

Richard Burns

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West Chester University
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USA

Research Interests

Natural Language Processing, Information Graphics, Data Science, Computational Linguistics, Artificial Intelligence, Machine Learning

Education

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

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

B.S., Computer Science, Saint Joseph's University, Philadelphia, PA, 2006
Minor: Mathematics

Appointments

Chairperson, Department of Computer Science, West Chester University, 2020 - present

Associate Professor, Department of Computer Science, West Chester University, 2017 - present

Assistant Chairperson, Department of Computer Science, West Chester University, 2017 - 2020

Assistant Professor, Department of Computer Science, West Chester University, 2012 - 2017

Instructor, Department of Computer Science, Saint Joseph's University, 2010

Teaching Assistant and Research Assistant, Department of Computer and Information Sciences, University of Delaware, 2006 - 2012

Teaching Assistant, Department of Mathematics and Computer Science, Saint Joseph's University, 2004 - 2006

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, F19], (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, S19]
- CSC 142, Computer Science II, [F18]
- CSC 345, Programming Languages and Paradigms, [S18, S19, F19, S20, S21]
- CSC 416/565, Design and Construction of Compilers, [F13, F15, F17, F19], (graduate)
- CSC 476, Game Application Development (Topics in Complex Large-Scale Systems), [F14, F16, F18, F20]
- CSC 481/575, Artificial Intelligence, [F19, S21], (graduate)
- CSC 540, Programming Languages and Paradigms, [S20], (graduate)
- CSC 576, Data Mining, [S13, S15, S17, S19], (graduate¹)
- CSC 577, Natural Language Processing (Topics), [S14, S16, S18, S20], (graduate²)
- HON 122, Computer Science for Social Justice, [F20], (Honors College)

Scholarship, West Chester University

Supervised Master's Thesis

- Jon Kilgannon, "A Machine Learning System for Glaucoma Detection using Inexpensive Computation", August 2020.

Independent Projects

- 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.
- Shayne Altizer, "Exploration of a Card-Playing AI Game in Unity", Summer 2018.
- Robert Schaffer, "Cryptocurrency Tweet Sentiment Analysis & Price Correlation", Summer 2018.
- Valerie-Anne Hlavinka, "Recipe Parser Web App", Fall 2018.
- Matthew Leinhauser, "Unlocking the Key to Injury Free Workouts Using Natural Language Processing", Fall 2018.
- Nora Sorrell, "Spotting Nuclei in Images", Fall 2018. (graduate)
- Maxwell Tsatsu, "Implementation of an Android App with Consumer-Driver Delivery Tracking", Fall 2018. (graduate)
- Scott Duffy, "App: Graph Theory Helper", Spring 2019.
- Ramsey Villarreal, "Use of a Neural Network to Detect Open WCU Parking Spaces", Spring 2019.
- Daniel Nenstiel, "Explorations in SCAM: SCala, Angular, Mongo", Summer 2019.
- Zachery Soles, "Towards an Framework for Automated Haskell Testing", Summer 2019.
- Jon Kilgannon, "Automated Detection of Glaucoma with Machine Learning", Summer 2019. (graduate)
- Brandon Fonticoba, "Development of a Social Justice Game in Unity", Fall 2019.
- Ryan Owings, "Development of a Virtual Reality Game in Unity Using the Oculus Rift", Fall 2019.
- Thomas Martin, "Research-Based Python App Development", Fall 2019.
- Andrew Wheeler, "Nosedive: Audio Effects Plugin", Spring 2020.
- Ravi Venkatesh, "An Exploration of the Global Terrorism Database: Predictions and Challenges", Spring 2020. (graduate)
- Richard Anastasi, "Android App Development with Geo-Location", Summer 2020.
- Sean Roberts, "Intended Messages in Stacked Bar Charts", Summer 2020.
- Erik Flaten, "Twitter Sentiment Analysis in the 2020 Election Cycle", Summer 2020.
- Akash Kumar, Spring 2021.
- Prathyusha Dongari, Spring 2021.

Instructor, Saint Joseph's University

- CSC 5805, Artificial Intelligence, [Su10], (graduate)

Course Development

- New Course, West Chester University, HON 122: Computer Science for Social Justice (honors), Fall 2020
- New Course, West Chester University, CSC 577: Natural Language Processing (graduate), Fall 2018
- New Course, West Chester University, CSC 576: Data Science (graduate), Spring 2017
- New Course, West Chester University, CSC 476: Game Development, Spring 2017
- CAPC, Distance Education Certification, 2021

Research

Dissertation

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

Peer-Reviewed Publications

Linh Ngo, **Richard Burns**, Si Chen. Containerizing CS Learning Environments. In *The Journal of Computing Sciences in Colleges*, Volume 36, Number 3, pp. 169, October 2020.

Stephanie Elzer Schwartz, **Richard Burns**. Understanding the Role of Information Graphics in Multimodal Documents. To appear and be presented at International Association of Applied Linguistics (AILA) 2020. (Conference meeting postponed from 2020 to 2021 due to COVID-19.)

Richard Burns, Sandra Carberry, Stephanie Elzer Schwartz. An Automated Approach for the Recognition of Intended Messages in Grouped Bar Charts. *Computational Intelligence (COIN)*, 35:955-1002, 2019.

Matthew Leinhauser, **Richard Burns**. Physical Exercise Instructions: Unlocking the Key to Injury-Free Workouts using Natural Language Processing. In *Proceedings of the 34th Annual Conference of The Pennsylvania Association of Computer and Information Science Educators (PACISE)*, pp. 91-97, 2019.

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 (PACISE)*, pp. 96-100, 2018. **Best Undergraduate Student Paper Award.**

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 (DIAGRAMS)*, pp. 265-271, 2016.

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 (PACISE)*, pp. 52-58, 2016. **Best Graduate Student Paper Award.**

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 (FLAIRS)*, pp. 217-220, 2015.

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 (FLAIRS)*, pp. 14-17, 2014. (Best Poster Nominee: 3 nominated out of 44.) Acceptance Rate: 49%

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.

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 (UMAP)*, pp. 114-126, 2013. Acceptance Rate: 32%

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

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.

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 (CICLing)*, pp. 501-512, 2013. Acceptance Rate: 26%

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)

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 (DIAGRAMS)*, pp. 8-22, 2012. Best Student Paper Award. Acceptance Rate: 30%

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.

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 (SIGCSE)*, pp. 209-214, 2012. Acceptance Rate: 35%

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.

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 (CogSci)*, pp. 2292-2297, 2009. Acceptance Rate: 32%

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.

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 (DIAGRAMS)*, pp. 353-356, 2008.

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)

“Preparing for Academia: How to have a Successful Career”, Graduate Symposium at the Tenth International Conference on the Theory and Application of Diagrams, Edinburgh, Scotland, June 2018.

“Recognizing the Communicative Intent of Information Graphics”, evoHaX, (weekend hackathon 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", 16th Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE), (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.

"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.

Undergraduate Work

"Use of Natural Language Processing to Improve Use Cases", Saint Joseph's University, 2006 Advisor: Jonathan P. E. Hodgson

Funding

Principal Investigator, National Science Foundation (IIS), April 2020 - March 2022. Workshop: Doctoral Symposium at the Eleventh International Conference on the Theory and Application of Diagrams. Award: #2023654. \$13,475.

Principal Investigator, National Science Foundation (Cyber-Human Systems), March 2018 - February 2019. Workshop: Doctoral Symposium at the Tenth International Conference on the Theory and Application of Diagrams. Award: #1830138. \$12,500.

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

Principal Investigator, College of Arts and Sciences Support and Development Awards (CASSDA) - West

Chester University, January 2014 - June 2014. "Processing of Large-Scale Datasets using Refactored Machines in a Cluster Configuration". \$2,519.79

Travel Grant, Professional Development Award, Graduate Office, University of Delaware, 2010.

Travel Grant, CogSci '09 (Cognitive Science Society), 2009.

Travel Grant, Alumni Enrichment Award, Alumni Office, University of Delaware, 2009.

Travel Grant, Professional Development Award, Graduate Office, University of Delaware, 2008.

Full Graduate Support, Department of Computer and Information Sciences, University of Delaware, 2006.

Honors and Awards

Outstanding Faculty Recipient, West Chester University, [2014-15, 2016-17, 2018-19, 2019-20].^{[3](#)}

Outstanding Advisor Recipient, West Chester University, [2016-17, 2017-18, 2018-19].^{[4](#)}

Quantum Leap Innovations Graduate Student Excellence Award, Department of Computer and Information Sciences, University of Delaware, 2012.^{[5](#)}

Graduate Teaching Assistant Award, Department of Computer and Information Sciences, University of Delaware, 2011.^{[6](#)}

Service

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

- Conference Chair, PACISE 2020, 35th Annual Spring Conference of Pennsylvania Educators.
- Steering Committee, Diagrams Conference Series, [2016 - Present]. (six year term)
- Webmaster, Diagrams Conference Series, [2016 - Present].
- Program Committee, International Conference on Multimedia Modeling (MMM), [2021].
- Program Committee, Content & Activity Engineering, [2020].
- Reviewer, Consortium for Computing Sciences in Colleges, Eastern Region (CCSCE), [2014, 2015, 2016, 2017, 2018, 2019].
- Reviewer, ACM Technical Symposium on Computer Science Education (SIGCSE), [2013, 2014, 2015,

- 2016, 2017, 2018, 2019, 2020].
- Program Committee, Florida Artificial Intelligence Research Society (FLAIRS), [2016, 2017, 2018, 2019, 2020, 2021].
- Program Committee, International Conference on the Theory and Application of Diagrams (DIAGRAMS), [2016, 2018, 2020, 2021].
- Program Committee, IEEE International Symposium on Multimedia (IEEE ISM), [2016, 2018].
- Local Chair, The Ninth International Conference on the Theory and Application of Diagrams (DIAGRAMS), Philadelphia, PA, 2016.
- Program Committee, International Workshop on Multimedia Analysis and Retrieval for Multimodal Interaction (MARMI), 2016.
- Program Committee, Graduate Symposium - International Conference on the Theory and Application of Diagrams (DIAGRAMS), [2014, 2016].
- Program Committee, User Modeling, Adaptation and Personalization (UMAP), 2013.
- Reviewer, International Conference on Cognitive Modeling (ICCM), 2013.
- Program Committee, Student Research Workshop - Association of Computational Linguistics (ACL), 2010.
- Reviewer, Cognitive Science Conference (CogSci), 2010.

Discipline: Other

- CSTA, Longwood Chapter, Officer: Higher Education Liaison, [2020 - Present].

PASSHE (State System Level)

- Representative, Credit for Prior Learning (PA Dept. of Education), [2018-20].
- Reviewer, Faculty Professional Development Council Grant (FPDC), [2019].
- Reviewer, STEM Undergraduate Research Conference, [2014, 2015].

University

- Dept. Representative, Curriculum and Academic Policies Council (CAPC), [2017-20].
 - Chair, Course Review and Revalidation Subcommittee (Academic Review Committee of CAPC), [2018-20].
- Working Group for Middle States Self-Study, [2019, 2020].
- Research and Creative Activity Advisory Board, [2018-20].
- Student Leadership Project Team, [2018-20].
- New Faculty Orientation Committee, [2012-18].
 - Co-Chair, Human Resources Subcommittee [2013-18].
- Reviewer, University Research Fund, [2017-18].
- Program Committee, Resources for the Electronic Classroom: a Faculty-Student Partnership (RECAP), [2013-16].

College

- Outstanding Student Award Committee, [2016-18].
- Research in Mathematics and the Sciences (RIMS) Award, [Fall 2016, Spring 2017].
- Dean's Awards for Strategic Initiatives, Fall 2016.
- Search Committee: Academic Coordinator, Fall 2016.

Department

- Chairperson, [2020-..]
- Assistant Chairperson, [2017-20].
- Program Coordinator, B.S/M.S. Accelerated Program, [2017-20].
- Dept. Representative, Pennsylvania Association of Computer and Information Science Educators (PACISE), [2018-20].
- Search Committee, [2014-15, 2015-16, 2016-17, Summer17, 2017-18, Summer18, 2018-19, 2019-20].
 - Chair, [2017-18, 2018-19, 2019-20].
- Chapter Advisor, Upsilon Pi Epsilon Computer Science Honor Society, [2017-20].
- Representative, Undergraduate Open House.
- Representative, Accepted Student Day.
- Representative, Graduate Open House.
- Advisor, WCU Computer Science Club, [2012-16].
- Team Coach, ACM International Programming Competition, [2012-15].
- Advisory Board, The Internet Security and Ethics Education and Knowledge Institute (ISEEK), [2012-15].

Professional Memberships

- ACM (Association for Computing Machinery)
 - 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
 - CSTA+ (Computer Science Teachers Association)
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1. Previously numbered CSC 600 [↩](#)
2. Previously numbered CSC 581 [↩](#)
3. Identified by Honors College students for outstanding teaching during the academic year. [↩](#)
4. Identified by Honors College students for outstanding advising during the academic year. [↩](#)
5. Monetary award given by Quantum Leap Innovations to a graduate student in CIS in recognition of excellence in the field of Artificial Intelligence. [↩](#)
6. Monetary award given to one Computer and Information Sciences graduate teaching assistant in recognition of teaching excellence. [↩](#)