

Jan M. Allbeck

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Computer and Information Science Department
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RESEARCH INTERESTS

I have had the great opportunity to explore many aspects of computer graphics. Above all, I am drawn to research at the crossroads of animation, artificial intelligence, and psychology in the pursuit of simulating humans. My current research focuses on the creation and simulation of functional crowds.

EDUCATION

Doctor of Philosophy, Computer and Information Science, University of Pennsylvania, Philadelphia, PA
Primary Fields: Computer Graphics and Artificial Intelligence
Dissertation: Creating 3D Animated Human Textures for Virtual Worlds
Advisor: Norman I. Badler
Projected Completion Date: August 2008

Master of Science in Engineering, Computer and Information Science, University of Pennsylvania, Philadelphia, PA
Completion Date: May 1997

Bachelor of Arts in Mathematics, Department of Mathematics and Computer Science, Bloomsburg University, Bloomsburg, PA
Graduation Awards: Magna Cum Laude
Completion Date: May 1995

Bachelor of Science in Computer Science, Department of Mathematics and Computer Science, Bloomsburg University, Bloomsburg, PA
Graduation Awards: Magna Cum Laude
Completion Date: May 1995

FELLOWSHIPS AND AWARDS

U.S. Department of Education Graduate Assistance in Areas of National Need,
Department of Computer and Information Science, University of Pennsylvania, 1997-2000

Ashton Fellowship, Department of Computer and Information Science, University of Pennsylvania, 1995-1999

SIGACCESS Best Technical Paper Award for the ASSETS 2007 Paper Titled: Evaluating American Sign Language Generation Through the Participation of Native ASL Signers. October 2007, Tempe, AZ

SAE Award for Excellence in Oral Presentation, Automated Analysis of Human Factors Requirements. SAE World Congress & Exhibition April 2007, Detroit, MI

SAE Award for Excellence in a Technical Paper, New Behavioral Paradigms for Virtual Human Models. SAE Proceedings of 2005 Digital Human Modeling for Design and Engineering Symposium, June 2005, Iowa City, IA

Dean's list, Bloomsburg University, Bloomsburg, PA, 1991-1995

Frannie and George DeMott Scholarship, Millville, PA, 1991

Valedictorian, Millville Area High School, Millville, PA, 1991

JOURNAL ARTICLES

M. Huenerfauth, L. Zhao, E. Gu and J. Allbeck. "Evaluation of American Sign Language Generation by Native ASL Signers." ACM Transactions on Accessible Computing. 2008.

N. Badler, J. Allbeck, S.-J. Lee, R. Rabbitz, T. Broderick and K. Mulkern. *New behavioral paradigms for virtual human models*. In SAE 2005 Transactions Journal of Passenger Cars - Electronic and Electrical Systems, pages 723-729.

N. Badler and J. Allbeck. *Creating Virtual Reality Simulations Using Natural Language*. Habitation, International Journal for Human Support Research. 9(3/4), pages 160-161, 2004. Abstract.

BOOK CHAPTERS

N. Pelechano, J.M. Allbeck, and N.I. Badler. *Crowd Simulation*. San Rafael, CA: Morgan & Claypool Publishers, 2008. In Preparation.

N.I. Badler and J.M. Allbeck. *Future Needs and Developments in Support of Computer-based Human Models*. In Handbook of Digital Human Modeling (Human Factors and Ergonomics). Vincent Duffy (Ed.) CRC Publishing. In Press.

J. Allbeck and N. Badler. *Creating Embodied Agents with Cultural Context*. In Agent Culture: Designing Virtual Characters for a Multi-Cultural World, R. Trappl and S. Payr (Eds.). New York: Lawrence Erlbaum Associates, pages 107-126, 2004.

J. Allbeck and N. Badler. *Representing and Parameterizing Agent Behaviors*. In Life-like Characters: Tools, Affective Functions and Applications, Helmut Prendinger and Mitsuru Ishizuka (Eds.). Berlin: Springer, pages 19-38, 2003.

J. Allbeck and N. Badler. *Embodied Autonomous Agents*. In Handbook of Virtual Environments, K. Stanney (Ed.). Lawrence Erlbaum Associates, pages 313-332, 2002.

N. Badler and J. Allbeck. *Towards behavioral consistency in animated agents*. In *Deformable Avatars*, N. Magnenat-Thalmann and D. Thalmann, (Eds.). Kluwer Academic Publishers, pages 191-205, 2001.

N.I. Badler, R. Bindiganavale, J. Allbeck, W. Schuler, L. Zhao, and M. Palmer. *Parameterized Action Representation for virtual human agents*. In *Embodied Conversational Agents*, J. Cassell, J. Sullivan, S. Prevost and E. Churchill (Eds.), Cambridge, MA: MIT Press, pages 256-284, 2000.

N.I. Badler, R. Bindiganavale, J. Bourne, J. Allbeck, J. Shi and M. Palmer. *Real Time Virtual Humans*. In *Digital Media: The Future*. J. Vince and R. Earnshaw (Eds). London: Springer-Verlag, pages 213-226, 2000.

PEER-REVIEWED CONFERENCE PAPERS

N. Pelechano, C. Stocker, J. Allbeck, and N. Badler. *Being a Part of the Crowd: Toward Validating VR Crowds Using Presence*. In *Proceedings of Autonomous Agents and Multi-Agent Systems*, pages 136-142, 2008. (22% acceptance rate)

M. Huenerfauth, L. Zhao, E. Gu and J. Allbeck. *Evaluating American Sign Language Generation Through the Participation of Native ASL Signers*. In *Proceedings of the 9th International ACM SIGACCESS Conference on Computers and Accessibility*. (Oct. 15-17 Tempe, AZ) Assets'07. NY: ACM Press, pages 211-218, 2007. (31% acceptance rate)

N. Pelechano, J. Allbeck and N. Badler. *Controlling Individual Agents in High-Density Crowd Simulation*. *ACM SIGGRAPH / Eurographics Symposium on Computer Animation (SCA) 2007* (August 3-4, San Diego, CA). NY: ACM Press, pages 99-108, 2007. (35% acceptance rate)

M. Huenerfauth, L. Zhao, E. Gu and J. Allbeck. *Design and Evaluation of an American Sign Language Generator*. In *Proceedings of 45th Annual Meeting of the Association for Computational Linguistics. Workshop on Embodied Language Processing*. (June 29, 2007 Prague, Czech Republic). Stroudsburg, PA: ACL, pages 51-59, 2007.

J. Allbeck and N. Badler. *Automated Analysis of Human Factors Requirements*. In *Proceedings of SAE International Digital Human Modeling for Design and Engineering*. (July 2006, Lyon, France). SAE International, 2006-01-2366, 2006.

N. Badler, J. Allbeck, L. Zhao, and M. Byun. *Representing and Parameterizing Agent Behaviors*. In *Proceedings of Computer Animation*. (June 2002, Geneva, Switzerland). IEEE Computer Society, pages 133-143, 2002. (31% acceptance rate)

J. Allbeck, K. Kipper, C. Adams, W. Schuler, E. Zoubanova, N. Badler, M. Palmer, and A. Joshi. *ACUMEN: Amplifying Control and Understanding of Multiple Entities*. In *Proceedings of Autonomous Agents and Multi-Agent Systems*. (July 2002, Bologna, Italy). ACM Press, pages 191-198, 2002. (26% acceptance rate)

J. Allbeck and N. Badler. *Toward Representing Agent Behaviors Modified by Personality and Emotion*. In Workshop on Embodied Conversational Agents - Let's specify and evaluate them! at Autonomous Agents and Multi-Agent Systems (July 16, 2002, Bologna, Italy), pages 1-6, 2002.

H. Shin, J. Allbeck, D. Elliott, and N. Badler. *Modeling deformable human arm for constrained reach analysis*. In Proceedings of Digital Human Modeling Conference. (June 18-20, 2002 Munich, Germany). VDI-Gesellschaft Fahrzeugund Verkehrstechnik - Düsseldorf: VDI Verlag and SAE-International, pages 217-228, 2002.

K. Ashida, S.J. Lee, J. Allbeck, H. Sun, N. Badler, and D. Metaxas. *Pedestrians: Creating Agent Behaviors through Statistical Analysis of Observation Data*. In Proceedings of the 14th Conference on Computer Animation, (November 2001, Seoul, South Korea), IEEE Press, pages 84-92, 2001.

J.M. Allbeck and N.I. Badler. *Consistent Communication with Control*. In Proceedings of Workshop on Multimodal Communication and Context in Embodied Agents at The 5th International Conference on Autonomous Agents. (May 29, 2001, Montreal, Canada), pages 21-26, 2001.

R. Bindiganavale, W. Schuler, J.M. Allbeck, N.I. Badler, A.K. Joshi, and M. Palmer. *Dynamically Altering Agent Behaviors Using Natural Language Instructions*. In Proceedings of the 4th International Conference on Autonomous Agents. (June 2000, Barcelona, Spain). ACM Press, pages 293-300, 2000.

N.I. Badler, J.M. Allbeck, R. Bindiganavale, K. Kipper, M.B. Moore, W. Schuler, L. Zhao, A.K. Joshi, M. Palmer. *Creating Agent Behaviors in Real-time*. International Workshop on Human Modeling and Animation. (June 28-29, 2000, Seoul, Korea) Korean Computer Society, 2000.

N.I. Badler, R. Bindiganavale, J. Allbeck, W. Schuler, L. Zhao, S.J. Lee, H. Shin, and M. Palmer. *Parameterized Action Representation and Natural Language Instructions for Dynamic Behavior Modification of Embodied Agents*. In Proceedings of AAAI Spring Symposium. (March 20-22, 2000, Stanford, CA), Menlo Park, CA: AAAI Press, pages 6-10, 2000.

J. Allbeck and N. Badler. *Avatars a la Snow Crash*. In Proceedings of Computer Animation. (June 1998, Philadelphia, PA), IEEE Press, pages 19-24, 1998.

SHORT PEER-REVIEWED CONFERENCE PAPERS

F. Durupinar, J. Allbeck, N. Pelechano, and N. Badler. *Creating Crowd Variation with the OCEAN Personality Model*. In Proceedings of Autonomous Agents and Multi-Agents Systems, pages 1217-1220, 2008.

N. Pelechano, C. Stocker, J. Allbeck and N.I. Badler. *Feeling Crowded? Exploring Presence in Virtual Crowds*. In Proceedings the 10th Annual International Workshop on Presence. (October 25-27, 2007, Barcelona, Spain). pages 373-376.

- B. Sunshine-Hill, J.M. Allbeck, N. Pelechano and N.I. Badler. *Generating Plausible Individual Agent Movement from Spatio-Temporal Occupancy Data*. In Proceedings of the Workshop of Massive Datasets at the 9th International Conference on Multimodal Interfaces. (November 12-15, 2007, Nagoya, Japan). ACM Press, 2007.
- N. Badler, J. Allbeck, A. Megahed, M. Whitmore. *RIVET: Rapid Interactive Visualization for Extensible Training*. In Proceedings of Habitation 2006. (Feb. 5-8, Orlando, FL), 2006.
- G. Lashari, J. Allbeck, N. Badler, A. Megahed. *RIVET: Rapid Interactive Visualization for Extensible Training*. In Proceedings of Bioastronautics. (Jan. 2005, Galveston, TX), 2005.
- N. Badler, J. Allbeck, M. Beitler, H. Lu. *Extending XMSF with a Parameterized Action Representation for Agent Behaviors*. In Proceedings of XMSF Workshop. Fairfax, VA, 2003. Position paper.
- N.I. Badler, J. Allbeck, Y. Liu, and H. Shin. *Physical and Psychological Aspects of Task Simulation for Maintenance and Safety*. In Proceedings of Bioastronautics, 2003.
- N. Badler, J. Allbeck, and R. Bindiganavale. *Describing human and group movements for interactive use by reactive virtual characters*. In Proceedings of the Army Science Conference. Orlando, FL, 2002.
- J. Allbeck, R. Bindiganavale, K. Kipper, M.B. Moore, W. Schuler, N.I. Badler, A.K. Joshi, and M. Palmer. *Authoring Embodied Agents' Behaviors through Natural Language and Planning*. In Proceedings of Workshop on Key Problems for Creating Real-time Embodied at the 4th International Conference on Autonomous Agents. (June 2000, Barcelona, Spain). ACM Press, 2000.

TECHNICAL PRESENTATIONS

- The Quest for Real-Time Virtual Human Control*. Keynote at Cognitive Animation Workshop, June 4th 2008, Yosemite National Park.
- Automated Analysis of Human Factors Requirements*. At SAE World Congress, April 2007, Detroit, MI. (Excellence in Oral Presentation Award).
- Automated Analysis of Human Factors Requirements*. At SAE International Conference on Digital Human Modeling for Design and Engineering, July 2006, Lyon, France.
- RIVET: Rapid Interactive Visualization for Extensible Training*. At Habitation, February 5-8, Orlando, FL.
- RIVET: Rapid Interactive Visualization for Extensible Training*. At Bioastronautics, January 2005, Galveston, TX.
- Research in the Center for Human Modeling and Simulation*. Presentation to NAVSEA. August 2005, Philadelphia, PA.
- Bodies and Making Them Move*. Invited presentation at ELVIS Workshop Meeting. April 2005, Sintra, Portugal.

Human and Group Movement Analysis using a Parameterized Action Representation. DIMACS Workshop, Fall 2004, Rutgers, NJ.

Extending XMSF with a Parameterized Action Representation for Agent Behaviors. XMSF Workshop. 2003, Fairfax , VA.

Describing human and group movements for interactive use by reactive virtual characters. The Army Science Conference, 2002, Orlando, FL.

Toward Representing Agent Behaviors Modified by Personality and Emotion. Workshop on Embodied Conversational Agents - Let's specify and evaluate them! at Autonomous Agents and Multi-Agent Systems, July 16, 2002, Bologna, Italy.

ACUMEN: Amplifying Control and Understanding of Multiple Entities. Autonomous Agents and Multi-Agent Systems, July 2002, Bologna, Italy.

Consistent Communication with Control. Workshop on Multimodal Communication and Context in Embodied Agents at The 5th International Conference on Autonomous Agents. May 29, 2001, Montreal, Canada.

Consistent Communication with Control. SEAS Graduate Research Symposium, 2001, University of Pennsylvania, Philadelphia, PA.

Real-Time 3D Human Character Animation. Presentation to Tau Beta Pi, 2001, Philadelphia, PA.

ACUMEN: Amplifying Control and Understanding of Multiple Entities. DARPA Workshop on Augmented Cognition, 2001, Austin, TX.

Authoring Embodied Agents' Behaviors through Natural Language and Planning. Workshop on Key Problems for Creating Real-time Embodied at the 4th International Conference on Autonomous Agents, June 2000, Barcelona, Spain.

Dynamically Altering Agent Behaviors Using Natural Language Instructions. The 4th International Conference on Autonomous Agents, June 2000, Barcelona, Spain.

Parameterized Action Representation and Natural Language Instructions for Dynamic Behavior Modification of Embodied Agents. AAAI Spring Symposium, March 2000, Stanford, CA.

Virtual Human Animation and Control. 3rd Annual Undergraduate Summer Workshop in Cognitive Science and Cognitive Neuroscience at the Institute for Research in Cognitive Science, June 5-21, Philadelphia, PA.

Avatars a la Snow Crash. Computer Animation, June 1998, Philadelphia, PA.

TEACHING EXPERIENCE

Computer Graphics, University of Pennsylvania

Spring 2007

Teaching Assistant for CSE 277, Introduction to Computer Graphics Techniques, an undergraduate course focused on programming the essential geometric and mathematical concepts underlying modern computer graphics. Heavily involved in

the creation of this class including the structure, the syllabus, the homework, and the exams. Responsible for a weekly laboratory lecture, held office hours, graded homework and exams, and participated in approximately half of the course lectures. Teaching evaluation score of 3.27 out of 4.00.

Artificial Intelligence, University of Pennsylvania March 2001
Guest Lecturer for CSE 391, Introduction to Artificial Intelligence, an undergraduate course covering a wide range of topics in artificial intelligence. Lectured on our Parameterized Action Representation and how it relates to computer graphics and AI.

Systems Engineering, University of Pennsylvania March 2000
Guest Lecturer for SYS 508, Design of Intelligent and Animated Software Agents, a graduate course focusing on building software agents. Gave a lecture entitled, Parameterized Action Representation and Natural Language Instructions for Dynamic Behavior Modification of Embodied Agents.

Artificial Intelligence, University of Pennsylvania Summer 1997
Grader for CIS 502 Introduction to Artificial Intelligence, a graduate course that is the foundation of one section of the Ph.D. qualifying exams. Involved in the creation of homework and exams, graded all homework, and met with students to discuss homework.

Computer Programming, University of Pennsylvania Fall 1996-Spring 1997
Teaching Assistant for CSE 110, Introduction to Computer Programming, an undergraduate course that covers the fundamentals of programming. Responsible for two weekly recitation sessions (50 students total in each semester), held office hours, prepared and administered quizzes, graded exams, gave two lectures.

WORK EXPERIENCE

Associate Director, University of Pennsylvania 2004-present
Responsibilities include:

Management of HMS research projects including proposals, reports, software design and deliverables, and management of team staff on projects.

Work with HMS Director, Dr. Norman Badler, as well as independently to supervise both individual and group projects consisting of both graduate and undergraduate students. Projects include funded research as well as independent studies, senior projects, and summer internships.

Participate in outreach activities through demonstrations of our immersive VR studio, LiveActor and HMS tours to high school groups, alumni, visiting researchers and teachers, and industry liaisons, as well as, through publications and publicity for HMS, the Digital Media Design and Computer Graphics and Game Technology programs, and the UPenn student SIGGRAPH chapter.

Negotiate with hardware and software vendors and oversee or perform required installations.

Represent HMS at sponsor meetings and research conferences.

Specific activities include:

Project manager/Programmer, Army MURI (Multidisciplinary University Research Initiative), 2007-2008.

Project manager, AF AVIS-MS (Advanced Visual and Instruction Systems for Maintenance Support). 2005-2007.

Motion capture specialist, NSF ASL Natural Language Generation and Machine Translation. 2005-2006.

Systems Programmer, University of Pennsylvania 2001-2004

Responsibilities include:

Managed research projects, programming of AI and animation systems, writing grant proposals, aiding and supervising students, and collaborating with research partners.

Specific activities include:

Project manager, NASA RIVET (Rapid Interactive Visualization for Extensible Training). 2004-2006.

Project manager, ONR VIRTE (Virtual Technologies and Environments). 2004-2005.

Project manager/programmer, LMCO Animation test-bed. 2002-2005.

Project manager, ACUMEN: Amplifying Control and Understanding of Multiple Entities. 2001-2002.

Program/system designer, Pedestrians: Creating Agent Behaviors through Statistical Analysis of Observation Data. 2000.

Project manager/programmer, NASA Crew Task Simulation for Maintenance, Training, and Safety. 2000-2003.

Graduate Research Assistant, University of Pennsylvania 1995-2001

Responsibilities include:

Participated heavily in the design, development, implementation, and documentation of an interactive, real-time simulation system, including resolving technical problems, publishing results, demonstrating the system, and instructing new developers and users.

Specific activities include:

Programmer/content designer, ONR Virtual Environments for Training. 1996-2001.

Programmer/content designer, NSF EMOTE Synthesis and Analysis of Communicative Gesture. 1999-2001.

Programmer/system designer/project manager, NSF The Actionary: A Dictionary that Portrays Natural Language Expressions as Context-Sensitive Simulations of Human Actions. 1999-2001.

Computer Consultant, All-Byte Consulting 1992-1995

Responsibilities include:

Sole proprietor of a small computer consulting business.

Specific activities include:

Equinox, Ltd., Williamsport, PA 1993-1995

Responsible for hardware repairs, installation of touch screen units, setup of a network and creation of custom business software. Assisted in programming a mathematically intensive CAD/CAM program.

General Tank, Inc., Berwick, PA 1993-1995

Responsible for minor hardware repairs and creation of custom business software including inventory, job costing, mailing, and payroll programs.

Henry Tool and Machine, Inc., New Albany, PA 1994-1995

Responsible for updating existing business applications and creation of custom business software including job costing and recording of bidding information.

Morante and Sons Inc., Milton, PA 1992-1993

Responsible for all hardware repairs, a network installation, and creation of custom business software including payroll and job costing programs.

SERVICE ACTIVITIES

Technical Reviewer

Ongoing

Computer Graphics International, 2001, 2005; SIGGRAPH, 2001; Graphical Models Journal, 2001; Autonomous Agents, 2001; Computer Animation, 2001; Web3D, 2002; Autonomous Agents and Multi-agent Systems, 2002-2004; Computer-Human Interaction, 2003; SIGGRAPH, 2003; Intelligent Virtual Agents, 2003; Computer Graphics International, 2004; Eurographics, 2004-2005; Technologies for Interactive Digital Storytelling and Entertainment, 2004; IEEE Transactions on Visualization and Computer Graphics, 2004; International Conference on Computer Animation and Social Agents 2005; AAAI Workshop on Modular Construction of Human-like Intelligence, 2005, Journal of Computer-Aided Design, 2006; Pacific Graphics, 2007; International Conference on Entertainment Computing, 2007, Computer Animation and Virtual World, 2007; Journal of Autonomous Agents and Multiagent Systems, 2008.

Program Committee Member

Ongoing

Virtual Storytelling 2003; CHI Workshop on Subtle Expressivity for Characters and Robots 2003; AAMAS Workshop on Embodied Conversational Characters as Individuals 2003; International Working Conference on Intelligent Virtual Agents 2005-2008; Computer Animation and Social Agents 2007; Autonomous Agents and Multi-Agent Systems, 2007-2008.

Graduate Student Engineering Group Representative

1997-1999

Represented the Department of Computer and Information Science in GSEG. Provided input to the graduate school's academic policies, recommendations regarding future SEAS courses, and addressed other issues relevant to the School of Engineering and Applied Science graduate students at the University of Pennsylvania. Sponsored social events and workshops.

INTERESTS AND ACTIVITIES

Photography, Traveling