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 Research Experience for Undergraduates (REU) **Albuquerque, New Mexico**

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. Spring 2006 - Fall 2007

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**.

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**.

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.

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 & 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)**

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 & 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)**

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)**

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 Summit - May 30, 2019

Viz Wars: Tableau vs. Shiny - National Laboratories Information Technology Summit - May 29, 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
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
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 Summit — May 28-31, 2019
Boise, Idaho - USA

RStudio Conference — Jan 15-18, 2019
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

Coursera: Machine Learning August 14, 2020
Online course on Machine Learning taught by Stanford professor Andrew Ng.

Apache Spark Programming (DB 105) Sept 24-26, 2019
This course covered the fundamentals of Apache Spark including Spark's architecture and internals, the core APIs for using Spark, SQL and other high-level data access tools, as well as Spark's streaming capabilities and machine learning APIs.

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 National Lab that covered deep learning methods.

Docker Fundamentals and Docker for Enterprise Developers
This course covered Docker fundamentals, Docker swarm, Docker compose files, YAML format, and more. Feb 19-22, 2018

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, Github Actions, Gitlab Runners

Programs: Inkscape, Lyx, Gimp, JustInMind, Balsamiq, UserZoom, Mendeley, Pencil, Tableau, RStudio, Axure, Morae, Tibco Data Virtualization, Collibra, yEd

Libraries: Pandas, SciPy, scikit-learn, jQuery, D3.js, Django, Bootstrap, NodeJS, Shiny, Jekyll, Spark, Tidyverse