

# Christopher L. North – Curriculum Vitae

(updated Feb 2020)

Department of Computer Science  
114 McBryde Hall  
Virginia Tech  
Blacksburg, VA 24061-0106

(540) 231-2458  
(540) 231-9218 fax  
north@vt.edu  
<http://people.cs.vt.edu/~north/>

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## Google Scholar:

- <http://scholar.google.com/citations?user=yBZ7vtkAAAAJ>
- h-index = 50

## Short Bio:

Dr. Chris North is a Professor of Computer Science at Virginia Tech. He is Associate Director of the Discovery Analytics Center, and leads the Visual Analytics research group (<http://infovis.cs.vt.edu>). He was principle architect of the GigaPixel Display Laboratory, one of the most advanced display and interaction facilities in the world. He also participates in the Center for Human-Computer Interaction, and the Hume Center for National Security. He was awarded Faculty Fellow of the College of Engineering in 2007, and the Dean's Award for Research Excellence in 2014. He earned his Ph.D. at the University of Maryland, College Park, in 2000.

He served as General Co-Chair of IEEE VisWeek 2009, and as Papers Co-Chair of the IEEE Information Visualization (InfoVis) and IEEE Visual Analytics Science and Technology (VAST) Conferences. He served on editorial boards of IEEE Transactions on Visualization and Computer Graphics (TVCG) and the Information Visualization journal. He was awarded over \$15M in grants, co-authored over 100 peer-reviewed publications, and delivered 5 keynote addresses at symposia in the field. He graduated 14 Ph.D. and 19 M.S. thesis students, 4 receiving outstanding research awards, and advised over 80 undergraduate research students. He led efforts to advance data science education, founded the Graduate Certificate in Data Analytics, and co-organized the Computation Modeling and Data Analytics (CMDA) major.

His research and education agenda seeks to enable people to interactively visualize and explore big data for discovering new insights, by establishing usable, effective, and scientifically-grounded methods for visual interaction. His current research themes focus on:

1. Interactive machine-learning methods that combine cognition and computation to support human sensemaking;
2. Immersive-analytics methods that exploit novel display spaces such as display walls and VR headsets for embodied visual interaction;
3. Evaluation methods that help understand underlying issues in visual interaction.

## Research and Teaching Interests:

- *Areas:* Visual Analytics, Information Visualization, Human-Computer Interaction, Data Science
- *Basic research:* Interactive machine learning, large high-resolution displays and interaction techniques; display ecologies; combining visualization and machine learning; visual text analytics and sensemaking; insight-based evaluation of visualization; multiple-view techniques; visualization usability; usability of data mining.
- *Applied domains:* Intelligence analysis, cyber security, geographic info, bioinformatics.

## Positions:

- Professor of Computer Science, Virginia Polytechnic Institute and State University, June 2014 – present
- Associate Professor of Computer Science, Virginia Polytechnic Institute and State University, June 2006 – June 2014
- Assistant Professor of Computer Science, Virginia Polytechnic Institute and State University, August 2000 – June 2006
- Sabbaticals as Visiting Researcher:
  - University of Hawaii, Data Science Institute, January 2020 – May 2020
  - Sandia National Laboratories, Cyber Engineering Research Lab, January 2013 – May 2013
  - Pacific Northwest National Laboratories, National Visual Analytics Center, January 2009 – May 2009
  - Microsoft Research, August 2008 – December 2008

## Education:

- **University of Maryland**, College Park, MD  
Ph.D., Computer Science, May 2000  
Dissertation: “A User Interface for Coordinating Visualizations based on Relational Schemata: Snap-Together Visualization”  
Advisor: Dr. Ben Shneiderman  
Committee: Dr. Ben Bederson, Dr. David Mount, Dr. Kent Norman, Dr. Adam Porter
- **University of Maryland**, College Park, MD  
M.S., Computer Science, December 1995
- **Carnegie Mellon University**, Pittsburgh, PA  
B.S. with University Honors, Computer Science / Mathematics, May 1992

## Awards:

- Best Paper Finalist Award, *IEEE International Conference on High Performance Computing and Communications (HPCC) 2017*. For article: Sajal Dash, Anshuman Verma, Chris North, and Wu Feng, "Portable Parallel Design of Weighted Multi-Dimensional Scaling for Real-Time Data Analysis".
- Award for Outstanding Research Contributions, Center for Human-Computer Interaction, Virginia Tech, October 2015.
- **Dean's Award for Excellence in Research**, College of Engineering, Virginia Tech, May 2014.
- Grand Prize Award, Yelp Dataset Challenge, Yelp Inc., 2013. For submission: “Clustered Layout Word Cloud for User Generated Review.” Ji Wang, Jian Zhao, Sheng Guo, Chris North, Naren Ramakrishnan, Virginia Tech and University of Toronto.
- Honorable Mention Award, *VAST Challenge, IEEE VisWeek*, Oct 2012.
- Scholar of the Week, Virginia Tech, July 23, 2012.
- Challenge Award, *VAST Challenge, IEEE VisWeek*, Oct 2011.
- Best Paper Honorable Mention Award, *ACM Conference on Human Factors in Computing Systems (CHI)*, April 2010. For article: C. Andrews, A. Endert, C. North, "Space to Think: Large, High-Resolution Displays for Sensemaking".

- Top Cited Article in 2005-2010 Award, *Computers & Graphics* journal, Elsevier. For article: Robert Ball, Chris North, “Realizing embodied interaction for visual analytics through large displays”, *Computers & Graphics*, 31(3): 380-400, June 2007. Awarded 2010.
- Service Award, *IEEE Computer Society*, October 2009. For service as General Co-Chair of VisWeek 2009 Conference.
- Award for Special Contributions, *VAST Challenge, IEEE VAST 2009 Conference*, October 2009.
- **Faculty Fellow Award**, College of Engineering, Virginia Tech, May 2007.
- Best Paper Honorable Mention award, *ACM Conference on Human Factors in Computing Systems (CHI)*, April 2007. For article: R. Ball, C. North, D. Bowman, "Move to Improve: Promoting Physical Navigation to Increase user Performance with Large Displays".
- Best Panel Award, *IEEE Visualization Conference*, October 2006. For panel: T.J. Jankun-Kelly, R. Kosara, G. Kindlmann, C. North, C. Ware, E.W. Bethel, “Is There Science in Visualization?”.
- Best student-authored paper award, *Human Factors and Ergonomics Society 47th Annual Meeting (HFES)*, Oct. 2003. For article: Y.S. Ryu, B. Yost, G. Convertino, J. Chen, C. North, “Exploring Cognitive Strategies for Integrating Multiple-View Visualizations”.
- Director's Award for Innovation, U.S. Bureau of the Census, May 2000.
- ACM CHI'98 Doctoral Consortium, Conference Scholarship, April 1998.
- U.S. National Library of Medicine, 2-year Graduate Fellowship, September 1994 - August 1996.
- Eastman Kodak Company, 2-year Full-Tuition Scholarship Award, August 1990 - May 1992.
- Dean's List, Carnegie Mellon University, 3 semesters.

#### ***Awards to Graduate Research Advisees:***

- Kylie Davidson (PhD advisee), New Horizons Scholarship, Virginia Tech, 2019-2024.
- Moeti Masiani (PhD advisee):
  - NSF UrbComp Fellowship, 2018-2020
  - GEM Fellowship, Virginia Tech, 2016-2017.
- Tianyi Li (PhD advisee), Pratt Fellowship, Department of Computer Science, 2019.
- Michelle Dowling (PhD advisee):
  - NSF UrbComp Fellowship, 2018-2020
  - Davenport Leadership Fellowship, 2019-2020
  - Hume Center and IC-CAE Intelligence Community Scholar Award, 2016-2020.
- John Wenskovitch (PhD advisee):
  - Outstanding Graduate Instructor Award, Department of Computer Science, 2019
  - Graduate Student Service Award, Department of Computer Science, 2018
  - Davenport Leadership Fellowship, Department of Computer Science, 2016-2019.
- Xin Chen (MS advisee, co-advised with Leanna House), Best MS Thesis Award, Department of Computer Science, May 2017; Nominated for the William Preston Society Thesis Award, Feb 2017.
- Lauren Bradel (PhD advisee):
  - 2<sup>nd</sup> Place Best Poster Award, Graduate Poster Showcase, April 2014
  - Hume Center and IC-CAE Intelligence Community Scholar Award, 2012-2014.

- Andre Esakia (PhD advisee), Outstanding GTA Award, Department of Computer Science, April 2014.
- Jessica Zeitz Self (PhD advisee):
  - Davenport Leadership Fellowship, Department of Computer Science, 2011 & 2013
  - Pratt Fellowship & Walts Fellowship, Department of Computer Science, 2012.
- Alex Endert (PhD advisee):
  - **Best Doctoral Dissertation Award, IEEE Computer Society's Visualization and Graphics Technical Committee (VGTC)**, presented at the IEEE VIS Conference, October 2013
  - Outstanding PhD Dissertation Award, Department of Computer Science, May 2013
  - TEDxVirginiaTech presenter, 2012
  - Davenport Leadership Fellowship, Department of Computer Science, 2010-2011.
- Lauren Shupp (MS advisee), Outstanding Master's Thesis Award, Department of Computer Science, May 2007; Nominated by Virginia Tech for the Conference of Southern Graduate Schools 2007 Innovative Application of Technology in a Master's Thesis Award, 2007.
- Nicholas Polys (PhD advisee), Outstanding PhD Dissertation Award, Department of Computer Science, May 2006.
- Glenn Fink (PhD advisee), NSF IGERT graduate fellowship award, 2004-2006.
- Nathan Conklin (MS advisee), Outstanding Master's Thesis Award, Department of Computer Science, May 2002.

***Awards to Undergraduate Research Advisees:***

- Joe Fletcher, Zhizheng Chen, Vijay Kuruvilla, 3<sup>rd</sup> Place Industry Choice Undergraduate Research Award, VTURCS Symposium 2015.
- Lauren Gibboney, Society of Women Engineers (SWE) and College of Engineering Scholarship, 2012.
- Kristen Koch, Undergraduate Research Award, VTURCS Symposium, 2012.
- David Machaj, Scott Connor, and Ron Forbes, 1st place Faculty Choice Undergraduate Research Award, 3rd Place People's Choice Undergraduate Research Award, VTURCS Symposium, 2007.
- Matt Witherspoon, 3rd Place Undergraduate Research Award, VTURCS Symposium, 2006.
- Andrew Sabri, People's Choice Undergraduate Research Award, VTURCS Symposium, 2005; 1st Place Undergraduate Research Award, VTURCS Symposium, 2006.
- Paul Muessig, Faculty Choice Undergraduate Research Award, VTURCS Symposium, 2005.

**Externally Funded Research:** (35 grants. Total = \$15,173,641. Personal share = \$3,608,257)

1. *NSF/NSA, IUCRC SHREC*, "Interactive Analytics with High-Performance Deep Learning", C. North, W. Feng, B. Mayer. 1/2020 - 12/2020. Total: \$40,000. Personal share: \$40,000 (100%). Role: PI. (Supplement to "IUCRC Center for Space, High-performance, and Resilient Computing", PI W. Feng).

2. *Laboratory for Analytic Sciences (LAS) at NCSU*, “Immersive Space to Think: 3D VR/AR Space for Sensemaking of Textual Data”, C. North, D. Bowman. 01/01/2020-12/31/2020. Total: \$103,711. Personal share: \$51,856 (50%). Role: PI.
3. *Microsoft*, “Evaluating Physical and Virtual Large Displays for Windows Productivity Beyond the Desktop”, C. North, D. Bowman. 1/2020 - 12/2020. Total: \$50,000 + equipment (Hololens2, SurfaceHub). Personal share: \$25,000 (50%). Role: PI.
4. *General Dynamics Mission Systems*, “CHITA: Computer Human Interactive Text Analytics”, C. North, N. Polys, S. Leman, L. House, N. Ramakrishnan. 11/2016 – 8/2017. Total: \$300,000. Personal share: \$90,000 (30%). Role: PI.
5. *IARPA*. T. Clancy, N. Ramakrishnan, J. Black, C. North, et al. 5/2016 – 10/2017. Total: \$967,000. Personal share: \$96,700 (10%). Role: Co-PI.
6. *Microsoft*, “Hololens: Collaborative Analysis of Large-scale Visual and Auditory Representations of Data”. J.Gabbard, D.Bowman (with Bukvic, Carstensen, Gracanin, Horning, North, Ogle, Polys, Knapp). 1/2016 – 12/2016. Total: \$100,000. Personal share: 0%. Role: senior personnel.
7. *General Dynamics Mission Systems*, “Human Machine Collaboration for Data Discovery”, C.North, N.Polys, S.Leman, L.House, N.Ramakrishnan. 10/2015 – 8/2016. Total: \$250,000. Personal share: \$75,000 (30%). Role: PI.
8. *NSF*, “CHS: Small: Supporting Crowdsourced Sensemaking in Big Data with Dynamic Context Slices”, K.Luther, C.North. 8/2015 – 9/2018. Total: \$500,000. Personal share: \$250,000 (50%). Role: Co-PI.
9. *US Government*, PI: N. Ramakrishnan. Co-PIs: CT. Lu, C. North, and J. Greene. 3/2015–9/2016. Total: \$ 3,585,438. Personal share: \$358,543 (10%). Role: Co-PI.
10. *NSF*, “BIGDATA: F: DKA: Usable Big Data Analytics via Multi-Scale Visual to Parametric Interaction (MV2PI)”, C. North, S. Leman, L. House, Y. Cao. 9/2014 – 9/2017. Total: \$998,912. Personal share: \$249,278 (25%). Role: PI.
11. *L-3 STRATIS*, “Discovering Coordinated Malicious Activity and Network Usage Patterns”, C. North, N. Ramakrishnan. 7/2014 – 7/2015. Total: \$56,610. Personal share: \$27,805 (50%). Role: PI.
12. *PNNL*, “Display Ecologies and Large-Scale Graph Visualization”, Chris North, Yong Cao. 9/2013 – 6/2014. Total: \$117,548. Personal share: \$58,774 (50%). Role: PI.
13. *L-3 STRATIS*, “Visual Analytics for Cyber Security”, C. North. 1/2013 – 6/2014. Total: \$200,885. Personal share: \$200,885 (100%). Role: PI.
14. *NSF TUES*, “Critical Thinking with Data Visualization (CTDV)”, L. House, S. Leman, C. North, N. Ramakrishnan, K. McConnell. 1/2013 – 12/2015. Total: \$199,943. Personal share: \$39,987 (20%). Role: Co-PI.
15. *NSF HCC*, “Semantic Interaction for Visual Text Analytics”, C. North. 9/2012 - 8/2015. Total: \$516,000. Personal share: \$516,000 (100%). Role: PI. [Includes NSF REU supplement]
16. *DDL OMNI Engineering LLC*, “STTR: Information Saliency”, C. North, S. Leman. 6/2012 – 12/2012. Total: \$43,957. Personal share: \$32,968 (75%). Role: PI.
17. *S2ERC (NSF I/UCRC & L-3 STRATIS)*, “Large Displays For Cyber Analytics”, C. North. 2/2012 - 1/2014. Total: \$35,000. Personal share: \$35,000 (100%). Role: PI.

18. *NSF CRI*, “II-EN: Device and Display Ecologies”, F. Quek, T. Martin, C. North, T. Smith-Jackson, D. Bowman, D. Gracanin, M. Evans. 5/2011 - 5/2014. Total: \$600,000. Personal share: \$78,000 (13%). Role: Co-PI.
19. *NSF DUE*, “Advancing Personalized Engineering Learning Via An Adaptive Concept Map”, C. Williams, A. Johri, C. North. 4/2011 – 3/2014. Total: \$198,753. Personal share: \$59,625 (30%). Role: Co-PI.
20. *NIA (FAA)*, “Continuous Adaptive Planning to Support Gate-to-Gate Management: Human Factors Issues”, C. North. 1/2011 – 11/2012. Total: \$135,000. Personal share: \$135,000 (100%). Role: PI.
21. *Agilent Technologies*, “GigaPixel Visualization for Bioinformatics”, C. North. 1/2011 – 12/2011. Total: \$23,250. Personal share: \$23,250 (100%). Role: PI.
22. *DHS VACCINE (Visual Analytics Center of Excellence)*, sub to *Purdue University*. “Co-Located Collaborative Visual Analytics on Large, High-Resolution Displays”, C. North. 12/2010 – 7/2012. Total: \$40,000. Personal share: \$40,000 (100%). Role: PI.
23. *NSF*, “User-Guided Spatializations for Visualizing NSF Award Portfolios”, C. North, S. Leman, L. House. 5/2010 – 11/2010. Total: \$24,900. Personal share: \$14,940 (60%). Role: PI.
24. *NSF FODAVA*, “Formal Models, Algorithms, and Visualizations for Storytelling Analytics”, N. Ramakrishnan, C. North, F. Quek. 10/2009 - 10/2014. Total: \$710,100. Personal share: \$248,535 (35%). Role: Co-PI.
25. *NSF FODAVA*, “Bayesian Analysis in Visual Analytics”, S. Leman, L. House, C. North. 10/2009 - 10/2013. Total: \$499,307. Personal share: \$99,861 (20%). Role: Co-PI.
26. *NSF*, “SGER: DL-VT416: A Digital Library Testbed for Research Related to 4/16/07 at Virginia Tech”, E. Fox, P. Fan, C. North, N. Ramakrishnan, D. Shoemaker. 5/2007 – 1/2009. Total: \$211,993. Personal share: \$42,399 (20%). Role: Co-PI.
27. *NSF CRI*, “Interfaces for the Embodied Mind”, F. Quek, W. Winchester, Y. Xiong, D. Tatar, D. Bowman; C. North (Sr. Pers.), et al. 4/2006 – 4/2008. Total: \$416,000. Personal share: \$20,800 (5%). Role: Senior Personnel.
28. *NSF HCC*, “SGER: Designing Scalable Interactive Information Visualizations on High Resolution Displays”, C. North. 4/2006 - 9/2007. Total: \$99,883. Personal share: \$99,883 (100%). Role: PI.
29. *NuTech Inc. (for IARPA)*, “Geographic Data Visualization on High-Resolution Displays”, C. North. 3/2006 – 12/2006. Total: \$41,500. Personal share: \$41,500 (100%). Role: PI.
30. *NIST*, “Flexible and Extensible Multivariate Data Visualization: Toward a Collaboratory for Sharing Data Findings”, S. McCrickard, C. North, D. Neale. 7/2005-5/2007. Total: \$109,729. Personal share: \$43,892 (40%). Role: Co-PI.
31. *ARDA & NGA (National Geospatial-intelligence Agency)*, “Ultra-High Resolution Interactive Information Visualization”, C. North, L. Carstensen. 2/2005 – 5/2010. Total: \$708,016. Personal share: \$566,413 (80%). Role: PI.
32. *NSF RR*, “Towards Unbounded Display: Developing a Reconfigurable Research Testbed for Large-scale, High-resolution Visual Displays”, C. North, D. Bowman, R. Ehrich, S. Harrison. 8/2004 – 7/2009. Total: \$242,067. Personal share: \$60,517 (25%). Role: PI.
33. *Agilent Technologies*, “Visualization Schemas for Bioinformatics”, C. North, 9/2002 – 8/2004. Total: \$35,000. Personal share: \$35,000 (100%). Role: PI.

34. *U.S. Bureau of the Census, Dept. of Commerce*, “DynaMaps for Counties USA”, C. North, 7/2002 – 5/2004. Total: \$45,831. Personal share: \$45,831 (100%). Role: PI.
35. *USENIX Association*, “Automated Data Structure Visualization”, C. North, 1/2002 – 6/2003. Total: \$10,160. Personal share: \$10,160 (100%). Role: PI.

**Internally Funded Grants:** (not included in funding totals)

- *ICAT*, “Human-Centered Data Science”, C. North. 1/2020 – 6/2020. Total: \$11,000. Role: PI.
- *Data & Decisions Destination Area*, “Immersive Space to Think (IST): Combining Virtual Reality and Analytics for Improved Sensemaking”, PI Bowman, North, Horning, Mitra, Polys. 12/2017 – 5/2018. Total: \$10,000. Role: Co-PI.
- *ICTAS*, “Supporting Crowdsourced Sensemaking and Discovery in Big Data with Context Slices”, K.Luther, C.North. 1/2015 – 6/2015. Total: \$10,000. Role: Co-PI.
- *ICAT*, “Be the Data”, L. House, C. North, S. Leman, W. Feng. 8/2014 – 8/2015. Total: \$30,000. Role: Co-PI.
- *ICTAS*, “Visual Analytics”, Y. Cao, C. North. 9/2012 – 5/2013. Total: \$40,000. Role: Co-PI.
- *CHCI*, “Visual Programming for Audio Mixing”, C. North, B. Knapp, I. Bukvic. 1/2013-5/2013. Total: \$10,000. Role: PI.
- *CHCI*, “Ecology of Displays”, F. Quek, C. North. 1/2010-5/2010. Total: \$10,000. Role: Co-PI.

**Software and Equipment Grants:** (not included in funding totals)

- *Microsoft*, Perceptive Pixel displays (two units), C. North. 8/2014. Total value: \$15,000.
- *Spotfire, Inc.*, software grant for two licenses of “Spotfire DecisionSite, Lead Discovery, and Functional Genomics”, C. North, 9/2004 - 9/2007. Total value: \$8970.
- *SAS Institute*, software grant for “SAS JMP”, C. North, 8/2003. Total value: \$500.

**Edited Special Issues, Proceedings, Books:**

- M. Chen, D. Ebert, H. Hauser, J. Heer, C. North, H. Qu, HW. Shen, M. Tory, A. Ynnerman, (editors), “Proceedings of VIS 2014”, *IEEE Transactions on Visualization and Computer Graphics*, Vol. 20, No. 12, Dec 2014.
- J. Dykes, H. Hauser, J. Heer, D. Laidlaw, C. North, G. Santucci, H.W. Shen, A. Ynnerman (editors), “Proceedings of VIS 2013”, *IEEE Transactions on Visualization and Computer Graphics*, Vol. 19, No. 12, Dec 2013.
- S. Carpendale, M. Chen, C. Hansen, K.L. Ma, C. North, (editors), “Proceedings of IEEE Visualization 2008 and Information Visualization 2008”, *IEEE Transactions on Visualization and Computer Graphics*, Vol. 14, No. 6, Nov/Dec 2008. (648 pages)
- A. Kerren, J. Stasko, JD. Fekete, C. North (editors), *Information Visualization – Human-Centered Issues in Visual Representation, Interaction, and Evaluation*. Springer-Verlag, August 2008. (176 pages)

- C. Plaisant, C. North (guest editors), “Special Issue in Honor of Ben Shneiderman’s 60th Birthday: Reflections on Human-Computer Interaction”, *Intl. Journal of Human-Computer Interaction*, vol. 23, No. 3, Dec 2007, (191 pages). Guest editors preface pg. 195-204.
- M. Chen, C. Hansen, C. North, A. Pang, J. vanWijk (editors), “Proceedings of IEEE Visualization 2007 and Information Visualization 2007”, *IEEE Transactions on Visualization and Computer Graphics*, Vol. 13, No. 6, Nov/Dec 2007. (661 pages)
- C. North, M. Haley (editors), *Conference Compendium of IEEE Visualization 2006, IEEE Symposium on Information Visualization 2006, IEEE Symposium on Visual Analytics Science and Technology 2006*, October 2006.
- C. North, T.M. Rhyne, K. Duca (guest editors), "Special Issue on Bioinformatics Visualization", *Information Visualization*, 4(3), Sept 2005, (95 pages). Guest editors preface pg. 147-148.

### Book Chapters:

- Wolfgang Büschel, Jian Chen, Raimund Dachsel, Steven Drucker, Tim Dwyer, Carsten Görg, Tobias Isenberg, Andreas Kerren, Chris North, and Wolfgang Stuerzlinger, “Interaction for Immersive Analytics”, chapter in *Immersive Analytics*, LNCS11190, Springer, pg. 95-138, 2018.
- Wolfgang Stuerzlinger, Tim Dwyer, Steven Drucker, Carsten Görg, Chris North, and Gerik Scheuermann, “Immersive Human-Centered Computational Analytics”, chapter in *Immersive Analytics*, LNCS11190, Springer, pg. 139-164, 2018.
- Chris North, "Information Visualization", chapter in *Handbook of Human Factors and Ergonomics, 4th Edition*, G. Salvendy (editor), New York: John Wiley & Sons, pg. 1209-1236, 2012.
- Jean-Daniel Fekete, Jarke van Wijk, John Stasko, Chris North, "The Value of Information Visualization", chapter in *Information Visualization: Human-Centered Issues and Perspectives*, Springer-Verlag, pp. 1-18, 2008.
- Chris North, "Information Visualization", chapter in *Handbook of Human Factors and Ergonomics, 3rd Edition*, G. Salvendy (editor), New York: John Wiley & Sons, pg. 1222-1246, 2005.
- C. North, B. Shneiderman, C. Plaisant, “User Controlled Overviews of an Image Library: A Case Study of the Visible Human”, in *Readings in Information Visualization: Using Vision to Think*, Card, Mackinlay, Shneiderman (editors), pg. 570-578, Morgan Kaufmann, 1999.
- Chris North, Ben Shneiderman, Catherine Plaisant. “Visual Information Seeking in Digital Image Libraries: The Visible Human Explorer”, chapter in *Information in Images*, Glenn Becker (Editor), Thomson Technology Labs, 1997.

### Journal Publications: (Total = 50)

1. Maoyuan Sun, Jian Zhao, Hao Wu, Kurt Luther, Chris North, Naren Ramakrishnan. “The Effect of Edge Bundling and Seriation on Sensemaking of Biclusters in Bipartite Graphs”, *IEEE Transactions on Visualization and Computer Graphics*, 25(10): 2983-2998, Oct 2019.
2. R. Skarbez, N. Polys, T. Ogle, C. North, D. Bowman. “Immersive Analytics: Theory and Research Agenda”, *Frontiers in Robotics and AI*, 6:82, Sept 2019.  
<https://doi.org/10.3389/frobt.2019.00082>
3. 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*, 16:49–58, July 2019.  
<https://doi.org/10.1016/j.bdr.2019.04.003> [Journal Impact Factor: 2.952]

4. Moeti Masiane, Anne Driscoll, Wuchun Feng, John Wenskovitch, and Chris North. “Towards Insight-Driven Sampling for Big Data Visualization,” *Behaviour & Information Technology*, pp. 1–20, May 2019. <https://doi.org/10.1080/0144929X.2019.1616223>
5. Reach C, North C. “Smooth, Efficient, and Interruptible Zooming and Panning”, *IEEE Transactions on Visualization & Computer Graphics*, 25(2):1421-1434, Feb 2019.
6. Michelle Dowling, John Wenskovitch, J.T. Fry, Leanna House, Scotland Leman, Chris North. “SIRIUS: Dual, Symmetric, Interactive Dimension Reductions”, *IEEE Transactions on Visualization and Computer Graphics* (IEEE VAST 2018), 25(1):172-182, Jan. 2019.
7. Yolanda Gil, Suzanne A. Pierce, Hassan Babaie, Arindam Banerjee, Kirk Borne, Gary Bust, Michelle Cheatham, Imme Ebert-Uphoff, Carla Gomes, Mary Hill, John Horel, Leslie Hsu, Jim Kinter, Craig Knoblock, David Krum, Vipin Kumar, Pierre Lermusiaux, Yan Liu, Chris North, Victor Pankratius, Shanan Peters, Beth Plale, Allen Pope, Sai Ravela, Juan Restrepo, Aaron Ridley, Hanan Samet, Shashi Shekhar, “Intelligent Systems for Geosciences: An Essential Research Agenda”, *Communications of the ACM*, Vol. 62 No. 1, Pages 76-84, January 2019.
8. Jessica Zeitz Self, Michelle Dowling, John Wenskovitch, Ian Crandell, Ming Wang, Leanna House, Scotland Leman, Chris North. “Observation-Level and Parametric Interaction for High-Dimensional Data Analysis”, in *ACM Transactions on Interactive Intelligent Systems (TIIS)*, 8(2), 36 pages, July 2018.
9. Haeyong Chung, Chris North. “SAViL: Cross-Display Visual Links for Sensemaking in Display Ecologies”, *Personal and Ubiquitous Computing*, 22(2):409-431, April 2018.
10. Xin Chen, Jessica Zeitz Self, Leanna House, John Wenskovitch, Maoyuan Sun, Nathan Wycoff, Jane Robertson Evia, Scotland Leman, Chris North. “Be the Data: Embodied Visual Analytics,” in *IEEE Transactions on Learning Technologies*, 11(1):81-95, 2018.
11. Hao Wu, Maoyuan Sun, Peng Mi, Nikolaj Tatti, Chris North, Naren Ramakrishnan. “Interactive Discovery of Coordinated Relationship Chains with Maximum Entropy Models”, *ACM Transactions on Knowledge Discovery from Data*, vol.12, no.1, 34 pages, Jan 2018.
12. 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* (IEEE VAST 2017), 24(1):131–141, Jan 2018.
13. P. Mi, M. Sun, M. Masiane, Y. Cao, C. North, “Interactive Graph Layout of a Million Nodes”, *MDPI Informatics*, special issue on Information Visualization for Massive Data, 3(4):23, 20 pages, December 2016.
14. P. Mi, M. Sun, M. Masiane, Y. Cao, C. North, “AVIST: A GPU-Centric Design for Visual Exploration of Large Multidimensional Datasets”, *MDPI Informatics*, special issue on Information Visualization for Massive Data, 3(4):18, 20 pages, October 2016.
15. M. Sun, M. Peng, C. North, N. Ramakrishnan. “BiSet: Semantic Edge Bundling with Biclusters for Sensemaking”, *IEEE Transactions on Visualization and Computer Graphics*, 22(1):310-319, Jan 2016.
16. A. Endert, R. Chang, C. North, M. Zhou. “Semantic Interaction: Coupling Cognition and Computation through Usable Interactive Analytics”, *IEEE Computer Graphics & Applications*, 35(4):94-99, July 2015.

17. J. Moore, C.B. Williams, C. North, A. Johri, M. Paretto. "Effectiveness of Adaptive Concept Maps for Promoting Conceptual Understanding: Findings from a Design-Based Case Study of a Learner-Centered Tool", *ASEE Advances in Engineering Education*, vol. 4, no. 4, 35 pages, 2015.
18. M. Sun, C. North, N. Ramakrishnan. "A Five-Level Design Framework for Bicluster Visualizations", *IEEE Transactions on Visualization and Computer Graphics*, 20:1713-1722, Dec 2014.
19. C. Rohrdantz, F. Mansmann, C. North, D. Keim. "Augmenting Educational Curriculum with the VAST Challenge: Opportunities and Pitfalls", *Information Visualization*, vol. 13, no. 4, pg. 313-325, October 2014.
20. H. Chung, C. Andrews, C. North. "A Survey of Software Frameworks for Cluster-Based Large High-Resolution Displays", *IEEE Transactions on Visualization and Computer Graphics*, 20(8):1158-1177, August 2014.
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**Conference Publications (peer-reviewed, full papers):** (Total = 72)

1. H. Manzoor, A. Naik, C. Shaffer, C. North, S. Edwards. “Auto-Grading Jupyter Notebooks”, *Proceedings of ACM Special Interest Group on Computer Science Education (SIGCSE)*, 6 pages, Mar 2020.
2. John Wenskovitch, Michelle Dowling, and Chris North. “What Respect to What: Simultaneous Interaction with Dimension Reduction and Clustering Projections,” *Proceedings of ACM International Conference on Intelligent User Interfaces (IUI)*, Cagliari, Italy, 12 pages, Mar 2020. [Acceptance Rate: 23.4%.]
3. Tianyi Li, C. Manns, C. North, K. Luther. “Dropping the Baton?: Understanding Errors and Bottlenecks in a Crowdsourced Sensemaking Pipeline”, *Proceedings of the ACM on Human-Computer Interaction*, 3 (CSCW), 136, 26 pages, Nov 2019. <http://doi.acm.org/10.1145/3359238> [31% acceptance rate]
4. John Wenskovitch and Chris North. “Pollux: Interactive Cluster-First Projections of High-Dimensional Data,” *Proceedings of IEEE 2019 Symposium on Visualization in Data Science (VDS)*, Vancouver, BC, Canada, 10 pages, Oct 2019. [Acceptance Rate: 29.6%]
5. John Wenskovitch, Jian Zhao, Scott Carter, Matthew Cooper, and Chris North. “Albireo: An Interactive Tool for Visually Summarizing Computational Notebook Structure,” *Proceedings of IEEE 2019 Symposium on Visualization in Data Science (VDS)*, Vancouver, BC, Canada, 10 pages, Oct 2019. [Acceptance Rate: 29.6%]
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21. A. Endert, P. Fiaux, C. North, “Semantic Interaction for Visual Text Analytics”, *ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 473–482, May 2012. [23% acceptance rate]
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32. C. Andrews, A. Endert, C. North, "Space to Think: Large, High-Resolution Displays for Sensemaking", *ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 55-64, April 2010. [22% acceptance rate] [Best Paper Honorable Mention award]
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37. D. Machaj, C. Andrews, C. North, "Co-located Many-player Gaming on Large High-resolution Displays", *International Symposium on Social Computing Applications, IEEE International Conference on Social Computing*, pp. 697-704, August 2009. [20% acceptance rate]
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  45. L. Shupp, R. Ball, B. Yost, J. Booker, C. North, "Evaluation of Viewport Size and Curvature of Large, High-Resolution Display", *Proceedings of Graphics Interface (GI)*, pg. 123-130, June 2006. [33% acceptance rate]
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  47. R. Ball, M. Varghese, B. Carstensen, E.D. Cox, C. Fierer, M. Peterson, C. North, "Evaluating the Benefits of Tiled Displays for Navigating Maps", *IASTED International Conference on Human-Computer Interaction*, pg. 66-71, Nov 2005.
  48. G. Fink, P. Muessig, C. North, "Visual Correlation of Host Processes and Network Traffic", *Workshop on Visualization for Computer Security (VizSec), IEEE Visualization Conference*, pg. 11-19, 2005. [40% acceptance rate]
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  50. P. Saraiya, P. Lee, C. North, "Visualization of Graphs with Associated Timeseries Data", *IEEE Symposium on Information Visualization (InfoVis)*, pg. 225- 232, 2005. [27% acceptance rate]
  51. R. Ball, C. North, "An Analysis of User Behavior on High-Resolution Tiled Displays", *Tenth IFIP TC13 International Conference on Human-Computer Interaction (INTERACT)*, LNCS volume 3585/2005, pg. 350-364, 2005. [27% acceptance rate]
  52. S. Krishnamoorthy, C. North, "Learnability of Interactive Coordinated-View Visualizations", *International Conference on Information Visualisation (IV)*, pg. 306-311, 2005.
  53. R. Ball, G.A. Fink, C. North, "Home-Centric Visualization of Network Traffic for Security Administration", *CCS Workshop on Visualization and Data Mining for Computer Security*, pg. 55-64, 2004.
  54. P. Saraiya, C. North, K. Duca, "An Evaluation of Microarray Visualization Tools for Biological Insight", *IEEE Symposium on Information Visualization (InfoVis)*, pg. 1-8, 2004. [30% acceptance rate]

55. N. Kampanya, R. Shen, S. Kim, C. North, E.A. Fox, "Citiviz: A Visual User Interface to the CITIDEL System", *8th European Conference on Digital Libraries (ECDL)*, LNCS vol. 3232/2004, pg. 122-133, 2004. [32% acceptance rate]
56. D. Raja, D. Bowman, J. Lucas, C. North, "Exploring the Benefits of Immersion in Abstract Information Visualization", *8th International Immersive Projection Technology Workshop*, 8 pages, 2004.
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58. P. Saraiya, C.A. Shaffer, D.S. McCrickard, C. North, "Effective Features of Algorithm Visualizations", *ACM Technical Symposium on Computer Science Education (SIGCSE)*, pg. 382 - 386, 2004. [28% acceptance rate]
59. N. Polys, M. Moldenhauer, A. Ray, C. Dandekar, C. North, D. Bowman, "Snap2Diverse: Coordinating Information Visualizations and Virtual Environments", *Proceedings of SPIE Conference on Visualization and Data Analysis (VDA)*, pg. 189-200, 2004.
60. Y.S. Ryu, B. Yost, G. Convertino, J. Chen, C. North, "Exploring Cognitive Strategies for Integrating Multiple-View Visualizations", *Human Factors and Ergonomics Society 47th Annual Meeting (HFES)*, pg. 591-595, 2003. [Award for Best Student-Authored Paper]
61. Q. Li, C. North, "Empirical Comparison of Dynamic Query Sliders and Brushing Histograms", *IEEE Symposium on Information Visualization (InfoVis)*, pg. 147-154, 2003. [32% acceptance rate]
62. D. Bowman, C. North, J. Chen, N. Polys, P. Pyla, U. Yilmaz, "Towards Usable and Effective Information-Rich Virtual Environments", *ACM Virtual Reality Software and Technology (VRST)*, pg. 81-90, 2003. [35% acceptance rate]
63. G. Convertino, J. Chen, B. Yost, Y.S. Ryu, C. North, "Exploring Context Switching and Cognition in Dual-View Coordinated Visualizations", *Intl. Conf. on Coordinated & Multiple Views in Exploratory Visualization (CMV)*, pg. 55-62, 2003.
64. C. North, N. Conklin, V. Saini, "Visualization Schemas for Flexible Information Visualization", *IEEE Symposium on Information Visualization (InfoVis)*, pg. 15-22, 2002. [27% acceptance rate]
65. S. Jayaraman, C. North, "A Radial Focus+Context Visualization for Multi-Dimensional Functions", *IEEE Visualization Conference (Vis)*, pg. 443-450, 2002. [33% acceptance rate]
66. C. M. Chewar, D.S. McCrickard, A. Ndiwalana, C. North, J. Pryor, D. Tessoroff, "Secondary Task Display Attributes: Optimizing Visualizations for Cognitive Task Suitability and Interference Avoidance", *Eurographics IEEE TCVG Symposium on Visualization (VisSym)*, pg. 165-171, 2002. [39% acceptance rate]
67. J. Somervell, D.S. McCrickard, C. North, M. Shukla, "An Evaluation of Information Visualization in Attention-Limited Environments", *Eurographics IEEE TCVG Symposium on Visualization (VisSym)*, pg. 211-216, 2002. [39% acceptance rate]
68. G. Dang, C. North, B. Shneiderman, "Dynamic Queries and Brushing on Choropleth Maps", *International Conference on Information Visualisation (IV)*, pg. 757-764, 2001.
69. C. North, "Multiple Views and Tight Coupling in Visualization: A Language, Taxonomy, and System", *Workshop of Fundamental Issues in Visualization (FIV), CSREA International Conference on Imaging Science, Systems, and Technology (CISST)*, pg. 626-632, 2001.



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72. C. North, B. Shneiderman, C. Plaisant. “User Controlled Overviews of an Image Library: A Case Study of the Visible Human”, *ACM Digital Libraries Conference (DL)*, pg. 74-82, 1996.

### Workshop Papers, Conference Short Papers, Videos, Posters:

- Yali Bian, John Wenskovitch, and Chris North. “DeepVA: Bridging Cognition and Computation through Semantic Interaction and Deep Learning”, *IEEE VIS 2019 Workshop on Machine Learning from User Interactions for Visualization and Analytics (MLUI)*, 10 pages, Oct 2019.
- Yali Bian, M. Dowling, C. North. “Evaluating Semantic Interaction on Word Embeddings via Simulation”, *IEEE VIS 2019 Workshop on Evaluation of Interactive Visual Machine Learning Systems (EVIVA)*, 5 pages, Oct 2019.
- Sun M, Koop D, Zhao J, North C, Ramakrishnan N. “Interactive Bicluster Aggregation in Bipartite Graphs”, *Proceedings of VIS 2019 Short Papers*, 5 pages, Oct 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*, Vancouver, BC, Canada, 9 pages, Oct 2019.
- Lata Kodali, John Wenskovitch, Nathan WycOFF, Leanna House, and Chris North. “Uncertainty in Interactive WMDS Visualizations,” in *Symposium on Visualization in Data Science (VDS)*, Vancouver, BC, Canada, Oct 2019. (Poster)
- 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*, Glasgow, UK, 6 pages, Apr 2019.
- John Wenskovitch, Michelle Dowling, and Chris North. “Simultaneous Interaction with Dimension Reduction and Clustering Projections,” in *Proceedings of the ACM 24th International Conference on Intelligent User Interfaces: Companion. IUI '19*. Marina del Rey, California, pp. 89–90, Mar 2019. DOI: 10.1145/3308557.3308718. (Poster)
- Dowling M, Wenskovitch J, Hauck P, Binford A, Polys N, North C. “A Bidirectional Pipeline for Semantic Interaction”, *IEEE VIS Workshop on Machine Learning from User Interaction for Visualization and Analytics*, Berlin, Germany, 11 pages, October 2018.
- Wenskovitch J, Dowling M, North C. “The Cognitive and Computational Benefits and Limitations of Clustering for Sensemaking”, *ACM CHI '18 Workshop on Sensemaking in a Senseless World*, Montreal, Canada, 14 pages, May 2018. [21% acceptance rate for full presentations]
- Tianyi Li, A. Shah, K. Luther, and C. North. “Crowdsourcing Intelligence Analysis with Context Slices”, *ACM CHI 2018 Workshop on Sensemaking in a Senseless World*, Montréal, Canada, 12 pages, May 2018. [21% acceptance rate for full presentations]
- John Wenskovitch and Chris North. “Visual Analytics and Semantic Interaction to Explore Astronomical Data,” in *European Week of Astronomy and Space Science (EWASS)*, April 2018.

- X. Chen, J. Self, M. Sun, L. House, C. North, “Be the Data: Social Meetings with Visual Analytics”, in *CTS International Workshop on Visualization and Collaboration (VisualCol 2016)*, 8 pages, November 2016.
- S. Mehta, C. North, and K. Luther. “An Exploratory Study of Human Performance in Image Geolocation Tasks”, in *HCOMP 2016 GroupSight Workshop on Human Computation for Image and Video Analysis*, Austin, TX, USA, 4 pages, November 2016.
- J. Self, R.K. Vinayagam, J.T. Fry, C. North, “Bridging the Gap between User Intention and Model Parameters for Data Analytics”, in *SIGMOD 2016 Workshop on Human-In-the-Loop Data Analytics (HILDA 2016)*, 6 pages, June 2016. [50% acceptance rate]
- J. Self, X. Hu, L. House, S. Leman, C. North, “Designing Usable Interactive Visual Analytics Tools for Dimension Reduction”, in *CHI 2016 Workshop on Human-Centered Machine Learning*, 7 pages, May 2016. [45% acceptance rate]
- M. Sun, M. Peng, H. Wu, C. North, N. Ramakrishnan, “Usability Challenges underlying Bicluster Interaction for Sensemaking”, in *CHI 2016 Workshop on Human-Centered Machine Learning*, 6 pages, May 2016. [45% acceptance rate]
- X. Chen, J. Self, L. House and C. North. “Be the Data: A New Approach for Immersive Analytics”, in *VR 2016 Workshop on Immersive Analytics*, 6 pages, March 2016.
- J. Wang, L. Bradel, C. North. “Event-Based Text Visual Analytics”, *VAST Challenge 2014, IEEE Visual Analytics Science and Technology (VAST)*, Nov 2014. (Contest Entry)
- J. Wang, P. Mi, C. North. “Making Sense of Daily Life Data: From Commonalities To Anomalies”, *VAST Challenge 2014, IEEE Visual Analytics Science and Technology (VAST)*, Nov 2014. (Contest Entry)
- A. Endert, C. North, R. Chang, M. Zhou. “Toward Usable Interactive Analytics: Coupling Cognition and Computation”, *Proceedings of KDD 2014 Workshop on Interactive Data Exploration and Analytics (IDEA)*, pg. 52-56, Aug. 2014.
- M. Sun, L. Bradel, C. North, and N. Ramakrishnan, “The Role of Interactive Biclusters in Sensemaking”, *ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 1559–1562, April 2014. (Short talk) [22.8% acceptance rate]
- L. Bradel, J. Self, A. Endert, M.S. Hossain, C. North, N. Ramakrishnan, “How Analysts Cognitively ‘Connect the Dots’”, *IEEE International Conference on Intelligence and Security Informatics (ISI)*, pg. 24–26, June 2013. (Short talk)
- J. Self, R. Zeitz, C. North, A. Breitler, “Auto-Highlighter: Identifying Salient Sentences in Text”, *IEEE International Conference on Intelligence and Security Informatics (ISI)*, pg. 260-262, June 2013. (Short talk)
- J. Wang, K. Dent, C. North, “Fisheye Word Cloud for Temporal Sentiment Exploration”, *ACM CHI Extended Abstracts on Human Factors in Computing Systems*, pg. 1767-1772, April 2013. (Poster) [32% acceptance rate]
- Douglas Smith, Haeyong Chung, Eric Ragan, Jessica Self, Chris North, Anthony Cate, “Spatial and semantic memory for kinesthetic learning in large-scale visual displays.” *Society for Neuroscience*, 2013.
- A. Endert, C. North. “Interaction Junk: User Interaction based evaluation of visual analytics”, *BELIV Workshop at IEEE VisWeek*, 3 pages, 2012. (Short talk)
- Y. Cao, R. Moore, P. Mi, A. Endert, C. North, R. Marchany. “Dynamic analysis of large datasets with animated and correlated views”, *VAST Challenge 2012, IEEE Visual Analytics Science and Technology (VAST)*, pg. 283-284, 2012. (Contest Entry) [Honorable Mention award]

- H. Chung, Y. J. Cho, J. Self, C. North, "Pixel-oriented Treemap for multiple displays", *VAST Challenge 2012, IEEE Visual Analytics Science and Technology (VAST)*, pg. 289-290, 2012. (Contest Entry)
- A. Endert, P. Fiaux, C. North, "Unifying the Sensemaking Loop with Semantic Interaction", *Workshop on Interactive Visual Text Analytics for Decision Making, at IEEE VisWeek*, 4 pages, October 2011. (Short talk)
- C. Andrews, MS. Hossain, S. Gad, N. Ramakrishnan, C. North. "Analyst's workspace: Protecting vastopolis", *VAST Challenge 2011, IEEE Conference on Visual Analytics Science and Technology (VAST)*, pg. 323-324, Oct 2011. (Contest Entry) [VAST Challenge Award]
- T. Ni, D. Bowman, C. North. "AirStroke: bringing unistroke text entry to freehand gesture interfaces", *ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 2473-2476, May 2011. (Short talk) [27% acceptance rate]
- C. Andrews, A. Endert, C. North, "Analyst Workspace", *VAST Challenge 2010 Workshop, IEEE VisWeek 2010*, Oct 2010. (Contest Entry)
- A. Endert, C. Andrews, G.A. Fink, C. North, "Professional Analysts using a Large, High-Resolution Display", *VAST Challenge 2009, IEEE Conference on Visual Analytics Science and Technology (VAST)*, pg. 273-274, 2009. (Contest Entry) [Awarded Special Contributions to the VAST Challenge Contest]
- J. Booker, T. Buennemeyer, A. Sabri, C. North, "High-resolution displays enhancing geotemporal data visualizations", *ACM Southeast Regional Conference*, pg. 443-448, 2007. (Short talk) [59% acceptance rate]
- J. Booker, T. Buennemeyer, A. Sabri, C. North, "High-Resolution Displays Enhancing Geotemporal Data Visualizations", *IEEE Intelligence and Security Informatics (ISI)*, 2 pages, July 2006. (Poster)
- R. Ball, A. Sabri, M. Varghese, C. North, "Tracking User Navigation and Performance on High-Resolution Displays using a Dynamic Real-Time Strategy Game", *Compendium Proc. of IEEE Symposium on Information Visualization (InfoVis)*, pg. 5-6, October 2005. (Poster)
- R. Ball, C. North, "Effects of Tiled High-Resolution Display on Basic Visualization and Navigation Tasks", *ACM Extended Abstracts on Human Factors in Computing Systems (CHI)*, pg. 1196-1199, 2005. (Short talk) [25% acceptance rate]
- B. Yost, C. North, "Single Complex Glyphs Versus Multiple Simple Glyphs", *ACM Extended Abstracts on Human Factors in Computing Systems (CHI)*, pg. 1889-1892, 2005. (Poster) [36% acceptance rate]
- C. North, "High-Resolution Displays for Visualization", *NSF/NIH Workshop on Visualization Research Challenges*, NIH, 2004. (Position statement)
- C. North, "Snap-Together Visualization", *Workshop on Visualization Software Infrastructures, at IEEE Symposium on Information Visualization (InfoVis)*, 2004. (Position statement)
- Polys, N., Bowman, D., North, C., "Information-Rich Virtual Environments: Challenges and Outlook", *NASA Workshop on the Knowledge Integrating Virtual Iron Bird*, 8 pages, (Monterey, April 2004).
- P. Saraiya, K. Duca, C. North, "A Biochemical Pathway Tool for Visualization and Discovery Using Functional Genomics and Proteomics Data", *Biomedical Information Science and Technology Initiative (BISTI) Symposium, Digital Biology: The Emerging Paradigm*, NIH, 2003. (Poster)
- N. Polys, D. Bowman, K. Duca, R. Laubenbacher, C. North, "Interactive Visualization of Biological Databases Using Information-Rich Virtual Environments", *Biomedical Information*

*Science and Technology Initiative (BISTI) Symposium, Digital Biology: The Emerging Paradigm*, NIH, 2003. (Poster)

- J. Carroll, D. Bowman, S. McCrickard, C. North, M. Pérez-Quiñones, M. Rosson, “Center for Human-Computer Interaction at Virginia Tech”, *Proceedings of IFIP TC13 International Conference on Human-Computer Interaction (INTERACT)*, pp. 1061-1062, 2003. (Short talk)
- Q. Li, C. North, “Dynamic Query Sliders vs. Brushing Histograms”, *Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 834-835, 2003. (Short talk) [38% acceptance rate]
- C. North, N. Conklin, K. Idukuri, V. Saini, Q. Yu, “Fusion: Interactive Coordination of Diverse Data, Visualizations, and Mining Algorithms”, *ACM CHI Extended Abstracts on Human Factors in Computing Systems (CHI)*, pg. 626-627, April 2003. (Short talk)
- N. Conklin, S. Prabhakar, C. North, “Multiple Foci Drill-Down through Tuple and Attribute Aggregation Polyarchies in Tabular Data”, *IEEE Symposium on Information Visualization (InfoVis)*, pg. 131-134, 2002. (Short talk) [27% acceptance rate]
- C. North, “Dynamically Integrating Diverse Data and Tools for Flexible Bioinformatics Visualization: Putting the Biologist in Control of the Loop, Letting the Computer Scientist Out of the Loop”, *Workshop on Visualization in Bioinformatics and Cheminformatics, IEEE Visualization Conference*, October 2002. (Short talk)
- J. Wang, A. Agrawal, A. Bazaz, S. Angle, E. Fox, C. North, “Enhancing the Envision Interface for Digital Libraries”, *Proc. ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, pg. 275-276, 2002. (Short talk)
- V. Colaso, A. Kamal, P. Saraiya, C. North, D.S. McCrickard, C.A. Shaffer, “Learning and Retention in Data Structures: A Comparison of Visualization, Text, and Combined Methods”, *AACE World Conference on Educational Multimedia, Hypermedia & Telecommunications (ED-MEDIA)*, 2 pages, 2002. (Short talk)
- S. Prabhakar, N. Conklin, C. North, “Breakdown Visualization: Multiple Foci Polyarchies of Values and Attributes”, *Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 800-801, 2002. (Short talk) [16% acceptance rate]
- D. Tessorf, C. Chewar, A. Ndiwalana, J. Pryor, D.S. McCrickard, C. North. “An Ordering of Secondary Task Display Attributes”, *Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 600-601, 2002. (Short talk) [16% acceptance rate]
- C. North, U. Farooq, D. Akhter, “DataWear: Revealing Trends of Dynamic Data in Visualizations”, *IEEE Symposium on Information Visualization (InfoVis), Late Breaking Hot Topics*, pg. 8-11, 2001. (Short talk)
- M. Beale, D.S. McCrickard, C. North, M. Einstein, P. Saraiya, “Visualizing Communication Timelines Containing Sparsely Distributed Clusters”, *IEEE Symposium on Information Visualization (InfoVis), Late Breaking Hot Topics*, pg. 16-19, 2001. (Short talk)
- Y. Tian, M. Clement, M. Ellis, J. Steele, C. North, "Gene Expression Mural: Visualizing Gene Expression Databases", *Work-in-Progress Compendium Proceedings of the IEEE Visualization Conference*, 2 pages, 2001. (Short talk)
- C. North, B. Shneiderman, “Component-Based, User-Constructed, Multiple-View Visualization”, *Extended Abstracts and Video Proc. of the ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 201-202, 2001. (Poster)
- C. North. “Robust, End-User Programmable, Multiple-Window Coordination”, *Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 60-61, 1998. (Poster)

- C. North, F. Korn, “Browsing Anatomical Image Databases: A Case Study of the Visible Human”, *Extended Abstracts and Video Proc. of the ACM Conference on Human Factors in Computing Systems (CHI)*, pg. 414-415, 1996. (Video)
- C. North, B. Shneiderman, C. Plaisant, “User Controlled Overviews of an Image Library: The Visible Human Explorer”, *Proc. of the National Library of Medicine Visible Human Project Conference*, NIH, 2 pages, 1996. (Demonstration)
- C. North, B. Shneiderman, “User Interfaces for the Visible Human Project”, *IEEE Forum on Advances in Digital Libraries (ADL)*, 2 pages, 1996. (Demonstration)

#### **Abstracts of Organized Panels, Workshops, Tutorials:**

- John Wenskovitch, Michelle Dowling, Chris North, Remco Chang, Alex Endert, David Rogers, Fabian Pena, Sriram Yarlagadda, Eli Brown. “Machine Learning from User Interaction in Visualization and Analytics”, IEEE VIS 2019 Workshops. (Workshop abstract)
- John Wenskovitch, Michelle Dowling, Chris North, Alex Endert, Remco Chang, David Rogers. “Machine Learning from User Interaction in Visualization and Analytics”, IEEE VIS 2018 Workshops. (Workshop abstract)
- C. Rooney, A. Endert, JD. Fekete, K. Hornbaek, C. North. “Powerwall: Workshop on Interactive, Ultra-high Resolution Displays”, *ACM CHI '13 Extended Abstracts on Human Factors in Computing Systems*, pg. 3227-3230, April 2013. (Workshop abstract)
- J. Gabbard, E. Swan, C. North, “Tutorial: Quantitative and Qualitative Methods for Human-Subject Visualization Experiments”, *Proc. of VisWeek 2011*, Providence RI, October 2011. (Tutorial abstract)
- C. North, R. Chang, A. Endert, W. Dou, R. May, B. Pike, G. Fink, “Analytic Provenance: Process + Interaction + Insight”, *ACM CHI '11 Extended Abstracts on Human Factors in Computing Systems*, p. 33–36, May 2011. (Workshop abstract)
- C. North, S. O’Donoghue, M. Hibbs, I. Dubchak, N. Gehlenborg, C. Nielsen, M. Meyer, C. Gorg, “Panel: Challenges in Visualizing Biological Data”, *Proc. of IEEE VisWeek 2010*, Oct 2010. (Panel abstract)
- T.J. Jankun-Kelly, R. Kosara, G. Kindlmann, C. North, C. Ware, E.W. Bethel, “Panel: Is There Science in Visualization?”, *Compendium Proceedings of IEEE Visualization 2006*, pg. 68-71, Oct 2006. “Visualization Science Requires Methods for Measurement” (Panel abstract) [Best Panel Award]
- C. North, G. Robertson, R. Ball, B. Yost, “Workshop: Using Large, High-Resolution Displays for Information Visualization”, *Proc. of IEEE Visualization*, Oct. 2005. (Workshop abstract)
- T.M. Rhyne, T. Dunning, G. Calapristi, C. North, D. Gresh, “Panel: Evolving Visual Metaphors and Dynamic Tools for Bioinformatics Visualization”, *Proc. IEEE Visualization 2002*, pg. 579-582, October 2002. “Flexible Bioinformatics Visualization and Fusion” (Panel abstract)

#### **Other Papers:**

- Lisa Singh, Amol Deshpande, Wenchao Zhou, Srinivas Aluru, Magdalena Balazinska, Gaitam Biswas, Auroop Ganguly, Aditya Johri, Fang Liu, Michael Mahoney, Chris North, Kunle Olukotun, Aarti Singh, Adam Smith, Suresh Venkatasubramanian. “NSF BIGDATA BDPI-2016 Workshop Report”, NSF, 2016.

- “Final Report on the 2015 NSF Workshop on Information and Intelligent Systems for Geosciences.” Yolanda Gil and Suzanne A. Pierce (Eds). National Science Foundation Workshop Report, October 2015.
- Fink G.A., Scholtz, J.C., Frincke, D. A., D McColgin, ML Gregory, D Gracanin, C North, K Edwards, J Karat, C Karat, and C Brodie. “Secure Systems Must be Usable. Usability: The Missing Section 8.3 in the Federal Cyber Security Plan”. PNNL-SA-53000 Pacific Northwest National Laboratory, Richland, WA, 2006.
- C. North, E. Kandogan, B. Shneiderman. “Information Abundant Interfaces: Advanced Organization and Coordination.” *Proceedings NSF Interactive Systems Grantees Workshop '97*, NSF, pg. 269-271, 1997.
- C. North. “Computer Composer”, *Enter: The World of Computers and New Technology*, vol. 2, no. 7, pg. 24, Children's Television Workshop, (May 1985).

### **Keynote Presentations:**

- Chris North, “Big Collaboration in Big Data Analytics”, *International Conference on Collaboration Technologies and Systems (CTS 2016)*, November 2016.
- Chris North, “The Role of Space in Immersive Analytics”, *VR 2016 Workshop on Immersive Analytics*, March 2016, Greenville, SC.
- Chris North, “Display Space: The Final Frontier in Visual Analytics”, *Graphics Interface (GI)*, May 2012, Toronto, Canada.
- Chris North, “Usability and Evaluation in Bioinformatics Visualization”, *EMBO Workshop on Visualizing Biological Data (VizBi)*, March 2010, Heidelberg, Germany.
- Chris North, “GigaPixel Displays: New Opportunities for Interactive Visual Analytics”, *International Workshop on Giga-Pixel Displays & Visual Analytics (GIANT)*, April 2008, Leeds, UK.

### **Other Invited Presentations and Lectures:**

- C. North, “The Two-Black-Boxes Problem”, IEEE VIS 2019 Workshop on Evaluation of Interactive Visual Machine Learning Systems (EVIVA-ML), October 2019. (Panel)
- C. North, “Interactive AI: How Humans and AI Can Collaborate in Data Analytics”, ORNL AI Workshop 2019, Oak Ridge National Laboratories, Sept 2019. (Invited talk)
- C. North, “High-Performance Semantic Interaction with Deep Learning”, NSF IUCRC SHREC annual PI meeting, Blacksburg, VA, June 2019.
- C. North, “Interactive AI: Semantic Interaction for the Two-Black-Box Problem”, Workshop on Algorithms that Make You Think, Center for HCI, Virginia Tech, April 2019.
- C. North, “Semantic Interaction for Big Text Analytics”, NSF BigData PI meeting, Arlington, VA, June 2018.
- C. North, “The Role of Big Display Space in Big Data Analytics”, Army Research Labs, Jan 2017.
- C. North, “Data Analytics and Decision Sciences: Big Display Spaces”, Big Data Science Workshop, Virginia Tech, Jan 2017.

- C. North, “Big Usability in Big Data Analytics”, Smoky Mountains Computational Sciences and Engineering Conference, August 2016. (Invited talk)
- C. North, “The Role of Big Display Space in Immersive Analytics”, Dagstuhl Seminar on Immersive Analytics, June 2016. (Invited talk)
- C. North, “Be the Data: Immersive Embodiment for Analytics Education”, Dagstuhl Seminar on Immersive Analytics, June 2016. (Lightning talk)
- L. House, C. North, “Be-the-Data Workshop”, Virginia Tech CUBE, April 2015, May 2015, July 2015, Oct 2015, June 2016. (Demonstration and Workshop)
- C. North, C. Reach, M. Sun, “Big Data Visualization for CyberSecurity”, S2ERC Annual Meeting, May 2015.
- C. North, “Large Display Interaction”, Virginia Science Festival, Oct 4, 2014. (Exhibit)
- C. North, “High-Resolution Multi-touch Interaction in Visual Analytics”, ICAT PlayDate, Sept 19, 2014. (Demonstration)
- L. Bradel, C. North, “StarSpire: Multi-Scale Semantic Interaction for Visual Text Analytics”, DHS VACCINE annual meeting, Sept 2013. (Demonstration)
- C. North, “Semantic Interaction for Visual Reasoning”, Dagstuhl Seminar on Interaction in Visual Reasoning, Dagstuhl, Germany, Aug 2013.
- C. North, “Display Space: The Final Frontier in Interactive Visual Analytics”, DOD, Aug 2013.
- C. North, “Semantic Interaction in Visual Analytics: Towards the Goal of Cognition + Computation”, Sandia National Labs, April 2013 and May 2013; Los Alamos National Labs, May 2013.
- C. North, L. Bradel. “Large Displays for Cyber Analytics”, Hume Center Open House, Sept. 2012.
- C. North, “New Opportunities in Visual Analytics”, Dahlgren, Aug 2012.
- C. North, L. Bradel. “ForceSpire: Semantic Interaction for Visual Text Analytics”, VACCINE annual meeting, May 2012. (Demonstration)
- C. North. “GigaPixel Displays: New Opportunities for Interactive Visual Analytics”, Dept Seminar, University of Copenhagen, April 2012.
- C. North, A. Endert, A. Esakia, “Large Displays for Cyber Analytics”, S2ERC annual meeting, 2011, 2012, 2013.
- S. Leman, L. House, C. North, “Bayesian Analysis in Visual Analytics”, Virginia Tech Discovery to Decision D2D Workshop, November 2011.
- C. North, A. Endert, “Visual Analytics for Cyber Security”, Sandia National Laboratories, University Partners Cyber Open House and Workshop, Albuquerque NM, July 2011.
- C. North “Visual Analytics”, Advisory Board Meeting of the Hume Center, March 2011.
- H. Chung, C. North, J. Ferris, “GigaPixel Displays for Terrain Visualization”, *RPUG Conference 2010*. (Invited presentation and demonstrations)
- C. North, S. Leeman, L. House, “User-guided spatialization of text document collections”, presented at the *NSF Visualizing Award Portfolios Advisory Committee* meeting, Sept 2010.
- C. North, “Challenge Datasets in Visual Analytics Education”, *Visual Analytics Education Workshop*, Visual Analytics Consortium meeting, Aug 2010.
- C. North, “GigaPixel Display”, C-Tech<sup>2</sup> summer program for high-school girls, presented annually 2010-present. [Diversity initiative]

- S. Leman, L. House, C. North, “Bayesian Analysis in Visual Analytics”, *NSF FODAVA Workshop*, Dec 2009, 2010, 2011, 2012.
- N. Ramakrishnan, C. North, F. Quek, “Storytelling in Visual Analytics”, *NSF FODAVA Workshop*, Dec 2009, 2010, 2011, 2012.
- C. North, “Visual Analytics on Large High-Resolution Displays”, Seminar Series of the Department of Computer Science, Virginia Tech, October 2009.
- C. North, “Big Displays: What’s the Big Deal?”, Pacific Northwest National Laboratories, Richland, WA, December 2007, February 2009.
- N. Polys, C. North, “Writing Grants with Visualization Components”, FDI short course, Virginia Tech, October 2007.
- R. Ball, C. North, “Large Displays for Visual Analytics”, *NSA Analyst Conference*, May 2007, Washington DC. (Exhibit)
- C. North, “Ultra-High Resolution Interactive Information Visualization”, NGA Academic Research Program Symposium, September 2007, Washington DC.
- C. North, “Impacts of Large Displays on Analysts”, NSA Knowledge Computing Workshop, October 2007, Columbia, MD.
- C. North, “Undergraduate research in computer science at VT”, College of Engineering undergraduate recruiting day, April 2, 2007.
- C. North, “GigaPixel Research at VT”, Advisory Board, Dept. of Computer Science, Virginia Tech, Oct 12, 2006.
- R. Ball, B. Yost, S. Peck, C. North, “High-resolution Information Visualization”, *IEEE Visualization 2006*, October 2006. (Exhibit)
- C. North, “Insight-based Evaluation of Bioinformatics Visualizations”, Eli Lilly & Co, June 2005.
- S. McCrickard, C. North, “Usability Engineering and Visualization”, NIST, June 2005.
- C. North, P. Saraiya, K. Duca, “Evaluating Bioinformatics Visualizations for Biological Insight”, Spotfire, Inc., May 2005. (Webcast lecture)
- F. Quek, C. North, “The AwareLab and GigaPixel Display”, *Pacific Northwest National Labs*, May 2005, Richland, WA.
- C. North, L. Carstensen, “Ultra-High Resolution Interactive Information Visualization”, ARDA/DTO PI Meetings: Feb 2005, Tampa, FL; Nov 2005, Orlando, FL; Nov 2006, Orlando, FL; March 2007, Dallas, TX.
- C. North, “GigaPixel Display”, Association for Women in Computing’s “Women in Computing Day”, presented annually 2004-present. [Diversity initiative]
- C. North, “ArcJump”, *ESRI User Conference*, 2003. (Demonstration)
- C. North, “Snap ArcJump”, SAS Institute Inc., 2003.
- C. North, “Adaptive Information Visualization in Multi-Tasking Environments”, Naval Surface Warfare Center, Dahlgren Division, Technical Interchange Day, April 12, 2002.
- C. North, D. Desjardins, “SNAP EDA Mapping Software”, U.S. Census Bureau, April 8, 2002.
- C. North, “Bioinformatics Research in Computer Science at Virginia Tech”, Agilent Laboratories, Mar 8, 2002.
- C. North, “Peripheral Visualization”, Microsoft Research, Mar 6, 2002.



- C. North, “Visualization Schemas and Snap-Together Visualization”, Central Washington University, April 2, 2001; Pacific Northwest National Labs, Mar 5, 2002; Microsoft, SQL Server group, Mar 7, 2002.
- C. North, “Multi-Dimensional Data Visualization”, B.F. Goodrich Corporation, May 2001.
- C. North, “Information Visualization for the Masses”, Seminar Series, Dept. of Computer Science, Virginia Tech, Sept 27, 2000.
- C. North, “Snap-Together Visualization”, Virginia Tech, University of Minnesota, Ohio State University, Microsoft Research, Lucent Bell-Labs, AT&T Research Labs, IBM Almaden, Spring 2000.
- C. North, “Dynamaps: The Marriage of Interactive Mapping and Graphical Data Analysis”, Census Seminar Series, U.S. Bureau of the Census, Washington DC, February 17, 2000 and March 6, 2000; *National Cancer Institute*, National Institute of Health, Bethesda, MD, May 15, 2000.
- C. North, “Dynamic Queries and Snap-Together Visualization”, Census Seminar Series, U.S. Bureau of the Census, Washington DC, July 26, 1999 and October 27, 1999.
- C. North, “Snap-Together Visualization”, Symposium and Open House, Human-Computer Interaction Lab, University of Maryland, June 18, 1999.
- C. North, “Surviving Graduate School”, Gateway Seminar, Information Systems Department, University of Maryland, Baltimore County, April 2, 1999. (Guest Lecture)
- C. North, “Tightly-Coupled Views”, Symposium and Open House, Human-Computer Interaction Lab, University of Maryland, May 30, 1997.
- C. North, “Visible Human Explorer: 2D or not 2D”, Symposium and Open House, Human-Computer Interaction Lab, University of Maryland, June 7, 1996.
- C. North, “Advanced Visual Information Seeking Interfaces”, Multimedia Project Development, Dept. of Computer Science, George Washington University, Washington DC, March 28, 1996 and March 3, 1997. (Guest Lecture)
- C. North, “Visible Human Project: Accessing Images of Human Anatomy”, *Software Psychology Society*, Washington DC, December 8, 1995.
- C. North, “Visible Human Project: Browsing Gigabytes of Medical Imagery”, Symposium and Open House, Human-Computer Interaction Lab, University of Maryland, June 2, 1995.

### **Students Advised:**

#### ***Current graduate students:***

- Michelle Dowling, PhD [Awarded Hume Fellowship, NSF UrbComp Fellowship]
- Tianyi Li, PhD (co-advised with Kurt Luther)
- Moeti Masiane, PhD [Awarded GEM Fellowship, NSF UrbComp Fellowship]
- Mai Dahshan, PhD (co-advised with Nicholas Polys)
- Yali Bian, PhD
- Kylie Davidson, PhD
- Payel Bandyopadhyay, MS

- Ming Wang, MS
- Rohit Kumar Chandaluri, MS
- Xiaoyu Chen, MS

***Post-Docs Supervised:***

- Robert Ball, Aug 2006-May 2007.

***Ph.D. Dissertations Supervised: (14 Graduated)***

1. John Wenskovitch, “Dimension Reduction and Clustering for Interactive Visual Analytics”, August 2019.  
*Visiting Assistant Professor, Department of Computer Science, Virginia Tech.*
2. Caleb Reach, “Smooth Interactive Visualization”, August 2017.  
*Research Engineer, Google.*
3. Maoyuan Sun, “Visual Analytics with Biclusters: Exploring Coordinated Relationships in Context”, August 2016.  
*Assistant Professor, Department of Computer Science, Northern Illinois University.*
4. Jessica Zeitz Self, “Designing and Evaluating Object-Level Interaction to Support Human-Model Communication in Data Analysis”, May 2016. [Awarded Davenport Fellowship, Pratt Fellowship, Walts Fellowship, Dept. of Computer Science, VT]  
*Assistant Professor, Department of Computer Science, University of Mary Washington.*
5. Lauren Bradel, “Multi-Model Semantic Interaction for Scalable Text Analytics”, May 2015. [Awarded Hume Graduate Fellowship, VT]  
*Research Computer Scientist, Department of Defense.*
6. Haeyong Chung, “Designing Display Ecologies for Visual Analysis”, May 2015.  
*Assistant Professor, Department of Computer Science, University of Alabama in Huntsville.*
7. Alex Endert, “Semantic Interaction for Visual Analytics: Inferring Analytical Reasoning for Model Steering”, August 2012. [IEEE VGTC Best Doctoral Dissertation Award, 2013; Outstanding PhD Dissertation Award, Department of Computer Science, VT]  
*Assistant Professor, School of Interactive Computing, Georgia Tech.*
8. Christopher Andrews, “Space to Think: Sensemaking and Large, High-Resolution Displays”, August 2011.  
*Assistant Professor, Department of Computer Science, Middlebury College.*
9. Tao Ni, “A Framework of Freehand Gesture Interaction: Techniques, Guidelines, and Applications”, August 2011, (co-advise with Doug Bowman).  
*Founder, Sproutup.co.*
10. Beth Yost, “The Visual Scalability of Integrated and Multiple View Visualizations for Large, High Resolution Displays”, May 2007.  
*Lead Human Factors Engineer, MITRE Corporation.*
11. Robert Ball, “Effects of Large, High-Resolution Displays for Geospatial Information Visualization”, August 2006.  
*Assistant Professor, Department of Computer Science, Weber State University.*
12. Glenn Fink, “Visual Correlation of Network Traffic and Host Processes for Computer Security”, August 2006. [Awarded NSF IGERT graduate fellowship.]  
*Senior Research Scientist, Pacific Northwest National Laboratory.*

13. Nicholas Polys, "Display Techniques in Information-Rich Virtual Environments", August 2006, (co-advise with Doug Bowman) [Outstanding PhD Dissertation Award, Department of Computer Science, VT].  
*Director of Visual Computing, Virginia Tech.*
14. Purvi Saraiya, "Insight-Based Studies for Pathway and Microarray Visualization Tools", August 2006.  
*Program Manager, Microsoft.*

***M.S. Theses Supervised: (19 graduated)***

1. Sidney Holman, "Entropy and Insight: Exploring how information theory can be used to quantify sensemaking in visual analytics", June 2018.
2. Adam Binford, "A Bidirectional Pipeline for Semantic Interaction in Visual Analytics", August 2016.
3. Xin Chen, "Be the Data: Embodied Visual Analytics", August 2016. (Co-advised with Leanna House, Department of Statistics) [Nominated by the Dept. of Computer Science for the William Preston Society Thesis Award]
4. Peng Mi, "GPU Based Methods for Interactive Information Visualization of Big Data", December 2015. (Co-advised with Yong Cao)
5. Andre Esakia, "Large Display Interaction via Multiple Acceleration Curves on a Touchpad", December 2013.
6. Kevin Logan, "SpatialHistory: Using Spatial Memory to Recall Information", December 2012.
7. Ji Wang, "Clustered Layout Word Cloud for User Generated Online Reviews", May 2012.
8. Patrick Fiaux, "Solving Intelligence Analysis Problems using Biclusters", Jan 2012.
9. David Machaj, "Co-Located Many-Player Gaming on Large High-Resolution Displays", May 2009.
10. Sarah Peck, "A Multiscale Interaction Technique for Large, High-Resolution Displays", May 2008.
11. Mehmet Celal Dasiyici, "Multi-Scale Cursor : Optimizing Mouse Interaction for Large Personal Workspaces", May 2008.
12. Lauren Shupp, "The Effects of Curving Large, High-Resolution Displays on User Performance", August 2006. [Outstanding Master's Thesis Award, Department of Computer Science, May 2007; nominated by Virginia Tech for the Conference of Southern Graduate Schools 2007 Innovative Application of Technology in a Master's Thesis Award]
13. Sujatha Krishnamoorthy, "Designing Interactive Visualizations for First-time Novice Users", December 2005.
14. Chris Catanzaro, "Vizability: Visualizing Usability Evaluation Data Based on the User Action Framework", Spring 2005.
15. Kiran Indukuri, "Fusion: A Visualization Framework for Interactive Rule Mining with Applications to Bioinformatics", Fall 2004.
16. John Costigan, "Applying Information Visualization Techniques to Visual Debugging", Spring 2003.
17. Varun Saini, "Visualization Schemas: A User Interface Extending Relational Data Schemas for Flexible, Multiple-View Visualization of Diverse Databases", Spring 2003.
18. Sanjini Jayaraman, "PolarEyez: A Radial Focus+Context Visualization for Multidimensional Functions", Fall 2002.

19. Nathan Conklin, “A web-based, run-time extensible architecture for interactive visualization and exploration of diverse data”, Fall 2002. [Outstanding Graduate Research Award, Department of Computer Science, VT, 2002.]

***Graduate independent study students supervised: (15 total)***

1. Amit Naik, Fall 2018
2. Jagathshree Suryanarayanan Iyer, (co-advised with Nicholas Polys), Spring 2017
3. Radha Krishnan Vinayagam, Fall 2016
4. Abhishek Abhyankar, Spring 2016
5. Seth Fox, Fall 2011
6. Andrew Perez-Lopez, Fall 2004
7. Umur Yilmaz, Spring 2004
8. Youngyun Chungbaek, Fall 2003
9. Qiang Yu, Fall 2003
10. Ying Chen, Spring 2003
11. Ines Khelifi, Spring 2003
12. Xiaofeng Bao, Fall 2002
13. Qing Li, Fall 2002
14. Yi Zhang, Fall 2002
15. Matt Clement, Spring 2002

***Undergraduate research students supervised: (89 total)***

- 2019: Laura Grose, Barrett Lattimer, Tom Phan
- 2018: Cameron Byers, Zach Hauck, Nate Miller, Dasha Savina (CMDA) (all co-advised by Peter Hauck); Aishwarya Deval (CMDA), Joseph Kim, Vincent Zhao (CMDA).
- 2017: Zack Hauck, Theo Zihao Long (ECE), Mason Peterson (SoVA), Kenneth Worden (all co-advised by Peter Hauck); Raju Nadimpalli.
- 2016: Mitchell Wagner (co-advised by Nicholas Polys), Theo Zihao Long, Anthony Wise.
- 2015: Nima Yahyazadeh Langroudi, Nathan Wycoff (Statistics); Mitchell Wagner (co-advised by Duncan Farrah, Physics); Zhizheng Chen, Joe Fletcher, Vijay Kuruvilla, Ed McEnrue (all co-advised by Kurt Luther); Kate Gorbach (Statistics, co-advised by Leanna House).
- 2012-2013: Michel Pascale.
- 2011-2012: Sarah Hendon, Ashleigh Hon (Psychology); Douglas Smith (VT Scieneering program, co-advised by A. Cate, Psychology); Andrew Berlin, James McIntyre, John Nein, Lauren Gibboney, Joe Luke, Michel Pascale, Joshua Rush (all co-advised by Chris Williams, Mechanical Engineering).
- 2010-2011: Russell Wolf.
- 2007-2008: Yonathan Taye, Nick Ciafardoni.
- 2006-2007: John Frame, Scott Conner, Ron Forbes, David Machaj, Alan Tran.
- 2005–2006: Mike Szwedo, Mike DellaNoche, Matt Witherspoon, Frank Malapelle, Ross Schwalm.
- 2004–2005: Dan Keathley, Tyler Hennessy, Paul Muessig, Peter Lee, Jeff Mitchell, Andrew Sabri, Chris Fierer, Dana Cox, Mike Varghese, Ryan Silva, Roy Baladi, Luis Barberi, Matthew Peters.
- 2003–2004: Ankit Singhal, Andrew Brletich, Michael Bevels, Larry Leventhal, Mike Johnson, Yoon-Soo Lee, Soohyung Lee, Henry Holstein, David Longley, Martin Holmes, Dustin Arendt, Mensur Medic, Nipun Jawalkar, Justin Martin, Erinn Bull.

- 2002–2003: Chris Shirk, Scott Walker, Craig Sinning, Matt Ingram, Patrick Wolf, Paul Murphy, Geoff Zelenka, Joseph Goodman.
- 2001–2002: Ben Whilite, John Costigan, Carlos Fernandez, Ben Bradley, Aaron Shook, Amit Nithian.
- 2000–2001: Sam Stone, Matt Sample, Chris Chin.

***Undergraduate honors theses supervised:***

- John Costigan, B.S., May 2002.

***Visiting research students supervised:***

- Alva Lee, visiting graduate study-abroad student, Taiwan, 2010-2011.
- Kristen Koch, visiting undergraduate student NSF REU, Tulane Univ., summer 2011.
- Kate Vogt, visiting undergraduate student NSF REU, Elon Univ., summer 2010.

***Ph.D. Dissertation Committee Memberships:***

*Current:*

- Aditya Bharadwaj, CS
- Rongrong Tao, CS
- Sajal Dash, CS

*Graduated:*

1. Sorour Ekhtiari Amiri, PhD, 2019
2. Shuo Niu, PhD, 2019
3. Run Yu, PhD, 2019
4. Rupinder Paul Khandpur, PhD, 2018
5. Yue Maassen Ning, PhD, 2018
6. Wallace Santos Lages, PhD, 2018
7. Parang Saraf, PhD, 2018
8. Doaa Altarawy, PhD, 2017
9. Panagiotis Apostolellis, PhD, 2017
10. Yinlin Chen, PhD, 2017
11. Hyungil Kim, PhD, Industrial and Systems Engineering, 2017
12. Ayat Mohammed, PhD, 2017
13. Wei Wang, PhD, 2017
14. Mahdi Nabiyouni, PhD, 2016
15. Sherif Hanie El Meligy Abdelhamid, PhD, 2016
16. Mohammed Fawzi Seddik Farghally, PhD, 2016
17. Fang Jin, PhD, 2016
18. Blake Sawyer, PhD, 2016
19. Felipe Bacim, PhD, 2015
20. Eli Brown, PhD, Computer Science, Tufts University, 2015
21. Sukhwan Cho, PhD, Mechanical Engineering, 2015
22. Mai Elshahali, PhD, 2015
23. Jongsoon Park, PhD, Industrial and Systems Engineering, 2015

24. Hao Zhang, PhD, 2015
25. Patrick Butler, PhD, 2014
26. Samah Gad, PhD, 2014
27. Xinran Hu, PhD, Dept. of Statistics, 2014
28. Bireswar Laha, PhD, 2014
29. Lucas Roberts, PhD, Dept. of Statistics, 2014
30. Hussain Almohri, PhD, 2013
31. Shubhangi Deshpande, PhD, 2013
32. Chreston Miller, PhD, 2013
33. Jacob Moore, PhD, Dept. of Engineering Education, 2013
34. Chao Peng, PhD, 2013
35. Eric Ragan, PhD, 2013
36. Huijun Xiong, PhD, 2013
37. Chao Han, PhD, Dept. of Statistics, 2012
38. Mahmud Shahriar Hossain, PhD, 2012
39. Youn Ah Kang, PhD, Interactive Computing, Georgia Tech, 2012
40. Dipayan Maiti, PhD, Dept. of Statistics, 2012
41. Regis Kopper, PhD 2011
42. Ryan McMahan, PhD, 2011
43. Hussein Ahmed, PhD, 2010
44. Yi Wang, PhD, 2010
45. Jiang Shu, PhD, 2009
46. Timothy Buennemeyer, PhD, Electrical & Computer Engineering, 2008
47. Seonho Kim, PhD, 2008
48. Andrew Ray, PhD, 2008
49. Deept Kumar, PhD, 2007
50. Weidong Huang, PhD, Computer Science, University of Sydney, Australia, 2007
51. Boon Kee Soh, PhD, Industrial and Systems Engineering, 2007
52. Jian Chen, PhD, 2006
53. Animesh Patcha, PhD, Electrical & Computer Engineering, 2006
54. Fernando Das Neves, PhD, 2004
55. Wendy Schafer, PhD, 2004
56. Jacob Somervell, PhD, 2004
57. William Staderman, PhD, Industrial and Systems Engineering, 2003

***M.S. Thesis Committee Memberships:***

1. Abhinav Kumar, MS, 2019
2. Lawrence Elliot Warren, MS, 2018
3. Faiz Abidi, MS, 2017
4. Rachel Kohler, MS, 2017
5. Brendan Mattina, MS, Electrical & Computer Engineering, 2017
6. Daniel Barton, MS, 2016
7. Andrew Ciambrone, MS, 2016
8. Bin He, MS, 2016
9. Sheriff Jolaoso, MS, 2015
10. Nabanita Maji, MS, 2015
11. Nathan Self, MS, 2015
12. Sruthi Iyer, MS, 2014
13. Rebecca Zeitz, MS, 2014
14. Ankit Singh, MS, 2012

15. Robert Hagan, MS, 2011
16. William McConnell, MS, 2008
17. Jaishankar Sundararaman, MS, 2008
18. Khaled Hussein, MS, 2007
19. Ryan McMahan, MS, 2007
20. Richard Travis Rose, MS, 2007
21. Hyun Seung Yoo, MS, Industrial and Systems Engineering, 2007
22. Alain Fabian, MS, 2006
23. Dheva Raja, MS, 2006
24. Johnny Sam Rajkumar, MS, 2006
25. Yogita Bhardwaj, MS, 2005
26. Junghan Kwak, MS, Dept. of Civil Engineering, 2005
27. John Lucas, MS, 2005
28. Ananth Raghavan, MS, 2005
29. Scott Alexander Turner, MS, 2005
30. Brandon Berry, MS, 2004
31. Dhruv Manek, MS, 2004
32. Hussein Vastani, MS, 2004
33. Chuck Holbrook, MS, 2003
34. Reenal Mahajan, MS, 2003
35. Ameya Datey, MS, 2002
36. Benjamin Hays, MS, Dept. of Civil Engineering, 2002
37. Ashwini Pande, MS, 2002
38. Purvi Saraiya, MS, 2002
39. Jun Wang, MS, 2002
40. Qinwei Zhu, MS, 2002

## **Teaching:**

### ***Courses:***

- CS 2604 Data Structures and File Processing: undergraduate, (Fall '00, Fall '01, Spring '03, Spring '06)
- CS 3114 Data Structures and Algorithms: undergraduate, (Spring 2010, Fall 2010, Spring 12, Spring 2014)
- CMDA/CS/STAT 3654 Intro to Data Analytics & Visualization: undergraduate, interdisciplinary, (Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019, Fall 2019) [new course]
- CS 3724 Introduction to Human-Computer Interaction: undergraduate, (Spring '02, Fall '02, Spring '04, Fall '04, Fall 06, Spring 08, Fall 09) [revised]
- CS 3744 GUI Programming and Graphics: undergraduate, (Spring 2011, Fall 11) [revised]
- CS 4604 Introduction to Database Management Systems: undergraduate, (Spring '04) [revised]
- CS 5764 Information Visualization: graduate, (Spring '01, Fall '01, Fall '02, Fall '03, Fall '04, Fall 05, Spring 07, Fall 07, Fall 09, Fall 11, Fall 12, Fall 14, Fall 15, Fall 2016, Fall 2017, Fall 2018) [new course]
- CS 6604/6724 Visual Analytics: graduate, (Fall 2010, Fall 2013) [new course]
- CS 6724 Display Wall User Interfaces: graduate, (Spring '06) [new course]

- Workshops on GUI programming in Java and C#: undergraduate, (2003, 2004) [new]
- AP Computer Science (2016-2017)

***Programs:***

- Program Founder and Administrator, **Graduate Certificate in Data Analytics**, Virginia Tech, 2015-present.
- Co-organizer, **Computational Modeling & Data Analytics (CMDA)** major, Virginia Tech, 2014-2015.

**Professional Service:**

***Editorships:***

- Associate Editor, *Information Visualization*, 2011 - present.
- Editorial Board Member, *Foundations and Trends in Human Computer Interaction (FnT-HCI)*, 2012-2015.
- Associate Editor, *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2010 - 2011.
- Guest co-editor, *IJHCI Festschrift* special issue honoring Ben Shneiderman, Dec 2007.
- Guest co-editor, *Information Visualization* special issue on “Bioinformatics Visualization”, Sept 2005.

***Conference Organizing Committees:***

- Chair, Best Paper Committee, IEEE VAST 2018
- Chair, Best Dissertation Award, IEEE VIS 2017
- 10-year Test of Time Award Committee, IEEE InfoVis 2017
- Best Poster Committee, VAST 2016
- Papers Co-Chair, IEEE VAST 2013, 2014
- Best Paper Committee, IEEE BioVis 2011
- Co-Organizer of the first annual IEEE BioVis Symposium 2011
- Session Chair, IEEE InfoVis 2010
- Best Poster Committee, InfoVis 2010
- General Co-Chair, IEEE VisWeek 2009
- General Chair, IEEE InfoVis 2009
- Papers Co-Chair, IEEE InfoVis 2008
- Papers Co-Chair, IEEE InfoVis 2007
- Session Chair, ACM CHI 2007
- Publications Co-Chair, IEEE InfoVis 2006 and IEEE Visualization 2006
- Session Chair, IEEE Visualization 2006
- Posters Co-Chair, IEEE InfoVis 2005



- Posters Co-Chair, IEEE InfoVis 2004
- Session Chair, IEEE InfoVis 2004

***Workshops and Panels Organized:***

- Co-organizer, Workshop on Machine Learning from User Interaction for Visualization and Analytics, at IEEE VIS 2019, Vancouver, BC, Canada, October 2019.
- Steering Committee member, IEEE VIS 2019 Workshop on Evaluation of Interactive Visual Machine Learning Systems (EVIVA-ML), Vancouver, BC, Canada, October 2019.
- Co-organizer, Workshop on Machine Learning from User Interaction for Visualization and Analytics, at IEEE VIS 2018, Berlin, Germany, October 2018.
- Co-organizer, with J. Self, X. Chen, “Embodied Analytics”, VIS Meetup, Oct 2015.
- Co-organizer, with L. House, S. Leman, L. Bradel, “Visual Analytics in the Classroom”, VIS 2014 MeetUp, Nov 2014.
- Co-organizer, with Ross Maciejewski, Niklas Elmqvist, MSI (Minority Serving Institutions) Faculty Training Workshop at Morgan State University as a service of VACCINE (Visual Analytics Center of Excellence), Baltimore MD, July 29-30, 2014.
- Co-organizer, with Alex Endert, Remco Chang, Michelle Zhou, “Workshop on Semantic Interaction”, Pacific Northwest National Laboratories, June 17-18, 2014.
- Co-Organizer, with Danyel Fisher, “Industrial Success Stories in the American Southeast - Visual Atlanta-lytics”, Panel at *IEEE Conference on Visual Analytics Science and Technology (VAST)*, Oct 2013.
- Co-Organizer, “Powerwall: Intl Workshop on Interactive, Ultra-High Resolution Displays”, Workshop at *ACM CHI*, April 2013.
- Co-Organizer, “Process+Interaction+Insight: Provenance in Visual Analytics”, Workshop at *ACM CHI*, May 2011.
- Co-Organizer, “Bring Your Own Data”, Working session at *VizBi, 2011*.
- Co-Organizer, "Challenges in Visualizing Biological Data", Panel at *IEEE VisWeek*, Oct 2010.
- Co-Organizer, "Research Agenda in Visualizing Biological Data", Birds-of-a-Feather meeting at *IEEE VisWeek*, Oct 2010.
- Co-Organizer, Dagstuhl Seminar on “Information Visualization - Human-Centered Issues in Visual Representation, Interaction, and Evaluation”, International Conference and Research Center for Computer Science at Schloss Dagstuhl, Germany, May 2007.
- Co-Organizer, "Is There Science in Visualization?", Panel at *IEEE Visualization Conference*, 2006. [Best Panel Award]
- Co-Organizer, “Workshop on Using Large, High-Resolution Displays for Information Visualization”, Workshop at *IEEE Visualization Conference*, 2005.
- Co-Organizer, “Evolving Visual Metaphors and Dynamic Tools for Bioinformatics Visualization”, Panel at *IEEE Visualization Conference*, 2002.

***Invited Advisory Workshops:***

- Invited participant, ODNI Sensemaking Research Planning Workshop, Arlington, VA, May 2018.
- Invited participant, DHS Workshop on Streaming Visual Analytics, Jan 2016.
- Invited participant, NSF Workshop on Intelligent Systems for Geosciences (NSF IIS-GEO), March 2015.

- Member, DHS VACCINE, Visual Analytics Center of Excellence, 2010 – 2016.
- Invited participant, Google Faculty Summit, July 2012.
- Invited participant, “Human Dimensions in Cyber Operations: R&D Priorities Workshop”, DOE, Washington DC, August 2012.
- Invited participant, NSF Workshop on Science of Interaction, March 2012.
- Invited participant, NSA Symposium on Building Computer Science Research Partnerships, August 2009.
- Invited participant, DHS Future of Visual Analytics Workshop, March 2009.
- Invited participant, NSA Knowledge Computing Workshop, October 2007.
- Invited participant, NSF Workshop on Human-Centered Computing, Sept 2006.
- Invited participant, National Academies workshop on Visualizing Uncertain Information, Mar 2005.
- Invited participant, NSF/NIH Future Challenges in Visualization workshop, Sept 2004.

***Advisory Boards:***

- Advisory Board Member, WallViz Project, Department of Computer Science, University of Copenhagen, 2011-2014.
- Member, NSF CISE/SBE Advisory Committee on Research Portfolio Analysis, 2009-2010.
- Advisory Board Member, Human-Computer Interaction Lab, University of Maryland, College Park, 2002.

***Technical Program Committee:***

- IEEE Visual Analytics Science & Technology (VAST), 2015, 2016, 2018, 2019
- Intl. Workshop on Big Data Visual Exploration and Analytics (BigVis), 2019
- IEEE International Conference on Intelligence and Security Informatics (ISI), 2016
- Workshop on Beyond Time and Errors: Novel Evaluation Methods for Visualization (BELIV), 2006, 2008, 2010, 2012, 2014, 2016
- IEEE Pacific Visualization Symposium (PacificVis), 2008, 2015
- IEEE Information Visualization Conference (InfoVis), 2001, 2002, 2003, 2004, 2005, 2006, 2010, 2011, 2012
- IEEE Symposium on Biological Data Visualization (BioVis), 2011
- ISMB/ECCB 2011, Bioimaging and Data Visualization Area, 2011
- Symposium on Visualization for Cyber Security (VizSec), 2005, 2006, 2009
- International Conference on Information Visualisation (IV), 2002, 2003, 2004, 2005
- International Conference on Coordinated & Multiple Views in Exploratory Visualization (CMV), 2003, 2004, 2005

***Technical Reviewer:***

- Funding Agencies:
  - NSF Panelist or Reviewer: 2004, 2007, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019
  - DOE Panelist or Reviewer: 2009, 2016, 2017

- American Association for the Advancement of Science
- Natural Sciences and Engineering Research Council of Canada
- Swedish Foundation for Strategic Research, Sweden
- Digiteo, France
- External U.S. P&T Evaluation letters: 11 (2008, 2010, 2013, 2013, 2013, 2014, 2016, 2018, 2018, 2019, 2019)
- International P&T Evaluation letters: 8 (2009, 2014, 2015, 2015, 2015, 2017, 2018, 2019)
- Journals:
  - ACM Journal of Educational Resources in Computing
  - ACM Transactions on Computer-Human Interaction
  - ACM Transactions on Intelligent Systems and Technology (TIST)
  - ACM Transactions on Interactive Intelligent Systems (TiiS)
  - Bioinformatics
  - Cell
  - Computers & Graphics
  - HFES Human Factors
  - IEEE Computer
  - IEEE Computer Graphics & Applications (CG&A)
  - IEEE Transactions on Visualization and Computer Graphics (TVCG)
  - Information Visualization
  - Intl. Journal of Human-Computer Interaction
  - Intl. Journal of Human-Computer Studies
  - ISPRS International Journal of Geo-Information
  - International Journal of Sensor Networks
  - Journal of the American Medical Informatics Association
  - Journal of Visual Languages and Computing
- Conferences:
  - ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW)
  - ACM Conference on Human Factors in Computing Systems (CHI)
  - ACM SIGGRAPH
  - ACM Symposium on User Interface Software and Technology (UIST)
  - Graphics Interface (GI)
  - IEEE Conference on Visual Analytics Science and Technology (VAST) [formerly IEEE Symposium on Visual Analytics Science and Technology]
  - IEEE Information Visualization Conference (InfoVis) [formerly IEEE Symposium on Information Visualization]
  - IEEE International Conference on Intelligence and Security Informatics (ISI) [formerly IEEE Joint Intelligence and Security Informatics Conference (JISIC)]
  - IEEE Scientific Visualization Conference (SciVis) [formerly IEEE Visualization Conference (Vis)]
  - IEEE Symposium on Biological Data Visualization (BioVis)

- IEEE VGTC Pacific Visualization Symposium (PacificVis)
- Intl. Conference on Coordinated and Multiple Views in Exploratory Visualization (CMV)
- Intl. Conference on Information Systems for Crisis Response and Management (ISCRAM)
- Intl. Conference on Information Visualization (IV)
- Intl. Conference on Intelligent Systems for Molecular Biology (ISMB)
- Intl. Conference on Knowledge Management and Knowledge Technologies (i-KNOW)
- Intl. Working Conference on Advanced Visual Interfaces (AVI)
- IS&T/SPIE Conference on Visualization and Data Analysis
- Symposium on Visualization for Cyber Security (VizSec)
- Workshop on Beyond Time and Errors: Novel Evaluation Methods for Visualization (BELIV)
- Workshop on Knowledge and Information Visualisation (KIV)

### University Service:

- Associate Director, **Discovery Analytics Center**, 2014-present.
- Mentor, Junior faculty mentorship program, Dept. of Computer Science, 2014-present.
- Mentor, Research scientists at Discovery Analytics Center, 2016-2019.
- Member, Stakeholder Committee, Data & Decisions Destination Area, 2016-2019:
  - Member, Education Subcommittee, undergraduate Data & Decision minor, 2016-2018
  - Member, Facilities Subcommittee, and GBAC Planning Committee, 2017
  - Representative, Master Plan Committee, 2017
- Member of Organizing Committee, Algorithms That Make You Think: Fourth Annual Virginia Tech Workshop on the Future of Human-Computer Interaction, Blacksburg, VA, April 2019.
- Member, Personnel Committee, Dept of Computer Science, 2018-2019.
- Chair, Faculty Search Committee for Data Analytics (2 positions), Dept. of Computer Science, 2017-2018.
- Member, HCI PhD Qualifier Exam Committee, 2017-2018.
- Member, Graduate Admissions Committee, Dept. of Computer Science, 2016-2017.
- Member, Faculty Search Committee, Dept. of English, Virginia Tech, 2016-2017.
- Faculty advisor, CMDA Undergraduate Club, Virginia Tech, 2015-2017.
  - Faculty advisor, DataFest Analytics Hackathon 2016, April 2016.
- Member, HCI PhD Qualifier Exam Committee, 2016-2017.
- Member, Personnel Committee, Dept. of Computer Science, 2015-2016.
- Chair, Faculty Search Committee for HCI, Dept. of Computer Science, 2015-2016.
- Member, Faculty Search Committee for CMDA, two hires, Dept. of Statistics, 2015-6.
- Founding Organizer, Graduate Certificate in Data Analytics, Virginia Tech, 2015.
- Executive Committee Member, Center for Human-Computer Interaction, 2011-2015.
- Member, Faculty Search Committee for CMDA, Dept. of Statistics, 2014-5.
- Member, Faculty Search Committee for cyber analytics, Dept. of Computer Science, 2014-5.

- Member, Faculty Search Committee for HCI/Vis, Dept. of Computer Science, 2013-2014.
  - Chair, Faculty Search Committee for Cyber Security, Dept. of Computer Science, 2010-2011.
  - Member, Faculty Search Committee for HCI/Vis, Virginia Bioinformatics Institute, 2010.
  - Peer teaching evaluator, Dept. of Computer Science, 2010, 2014, 2019.
  - Member, Admissions Committee, Dept. of Computer Science, 2014-2015.
  - Member, Undergraduate Program Committee, Dept. of Computer Science, 2013-2014.
  - Graduate Recruiting Coordinator, Dept. of Computer Science, 2005-2012.
    - C. North, N. Ramakrishnan, “Recruiting Doctoral Students in Computer Science”, proposals funded by College of Engineering, Virginia Tech; \$15,000 in 2010; \$12,000 in 2008; \$10,000 in 2007.
    - Developed fellowship applications for graduate applicants from under-represented groups.
  - Member, Graduate Program Committee, Dept. of Computer Science, 2003-2012.
    - Chair, 5-year assessment of Dept.’s graduate program, 2005.
  - Co-Advisor, Research in Gaming (RiG) student group, 2007.
  - Chair, HCI Ph.D. Qualifier Exam Committee, 2005, 2008, 2014.
  - Co-Coordinator, Virginia Tech’s certification as NSA National Center of Academic Excellence in Information Assurance Education (NCAEIAE), 2005.
  - Co-Coordinator, Virginia Tech’s certification as NSA National INFOSEC Education and Training Program, 2003.
  - Faculty Advisor, Virtual Corporation undergraduate team, 2002.
- 
- Head, InfoVis Lab, Virginia Tech, 2000-present
  - Head, GigaPixel Display Facility, Virginia Tech, 2004-2015.
  - Member, Center for Human-Computer Interaction, Virginia Tech, 2000-present
    - Member, 3DE research sub-group of the CHCI, 2014-present
  - Member, Discovery Analytics Center, 2012-present
  - Member, Hume Center for National Security and Technology, 2011-present
  - Member, Computational Modeling & Data Analytics (CMDA) faculty, 2015-present
  - Member, Genetics, Bioinformatics, and Computational Biology (GBCB) faculty, 2007-present