John Wenskovitch

Visiting Assistant Professor

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Research Overview

The heart of my research lies in the question "What can **machine learning** do to support **visualization**?" At the intersection of **visual analytics**, **human-computer interaction**, and **machine learning**, I design **human-in-the-loop** systems and interfaces that enable analysts to interact with complex **mathematical** models via natural interactions with the data. Accompanying this **semantic interaction** focus are supplementary research endeavors including **scientific visualization** and **data science** in the **astronomy** domain, **social media** studies in the **health care** domain, and creating **interactive electronic art**.

Education

2019 / 2011

Ph.D. in Computer Science, Virginia Polytechnic Institute and State University, Advisor: Dr. Chris North, (at Virginia Tech 2016-2019, at the University of Pittsburgh 2011-2014 advised by Dr. G. Elisabeta Marai)
Dimension Reduction and Clustering for Interactive Visual Analytics

2011 / 2009
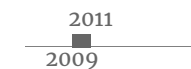
M.S. in Computer Science, University of Pittsburgh, Advisor: Dr. Jingtao Wang
Exploring the Use of Rotational Input and Gyroscopes in Smartphones

2009 / 2005
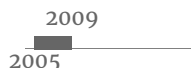
B.S. in Software Engineering (Mathematics Minor and Multimedia Application Domain), Gannon University, Advisor: Dr. Mei-Huei Tang
Rosetta Fist: An Interactive Sign Language Tutoring Tool using the Nintendo WiiMote

Current Positions

2020 / 2019

Visiting Assistant Professor, Department of Computer Science, Virginia Tech
- I will teach 5 courses (6 individual classes), and I received a grant to develop an Intermediate Python course.

Previous Positions

Academia

2019 / 2017

Graduate Instructor of Record, Department of Computer Science, Virginia Tech
- I taught 2 courses (5 individual classes) ranging from 50–540 students who received their first exposure to C, x86, and Python.

2019 / 2016

Graduate Research Assistant, Department of Computer Science, Virginia Tech
- My PhD research focused the intersection of machine learning and visualization, with particular interest in semantic interaction and interactive visual analytics.

2017 / 2014
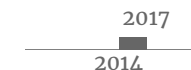
Visiting Assistant Professor, Department of Computer Science, Allegheny College [Visiting Assistant Professor (2014-2016), Adjunct Professor (2016-2017)]
- I taught 5 courses (10 individual classes), ran Independent Study courses on Big Data, video game design, and advanced graphics, advised undergraduate students, and received a grant to develop a mathematical and computational theory course sequence.

2013 / 2012

Adjunct Professor, Department of Mathematics, Chatham University
- I taught 4 courses (6 individual classes) in mathematics and statistics, including 1 online course.

Teaching Assistant, Department of Computer Science, University of Pittsburgh
- I was a Teaching Assistant for 10 different courses (18 individual classes), leading recitations and assisting with creating course content.

2013
2011

Graduate Student Researcher, Department of Computer Science, University of Pittsburgh
- My research included creating visualization systems for computational biologists and investigating novel interaction techniques for smartphones.

2009
2005

System Administrator Aide, Department of Computer Science, Gannon University
- I helped to maintain both software and hardware in the computer labs in the Computer and Information Science Department.

Industry

2018
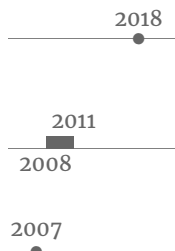
Intern, Enterprise AI Group, Research Department, FX Palo Alto Laboratory (FXPAL)
- I designed a visualization system for comprehending and communicating the structures within and behaviors of computational notebooks.

2011
2008

Software Engineer Intern, PRS Pharmacy Services
- I developed several ASP.NET systems that supported thousands of pharmacy and pharmacist end users.

2007

Information Systems Intern, The Children's Institute of Pittsburgh
- I assisted in a system-wide operating system upgrade across multiple sites and departments in a hospital environment.

Publications

Journal, Conference, and Symposium Publications

2020 — **John Wenskovitch**, Michelle Dowling, and Chris North. "What Respect to What: Simultaneous Interaction with Dimension Reduction and Clustering Projections," in *ACM International Conference on Intelligent User Interfaces*. IUI'20. Cagliari, Italy, 2020. Acceptance Rate: 23.4%.

2019 — **John Wenskovitch** and Chris North. "Pollux: Interactive Cluster-First Projections of High-Dimensional Data," in *2019 Symposium on Visualization in Data Science*. VDS'19. Vancouver, BC, Canada, 2019. Acceptance Rate: 29.6%.

2019 — **John Wenskovitch**, Jian Zhao, Scott Carter, Matthew Cooper, and Chris North. "Albireo: An Interactive Tool for Visually Summarizing Computational Notebook Structure," in *2019 Symposium on Visualization in Data Science*. VDS'19. Vancouver, BC, Canada, 2019. Acceptance Rate: 29.6%.

2019 — Christian Bors, **John Wenskovitch**, Michelle Dowling, Simon Attfield, Leilani Battle, Alex Endert, Olga Kulyk, and Robert S. Laramee. "A Provenance Task Abstraction Framework," *IEEE Computer Graphics and Applications*, 39(6) (Nov. 2019), pp. 46–60. DOI: 10.1109/MCG.2019.2945720. Journal Impact Factor: 1.725.

2019 — Moeti M. Masiane, Anne Driscoll, Wu-chun Feng, **John Wenskovitch**, and Chris North. "Towards Insight-Driven Sampling for Big Data Visualization," *Behaviour & Information Technology* (2019), pp. 1–20. DOI: 10.1080/0144929X.2019.1616223. Journal Impact Factor: 1.429.

2019 — Michelle Dowling, Nathan Wycoff, Brian Mayer, **John Wenskovitch**, Scotland Leman, Leanna House, Nicholas Polys, Chris North, and Peter Hauck. "Interactive Visual Analytics for Sensemaking with Big Text," *Big Data Research*, 16 (July 2019), pp. 49–58. DOI: https://doi.org/10.1016/j.bdr.2019.04.003. Journal Impact Factor: 2.952.

2019 — Michelle Dowling, **John Wenskovitch**, J.T. Fry, Scotland Leman, Leanna House, and Chris North. "SIRIUS: Dual, Symmetric, Interactive Dimension Reductions," *IEEE Transactions on Visualization and Computer Graphics*, 25(1) (Jan. 2019), pp. 172–182. DOI: 10.1109/TVCG.2018.2865047. Presented at IEEE VIS (VAST) 2018; Acceptance Rate 25.6%. Journal Impact Factor: 2.84.

2018 — **John Wenskovitch**, Lauren Bradel, Michelle Dowling, Leanna House, and Chris North. "The Effect of Semantic Interaction on Foraging in Text Analysis," in *2018 IEEE Conference on Visual Analytics Science and Technology (VAST)*. Oct. 2018, pp. 13–24. DOI: 10.1109/VAST.2018.8802424. Acceptance Rate: 30.4%.

2018 Jessica Zeitz Self, Michelle Dowling, **John Wenskovitch**, Ian Crandell, Ming Wang, Leanna House, Scotland Leman, and Chris North. "Observation-Level and Parametric Interaction for High-Dimensional Data Analysis," *ACM Transactions on Interactive Intelligent Systems (TiiS)*, 8(2) (June 2018), 15:1–15:36. DOI: 10.1145/3158230. Journal Impact Factor: 1.65.

2018 Xin Chen, Jessica Zeitz Self, Leanna House, **John Wenskovitch**, Maoyuan Sun, Nathan Wycoff, Jane Robertson Evia, Scotland Leman, and Chris North. "Be the Data: Embodied Visual Analytics," *IEEE Transactions on Learning Technologies*, 11(1) (Jan. 2018), pp. 81–95. DOI: 10.1109/TLT.2017.2757481. Journal Impact Factor: 2.315.

2018 **John Wenskovitch**, Ian Crandell, Naren Ramakrishnan, Leanna House, Scotland Leman, and Chris North. "Towards a Systematic Combination of Dimension Reduction and Clustering in Visual Analytics," *IEEE Transactions on Visualization and Computer Graphics*, 24(1) (Jan. 2018), pp. 131–141. DOI: 10.1109/TVCG.2017.2745258. Presented at IEEE VIS (VAST) 2017; Acceptance Rate: 21.4%. Journal Impact Factor: 2.84.

2016 **John Wenskovitch**, James C. Lombardi, and Roger W. M. Hatfull. "FluxE: Exploring Flux in Astrophysical Simulations," in *SIGGRAPH ASIA 2016 Symposium on Visualization*. SA '16. Macau: ACM, 2016, 15:1–15:8. DOI: 10.1145/3002151.3002154.

2016 Debra M. Wolf, **John Wenskovitch**, and Bonnie B. Anton. "Nurses' Use of the Internet and Social Media: Does Age, Years of Experience and Educational Level Make a Difference?" *Journal of Nursing Education and Practice*, 6(2) (2016), pp. 68–75. DOI: https://doi.org/10.5430/jnep.v6n2p68. Journal Impact Factor: 7.86.

2014 **John Wenskovitch**, Leonard A. Harris, Jose-Juan Tapia, James R. Faeder, and G. Elisabeta Marai. "MOSBIE: A Tool for Comparison and Analysis of Rule-Based Biochemical Models," *BMC Bioinformatics*, 15(1) (2014), pp. 316–331. DOI: 10.1186/1471-2105-15-316. Journal Impact Factor: 2.213.

2014 Timothy Luciani, **John Wenskovitch**, Koonwah Chen, David Koes, Timothy Travers, and G. Elisabeta Marai. "FixingTIM: Interactive Exploration of Sequence and Structural Data to Identify Functional Mutations in Protein Families," *BMC Proceedings*, 8(2) (2014), S3. DOI: 10.1186/1753-6561-8-S2-S3. Journal Impact Factor: 1.46.

2014 Chad Rittle, Yolanda C. Lang, and **John Wenskovitch**. "Tdap: The Need to Educate and Immunize," *Workplace Health & Safety*, 62(11) (2014), pp. 468–475. Journal Impact Factor: 1.029.

2014 Debra M. Wolf, Bonnie B. Anton, and **John Wenskovitch**. "Promoting Health and Safety Virtually: Key Recommendations for Occupational Health Nurses," *Workplace Health & Safety*, 62(7) (2014), pp. 302–306. Journal Impact Factor: 1.029.

2014 Debra M. Wolf, Bonnie B. Anton, and **John Wenskovitch**. "Using Nurse Survey Data to Empower Patients," *Journal of Healthcare Information Management*, 28(1) (2014), pp. 58–65.

2013 **John Wenskovitch**, Tim Luciani, Koonwah Chen, and G. Elisabeta Marai. "Fixing TIM: Identifying Functional Mutations in Protein Families through the Interactive Exploration of Sequence and Structural Data," in *BioVis 2013 Data Contest*. BioVis '13. Atlanta, GA, 2013. **[Vis Experts' Pick for Best Contest Submission]**.

Peer-Reviewed Workshop Publications

2019 **John Wenskovitch**, Michelle Dowling, Laura Grose, Chris North, Remco Chang, Alex Endert, and David H. Rogers. "Machine Learning from User Interaction for Visualization and Analytics: A Workshop-Generated Research Agenda," in *Proceedings of the IEEE VIS Workshop MLUI 2019: Machine Learning from User Interactions for Visualization and Analytics*. VIS'19. Vancouver, BC, Canada, 2019.

2019 Yali Bian, **John Wenskovitch**, and Chris North. "DeepVA: Bridging Cognition and Computation through Semantic Interaction and Deep Learning," in *Proceedings of the IEEE VIS Workshop MLUI 2019: Machine Learning from User Interactions for Visualization and Analytics*. VIS'19. Vancouver, BC, Canada, 2019.

2019 **John Wenskovitch** and Chris North. "Machine Learning from Interaction in Multi-Model Visual Analytics," in *Proceedings of the ACM CHI Conference Workshop on Human-Centered Machine Learning Perspectives*. CHI'19. Glasgow, UK, 2019.

2018 Michelle Dowling, **John Wenskovitch**, Peter Hauck, Adam Binford, Nicholas Polys, and Chris North. "A Bidirectional Pipeline for Semantic Interaction," in *Proceedings of the IEEE VIS Workshop on Machine Learning from User Interaction for Visualization and Analytics*. VIS'18. Berlin, Germany, 2018.

2018 **John Wenskovitch**, Michelle Dowling, and Chris North. "The Cognitive and Computational Benefits and Limitations of Clustering for Sensemaking," in *Proceedings of the ACM CHI Workshop on Sensemaking in a Senseless World*. CHI'18. Montreal, QC, Canada, 2018. Long Presentation Acceptance Rate: 20.8%.

2017 **John Wenskovitch** and Chris North. "Observation-Level Interaction with Clustering and Dimension Reduction Algorithms," in *Proceedings of the 2nd Workshop on Human-In-the-Loop Data Analytics*. HILDA'17. Chicago, IL, USA: ACM, 2017, 14:1–14:6. DOI: 10.1145/3077257.3077259.

Peer-Reviewed Conference Posters and Presentation Abstracts

2019 **John Wenskovitch** and Byron Rich. "Pulsar to Person (P2P): Data Visualization and Sonification to Experience the Universe," in *European Week of Astronomy and Space Science 2019*. EWASS'19. Lyon, France, 2019.

2019 Lata Kodali, **John Wenskovitch**, Nathan Wycoff, Leanna House, and Chris North. "Uncertainty in Interactive WMDS Visualizations," in *2019 Symposium on Visualization in Data Science*. VDS'19. Vancouver, BC, Canada, 2019.

2019 **John Wenskovitch**, Michelle Dowling, and Chris North. "Simultaneous Interaction with Dimension Reduction and Clustering Projections," in *Proceedings of the 24th International Conference on Intelligent User Interfaces: Companion*. IUI '19. Marina del Rey, California: ACM, 2019, pp. 89–90. DOI: 10.1145/3308557.3308718.

2018 **John Wenskovitch**. "Dimension Reduction and Clustering Algorithm Combinations for Exploratory Data Analysis," in *2018 IEEE VIS Doctoral Colloquium Compendium*. Berlin, Germany, 2018.

2018 Byron Rich and **John Wenskovitch**. "Embodied Astronomical Phenomenon: Using Art to Access Astronomy," in *European Week of Astronomy and Space Science 2018*. EWASS'18. Liverpool, UK, 2018.

2018 **John Wenskovitch** and Chris North. "Visual Analytics and Semantic Interaction to Explore Astronomical Data," in *European Week of Astronomy and Space Science 2018*. EWASS'18. Liverpool, UK, 2018.

2018 Kimberly Olszewski, **John Wenskovitch**, and Debra Wolf. "Preparing for the Future: Where Are You with Total Worker Health?" in *2018 NSC Congress & Expo*. Houston, TX, 2018.

2018 Kimberly Olszewski, Debra Wolf, and **John Wenskovitch**. "Exploring Occupational Health Nurse's Understanding and Needs in Regard to Total Worker Health (TWH)," in *2nd International Symposium to Advance Total Worker Health*. Bethesda, MD, 2018.

2018 Kimberly Olszewski, Debra Wolf, and **John Wenskovitch**. "Total Worker Health.... Where are we? Where do we need to be?" in *AAOHN 2018 National Conference*. Reno, NV, 2018.

2017 **John Wenskovitch**, James C. Lombardi Jr., and Roger W.M. Hatfull. "A Computer Science Perspective on the Astronomy Research Software Process," in *European Week of Astronomy and Space Science (EWASS) 2017*. Prague, CZ, 2017.

2016 Debra Wolf, Bonnie Anton, and **John Wenskovitch**. "Empowering Patients to Use the WWW Safely to Make Decisions Regarding Their Health," in *18th International Conference on Nursing and Healthcare*. Irving, TX, 2016.

2013 **John Wenskovitch**, Leonard Harris, James Faeder, and G. Elisabeta Marai. "A Journaling System for Rule-Based Biochemical Models," in *IEEE BioVis Poster Abstracts with System Demonstration*. Atlanta, GA, 2013.

2011 Scott Rothenberger, **John Wenskovitch**, and G. Elisabeta Marai. "Pexel and Heatmap Visual Analysis of Multidimensional Gun/Homicide Data," in *IEEE Visualization VAST Poster Compendium*. Providence, RI, 2011, pp. 297–298. DOI: 10.1109/VAST.2011.6102482.

Courses Taught

Virginia Tech, Instructor

2019
2018 Computer Science 1064, Introduction to Programming in Python

2020 Computer Science 2064, Intermediate Python (initial offering as CS 2984)

2020
2017 Computer Science 2505, Introduction to Computer Organization I

2020 Computer Science 4774, HCI Design Experience (initial offering as CS 4984)

2020 Computer Science 4784, Human–Computer Interaction Capstone

Allegheny College, Instructor

2017
2015 Computer Science 112, Introduction to Computer Science II

2016
2014 Computer Science 210, Principles of Computer Organization

2014 Computer Science 230, Theory of Computation

2016
2015 Computer Science 250, Analysis of Algorithms

2015 Computer Science 382, Visual Computing

Chatham University, Instructor

2013 Math 105, College Algebra

2013 Math 108, Precalculus

2012 Math 110, Elementary Statistics

2012 Math 244, Discrete Mathematics

University of Pittsburgh, Teaching Assistant

2011
2010 Computer Science 0401, Intermediate Programming using Java

2011 Computer Science 0441, Discrete Structures for Computer Science

2012 Computer Science 0447, Computer Organization and Assembly Language

2012 Computer Science 0449, Introduction to Systems Software

2013
2012 Computer Science 1501, Algorithm Implementation

2014 Computer Science 1511, Introduction to the Theory of Computation (Also Graduate Course)

2013 Computer Science 1566, Introduction to Computer Graphics

2014 Computer Science 1567, Programming and System Design on a Mobile Robot Platform

2011 Computer Science 2510, Operating Systems (Graduate Course)

2014 Computer Science 2620, Interdisciplinary Modeling and Visualization (Graduate Course)

Grants, Scholarships, and Funding Awards

2019 "Pathways Grant," Provost funding to develop an Intermediate Python course. $10,000.

2018
2017 "Davenport Fellowship," Virginia Tech Computer Science funding award. $4,000 per academic year.
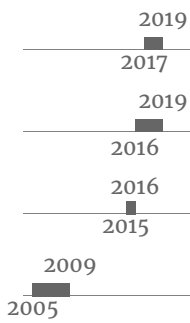
2019 / 2017 "IC CAE Scholar," Virginia Tech funding award from the Ted and Karyn Hume Center for National Security and Technology. $3,000 per academic year.

2019 / 2016 "Pratt Fellowship," Virginia Tech Computer Science funding award for "exceptional applicants" accepted to the department. $4,000 per academic year.

2016 / 2015 "Demmler Award for Teaching Innovation," Allegheny College grant towards new course and curriculum development. $4,000.

2009 / 2005 "Gannon University Engineering Design Scholarship," 1st prize. $3,000 per academic year.

Selected Professional Distinctions, Honors, and Awards
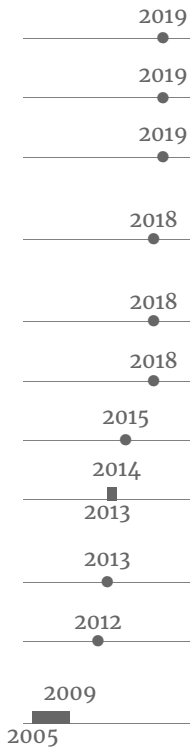
2019 Virginia Tech Department of Computer Science Outstanding Graduate Instructor Award

2019 Virginia Tech Favorite Faculty Award Nomination

2019 Virginia Tech Department of Computer Science Nominee for the University Graduate Teaching Excellence Award

2018 Invited participant at Dagstuhl Seminar 18462: Provenance and Logging for Sense Making (November 11–16)

2018 Accepted participant to the Doctoral Colloquium at IEEE VIS 2018, Berlin, Germany

2018 Virginia Tech Computer Science Graduate Student Service Award

2015 Awarded a summer residency at Ars Bioarctica in Kilpisjärvi, Finland

2014 / 2013 Named the Teaching Assistant Mentor for the University of Pittsburgh Department of Computer Science

2013 Received the BioVis Data Contest Vis Experts' Pick Award for FixingTIM

2012 Received the University of Pittsburgh Department of Computer Science Teaching Assistant Award (best teaching evaluation scores for the 2011–2012 academic year)

2009 / 2005 Eight consecutive semesters on the Gannon University Dean's List

Professional Service

Workshops and Sessions Organized

2020 Amruta Jaodand, **John Wenskovitch**, and Martijn Wilhelm. "Machine Learning and Visualisation: Bracing for Data Deluge in Astronomy," in *EWASS 2020*. Leiden, The Netherlands, 2020.

2020 **John Wenskovitch** and Amruta Jaodand. "Machine Learning and Data Visualization Frontiers for Astronomy," in *235th Meeting of the American Astronomical Society*. Honolulu, HI, 2020.

2019 **John Wenskovitch**, Michelle Dowling, Chris North, Remco Chang, Alex Endert, David Rogers, Fabian C. Peña, Sriram Yarlagadda, and Eli T. Brown. "MLUI 2019: Machine Learning from User Interaction for Visualization and Analytics," in *IEEE VIS 2019*. Vancouver, BC, Canada, 2019.

2019 **John Wenskovitch**, Mohammad Akhlaghi, David Valls-Gabaud, Amruta Jaodand, Rachael Ainsworth, Rein Warmels, and Alice Allen. "Python in Astronomy," in *EWASS 2019*. Lyon, France, 2019.

2019 **John Wenskovitch**, Amruta Jaodand, Rachael Ainsworth, Alice Allen, Mohammad Akhlaghi, and David Valls-Gabaud. "Understanding Data: Visualisation, Machine Learning, and Reproducibility," in *EWASS 2019*. Lyon, France, 2019.

2019 Stella Offner, Serena Viti, Ralf Klessen, Stefanie Walch, Thorsten Naab, Ullrich Koethe, **John Wenskovitch**, and Amruta Jaodand. "Learning the Milky Way: Artificial Intelligence Applications from Solar System to Galaxy Scale," in *EWASS 2019*. Lyon, France, 2019.

2019 Amruta Jaodand, **John Wenskovitch**, Rachael Ainsworth, and Alice Allen. "Hack Day," in *EWASS 2019*. Lyon, France, 2019.

2018 **John Wenskovitch**, Michelle Dowling, Chris North, Remco Chang, Alex Endert, and David Rogers. "Machine Learning from User Interaction for Visualization and Analytics," in *IEEE VIS 2018*. Berlin, Germany, 2018.

Organizing & Program Committees

2021 Chair, ACM CHI Web Committee

2020 Chair, ACM IUI Proceedings Committee

2019
2018 IEEE VIS Symposium on Visualization in Data Science (VDS)
- ○ Program Committee
- ○ Session Chair

2018
2015 Chair, IEEE VIS Student Volunteers

2017
2014 Team Leader, SIGGRAPH Asia Student Volunteers (2014, 2016–2017)

Conference & Journal Reviewer

2020 EuroVis

2019 ACM Transactions on Interactive Intelligent Systems (TiiS), *Distinguished Reviewer*

2019 IEEE Transactions on Knowledge and Data Engineering (TKDE)

2019 Computer Graphics & Applications (CG&A)

2019 PacificVis

2019 ACM Intelligent User Interfaces (IUI)

2018 ACM Computing Surveys

2018 IEEE VIS (VAST and InfoVis Tracks)

2017 IEEE Transactions on Visualization and Computer Graphics (TVCG)
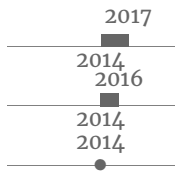
Student Volunteering

2019 ACM SIGCHI Executive Committee Volunteer

2018
2019 SIGGRAPH Asia Student Volunteer

2013
2018 IEEE VIS Student Volunteer

2012

Institutional Service

Virginia Tech

2019
2017 Department of Computer Science Graduate Council
- ○ Initial contact point for graduate students during reboot, and subsequently Interim President (2017–2018)
- ○ Past President (2018–2019)
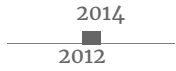- ○ Bylaws Subcommittee (2017–2018)

Allegheny College

2017
2014
Telescope Operator, Newton Observatory

2016
2014
Department of Computer Science Open House Volunteer

2014
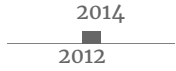ACM-ICPC (International Collegiate Programming Contest) Team Coach

University of Pittsburgh

2014
2012
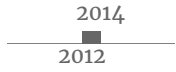Department of Computer Science Graduate Student Organization
- President (2012–2013)
- Secretary (2013–2014)

2014
2012
College of Arts & Sciences Graduate Student Organization
- Elizabeth Baranger Teaching Awards Committee Chair (2013–2014)

2014
2012
Graduate & Professional Student Government Representative

Gannon University

2009
2005
Association for Computing Machinery (ACM) Student Chapter
- Chair (2007–2008)
- Vice-Chair (2005–2007)
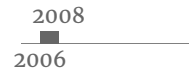- Secretary (2008–2009)

2009
2005
Environmental Club
- President (2006–2008)

2009
2005
Honors College
- *Excalibur* Newsletter Co-Editor (2006-2009)
- Student Advisory Board (2007–2009)

2008
2006
Engineering Summer Camp Volunteer

Open Source Software

2015
Gemini, Castor (named post-publication), **and Pollux**, Three prototype systems for projection of and simultaneous interaction with Dimension Reduction and Clustering algorithms. http://johnwenskovitch.com/research/castor-pollux-and-gemini/

2015
Flux Explorer (FluxE), A software package for visualizing effective temperature and spectral flux density values computed from astrophysical simulations, focusing on stellar merger simulations. http://starsmasher.allegheny.edu/fluxe/
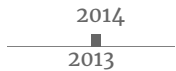
2014
2013
FixingTIM, A visualization tool for exploring families of proteins. Release is currently Linux only, but functions well in a virtual environment. http://vizwizards.com/fixingTIM.html
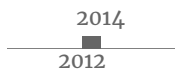
2014
2012
Model Simulation Browser and Interactive Explorer (MOSBIE), An extension of RuleBender for browsing families of rule-based models, identifying similar structures across the individual models. http://visualizlab.org/mosbie
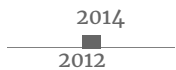
2014
2012
RuleBender, A visualization tool for constructing, debugging, simulating, and analyzing rule-based biological models. Distributions for Windows, Linux, and OSX, 32-bit and 64-bit. The system has 1000+ downloads in 2012 alone and is used at more than 40 institutions. http://www.rulebender.org

Art Projects and Associated Shows & Talks

2018 **Pulsar2Person (P2P)**, Interactive data visualization and sonification system for experiencing the universe via pulsar data. Collaboration with Byron Rich. Discussed at:
- EWASS 2018, Liverpool, United Kingdom (April 2018, Artist Talk)
- EWASS 2019, Lyon, France (June 2019, Conference Presentation)

2018 **Microbiome Ark (M-Ark)**, Spacecraft prototype containing a human microbiome and communication capabilities. Collaboration with Byron Rich. Discussed at:
- EWASS 2018, Liverpool, United Kingdom (April 2018, Artist Talk)
- ISEA 2018, Durban, South Africa (June 2018, Artist Talk)

2017 **Creatures Such as We**, An autonomous airship equipped with a family of sensors to locate ideal conditions for the growth of its cargo. Collaboration with Byron Rich. Discussed at:
- ISEA 2017, Manizales, Colombia (June 2017, Artist Talk)
- Balance Unbalance, Plymouth, UK (August 2017)
- Ars Electronica Festival, Linz, Austria (September 2017)

2016 **The Interrupted Living Machine**, A project designed to draw attention to climate change and pollution by scraping social media for hashtags related to environmental degradation. Collaboration with Byron Rich. Discussed at:
- ISEA 2016, Hong Kong (May 2016, Artist Talk)

2016 **Resonant**, This project is a sonification of the vessel in waveform; essentially, each vessel is playing the sound of itself. Collaboration with Ian F. Thomas. Shown at:
- NCECA (National Council on Education for the Ceramic Arts) 2016, Kansas City Convention Center, Kansas City, MO (March 2016)

2016
2015 **Immor(t)al**, Information obtained from an EEG is used to manipulate growing conditions for a colony of HeLa GFP cancer cells inside a custom-designed incubator. Collaboration with Byron Rich and Heather Brand. Shown and discussed at:
- Phantom Vibrations, State University of New York at Buffalo, Buffalo, NY (April–May 2015)
- ISEA 2015, Vancouver, BC, Canada (August 2015, Artist Talk)
- ISEA 2016, Hong Kong (May 2016, Artist Talk)

2015 **TWEET_SHOT**, A fictional gun control device which automatically posts a tweet and photo to a dedicated account when the trigger of a toy gun is pulled. Collaboration with Byron Rich. Shown at:
- ELECTRODOME, Gothenburg, Sweden (January–May 2015)
- Stimulus|Response|Affect, Oakland University, Rochester, MI (October 2015)

Advising

Supervised Theses (Committee Chair or Member)

2017 SJ Guillaume. "Do the Visual Features of Stack Overflow Influence Information Foraging Behavior?" Technical Report CS2017-03, Meadville, PA: Allegheny College, 2017.

2017 Jacob Hanko. "Allegheny College Online Campus Map," Technical Report CS2017-04, Meadville, PA: Allegheny College, 2017.

2017 Lucas Hawk. "Intelligent Monte-Carlo Tree Search for Perfect Information Games," Technical Report CS2017-05, Meadville, PA: Allegheny College, 2017.

2017 Daniel Ocampo. "The Effects and Analysis of Mobile Devices," Technical Report CS2017-07, Meadville, PA: Allegheny College, 2017.

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Additional Resources

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Google Scholar: `https://scholar.google.com/citations?user=hFOkXLYAAAAJ`

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