Robert E. Bodenheimer, Jr.
<div align="right">Curriculum Vitae</div>

Professor of Computer Science
Professor of Electrical & Computer Engineering (courtesy)
Professor of Psychology & Human Development (courtesy)
Vanderbilt University
Computer Science
VU Station B #351679, 2301 Vanderbilt Place
Nashville, TN 37235, USA
(615)322-3555
Fax: (615) 343-5459
robert.e.bodenheimer@vanderbilt.edu
Google Scholar: https://scholar.google.com/citations?user=hI4XguUAAAAJ
Web: http://www.vuse.vanderbilt.edu/~bobbyb/

PROFESSIONAL INTERESTS

My research is in the area of virtual and augmented reality, specifically in how people learn and interact in virtual and augmented spaces. These technologies can provide compelling simulations different from the real world, and I am interested in gathering and analyzing the perceptual information that people obtain through these mediums to develop new methods of interaction and provide richer experiences. I have crossover interests in areas of visual computing, and much prior work was in computer animation, where I developed methods that allow the creation of visually compelling human motion. I was especially interested in formal evaluation of such methods, and how such evaluation informed the design process for the creation of animated motion.

EDUCATION

California Institute of Technology, Electrical Engineering Dept., Pasadena (CA)
Ph.D. in Electrical Engineering, June 1995
Dissertation: *The Whirling Blade and the Steaming Cauldron*
Advisor: Prof. John Doyle

University of Tennessee, Electrical Engineering Dept., Knoxville (TN)
Master of Science in Electrical Engineering, December 1987
Thesis: *Elliptical Bounds, Robustness, and Performance in Control Systems*
Advisor: Prof. Doug Birdwell

University of Tennessee, Electrical Engineering Dept., Knoxville (TN)
Bachelor of Science in Electrical Engineering, June 1986

University of Tennessee, Mathematics Dept., Knoxville (TN)
Bachelor of Arts in Mathematics, June 1986

PROFESSIONAL EXPERIENCE

Vanderbilt University, Electrical Engineering and Computer Science, Nashville (TN)
Professor, January 2020 – Present
Associate Professor, September 2007 – December 2019
Assistant Professor, September 2000 – August 2007

Georgia Institute of Technology, College of Computing, Atlanta (GA)
Postdoctoral Fellow, January 1998 – May 2000

Microsoft, Microsoft Research Graphics Group, Redmond (WA)
Visiting Researcher, October 1995 – December 1997

California Institute of Technology, Pasadena (CA)
Research Assistant, September 1989 – June 1991, September 1992 – June 1995

Alysis Software, San Francisco (CA)

Software Consultant, June 1991 – June 1995

Minds and Machines, San Francisco (CA)
Software Consultant, June 1988 – August 1989

University of Tennessee, Engineering Computer Laboratory, Knoxville (TN)
System Manager, September 1983 – August 1986

HONORS AND AWARDS

2022	IEEE CG&A Test-of-Time Award for *Verbs & Adverbs* (J4)
2018	Best Poster Award, Symposium on Applied Perception (P29)
2017-20	Vanderbilt University Cross-College Scholar
2014	First place (Engineering), Vanderbilt Undergraduate Research Fair (P22)
2003-2008	NSF CAREER award
2005	Best Paper award, ACM Southeastern Regional Conference (C17)
1998-2000	Postdoctoral Research Award in Experimental Computer Science, National Science Foundation.
1987-1988	Earle C. Anthony Fellowship.
1986	John H. Barret Prize as Outstanding Senior in Mathematics, University of Tennessee, Knoxville, 1986.

HONORARY SOCIETIES

Member of Eta Kappa Nu and Tau Beta Pi

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Association for Computing Machinery (ACM)
Senior Member, Institute for Electrical and Electronics Engineers (IEEE)
ACM Special Interest Group on Graphics (SIGGRAPH)

PUBLICATIONS

Refereed Journal Articles

J40. Y. Zhao, J. K. Stefanucci, S. H. Creem-Regehr, and B. Bodenheimer, "Evaluating Augmented Reality Landmark Cues and Frame of Reference Displays with Virtual Reality," *IEEE Transactions on Visualization and Computer Graphics*, **29**(5), pp. 2710–2720, 2023.

J39. S. H. Creem-Regehr, J. K. Stefanucci, and B. Bodenheimer, "Perceiving Distance in Virtual Reality: Theoretical Insights from Contemporary Technologies," *Philosophical Transactions of the Royal Society B*, **378**:20210456, 2023. (10.1098/rstb.2021.0456).

J38. H. Adams, J. Stefanucci, S. H. Creem-Regehr, G. Pointon, W. B. Thompson, and B. Bodenheimer, "Shedding Light on Cast Shadows: An Investigation of Perceived Ground Contact in AR and VR," *IEEE Transactions on Visualization and Computer Graphics*, **28**(12), pp. 4624–4639, December 2022, (10.1109/TVCG.2021.3097978).

J37. L. Buck, S. Chakraborty, and B. Bodenheimer, "The Impact of Embodiment and Avatar Sizing on Personal Space in Immersive Virtual Environments," *IEEE Transactions on Visualization and Computer Graphics*, **28**(5), pp. 2102–2113, May 2022.

J36. L. Buck, R. Paris, and B. Bodenheimer, "Distance Compression in the HTC Vive Pro: A Quick Revisitation of Resolution," *Frontiers in Virtual Reality*, vol. 2, 07 December 2021.

J35. H. Lee, S. Hong, T. Baxter, J. Scott, S. Shenoy, L. Buck, B. Bodenheimer, and S. Park, "Altered Peripersonal Space and the Bodily Self in Schizophrenia – A Virtual Reality Study," *Shizophrenia Bulletin*, **47**(4), pp. 927–937, July 2021.

J34. H. Gagnon, Y. Zhao, M. Richardson, G. Pointon, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "Gap Affordance Judgments in Mixed Reality: Testing the Role of Display Weight and Field of View," *Frontiers in Virtual Reality*, vol. 2, 22 pages, March, 2021.

J33. H. Gagnon, C. Salas Rosales, R. Mileris, J. Stefanucci, S. Creem-Regehr, B. Bodenheimer, "Estimating Distances in Action Space in Augmented Reality," *ACM Transactions on Applied Perception*, **18**(2), art. 7, 16 pages, June 2021.

J32. O. Molvig and B. Bodenheimer, "Interdisciplinarity and Teamwork in Virtual Reality Design," *Journal of Interactive Technology and Pedagogy*, Issue 18, December 10, 2020.

J31. J. Zhao, T. Sensibaugh, B. Bodenheimer, T. P. McNamara, A. Nazareth, N. Newcombe, M. Minear, and A. Klippel, "Desktop versus immersive virtual environments: effects on spatial learning," *Spatial Cognition & Computation*, **20**(4), pp. 328–363, September 2020. DOI: https://doi.org/10.1080/13875868.2020.1817925.

J30. S. Creem-Regehr, D. M. Gill, G. D. Pointon, B. Bodenheimer, and J. Stefanucci, "Mind the Gap: Gap Affordance Judgments in Children, Teens, and Adults in an Immersive Virtual Environment," *Frontiers in Robotics and AI*, vol. 6, 14 pages, October, 2019.

J29. Q. He, T. McNamara, B. Bodenheimer, and A. Klippel, "Acquisition and Transfer of Spatial Knowledge during Wayfinding," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, **45**(8), pp. 1364–1386, 2019.

J28. L. Buck, J. Rieser, G. Narasimham, and B. Bodenheimer, "Interpersonal Affordances and Social Dynamics in Collaborative Immersive Virtual Environments: Passing Together Through Apertures," *IEEE Transactions on Visualization and Computer Graphics*, **25**(5), pp. 2123–2133, May, 2019.

J27. H. Wu, D. Ashmead, H. Adams, and B. Bodenheimer, "Using Virtual Reality to Assess the Street Crossing Behavior of Pedestrians with Simulated Macular Degeneration at a Roundabout," *Frontiers in ICT*, vol. 5, 17 pages, October, 2018.

J26. L. Buck, M. K. Young, B. Bodenheimer, "A Comparison of Distance Estimation in HMD-based Virtual Environments with Different HMD-based Conditions," *ACM Transactions on Applied Perception*, **15**(3), Article 21, 16 pages, July 2018.

J25. H. Adams, G. Narasimham, J. Rieser, S. Creem-Regehr, J. Stefanucci, B. Bodenheimer, "Locomotive Recalibration and Prism Adaptation of Children and Teens in Immersive Virtual Environments," *IEEE Transactions on Visualization and Computer Graphics*, **24**(4), pp. 1408–1417, April 2018.

J24. R. Paris, B. Bodenheimer, R. Blake, "Does direction of walking impact binocular rivalry between competing patterns of optic flow?", *Attention, Perception, and Psychophysics*, **79**(4), pp. 1182–1194, May 2017.

J23. S. Bailey, J. I. Echevarria, B. Bodenheimer, D. Gutierrez, "Fast depth from defocus from focal stacks," *The Visual Computer*, **31**(12), pp. 1697–1708, December 2015 (first online 03 December 2014).

J22. Q. Lin, J. Rieser, B. Bodenheimer, "Affordance Judgments in HMD-based Virtual Environments: Stepping over a Pole and Stepping off a Ledge," *ACM Transactions on Applied Perception*, **12**(2), Article 6, (April 2015), 21 pages.

J21. A. S. Rao, B. M. Dawant, R. E. Bodenheimer, R. Li, J. Fang, F. Phibbs, P. Hedera, T. Davis, "Validating an objective video-based dyskinesia severity score in Parkinson's disease patients," *Parkinsonism & related disorders*, **19**(2), pp. 232-237, 2013.

J20. B. Williams, S. Bailey, G. Narasimham, M. Li, and B. Bodenheimer, "Evaluation of walking in place on a Wii balance board to explore a virtual environment," *ACM Transactions on Applied Perception*, **8**(3), Article 19, August 2011.

J19. B. Bodenheimer, B. Williams, M. Kramer, K. Viswanath, R. Balachandran, K. Belynne, and G. Biswas, "Construction and Evaluation of Animated Teachable Agents," *Educational Technology & Society*, **12**(3), pp. 191-205, 2009.

J18. J. W. Kelly, T. P. McNamara, B. Bodenheimer, T. H. Carr, and J. J. Rieser, "Individual differences in using geometric and featural cues to maintain spatial orientation: Cue quantity and cue ambiguity are more important than cue type." *Psychonomic Bulletin & Review*, **16**(1), pp. 176-181, 2009.

J17. R. A. Peters II, K. Hambuchen, and B. Bodenheimer, "The Sensory Ego-Sphere: A Mediating Interface Between Sensors and Cognition," *Autonomous Robots*, **26**(1), pp. 1–19, January 2009.

J16. J. W. Kelly, T. P. McNamara, B. Bodenheimer, T. H. Carr, and J. J. Rieser, "The shape of human navigation: How environmental geometry is used in maintenance of spatial orientation," *Cognition*, **109**, pp. 281–286, 2008.

J15. S. Pallavaram, H. Yu, J. Spooner, P-F. D'Haese, B. Bodenheimer, P. E. Konrad, B. M. Dawant, "Inter-surgeon variability the selection of anterior and posterior commissures and its potential effects on target localization," *Stereotactic and Functional Neurosurgery*, **86**, pp. 113–119, 2008.

J14. J. Wang and B. Bodenheimer, "Synthesis and Evaluation of Linear Motion Transitions," *ACM Transactions on Graphics*, **27**(1), art. 1, 2008.

J13. A. E. Seward, D. H. Ashmead, and B. Bodenheimer, "Using Virtual Environments to Assess Time-to-Contact Judgments from Pedestrian Viewpoints," *ACM Transactions on Applied Perception*, **4**(3), Article 18, Nov. 2007.

J12. A. Mohan, R. Bailey, J. Waite, J. Tumblin, C. Grimm, and B. Bodenheimer, "Table-top Computed Lighting for Practical Digital Photography," *IEEE Transactions on Visualization and Computer Graphics*, **13**(4), pp. 652–662, July/August 2007.

J11. B. Williams, G. Narasimham, C. Westerman, J. Rieser, and B. Bodenheimer, "Functional Similarities in Spatial Representations Between Real and Virtual Environments," *ACM Transactions on Applied Perception*, **4**(2), July 2007.

J10. C. Campbell, R. A. Peters II, R. E. Bodenheimer, W. J. Bluethmann, E. Huber, and R. O. Ambrose, "Superpositioning of Behaviors Learned Through Teleoperation," *IEEE Transactions on Robotics*, **22**(1), pp. 79–91, February 2006.

J9. T. Kriete, M. House, B. Bodenheimer, and D. C. Noelle, "NAV: A tool for producing presentation-quality animations of graphical cognitive model dynamics." *Behavior Research Methods*, **37**(2), pp. 335–339, May 2005.

J8. A. Crecelius, D. S. Cornett, R. M. Caprioli, B. Williams, B. Dawant, and R. E. Bodenheimer, ""Three-Dimensional Visualization of Protein Expression in Mouse Brain Structures Using Imaging Mass Spectrometry," J. Am. Soc. Mass Spectrometry, **16**, pp. 1093–1099, June 2005.

J7. Z. Chen, J. F. Barnes, B. Bodenheimer, "Hybrid and Forward Error Correction Transmission Techniques for Unreliable Transport of 3D Geometry," *Multimedia Systems Journal*, **10**(3), pp. 230–244, March 2005.

J6. K. Kawamura, R. A. Peters II, R. E. Bodenheimer, N. Sarkar, J. Park, C. A. Clifton, A. Spratley, and K. A. Hambuchen, "A Multi-Agent Cognitive Robot Architecture and its Realization," *International Journal of Humanoid Robotics*, **1**(1), pp. 65–93, March 2004.

J5. P. Bendotti, and B. Bodenheimer, "Linear Parameter-Varying versus Linear Time-Invariant Control Design for a Pressurized Water Reactor," *International Journal of Robust and Nonlinear Control*, **9**(13), pp.969–995, November 1999.

J4. C. Rose, B. Bodenheimer, and M. Cohen, "Verbs and Adverbs: Multidimensional Motion Interpolation," *IEEE Computer Graphics and Applications*, **18**(5), pp. 32–41, September/October 1998.

J3. B. Bodenheimer, P. Bendotti, and M. Kantner, "Linear Parameter-Varying Control of a Ducted Fan Engine," *Int. J. of Robust and Nonlinear Control*, **6**(9/10), pp. 1023–1044, November 1996.

J2. K. Zhou, K. Glover, B. Bodenheimer, and J. Doyle, "Mixed $\mathcal{H}_2$ and $\mathcal{H}_\infty$ Performance Objectives I: Robust Performance Analysis," *IEEE Trans. on Automatic Control*, **39**(8), pp. 1564–1574, August 1994.

J1. J. Doyle, K. Zhou, K. Glover, and B. Bodenheimer, "Mixed $\mathcal{H}_2$ and $\mathcal{H}_\infty$ Performance Objectives II: Optimal Control," *IEEE Trans. on Automatic Control*, **39**(8), pp. 1575–1587, August 1994.

Highly-Selective Conference Publications

(Acceptance based on peer review of full paper and acceptance rate $\leq 40\%$.)

CF19. Y. Liu, Y. Wang, O. Vu, R. Moretti, B. Bodenheimer, J. Meiler, T. Derr, "Interpretable Chirality-Aware Graph Neural Network for Quantitative Structure Activity Relationship Modeling in Drug Discovery," *Thirty-Seventh AAAI Conference on Artificial Intelligence (AAAI-23)*, February, 2023.

CF18. H. A. Adams, J. K. Stefanucci, S. H. Creem-Regehr, B. Bodenheimer, "Depth Perception in Augmented Reality: The Effects of Display, Shadow, and Position." *2022 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Christchurch, New Zealand, March 2022, pp. 792–801.

CF17. R. Paris, L. Buck, T. P. McNamara, B. Bodenheimer, "Evaluating the Impact of Limited Physical Space on the Navigation Performance of Two Locomotion Methods in Immersive Virtual Environments." *2022 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Christchurch, New Zealand, March 2022, pp. 821–831.

CF16. H. C. Gagnon, T. Rohovit, H. Finney, Y. Zhao, J. M. Franchak, J. K. Stefanucci, S. H. Creem-Regehr, B. Bodenheimer, "The Effect of Feedback on Estimates of Reaching Ability in Virtual Reality." *2021 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Lisboa, Portugal, March 2021, pp. 798–806.

CF15. L. E. Buck, T. P. McNamara, and B. Bodenheimer, "Dyadic Acquisition of Survey Knowledge in a Shared Virtual Environment." In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Atlanta, GA, March 2020, pp. 579-587.

CF14. L. E. Buck, S. Park, and B. Bodenheimer, "Determining Peripersonal Space Boundaries and Their Plasticity in Relation to Object and Agent Characteristics in an Immersive Virtual Environment." In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Atlanta, GA, March 2020, pp. 332-342.

CF13. H. C. Gagnon, D. Na, K. Heiner, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "The Role of Viewing Distance and Feedback on Affordance Judgments in Augmented Reality." In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Atlanta, GA, March 2020, pp. 922-929.

CF12. S. Hanson, R. Paris, H. Adams, and B. Bodenheimer, "Improving Walking in Place Methods with Individualization and Deep Networks," In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pp. 367-376, Osaka, Japan, March 2019.

CF11. C. Salas Rosales, G. Pointon, H. Adams, J. Stefanucci, S. Creem-Regehr, W. B. Thompson, and B. Bodenheimer, "Distance Judgments to On- and Off-Ground Objects in Augmented Reality," In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pp. 237-243, Osaka, Japan, March 2019.

CF10. B. Bodenheimer, S. Creem-Regehr, J. Stefanucci, E. Shemetova, and W. B. Thompson, "Prism Aftereffects for Throwing with a Self-Avatar in an Immersive Virtual Environment," In *IEEE VR 2017*, pp. 141-147, March 2017.

CF9. C. N. de Juan and B. Bodenheimer, "Re-Using Traditional Animation: Methods for Semi-Automatic Segmentation and Inbetweening," Symposium on Computer Animation, pp. 223–232, Vienna, Austria, September 2006.

CF8. A. Mohan, J. Tumblin, B. Bodenheimer, C. Grimm, and R. Bailey, "Table-top Computed Lighting for Practical Digital Photography," Eurographics Symposium on Rendering, pp.165–172, Konstanz, Germany, June 2005.

CF7. C. N. de Juan, and B. Bodenheimer, "Cartoon Textures," 2004 ACM SIGGRAPH / Eurographics Symposium on Computer Animation. pp. 267–276, Grenoble, France, August 2004.

CF6. J. Wang, and B. Bodenheimer, "Computing the Duration of Motion Transitions: An Empirical Approach," 2004 ACM SIGGRAPH/Eurographics Symposium on Computer Animation, pp. 337–346, Grenoble, France, August 2004.

CF5. K. Viswanath, R. Balachandran, M. R. Kramer, and B. Bodenheimer, "Interface Design Issues for Teachable Agent Systems," Proceedings of ED-MEDIA 2004, pp. 4197-4204, Lugano, Switzerland, June 2004.

CF4. J. Wang, and B. Bodenheimer, "An Evaluation of a Cost Metric for Selecting Transitions Between Motion Segments," *2003 ACM SIGGRAPH/Eurographics Symposium on Computer Animation*, pp. 232–238, San Diego, CA, July 2003.

CF3. J. Davis, K. Leelawong, K. Belynne, B. Bodenheimer, G. Biswas, N. Vye, and J. Bransford, "Intelligent User Interface Design for Teachable Agent Systems," 2003 International Conference on Intelligent User Interfaces, pp. 26–34, Miami, FL, January 2003.

CF2. J. O'Brien, B. Bodenheimer, B. Brostow, and J. K. Hodgins, "Automatic Joint Parameter Estimation from Magnetic Motion Capture Data," Proceedings of *Graphics Interface 2000*, pp. 53–60, Montreal, CA, May 2000.

CF1. C. Rose, B. Guenter, B. Bodenheimer, and M. Cohen, "Efficient Generation of Motion Transitions using Space-time Constraints," *Computer Graphics '96*, pp. 147–154, Proc. SIGGRAPH '96.

Conference Proceedings with Acceptance Based on Peer Review of Full Paper

C61. S. Chakraborty, J. Stefanucci, S. Creem-Regehr and B. Bodenheimer, "Distance Estimation with Social Distancing: A Mobile Augmented Reality Study," *Perceptual and Cognitive Issues in xR (PERCxR) 2021*, in *IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*, 2021, pp. 87–91.

C60. J. K. Stefanucci, S. Creem-Regehr and B. Bodenheimer, "Comparing Distance Judgments in Real and Augmented Reality," *Perceptual and Cognitive Issues in xR (PERCxR) 2021*, in *IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*, 2021, pp. 82–86.

C59. Y. Zhao, J. Stefanucci, S. H. Creem-Regehr, and B. Bodenheimer, "The Perception of Affordances in Mobile Augmented Reality," *SAP '21: ACM Symposium on Applied Perception 2021*, September 2021, Article 12, 10 pages.

C58. L. Buck and B. Bodenheimer, "Privacy and Personal Space: Addressing Interactions and Interaction Data as a Privacy Concern," *IEEE VR Workshop PrXR: Towards a roadmap for privacy and security research for mixed reality applications*, in *2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, 2021, pp. 399-400.

C57. S. Chakraborty, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "Distance Estimation with Mobile Augmented Reality in Action Space: Effects of Animated Cues," IEEE VR VHCIE workshop, in *2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, 2021, pp. 144-147.

C56. Y. Liu, R. Moretti, B. Bodenheimer, and Jens Meiler, "Foldit Drug Design Game Usability Study: Comparison of Citizen and Expert Scientists," *Motion, Interaction and Games (MIG '20)*. 2020. ACM, New York, NY, USA, Article 20, 19 pages, October.

C55. G. Narasimham, H. Adams, J. Rieser, and B. Bodenheimer, "Encoding Height: Egocentric Spatial Memory of Adults and Teens in a Virtual Stairwell," *ACM Symposium on Applied Perception (SAP '20)*. 2020. ACM, New York, NY, USA, Article 8, 8 pages, September.

C54. H. Gagnon, L. Buck, T. Smith, G. Narasimham, J. Stefanucci, S. Creem-Regehr and B. Bodenheimer, "Far Distance Estimation in Mixed Reality," *ACM Symposium on Applied Perception (SAP '20)*. 2020. ACM, New York, NY, USA, Article 9, 8 pages, September.

C53. L. Li, R. A. Paris, C. Pinson, Y. Wang, J. Coco, J. Heard, J. A. Adams, D. V. Fabbri, and B. Bodenheimer, "Emergency Clinical Procedure Detection With Deep Learning," 2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Montreal, QC, Canada, 2020, pp. 158-163.

C52. J. M. Liu, G. Narasimham, J. K. Stefanucci, S. Creem-Regehr and B. Bodenheimer, "Distance Perception in Modern Mobile Augmented Reality," 2020 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW, PERCAR), Atlanta, GA, USA, 2020, pp. 196-200.

C51. S. Bloos, C. McNaughton, J. Coco, L. Novak, J. Adams, R. Bodenheimer, J. Ehrenfeld, R. Paris, C. Simpson, D. Scully, and D. Fabbri, "Feasibility Assessment of a Pre-Hospital Automated Sensing Clinical Documentation System." 2019. Proceedings of the AMIA 2019 Annual Symposium, Washington, D.C., 10 pages, November.

C50. R. Paris, J. Klag, P. Rajan, L. Buck, T. P. McNamara, and B. Bodenheimer. 2019. "How Video Game Locomotion Methods Affect Navigation in Virtual Environments," *ACM Symposium on Applied Perception (SAP '19)*, ACM, New York, NY, USA, Article 12, 7 pages, September.

C49. B. Williams-Sanders, T. Carr, G. Narasimham, T. McNamara, J. Rieser, and B. Bodenheimer. 2019. "Scaling Gain and Eyeheight While Locomoting in a Large VE," International Conference on Human-Computer Interaction, Orlando, FL, pp. 277–298, July.

C48. J. Heard, R. Paris, D. Scully, C. McNaughton, J. Ehrenfeld, J. Coco, D. Fabbri, R. Bodenheimer, and J. Adams. 2019. "Automatic Clinical Procedure Detection for Emergency Services," 41st International Conference of IEEE Engineering in Medicine and Biology Society, Berlin, Germany, July.

C47. H. Wu, H. Adams, G. Pointon, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer. 2019. "Danger from the Deep: A Gap Affordance Study in Augmented Reality," *IEEE VR 2019 Workshop on Perceptual and Cognitive Issues in AR (PERCAR)*, Osaka, Japan, 5 pages, March.

C46. L. E. Buck, R. P. Paris, T. P. McNamara, and B. Bodenheimer, "Acquisition of Spatial Knowledge by Dyads in Shared Immersive Virtual Environments," Collective Spatial Cognition Specialist Meeting. Santa Barbara, CA, USA (Feb), 12 pages.

C45. X. Xie, R. A. Paris, T. P. McNamara, and B. Bodenheimer. 2018. "The Effect of Locomotion Modes on Spatial Memory and Learning in Large Immersive Virtual Environments: A Comparison of Walking with Gain to Continuous Motion Control," Spatial Cognition, Tübingen, Germany, pp. 58-73, September.

C44. N. Asjad, H. Adams, R. Paris, and B. Bodenheimer. 2018. "Perception of Height in Virtual Reality — A Study of Climbing Stairs," *ACM Symposium on Applied Perception (SAP '18)*, ACM, New York, NY, USA, Article 4, 8 pages, August.

C43. G. Pointon, C. Thompson, S. Creem-Regehr, J. Stefanucci, M. Joshi, R. Paris, and B. Bodenheimer. 2018. "Judging Action Capabilities in Augmented Reality," *ACM Symposium on Applied Perception (SAP '18)*, ACM, New York, NY, USA, Article 4, 8 pages, August.

C42. H. Wu, D. H. Ashmead, H. Adams, and B. Bodenheimer. 2018. "3D Sound Rendering in a Virtual Environment to Evaluate Pedestrian Street Crossing Decisions at a Roundabout," *2018 IEEE 4th VR Workshop on Sonic Interactions for Virtual Environments (SIVE)*, Reutlingen, Germany, 6 pages.

C41. G. Pointon, C. Thompson, S. Creem-Regehr, J. Stefanucci, and B. Bodenheimer. 2018. "Affordances as a Measure of Perceptual Fidelity in Augmented Reality," *IEEE VR 2018 Workshop on Perceptual and Cognitive Issues in AR (PERCAR)*, Reutlingen, Germany, 5 pages.

C40. R. A. Paris, M. Joshi, Q. He, G. Narasimham, T. P. McNamara, and B. Bodenheimer. 2017. "Acquisition of Survey Knowledge Using Walking in Place and Resetting Methods in Immersive Virtual Environments," Proceedings of the *ACM Symposium on Applied Perception (SAP '17)*. ACM, New York, NY, USA, Article 7, 8 pages. DOI: https://doi.org/10.1145/3119881.3119889.

C39. M. K. Young, J. Rieser, and B. Bodenheimer. 2015. "Dyadic Interactions with Avatars in Immersive Virtual Environments: High Fiving," Proceedings of the *ACM Symposium on Applied Perception (SAP '15)*. ACM, New York, NY, USA, 119-126. DOI=http://dx.doi.org/10.1145/2804408.2804410.

C38. B. Bodenheimer and Q. Fu. 2015. "The Effect of Avatar Model in Stepping Off a Ledge in an Immersive Virtual Environment," Proceedings of the *ACM Symposium on Applied Perception (SAP '15)*. ACM, New York, NY, USA, 115-118. DOI=http://dx.doi.org/10.1145/2804408.2804426.

C37. M. K. Young, G. B. Gaylor, S. M. Andrus, and B. Bodenheimer. 2014. "A comparison of two cost-differentiated virtual reality systems for perception and action tasks," Proceedings of the *ACM Symposium on Applied Perception (SAP '14)*. ACM, New York, NY, USA, 83-90. DOI=10.1145/2628257.2628261.

C36. B. Williams, P. T. Wilson, G. Narasimham, T. P. McNamara, J. Rieser, and B. Bodenheimer. 2013. "Does neck viewing angle affect spatial orientation in an HMD-based VE?," Proceedings of the *ACM Symposium on Applied Perception (SAP '13)*. ACM, New York, NY, USA, 111-114. DOI=10.1145/2492494.2492516 http://doi.acm.org/10.1145/2492494.2492516.

C35. Q. Lin, J. J. Rieser, and B. Bodenheimer. 2013. "Stepping off a ledge in an HMD-based immersive virtual environment," Proceedings of the *ACM Symposium on Applied Perception (SAP '13)*. ACM, New York, NY, USA, 107-110. DOI=10.1145/2492494.2492511.

C34. Q. Lin, J. Rieser, B. Bodenheimer. 2012. "Stepping over and ducking under: The influence of an avatar on locomotion in an HMD-based immersive virtual environment," Proceedings of the *ACM SIGGRAPH Symposium on Applied Perception* (SAP '12). ACM, New York, NY, USA, 7–10. DOI=10.1145/2338676.2338678.

C33. E. A. McManus, Q. Lin, A. Erdemir, S. W. Bailey, J. Rieser, and B. Bodenheimer. 2011. "Perceiving alterations in trajectories while throwing in a virtual environment," Proceedings of the *ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization* (APGV '11), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 23-28. DOI=10.1145/2077451.2077456.

C32. E. A. McManus, B. Bodenheimer, S. Streuber, S. de la Rosa, H. H. Bülthoff, and B. J. Mohler. 2011. "The influence of avatar (self and character) animations on distance estimation, object interaction and locomotion in immersive virtual environments." Proceedings of the *ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization* (APGV '11), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 37-44. DOI=10.1145/2077451.277458.

C31. Q. Lin, X. Xie, A. Erdemir, G. Narasimham, T. P. McNamara, J. Rieser, and B. Bodenheimer. 2011. Egocentric distance perception in real and HMD-based virtual environments: the effect of limited scanning method. In Proceedings of the ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization (APGV '11), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 75-82. DOI=10.1145/2077451.2077465.

C30. X. Xie, Q. Lin, H. Wu, G. Narasimham, T. P. McNamara, J. Rieser, and B. Bodenheimer. 2010. "A System for Exploring Large Virtual Environments That Combines Scaled Translational Gain and Interventions." In Proceedings of the *7th Symposium on Applied Perception in Graphics and Visualization* (APGV '10). ACM, New York, NY, USA, 65-72. DOI=http://dx.doi.org/10.1145/1836248.1836260.

C29. B. E. Riecke, B. Bodenheimer, T. P. McNamara, B. Williams, P. Peng, and D. Feuereissen, "Do We Need to Walk for Effective Virtual Reality Navigation? Physical Rotations Alone May Suffice," Spatial Cognition, pp. 234–247, July 2010.

C28. H. Wu, D. H. Ashmead, and B. Bodenheimer, "Using Immersive Virtual Reality to Evaluate Pedestrian Street Crossing Decisions at a Roundabout," Symposium on Applied Perception in Graphics and Visualization (APGV), Chania, Crete, Greece, October 2009.

C27. S. Rao, R. E. Bodenheimer, T. Davis, R. Li, C. Voight, and B. Dawant, "Quantifying Drug Induced Dyskinesia in Parkinson's Patients Using Standardized Videos," Proc. 30th Annual Int. Conference of IEEE Engineering in Medicine and Biology Society, pp. 1769-1772, Vancouver, British Columbia, August 2008.

C26. B. Bodenheimer, J. Meng, H. Wu, G. Narasimham, B. Rump, T. McNamara, T. Carr, J. Rieser, "Distance Estimation in Virtual Environments using Bisection," Symposium on Applied Perception in Graphics and Visualization (APGV), pp. 35–40, Tübingen, Germany, July 2007.

C25. B. Williams, G. Narasimham, B. Rump, T. McNamara, T. Carr, J. Rieser, B. Bodenheimer, "Exploring Large Virtual Environments with an HMD when Physical Space is Limited," Symposium on Applied Perception in Graphics and Visualization (APGV), pp. 41–48, Tübingen, Germany, July 2007.

C24. R. A. Peters II, R. E. Bodenheimer, O. C. Jenkins, "Sensory-Motor Manifold Structure Induced by Task Outcome: Experiments with Robonaut," IEEE-RAS International Conference on Humanoid Robots (HUMANOIDS '06), pp. 484–489, Genova, Italy, December 2006. DOI 10.1109/ICHR.2006.321317.

C23. K. A. Fleming, R. A. Peters II, R. E. Bodenheimer, "Image Mapping and Visual Attention on a Sensory Ego-Sphere," IEEE/RSJ Conference on Intelligent Robotics and Systems (IROS), pp. 241–246, Beijing, China, October 2006.

C22. O. C. Jenkins, R. A. Peters II, R. E. Bodenheimer, "Uncovering Success in Manipulation," in *Robotics: Science and Systems Workshop on Manipulation in Human Environments*, Philadelphia, PA, August 2006.

C21. A. E. Seward, D. H. Ashmead, and B. Bodenheimer, "Discrimination and Estimation of Time-to-Contact for Approaching Traffic Using a Desktop Environment," Symposium on Applied Perception in Graphics and Visualization, pp. 29–32, Boston, MA, July 2006.

C20. B. Williams, G. Narasimham, T. McNamara, T. Carr, J. Rieser, and B. Bodenheimer, "Updating Orientation in Large Virtual Environments Using Scaled Translational Gain," Symposium on Applied Perception in Graphics and Visualization, pp. 21–28, Boston, MA, July 2006.

C19. O. C. Jenkins, B. Bodenheimer, and R. A. Peters II, "Manipulation Manifolds: Explorations in Uncovering Manifolds in Sensory-Motor Spaces," Fifth International Conference on Development and Learning, Bloomington, IN, June 2006.

C18. B. Williams, A. Crecelius, S. Cornett, R. Caprioli, B. Dawant, and B. Bodenheimer, "An algorithm for baseline Correction of MALDI Mass Spectra," Proceedings of the 43rd ACM SE Regional Conference., v. 1, pp. 137-142, March 2005.

C17. A. E. Seward, and B. Bodenheimer, "Using Nonlinear Dimensionality Reduction in 3D Figure Animation," Proceedings of the 43rd ACM SE Regional Conference, v. 2, pp. 388-392, Kennesaw, GA, March 2005.

C16. M. Xie, M. Tomlinson, and B. Bodenheimer, "Interface Design for a Modern Software Ticketing System," Proceedings of the ACM Southeast Conference (ACMSE04), pp. 122-127, Huntsville, AL, April 2004.

C15. Z. Chen, B. Bodenheimer, J. F. Barnes "Extending Progressive Meshes for Use over Unreliable Networks," *2003 IEEE Conference on Multimedia and Expo*, v. 3, pp. 253–256, Baltimore, MD, July 2003.

C14. Z. Chen, B. Bodenheimer, J. F. Barnes, "Robust Transmission of 3D Geometry Over Lossy Networks," *Proceedings of the 8th International Conference on 3D Web Technology*, pp. 161–173, St. Malo, France, March 2003.

C13. T. Convery., B. Nuttall, B. Bodenheimer, "Web-based Courseware Application Usability," *Proceedings of the ACM Southeast Conference (ACMSE03)*, pp. 399-404, Savannah, GA, March 2003.

C12. K. Viswanath, R. Balachandran, J. Davis, B. Bodenheimer, "Effective User Interface Design for Teachable Agent Systems," *Proceedings of the ACM Southeast Conference (ACMSE03)*, pp. 138–144, Savannah, GA, March 2003.

C11. R. Olivares, C. Zhou, J. Adams, and B. Bodenheimer, "Interface Evaluation for Mobile Robot Teleoperation," *Proceedings of the ACM Southeast Conference (ACMSE03)*, pp. 112–118, Savannah, GA, March 2003.

C10. B. Bodenheimer, A. Shleyfman, and J. K. Hodgins, "The Effect of Noise on the Perception of Animated Human Running," *Computer Animation and Simulation '99*, N. Magnenat-Thalmann and D. Thalmann (eds.), pp. 53–63, Milan, Italy, August 1999.

C9. B. Bodenheimer, C. Rose, S. Rosenthal, and J. Pella, "The Process of Motion Capture: Dealing with the Data," *Computer Animation and Simulation '97*, D. Thalmann and M. van de Panne (eds.), pp. 3–18, Budapest, Hungary, August 1997.

C8. B. Bodenheimer, and P. Bendotti, "Optimal Linear-Parameter Varying Control of a Pressurized Water Reactor," *Proc. of 34th Conf. on Decision and Control,* pp. 182–187, New Orleans, LA, December 1995.

C7. C. Beck, B. Bodenheimer, and P. Bendotti, "LMI-based Model Reduction for a Vectored-Thrust Ducted Fan Experiment," *Proc. of 34th Conf. on Decision and Control,* pp. 871-875, New Orleans, LA, December 1995.

C6. M. Kantner., B. Bodenheimer, P. Bendotti, and R. M. Murray, "An Experimental Comparison of Controllers for a Vectored Thrust, Ducted Fan Engine," *Proc. of the American Control Conference*, v. 3, pp. 1956–1961, Seattle, WA, July 1995.

C5. P. Bendotti, and B. Bodenheimer, "Identification and $\mathcal{H}_\infty$ Control for a Pressurized Water Reactor," *Proc. of the 33rd Conf. on Decision and Control*, pp. 1072-1077, Orlando, FL, December 1994.

C4. C. Hrovat, and B. Bodenheimer, "Robust Automotive Idle Speed Control Design Based on μ-synthesis," *Proc. of the American Control Conference*, pp. 1778-1783, Seattle, WA, June 1993.

C3. K. Zhou, J. C. Doyle, and B. Bodenheimer, "Mixed $\mathcal{H}_2$ and $\mathcal{H}_\infty$ control," *Proc. of the American Control Conference*, San Diego, CA, June 1990.

C2. J. C. Doyle, K. Zhou, and B. Bodenheimer, "Optimal Control with Mixed $\mathcal{H}_2$ and $\mathcal{H}_\infty$ Performance Objectives," *Proc. of the American Control Conference*, pp. 2065-2070, Pittsburgh, PA, June 1989.

C1. R. E. Bodenheimer, Jr., and W. J. Toth, "Integral and Differential Linearity Errors in the Synthesis of Electronic Music," *Proc. of the 1986 IEEE Southeastcon*, pp. 260-264, Richmond, VA, March 1986.

Conference Proceedings with Acceptance Based on an Extended Abstract

CE12. Y. Liu, Y. Wang, O. Vu, R. Moretti, B. Bodenheimer, J. Meiler, T. Derr, "Interpretable Chirality-Aware Graph Neural Network for Quantitative Structure Activity Relationship Modeling," *The First Learning on Graphs Conference (LoG 2022)*, December 2022.

CE11. L. Buck and B. Bodenheimer, "Peripersonal Space in Virtual Reality," *Proceedings of the 8th International Conference on Spatial Cognition: Cognition and Action in a Plurality of Spaces (ICSC 2021)*, In *Cognitive Processing*, **22**(1), p. 34, September 2021.

CE10. S. Chakraborty, Y. Zhao, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "Using Mobile Augmented Reality for Spatial Cognition," *Proceedings of the 8th International Conference on Spatial Cognition: Cognition and Action in a Plurality of Spaces (ICSC 2021)*, In *Cognitive Processing*, **22**(1), p. 36, September 2021.

CE9. H. A. Adams, J. Shinn, W. G. Morrel, J. Noble, and B. Bodenheimer, "Development and Evaluation of an Immersive Virtual Reality System for Medical Imaging of the Ear," In Proceedings Volume 10951, Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling; 1095111 (2019) https://doi.org/10.1117/12.2506178.

CE8. R. A. Paris, P. Sullivan, J. Heard, D. Scully, C. McNaughton, J. M. Ehrenfeld, J. A. Adams, J. Coco, D. Fabbri, and B. Bodenheimer. "Heatmap Generation for Emergency Medical Procedure Identification," In Proceedings Volume 10951, Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling; 1095130 (2019) https://doi.org/10.1117/12.2513122

CE7. Q. Lin, Z. Xu, R. Baucom, B. Poulose, B. A. Landman, R. E. Bodenheimer. "Immersive Virtual Reality for Visualization of Abdominal CT." In Proceedings SPIE 8673, Medical Imaging 2013: Image Perception, Observer Performance, and Technology Assessment, 867317, March 28, 2013. doi:10.1117/12.2008050.

CE6. V. Sathyanarayanan and R. E. Bodenheimer, "Evaluation of Moving Least Squares as a Technique for Non-rigid Medical Image Registration," *Proc. SPIE* 7259, Medical Imaging 2009: Image Processing, 72592I (March 27, 2009); DOI 10.1117/12.811740.

CE5. S. Pallavaram, H. Yu, J. Spooner, P.-F. D'Haese, T. Koyama, B. Bodenheimer, P. E. Konrad, B. M. Dawant, "Automated Selection of Anterior and Posterior Commisures Based on a Deformable Atlas and Its Evaluation Base on Manual Selection by Neurosurgeons," *Proc. SPIE* 6509, Medical Imaging 2007: Visualization and Image-Guided Procedures, 65091C (March 21, 2007); DOI 10.1117/12.709936.

CE4. S. Shankar, L. Su, Y. Jin, J. A. Adams, and B. Bodenheimer, "Comparing the Usability of Enhanced RoboFlag Interfaces," *IEEE International Conference on Systems, Man, and Cybernetics*, v. 3, pp. 2815–2820, The Hague, Netherlands, October 2004.

CE3. S. Shankar, L. Su, Y. Jin, J. A. Adams, and B. Bodenheimer, "Enhancing RoboFlag Users' Situation Awareness," *Proceedings of the 48th Annual Human Factors and Ergonomics Society Meeting*, pp. 356-360, New Orleans, LA, September 2004.

CE2. G. Deng, Z. Ding, B. Bodenheimer, and S. Schach, "Understanding Software Coupling through Visualization," *2003 ACM Midsoutheast Regional Conference*, pp. 26, Gatlinburg, TN, Nov. 2003.

CE1. R. E. Bodenheimer, M. E. Edgerton, M. S. Ross, B. Dawant, "Registration and Alignment of Histopathological Images," *Archives of Pathology and Laboratory Medicine (proceedings of APIII '02)*, **127**(7), pp. 789–813, Pittsburgh, PA, October 2002.

Book Chapters

B2. S. H. Creem-Regehr, J. W. Kelly, B. Bodenheimer, J. K. Stefanucci, "Virtual Reality as a Tool to Understand Spatial Navigation," *Encyclopedia of the Human Brain*, 2nd ed., Jordan Grafman (Ed.), Elsevier, Ch. 00095, to appear.

B1. J. K. Hodgins, J. F. O'Brien, R. E. Bodenheimer, "Computer Animation," In The Wiley Encyclopedia of Electrical and Electronics Engineering, John G. Webster Ed., Volume 3, pp. 686-690, 1999.

Invited Articles

I5. B. Bodenheimer, V. Popescu, J. Quarles and L. Wang, "IEEE VR 2023 Message from the Program Chairs and Guest Editors," in *IEEE Transactions on Visualization and Computer Graphics*, **29**(5), pp. viii–ix, May 2023, doi: 10.1109/TVCG.2023.3249940.

I4. B. Bodenheimer, V. Popescu, J. Quarles and L. Wang, "IEEE VR 2023 Message from the Program Chairs," *2023 IEEE Conference Virtual Reality and 3D User Interfaces (VR)*, Shanghai, China, 2023, pp. xiv–xv, doi: 10.1109/VR55154.2023.00006.

I3. P. Figueroa, B. Bodenheimer, G. Bruder, S. Creem-Regehr, M. Hachet, A. Sadagic, R. Skarbez, M. Sugimoto, and B. Weyers, "IEEE VR 2022 Conference Paper Program Chairs Message," In *Proceedings 2022 IEEE Conference on Virtual Reality and 3D User Interfaces*, VR 2022, pp. XIII–XIV, 2022.

I2. B. Bodenheimer, "Editorial," *ACM Transactions on Applied Perception,* **18**(4), Article 17, October 2021, 2 pages. https://doi.org/10.1145/3486957.

I1. Bodenheimer, B. "TEX, LATEX, etc.: questions et réponses," *Cahiers Gutenberg*, pp. 55–77, No 13, June 1992.

Posters and Abstracts (acceptance based on extended abstract)

P43. B. Bodenheimer, H. Adams, J. Stefanucci, S. Creem-Regehr, "Judging Distances to Virtual Objects Generated by Optical and Video See-Through Augmented Reality," *Journal of Vision*, 2022, **22**(14), p. 4407.

P42. H. Gagnon, H. Finney, R. Bodenheimer, J. Stefanucci, S. Creem-Regehr, "Calibration of Passability Judgments in Virtual Reality Transfers to Augmented Reality," 63rd Annual Meeting of the Psychonomic Society, Boston, MA, November, 2022.

P41. P. Newman, T. McNamara, R. Bodenheimer, "Integration of Artifactual Cues During Spatial Navigation," 63rd Annual Meeting of the Psychonomic Society, Boston, MA, November, 2022.

P40. S. H. Creem-Regehr, J. K. Stefanucci and B. Bodenheimer, "Perceiving Affordances for Passing Through Apertures: A Discussion of Factors Influencing Replication Across Extended Reality," *2022 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*, Singapore, Singapore, 2022, pp. 274-275, doi: 10.1109/ISMAR-Adjunct57072.2022.00061.

P39. K. Choi, G. Crumb, R. Li, R. Natarrajan, P. Tong, O. Molvig, and B. Bodenheimer, "Experience Orchestra: Manipulating Musical Instruments in VR," *2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, 2022, pp. 918-919.

P38. H. C. Gagnon, D. Na, K. Heiner, J. Stefanucci, S. Creem-Regehr and B. Bodenheimer, "Walking Through Walls: The Effect of Collision-Based Feedback on Affordance Judgments in Augmented Reality," *2021 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*, 2021, pp. 266-267.

P37. T. Rohovit, H. Gagnon, H. Finney, Y. Zhao, J. Franchak, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "Integrating feedback to improve reaching estimates in virtual reality," *Journal of Vision*, 2021, **21**(9), p. 2162.

P36. Y. Zhao, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "Improving Wayfinding with Augmented Reality: Opportunities and Challenges," *SPAGAT '21: 1st Int. Workshop on Spatial-HCI and Geographic-Aware Technologies*, June 2021.

P35. Y. Zhao, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "Affordance judgments in mobile augmented reality with cues," *2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, March 2021, pp. 559-560.

P34. H. C. Gagnon, D. Na, K. Heiner, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, "Judgments of passing through augmented reality apertures: The role of viewing distance and feedback." Annual meeting of the Vision Sciences Society, 5/15/2020. Abstract in Journal of Vision, Vol. 20 (11), p. 262, September, 2020.

P33. G. Pointon, C. Salas, H. Adams, S. Creem-Regehr, J. Stefanucci, B. Bodenheimer, & W. B. Thompson, "Perceived distance to augmented reality images is influenced by ground-contact." Talk given at the annual meeting of the Vision Sciences Society, 5/21/2019, St. Pete Beach, FL. Abstract in Journal of Vision, Vol. 19, p. 15a, September, 2019.

P32. S. J. Hong, L. Buck, H. S. Lee, A. Prada, R. Bodenheimer, & S. Park, "Altered Peripersonal Space Boundaries in Schizophrenia: a Virtual Reality Study." In Schizophrenia Bulletin (Vol. 45, pp. S274-S275). Great Clarendon St, OxfordOX2 6DP, England: Oxford Univ. Press, April, 2019. https://doi.org/10.1093/schbul/sbz018.463.

P31. H. Adams, W. Morrel, J. Shinn, J. Noble, A. Rivas, R. Labadie, and B. Bodenheimer, "Play it by Ear: An Immersive Ear Anatomy Tutorial." In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pp. 836-837, March 2019.

P30. G. Pointon, C. Thompson, S. Creem-Regehr, J. Stefanucci, M. Joshi, R. Paris, and B. Bodenheimer, "Investigating Space Perception with Affordance Judgments in Augmented Reality," 59th Annual Meeting of the Psychonomic Society, New Orleans, LA, November, 2018.

P29. L. Buck and B. Bodenheimer, "Delimitation of Peripersonal Space via Multisensory Interaction Using the HTC Vive," *ACM Symposium on Applied Perception (SAP '18)*, Vancouver, BC, August, 2018.

P28. L. Buck, R. Paris, and B. Bodenheimer, "Distance Perception in the HTC Vive Pro," *ACM Symposium on Applied Perception (SAP '18)*, Vancouver, BC, August, 2018.

P27. G. Narasimham, H. Adams, J. Rieser, S. Creem-Regehr, J. Stefanucci and B. Bodenheimer, "Spatial Memory of Children and Teens in Virtual Environments," *ACM Symposium on Applied Perception (SAP '18)*, Vancouver, BC, August, 2018.

P26. R. Paris, T. McNamara, J. Rieser, B. Bodenheimer, "A Comparison of Methods for Navigation and Wayfinding in Large Virtual Environments using Walking," In *2017 IEEE Virtual Reality (VR)*, pp.261–262, March 2017. doi: 10.1109/VR.2017.7892276

P25. Q. He, T. P. McNamara, B. Bodenheimer, and A. Klippel. "Acquisition of Spatial Knowlege from Wayfinding," 57th Annual Meeting of the Psychonomics Society, November, 2016.

P24. K. Wang, R. Paris, J. Rieser, and B. Bodenheimer, "The Autonomy of Visual Kinesthesis in Virtual Reality," 2016 Grace Hopper Conference, October, 2016.

P23. B. Bodenheimer, Y. Wang, D. Maloney, and J. Rieser. 2016. "Induction of Linear and Circular Vection in Real and Virtual Worlds," *2016 IEEE Virtual Reality (VR)*, Greenville, SC, 2016, pp. 153–154. doi: 10.1109/VR.2016.7504699.

P22. M. K. Young and B. Bodenheimer. 2014. "A Comparison of Two Cost-Differentiated Virtual Reality Systems," Vanderbilt Undergraduate Research Fair. First Place, Engineering.

P21. S. M. Andrus, G. Gaylor, and B. Bodenheimer. 2014. "Distance estimation in virtual environments using different HMDs," Proceedings of the *ACM Symposium on Applied Perception (SAP '14)*. ACM, New York, NY, USA, 130-130. DOI=10.1145/2628257.2628359.

P20. R. Paris, R. Blake, and B. Bodenheimer. 2014. "A pilot study on binocular rivalry and motion using virtual reality," Proceedings of the *ACM Symposium on Applied Perception (SAP '14)*. ACM, New York, NY, USA, 125-125. DOI=10.1145/2628257.2628357.

P19. E. Shemetova and B. Bodenheimer. 2014. "Egocentric distance estimation on a discontinuous ground surface in the virtual environment," Proceedings of the *ACM Symposium on Applied Perception (SAP '14)*. ACM, New York, NY, USA, 131-131. DOI=10.1145/2628257.2628358

P18. S. W. Bailey and B. Bodenheimenr. "A Comparison of Motion Capture Data Recorded From a Vicon System and a Microsoft Kinect Sensor," Proceedings of *ACM SIGGRAPH 2012*. Los Angeles, CA.

P17. X. Xie, J. A. Adams, T. P. McNamara, and B. Bodenheimer. "Distributed Spatial Memory in Virtual Human-Robot Team Scenarios," Proceedings of *ACM SIGGRAPH Symposium on Applied Perception* (SAP '12). ACM, New York, NY, USA, 125-125. DOI=10.1145/2338676.2338707.

P16. S. W. Bailey and B. Bodenheimenr. "A Comparison of Motion Capture Data Recorded From a Vicon System and a Microsoft Kinect Sensor," Proceedings of *ACM SIGGRAPH Symposium on Applied Perception* (SAP '12). ACM, New York, NY, USA, 121-121. DOI=10.1145/2338676.2338703.

P15. X. Xie, Q. Lin, H. Wu, Julie A. Adams, and Bobby Bodenheimer. "Immersion with robots in large virtual environments," Proceedings of the seventh annual *ACM/IEEE international conference on Human-Robot Interaction* (HRI '12). ACM, New York, NY, USA, 273-274. DOI=10.1145/2157689.2157790

P14. S. W. Bailey, F. S. Pampel, D. Ashmead, and B. Bodenheimer. "Spatial localization with only auditory cues: a preliminary study," In Proceedings of the *ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization* (APGV '11), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 124-124. DOI=10.1145/2077451.2077487

P13. Q. Lin, X. Xie, A, Erdemir, G. Narasimham, T. P. McNamara, J. Rieser, and B. Bodenheimer. "Egocentric distance perception in HMD-based virtual environments," In Proceedings of the *ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization* (APGV '11), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 123-123.

P12. E. A. McManus, A. Erdemir, S. W. Bailey, J. Rieser, and B. Bodenheimer. "Using endpoints to judge alterations in self-produced trajectories in an immersive virtual environment," In Proceedings of the ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization (APGV '11), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 122-122. DOI=10.1145/2077451.2077485

P11. M. D. Calderwood, J. Kelly, T. P. McNamara, and B. Bodenheimer, "Adding Head Tracking to Desktop Virtual Reality with the Wii Remote as an Aid to Spatial Cognition," *Symposium on Applied Perception in Graphics and Visualization*, Chania, Crete, Greece, October 2009.

P10. J. Kelly, M. D. Calderwood, T. P. McNamara, and B. Bodenheimer, "The Contributions of Self-Motion Cues and Room Shape During Navigation Through Virtual Environments," *Symposium on Applied Perception in Graphics and Visualization*, Chania, Crete, Greece, October 2009.

P9. P. Peng, B. Riecke, B. Williams, T. McNamara, and B. Bodenheimer, "Locomotion for Navigation in Virtual Environments: Walking, Turning, and Joystick Modalities Compared," *Vision Sciences Society*, Naples, FL, May, 2009.

P8. B. Williams, G. Narasimham, B. Rump, T. McNamara, T. Carr, J. Rieser, B. Bodenheimer, "Exploring Large Virtual Environments with an HMD on Foot," *Symposium on Applied Perception in Graphics and Visualization*, Boston, MA, July 2006.

P7. J. Meng, J. Rieser, and B. Bodenheimer, "Distance Estimation in Virtual Environments Using Bisection," *Symposium on Applied Perception in Graphics and Visualization*, Boston, MA, July 2006.

P6. S. Pallavaram, P-F. D'Haese, B. Bodenheimer, J. Spooner, H. Yu, P. E. Konrad, B. Dawant, "Automated selection of anterior and posterior commissures (AC-PC) based on a deformable atlas can remove variability in the current frame of reference use for stereotactic neurosurgical procedures," ASSFN, American Society of Stereotactic and Functional Neurosurgery, Boston, MA, June 2006.

P5. A. Mohan, J. Tumblin, B. Bodenheimer, R. Bailey, C. Grimm, "Tabletop Computed Lighting for Practical Digital Photography," *SIGGRAPH Sketch*, Los Angeles, CA, August 2005.

P4. B. Williams, K. Belynne, and B. Bodenheimer, "An Evaluation of Animation in a Pedagogical Agent," SIGGRAPH 2005, Los Angeles, CA, August 2005.

P3. J. Wang and B. Bodenheimer, "The Just Noticeable Difference of Transition Durations," SIGGRAPH 2005, Los Angeles, CA., August 2005.

P2. A. Crecelius, B. Williams, Li Xia, B. Dawant, B. Bodenheimer, D. S. Cornett, R. M. Caprioli, "Creating 3D-Images of Mouse Brain Structure Using MALDI/MS," *Proceedings of 52nd ASMS Conference on Mass Spectrometry and Allied Topics.*, Nashville, TN, June 2004.

P1. A. Crecelius, D. S. Cornett, B. Williams, B. Bodenheimer, B. Dawant, R. M. Caprioli, "Developing 3-D Imaging Mass Spectrometry," *Proceedings of the 51st ASMS Conference on Mass Spectrometry and Allied Topics*, Montreal, Canada, June 2003.

Invited Talks

T52. "Perception and Action in Immersive Virtual Spaces: How Well Are We Building Virtual Worlds?", LIVE Lunch Series, January, 2023.

T51. "The Role of Perception in Augmented and Virtual Reality: Challenges and Opportunities", Cognition/Cognitive Neuroscience Seminar, January 2023.

T50. "Visions of the Metaverse," Emerge 2022 keynote, April, 2022.

T49. "Towards an Understanding of Near-Distance Interaction Space in Immersive Virtual Environments," Person-to-Person interaction: from analysis to applications workshop (with Lauren Buck), June, 2020.

T48. "Distance Perception in Augmented Reality with Animated Avatars as a Cue," talk at VHCIE 2020 by S. Chakraborty on work by S. Chakraborty, H. Adams, J. Stefanucci, S. Creem-Regehr, and B. Bodenheimer, March, 2020.

T47. "The Role of Perception in Augmented and Virtual Reality: Challenges and Opportunities," PERCAR keynote, March, 2020.

T46. "Applying Virtual Reality to Simulate Visual Impairment," Innovations in Vision Series, Vanderbilt University, October, 2018.

T45. "How Augmented Reality (AR) Can Change Research in Spatial Cognition," S. Creem-Regehr, J. Stefanucci, B. Bodenheimer, Spatial Cognition 2018 Workshop: Virtual environments as geo/spatial labs, Tübingen, Germany, September 2018.

T44. "Locomotion and Navigation in Large Immersive Virtual Environments," Thinking Within 2017, State College, PA, December 2017.

T43. "Prism Aftereffects for Throwing with a Self-Avatar in an Immersive Virtual Environment," VRLA, Los Angeles, CA, March 2017.

T42. "Self-Avatars and Affordance Judgments," Max Planck Institute, Tübingen, Germany, June 2016.

T41. "Computer Science for the Non-Major: The Iceberg Metaphor," Consortium for Computing Sciences in Colleges: Mid-South keynote, April 2016.

T40. "Self-Avatars Provide Critical Information for Perception and Action in Immersive Virtual Environments," Clemson University, October 2014.

T39. "Self-Avatars Provide Critical Information for Perception and Action in Immersive Virtual Environments," Max Planck Institute, Tübingen, Germany, November 2013.

T38. "Perception, Action, and Self-Avatars in Virtual Environments," TAP editorial board meeting, Giessen, Germany, Nobember 2013.

T37. "Perception in Virtual Environments: Distance, Avatars, Locomotion," Seoul National University, Seoul, South Korea, November 2012.

T36. "Four Experiments that didn't work," University of Utah, November 2012.

T35. "Exploring Large Virtual Environments When Physical Space is Limited," Transactions on Applied Perception Editorial Board Meeting, Dublin, Ireland, September 2010.

T34. "Exploring Large Virtual Environments When Physical Space is Limited," Spatial Cognition, Mt. Hood, OR, August 2010.

T33. "Navigation Modes in Virtual Environments,", Midgraph Graphics Workshop, St. Louis, MO, October 2008.

T32. "Computer Graphics and Future Directions in Computation," Keynote, Hendrix-Rhodes-Sewanee Undergraduate Symposium, April 2008.

T31. "Synthesizing and Evaluating Data-Driven Motion Transitions," Bowling-Green State University, October 2007.

T30. "Just Noticeable Differences in Motion Transitions," Cognitive Animation Workshop, Yosemite, CA, June 2007.

T29. "A Geometric Approach to Animation (and Robotics)," Midgraph Graphics Workshop, Nashville, TN, October 2006.

T28. "Complex Data in Computer Animation and Robotics: A Geometric Approach," Vanderbilt Kennedy Center, August 2006.

T27. "Navigating Through Large Virtual Environments when the Physical Environment is Small," Carnegie-Mellon University, April 2006

T26. "Synthesizing and Evaluating Data-Driven Motion Transitions," Carnegie-Mellon University, April 2006.

T25. "Synthesis and Evaluation of Data-Driven Motion Transitions," Electronic Arts, Vancouver, BC, Canada, April 2006.

T24. "Navigating Through Large Virtual Environments when the Physical Environment is Small," University of British Columbia, April 2006

T23. "Navigating Through Large Virtual Environments when the Physical Environment is Small," University of Minnesota, April 2006

T22. "Synthesizing and Evaluating Data-Driven Motion Transitions," University of Pennsylvania, October 2005

T21. "Synthesizing and Evaluating Data-Driven Motion Transitions," University of Iowa, October 2005

T20. "Synthesizing and Evaluating Data-Driven Motion Transitions," Brown University, September 2005.

T19. "Synthesis and Evaluation of Data-Driven Motion Transitions," Washington University at St. Louis, September 2005.

T18. "Functional Similarities in Spatial Representations Between Real and Virtual Environments," Midgraph Graphics Workshop, University of Illinois Urbana-Champaign, November 2005.

T17. "Making Them Move: Human and Robot Animation through Data Acquisition and Dynamic Simulation," Mechanical Engineering, Vanderbilt University, October 2003.

T16. "Making Them Move, Getting Stuff There, and Showing It Well: A Description of Three Applications of Computer Graphics and Animation," University of Alabama at Birmingham, November 2003.

T15. "Robust Transmission of 3D Geometry over Lossy Networks," Middle Tennessee State University, February 2003.

T14. "Registration and Alignment of Histopathological Images," Advancing Pathology Informatics, Imaging, and the Internet, Pittsburgh, PA, October 2002.

T13. "Animating Humans through Data Acquisition and Dynamic Simulation," Middle Tennessee State University, March 2002.

T12. "Animating Humans through Data Acquisition and Dynamic Simulation," University of Georgia, April 2000.

T11. "Animating Humans through Data Acquisition and Dynamic Simulation," University of Tennessee, Knoxville (CS), March 2000.

T10. "Animating Humans through Data Acquisition and Dynamic Simulation," Clemson University, March 2000.

T9. "Animating Humans through Data Acquisition and Dynamic Simulation," University of California, Irvine, March 2000.

T8. "Animating Humans through Data Acquisition and Dynamic Simulation," University of Central Florida, March 2000.

T7. "Animating Humans through Data Acquisition and Dynamic Simulation," University of New Mexico, March 2000.

T6. "Animating Humans through Data Acquisition and Dynamic Simulation," Vanderbilt University, March 2000.

T5. "Animating Humans through Data Acquisition and Dynamic Simulation," University of Tennessee, Knoxville (EE), February 2000.

T4. "The Process of Motion Capture: Dealing with the Data," Industrial Light and Magic, San Rafael, CA, November 1997.

T3. "The Process of Motion Capture: Dealing with the Data," Electronic Arts, Vancouver, BC, Canada, October 1997.

T2. "Applications of Linear Parameter Varying Control," Microsoft, August 1995

T1. "Applications of Linear Parameter Varying Control," Georgia Institute of Technology, July 1995.

Invited Panels

IP7. *Group Work and Student Collaboration Online*, Vanderbilt Center for Teaching Panel, January 2021.

IP6. *The Future of Work: Augmented and Virtual Productivity Experiences*, Microsoft Research Faculty Summitt, July 2019.

IP5. *Virtual Reality Curriculum*, IEEE VR, March 2019.

IP4. *Virtual Reality for Interdisciplinary Applications*, IEEE VR, March 2018. (Organizer)

IP3. *Perception and Action in Virtual Reality with New Commodity Level Equipment: What is New and Different?*, IEEE Virtual Reality, March 2017. (Organizer)

IP2. *Affordances in Immersive and Mixed Virtual Reality: Design, Importance, and Open Questions*, IEEE Virtual Reality, March 2016. (Organizer)

IP1. *Cutting Edge Problems in Virtual Environments*, Symposium on Applied Perception in Graphics and Visualization, August 2009.

Other Publications

O4. J. Fowlin, B. Bodenheimer, C. Doyle, and H. Fedesco, 2021. Project-based and Dynamic Collaborative Learning. Vanderbilt University Course Development Resources.
`https://www.vanderbilt.edu/cdr/module-2/project-based-and-dynamic-collaborative-learning/`

O3. R. E. Bodenheimer, J. D. Birdwell, A. J. Laub, *The Cascade User's Library*, 1988. Available at `http://www.netlib.org/` (software downloaded over 789,452 times).

O2. Birdwell, J. D., J. R. B. Cockett, R. E. Bodenheimer, Jr., and G. Chang, *Cascade Final Report Vol. II: The Cascade Tools and Knowledge Base*, Final Report submitted to Oak Ridge National Laboratory for work performed under subcontract 41B-07685C project authorization S13, April, 1988.

O1. Birdwell, J. D., R. E. Bodenheimer, Jr., and A. J. Laub, *Cascade Final Report Vol. III: The Cascade Library User's Guide*, Final Report submitted to Oak Ridge National Laboratory for work performed under subcontract 41B-07685C project authorization S13, April, 1988.

PATENTS

PT3. "Automatic Sensing for Clinical Decision Support," D. Fabbri, J. Coco, Y. Cheng, D. Scully, C. McNaughton, J. Ehrenfeld, C. Simpson, L. Novak, S. Bloos, R. Bodenheimer, R. Paris, J. Adams, J. Heard, (provisional).

PT2. "System for Interpolating Motions with Verbs and Adverbs," C. Rose, R. E. Bodenheimer, M. F. Cohen, (6,462,742).

PT1. "Generating Optimized Motion Transitions for Computer Animated Objects," B. Guenter, C. Rose, R. E. Bodenheimer, M. F. Cohen, (5,982,389).

SPONSORED RESEARCH ACTIVITIES

The total research funding that I've been involved with since September 2000 is $23,384,691. This can be categorized as follows:

	As PI	As Co-PI or S.P.
Total	$ 5,728,474	$ 17,656,217

Funded External Proposals

23. Spatial Self Boundary, Interpersonal Distance and Social Impairments in Schizophrenia

    Sponsoring Agency: NIH
    Date: 9/2022
    Amount: $3,406,977
    PI and Co-PIs: S. Park (PI), B. Bodenheimer, C. Chang (co-PIs)

22. Augmented Reality Cues for Navigational Success (ARCNAV)

    Sponsoring Agency: DoD/ONR
    Date: 9/2021
    Amount: $1,195,909
    PI and Co-PIs: B. Bodenheimer (PI), S. Creem-Regehr, J. Stefanucci (co-PIs)

21. DURIP: Virtual Co-located Augmented REality Spaces for Visualization, Training, and Navigation

    Sponsoring Agency: DoD/ONR
    Date: 8/2020
    Amount: $317,000
    PI and Co-PIs: B. Bodenheimer (PI), D. Bowman, S. Creem-Regehr, S. Feiner, T. Hölleror, M. Nowatkowski, J. Orlosky, J. Stefanucci (co-PIs)

20. MARC at Vanderbilt

    Sponsoring Agency: NIH
    Date: 2/2020
    Amount: $7.45M
    PI and Co-PIs: D. McMahon (PI), K. Friedman (co-PI), B. Bodenheimer (Senior Personnel) et al.

19. CRI: II-EN: High-Fidelity Real-Time Avatars for Virtual and Mixed Reality

    Sponsoring Agency: NSF
    Date: 8/2018
    Amount: $65,000
    PI and Co-PIs: B. Bodenheimer (PI), T. McNamara, G. Narasimham, J. Rieser (co-PIs)

18. CHS:Medium:Collaborative Research:Designing Virtual Worlds for Children — A Developmental Study of How Children Act, Perceive, and Reason Spatially

    Sponsoring Agency: NSF
    Date: 8/2018
    Amount: $1,199,426
    PI and Co-PIs: B. Bodenheimer (PI), S. Creem-Regehr (Utah), G. Narasimham, A. Needham, J. Rieser, J. Stefanucci (Utah), W. B. Thompson (Utah) (co-PIs)

17. Affordances for Quantitative and Objective Measures of Immersion and Presences

    Sponsoring Agency: ONR
    Date: 1/2018
    Amount: $797387
    PI and Co-PIs: B. Bodenheimer (PI), S. Creem-Regehr (Utah), J. Stefanucci (Utah), W. B. Thompson (Utah), (co-PIs)

16. Automatic Sensing for Clinical Documentation

    Sponsoring Agency: USAMRMC
    Date: 9/2017

Amount: $1,737,328
PI and Co-PIs: D. Fabbri (PI), J. Adams, B. Bodenheimer, J. Ehrenfeld, T. Lasko, C. McNaughton, L. Novak, W. Self (co-PIs)

15. CHS:Small:Collaborative Research:Improving Wayfinding and Navigation in Immersive Virtual Environments

Sponsoring Agency: NSF
Date: 11/2015
Amount: $500,016
PI and Co-PIs: B. Bodenheimer (PI), T. P. McNamara, A. Klippel (Penn. State), A. Shelton (JHU) (co-PIs)

14. REU - HCC:Small:Collaborative Research:The Influence of Self-Avatars on Perception and Action in Virtual Worlds

Sponsoring Agency: NSF
Date: 5/2015
Amount: $16,000
PI and Co-PIs: B. Bodenheimer (PI)

13. HCC:Small:Collaborative Research:The Influence of Self-Avatars on Perception and Action in Virtual Worlds

Sponsoring Agency: NSF
Date: 9/2011
Amount: $500,000
PI and Co-PIs: W. B. Thompson (Utah, PI), B. Bodenheimer, S. Creem-Regehr (Utah), J. Stefanucci (Utah) (co-PIs)

12. REU - HCC: Design and Evaluation of Spatially Aware Interfaces into Virtual Environments

Sponsoring Agency: NSF
Date: 4/1/2011-8/31/2012
Amount: $16,000
PI: R. E. Bodenheimer (PI)

11. CPATH: Revitalizing Computing Education Through Computational Science

Sponsoring Agency: NSF
Date: 9/2009
Amount: $299,300
PI and Co-PIs: B. Bodenheimer (PI), M. Miga, T. Palmeri, D. Weintraub (co-PIs)

10. MRI: Acquisition of Instrument for Interaction, Learning, and Perception in Virtual Environments

Sponsoring Agency: NSF
Date: 9/2008
Amount: $233,546
PI and Co-PIs: R. E. Bodenheimer (PI), J. Adams, T. McNamara, J. Rieser, N. Sarkar (co-PIs)

9. HCC: Design and Evaluation of Spatially Aware Interfaces into Virtual Environments

Sponsoring Agency: NSF
Date: 9/1/2007-8/31/2012
Amount: $427,055
PI and Co-PIs: R. E. Bodenheimer (PI), T. Carr, T. McNamara, G. Narasimham, J. Rieser (co-PIs)

8. Robot Behavior Acquisition

Sponsoring Agency: NASA
Date: 5/1/2007-5/31/2008

Amount: $200,000
PI and Co-PIs: R. A. Peters (PI) B. Bodenheimer (co-PI)

7. Computer-assisted Functional Neuro-Surgery

   Sponsoring Agency: NIH
   Date: 6/1/2006-5/31/2010
   Amount: $2,039,806
   PIs and Co-PIs: B. Dawant (PI), R. E. Bodenheimer, A. B. Bonds, D. P. Charles, D. Fisher, J. M. Fitzpatrick,
      C. Kao, P. E. Konrad (co-PIs).

6. Blind Pedestrian's Access to Complex Intersections

   Sponsoring Agency: NIH
   Date: 10/01/2005-9/30/2006
   Amount: $169,197
   PI and Co-PIs: D. Ashmead (PI), R. E. Bodenheimer, D.W. Grantham (co-PIs). with both normal and impaired
      vision. This work supports one graduate student for my part of the project.

5. Center for Advanced Sensors

   Sponsoring Agency: Army Research Office
   Date: 1/31/2005-5/31/2006
   Amount: $356,909
   PI and Co-PIs: J. Davidson (PI), A. B. Bonds, B. Bodenheimer, D. Noelle (co-PIs).

4. An Approach to Authoring Content for Animated Pedagogical Agents

   Sponsoring Agency: NSF
   Date: 6/1/2004-8/31/2004
   Amount: $6,000
   PI: B. Bodenheimer

3. CAREER: Implementing and Assessing Human Figure Animation in Pedagogical Agents

   Sponsoring Agency: NSF
   Date: 3/1/2003-2/29/2008
   Amount: $423,000
   PI: R. Bodenheimer

2. 3-D Imaging Mass Spectrometry

   Sponsoring Agency: NIH/NCI
   Date: 1/1/2003-12/31/2005
   Amount: $325,000
   PI: R. M. Caprioli (PI), B. Dawant, R. Bodenheimer (co-PIs). mass spectrometry data. The grant supports one
      graduate student doing this aspect of the project.

1. Acquisition of Autonomous Behaviors by Robotics Assistants

   Sponsoring Agency: DARPA
   Date: 7/2002-12/2004
   Amount: $1,025,000
   PIs and Co-PIs: K. Kawamura (PI), R. A. Peters II, N. Sarkar, B. Bodenheimer (co-PIs).

Funded Internal Proposals

14. Looking to the Future of Learning and Collaborating in Virtual Worlds

    Sponsoring Agency: Chancellor's Sequicentennial Grant
    Date Submitted: Funded
    Amount: $30,000
    PI and Co-PIs: Andrew McAvan (PI), T. McNamara, B. Bodenheimer, S. Chakraborty

13. Digital Cultural Heritage Research Cluster

    Sponsoring Agency: TIPS
    Date Submitted: Funded
    Amount: $200,000
    PI and Co-PIs: Lynn Ramey (PI), Tracy Miller, B. Bodenheimer, D. Michelson, J. Calico, O. Molvig, B. Robinson, J. Janusek, S. Wernke

12. Implementation of a 3-D Body Mapping Tool for Emotion Identification and Communication

    Sponsoring Agency: VKC Director's Strategic Priorities Grant
    Date Submitted: Funded
    Amount: $50,000
    PI and Co-PIs: Sohee Park (PI), B. Bodenheimer

11. Data Visualization Working Group

    Sponsoring Agency: VIDL
    Date Submitted: Funded
    Amount: $4,000
    PI and Co-PIs: Gayathri Narasimham (Org.), Cliff Anderson, Andreas Berlind, B. Bodenheimer, D. Bruff, B. Smiley

10. The Art and Science of Attentional Tracking in New Media (Working Group)

    Sponsoring Agency: VIDL
    Date Submitted: Funded
    Amount: $4,000
    PI and Co-PIs: Dan Levin (Org.), Amanda Goodwin, Gautam Biswas, Lutz Koepnick, Sun-Joo Cho

9. Data Science Visions

    Sponsoring Agency: TIPs
    Date Submitted: Funded
    Amount: $100,000
    PI and Co-PIs: Andreas Berlin (PI), etc.

8. A Trans-Institutional Program in Big Data / Data Science at Vanderbilt

    Sponsoring Agency: TIPs
    Date Submitted: Seed Funded
    Amount: $10,000
    PI and Co-PIs: Andreas Berlin (PI), Keivan Stassun, Bobby Bodenheimer, etc. (co-PIs).

7. Simulation of Retinal Diseases in an Immersive Virtual Environment

    Sponsoring Agency: Discovery Grant
    Date Submitted: November 2011
    Amount: $62,368
    PI and Co-PIs: R. E. Bodenheimer (PI), D. Ashmead, S. Donahue, A. Agarwal (co-PIs)

6. Motion Analysis to Assess Surgical Treatment of Movement Disorders

   Sponsoring Agency: Discovery Grant
   Date Submitted: November 2006
   Amount: $64,471
   PI and Co-PIs: R. E. Bodenheimer (PI), B. Dawant, J. Neimat (co-PIs)

5. Construction of Virtual Environments for Learning and Cognition

   Sponsoring Agency: Discovery Grant
   Date: 5/2005-6/2007
   Amount Requested: $95,000
   PI: B. Bodenheimer (PI), J. Rieser, T. McNamara, D. Ashmead (co-PIs).

4. Dynamic Lighting Design with Digital Photography

   Sponsoring Agency: Vanderbilt University Summer Research Program
   Date: 6/2004–8/2004
   Amount Requested: $4,000
   PI: B. Bodenheimer

3. Nonlinear dimensionality reduction for 3-D animation

   Sponsoring Agency: Vanderbilt University Summer Research Program
   Date: 6/2004–8/2004
   Amount Requested: $3,800
   PI: B. Bodenheimer

2. Using Isomap to Animate Pedagogical Agents

   Sponsoring Agency: Vanderbilt University Summer Research Program
   Date: 5/2003–7/2003
   Amount Requested: $3,500
   PI: B. Bodenheimer

1. Laboratory for Learning in Immersive Virtual Environments

   Sponsoring Agency: Learning Sciences Institute Seed Grant
   Date: 8/2002
   Amount Requested: $48,000
   PIs and Co-PIs: D. Ashmead, G. Biswas, B. Bodenheimer, J. Bransford, K. Frampton, M. Goldfarb, J. Lappin,
       T. McNamara, J. Rieser, N. Sarkar, C. Smith, P. Thompson, N. Vye

NATIONAL AND INTERNATIONAL SERVICE

Editorial Board Memberships

2021–Present   Editor-in-Chief, *ACM Transactions on Applied Perception*
2009–2021   Associate editor, *ACM Transactions on Applied Perception*
2015–2019   Associate editor, *IEEE Transactions on Visualization and Computer Graphics*

National Working Groups and Committees

2018   Siggraph Curriculum Working Group

Conference and Program Chairs

2023	Program Co-Chair, IEEE VR Papers
2022	Program Co-Chair, IEEE VR Conference Papers Track
2009	Program Chair, Symposium on Applied Perception in Graphics and Visualization
2009	Conference Chair, Symposium on Computer Animation
2008	Conference Chair, Symposium on Applied Perception in Graphics and Visualization
2006	Chair, Midwest Graphics Workshop (MidGraph)

Program Committees

2019-20	IEEE VR Journal Track IPC
2012-20	Symposium on Applied Perception
2007-11	Symposium on Applied Perception in Graphics and Visualization
2002-12	Symposium on Computer Animation
2012	Computer Animation and Social Agents
2002	International Conference on 3D Web Technology
1998	Eurographics Workshop on Computer Animation and Simulation

Conference Organization and Responsibilities

2021	Session Chair, IEEE ISMAR
2012-21	Steering Committee, Symposium on Applied Perception
2020-21	Session Chair, IEEE VR
2017-19	Publicity Committee, IEEE VR
2009,'10,'11	Steering Committee, Symposium on Applied Perception in Graphics and Visualization
2009,'10,'17,'18,'20	SIGGRAPH General Submissions Juror
2009,'10,'11,'12	Steering Committee, Symposium on Computer Animation
2012,'13,'14,'15	Session Chair, Symposium on Applied Perception
2006,'11	Session Chair, Symposium on Applied Perception in Graphics and Visualization
2007	Session Chair, Cognitive Animation Workshop
2003	Co-Founder and co-chair (with C. Grimm), Midwest Graphics Workshop (MidGraph)
2002,'03,'07	Session Chair, Symposium on Computer Animation
1995	Session Chair, Conference on Decision and Control

Mentoring

2020-2022	Chair of mentoring committee for Matthew Berger
2011-12	Mentoring Grant for Scott Kuhl (Michigan Tech)

Journal and Conference Reviewing

ACM Transactions on Graphics
ACM Transactions on Applied Perception
Automatica
Computer Graphics Forum
Frontiers in Robotics and AI
IEEE Transactions on Automatic Control
IEEE Transactions on Robotics
Graphical Models
Perception and Psychophysics
Presence
SIGGRAPH Asia
ACM Symposium on Applied Perception (SAP)
ACM Symposium on User Interface Software and Technology (UIST)
Eurographics
IEEE Artificial Intelligence & Virtual Reality (AIVR)
Eurographics Workshop on Computer Animation and Simulation
International Symposium on Mixed and Augmented Reality (ISMAR)
ACM/IEEE Conference on Human-Robot Interaction (HRI)
ACM Symposium on Applied Perception in Graphics and Visualization (APGV)
IEEE Transactions on Visualization and Computer Graphics

ACM Computing Surveys
Attention, Perception, & Psychophysics
Computer Animation and Virtual Worlds
Computers & Graphics
Journal of Perceptual Imaging
IEEE Transactions on Medical Imaging
Web 3D Symposium
Neural Computation
PLOS ONE
SIGGRAPH
Interactive 3D Graphics (I3D)
ACM Symposium on Computer Animation (SCA)
ACM Symposium on Virtual Reality Software and Technology (VRST)
American Control Conference
IEEE Virtual Reality (VR) Conference

Review Panels

National Science Foundation (2003–2019)
National Endowment for the Humanities (2003, 2004)

INTRAMURAL SERVICE

University

Internal Awards Review Committee (2022–)
Goldwater Scholarship Nominating Committee (2020–2021)
Limited Submission Opportunity Review Committee (2020–2024)
Trans-institutional Digital Humanities Committee (2019)
Wild Bunch Places & Spaces Exhibit Committee (2016)
Faculty Senate Online Education Task Force (2013-15)
Simons Math+X committee member (2013)
Vice-Chair Past, Faculty Senate (2011-02012)
Vice-Chair, Faculty Senate (2010–2011)
Vice-Chair Elect, Faculty Senate (2009–2010)
Co-author, Faculty Senate *Honor System Report*
Search committee member for Director of Office of Equal Opportunity, Affirmative Action, and Disability Services (2009)
Faculty Senate (2008-2012)
Honor Council (2008-2018)
Prof 101: Launching Successful Faculty Careers Workshop (2009)
Grant and Fellowship Workshop for Graduate Students (2008)
CIRTL CAREER Preparation Workshop (2007)

School

Chair, Dean's Consultative Committee (2021–Present)
Director of the Scientific Computer Minor (2011–Present)
Chair, Strategic Plan Working Group on Curricular Initiatives in Big Data (2014)
School of Engineering Curriculum Committee (2007–2012)
CAREER Preparation Workshop (2003–2011)
Freshman Year Evaluation Committee (2002–2003)
School Open House participant (2001–2015)
Laptop Committee (2000–2005)

Department

Director of Undergraduate Studies for Computer Science (2007–2012)
Computer Science Undergraduate Curriculum Committee (2006–2012)
Computer Science Graduate Program Committee (2003–2005)
Computer Science PhD Requirements Committee (2018)
Search Committee for Electrical Engineering and Computer Science (2001,2002,2008,2010,2011,2014,2016,2017)
Programming Languages Evaluation Committee (2001-2002)
Development of Departmental Web Page (2001-2012)
ABET Fulfillment Committee for Electrical Engineering and Computer Engineering (2001)
Advisor for the Computer Science Classes of 2005, 2018, 2023
Advisor for CS double majors, 2013
Member of the tenure review committee for Julie Adams, 2009
Member of the four-year review committee for Bennett Landman, 2013
Member of the tenure review committee for Bennett Landman, 2015
Member of the two-year review committee for Eugene Vorobeychik, 2015
Member of the four-year review committee for Eugene Vorobeychik, 2017
Member of the two-year review committee for Maithilee Kunda, 2017
Chair of the two-year review committee for Ipek Oguz, 2020
Member of the tenure review committee for Taylor Johnson, 2020
Chair of the two-year review committee for Yuankai Ho, 2021
Chair of the four-year review committee for Matt Berger, 2022
Chair of the four-year review committee for Yuankai Ho, 2023

THESES AND STUDENT SUPERVISION

Publications with students, if any, are shown in parenthesis.

Advisor - Thesis or Dissertation

Lauren Buck	Ph.D.	2021	Measuring the Components of Personal Space Cognition inSimulated Immersive Virtual Environments (J26,P29,P28,J28,P32,C46,C50,CF15,CF14,C54, J35,C58,CE11,J36,J37)
Richard Paris	Ph.D.	2020	Evaluation of Locomotion Techniques in Room and Standing Scale Tracked Space (P20, J24, P26, C40, C50, C48, CE8, P24, C44, C43, C45, P28, C50, P30, C46, CF12, C51, C53,J36,CF17)
Haojie Wu	Ph.D.	2019	Using a Virtual Environment to Evaluate Pedestrian Street Crossing Decisions at a Traffic Roundabout (C26,J27,C42)
Xianshi Xie	Ph.D.	2015	An Examination of Navigation Methods for Large Immersive Virtual Environments with Application to the Study of Human-Robot Teams (C30,P15,C45). Currently at Meta.
Qiufeng Lin	Ph.D.	2014	People's Perception and Action in Immersive Virtual Environments (J22, C35, C34, C31, P13, CE7, C33, C30, P15). Currently at Google.
Anusha Rao (co-advised)	Ph.D.	2012	Quantifying Drug-Induced Dyskinesia Using Clinical Videos of Parkinson's Disease Patients (C27,J21). Currently at IUPUI.
L. Elizabeth Williams	Ph.D.	2008	Navigating Large Virtual Environments in Small Physical Spaces (J11,J8,J19,C20,C18,P8,P4,P2,P1,C49). Currently at Rhodes College.
Christina de Juan	Ph.D.	2006	Cartoon Textures: Re-Using Traditional Animation via Methods for Segmentation, Re-Sequencing, and Inbetweening (CF9,CF7). Currently self-employed.
Jing Wang	Ph.D.	2005	Synthesizing and Evaluating Data-Driven Motion Transitions (J14,CF6,CF4,P3). Currently at the University of South Florida.
Qiang Fu	M.S.	2015	The Effect of Avatar Model in Stepping Off a Ledge in an Immersive Virtual Environment (C38)
Yiming Wang	M.S.	2015	Vection (Self-Motion Illusions) In Virtual Reality (P23)
Erin McManus	M.S.	2012	Human Performance and the Perception of Actions in Immersive Virtual Environments (C33,C32,P12). Currently at RTI.
Raffi Bedikian	M.S.	2011	Perceptual Analysis of Motion Blur Techniques in Distribution Ray Tracing. Currently at Leap.
Matthew Calderwood	M.S.	2009	Possible Applications of the Wii Remote as an Aid to Spatial Updating and Spatial Memory in Desktop Virtual Reality (P11, P10)
V. Sathayanaranan	M.S.	2008	Evaluation of Moving Least Squares as a Technique for Non-rigid Medical Image Registration (CE6). Currently at IIT Madras.
A. Elizabeth Seward	M.S.	2006	Time-to-Contact Estimation for Street Crossing (C17,C21, J13). Currently at CTS, inc.

Graduate Student Supervision

Yu Zhao	2019-Present	Ph.D. (CF16,J34,P35,P37, P36,CE10,C59,J40)
Soumyajit Chakraborty	2019-Present	Ph.D. (T48,C57,C61,CE10)
Yunchao Liu	2018-Present	Ph.D. (co-advised, C56,CF19,CE12)
Haley Adams	2016-Present	Ph.D. (J25,J27,C44,C42,P27,CE9,CF12,C47,CF11,P31,P33,C55,T48,J38, CF18,P43)
Nishan Shehaden	2021-Present	M.S. (Expected May 2023: Presence in Augmented Reality)
Yunhao Lyu	2021-Present	non-thesis M.S.
Aryan Katneni	2021-Present	non-thesis M.S.
Tabitha S. Y. Lee	2021-Present	non-thesis M.S.
Sam Alws	2021-Present	non-thesis M.S.
Jingtao Cheng	2020-2021	non-thesis M.S.
Hoonhee Lee	2019-2021	non-thesis M.S.
Natalie Giordana	2017-2019	non-thesis M.S.
Joshua Klag	2016-2018	non-thesis M.S. (C50)
Tristan Griggs	2018	non-thesis M.S.
Frederick Weitendorf	2018	non-thesis M.S.
Guimin Dong	2016-2018	non-thesis M.S.
Haochen Shi	2014-2016	non-thesis M.S.
Elena Shemetova	2013-2015	non-thesis M.S. (P19,CF10)
Mary K. Young	2013-2015	non-thesis M.S. (C37,C39, P22)
Peng Peng	2006-2008	non-thesis M.S. (P9)
Jingjing Meng	2004-2006	non-thesis M.S. (P7,C26)
Paul Bielaczyc	2002-2004	non-thesis M.S.
Zhihua Chen	2002-2004	non-thesis M.S. (J7,C15,C14)
Chen Zhou	2003	non-thesis M.S. (C11)

Committee Member/Second Reader

Akshith Ullal	Ph.D.	TBD	A Framework for Naturalistic Interaction and Collaboration in Remote Mixed/Augmented Reality (M.E.)
Emily Tighe	M.S.	2023	Navigation Efficiency and Strategy Differences in Adults and Children Using a Dual Solution Task (Psych., University of Utah)
Hyeon-Seung Lee	Ph.D.	TBD	Altered Representation of Personal Space in Psychopathology (Psych.)
Phillip Newman	Ph.D.	TBD	TBD: Statistically Optimal Cue Integration During Spatial Navigation (Psych.)
Holly Gagnon	Ph.D.	2023	Reaching between worlds: Calibration and transfer of perceived affordances from virtual to real environments (Psych., University of Utah)
Bhuvaneswari Sarupuri	Ph.D.	2020	Comfortable and Usable Locomotion Techniques in Virtual Reality (CS, Univ. of Canterbury, NZ)
Qiliang He	Ph.D.	2017	Acquisition and Development of Spatial Knowledge During Wayfinding (Psych.) (J29)
Amanda Shultz	Ph.D.	2017	Control Methods for Powered Ankle Prosthesis to Improve Mobility and Stability in Persons with Lower Limb Amputations (Mech. Engr.)
Caroline Harriott	Ph.D.	2015	Workload and Task Performance in Human-Robot Peer-Based Teams
Sean Hayes	Ph.D.	2015	Accurate Interaction for Mobile Applications
Ankur Jumar	Ph.D.	2014	Quantifying *In Vivo* Motion in Video Sequences Using Image Registration
Ryan Datteri	Ph.D.	2014	Assessing Registration Quality via Registration Circuits
James Segedy	Ph.D.	2014	Adaptive Scaffolds in Open-Ended Computer-Based Learning Environments
Eli Hooten	Ph.D.	2014	Information Context in Geocollaborative Interfaces
			Continued on next page

Lujun Wang	Ph.D.	2012	Trivariate Polynomial Splines on 3D T-Meshes (Math.)
Siyi Ding	Ph.D.	2010	Intraoperative Brain Shife Estimation Using Vessel Segmentation, Registration, and Tracking
Srivatsan Pallavaram	Ph.D.	2010	Standardizing Indirect-Targeting and Building Electrophysiological Maps for Deep Brain Stimulation (DBS) Surgery after Accounting for Brain Shift
Philip Ko	Ph.D.	2010	The Objects of Visual Attention and Memory (Psych.)
Curtis M. Humphrey	Ph.D.	2009	Information Abstraction Visualization for Human-Robot Interaction
Karla Welch	Ph.D.	2009	Psychophysiological Analysis of Affective States in Human-Computer Interaction for Children with Autism Spectrum Disorders (Mech. Engr.)
Katherine Fleming	Ph.D.	2009	A Multi-modal Attention System for a Sensor-Guided Robot
Ning Xu	Ph.D.	2007	Correction of Image Distortion in Echo Planar Image Series Using Phase and Intensity
Xia Li	Ph.D.	2007	Inter-modal Registration of Whole-Body Animal Image Data
Ramya Balachandran	Ph.D.	2007	Improving the Accuracy of Tracked Fiducial Systems
Yong Zhu	Ph.D.	2006	Impedance Control of a Pneumatic Actuator for Contact Tasks (Mech. Engr.)
Yuliya Babenko	Ph.D.	2006	On the Asymptotic Behavior of the Optimal Error of Spline Interpolation of Multivariate Functions (Math.)
Xiangrong Shen	Ph.D.	2006	Exploiting Natural Characteristics of Pneumatic Servo-Actuation Through Multi-Input Control (Mech. Engr.)
Navneet Gulati	Ph.D.	2005	Modeling and Observer-based Robust Control Design for Energy-Dense Monopropellant Powered Actuators (Mech. Engr.)
Zhujiang Cao	Ph.D.	2005	Segmentation of Medical Images (Bio. Engr.)
Tatyana Sorokina	Ph.D.	2005	Quintic Splines on Type-4 Tetrahedral Projections (Math.)
Krittaya Leelawong	Ph.D.	2005	A Learning-by-Teaching Environment for Learning Complex Scientific Domains: A Teachable Agent Project
Duane Yoder	Ph.D.	2003	Distortion Correction of MR Echo Planar Images
Natasha Balac	Ph.D.	2002	Learning Action Models for Navigation in Noisy Environments
Sriram Narasimhan	Ph.D.	2002	Model-based Diagnosis of Hybrid Dynamical Systems
Katherine Achim	M.S.	2005	Image Mapping and Attention on the Sensory Ego-Sphere
Trenton E. Kriete	M.S.	2005	Impaired Cognitive Flexibility and Intact Cognitive Control in Autism: A Computational Cognitive Neuroscience Approach
Christina L. Campbell	M.S.	2003	Superposition of Behaviors Learned through Teleoperation
Shuanglin Wang	M.S.	2001	A Case Study in Repeated Maintenance

Other Graduate Student Supervision

Josh Klag	2018	Independent study on navigation affordances in virtual reality
Graham Hemingway	2006	Independent study on manifold structure of human animation
Shan Xiong	2001	Independent study in advanced ray-tracing methods.

Undergraduate Student Project Supervision

Elle Choi	2022	Undergraduate Research (CS 3861): Exploring Emotional Reactions to Avatars in Immersive VR
Grant Bowlds	2021-22	Undergraduate Research (CS 3860): Gaze during Avatar Conversations in Virtual Reality
May Liu	2020	Undergraduate Research (CS 3861): Remote, Distributed Desktop Navigation
Carlos Salas	2020	NSF REU: Affordance Judgments in Desktop Virtual Reality
Irisa Myint	2020	Undergraduate Research (CS 3861): Machine Learning with Virtual Reality Navigation Data

Hunter Wang	2020	Undergraduate Research (CS 3861): Machine Learning with Virtual Reality Navigation Data
Lingfeng Li	2020	Undergraduate Research (CS 3861): Low Vision Simulation in Virtual Reality
Lingfeng Li	2019	Undergraduate Research (CS 3860): Deep Learning of Video for Emergency Medical Procedures (C53)
Shaon Borosha	2019	Undergraduate Research (CS 3861): Virtual Reality Vision Deficit Simulation in 3D Maze with Grabbable Objects
Ruida Zeng	2019	Automatic Sensing for Clinical Documentation
Hunter Wang	2019	Automatic Sensing for Clinical Documentation (C53)
Conner Pinson	2019	Automatic Sensing for Clinical Documentation (C53)
Carlos Salas	2019	Affordances for Quantitative Measures of Immersion and Presence (CF11,P33,J33)
Taylor Smith	2019	Affordances for Quantitative Measures of Immersion and Presence (C54)
May Liu	2019	Affordances for Quantitative Measures of Immersion and Presence (C52)
Albert Na	2019	Affordances for Quantitative Measures of Immersion and Presence (CF13,P34,P38)
Priya Rajan	2019	NSF REU: Designing Virtual Worlds for Children (C50)
Irisa Myint	2019	NSF REU: Designing Virtual Worlds for Children
Abigale White	2019	Undergraduate Research (CS 3861): Virtual Reality Orthopedic Operating Room
Emma Sona	2019	Undergraduate Research (CS 3861): Naturalistic Environments in Augmented Reality
Emma Sona	2018	Undergraduate Research (CS 3860): Affordances in Augmented Reality
Sara Hanson	2018	NSF REU: Improving Wayfinding and Navigation in Virtual Reality (CF12)
Priya Rajan	2018	NSF REU: Improving Wayfinding and Navigation in Virtual Reality
Hansen Wu	2018	Affordances for Quantitative Measures of Immersion and Presence (C47)
Peter Cho	2018	Affordances for Quantitative Measures of Immersion and Presence
Nidhi Mehta	2018	Affordances for Quantitative Measures of Immersion and Presence
Paul Sullivan	2018	Automatic Sensing for Clinical Documentation (CE8)
Lia Vanatta	2018	Undergraduate Research (CS 3860): Unreal Engine for Implementing Walking-In-Place
Suyi Diao	2018	Undergraduate Research (CS 3860): Comparing Game-Motivated Locomotion Methods
Miti Joshi	2018	Undergraduate Research (CS 3860): Applications of Augmented Reality (C43,P30)
Noorin Asjad	2017	Undergraduate Research (EECE 3860): Ascending Heights in Virtual Reality (C44)
Yuzhou Huang	2017	NSF REU: Improving Wayfinding and Navigation in Virtual Reality
Abigail White	2017	Undergraduate Research (CS 3860): Visualization of Ear Models in Virtual Reality
Cole Carlin	2017	Undergraduate Research (CS 3860) VR Photogrammetry
Miti Joshi	2016	SUGRE: Wayfinding with Mobile Virtual Reality (C40)
Joshua Klag	2016	Undergraduate Research (CS 3861) : Building Collaborative Immersive Virtual Environments
David Connor Lehr	2015	Undergraduate Research (CS 2240) : Building Virtual Worlds using Video Game Platforms
Divine Maloney	2015	NSF REU: Vection in Virtual Environments (P23)
Matthew Labadie	2015	NSF REU: Collaboration in Virtual Environments
		Continued on next page

Eunice Jun	2014	Undergraduate Research (CS 240) : Affordances and Size Cues in Virtual Environments
Mary Young	2013-14	Undergraduate Research (CS 240): Dyadic Interactions in Virtual Environments (C37)
Scott Andrus	2014	Indepdent Study (CS240) : Augmented Reality Using the Google Glass (P21)
Graham B. Gaylor	2013-14	Undergraduate Research (CS240) : Usability in Commodity-Level Virtual Environments (C37, P21)
Ryan N. Steier	2011	Undergraduate Research (CS 240): Design, Implementation, and Testing of Thermionic Emission Characterization Apparatus
Erin Adams McManus	2010-11	Undergraduate Research (CS 240) : Perception-Action Couplings in Virtual Environments
Raffi Bedikian	2009	Undergraduate Research (CS 240): Distribution Ray Tracing
Michael Andereck	2006	Undergraduate Research (CS 240): Dynamical Simulation using the Maya Dynamics Engine
Jonathan Waite	2005	VUSRP: Dynamic Lighting Design with Digital Photography (also independent study, Fall 2005) (J12)
Timothy Rapp	2005	Undergraduate Research (CS 240): Nonphotorealistic Rendering: Multiple Perspectives in a Single Scene
A. Elizabeth Seward	2004	VUSRP: Using Nonlinear Dimensionality Reduction for Human Figure Animation (also independent study, Fall 2004) (C17)
Jason Tan	2003	Undergraduate Research (CS 240): Construction of Learning Tasks for Immersive Virtual Environments
Gerard Raiti	2003	Undergraduate Research (CS 240): Can biologic motion be generalized to non-human characters?
Justin Harmon	2003	Undergraduate Research (CS 240): Graphical design of a networked Stratego game
Mattie R. Kramer	2003	Vanderbilt Undergraduate Summer Research Program (VUSRP): Using Isomap to Animate Pedagogical Agents (also independent studies, Fall 2003 and Spring 2004) (J19,CF5)
Reed Wotiz	2001	Independent study in advanced methods of computer animation: production, rendering, and sound techniques
Drew Blackard	2001	Independent study in advanced methods of computer animation: production, rendering, and sound techniques

Other Research Supervision

Carlos Salas	2018	Hume-Fogg High School, Nashville, TN: Distance Estimation in Augmented Reality
Sara Hanson	2018	Harpeth Hall High School, Nashville, TN: Locomotion in Virtual Reality
Margaret Cook	2017-18	Harpeth Hall High School, Nashville, TN: The Effect of Virtual Avatars on Proxemics in Joint Affordances
Taylor Smith	2016-17	Hillsboro High School, Nashville, TN: Simulating Visual Deficits in a Virtual Environment: A Street Crossing Study
Kaili Wang	2015-16	Harpeth Hall High School, Nashville, TN: Induction of Linear Vection through a Virtual Swaying Room (P24)

ACADEMIC RESPONSIBILITIES

Course numbering reflects curricular changes approved by the School of Engineering faculty. Courses may have actually appeared as, for example, CS 292 instead of CS 259. Enrollment in shown in parenthesis beside the year the course was taught.

Courses Taught

Course Number	Course Title	Fall	Spring
CS (3/5)258 (291)	Introduction to Computer Graphics	2001 (18), '02 (14), '03 (11), '04 (16), '05 (16) '06 (19), '07 (10)	'09 (17), '10 (17), '11 (18), '12 (13), '13 (20), '14 (17), '15 (10), '17 (24), '19 (22)
CS (3/5)259 (292)	Introduction to Computer Animation	2009 (12), '11 (13), '13 (24), '15 (21)	2001 (39), '03 (37), '04 (33), '05 (25), '06 (10), '07 (14), '08 (12)
CS 351 (396)	Advanced Animation Seminar		2002 (8), '05 (3)
CS 352 (395)	Human-Computer Interaction	2002 (10), '03 (13)	
CS 395/396	Advanced Topics in Graphics and Image Processing	2000 (19), '14 (9)	2006 (18), '07 (6), '14 (9)
CS (3/5)892	Special Topics - VR w. Mobile & Commodity Dev.	2016 (26)	
CS (3/5)892	Special Topics - VR for Interdisc. Apps.	2017 (30), '18 (27), '19 (33), '20 (36)	
CS 4959	Computer Science Senior Project Seminar	2015 (7), '16 (16), '17 (100)	
CS 8395	Special Topics - Advanced Topics in AR/VR		2018 (2), '20 (5), '22 (22)
ES 140	Introduction to Engineering	2008 (67), '10 (80)	
PSY 3780 (236) / EECE 225	The Visual System (Lecturer)		2001, '02, '03, '04 (27), '05 (25), '06 (31), '07 (31), '08 (32), '09 (30), '10 (14), '11 (31), '12 (9), '13 (9), '14 (28), '15 (37), '17 (38)
SC (3/5)250	Scientific Computing Toolbox	2011 (12), '12 (18), '13 (20), '14 (24), '15 (25), '16 (32), '17 (35), '18 (39), '19 (31)	
CS 4249/ CSET 3257 (UNIV 3279)	VR Design	2017 (17), '18 (8), '19 (18), '20 (54) '21 (59) '22 (64)	

Curriculum Development and Educational Innovations

ES140	I developed a computer science module for this class.
CS(3/5)258/395	I developed both of these courses; CS395 was a graduate version, although in its current manifestation graduate students can now take CS258 by completing extra assignments. This course is an intensive programming course teaching the fundamentals of computer graphics. For several years, there was no adequate textbook that covers these topics in the detail that I go into, so I developed an extensive set of course notes. These notes now supplement a textbook. There are five projects, also of my own construction.
CS259/CS292	This course was also a new course that I developed. It is a large, group project-based course in which students are taught the fundamentals of computer animation. Since CS258 is not a prerequisite for the course, there is some duplication of material in the course, but common topics are covered in more depth in CS258. There is no adequate textbook for the material that I cover, so I developed an extensive set of course notes.
CS351/CS396	This course is an advanced seminar on computer graphics and animation, for graduate students with some maturity or background in computer graphics, and especially for those intending to do research in the area (or a related one, such as image processing). The latest developments in the field are discussed, and the students implement some of them as a project. Because of the nature of the course, there is no textbook for this course. A set of approximately 25 papers is covered, with lectures to provide an introduction to some of the underlying principles used in the papers.
CS352/CS395	This course was a new course that I developed and is a graduate level course on introductory human-computer interaction (HCI). A number of papers are presented in the course, from seminal papers in the field to latest results. The course was a combination of lecture and seminar format, and involves a semester long project involving some novel application of HCI techniques. Some of these projects have been published in peer-reviewed conferences.
CS396	I developed this graduate seminar on advanced topics in Image Processing and Graphics. We studied 24 papers covering novel and leading tools in both specialties, such as high dynamic range imaging, perception in graphics and animation, quaternions, level sets, support vector machines and manifold learning.
CS(3/5)892	A special topics course on virtual reality. The first version focused on building virtual reality applications for mobile, commodity level devices. The second version is co-taught as a university course, co-taught and co-developed with Ole Molvig in History. Both are team project courses.
CS4959	I taught this course in its second offering. I revised the structure to (hopefully) better engage the students in topics of ethics and professionalism, although the format I've employed may not generalize to large class size and will have to revisited in future offerings.
CS 8395	A graduate-level seminar on advanced virtual reality presented through head-mounted displays. The capstone project of the course was to build a head-mounted display out of off-the-shelf components, and then develop virtual environments for it.
PSY3780	This interdisciplinary course is made up of lectures given by specialists on various aspects of the visual system. I was one of several lecturers and lectured on the impact the visual system has on the theory, design, and implementation of computer graphics, and vice versa.
SC(3/5)250	This interdisciplinary course is the flagship course of the scientific computing minor that I codeveloped. It teaches fundamental topics in scientific computing with application to current problems in science and engineering.
UNIV 3279	A university course co-taught and co-developed with Ole Molvig in History. This course focuses on building virtual reality projects for interdisciplinary applications. It is a team project course. It has morphed into a two section team taught CS 4249/ CSET 3257 class (after the expiration of University courses).