

Curriculum Vitae

Patrick E. Carlson

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Education

Iowa State University**Ames, Iowa**

PhD, Cumulative GPA: 3.68/4.0

2008 - 2015

Major: Human-Computer Interaction (HCI)

Simpson College**Indianola, Iowa**

Bachelor of Arts, cum laude, Cumulative GPA: 3.715/4.0

2003 - 2008

Majors: Computer Science and Psychology

Experience

Sandia National Labs**Albuquerque, New Mexico**

Data Scientist

2017 - present

Data analysis, R and Python programming, data virtualization, Tableau and Shiny visualizations, analytics team co-lead, SQL and Mongo querying, architecture and data engineering research, project planning, writeups, design mockups, and UX reviews.

Renaissance Learning**Wisconsin Rapids, Wisconsin**

User Experience Analyst

2016 - 2017

Perform remote usability testing on software prototypes, help with UI design, and develop and analyze survey data.

Iowa State University**Ames, Iowa**

Improving Open Source Software Development (Dissertation Topic)

2010 - 2015

Apply data mining in the development of algorithms and tools to improve developer understanding of technical and social structure in large Open Source communities. Under direction of Dr. Judy Vance.

Bimanual Haptics for Virtual Assembly Tasks (Research Assistant)

2009 - 2015

Designed and analyzed studies examining various bimanual haptic device configurations and learning transfer for virtual assembly tasks. Under direction of Dr. Judy Vance.

Mentor/Support Research Experience for Undergraduate (REU) Students

Summer 2010

Helped coordinate three undergraduate REU students whose project entailed creating a physical mockup of a shopping cart which was then used in a virtual reality user study. Under direction of Dr. Judy Vance.

University of New Mexico**Albuquerque, New Mexico**

Research Experience for Undergraduates (REU)

Spring 2006 - Fall 2007

Learned the basics of machine learning and worked on applying this to improving the routing of packets in a dynamic network. Under direction of Dr. Terran Lane.

Simpson College

Indianola, Iowa

Usability and Appeal of the Linux Desktop (Psychology Capstone) Spring 2007 - Fall 2008
 Constructed and performed an experiment empirically contrasting usability and appeal of a 2D versus 3D Linux desktop.

Origins of Human Cooperation and Altruism Fall 2005 - Fall 2006
 Simulated the evolution of cooperation/altruism using game theory techniques and genetic algorithms.
 Presented work at Argonne National Laboratory.

Student Technician Nov 2005 - May 2006
 Helped students and faculty connect to the Internet and troubleshoot network issues.

Mounds Park Academy**St. Paul, Minnesota**

Computer Technician Summers 2002 - 2005, and 2008
 Conducted laptop repair and software setup for 60 freshman students. Imaged and configured multiple computer labs.

Teaching and Other

Engineering/LAS Online Learning (Graduate Assistant) Fall 2014
 Recorded class videos, advised undergraduate producers, and scripted automated startups for recordings

ME/WLC 484/584: Technology, Globalization, and Culture (Teaching Assistant) Fall 2013
 Graded homework, facilitated online class discussions

HCI/Psych 522: Scientific Methods in HCI (Teaching Assistant) Spring 2013
 Graded homework and managed content for online website

CS 309: Software Development Practices (Teaching Assistant) Spring 2009
 Graded homework, helped students with documenting project development

CS 207: Programming I (Teaching Assistant) Fall 2008
 Assisted and tutored students with homework and basic programming concepts

Groups and Activities

Sandia Data Sciences - Community of Practice Organizer 2018 - Present
 Iowa State University Badminton Club 2009 - 2015
 ISU Badminton Club Webmaster 2009 - 2012
 Computational Design Synthesis: Summer Camp (Munich, Germany) August 1-5, 2011
 ISU Human-Computer Interaction Student Group Vice President 2010 - 2011
 Simpson College Math Club 2006 - 2008
 Simpson College Computer Club 2003 - 2008

Honors

Iowa State University Research Excellence Award Spring 2015
 Outstanding Senior in Computer Science (Simpson College) May 2008
 Honorable Mention in the Mathematical Contest in Modeling (MCM) 2006, 2007, 2008
 Psi Chi National Honor Society in Psychology March 2007
 Simpson College Dean's List Spring 2005, Fall 2006, Fall 2007
 Simpson College Academic Honor Scholarship Fall 2003 - Spring 2008
 Certificate of Achievement from MPA Technology Department December 2000

Poster Presentations

Carlson, Patrick & Vance, Judy M. (2013, April). [Who Should I Contact?: Helping New Developers Find Experts](#). Poster presented at the Emerging Technologies Conference, Ames, IA. **Awarded most interesting research project.**

Vance, Judy M. & Gilbert, Stephen & Oren, Michael & Pavlik, Ryan & Carlson, Patrick (2012, July). [GOALI: A Hybrid Method to Support Natural Interaction of Parts in a Virtual Environment](#). Poster presented at the NSF Engineering Research and Innovation Conference, Atlanta, Georgia.

Peters, Anicia & Carlson, Patrick & Gilbert, Stephen & Vance, Judy M. (2012, April). [A Hybrid Method to Support Natural Interaction of Parts in a Virtual Environment](#). Poster presented at the Emerging Technologies Conference, Ames, IA. **Awarded most interesting research project.**

Carlson, Patrick & Vance, Judy M. & Nguyen, Tien & Blankenship, Kevin (2011, April). [Social Technical Congruence: The Link Between Social Science and Technology](#). Poster presented at the Emerging Technologies Conference, Ames, IA.

Carlson, Patrick & Vance, Judy M. (2010, May). [An Evaluation of Asymmetric Interfaces for Bimanual Virtual Assembly With Haptics](#). Poster presented at the ASME World Conference on Innovative Virtual Reality, Ames, IA.

Carlson, Patrick (2008, May). Usability and Appeal of a 2D versus 3D Linux Operating System. Poster presented at the Midwestern Psychological Association, Chicago, IL.

Publications

Carlson, Patrick & Vance, Judy M. & Berg, Meisha (2016). An evaluation of asymmetric interfaces for bimanual virtual assembly with haptics. In [Virtual Reality](#), pages 1-9. **(Peer-Reviewed Journal Article)**

Carlson, Patrick (2015). Engaging developers in open source software projects: harnessing social and technical data mining to improve software development. In [Graduate Theses and Dissertations](#), pages 1-192, Ames, IA. **(PhD Dissertation)**

Carlson, Patrick & Peters, Anicia & Gilbert, Stephen & Vance, Judy M. & Luse, Andy (2015). Virtual Training: Learning Transfer of Assembly Tasks. In [IEEE Transactions on Visualization and Computer Graphics](#), pages 770-782. **(Peer-Reviewed Journal Article)**

Oren, Mike & Carlson, Patrick & Gilbert, Stephen & Vance, Judy M. (2012). Puzzle Assembly Training: Real World vs. Virtual Environment. In [Proceedings of the IEEE 2012 virtual reality conference](#), pages 1-4, Orange County, California. **(Conference Paper)**

Carlson, Patrick & Xiao, Nan (2012). Experience and Recommendations for Distributed Software Development. In [Proceedings of the international conference on software engineering \(ICSE\) workshop on collaborative teaching of globally distributed software development](#), pages 1-4, Zurich, Switzerland. **(Workshop Paper)**

Vance, Judy M. & Gilbert, Stephen B. & Oren, Michael & Pavlik, Ryan & Carlson, Patrick (2011). GOALI: A Hybrid Method to Support Natural Interaction of Parts in a Virtual Environment. In NSF engineering research and innovation conference proceedings, pages 1-4, Atlanta, Georgia. **(Workshop Paper)**

Carlson, Patrick & Kirpes, Carl & Pavlik, Ryan A. & Vance, Judy M. & Yin, Livien & Scott-Cooper, Terrence & Lambert, Troy (2011). Comparison of Single-Wall Versus Multi-Wall Immersive Environments to Support a Virtual Shopping Experience. In [Proceedings of the ASME 2011 world conference on innovative virtual reality \(WINVR2011\)](#), pages 1-5, Milan, Italy. **(Conference Paper)**

Invited Presentations

Sandia Insights - A Data Sciences Architecture and Framework - National Laboratories Information Technology Conference - March 28-31, 2019

Viz Wars: Tableau vs. Shiny - National Laboratories Information Technology Conference - March 28-31, 2019

IEEE VR 2015 (presented by Dr. Judy Vance), invited by Dr. Ed Swan, talk title: Virtual Training: Learning Transfer of Assembly Tasks - March 23-27, 2015

IE 681 Cognitive Engineering, invited by Dr. Stephen Gilbert, talk on Open Source communities - December 4, 2014

HCI 591 Seminar, talk on Open Source socialization - November 16, 2012

Outreach

Road Less Traveled	Spring 2010, 2011, 2012, 2013
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Demo of virtual reality system for over 50 middle school and high school girls from across Iowa.

ISU Badminton Club online tournament support	2010, 2011, 2012, 2014, 2015
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Created online tournament registration and administration system.

Professional Organizations

Special Interest Group on Human-Computer Interaction (Past Student Member)

Association for Computing Machinery (Past Student Member)

Conference Attendance

National Laboratories Information Technology	May 28-31, 2019
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Boise, Idaho - USA

RStudio Conference	Jan 15-18, 2019
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Austin, Texas - USA	
Tableau Conference	Oct 9-12, 2017
Las Vegas, Nevada - USA	
International Conference on Software Engineering (ICSE)	June 2-9, 2012
Zurich - Switzerland	
IEEE Virtual Reality Conference	March 4-8, 2012
Costa Mesa, California - USA	
The Association for the Advancement of Artificial Intelligence	July 22-26, 2007
Vancouver, British Columbia - Canada	
The Association for the Advancement of Artificial Intelligence	July 16-20, 2006
Boston, Massachusetts - USA	

Training

Intermediate Shiny (RStudio Conference 2019)	Jan 15-16, 2019
This covered the basics of Shiny, reactivity, modules, and best-practices.	
Intro to Deep Learning	August 2018 - 8 hours
This was an internal course offered at Sandia that covered deep learning methods.	
Docker Fundamentals and Docker for Enterprise Developers	Feb 19-22, 2018
This course covered Docker fundamentals, Docker swarm, Docker compose files, YAML format, and more.	
R and Shiny Training	April 9-12, 2018
Taught by Matt Pickard this covered the basics of R, dplyr, Shiny, and reactivity.	

Technical Skills

Programming Languages: [Python](#), [Lua](#), [Java](#), [R](#), [C++](#), [C#](#), [HTML](#), [Javascript](#), [SQL](#), [PHP](#), [LaTeX](#), [Cypher \(Neo4j\)](#)

Tools: [Git](#), [Subversion](#), [Windows](#), [Linux](#), [CMake](#), [Eclipse](#), [Jupyter](#), [Docker](#), [Travis-CI](#)

Programs: [Inkscape](#), [Lyx](#), [Gimp](#), [JustInMind](#), [Balsamiq](#), [UserZoom](#), [Mendeley](#), [Pencil](#), [Tableau](#), [RStudio](#), [Axure](#)

Libraries: [Pandas](#), [SciPy](#), [scikit-learn](#), [jQuery](#), [D3.js](#), [Django](#), [Bootstrap](#), [NodeJS](#), [Shiny](#), [Jekyll](#)