HAEYONG CHUNG

Associate Professor, Department of Computer Science
University of Alabama in Huntsville
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Visual Analytics / Information Visualization / Gaming / Human-Computer Interaction / Large-High Resolution Displays / Display Ecologies / Sensemaking / Text Mining.

I investigate how the marriage of data visualization with mobile and large display technologies can enhance people's ability to analyze and understand the escalating quantity of data. My research explores novel visual analysis solutions that involve combining techniques from gaming, data mining, human-computer interactions, and ubiquitous computing. I have also designed and developed interactive visualizations that facilitate greater insights into complex data in a broad range of application domains, including intelligence analysis, cyber security, crisis management and social network services, pavement evaluation, and computational chemistry.

EDUCATION

05/2015
Virginia Polytechnic Institute and State University (Virginia Tech)
Ph.D. in *Computer Science*. Advisor: Chris North

07/2005
Rensselaer Polytechnic Institute (RPI)
M.S. in *Computer and Systems Engineering*.

02/2000
Dongguk University, South Korea
B.Sc. in *Computer Science and Statistics*

EMPLOYMENT

04/2022 - PRESENT
University of Alabama in Huntsville, Huntsville, AL
Associate Professor, Department of Computer Science.

08/2015 – 03/2022
University of Alabama in Huntsville, Huntsville, AL
Assistant Professor, Department of Computer Science.

05/2014 – 09/2014
Tableau Software, Menlo Park, CA
Research Intern with Jock Mackinlay and Vidya Setlur.
Worked on project: View Generalization for Multi-Scale Data Visualization.

08/2010 – 02/2015
Virginia Tech, Blacksburg, VA
Research Assistant with Chris North
Worked on project: Display Ecology for Visual Analytics, Situation Awareness in Integrated Work Environment.

08/2009 – 08/2010
Virginia Tech, Blacksburg, VA
Research Assistant with John Ferris, Mechanical Engineering Dept.
Worked on project: Developing high fidelity terrain visualization for large displays.

08/2007 – 08/2008
Virginia Tech, Blacksburg, VA
Research Assistant with Brent Jesiek, Center for Digital Discourse and Culture (CDDC)
Worked on project: Developing the April 16 Digital Archive: http://www.april16archive.org.

08/2003 - 07/2005	Rensselaer Polytechnic Institute, Troy, NY *Research Assistant* with Rich Radke, Electrical, Computer, and Systems Engineering Dept. Worked on project: Distributed Active Processing on Hundred-Camera Network (DAPHNE) Built multi-camera network system around RPI campus.
02/2002 - 07/2002	National Instruments *Applications Engineer* Developed LabVIEW programs and two demos - Airplane Wing Stress Visualization using Strain Gauge and Transducer Unit Box.
07/2000 – 02/2002	National Center for Superfunctional Materials, Postech, South Korea *Researcher* (Director: Kwang S. Kim) Worked on project: POSMOL - Three-dimensional molecular visualization and analysis tool.

PUBLICATIONS

JOURNAL PAPERS

Hutchinson, S., Mirza, M., West, N., Karabiyik, U., Rogers, M., Mukherjee, T., Aggarwal, S., **Chung, H.**, & Pettus-Davis, C. Investigating Wearable Fitness Applications: Data Privacy and Digital Forensics Analysis on Android. *Journal of Applied Sciences,* 12, 9747, 2022 (IF: 2.921)

Sun, M., Namburi, A., Koop, D., Zhao, J., Li, T**., Chung, H**, "Towards Systematic Design Considerations for Visualizing Cross-View Data Relationships," *IEEE Transaction on Visualization and Computer Graphics*, accepted, 2021. (Impact Factor: 4.558)

Chung, H., <u>Nandhakumar, S.</u>, Yang, S., "GridSet: Visualizing Individual Elements and Attributes for Analysis of Set-Typed Data," *IEEE Transaction on Visualization and Computer Graphics*, accepted, 2020. (Impact Factor: 4.558)

Chung, H., <u>Nandhakumar, S., Vasu, G., Vicker, A.,</u> Lee, E., "GoCrystal: A Gamified Visual Analytics Tool for Analysis and Visualization of Atomic Configurations and Thermodynamic Energy Models," *Journal of Information Visualization, 9(4),* pp.296-317 2020. (Impact Factor: 1.325)

Chung, H., Esakia, A., Ragan, E., "The relationship between screen space and the use of live visual history in analytical processes," *International Journal of Data Analytics (IJDA),* 1(2), 67-88 2020.

<u>Shrestha, B.,</u> **Chung, H.**, Aygun, R., "FaceTimeMap: Multi-Level Bitmap Index for Temporal Querying of Faces in Videos," *International Journal of Multimedia Data Engineering and Management (IJMDEM),* 10(2), pp.37-59, 2019.

Yang, S., Ju, B., **Chung, H.**, "Identifying Topical Coverages of Curricula using Topic Modeling and Visualization Techniques: A Case of Digital and Data Curation," *International Journal of Digital Curation*, 13 (2), 2019.

Chung, H., North, C., "SAViL: Cross-Display Visual Links for Sensemaking in Display Ecologies," *Journal of Personal and Ubiquitous Computing*, 22(2), pp.409-431, 2018. (Impact Factor: 3.006)

Chung, H., North, C., Self, J., Chu, S., Quek, F., "VisPorter: Facilitating Information Sharing for Collaborative Sensemaking on Multiple Displays," *The Journal of Personal and Ubiquitous Computing*, 18(5), pp.1169-1186, 2014. (Impact Factor: 3.006)

Chung, H., Andrews, C., North, C., "A Survey of Software Frameworks for Cluster-based Large High-Resolution Displays", *IEEE Transaction on Visualization and Computer Graphics*, 20(8), pp.1158-1177, 2014. (Impact Factor: 4.558)

Chung, H., North, C., Ferris, J. B., "Developing Large High-Resolution Display Visualizations of High-Fidelity Terrain Data," *ASME Journal of Computing and Information Science in Engineering*, 13(3), 2013. (Impact Factor: 1.431)

Devarajan, D., Radke, R., **Chung, H.**, "Distributed Metric Calibration for Large-Scale Camera Networks," *ACM Transaction on Sensor Networks*, 2 (3), pp.380-403, 2006. (Impact Factor: 2.469)

Lee, S., **Chung, H.**, Kim, K., "POSMOL: An Easy to Use Three Dimensional Molecular Visualization and Analysis Program," *Bull. Kor. Chem. Soc.*, vol 25, pp.1061-1064, 2004. (Impact Factor: 0.969)

Kim, K. S., Suh, S. B., Kim, J. C., Hong, B. H., Lee, E. C., Yun, S, et al. "Assembling phenomena of calix [4] hydroquinone nanotube bundles by one-dimensional short hydrogen bonding and displaced π-π stacking," *Journal of the American Chemical Society*, 124(47), pp.14268-14279, 2002. (Impact Factor: 15.42)

Gryphon, K., **Chung, H.**. "Assembly Academy: Using Video Games and Virtual Robots to Teach Assembly Programming." *IEEE International Conference on Advanced Learning Technologies (IEEE ICALT)*, 2023. Accepted

Diliberti, N., **Chung, H.**, Keim, Y., Rogers, M., Karabiyik, U., Aggarwal, S., Mukherjee, T., & Pettus, C., "Supporting and Motivating Re-integration of the Justice-Involved Individuals through Gamification." *International Conference on Human Computer Interaction.*, 2023. Accepted

Setlur, V., **Chung, H.**, "Semantic Resizing of Charts Through Generalization: A Case Study with Line Charts," *Proc. IEEE VIS*, 2019. *Honorable Mention Award.*

Shrestha, B., **Chung, H.**, Aygun, R., "Temporal Querying of Faces in Videos Using Bitmap Index," *Proc. IEEE International Conference on Multimedia Information Processing and Retrieval (MIPR)*, pp.36-41, 2019.

Chung, H., Dasari, P., Nandhakumar, S., Andrews, C., "CRICTO: Supporting Sensemaking through Crowdsourced Information Schematization," *Proc. IEEE Visual Analytics Science and Technology (VAST)*, pp.139-150, 2017.

Chung, H., North, C., Joshi, S., Chen, J., "Four Considerations for Supporting Visual Analysis in Display Ecologies," *Proc. IEEE Visual Analytics Science and Technology (VAST)*, pp.33-40, 2015.

Kwon, Y., Yang, S., **Chung, H.,** "Enabling Disaster Early Warning via a Configurable Data Collection Framework and Real-time Analytics," *Proc. International Conference on Human–Agent Interaction*, pp.337-340, 2015.

Chung, H., Chu, S., Quek, F., North, C., "A Comparison of Two Display Ecology Models for Collaborative Sensemaking," *Proc. ACM Pervasive Displays, pp. 37–42, 2013.*

Yang, S., **Chung, H.**, et al., "PhaseVis: What, When, Where, and Who in Visualizing the Four Phases of Emergency Management Through the Lens of Social Media," *ISCRAM*, 2013.

Chung, H., Cho, J., Self, J., and North, C., "Pixel-oriented Treemap for multiple displays," *Proc. IEEE VAST '12*, pp.289-290, 2012.

Chu, S., Quek, F., Endert, A., **Chung, H.,** and Sawyer, B., "The Physicality of Technological Devices in Education: Building a Digital Experience for Learning," *Proc. Advanced Learning Technologies (ICALT)*, pp. 579-581, 2012.

Endert, A., Fiaux, P., **Chung, H.**, Stewart, M., Andrews, C., North, C., "ChairMouse: Leveraging Natural Chair Rotation for Cursor Navigation on Large, High-Resolution Displays," *Proc. ACM CHI 2011 alt.chi*, pp.571-580, 2011.

POSTER/ABSTRACT Pham, D., Kaulfus, A., & Chung, H. (2022). Influence Network: Network visualization of influence between stories for Earth Science data and information exploration. *American Geophysical Union (AGU) Fall Meeting 2023*, Poster.

Khatri, M., Gurung, I., Priftis, G., Gupta, P., Ramachandran, R., **Chung, H.,** Ramasubramanian, M., Kaulfus, A., Cheng, P., Maskey, M., Christopher, S., "A Deep learning Approach for Surface PM2.5 Estimations from Geostationary Satellite and Numerical Model Data," *American Geophysical Union (AGU) Fall Meeting 2020*, Poster.

Khatri, M., Gahlot, S., Ramasubramanian, M., Gurung, I., Kaulfus, A., Priftis, G., Cheng, P., Gupta, P., Maskey, M., Ramachandran, R., Christopher, **Chung, H.,** "Application of Artificial Intelligence for Surface PM2.5 Estimations from Geostationary Satellite and Atmospheric Numerical Model Data," *American Meteorological Society (AMS) 101st Annual Meeting*, 2020, Poster.

Boyd, W., Diliberti, N., **Chung, H.,** "Visualizing Branches and Metrics of Version Control Systems on Mobile Devices," *IEEE InfoVis, 2020*, Poster.

Smith, D., **Chung, H.,** Ragan, E., Self, J., North, C., Cate, A., "Spatial and semantic memory for kinesthetic learning in large-scale visual displays," *Neuroscience 2013*, 2013, Poster.

Chung, H., North, C., Supporting Display Ecology for Collaborative Sensemaking", *UKC 2013*, New York, NY. 2013, Abstract.

Chung, H., Yang, S., Massjouni, N., Andrews, C., Kanna, R., North, C., "Supporting Synchronous Collaboration in Intelligence Analysis", *The 27th annual GSA research symposium*, Blacksburg, VA. 2011, Poster.

Chung, H., Yang, S., Massjouni, N., Andrews, C., Kanna, R., and North, C., "VizCept: Supporting Synchronous Collaboration for Constructing Visualizations in Intelligence Analysis," *Proc. IEEE Visual Analytics Science and Technology (VAST)*, pp.107-114, 2010.

Yang, S., **Chung, H.,** North, C., Fox, E., "The Effect of Presenting Long Documents with Large High-Resolution Displays on Comprehension of Content and User Experience," t*he 13th International Symposium on Electronic Theses and Dissertations (ETD' 10)*, 2010.

Chung, H., North, C., and Ferris, J. B., "Developing Large High-Resolution Display Visualization of High-Fidelity Terrain Data," *The 22th Annual Road Profile Users Group Conference*, Roanoke, VA. 2010, Presentation.

Chung, H., and Ferris, J. B., "Analyzing High Fidelity Terrain Data Using Large High-Resolution Displays," *The 21th Annual Road Profile Users Group Conference, Atlanta, GA.* 2009, Presentation.

DISSERTATION **Chung, H.,** "Display Ecologies for Visual Analysis," Ph.D. Dissertation, Computer Science Dept., Virginia Tech, Blacksburg, VA.

UNDER REVIEW Yang, S., **Chung, H.,** Shams, S., Depak, S., "A Two-Step Approach to Detect and Understand Dismisinformation Events Occurring in Social Media amid Critical Times," *PLOS ONE, under review.*

Gilbreath, J., Gryphon, K., Newman, T., Sun, M., **Chung, H.,** "AR-Enhanced Spatially Aware Visual Links for Multiple Displays," *IEEE VIS 2023, under review.*

Gryphon K., Vu, Veronica, **Chung, H.,** "A Design Space of Spatial Interactions for Multi-Display Visualization Tasks," *IEEE VIS 2023, under review.*

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AWARDS AND GRANTS

06/2022 – 05/2027	NSF CAREER Award, PI, "Display Ecologies for Visual Analysis and Sensemaking." Total: $520,000 (100%).
10/2021	Honorable Mention Award (with Vidya Setlur), "Semantic Resizing of Charts Through Generalization: A Case Study with Line Charts," IEEE VIS 2021.
01/2020 – 12/2023	National Institute of Justice, co-PI, "AI-Enabled Community Supervision for Criminal Justice Services." Total: $1,999,778 (30%). (PI: Marcus Rogers, Purdue)
06/2019 – 05/2023	NASA IMPACT/NSSTC, Subcontractor, "Supporting Inter-agency Implementation and Advanced Concepts (IMPACT) Through Visual Analytics and Machine Learning." Total: $132,039 (100%). (PI: Sundar Christopher, NSSTC)
01/2019 – 8/2019	Social Media 23, PI, "Improving Social Media Vetting through Machine Learning Algorithms." Total: $16,446 (100%).
07/2017 – 12/2018	Social Media 23, PI, "Supporting Social Media Vetting through NLP and Visual Analytics." Total: $138,000 (96%).
05/2021 – 08/2021	*UAH College of Business and College of Arts, Humanities, & Social Sciences*, PI, "AR-assisted Music Instruction." Total: $3,500 (100%).
01/2017 – 01/2018	*UAH Cross-College Faculty Research Grant*, PI, "Game-assisted Research and Education of Material Development." Total: $5,000.
01/2016 – 01/2017	*UAH New Faculty Research Award*, "Supporting Sensemaking through Crowdsourced Information Schematization." Total: $10,000

TEACHING EXPERIENCE

UA HUNTSVILLE	
FALL 2015 – 2021	CS143: Introduction to Technologies for Multimedia and Gaming
FALL 2016 – 2021	CS371: Mobile Computing App Development
SPRING 2021	CS347: Introduction to Video Game Design and Programming
SPRING 2017 – 2019	CS571: Mobile Computing Software Architecture and Development
SPRING 2016 – 2021	CS443/543: Introduction to Multimedia Systems
SPRING 2016 – 2018	CS696: ST: Visual Analytics
SPRING 2019, FALL 2019, 2020, 2021	CS496/696: ST: Data Visualization
FALL 2017	CS496: ST: Human-Computer Interaction
SPRING 2018	CS696: ST: Augmented Reality
SPRING 2020	CS496: ST: Virtual Reality

VIRGINIA TECH	CS3724: Introduction to Human-Computer Interaction,
SPRING 2010, 2011	*Course Assistant* for Doug Bowman
	Taught and led design activity classes once per week
	CS3114: Data Structure and Algorithms
FALL 2009	*Course Assistant* for William McQuain
FALL 2010	*Course Assistant* for Chris North
	CS1124: Media Computation as Graduate Student Instructor
FALL 2009	*Course Assistant* for Dwight Barnette
SPRING 2010	*Course Assistant* for Deborah Tatar
	Taught and led laboratory classes once per week
	CS5764: Information Visualization
FALL 2012	*Course Assistant* for Chris North

RENSSELAER	CSCI6270 Computer Vision
FALL 2006	*Course Assistant* for Daniel Freedman

FALL 2005	CSCI4963 Enterprise Java programming *Course Assistant* for Alok Mehta

GRADUATE AND UNDERGRADUATE ADVISING

CURRENT PHD STUDENT	Nicholas Diliberti, Veronica Vu, Hue Dinh
CURRENT MS STUDENTS	Kaden Gryphon
MS ALUMNI	Jordan Gibreath (M.S. Fall 2022) Dan Pham (M.S., Spring 2023) Hassan Muhammad (M.S., Summer 2020) Santhosh Nanthakumar (M.S., Fall 2019) Gopinath Vasu (M.S., Spring 2019) Sai Prashanth Dasari (M.S., Spring 2017)
PHD COMMITTEE	Vaidyanath Shanthakumar (Fall 2021), Jacob Hauenstein (Spring 2020), Khomsun Singhirunnusorn (Spring 2020)
MS COMMITTEE	Arun John (Fall 2021), Pooja Khanal (Summer 2021), Prasanna Koirala (Summer 2021), Slesa Adhikari (Spring 2020) Buddha Raj Shrestha (Spring 2019), Sriraksha Nagaraj (Summer 2018), Bidhan Bhattarai (Fall 2017), Samyam Acharya (Fall 2016).
GRADUATE INDEPENDENT STUDY ADVISING	Sai Prashanth Dasari (Fall 2015), Santhosh Nandhakumar (Spring 2016), Truong Xuan Tran (Fall 2016), Maniraj Selladurai (Fall 2016), Abhishek Mugalikar (Spring 2017), Mohammad Eshani (Fall 2017), Sai Nikhil Reddy Mettupally (Summer 2017), Adithya Krishna Naik (Summer 2017), Tyler Kline (Spring 2018), Maximilian Schalk (Spring 2019), Gopinath Polasani Vasu (Summer 2019), Coner McKinney (Fall 2019), Brian Ramsdell (Fall 2019), Hassan Muhammad (Spring 2019), Jordan Gibreath (Fall 2020), Dan Pham (Fall 2021), Will Boyd (Fall 2021), Veronica Vu (Spring 2023), Hue Dinh.
UNDERGRADUATE INDEPENDENT STUDY ADVISING	Susan Kitts (Fall 2017), Hassan Muhammad (Fall 2018, Spring 2019), Austin Vickers (Spring 2019), Chandler Davidson (Spring 2019), Edward Brown (Fall 2020), Timmy Haggler (Summer 2021), Bernard Allotey (Fall 2022), Kaden Gryphon (Spring 2022), Owen Tiedeman (Fall 2022), Francis Brown (Fall 2022), KyungJae Lee (Summer 2022), Van Hudson (Spring 2023), Lance Chaffin (Spring 2023).

PROFESSIONAL SERVICES

PANEL	NSF Review Panel (CISE IIS/Visualization & Human-computer interaction) 2019, 2022 Canada Foundation for Innovation (FI) Review Panel 2020.
ORGANIZER	International Workshop on Visualization and Collaboration (VisualCol) 2016. International Conference on Informatics, Electronics, and Vision (ICIEV) 2015.
PROGRAM COMMITTEE	IEEE VIS 2023, 2022, 2021. IEEE Conference on Visualization (Visual Analytics Science and Technology (VAST) 2019, 2020. International Conference on Applications and Systems of Visual Paradigms (VISUAL) 2017, 2018, 2019, 2020.
REVIEWER	IEEE VIS 2023, 2022, 2021. IEEE Conference on Information Visualization (InfoVis) 2012, 2015, 2017.

IEEE Conference on Visual Analytics Science and Technology (VAST) 2013, 2014, 2015, 2018, 2019, 2020.
IEEE VAST Challenge 2019, 2020.
IEEE Pervasive Computing 2016.
IEEE Transaction on Visualization and Computer Graphics 2011, 2015, 2016, 2019, 2020, 2021.
ACM Symposium on User Interface Software and Technology (UIST) 2015, 2018.
IEEE Games, Entertainment, and Media (GEM) 2015.
ACM SIGCHI Conference on Human Factors in Computing Systems (CHI) 2014.
ACM Designing Interactive Systems (DIS) 2019.
Visual Computer, International Journal of Computer Graphics, 2014.

The Alabama A&M University STEM Day, April 2018.

BlackLab Equipment Manager, Center for Human-Computer Interaction, Virginia Tech, 2011-2014.

INVITED TALKS AND DEMOS

Tableau User Group Huntsville, June 6, 2016.
Georgia Southern University, Statesboro, GA, April 9, 2015.
IBM T. J. Watson Research Center, Yorktown Heights, NY, May 13, 2014.
Tableau Research, Menlo Park, CA, May 22, 2014.
General Dynamics, June 2015.
Virginia Tech CS Graduate Recruiting Day, March 2014.
Department of Defense, December 2013.
University of Pittsburg, November 2013.
Naval Science Advisory Panel, November 2013.
Human Factors and Ergonomics Society (HFES) Student Chapter, October 2013.
Virginia Governor's School Visit, July 2013.
The Director of Center for Advanced Engineering & Research, July 2013.
Executive officers of L-3 (Lockheed Martin)/LS National Security Solutions, May 2013.
Gigapixel Demo for Pavement Evaluation 2010 Conference Tour, September 2010.
Gigapixel Demo for Dr. Peter Lee, Microsoft Research, October 2010.

MEDIA COVERAGE

Scanning the Social Media Minefield, Business Alabama, November 2018.

AI system would help prisoners re-enter society, Huntsville Times, October 25, 2019.

AI system being developed under $1.9 million grant to help parolees integrate into society, UAH News/ Florida State University News, November 12, 2019.

Apps Are Now Putting the Parole Agent in Your Pocket, WIRED, November 2020.

PATENT

Semantic Resizing of Line Charts. Vidya Setlur, Haeyong Chung. 061127-5251-PR. Filed on August 13, 2021. Provisional Application No. 63/233,195.