25 University Avenue
West Chester University
West Chester, PA 19383
USA

Richard Burns

curriculum vitae

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Education

Dec 2012 **Ph.D.**, *Computer Science*, University of Delaware, Newark, DE

May 2008 **M.S.**, *Computer Science*, University of Delaware, Newark, DE

May 2006 **B.S.**, *Computer Science*, Saint Joseph's University, Philadelphia, PA
Cum Laude, Departmental Honors
Minor: *Mathematics*

Interests

Teaching:

CS1, CS2, Data Structures, CS0 Primer Courses, Artificial Intelligence, Data Mining, Machine Learning, Compilers, Algorithms

Research:

Artificial Intelligence, Natural Language Processing, Data Mining, Machine Learning, Cognitive Science

Professional Experience

Aug 2017 – present **Associate Professor**, *Department of Computer Science*, West Chester University

Aug 2017 – present **Assistant Chairperson**, *Department of Computer Science*, West Chester University

Sept 2012 – Aug 2017 **Assistant Professor**, *Department of Computer Science*, West Chester University

May 2010 – June 2010 **Instructor**, *Department of Computer Science*, Saint Joseph's University

Sept 2006 – Aug 2012 **Teaching Assistant and Research Assistant**, *Department of Computer and Information Sciences*, University of Delaware

Sept 2004 – May 2006 **Teaching Assistant**, *Department of Mathematics and Computer Science*, Saint Joseph's University

Teaching

Courses Taught, West Chester University

key: F=Fall, S=Spring, Su=Summer

CSC 110 **Fundamentals of Computer Science**, *[F12, S13, Su13, F13, Su14, F15, F16, S17, F17, F18]*, (nonmajors)

CSC 115 **Introduction to Computer Programming**, *[F12, S13, S14, S15, Su15, S16]*, (nonmajors & IT minors)

CSC 141 **Computer Science I**, *[F12, F13, S14, F14, S15, F15, S16, F16, S17, F17, S18]*

CSC 142 **Computer Science II**, *[F18]*

CSC 345 **Programming Languages and Paradigms**, *[S18]*

CSC 416/565 **Design and Construction of Compilers**, *[F13, F15, F17]*, (graduate)

CSC 476 **Game Application Development** (Topics in Complex Large-Scale Systems), *[F14, F16, F18]*

CSC 581 **Natural Language Processing** (Topics), *[S14, S16, S18]*, (graduate)

CSC 600 **Data Mining** (Advanced Seminar), *[S13, S15, S17]*, (graduate)

Independent Study Supervision, West Chester University

Vedamati Upadhyay, "Exploration of Collaborative Filtering Recommendation Systems", Spring 2013. (graduate)

Jennifer Tsan, "Using Robots and Scratch Outside the Classroom to Teach CS to High School Students", Spring 2014.

Sanjeev Pandey, "Document Parsing in Python: Extracting Table Data from PDF Files", Spring 2014. (graduate)

Andrew Hancock, "Performance Analysis of a Hadoop Cluster with Large Datasets and Different Compression Options", Fall 2014.

David Reno, "Building an SNMP Monitored Microcontroller Sensor System", Fall 2014. (graduate)

Andrew Hancock, "Adding an Intermediate Representation, Register Allocation and Native Code Generation to a MiniJava Compiler", Spring 2015.

Michael Nelson, "A MuseScore Plugin that Adds a Petal Staff to SATB Music", Spring 2015.

David Hunsicker, "Development of a Cross-Platform Mobile Application using Xamarin", Fall 2015.

Wiktoria Domanowska, "An Annotated Corpus of Pie Charts and their Intended Messages", Fall 2015.

Matthew McKenna, "Building Encrypted Communication into an End-To-End Messaging App for Android Devices", Spring 2016.

Christopher Zimmer, "Exploration of Game Programming and 2D Game Engines Using Phaser", Spring 2016.

Tyler Traub, "Helping Sight-Impaired Individuals Understand Information Graphics", Spring 2016.

Wil Leman, "Exploring the Installation and Maintenance of MySQL and MongoDB Database Frameworks", Summer 2016.

Bruce Langlois, "Helping Sight-Impaired Individuals Understand Information Graphics", Fall 2016.

Mark Zeits, "Big Data and Data Mining", Fall 2016.

David Andrien, "OpenCV Image Processing in Java", Fall 2016.

David Baumann, "Designing Artificial Intelligence for Pac-Man", Fall 2016.

Joseph Jaspers, "Exploration of RNN and LSTM Neural Networks", Spring 2017.

Sean Johnson, "Development of a First-Person Game Using Unity", Spring 2017.

Austin McDermott, "Animation and Asset Creation for 2D Unity Games", Spring 2017.

Matthew Ruiz, "Development of a Virtual Reality Game in Unity Using the Oculus Rift", Spring 2017.

Bruce Langlois, "A Taxonomy of Intended Messages for Grouped Pie Charts", Spring 2017.

Kashish Khare, "Event Recommendation Using Data Mining", Spring 2017. (graduate)

Steven Massaro, "Administration and Deployment of a Hadoop Cluster", Fall 2017.

Mark Erickson, "Development of an RPG in Unity", Fall 2017.

Jeffrey Kapochus, "Development of an RPG in Unity", Spring 2018.

Michael Salomone, "Ethical Issues in Artificial Intelligence", Spring 2018.

Matthew Bonham, "Sentiment Analysis of Emojis on Twitter", Spring 2018.

Joseph Cardozo, "A Reflection on AI Automation and the Future of Robotics', Spring 2018.

Shereen Majeeth, "Predicting the Sale Price of Homes based on Boston Housing Data", Spring 2018.

Instructor, Saint Joseph's University

CSC 5805 **Artificial Intelligence**, *[Summer 2010]*, (graduate)

Course Development

Fall 2018 **New Course Development**, West Chester University, CSC 577: Natural Language Processing
(graduate)

Spring 2017 **New Course Development**, West Chester University, CSC 576: Data Science
(graduate)

Spring 2017 **New Course Development**, West Chester University, CSC 476: Game Development

Other

Summer 2006 **Alice**, *Stephen Cooper*, Saint Joseph's University
Developed chapter tests for the textbook *Learning With Alice*.
ISBN: 0-13-187289-3

Research

Peer-Reviewed Publications

PACISE '18 Matthew Bonham, **Richard Burns**. *Sentiment Analysis of Emoji on Twitter*. In *Proceedings of the 33rd Annual Conference of The Pennsylvania Association of Computer and Information Science Educators*, pp. 96-100, 2018.
Best Undergraduate Student Paper Award.

Diagrams '16 **Richard Burns**, Eric Balawejder, Wiktoria Domanowska, Stephanie Elzer Schwartz, Sandra Carberry. *Exploring the Types of Messages that Pie Charts Convey in Popular Media*. In *Proceedings of the Ninth International Conference on the Theory and Application of Diagrams*, pp. 265-271, 2016.

PACISE '16 Eric Balawejder, Tyler Traub, **Richard Burns**. *Exploring the Automatic Recognition of Pie Chart Information Messages.* In *Proceedings of the 31st Annual Conference of The Pennsylvania Association of Computer and Information Science Educators*, pp. 52-58, 2016.
Best Graduate Student Paper Award.

FLAIRS '15 **Richard Burns**, Sandra Carberry, Stephanie Elzer Schwartz. *Classifying Salient Textual Entities in the Headlines and Captions of Grouped Bar Charts.* In *Proceedings of the 28th International Florida Artificial Intelligence Research Society Conference*, pp. 217-220, 2015.

FLAIRS '14 **Richard Burns**, Sandra Carberry, Stephanie Elzer Schwartz. *Analyzing the Effect of Communicative Evidence in a Bayesian System for Grouped Bar Chart Message Recognition.* In *Proceedings of the 27th International Florida Artificial Intelligence Research Society Conference*, pp. 14-17, 2014.
(Best Poster Nominee: *3 nominated out of 44.*) *Acceptance Rate: 49%*

CCSCE '13 **Richard Burns**, Wanda Eugene, Tiffany Barnes, Stephen Chandler, Megan Harwell, Osarieme Omokaro. *Reflections from a Computational Service Learning Trip to Haiti.* In *The Journal of Computing Sciences in Colleges*, Volume 29, Number 3, pp. 43-50, January 2014.

UMAP '13 **Richard Burns**, Sandra Carberry, Stephanie Elzer Schwartz. *Modeling a Graph Viewer's Effort in Recognizing Messages Conveyed by Grouped Bar Charts.* In *Proceedings of the 21st Conference of User Modeling, Adaptation and Personalization*, pp. 114-126, 2013. *Acceptance Rate: 32%*

workshop @ UMAP '13 **Richard Burns**, Stephanie Elzer Schwartz, Sandra Carberry. *Towards Adapting Information Graphics to Individual Users to Support Recognizing Intended Messages.* In *First International Workshop on User-Adaptive Visualization*, pp. 1-4, 2013.

ASEE '13 Wanda Eugene, Shaundra Bryant Daily, Tiffany Barnes, **Richard Burns**. *Building Technology Fluency: Fostering Agents of Change.* In *Proceedings of the 120th American Society for Engineering Education Annual Conference and Exposition*, 2013.

CICLing '13 Seniz Demir, Stephanie Elzer, **Richard Burns** and Sandra Carberry. *What is Being Measured in an Information Graphic?* In *Proceedings of the 14th International Conference on Intelligent Text Processing and Computational Linguistics*, pp. 501-512, 2013. *Acceptance Rate: 26%*

book chapter Sandra Carberry, Stephanie Elzer, **Richard Burns**, Peng Wu, Daniel Chester and Seniz Demir. *Information Graphics in Multimodal Documents* in *Multimedia Information Extraction: Advances in Video, Audio, and Imagery Analysis for Search, Data Mining, Surveillance, and Authoring.* Mark T. Maybury ed. Wiley-IEEE Computer Society Press. Chapter 15, pp. 235-252, 2012. (ISBN-13: 978-1-1181-1891-7)

Diagrams '12 **Richard Burns**, Sandra Carberry, Stephanie Elzer and Daniel Chester. *Automatically Recognizing Intended Messages in Grouped Bar Charts.* In *Proceedings of the Seventh International Conference on the Theory and Application of Diagrams*, pp. 8-22, 2012.
Best Student Paper Award. *Acceptance Rate: 30%*

workshop @ ICSE '12 **Richard Burns**, Terry Harvey, Lori Pollock. *An Experience Report on Cross-Semester Student Critique and Action in an Integrated Software Engineering, Service Learning Course.* In *First International Workshop on Software Engineering Education based on Real-World Experiences (EduRex)*, pp. 21-24, 2012.

SIGCSE '12 **Richard Burns**, Lori Pollock and Terry Harvey. *Integrating Hard and Soft Skills: Software Engineers Serving Middle School Teachers.* In *Proceedings of the 43rd ACM Technical Symposium on Computer Science Education*, pp. 209-214, 2012.
Acceptance Rate: 35%

workshop @ AAAI '10 **Richard Burns**, Sandra Carberry and Stephanie Elzer. *Visual and Spatial Factors in a Bayesian Reasoning Framework for the Recognition of Intended Messages in Grouped Bar Charts.* In *Papers from the AAAI Workshop on Visual Representations and Reasoning*, AAAI Technical Report WS-10-07, pp. 6-13, 2010.

CogSci '09 **Richard Burns**, Stephanie Elzer and Sandra Carberry. *Modeling Relative Task Effort for Grouped Bar Charts.* In *Proceedings of the 31th Annual Conference of the Cognitive Science Society*, pp. 2292-2297, 2009.
Acceptance Rate: 32%

AAAI F'08 symposium **Richard Burns**, Sandra Carberry and Stephanie Elzer. *Processing Information Graphics in Multimodal Documents.* In *Papers from the AAAI Fall Symposium: Multimedia Information Extraction*, AAAI Technical Report FS-08-05, pp. 5-9, 2008.

Diagrams '08 **Richard Burns**, Stephanie Elzer and Sandra Carberry. *Estimating Effort for Trend Messages in Grouped Bar Charts.* In *Proceedings of the Fifth International Conference on the Theory and Application of Diagrams*, pp. 353-356, 2008. (Poster Paper.)

workshop @ SC '08 Stephanie Elzer, **Richard Burns** and Sandra Carberry. *The Role of Cognitive Modeling in an Automated System for Understanding Bar Charts.* In *Proceedings of the Workshop on Cognitive Models of Human Spatial Reasoning*, International Conference on Spatial Cognition, pp. 1-6, 2008.

Other Invited Presentations and Panels (not including above conference talks)

"Recognizing the Communicative Intent of Information Graphics", evoHaX, (weekend hack-a-thon with theme of technological accessibility for individuals with disabilities), Philadelphia, Pennsylvania, April 2015.

"A Framework for the Recognition of Intended Messages in Grouped Bar Charts", (guest AI class talk), West Chester University, November 2014.

"A Framework for the Recognition of Intended Messages in Grouped Bar Charts", (guest AI class talk), West Chester University, November 2013.

"A Framework for the Recognition of Intended Messages in Grouped Bar Charts", (guest AI class talk), West Chester University, November 2012.

"Managing Projects and Teams", STARS Celebration, (annual leadership conference for student, faculty, and industry STARS partners; co-presentation with Eric McGinnis, for Lori Pollock), Hampton, Virginia, August 2012.

"A Framework for the Recognition of Intended Messages in Grouped Bar Charts", Seminar: Special Interest Group on Artificial Intelligence, University of Delaware, April 2012.

"Designing and Developing Educational Learning Games in a Service Learning Context", West Chester University, March 2012.

"Combining Multiple Pedagogies to Boost Learning and Enthusiasm", ITiCSE (16th Annual Conference on Innovation and Technology in Computer Science Education), (for Lori Pollock and Terry Harvey) Darmstadt, Germany, June 2011.

"Service-Learning in Computer and Information Science", Panel at Gulf-South Summit on Service-Learning and Civic Engagement Through Higher Education, Roanoke, Virginia, March 2011. Panel Chair: Sukhamay Kundu (Louisianna State University). Panelists: Richard Burns (University of Delaware), Terry Harvey (University of Delaware), Brook Osborne (Duke University).

"ACT-R: As a Device for the Cognitive Scientist", Seminar: Special Interest Group on Natural Language Processing, University of Delaware, October 2010.

"Exploiting Article Text in Grouped Bar Chart Recognition", Seminar: Special Interest Group on Natural Language Processing, University of Delaware, November 2009.

"Visual and Spatial Factors in Graph Cognition", University of Delaware Cognitive Science Graduate Student Conference, March 2009.

"Toward a Computational Modeling of Grouped Bar Chart Tasks", Seminar: Special Interest Group on Natural Language Processing, University of Delaware, November 2007.

Graduate and Undergraduate Research

Fall 2006 – Fall 2012 **Dissertation Research**, University of Delaware

Thesis: *"Automated Intention Recognition of Grouped Bar Charts in Multimodal Documents"*. University of Delaware, ProQuest, UMI Dissertations Publishing, 2013

Advisor: Sandra Carberry

Partial Support: National Science Foundation, Grant No. IIS-0534948

Information graphics in popular media are often intended to communicate a high-level contextual message which is often not repeated in the accompanying text or caption of the graphic. Thus, it is necessary to consider information graphics to completely understand a multimodal document.

My dissertation focused on creating, implementing, and evaluating a framework that automatically recognized intended messages in grouped bar chart information graphics. This research was inter-disciplinary across the fields of artificial intelligence, natural language procession, machine learning, and cognitive science.

Major facets included: developing a corpus of grouped bar charts; identifying intended messages that are communicated by graphic designers; generalizing these intentions into message categories; annotating the graphics in the corpus with their intended messages; performing consensus-based agreement; identifying communicative signals used by graphic designers, linguistic and lexical clues in accompanying text, and perceptual features that affect graphical cognition; building and validating a cognitive model which estimated the perceptual effort required for an individual to perform the recognition of a message given a graphic – motivated by an eye-tracking experiment which I designed, performed, and analyzed; designing and implementing a Bayesian reasoning framework which captured the relationship between intentions and communicative evidence; evaluating the system by training and validating on the annotated corpus.

Fall 2010 – Summer 2012 **Graduate Assistant**, *Broadening Participation in Computing*, University of Delaware

PIs: Lori Pollock and Terry Harvey, (University of Delaware)

Support: National Science Foundation, Grant No. CNS-0940501

Computing Teams 4 Youth is a partnership with a local underprivileged charter school with goals of positively impacting (1) middle school students through computational learning and (2) college computer science students through service learning. The model is implemented through the University of Delaware *Educational Game Development* course (see Teaching Experience).

Duties: oversaw documentation, data gathering, and analysis for research, assisted in planning advisory panels and itinerary, contributed to annual grant reports, participated in planning and execution of annual teacher workshops, archived created software.

Summer 2005 **Summer Scholar**, Saint Joseph's University

Thesis: *"Use of Natural Language Processing to Improve Use Cases"*

Advisor: Jonathan P. E. Hodgson

Designed and implemented system which automatically detected ill-formed specifications in use cases and offered suggested revisions.

Funding

Principal Investigator, *National Science Foundation*, 2018.
Doctoral Symposium at the Tenth International Conference on the Theory and Application of Diagrams
Amount: $12,500.

Principal Investigator, *Faculty Professional Development Council (FPDC) - PASSHE (PA) State System*, June 2015 - October 2016.
Title: *"Building a Bayesian Network that Recognizes the Intended Message of a Pie Chart"*
Amount: $7,630.00

Principal Investigator, *College of Arts and Sciences Support and Development Awards (CASSDA) - West Chester University*, January 2014 - June 2014.
Title: *"Processing of Large-Scale Datasets using Refactored Machines in a Cluster Configuration"*
Amount: $2,519.79

Travel Grant: Professional Development Award, *Graduate Office, University of Delaware*, 2010.
Competitive monetary award given to graduate students for financial assistance to present and attend a major conference in their field.

Travel Grant, *CogSci '09 (Cognitive Science Society)*, 2009.
Competitive monetary grant awarded to students who are first-author on a CogSci paper, paper submission quality was considered as part of awardee selection.

Travel Grant: Alumni Enrichment Award, *Alumni Office, University of Delaware*, 2009.
Competitive monetary financial assistance provided to students to take part in opportunities outside the classroom, such as research presentations and conferences.

Travel Grant: Professional Development Award, *Graduate Office, University of Delaware*, 2008.
Competitive monetary award given to graduate students for financial assistance to present and attend a major conference in their field.

Full Graduate Support, *Department of Computer and Information Sciences, University of Delaware*, 2006.
Graduate student stipend and 100% tuition reduction with renewal options provided the student remains in good academic standing with the department and maintains progress toward the Ph.D degree.

Honors and Awards

Outstanding Faculty Recipient, *West Chester University*, [2014-15, 2016-17].
Identified by Honors College students for outstanding teaching during the academic year.

Outstanding Advisor Recipient, *West Chester University*, [2016-17, 2017-18].
Identified by Honors College students for outstanding advising during the academic year.

Best Student Paper Award, *Diagrams '12 (Diagrams Conference Series)*, July 2012.
Competitive monetary award given to best student paper at conference.

Quantum Leap Innovations Graduate Student Excellence Award, *Department of Computer and Information Sciences, University of Delaware*, May 2012.
Monetary award given by Quantum Leap Innovations to a graduate student in CIS in recognition of excellence in the field of Artificial Intelligence.

Graduate Teaching Assistant Award, *Department of Computer and Information Sciences, University of Delaware*, May 2011.
Monetary award given to one Computer and Information Sciences graduate teaching assistant in recognition of teaching excellence.

Service

Organizing

Steering Committee, Diagrams Conference Series, 2016 - Present. (six year term)

Local Chair, Diagrams (Conference on the Theory and Application of Diagrams), 2016.

Discipline: *Journals*

Reviewer, Cognitive Science: A Multidisciplinary Journal.

Reviewer, ACM Transactions on Interactive Intelligent Systems (ACM TiiS).

Reviewer, Africa Education Review.

Reviewer, ACM Computing Reviews (CR).

Discipline: *Edited Books*

Reviewer, *Engineering and Engineering Education in the Middle East: Status, Challenges, Role in Fostering Human and Economic Development, and Futuristic Transformations.*

Discipline: *Conferences and Workshops*

Program Committee, FLAIRS (Florida Artificial Intelligence Research Society), [2016, 2017, 2018].

Steering Committee, Diagrams Conference Series, 2016 - Present. (six year term)

Program Committee, IEEE ISM (IEEE International Symposium on Multimedia), [2016, 2018].

Program Committee, MARMI (International Workshop on Multimedia Analysis and Retrieval for Multimodal Interaction), 2016.

Program Committee, Diagrams (International Conference on the Theory and Application of Diagrams), [2016, 2018].

Reviewer, SIGCSE (ACM Technical Symposium on Computer Science Education), [2013, 2014, 2015, 2016, 2017, 2018, 2019].

Program Committee, Graduate Symposium @ Diagrams (Conference on the Theory and Application of Diagrams), [2014, 2016].

Reviewer, CCSCE (Consortium for Computing Sciences in Colleges, Eastern Region), [2014, 2015, 2016, 2017, 2019].

Program Committee, UMAP (User Modeling, Adaptation and Personalization), 2013.

Reviewer, ICCM (International Conference on Cognitive Modeling), 2013.

Program Committee, Student Research Workshop @ ACL (Association of Computational Linguistics), 2010.

Reviewer, CogSci (Cognitive Science Conference), 2010.

PASSHE (State System Level)

Reviewer, STEM Undergraduate Research Conference, [2014, 2015].

University

Department Representative, Curriculum and Academic Policies Council (CAPC), [2017-19].

Chair, Course Review and Revalidation Subcommittee (Academic Review Subcommittee of CAPC), [2018-19.

Member, Low Enrollment Subcommittee (Academic Review Subcommittee of CAPC), [2017-18].

Program Committee, RECAP (Resources for the Electronic Classroom: a Faculty-Student Partnership), [2013-14, 2014-15, 2015-16].

Member, New Faculty Orientation Committee, [2012-13, 2013-14, 2014-15, 2015-16, 2016-17, 2017-18].

Reviewer, University Research Fund, [2017-18].

College

Research in Mathematics and the Sciences (RIMS) Award, [Fall 2016, Spring 2017].

Dean's Awards for Strategic Initiatives, Fall 2016.

Outstanding Student Award Committee, [2016-17, 2017-18].

Search Committee: Academic Coordinator, Fall 2016.

CS Department

Assistant Chairperson, [2017-19].

Advising Chair, [2016-17, 2017-18].

Search Committee, [2014-15, 2015-16, 2016-17, Summer17, 2017-18 (committee chair), Summer18, 2018-19 (committee chair)].

Graduate Committee, [2012-13, 2013-14, 2014-15, 2015-16, 2016-17].

Representative, Undergraduate Open House, [09/12, 10/13, 09/14].

Representative, Accepted Student Day, [03/13, 03/14, 03/15, 03/16, 03/17, 02/18, 03/18].

Representative, Graduate Open House, 10/12.

Advising

Advisor, Upsilon Pi Epsilon Computer Science Honor Society, [2017 - present].

Team Coach, ACM International Programming Competition, [2012 - 2015].

Advisory Board, ISEEK, [2012 - 2015].

Advisor, WCU Computer Science Club, [2012 - 2016].

Professional Memberships

ACM SIGCSE (ACM Special Interest Group on Computer Science Education)

Upsilon Pi Epsilon, West Chester University Chapter

Upsilon Pi Epsilon, Saint Joseph's University Chapter

Sigma Xi, Saint Joseph's University Chapter