Alexander Shoulson, Ph.D.

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EDUCATION

University of Pennsylvania – Philadelphia, PA, USA — Mar 2015
Doctor of Philosophy, Computer and Information Science, Human Modeling and Simulation
Advisor: Norman I. Badler

Hamilton College – Clinton, NY, USA — May 2010
Bachelor of Arts, Graduated *Summa Cum Laude*
Concentrations: Computer Science (Honors), Mathematics (Honors)

WORK EXPERIENCE

AI Programmer — Mar 2015 – Present
Ubisoft Toronto, Toronto, ON, Canada

- AI and gameplay programming for Watch_Dogs 2 living city and character behavior content
- Developed behavior for virtual humans, animals, and the watcher/greeter robot character archetypes

Computer Graphics Research Intern — Jul – Sep 2014
Disney Research Zürich, Zürich, Switzerland

- Produced and published research on interactive narrative, computer graphics, and character animation
- Managed core development of CANVAS, a "smart" pre-visualization tool for movie storyboarding

Animation Engineer Intern — Jan – May 2013
EA Tiburon, Orlando, FL, USA

- Core Football Gameplay development for the Madden NFL and NCAA Football franchises
- Developed AI and LOD architecture for virtual characters in crowd and sidelines in Madden NFL 25

Math Tech — May – Aug 2009, May – Jun 2010
Air Force Research Laboratory Rome Research Site, Rome, NY, USA

- Security audits on the Java Virtual Machine for exploits and SSL authorization techniques
- Developed a suite of web services for domain management and military network security

PROJECTS

Volatile Physics
A 2D physics library designed for networked games. Supports historical past-frame casts and queries for collision resolution in lag-compensated environments. https://github.com/ashoulson/VolatilePhysics

Railgun Networking
A state-syncing UDP library for networked games. Supports client-side prediction, scoping, and packet compression for over 320 synchronized entities at <32KBps. https://github.com/ashoulson/RailgunNet

Agent Development and Prototyping Testbed (ADAPT)
A platform for rapid development of virtual worlds containing crowds of actors. Supports locomotion, navigation, steering, IK reaching, multi-actor behavior trees, and more. https://github.com/ashoulson/ADAPT

SKILLS

Game Development. Experienced with Unity and Unreal Engine. Developed libraries for game animation, physics, and networking. Experienced with the state of the art of virtual human simulation and game AI.

Writing and Communication. Over a dozen peer-reviewed publications and technical reports. Accompanying talks given at conferences for most of these publications internationally. Experience writing proposals for major research grants. Teaching and management experience for programming teams of 2-5 students.

RESEARCH KEYWORDS

Interactive Narrative, Virtual Worlds, Autonomous Virtual Humans, Machine Learning, Crowd Simulation

DISSERTATION

A. Shoulson. *Real-Time Storytelling with Events in Virtual Worlds.* University of Pennsylvania. 2015.

BOOKS AND BOOK CHAPTERS

M. Kapadia, **A. Shoulson**, F. Durupinar, N. Badler. *Authoring Diversity in Personality and Behavior for Multi-Actor Simulations.* In Modeling, Simulation and Visual Analysis of Large Crowds. Springer-Verlag, 2012.

REFEREED JOURNALS

K. Ninomiya, M. Kapadia, **A. Shoulson**, F. Garcia, N. Badler. *Planning Approaches to Constraint-Aware Navigation in Dynamic Environments.* Computer Animation and Virtual Worlds, 2015.

A. Shoulson, N. Marshak, M. Kapadia, N. Badler. *ADAPT: The Agent Development and Prototyping Testbed.* IEEE Transactions on Visualization and Computer Graphics (TVCG), 2014.

L. Sun, **A. Shoulson**, P. Huang, N. Nelson, W. Qin, A. Nenkova, N. Badler. *Animating Synthetic Dyadic Conversations with Variations Based on Context and Agent Attributes.* Computer Animation and Virtual Worlds, 2012.

REFEREED CONFERENCES

A. Shoulson, M. Gilbert, M. Kapadia, N. Badler. *An Event-Centric Planning Approach for Dynamic Real-Time Narrative.* Sixth International Conference on Motion in Games (MIG), 2013.

K. Ninomiya, M. Kapadia, **A. Shoulson**, F. Garcia, N. Badler. *Constraint-Aware Navigation in Dynamic Environments.* Sixth International Conference on Motion in Games (MIG), 2013.

A. Shoulson, N. Marshak, M. Kapadia, N. Badler. *ADAPT: The Agent Development and Prototyping Testbed.* Interactive 3D Graphics and Games (I3D), 2013.

M. Kapadia, **A. Shoulson**, C. Boatright, P. Huang, F. Durupinar, N. Badler. *Whats Next? The New Era of Autonomous Virtual Humans.* Fifth International Conference on Motion in Games (MIG), 2012.

A. Shoulson, F. Garcia, M. Jones, R. Mead, N. Badler. *Parameterizing Behavior Trees.* Fourth International Conference on Motion in Games (MIG), 2011.

A. Shoulson, N. Badler. *Event-Centric Control for Background Agents.* Fourth International Conference on Interactive Digital Storytelling (ICIDS), 2011.

D. Markowitz, J. Kider, **A. Shoulson**, N. Badler. *Intelligent Camera Control Using Behavior Trees.* Fourth International Conference on Motion in Games (MIG), 2011.

TECHNICAL REPORTS AND WORKSHOPS

A. Shoulson, M. Kapadia, N. Badler. *PAStE: A Platform for Adaptive Storytelling with Events.* Sixth Intelligent Narrative Technologies Workshop (INT6), 2013.

A. Shoulson, N. Badler. *Selecting Agents for Narrative Roles.* Fourth Intelligent Narrative Technologies Workshop (INT4), 2011.

A. Shoulson, K. Pearson. *Procedure-Level Authorization for Java Remote Method Invocation Using Secure Socket Layer (SSL) Credentials.* DTIC Technical Report, Air Force Research Lab, Rome, NY, 2010.