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Electrical Engineering and Computer Science
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RESEARCH INTERESTS

My research focuses on improving the quality and robustness of animations, emphasizing human figures. Creating realistic and convincing animations of human figures is a difficult and time-consuming task. Most animation techniques are *ad hoc* and employ heuristic techniques to achieve visually compelling results. As the demand for quality and complexity in animation rises, it is my belief that these methods will no longer generate appealing results, and the field will increasingly rely on robust mathematical methods for its results. Developing these techniques is the goal of my work.

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 (Tennessee)

Assistant Professor, September 2000 – Present

Georgia Institute of Technology, College of Computing, Atlanta (Georgia)

Postdoctoral Fellow, January 1998 – May 2000

Microsoft, Microsoft Research Graphics Group, Redmond (Washington)

Visiting Researcher, October 1995 – December 1997

Alysis Software, San Francisco (California)

Software Consultant, June 1991 – June 1995

Minds and Machines, San Francisco (California)

Software Consultant, June 1988 – August 1989

University of Tennessee, Engineering Computer Laboratory, Knoxville (Tennessee)

System Manager, September 1983 – August 1986

PROFESSIONAL ACTIVITIES

Program Committees

- 2001 International Conference on 3D Web Technology
- 1998 Eurographics Workshop on Computer Animation and Simulation

Other

- 1995 Session Chair, Conference on Decision and Control

TEACHING EXPERIENCE

Instructor

- Spring 2001 Introduction to Computer Animation - CS 292
- Fall 2000 Seminar on Computer Graphics - CS 395
- Winter 1998 Introduction to Computer Graphics (Georgia Tech) - CS 4390
- Winter 1994 Linear Systems Theory (Caltech)

Guest Lecturer

- Spring 2001 The Visual System - Psy 236
- Spring 2000 Computer Animation (Georgia Tech.) - CS 4496
- Spring 1999 Advanced Computer Animation (Georgia Tech.) - CS 8113
- Spring 1999 Digital Video Special Effects (Georgia Tech.) - CS 4803

PATENTS

“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, (pending).

AWARDS AND FELLOWSHIPS

Awards

- 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

- Eta Kappa Nu
- Tau Beta Pi

MASTER’S THESIS READER

- Fall 2000 Shuanglin Wang: A Case Study in Repeated Maintenance

PH.D. COMMITTEES

- Spring 2001 Sriram Narasimhan: Model-based Diagnosis of Hybrid Systems (Proposal)
- Spring 2001 Natasha Balac: Learning Action Models for Navigation in Noisy Environments (Proposal)

INTERNAL COMMITTEES

2000-2001 Laptop Committee

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Association for Computing Machinery (ACM)

Institute for Electrical and Electronics Engineers (IEEE)

PUBLICATIONS

1. O'Brien, J., Bodenheimer, B., Brostow, G., and Hodgins, J., "Automatic Joint Parameter Estimation from Magnetic Motion Capture Data," *Proceedings of Graphics Interface 2000*, Montreal, CA, pp. 53–60, May 2000.
2. Bodenheimer, B., Shleyfman, A., and Hodgins, J., "The Effect of Noise on the Perception of Animated Human Running," *Computer Animation and Simulation '99*, pp. 53–63, N. Magnenat-Thalmann and D. Thalmann (eds.), Springer-Verlag, Wien.
3. Bendotti, P., and Bodenheimer, B., "Linear Parameter-Varying versus Linear Time-Invariant Control Design for a Pressurized Water Reactor," *International Journal of Robust and Nonlinear Control*, v. 9, no. 13, November 1999, pp.969–995.
4. Hodgins, J. K. O'Brien, J. F., Bodenheimer, R. E., "Computer Animation", In *The Wiley Encyclopedia of Electrical and Electronics Engineering*, John G. Webster Ed., Volume 3, pp. 686-690, 1999.
5. Rose, C., B. Bodenheimer, and M. Cohen, "Verbs and Adverbs: Multidimensional Motion Interpolation," *IEEE Computer Graphics and Applications*, pp. 32–41, v. 18, no. 5, September/October 1998.
6. Bodenheimer, B., C. Rose, S. Rosenthal, and J. Pella, "The Process of Motion Capture: Dealing with the Data," *Computer Animation and Simulation '97*, pp. 3–18, D. Thalmann and M. van de Panne (eds.), Springer-Verlag, New York.
7. Rose, C., 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.
8. Bodenheimer B., P. Bendotti, and M. Kantner, "Linear Parameter-Varying Control of a Ducted Fan Engine", *Int. J. of Robust and Nonlinear Control*, v. 6, pp. 1023–1044, 1996.
9. Bodenheimer, B., and P. Bendotti, "Optimal Linear-Parameter Varying Control of a Pressurized Water Reactor," *Proc. of 34th Conf. on Decision and Control*, pp. 182–187, December 1995.
10. Beck, C., 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, December 1995.
11. Bendotti, P., 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, December 1994.
12. Zhou, K., 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*, pp. 1564–1574, V. 39, No. 8, August 1994.
13. Doyle, J., K. Zhou, K. Glover, and B. Bodenheimer, "Mixed \mathcal{H}_2 and \mathcal{H}_∞ Performance Objectives II: Optimal Control," *IEEE Trans. on Automatic Control*, pp. 1575–1587, V. 39, No. 8, August 1994.
14. Hrovat, D., and B. Bodenheimer, "Robust Automotive Idle Speed Control Design Based on μ -synthesis," *Proc. of the American Control Conference*, pp. 1778-1783, June 1993.
15. Bodenheimer, B. "T_EX, L^AT_EX, etc.: questions et réponses", *Cahiers Gutenberg*, pp. 55–77, No 13, June 1992.
16. Zhou, K., J. C. Doyle, and B. Bodenheimer, "Mixed \mathcal{H}_2 and \mathcal{H}_∞ control," *Proc. of the American Control Conference*, 1990.

17. 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, 1989.
18. 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.
19. 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.
20. Bodenheimer, Robert E. Jr., and William J. Toth, "Integral and Differential Linearity Errors in the Synthesis of Electronic Music," *Proc. of the 1986 IEEE Southeastcon*, pp. 260-264, March, 1986.