)
90. Dong, H.J. Chang, S.L., Gye, B.J., Song, C.G., Babu, S., and Hodges, L.F. (2005). "Differentiation on information gathering ability in real and virtual world," *13th Pacific Conference on Computer Graphics and Applications* (Pacific Graphics 2005, Macao, China), p.157-159.
91. Whitney, S.L., Sparto, P.J., Hodges, L.F., Babu, S.V., Furman, J.M., and Redfern, M.S. (2005). "Responses to a virtual reality grocery store in persons with and without vestibular dysfunction," in *The Fourth International Workshop on Virtual Rehabilitation (IWVR 2005*, Sept. 19-21, Catalina Island, CA), 9(2), pp.152-156.
92. Babu, S., Zambaka, C., Jackson, J., Chung, T., Lok, B., Shin, M.C., and Hodges, L.F. (2005). "Virtual Human Physiotherapist Framework for Personalized Training and Rehabilitation," in *Proceedings of the International Conference on Graphics Interface 2005*, p. 9-11, Victoria, British Columbia, Canada, May 9 - 11, 2005.

## RÉSUMÉ:

93. Zambaka, C., Lok, B., Babu, S., Xiao, D., Ulinski, A, and Hodges L.F. (2004). “Effects of Travel Technique on Cognition in Virtual Environments,” in *Proceedings of IEEE Virtual Reality 2004*, Chicago, IL, p. 149-156, 286. (Acceptance rate 20.3%)
94. Babu, S., Liao, P.-C., Shin, M.C., and Tsap, L.V. (2004). “Towards Recovery of 3D Chromosome Structure,” in *IEEE Workshop on Articulated and Nonrigid Motion* (held in conjunction with *IEEE CVPR 2004*), Washington, D.C., p. 1-5, June 2004. (Acceptance rate 25%)

## PRESENTATIONS AND PANELS

- “Lessons Learned in Personal Space Interactions with Virtual Humans and Avatars, on Social Influences, Affordances and Perception-Action in XR,” Invited Speaker, Seminar, Virginia Tech University, Washington, D.C., March, 2024.
- “Lessons Learned in Personal Space Interactions with Virtual Humans and Avatars, Affordances and Perception-Action in XR,” Invited Speaker, Seminar, University of Illinois Chicago (UIC), Chicago, Illinois, March, 2024.
- “Lessons Learned in Personal Space Interactions with Virtual Humans and Avatars, on Social Influences, Affordances and Perception-Action in XR,” Invited Speaker, Seminar, University of Indiana Indianapolis, Indianapolis, Indiana, April, 2024.
- “Lessons Learned in Near-Field Interactions with Virtual Humans, Affordances, and 3D Interaction for Training and Education in MR,” Keynote Speaker, in the 2023 International Computer Graphics Workshop (Asia-Pacific), Taichung, Taiwan, July, 2023.
- “Lessons Learned in Near-Field Interactions with Virtual Humans and 3D Interaction Design for Training and Education in VR,” Invited Speaker, in the *Digital and Enabling Technology Innovation and Application Trend Forum Agenda, Industrial Technology Research Institute (ITRI)*, Taiwan. Web - <https://youtu.be/PzobTFJxi4A>
- “Lessons Learned in Near-Field Interactions with Virtual Humans and 3D Interaction Design for Training and Education in VR,” Keynote Speaker, in the *IEEE VR 2022 – 3rd Annual Workshop on 3D Content Creation for Simulated Training in eXtended Reality*. Web - <https://sites.google.com/view/trainingxrieevr2022>
- “XR Thrusts in Research, Applications and Education,” Keynote Speaker, in the *Asia Global Digital Service & Innovation Competition*, NYCU, Hsinchu, Taiwan, July 1st 2021. Web - <http://event.oia.nycu.edu.tw>
- “Implementing Virtual Reality at Scale in the Field – Challenges of Spaces and Places,” Panel Speaker, along with Soo Joo (Grace) Ahn (University of Georgia), Kyle Johnson (University of Georgia), Christoph Borst (The University of Louisiana), Erica Southgate (University of Newcastle), and Maki Sugimoto (The University of Tokyo), in the *IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2019*, Osaka, Japan. Web - <https://ieeerv.org/2019/program/panels.html#scalevr>
- “Perception and Affordance Research Inspired Design of Virtual Self-Representation in Near-Field Virtual Reality Interactions,” Keynote Speaker, in the *14th International Symposium on*

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*Visual Computing (ISVC) 2019*, Lake Tahoe, NV, Oct 2019. Web - <http://www.isvc.net/wp-content/uploads/2019/09/SabarishBabu.pdf>

- “Towards Investigating the Effects of Stereoscopic Voxalization, Adaptive Focal Plane Shifting, and Depth of Field Rendering on Near-Field Distance Perception in MR Displays.” Keynote Speaker, Annual Meeting, *Society for Information Displays (SID)-Taipei Chapter*, Taiwan, June 2018.
- “Towards Investigating the Effects of Stereoscopic Voxalization, Adaptive Focal Plane Shifting, and Depth of Field Rendering on Near-Field Distance Perception in MR Displays.” Invited Speaker, Departmental Seminar, *National Chiao-Tung University*, Taiwan, March 2018.
- “Investigations in Appearance, Animation and Interaction Fidelity with Self-Avatars, Virtual Humans and 3D Interaction on Depth Perception, Visual Attention and Learning.” Invited Speaker, Institute of Multimedia Engineering, *National Chiao-Tung University*, Taiwan, March 2018.
- “Examining the Effects of Interaction Fidelity on Task Performance and Learning in Virtual Reality.” Invited Speaker, *Boeing Corporation*, Charleston, South Carolina, August 2017.
- “From Emotional Interaction to Educational Experiences with Virtual Humans in Virtual Reality Simulations.” Invited Speaker, *National Chiao-Tung University*, Hsinchu, Taiwan, January 2017.
- “Examining the Effects of Interaction Fidelity on Task Performance and Learning in Virtual Reality.” Invited Speaker, *National Tsing-Hua University*, Hsinchu, Taiwan, January 2017.
- “From Emotional Interaction to Educational Experiences with Virtual Humans in Virtual Reality Simulations.” Invited Speaker, School of Computing, *Clemson University*, Clemson, U.S.A., October 2016.
- “Research on Visual Attention to Wayfinding Aids in Immersive Virtual Environments.” Invited Speaker, *National Tsing-Hua University*, Hsinchu, Taiwan, January 2014.
- “Investigating Applied Perception and Virtual Human Behavior Modeling in Interactive Virtual Environments.” Institute of Creative Technologies Seminar, *University of Southern California*, Los Angeles, California, June, 2013. Web - <http://www.youtube.com/watch?v=7W5fihFj26E>
- “Investigating Applied Perception and Virtual Human Behavior Modeling in Interactive Virtual Environments.” Invited Speaker, *National Tsing-Hua University*, Hsinchu, Taiwan, January, 2013.
- “Research in Applied Perception and Virtual Humans in Immersive Virtual Environments.” Distinguished Lecture Series, *Indian Institute of Technology*, Madras, India, August, 2012.
- “Investigating Applied Perception and Peer Influence in Immersive Virtual Environments.” Computer Science Colloquia, *University of Iowa*, Iowa City, Iowa, Oct, 2009.

## RÉSUMÉ:

- “Investigating Applied Perception and Peer Influence in Immersive Virtual Environments.” Graduate Seminar, *University of North Carolina at Charlotte*, Charlotte, North Carolina, Jan, 2009.
- “Investigating Applied Perception and Peer Influence in Immersive Virtual Environments.” Graduate Seminar, *Clemson University*, Clemson, South Carolina, Oct, 2008.
- “Research in Social Conversation and Peer Influence in Human-Virtual Human Interaction.” Teaching Game Design Conference, *Dakota State University*, South Dakota, Oct, 2008.
- "Research directions in Travel Techniques, Display Modalities, and Interactive Virtual Humans in Immersive Virtual Environments." Center for Computer Aided Design (CCAD), *University of Iowa*, Iowa City, Iowa, Jan, 2008.
- "Inter-Personal Social Conversation in Multi-modal Human-Virtual Human Interaction", Institute of Creative Technologies (ICT), *University of Southern California*, Los Angeles, California, June, 2007.
- "Inter-Personal Social Conversation in Multi-modal Human-Virtual Human Interaction", Department of Computer Science, *University of Iowa*, Iowa City, Iowa, April, 2007.
- "Inter-Personal Social Conversation in Multi-modal Human-Virtual Human Interaction", Department of Computer Science, *Rochester Institute of Technology*, Rochester, New York, April, 2007.
- "Virtual Human Interface Framework (VHIF) for studying Human-Virtual Human Interaction", Graduate Seminar, *University of North Carolina at Charlotte*, Charlotte, North Carolina, April, 2005.
- "Marvel: Messaging and Recognition Virtual Entity", Center for Human Computer Interaction and 3D Interaction Group, *Virginia Tech University*, Blacksburg, Virginia, October, 2004.

## SPONSORED RESEARCH

- “HCC: Small: Harnessing Cognitive Engagement Tasks to Counteract Cybersickness in VR,” U.S. National Science Foundation, Principle Investigator, Award Total: 599,848, Babu portion: \$300,000 (9/24 – 9/27).
  - Award announcement:  
[https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=2422718&HistoricalAwards=false](https://www.nsf.gov/awardsearch/showAward?AWD_ID=2422718&HistoricalAwards=false)
- “Digital Humans and Extended Realities/Metaverse,” BMW Information Technology Research Award, Sole Principle Investigator, Award Total: \$223,512 (1/24 – Present, extendable for 3 years).
- “CHS: Small: Investigating the Characteristics of User Representations and Long-Term Experiences in Personal Space Depth Perception in Virtual Reality,” U.S. National Science Foundation, Principle Investigator, Award Total: \$498,982, Babu portion: \$249,491 (Award ID: 2007435; 8/20 – 7/25).
  - Award announcement:  
[https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=2007435&HistoricalAwards=false](https://www.nsf.gov/awardsearch/showAward?AWD_ID=2007435&HistoricalAwards=false)

## RÉSUMÉ:

- “mHealth Virtual Agent System for Remote Monitoring of Respiratory Distress and Hypoxia Mitigation in COVID-19 Patients,” CU-Prisma Health Innovation Maturation Fund Award, Principle Investigator, Award Total: \$20,000, Babu portion: \$20,000 (8/20 – 7/21).
- “Usability Assessment of a Patient-Centric Mobile Health Application for Patient Self-Management and Enhanced Patient-Caregiver-Provider Communication of Heart Failure,” Prisma Health Transformative Seed Grant, Principle Investigator, Award Total: \$20,000, Babu portion: \$20,000 (3/20-12/20).
- “MRI: Development of Enodia: A highly reconfigurable, HPC-backed instrument enabling multifaceted interactive visualization,” U.S. National Science Foundation, Senior Personnel, Award Total: \$499,375, Babu portion: \$0 (Award ID: 1828611; 10/18-09/24).
  - Award announcement: [https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=1828611&HistoricalAwards=false](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1828611&HistoricalAwards=false)
- “IUSE: EHR: Assessing Virtual Reality Field Experiences for Enhanced Learning in the Geosciences,” U.S. National Science Foundation, Co-Principle Investigator, Award Total: \$599,950, Babu portion: \$155,000 (8/18 – 7/21).
  - Award announcement: [https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=1821676](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1821676)
- “Usability Assessment of a Patient-centered Mobile Health Application (iHeartU) for Self-management of Heart Failure,” Greenville Health System (GHS) Transformative Seed Grant program, Co-Principle Investigator, Award Total: \$20,000, Babu portion: \$15,000 (05/17 – 12/17).
- “Building 3D Ad Contents for Virtual Reality Experiences,” Adobe Digital Marketing Research Awards, Co-Principle Investigator, Award Total: \$50,000, Babu portion: \$40,000 (05/18 – 05/22).
- “Virtual Environment Interactions: Exploring Grounded Embodied Pedagogy in Support of Computational Thinking,” U.S. National Science Foundation, Co-Principal, Award Total: \$579,673, Babu portion: \$160,225 (Award ID: 1559756; 01/13 – 12/16).
  - Award Announcement: [https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=1559756&HistoricalAwards=false](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1559756&HistoricalAwards=false)
- “Nursing Surveillance Training using Interactive Virtual Simulation,” Medline Industries, Co-Principle Investigator (PI-Dr. Tracy Fasolino), Award Total: \$99,981, Babu portion: \$99,981, (08/13 – 07/14).
- “Center for Aviation and Automotive Technology Education using Virtual E-School [CA2VES]: A Resource to Meet Technician Workforce Needs,” U.S. National Science Foundation, Investigator, Award Total: \$1,200,000, Babu portion: \$240,000 (funded 2 graduate students for 3 full years), (Award ID: 1104181; 08/13 – 09/16).
- “Accessible Support Services and Instruction for Sustainable Transition to Work (ASSIST),” U.S. Department of Labor, Co-Principle Investigator, Award Total: \$878,467, Babu portion: \$292,822, (01/11 – 09/14).
- “Improving Patient Safety with Interactive Virtual Environment Simulation for Direct Care Nurses,” St. Francis Foundation, Co-Principle Investigator (PI-Dr. Tracy Fasolino), Award Total: \$41,999, Babu portion: \$41,999 (05/11 – 05/12).

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- “Instrumentation of Large Screen Stereoscopic Display for Perceptual Affordance Investigation”, NVIDIA Faculty Award, Principle Investigator, Award Total: \$5,000, Babu portion: \$5,000 (01/10 – 12/10).

## **OTHER SPONSORED ACTIVITY**

- “CU SEED-Tier 2: Investigating Thermoception in Interactive XR Simulations,” Clemson University Support for Early Exploration and Development (CU SEED) Grant, Principle Investigator, Total \$10,000, (2/21 - 1/22).
- “Investigating the Anthropomorphic Fidelity of Self-Avatars on Spatial Perception and Body Schema Representation in Immersive Virtual Environments,” Transformative Initiative for Generating Extramural Research (TIGER), Clemson University, Principle Investigator, Total \$15,000, (01/18 – 01/19).
- “Investigating Perceptual-Motor Synchrony and Coordination on Cybersickness, Skills Training, and Spatial Perception in a VR Rowing Simulator,” Brooks Sports Sciences Institute (BSSI) Seed Grant, Clemson University, Principle Investigator, Total \$47,000, (01/17 – 12/17).
- “A Virtual Experimenter as Means to Overcome Biases in Psychosomatic Research Methodology”, Transformative Initiative for Generating Extramural Research (TIGER), Clemson University, Principle Investigator, Total \$20,000, (08/14 – 06/14).
- “Enhancing Depth Estimation in Virtual Reality via Visuo-Motor Calibration”, University Research Grant Committee, Clemson University, Principle Investigator, Total \$10,000, (08/13 – 09/14).
- “Using Virtual Peers to Investigate Social Influences in Children’s Bicycling,” Internal Funding Initiative, Social Sciences Funding Program – University of Iowa, Principle Investigator, Total \$30,000, (05/09 – 12/09).

## **GRADUATE STUDENT ADVISING**

### *Doctoral Graduates*

1. Dr. Kristopher C. Kohm (PhD Human Centered Computing), “Changes in Near-Field Perception and Reaching Behavior in Virtual Environments Over Time,” 8/2024 (Co-Advisor).
  - Current Position: Post-Doctoral Research Fellow, NASA Ames Research Laboratory.
2. Dr. Roshan Venkatakrishnan (PhD Human Centered Computing), “All Hands on Deck: Choosing Virtual End Effector Representations to Improve Near Field Object Manipulation Interactions in Extended Reality,” 8/2023, (Advisor).
  - Current Position: Post-Doctoral Research Fellow, Department of Computer, Information Sciences and Engineering, The University of Florida.
3. Dr. Rohith Venkatakrishnan (PhD Human Centered Computing), “The Effects of Primary and Secondary Task Workloads on Cybersickness in Immersive Virtual Active Exploration Experiences,” 8/2023, (Advisor).
  - Current Position: Post-Doctoral Research Fellow, Department of Computer, Information Sciences and Engineering, The University of Florida.

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4. Dr. David P. Brickler, (PhD Human Centered Computing), “Investigating Visuo-Haptic Interaction Fidelity and Display Metaphors on Near-Field Fine Motor Selection and Manipulation Tasks in Virtual Reality,” 8/2021, (Advisor).
  - Current Position: Lecturer, Department of Computer Science, Morehouse University.
5. Dr. Matias Volonte (PhD Human Centered Computing), “Effects of Virtual Humans in Dyadic and Crowd Settings on Emotion, Visual Attention and Task Performance in Interactive Simulations,” 5/2021, (Advisor).
  - Received School of Computing Outstanding Human Centered Computing PhD Student Award 2019-2020
  - Currently Position: Assistant Professor, School of Computing, Clemson University.
6. Dr. Ayush Bhargava (PhD Computer Science), “The Effect of Anthropometric Properties of Self-Avatars on Action Capabilities in Virtual Reality,” 12/2019, (Advisor).
  - Received the Graduate School Doctoral Dissertation Completion Grant Award 2018-2019.
  - Current Position: VR/AR UX Researcher, Meta Reality Labs, Meta/Facebook Inc.
7. Dr. Elham “Ellie” Ebrahimi, (PhD Human Centered Computing), “Investigating Embodied Interaction in Near-Field Perception-Action Re-calibration on Performance in Immersive Virtual Environments,” 12/2017, (Advisor).
  - Received School of Computing Outstanding Human Centered Computing PhD Student Award 2015-2016
  - Received School of Computing Outstanding Teaching Assistant Award 2014-2015
  - Current Position: Tenured Associate Professor, Department of Computer Science, University of North Carolina at Wilmington
8. Dr. Dhaval Parmar, (PhD Computer Science), “Evaluating the Effects of Immersive Embodied Interaction on Cognition in Virtual Reality,” 08/2017, (Advisor).
  - Received School of Computing Outstanding Computer Science PhD Student Award 2014-2015
  - Currently Position: Post-Doctoral Research Associate, Khoury College of Computer Sciences, Northeastern University
9. Dr. Jeffrey W. Bertrand, (PhD Human Centered Computing), “Examining the Effects of Interaction Fidelity on Task Performance and Learning in Virtual Reality,” 12/2016, (Advisor).
  - Received School of Computing Outstanding Human Centered Computing PhD Student Award 2013-2014, received the award at the College of Engineering, Computing and Applied Science annual ceremony.
  - Current Position: Director of VR/Visualizations, Clemson University Center for Workforce Development (CUCWD)

### **Master's Graduates**

1. Bryson Rudolph (MS Computer Science), “Design and Creation of VRFE: Virtual Reality Field Experience Simulation for Learning Geology Concepts in Undergraduate Education,” 08/2021, (Advisor).
2. Anand Saral (MS Computer Science), “Redesign and Implementation of the Rapid Response Training System for Healthcare Worker Education,” 05/2021, (Advisor).
3. Pratyush Singh (MS Computer Science), “Design of a Mobile Health Monitoring Virtual Human Application and Empirical Evaluation of the Effectiveness of the Interactive Virtual Human on Presence, Healthcare Outcomes and Usability,” 08/2018, (Advisor).

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4. Vibhor Rastogi (MS Computer Science), "Virtual Reality Based Simulation Testbed for Evaluation of Autonomous Vehicle Behavior Algorithms," 12/2017, (Co-Advisor).
5. Himanshu Chaturvedi, (MS Computer Science), "Virtual Humans and Photorealism: The Effect of Photorealism of Interactive Virtual Humans in Clinical Virtual Environment on Affective Responses," 12/2015, (Advisor).
6. Yangxiang Wu, (MS Computer Science), "Effects of Virtual Human Animation on Emotion Contagion in Simulated Interpersonal Experiences," 05/2014, (Advisor).
7. Manan Gupta, (MS Computer Science) "Data Driven Approach to Multi-Agent Low Level Behavior Generation in Medical Simulations," 05/2012, (Advisor).
8. Philip Napieralski, (MS Computer Science) "Effects of Immersion on Spatial Updating in Virtual Panoramas," 05/2012, (Advisor).

### ***Current Graduate Advising***

1. Mark Tolchinsky (PhD Human Centered Computing), TBD, expected: 08/2027, (Advisor).
2. Chandni Murmu (PhD Human Centered Computing), TBD, expected: 05/2027, (Advisor).
3. Vyomakesh Shivakumar (PhD Human Centered Computing), TBD, expected: 05/2027, (Advisor).
4. Elisabeth Alexandra Schelesener (PhD Human Centered Computing), TBD, expected: 05/2027, (Advisor)

### ***Doctoral Student Committee Service***

1. Dr. Hannah Solini (PhD Human Factors), "Just Around the Corner: The Impact of Instruction Method and Corner Geometry on Teleoperation of Virtual Unmanned Ground Vehicles," 12/2021, (Committee Member).
2. Dr. Marie Jarrell (PhD Human Centered Computing), "The Importance of Play: Identification with Video Game Characters' Intersectional Effects on Bias," 12/2020, (Committee Member).
3. Dr. Alexandre Gomes de Siqueira (PhD Human Centered Computing), "Toward New Ecologies of Cyberphysical Representational Forms, Scales, and Modalities," 09/2019, (Committee Member).
4. Dr. Tania Roy (PhD Human Centered Computing), "Secondlook: A Prototype Mobile Phone Intervention for Digital Dating Abuse," 07/2018, (Committee Member).
5. Dr. Brian Day (PhD Human Factors), "Examining the Effects of Altered Avatars on Perception-Action in Virtual Reality", 06/2017, (Committee Member).
6. Dr. Toni B. Pence (PhD Human Centered Computing), "Iterative Development and Evaluation of a Virtual Pediatric Patient System", 06/2015, (Committee Member).
7. Dr. Jerome McClendon (PhD Human Centered Computing), "Optimization of a Language Model for the Classification of Queries in a Script Based Conversational Agent", 05/2015, (Committee Member).

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8. Dr. Lauren C. Dukes (PhD Human Centered Computing), “A Scenario Builder Tool for Pediatric Virtual Patients”, 05/2015, (Committee Member).
9. Dr. Kennis Gosha (PhD Human Centered Computing), “The Application of Relational Agents for Mentoring African-American STEM Doctoral Students”, 05/2013, (Committee Member).

### **Master's Student Committee Service**

1. Elenah Brielle Rosopa (MA Applied Psychology), “Let's Get The Ball Rolling: Dynamic Affordances for an Object Retrieval Task in Virtual Reality,” 08/2024, (Committee Member).
2. Balagopal Raveendranath (MA Applied Psychology), “Affordance Judgment for Collision or Bypass of Objects by Rotating Panels,” 05/2021, (Committee Member).

### **Undergraduate Honors Thesis Students**

1. Nathan Brown (BS CS Honors), “VRFE: Development and Evaluation of Virtual Reality Field Experiences for Geology Education,” 5/2022, (Advisor).
2. Mark Tolchinsky, (BS CS Honors), “Investigating Motor Control during Tracking in Extended Reality (XR),” 12/2021, (Advisor).
3. Rowan Armstrong, (BS CS Honors), “Investigating Animation Fidelity of Virtual Patients in Learning and Emotion Contagion,” 12/2013, (Advisor).
4. Ian Wood, (BS CS Honors), “Design and Evaluation of a Treadmill System for Immersive Travel in Virtual Reality,” 05/2012, (Advisor).

### **Undergraduate Research Experience (REU) Students**

1. Erica Porter (BS Honors), “Measuring Physiological Responses to Virtual Humans,” 05-08/2013, (Advisor).
2. Daniel Taylor (BS Honors), “Analyzing Users Emotions from Video Analysis,” 05-08/2013, (Advisor).
3. Christopher West (BS Honors), “Investigations in Visual Appearance of Virtual Humans,” 05-08/2014, (Advisor).
4. Jacob Thompson, (BS Honors) “Investigation Depth Perception and Calibration in VR,” 05-08/2014, (Advisor).

## **TEACHING**

### **Courses Taught**

Beginning Spring 2010 at Clemson University

- *CPSC 1210/1211 Computational Thinking (and Laboratory)*, Spring 2022, School of Computing, Clemson University.
  - This new course is a creative and engaging way to learn principles of computer science. Students learn to create and analyze programs using Snap!, a beginner friendly, graphical programming language that can be combined into complex programs and Python. The course is organized around the big ideas of computing, such as abstraction, design, recursion, concurrency, simulations, and limits of computing. Students learn how to apply these ideas to solve problems and critically reflect on how existing solutions impact people and society.

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- *CPSC 1070 Introduction to Programming Methodology (and CPSC 1071 Introduction to Programming Methodology laboratory)*, Spring 2020, Spring 2021, School of Computing, Clemson University.
  - I taught an introductory core course for Freshmen/Sophomore BS Computer Science students in programming techniques and methodology in C and C++. Topics include structured programming, stepwise refinement, program design and implementation techniques, modularization criteria, program testing and verification, basic data structures, object-oriented programming and analysis of algorithms. I created lectures, assignments, quizzes and tests for both the lecture and laboratory sections of the course. Assignments had a visual computing and image processing focus and included 2D game development (using the SDL library), 2D scenario loading and computer animation.
  
- *CPSC 4140/6140, Introduction to Human Computer Interaction*, Spring 2011, Spring 2012, Spring 2013, Summer 2014, Spring 2015, Summer 2015, Spring 2016, Summer 2016, Spring 2017, Summer 2017, Spring 2019, Summer 2020, Spring 2021, Summer 2021, Spring 2022, Summer 2022, Spring 2023, Spring 2024, Summer 2024, School of Computing, Clemson University.
  - This is a course on the survey of human-computer interaction concepts, theory, practice and research. Covered the basic components of human-computer interaction, and interdisciplinary theoretical underpinnings. This is a core course for our Human Centered Computing PhD program. Informed and critical evaluation of computational systems. The course involved a user-oriented perspective, rather than system-oriented, with two thrusts: human (cognitive, social) and technological (input/output, interactions styles, devices). Course covered design guidelines, evaluation methods, participatory design, communication between users and system developers. Also, some basics principles of user centered design, usability evaluation, and quantitative/qualitative user analysis.
  
- *CPSC 4110/6110, Virtual Reality Systems*, Fall 2010, Fall 2011, Fall 2012, Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018, Fall 2019, Fall 2020, Fall 2021, Fall 2022, Spring 2024, Fall 2024, School of Computing, Clemson University.
  - This is an introductory course in the theory, technology, software, design, applications and human factors issues of contemporary VR/AR system. This course is one of the senior electives for our BS/BA in computer science programs, an elective for the Master of Fine Arts in Digital Production Arts program, and one of the courses necessary to earn a concentration in Interactive Computing for MSCS students. Students learned the technical design and affordances of displays and tracking technologies; the technical aspects of geometry and image based virtual reality systems; to determine the basic requirements on interface, hardware, and software configurations of a VR/AR system; to design, implement and evaluate a VR/AR system. Groups of students work on designing, creating and evaluating an interactive VR experience. Some groups of students have also targeted the design and creation of applications for the 3D User Interface Contest at the annual IEEE International Conference on Virtual Reality (IEEE VR), with several students receiving authorships on peer-reviewed Demo and 3DUI Contest papers of their applications at the IEEE VR conference.
  
- *HCC 8810, Fundamentals of Measurements and Evaluation of HCC Systems*, Spring 2013, Spring 2014, Spring 2015, Spring 2016, School of Computing, Clemson University.
  - I designed and taught this course on quantitative research methods and reporting in empirical evaluation of computing systems for HCI and HCC research. It is a core course for our Human Centered Computing PhD program, and by the end of the semester provides students with knowledge and experience in applying parametric and non-parametric quantitative statistical evaluation methods to research data and reporting of the analysis results in HCI conferences and journal papers. The techniques include linear, non-linear and multiple regression analysis, univariate and multivariate analysis (ANOVA, MANOVA, ANCOVA), correlations, other common parametric and non-parametric analysis methods for HCC

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research. The course also covers best existing techniques for the reporting and visualization of the results for high impact publications in HCI and HCC research.

- *DPA 4000/6000, Technical Fundamentals I – Python and C Programming*, Fall 2013, School of Computing, Clemson University.
  - This is an introductory course in programming in Python and C for incoming graduate students from non-computing backgrounds to our DPA MFA and HCC PhD programs. The course involves syntax, semantics, algorithms, data structures and programming structures in Python and C programming languages with applications to visual computing problems: 2D game development, ray tracing, and image processing applications (interpolation, decimation, image enhancement and filtering). Created my own lectures, projects and other assessment materials.
- *DPA 4010/6010, Technical Foundations II – C and C++ (+OOP) Programming*, Spring 2014, School of Computing, Clemson University.
  - This is an introductory course in programming in C++ and object-oriented programming for students from non-computing background feeding to our Digital Production Arts MFA and HCC PhD programs. The course involves learning the syntax, semantics, algorithms, data structures and programming structures in C++ with applications to visual computing problems: 2D game development in OpenGL, 3D scene construction, image processing, and ray-tracing in computer graphics. Created all lectures, projects and assessments.
- *CPSC 1020, Introduction to Programming II*, Spring 2014, School of Computing, Clemson University.
  - This is a course in programming in C/C++ and object-oriented programming, which is a core course for incoming Freshmen and Sophomore students in our BS Computer Science program. The course involves learning the syntax, semantics, algorithms, data structures, and programming constructs in C/C++ including variables, pointers, classes, objects, functions, overloading /overriding, inheritance and polymorphism. Assignments involved visual computing and image processing problems such as scene geometry rendering, texturing, illumination, and a semester long project to create a ray tracer in a computer graphics scene.
- *CS:22:14, Introduction to Virtual Environments and Embodied Conversational Agents*, Spring 2008, Spring 2009, Department of Computer Science, University of Iowa.
  - For a first time at the University of Iowa, I designed and offered an introductory course in the theory, technology, software, design, application, and human factor issues in Virtual Environments. The course also covered the design and evaluation of Embodied Conversational Agents/Virtual Human Interfaces in Interactive Virtual Environments. The course also provides a general technical background and experience with computer graphics, user interface design, and computer vision. Topics on Virtual Humans included 3D modeling, rigging, and computer animation. This course is part theory and part application, with a semester long group project. Students created their own augmented and virtual environments. The topic was of their choosing.
- *CPSC 1214, Introduction to Programming in C++*, Fall 2006, Spring 2007, Department of Computer Science, University of North Carolina at Charlotte.
  - I served as the instructor on record for a core course for BS Computer Science students in object-oriented programming in C++. The course covers syntax and programming techniques, data structures, and basic algorithms in the C++ computer language and covered concepts such as function overloading, overriding, inheritance and polymorphism. I created instruction and assessment materials for students and as the instructor on record was fully responsible for teaching and grading the course.

## ***New Course Development***

## RÉSUMÉ:

- *HCC 8810, Fundamentals of Measurements and Evaluation of HCC Systems*, School of Computing, Clemson University.
  - Founded the Measurements and Evaluation of HCC Systems course, designed and taught it as part of the Human Centered Computing PhD program, when the PhD program was conceived. It is now a core course for our HCC PhD students in quantitative methods, data analysis and reporting in HCC research.
- *CPSC 4140/6140, Online Human-Computer Interaction (HCI) Course*, School of Computing, Clemson University.
  - Created a novel course in offering the Introduction to Human-Computer Interaction course online or remotely to appeal to a broader and diverse cohort of students from computing, non-computing and online graduate and undergraduate programs across Clemson University. As a result, since 2013, the online offering of the HCI course has garnered at least 40-50 students each semester it is offered. Besides students from the School of Computing, students from Psychology, Sociology, Communication, Human Factors, Industrial Engineering, Mechanical Engineering, Electrical Engineering as well as students from several online MS programs have successfully taken this course and learned the knowledge and skillsets to become usability and user experience engineers and consultants.

### **New Program Development**

- *Human Centered Computing (HCC) PhD Program*, Founding Member and Team Member, School of Computing, Clemson University.
  - Starting in 2010, I worked alongside faculty members of the Human Centered Computing Division to assist in the design, creation, establishment and support of the Human Centered Computing PhD program in the School of Computing at Clemson University. The program graduated its first PhD students in 2012, and today is among a select group of prestigious institutions offering the HCC PhD program. Designed and taught several core and elective courses as part of our newly established HCC PhD program, including VR Systems, HCI, Measurements and Evaluation of HCC Systems etc.

## **PROFESSIONAL ACTIVITIES**

### **Leadership Roles**

- Program Co-Chair, ACM Symposium on Applied Perception (ACM SAP) 2025
  - Link: <https://sap.acm.org/2025/>
- Program Co-Chair, IEEE Virtual Reality Conference (IEEE VR) 2017
  - Link: <http://ieeevr.org/2017>
- General Chair, IEEE Virtual Reality Conference (IEEE VR) 2016
  - Link: <http://ieeevr.org/2016>
- Session Chair, IEEE International Symposium on Mixed and Augmented Reality (IEEE ISMAR) 2024
- Session Chair, IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2014, 2015, 2016, 2017
- Workshop Co-Organizer, IEEE VR 2023 Workshop: 2nd XR Health workshop - XR Technologies for Healthcare and Wellbeing (XR Health) 2023
- Posters Co-Chair, International Conference on Artificial Reality and Tele-existence-EuroVR-EuroGraphics Virtual Environments (ICAT-EuroVR-EGVE) 2015
- Publicity Co-Chair, IEEE 3D User Interfaces Conference (IEEE 3DUI) 2014, 2015
- Doctoral Consortium Mentor, IEEE Virtual Reality Conference (IEEE VR) 2015
- Posters Co-Chair, IEEE Virtual Reality Conference (IEEE VR) 2014, 2015
- Workshops Co-Chair, IEEE Virtual Reality Conference (IEEE VR) 2013
- Student Volunteers Co-Chair, IEEE Virtual Reality Conference (IEEE VR) 2010
- Exhibits Co-Chair, IEEE Virtual Reality Conference (IEEE VR) 2008
- Local Arrangements, IEEE Virtual Reality Conference (IEEE VR) 2007
- Exhibits Co-Chair, IEEE Virtual Reality Conference (IEEE VR) 2007

### ***Program Committee Roles***

- Program Committee, IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2019 - Present
- Program Committee, ACM Symposium on Applied Perception (ACM SAP) 2017 - Present
- Program Committee, ACM Symposium on Virtual Reality Software and Technology (ACM VRST) 2015 - Present
- Program Committee, IEEE Virtual Reality Conference (IEEE VR) 2014 - 2017
- Program Committee, IEEE 3D User Interfaces Conference (IEEE VR) 2013 - 2017
- Program Committee, International Conference on Intelligent Virtual Agents (ACM IVA) 2013, 2014
- Program Committee, Joint ICAT – EuroVR – EGVE Conference on Virtual Reality 2009 – 2015

### ***Editorial Roles***

- Editorial Board Member, MDPI Virtual Worlds Journal, 2021 - Present
- Guest Editor, Special Issue IEEE Transactions on Visualization and Computer Graphics 2017

### ***Reviewer Roles***

- Reviewer, IEEE Transactions on Visualization and Computer Graphics (IEEE TVCG) 2005 – Present
- Reviewer, IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2019 - Present
- Reviewer, ACM Symposium on Applied Perception (ACM SAP) 2019
- Reviewer, Springer Virtual Reality Journal, 2010 - Present
- Reviewer, Interacting with Computers Journal 2013
- Reviewer, International Journal on Human-Computer Studies (IJHCS), 2009 – 2014
- Reviewer, Joint ICAT – EuroVR – EGVE Conference on Virtual Reality, 2009, 2010, 2011, 2013
- Reviewer, ACM Special Interest Group on Human-Computer Interaction (SIGCHI), 2009 - 2020
- Reviewer, IEEE Symposium on 3D User Interfaces (IEEE 3DUI), 2008 - 2015
- Reviewer, IEEE International Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2008 – Present
- Reviewer, IEEE International Symposium on Artificial and Mixed Reality (IEEE ISMAR) 2020 – Present
- Reviewer, IEEE Transactions on Image Processing 2006 - 2008

### ***Panelist Roles***

- Panelist, National Science Foundation 2015, 2021, 2022, 2023, 2024, 2025
- Panelist, National Institute of Health 2017
- External Reviewer, Swiss National Science Foundation 2021

## **UNIVERSITY AND PUBLIC SERVICE**

### ***College Committees***

- Member, Global Engagement Committee (2021-Present).
- Vice Chair, Global Engagement Committee (2018-2021).

### ***School of Computing Committees***

- Chair, Student Awards Committee (2019-2022).

## RÉSUMÉ:

- Chair, Space Committee (2014 – 2018).
- Chair, External and Foreign Programs Committee, (2011-2012).
- Member, Graduate Student Recruiting Committee, (2011-2014).
- Member, Sabbatical Review Committee, (2014-2016)
- Member, SoC External/Industrial Relations Committee, (2012-2013).

### **Human Centered Computing Division Committees**

- Member, HCC TPR Guidelines Review and Revision Committee (2020-Present).
- Chair, HCC Division Chair Evaluation Committee (2020-2021).
- Member, Tenure and Promotion Review (TPR) Committee (2016 - Present).
- Member, HCC PhD Student Portfolio Review Committee (2011 -Present).
- Member, HCC PhD Degree Program Development Committee (2010 – 2011).

## **MISCELLANEOUS**

### ***In The News***

- “Twin Tigers share the graduation stage to collect matching PhDs with matching GPAs. Their plans: to pursue research careers,” Clemson University Newsstand (August 2023).
  - Website: <https://news.clemson.edu/twin-tigers-share-the-graduation-stage-to-collect-matching-ph-d-s-with-matching-gpas-their-plan-to-pursue-research-careers/>
- “Clemson researchers receive innovation maturation funding for COVID-19 research,” Clemson University Newsstand (July 2020).
  - Website: <https://newsstand.clemson.edu/clemson-researchers-receive-innovation-maturation-funding-for-covid-19-research/>
- “Clemson researchers receive seed grant funding from Health Sciences Center at Prisma Health,” Clemson University Newsstand (February 2020).
  - Website: <https://newsstand.clemson.edu/clemson-university-researchers-receive-seed-grant-funding-from-health-sciences-center-at-prisma-health/>
- “Cure to Virtual Reality Illness Sought in New Clemson University Research,” Clemson University Newsstand (March 2017).
  - Website: <http://newsstand.clemson.edu/cure-to-virtual-reality-illness-sought-in-new-clemson-university-research/>
- “Clemson Developed Virtual Patient a Medical Education Game Changer,” TV Interview and Short Documentary Channel 7 WSPA, Greenville SC (September 2015).
  - Website: <https://www.wspa.com/news/local-news/clemson-developed-virtual-patient-a-medical-education-game-changer/896796593>
- “Clemson Offers Virtual Learning,” TV Interview on Regional Channel 9 WYFF Greenville SC (February 2015).
  - Website: <http://www.wyff4.com/news/clemson-offers-virtual-learning/30963798>
- “Virtual Peers to Investigate Social Influences in Children’s Bicycling,” FYI Online Magazine at the University of Iowa. (March 2009).

RÉSUMÉ:

- “Using Virtual humans to Teach Cultural Protocols”, in The Global Perspective, Official Newsletter of the Office of International Programs, University of North Carolina at Charlotte. (November 2006).
- “Best Badminton Players in the Country”, in Channel 9 Carolina, Charlotte, NC (July 1999).
  - Website: [http://people.clemson.edu/~sbabu/Sab\\_Badminton.wmv](http://people.clemson.edu/~sbabu/Sab_Badminton.wmv)

***Updated on 1/2/2026.***