
Associate Professor of Computer Science
Associate Professor of Computer Engineering
Vanderbilt University
Electrical Engineering and Computer Science
VU Station B #351679, 2301 Vanderbilt Place
Nashville, TN 37235, USA
(615)322-3555
Fax: (615) 343-5459
bobbyb@vuse.vanderbilt.edu
<http://www.vuse.vanderbilt.edu/~bobbyb/>

PROFESSIONAL INTERESTS

My research is in the area of computer graphics, specifically computer animation and virtual environments. My particular interests in animation and virtual environments lie in the design of algorithms that can be shaped for use in learning applications. In computer animation, I develop methods that allow the creation of visually compelling human motion. I am especially interested in formal evaluation of such methods, and how such evaluation informs the design process for the creation of animated motion. I also study how people learn and act on their perceptions in virtual environments, using this information to build virtual environments that leverage perceptual affordances.

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)

Associate Professor, September 2007 – Present

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

AWARDS

- 2003-2008 NSF CAREER award
- 2005 Best Paper award, ACM Southeastern Regional Conference (C13)
- 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

Students are underlined.

Refereed Journal Articles

- J1. B. Bodenheimer, B. Williams, M. Kramer, K. Viswanath, R. Balachandran, K. Belyne, and G. Biswas, "Construction and Evaluation of Animated Teachable Agents," *Educational Technology & Society*, in press.
- J2. 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.
- J3. 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.
- J4. 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.
- J5. S. Pallvaram, 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," *Journal of Stereotactic and Functional Neurosurgery*, **86**, pp. 113-119.
- J6. J. Wang and B. Bodenheimer, "Synthesis and Evaluation of Linear Motion Transitions," *ACM Transactions on Graphics*, **27**(1), art. 1, 2008.
- J7. 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), Nov. 2007.
- J8. 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.

- J9. 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.
- J11. 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.
- J12. 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.
- J13. 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.
- J14. 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.
- J15. 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.
- J16. 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.
- J17. 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.
- J18. K. Zhou, K. Glover, B. Bodenheimer, and J. Doyle, "Mixed \mathcal{H}_2 and \mathcal{H}_∞ Performance Objectives I: Robust Performance Analysis," *IEEE Trans. on Automatic Control*, **39**(8), pp. 1564–1574, August 1994.
- J19. J. Doyle, K. Zhou, K. Glover, and B. Bodenheimer, "Mixed \mathcal{H}_2 and \mathcal{H}_∞ Performance Objectives II: Optimal Control," *IEEE Trans. on Automatic Control*, **39**(8), pp. 1575–1587, August 1994.

Papers Published in Conferences with Acceptance Based on Full Papers and Acceptance Rate Comparable to Copyrighted Journals

- CF1. J. Davis, K. Leelawong, K. Belyne, 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. 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

- C1. 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.
- C2. 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.

- C3. 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.
- C4. 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), Genova, Italy, December 2006.
- C5. 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.
- C6. O. C. Jenkins, R. A. Peters II, R. E. Bodenheimer, "Uncovering Success in Manipulation," RSS Workshop on Manipulation for Human Environments, Philadelphia, PA, August 2006.
- C7. 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.
- C8. 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.
- C9. 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.
- C10. 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.
- C11. 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.
- C12. B. Williams, A. Crecelius, S. Cornett, R. Caprioli, B. Dawant, and B. Bodenheimer, "Baseline Correction of MALDI Mass Spectrometry Imaging," Proceedings of the 43rd ACM SE Regional Conference., v. 1, pp. 137–142, March 2005.
- C13. 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.
- C14. C. N. de Juan, and B. Bodenheimer, "Cartoon Textures," 2004 ACM SIGGRAPH / Eurographics Symposium on Computer Animation. pp. 267–276, Grenoble, France, August 2004.
- C15. 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.
- C16. 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.
- C17. 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.
- C18. 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.
- C19. 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.

- C20. 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.
- C21. 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.
- C22. 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.
- C23. 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.
- C24. 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.
- C25. 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.
- C26. 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.
- C27. 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.
- C28. 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.
- C29. 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.
- C30. P. Bendotti, and B. Bodenheimer, “Identification and \mathcal{H}_∞ Control for a Pressurized Water Reactor,” *Proc. of the 33rd Conf. on Decision and Control*, pp. 1072-1077, Orlando, FL, December 1994.
- C31. 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.
- C32. K. Zhou, J. C. Doyle, and B. Bodenheimer, “Mixed \mathcal{H}_2 and \mathcal{H}_∞ control,” *Proc. of the American Control Conference*, San Diego, CA, June 1990.
- C33. J. C. Doyle, K. Zhou, and B. Bodenheimer, “Optimal Control with Mixed \mathcal{H}_2 and \mathcal{H}_∞ Performance Objectives,” *Proc. of the American Control Conference*, pp. 2065-2070, Pittsburgh, PA, June 1989.
- C34. 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

- CE1. V. Sathyanarayanan and B. Bodenheimer, “Evaluation of Moving Least Squares as a Technique for Non-rigid Medical Image Registration,” *SPIE Symposium on Medical Imaging (Image Processing)*, Orlando, FL, February 2009.
- CE2. 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,” *SPIE Symposium on Medical Imaging (Visualization and Image-Guided Procedures)*, San Diego, CA, February 2007.

- CE3. 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.
- CE4. 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.
- CE5. G. Deng, Z. Ding, B. Bodenheimer, and S. Schach, "Understanding Software Coupling through Visualization," *2003 ACM Midsouthwest Regional Conference*, pp. 26, Gatlinburg, TN, Nov. 2003.
- CE6. 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

- 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.

Posters and Abstracts (acceptance based on extended abstract)

- P1. 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.
- P2. 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.
- P3. 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.
- P4. 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.
- Acceptance rate: 25%.*
- P6. B. Williams, K. Belyne, and B. Bodenheimer, "An Evaluation of Animation in a Pedagogical Agent," *SIGGRAPH 2005*, Los Angeles, CA, August 2005.
- P7. J. Wang and B. Bodenheimer, "The Just Noticeable Difference of Transition Durations," *SIGGRAPH 2005*, Los Angeles, CA., August 2005.
- P8. 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.
- P9. 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

- T1. "Navigation Modes in Virtual Environments," Midgraph Graphics Workshop, St. Louis, MO, October 2008.
- T2. "Computer Graphics and Future Directions in Computation," Keynote, Hendrix-Rhodes-Sewanee Undergraduate Symposium, April 2008.
- T3. "Synthesizing and Evaluating Data-Driven Motion Transitions," Bowling-Green State University, October 2007.
- T4. "A Geometric Approach to Animation (and Robotics)," Midgraph Graphics Workshop, Nashville, TN, October 2006.
- T5. "Complex Data in Computer Animation and Robotics: A Geometric Approach," Vanderbilt Kennedy Center, August 2006.
- T6. "Navigating Through Large Virtual Environments when the Physical Environment is Small," Carnegie-Mellon University, April 2006
- T7. "Synthesizing and Evaluating Data-Driven Motion Transitions," Carnegie-Mellon University, April 2006.
- T8. "Synthesis and Evaluation of Data-Driven Motion Transitions," Electronic Arts, Vancouver, BC, Canada, April 2006.
- T9. "Navigating Through Large Virtual Environments when the Physical Environment is Small," University of British Columbia, April 2006
- T10. "Navigating Through Large Virtual Environments when the Physical Environment is Small," University of Minnesota, April 2006
- T11. "Synthesizing and Evaluating Data-Driven Motion Transitions," University of Pennsylvania, October 2005
- T12. "Synthesizing and Evaluating Data-Driven Motion Transitions," University of Iowa, October 2005
- T13. "Synthesizing and Evaluating Data-Driven Motion Transitions," Brown University, September 2005.
- T14. "Synthesis and Evaluation of Data-Driven Motion Transitions," Washington University at St. Louis, September 2005.
- T15. "Functional Similarities in Spatial Representations Between Real and Virtual Environments," Midgraph Graphics Workshop, University of Illinois Urbana-Champaign, November 2005.
- T16. "Making Them Move: Human and Robot Animation through Data Acquisition and Dynamic Simulation," Mechanical Engineering, Vanderbilt University, October 2003.
- T17. "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.
- T18. "Robust Transmission of 3D Geometry over Lossy Networks," Middle Tennessee State University, February 2003.
- T19. "Registration and Alignment of Histopathological Images," Advancing Pathology Informatics, Imaging, and the Internet, Pittsburgh, PA, October 2002.
- T20. "Animating Humans through Data Acquisition and Dynamic Simulation," Middle Tennessee State University, March 2002.
- T21. "Animating Humans through Data Acquisition and Dynamic Simulation," University of Georgia, April 2000.
- T22. "Animating Humans through Data Acquisition and Dynamic Simulation," University of Tennessee, Knoxville (CS), March 2000.
- T23. "Animating Humans through Data Acquisition and Dynamic Simulation," Clemson University, March 2000.

- T24. “Animating Humans through Data Acquisition and Dynamic Simulation,” University of California, Irvine, March 2000.
- T25. “Animating Humans through Data Acquisition and Dynamic Simulation,” University of Central Florida, March 2000.
- T26. “Animating Humans through Data Acquisition and Dynamic Simulation,” University of New Mexico, March 2000.
- T27. “Animating Humans through Data Acquisition and Dynamic Simulation,” Vanderbilt University, March 2000.
- T28. “Animating Humans through Data Acquisition and Dynamic Simulation,” University of Tennessee, Knoxville (EE), February 2000.
- T29. “The Process of Motion Capture: Dealing with the Data,” Industrial Light and Magic, San Rafael, CA, November 1997.
- T30. “The Process of Motion Capture: Dealing with the Data,” Electronic Arts, Vancouver, BC, Canada, October 1997.
- T31. “Applications of Linear Parameter Varying Control,” Microsoft, August 1995
- T32. “Applications of Linear Parameter Varying Control,” Georgia Institute of Technology, July 1995.

Invited Articles

- I1. Bodenheimer, B. “ \TeX , \LaTeX , etc.: questions et réponses,” *Cahiers Gutenberg*, pp. 55–77, No 13, June 1992.

Other Publications

- O1. R. E. Bodenheimer, J. D. Birdwell, A. J. Laub, *The Cascade User’s Library*, 1988. Available at <http://www.netlib.org/>.
- 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.
- O3. 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

- “Robotic Trajectories Using Behavior Superposition,” R. E. Bodenheimer, Jr., R. A. Peters II (pending)
- “Generating Optimized Motion Transitions for Computer Animated Objects,” B. Guenter, C. Rose, R. E. Bodenheimer, M. F. Cohen, (5,982,389).
- “System for Interpolating Motions with Verbs and Adverbs,” C. Rose, R. E. Bodenheimer, M. F. Cohen, (6,462,742).

SPONSORED RESEARCH

The total research funding that I’ve been involved with since September 2000 is \$5,159,813. This sum can be broken into two categories: Principal Investigator (PI) \$1,195,901; Co-PI \$3,963,912.

Funded External Proposals

Title: 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)

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

Sponsoring Agency: NSF

Date: 9/1/2007-8/31/2011

Amount: 427,055

PI and Co-PIs: R. E. Bodenheimer (PI), T. Carr, T. McNamara, G. Narasimham, J. Rieser (co-PIs)

Title: 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).

Title: 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).

Title: 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).

Title: 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

Title: 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

Title: 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).

Title: 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

Title: 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)

Title: 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).

Title: 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

Title: 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

Title: 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

Title: 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

Pending External Proposals

Title: Revitalizing Computing Education Through Computational Science

Sponsoring Agency: NSF

Date Submitted: April 2009

Amount: 299,300

PI and Co-PIs: B. Bodenheimer (PI), M. Miga, T. Palmeri, D. Weintraub (co-PIs)

NATIONAL AND INTERNATIONAL SERVICE**Program Committees**

2007	Applied Perception in Graphics and Visualization
2002,'03,'04, '05, '07, '08	Symposium on Computer Animation
2002	International Conference on 3D Web Technology
1998	Eurographics Workshop on Computer Animation and Simulation

Journal and Conference Reviewing

ACM Transactions on Graphics
SIGGRAPH
ACM Transactions on Applied Perception
IEEE Transactions on Visualization and Computer Graphics
IEEE Transactions on Robotics
IEEE Transactions on Automatic Control
Computer Animation and Virtual Worlds
Perception and Psychophysics
Computer Graphics Forum
Automatica
Neural Computation
Graphical Models
IEEE Virtual Reality Conference American Control Conference
Eurographics
Eurographics Workshop on Computer Animation and Simulation
Interactive 3D Graphics Symposium on Computer Animation
Web 3D Symposium

Conference Organization and Responsibilities

2009 Jury member, SIGGRAPH Unified Jury
 2009 Steering Committee, Symposium on Computer Animation
 2009 Steering Committee, Symposium on Applied Perception in Graphics and Visualization
 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)
 2006 Session Chair, Applied Perception in Graphics and Visualization
 2003 Co-Founder and co-chair (with C. Grimm), Midwest Graphics Workshop
 2002,'03 Session Chair, Symposium on Computer Animation
 1995 Session Chair, Conference on Decision and Control

Review Panels

National Science Foundation (2003, 2004, 2005, 2006, 2007, 2008, 2009)
 National Endowment for the Humanities (2003, 2004)

INTRAMURAL SERVICE

University

Faculty Senate (2008-present)
 Honor Council (2008-present)
 Prof 101: Launching Successful Faculty Careers Workshop (2009)
 Grant and Fellowship Workshop for Graduate Students (2008)
 CIRTL CAREER Preparation Workshop (2007)

School

Search Committee for Electrical Engineering and Computer Science (2001-2002,2002-2003,2008-2009)
 CAREER Preparation Workshop (2003-present)
 Freshman Year Evaluation Committee (2002-2003)
 School Open House participant (2001-present)
 Laptop Committee (2000-2005)
 ABET Fulfillment Committee for Electrical Engineering and Computer Engineering (2001)

Department

Computer Science Director for Undergraduate Studies (2008-present)
 Computer Science Undergraduate Curriculum Committee (2006-present)
 Computer Science Graduate Program Committee (2003-2005)
 Programming Languages Evaluation Committee (2001-2002)
 Development of Departmental Web Page (2001-present)
 Advisor for the Computer Science Class of 2005

THESES AND STUDENT SUPERVISION

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

Primary Advisor - Thesis

L. Elizabeth Williams	Ph.D.	2008	Navigating Large Virtual Environments in Small Physical Spaces (J9,J12,J1, C9,C12,P2,P6,P8,P9). Currently at Rhodes College.
Christina de Juan	Ph.D.	2006	Cartoon Textures: Re-Using Traditional Animation via Methods for Segmentation, Re-Sequencing, and Inbetweening (C7,C14). Currently at DreamWorks.
Jing Wang	Ph.D.	2005	Synthesizing and Evaluating Data-Driven Motion Transitions (J6,C15,C19,P7). Currently at the University of South Florida.
V. Sathyanarayanan	M.S.	2008	Evaluation of Moving Least Squares as a Technique for Non-rigid Medical Image Registration (CE1).
A. Elizabeth Seward	M.S.	2006	Time-to-Contact Estimation for Street Crossing (C13,C8, J7).

Graduate Student Supervision

Qiufeng Lin	2008-Present	Ph.D.
Xianxi Xie	2008-Present	Ph.D.
Haojie Wu	2007-Present	Ph.D. (C2)
Anusha Rao	2006-Present	Ph.D. (C1)
Matthew Calderwood	2007-Present	thesis MS
Peng Peng	2006-2008	non-thesis MS (P1)
Jingjing Meng	2004-2006	non-thesis MS (P3,C2)
Paul Bielaczyc	2002-2004	non-thesis MS
Zhihua Chen	2002-2004	non-thesis MS (J13,C18,C20)
Chen Zhou	2003	non-thesis MS (C23)

Committee Member/Second Reader

Christina Campbell	Ph.D.	2009 (ant.)	Sensory Motor Coordination: Learning from Experience
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

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

Michael Andereck	2006	Independent Study (CS 240): Dynamical Simulation using the Maya Dynamics Engine
Jonathan Waite	2005	VUSRP: Dynamic Lighting Design with Digital Photography (also independent study, Fall 2005) (J8)
Timothy Rapp	2005	Independent Study (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) (C13)
Jason Tan	2003	Independent Study (CS 240): Construction of Learning Tasks for Immersive Virtual Environments
Gerard Raiti	2003	Independent Study (CS 240): Can biologic motion be generalized to non-human characters?
Justin Harmon	2003	Independent Study (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) (J1,C16)
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

ACADEMIC RESPONSIBILITIES

Courses Taught

Course Number	Course Title	Fall	Spring
CS 258 (291)	Introduction to Computer Graphics	2001 (18), '02 (14), '03 (11), '04 (16), '05 (16) '06 (19), '07 (10)	'09 (17)
CS 259 (292)	Introduction to Computer Animation		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	Seminar on Computer Graphics	2000 (19)	
CS 396	Advanced Topics in Graphics and Image Processing		2006 (18), '07 (6)
ES 140	Introduction to Engineering	2008 (67)	
EECE 225/Psy 236	The Visual System (Lecturer)		2001, '02, '03, '04 (27), '05 (25), '06 (31), '07 (31), '08 (32), '09 (30)