Connor R. Schenck ***Curriculum vitae***
Phone: (515) 257-6335 *Email*: connor.schenck@gmail.com *URL*: connorschenck.com

Research Interests

Artificial Intelligence with an emphasis on learning and adaptation including: Machine Learning, Robotics, Developmental Robotics, Computational Perception, Robotic Manipulation, Autonomous Systems, Humanoid Robotics, and Artificial Intelligence for Video Games.

Education

University of Washington Seattle, WA

Doctor of Philosophy Summer 2018

- Major: Computer Science & Engineering
- Thesis Field: Robotics
- Advisor: Dr. Dieter Fox

Iowa State University of Science and Technology Ames, IA

Master of Science Summer 2013

- Major: Computer Science
- Co-Major: Human-Computer Interaction
- Thesis Field: Developmental Robotics
- Advisor: Dr. Alexander Stoytchev

Bachelor of Science Fall 2011

- Major: Computer Science
- Emphasis: Artificial Intelligence and Machine Learning
- GPA: 3.92/4.0 *Summa Cum Laude*

Work Experience

Thirdwave Automation Union City, CA

Engineering Manager/Director January 2022 - current

- Managed a team of 4 focused on developing algorithms to allow the forklift to manipulate pallets.
- Coordinated the larger team of 7 with other directors to produce a product for a commercial pilot.

Applied Research Scientist April 2021 - December 2021

- Researched novel ways to apply learning from demonstration to forklift automation.
- Conducted data-driven experiments to investigate viability of various approaches to incorporating demonstrations.

Tech Lead/Senior Software Engineer October 2018 - March 2021

- Developed the planning and control stack for the autonomous forklifts from the ground up.
- Applied modern robotics algorithms to solve challenging tasks in the forklift domain.

Nvidia Corporation Seattle, WA

Research Intern Winter 2018

Robotics Research Lab

- Conducted research in robotics on combining deep learning with fluid simulation.
- Developed new particle convolution layer for performing convolutions on unordered particle sets.
- Constructed a fluid simulator using only deep neural networks.

Google, Inc. Mountain View, CA

Software Engineering Intern Winter/Spring 2017
Google Brain

- Conducted research in robotics focusing on applying deep learning to robotic tasks.
- Published the results of the research in a peer-reviewed academic conference.

Software Engineering Intern Summer 2015
Google X

- Created a tool to help analyze the performance of various modules of the self-driving car's codebase.
- Applied machine learning to detect yielding of other cars to the self-driving car.

Iowa State University Ames, IA

Software Developer Summer 2011 to Spring 2012
Department of Statistics

- Implemented mutli-byte character support in a text coding application
- Debugged the large code-base collaboratively made with many other developers and released the application

Research Assistant Summer/Fall 2010
Virtual Reality Applications Center

- Developed a tool tracking application for factory workers
- Worked with factory workers to incorporate feedback

Research Experience for Undergraduates Summer 2009
Department of Human-Computer Interaction

- Chose a research topic and created a research question
- Conducted research in Developmental Robotics
- Coordinated tasks between group members
- Wrote and presented a report on the research

Technical Skills

Programming Languages, Libraries and Software Applications

- *Recent*: C++, Python, Cuda, Bazel, Git, Linux, OpenCV, PyTorch
- *Past*: C, Java, Matlab, Unix shell scripting, LaTeX, Windows, GNU make, Matlab Image Processing Toolkit, Java Swing, Microsoft Foundation Classes, Robot Operating System, Weka, Scikit-Learn, Caffe, Tensorflow

Technical Training & Proficiency

- Human-Computer Interaction, Artificial Intelligence, Machine Learning, Computer Vision, Computational Perception, Algorithms, Probability & Statistics, Computational Randomness, Probabilistic Robotics, Robotic Manipulation and Planning

Honors & Awards

- National Science Foundation Graduate Research Fellow
- Goldwater Scholar
- President's Leadership Scholarship
- President's Award for Competitive Excellence
- H Stuart Kuyper Engineering Endowment Fund
- Dean's List
- Highest 2% ISU Engineering Freshmen

Publications & Presentations

PhD Thesis

- **Schenck, C.**, "Liquids & Robots: An Investigation of Techniques for Robotic Interaction with Liquids," PhD Thesis, Paul G. Allen School of Computer Science & Engineering, University of Washington, Seattle, WA, August 2018.

Master's Thesis

- **Schenck, C.**, "Intelligence Tests for Robots: Solving Perceptual Reasoning Tasks with a Humanoid Robot," M.S. Thesis, Department of Computer Science & Human-Computer Interaction Program, Iowa State University, Ames, IA, July 2013.

Refereed Journal Articles

- **Schenck, C.**, and Fox, D, "Perceiving and Reasoning About Liquids Using Fully-Convolutional Networks," *International Journal of Robotics Research (IJRR)*, Vol. 37, No. 4–5, pp. 452–471, April, 2018.
- **Schenck, C.**, Sinapov, J., Johnston, J., and Stoytchev A., "Which Object Fits Best? Solving Matrix Completion Tasks with a Humanoid Robot," *IEEE Transactions on Autonomous Mental Development*, Vol. 6, No. 3, pp. 226–240, 2014.
- Sinapov, J., **Schenck, C.**, Staley, K., Sukhoy, V., and Stoytchev A., "Grounding Semantic Categories in Behavioral Interactions: Experiments with 100 Objects," *Journal of Robotics and Autonomous Systems*, Vol. 62, No. 5, pp. 632–645, 2014.
- **Schenck, C.**, Sinapov, J., and Stoytchev, A., "Which Object Comes Next? Grounded Order Completion by a Humanoid Robot," *Journal of Cybernetics and Information Technologies*, Vol. 12, No. 3, pp. 5–16, 2012.
- Sinapov, J., Bergquist, T., **Schenck, C.**, Ohiri, U., Griffith, S., and Stoytchev, A., "Interactive Object Recognition Using Proprioceptive and Auditory Feedback," *International Journal of Robotics Research*, Vol. 30, No. 10, pp. 1250–1262, 2011.

Conference Articles (peer reviewed)

- **Schenck, C.**, and Fox, D., "SPNets: Differentiable Fluid Dynamics for Deep Neural Networks," In *Proceedings of the Second Conference on Robot Learning (CoRL)*, Zurich, Switzerland, October 29–31, 2018.
- **Schenck, C.**, Tompson, J., Fox, D., and Levine, S., "Learning Robotic Manipulation of Granular Media," In *Proceedings of the First Conference on Robot Learning (CoRL)*, Mountain View, CA, USA, November 13–15, 2017.
- **Schenck, C.**, and Fox, D, "Reasoning About Liquids via Closed-Loop Simulation," In *Robotics: Science & Systems (RSS)*, Cambridge, MA, USA, July 12–16, 2017.
- **Schenck, C.**, and Fox, D, "Visual Closed-Loop Control for Pouring Liquids," In *Proceedings of the International Conference on Experimental Robotics (ICRA)*, Singapore, May 29 – June 3, 2017.
- **Schenck, C.**, and Fox, D, "Towards Learning to Perceive and Reason About Liquids," In *Proceedings of the International Symposium on Experimental Robotics (ISER)*, Tokyo, Japan, October 3–6, 2016.
- Sinapov, J., **Schenck, C.**, and Stoytchev, A, "Learning Relational Object Categories Using Behavioral Exploration and Multimodal Perception," In *Proceedings of the 2014 IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, May 31 – June 7, 2014.

Workshop Presentations & Articles (peer reviewed)

- **Schenck, C.**, and Fox, D., "SPNets: Modeling Position Based Fluids using Smooth Particle Networks," In *Proceedings of Robotics Science & Systems (RSS) 2018 Workshop Learning and Inference in Robotics: Integrating Structure, Priors and Models*, Pittsburgh, PA, USA, June 29, 2018.
- **Schenck, C.**, and Fox, D., "Detection and Tracking of Liquids with Fully Convolutional Networks," In *Proceedings of Robotics Science & Systems (RSS) 2016 Workshop Are the Skeptics Right? Limits and Potentials of Deep Learning in Robotics*, Ann Arbor, Michigan, USA, June 18, 2016.
- **Schenck, C.**, and Sinapov, A., "The Object Pairing and Matching Task: Toward Montessori Tests for Robots," In *Proceedings of the Humanoids 2012 Workshop on Developmental Robotics*, Okaka, Japan, November 29, 2012.
- **Schenck, C.**, Sinapov, J., and Stoytchev, A., "Which Object Comes Next? Grounded Order Completion by a Humanoid Robot," *AIMSA Workshop: Advances in Robot Learning and Human-Robot Interaction*, Varna, Bulgaria, September 12, 2012.
- Bergquist, T., **Schenck, C.**, Ohiri, U., Sinapov, J., Griffith, S., and Stoytchev, A., "Interactive Object Recognition Using Proprioceptive Feedback," In *Proceedings of the IROS 2009 Workshop: Semantic Perception for Mobile Manipulation*, St. Louis, MO, October 15, 2009.

Symposium Presentations & Invited Talks

- **Schenck, C.**, "Towards Perceiving and Manipulating Liquids with Real Robots," *Invited Talk*, University of California at Berkeley, Berkeley, California, April 21, 2017.
- **Schenck, C.**, "Object Recognition Using Proprioceptive and Auditory Feedback," *Iowa State University Undergraduate Research Symposium*, April 19, 2011.
- Bergquist, T., **Schenck, C.**, and Ohiri, U., "Interactive Object Recognition Using Proprioceptive and Auditory Feedback," *Iowa State University REU Research Symposium*, Ames, IA, July 31, 2009.

Teaching Experience

Teaching Assistant
University of Washington — Seattle, WA

CSE 455: Computer Vision — Spring 2018

- Aided students from a wide variety of backgrounds in learning concepts in computer vision.
- Provided feedback to students via in class activities, assignments, and tests.

CSE 415: Introduction to AI for Non-Majors — Fall 2017

- Aided students from a wide variety of backgrounds in learning concepts in AI.
- Provided feedback to students via in class activities, assignments, and tests.

Iowa State University — Ames, IA

ComS/HCI 575x: Computational Perception — Spring 2010

- Assisted students in understanding problems in Computer Vision through weekly office hours and appointments

CprE 185: Introduction to Programming in C Fall 2009

- Designed lessons and projects for students in order to enhance understanding of concepts
- Aided students in understanding the basics of C programming

ComS 227: Introduction to Object-Oriented Programming Spring 2009

- Aided students in understanding concepts of object-oriented programming
- Proctored and graded exams, quizes, and homeworks

Leadership

Iowa State University Game Design Competition Fall 2010/Spring 2011

- Lead a team of 11 developers, artists, and business majors to design and implement a video game
- Won first place ($10,000) in the PC and Console category

Presiden's Leadership Class Fall 2008

- Group of 30 freshmen selected to meet with President Geoffroy of Iowa State University Once per week
- Developed leadership skills