Lane Harrison

Contact Information

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1. Professional Appointments

2022 - Present	Visiting Faculty (Sabbatical)	Northeastern University / Roux Institute	Portland, ME
2021 - Present	Associate Professor	Worcester Polytechnic Institute	Worcester, MA
2015 - 2021	Assistant Professor	Worcester Polytechnic Institute	Worcester, MA
2014 - 2015	Instructor	Tufts University	Medford, MA
2013 - 2015	Postdoctoral Researcher	Visual Analytics Lab, Tufts University	Medford, MA
2012 - 2013	Visiting Researcher	Oak Ridge National Laboratory	Oak Ridge, TN

2. Education

Aug 2013 — Ph.D. in Computer Science
University of North Carolina at Charlotte, Charlotte, NC
Dissertation: "The Role of Emotion in Visualization"
Advisor: Aidong Lu

May 2009 — B.S. in Computer Science, Mathematics Minor
University of North Carolina at Charlotte, Charlotte, NC

3. Publications

In the following publication list, WPI graduate student co-authors are underlined while both underlining and italics denote WPI *undergraduate student* co-authors.

Peer Reviewed Journals

J1. Yuan Cui, Lily Ge, Yiren Ding, Fumeng Yang, Lane Harrison, and Matthew Kay. "Adaptive Assessment of Visualization Literacy." *IEEE Transactions on Visualization and Computer Graphics*, 2023.

J2. Russell Davis, Xiaoying Pu, Yiren Ding, Brian D. Hall, *Karen Bonilla*, Mi Feng, Matthew Kay, and Lane Harrison. "The Risks of Ranking: Revisiting Graphical Perception to Model Individual Differences in Visualization Performance" *IEEE Transactions on Visualization and Computer Graphics*, 2022. Impact Factor 4.579

J3. Noelle Rakotondravony, Yiren Ding, and Lane Harrison. "Probablement, Wahrscheinlich, Likely? A Cross-Language Study of How People Verbalize Probabilities in Icon Array Visualizations" *IEEE Transactions on Visualization and Computer Graphics*, 2022. Impact Factor 4.579

J4. Alyssa Pena, Eric Ragan, and Lane Harrison. "Memorability of Enhanced Informational Graphics: the effects of design relevance and chart type on recall" *Interdisciplinary Journal of Signage and Wayfinding*, 2020. Impact Factor: 0.5

J5. Fumeng Yang, James Tompkin, Lane Harrison, David Laidlaw. "Visual Cue Effects on a Classification Accuracy Estimation Task in Immersive Scatterplots." *IEEE Transactions on Visualization and Computer Graphics*, 2022. Impact Factor: 4.579

J6. Fumeng Yang, Lane Harrison, Ronald A Rensink, Steven Franconeri, and Remco Chang. "Correlation Judgment and Visualization Features: A Comparative Study." *IEEE Transactions on Visualization and Computer Graphics*, 2018. Impact Factor: 4.579

J7. Bolin Zhu, Mi Feng, *Hannah Lowe*, Jeffrey Kesselman, Lane Harrison, and Robert E Dempski. "Increasing Enthusiasm and Enhancing Learning for Biochemistry-Laboratory Safety with an Augmented-Reality Program." *Journal of Chemical Education*, 2018. Impact Factor: 1.763

J8. Li Yu, Lane Harrison, and Aidong Lu. "Effectiveness of Feature-Driven Storytelling in 3D Time-Varying Data Visualization." *Journal of Imaging Science and Technology*, 2016. Impact Factor: 0.460

J9. Wenwen Dou, Caroline Ziemkiewicz, Lane Harrison, Dong Hyun Jeong, William Ribarsky, Xiaoyu Wang, and Remco Chang. "Toward a Deeper Understanding of the Relationship between Interaction Constraints and Visual Isomorphs." *Information Visualization*, 2012. Impact Factor: 1.150

J10. Li Yu, Lane Harrison, Aidong Lu, Zhiwei Li, and Weichao Wang. "3D Digital Legos for Teaching Security Protocols." *IEEE Transactions on Learning Technologies*, 2011. Impact Factor: 3.30

Peer Reviewed Conferences

C1. Akim Ndlovu, Hilson Shrestha, and Lane T. Harrison. "Taken By Surprise? Evaluating how Bayesian Surprise & Suppression Influences Peoples' Takeaways in Map Visualizations." *In 2023 IEEE Visualization and Visual Analytics (VIS),* 2023.

C2. Yiren Ding, Lane T. Harrison. "Data in the Wind: Evaluating Multiple-Encoding Design for Particle Motion Visualizations." *In 2023 IEEE Visualization and Visual Analytics (VIS),* 2023. **Honorable Mention Best Short Paper**

C3. Yiren Ding, Jack Wilburn, Hilson Shrestha, Akim Ndlovu, Kiran Gadhave, Carolina Nobre, Alexander Lex, and Lane Harrison. "reVISit: Supporting Scalable Evaluation of Interactive Visualizations." *In 2023 IEEE Visualization and Visual Analytics (VIS),* 2023.

C4. Hilson Shrestha, Kathleen Cachel, Mallak Alkhathlan, Elke Rundensteiner, and Lane Harrison. "Help or Hinder? Evaluating the Impact of Fairness Metrics and Algorithms in Visualizations for Consensus Ranking" *ACM Conference on Fairness, Accountability, and Transparency*, 2023.

C5. Fumeng Yang, Yuxin Ma, Lane Harrison, James Tompkin, and David Laidlaw. "How Can Deep Neural Networks Aid Visualization Perception Research?" *The 2023 CHI Conference on Human Factors in Computing Systems*, 2023.

C6. Hilson Shrestha, Kathleen Cachel, Mallak Alkhathlan, Elke Rundensteiner, and Lane Harrison. "FairFuse: Interactive Visual Support for Fair Consensus Ranking" *2022 IEEE Visualization and Visual Analytics (VIS)*, 2022.

C7. *Ryan Birchfield*, *Maddison Caten*, *Errica Cheng*, *Madyson Kelly*, *Truman Larson*, *Hoan Phan Pham*, Yiren Ding, Noelle Rakotondravony, and Lane Harrison. "VisQuiz: Exploring Feedback Mechanisms to Improve Graphical Perception" *2022 IEEE Visualization and Visual Analytics (VIS)*, 2022.

C8. Matthew Puentes, Yunsen Lei, Noelle Rakotondravony, Lane Harrison, and Craig Shue. "Visualizing Web Application Execution Logs to Improve Software Security Defect Localization" *2022 IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER)*, 2022.

C9. Tabassum Kakar, Xiao Qin, Elke Rundensteiner, Lane Harrison, Sanjay Sahoo, Suranjan De, and Thang La. "ConText: Supporting the Pursuit and Management of Evidence in Text-based Reporting Systems" *VISIGRAPP (3: IVAPP)*, 2022.

C10. Tabassum Kakar, Xiao Qin, Thang La, Sanjay K Sahoo, Suranjan De, Elke Rundensteiner, Lane Harrison. "SumRe: Design and Evaluation of a Gist-based Summary Visualization for Incident Reports Triage" *Computer Graphics Forum*, 2021.

C11. Mallak Alkhathlan, ML Tlachac, Elke Rundensteiner, and Lane Harrison. ""Honestly I Never Really Thought About Adding a Description": Why Highly Engaged Tweets Are Inaccessible" *INTERACT 2021: 18th IFIP TC 13 International Conference Proceedings*, 2021.

C12. Tabassum Kakar, Xiao Qin, *Cory M. Tapply*, *Oliver Spring*, *Derek Murphy*, *Daniel Yun*, Elke Rundensteiner, Lane Harrison, Thang La, and Sanjay K Sahoo. "Designing a visual analytics system for medication error screening and detection" *VISIGRAPP (IVAPP)*, 2020.

C13. Tabassum Kakar, Xiao Qin, *Cory M. Tapply*, *Oliver Spring*, *Derek Murphy*, *Daniel Yun*, Elke Rundensteiner, Lane Harrison, Thang La, and Sanjay K Sahoo. "MEV: Visual Analytics for Medication Error Detection." *VISIGRAPP (IVAPP)*, 2019.

C14. ML Tlachac, Miranda Reisch, Brittany Lewis, Ricardo Flores, Lane Harrison and Elke Rundensteiner. "Impact assessment of stereotype threat on mobile depression screening using Bayesian estimation" *Healthcare Analytics*, 2022.

C15. Kathleen Cachel, Elke Rundensteiner, Lane Harrison. "Mani-rank: Multiple attribute and intersectional group fairness for consensus ranking." *IEEE 38th International Conference on Data Engineering (ICDE)*, 2022.

C16. Kevin Beltran, Cody Rowland, Nicki Hashemi, Anh Nguyen, Lane Harrison, Sophie J. Engle, and Beste F. Yuksel. "Using a Virtual Workplace Environment to Reduce Implicit Gender Bias." *International Journal of Human–Computer Interaction*, 2022.

C17. Carolina Nobre, Dylan Wootton, Zach Cutler, Lane Harrison, Hanspeter Pfister, and Alexander Lex. "reVISit: looking under the hood of interactive visualization studies." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2021.

C18. Caitlyn McColeman, Mi Feng, Lane Harrison, Steven Franconeri. "No mark is an island: Precision and category repulsion biases in data reproductions." *IEEE Transactions on Visualization and Computer Graphics (Proc InfoVis)*, 2020.

C19. Carolina Nobre, Dylan Wootton, Lane Harrison, and Alexander Lex. "Evaluating multivariate network visualization techniques using a validated design and crowdsourcing approach." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2020.

C20. Caitlin Kuhlman, *Diana Doherty*, *Malika Nurbekova*, *Goutham Deva*, *Zarni Phyo*, *Paul-Henry Schoenhagen*, *Mary VanValkenburg*, Elke Rundensteiner, and Lane Harrison. "Evaluating Preference Collection Methods for Interactive Ranking Analytics." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2019.

C21. Tabassum Kakar, Xiao Qin, Elke Rundensteiner, Lane Harrison, Sahoo K. Sanjay, and Suranjan De. "DIVA: Exploration and Validation of Hypothesized Drug-Drug Interactions." *Computer Graphics Forum (Proc. EuroVis)*, 2019.

C22. Mi Feng, Evan M. Peck, and Lane Harrison. "Patterns and Pace: Quantifying Diverse Exploration Behavior with Visualizations on the Web." *IEEE Transactions on Visualization and Computer Graphics (Proc InfoVis)*, 2018.

C23. Mi Feng, Cheng Deng, Evan M. Peck, and Lane Harrison. "The Effects of Adding Search Functionality to Interactive Visualizations on the Web". *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2018.

C24. Tabassum Kakar, Xiao Qin, *Andrew Schade*, *Brian McCarthy*, *Huy Quoc Tran*, *Brian Zylich*, Elke Rundensteiner, Lane Harrison, Sanjay K Sahoo, and Suranjan De. "Deves: Interactive Signal Analytics for Drug Safety." *In Proceedings of the 27th ACM International Conference on Information and Knowledge Management*, 2018.

C25. Tabassum Kakar, Xiao Qin, *Andrew Schade*, *Brian McCarthy*, *Huy Quoc Tran*, *Brian Zylich*, Elke Rundensteiner, Lane Harrison, Sanjay K Sahoo, and Suranjan De. "MEDIAR: Multi-Drug Adverse Reactions Analytics." *IEEE 34th International Conference on Data Engineering (ICDE)*, 2018.

C26. Caitlin Kuhlman, *Mary VanValkenburg*, *Diana Doherty*, *Malika Nurbekova*, *Goutham Deva*, *Zarni Phyo*, Elke Rundensteiner, and Lane Harrison. "Preference-Driven Interactive Ranking System for Personalized Decision Support." *In Proceedings of the 27th ACM International Conference on Information and Knowledge Management*, 2018.

C27. Helen Chen, Sophie Engle, Alark Joshi, Eric D. Ragan, Beste F. Yuksel, and Lane Harrison. "Using Animation to Alleviate Overdraw in Multiclass Scatterplot Matrices." *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2018.

C28. Natasha Danas, Tim Nelson, Lane Harrison, Shriram Krishnamurthi, and Dan Dougherty. "User Studies of Principled Model Finder Output." *Software Engineering and Formal Methods (SEFM)*, 2017.

C29. Mi Feng, Cheng Deng, Evan Peck, and Lane Harrison. "HindSight: Encouraging Exploration through Direct Encoding of Personal Interaction History." *IEEE Transactions on Visualization and Computer Graphics (Proc InfoVis)*, 2016.

C30. Anzu Hakone, Lane Harrison, Alvitta Ottley, Nathan Winters, Caitlin Guthiel, Paul K. J. Han, and Remco Chang. "PROACT: Iterative Design of a Patient-Centered Visualization for Effective Prostate Cancer Health Risk Communication." *IEEE Transactions on Visualization and Computer Graphics (Proc InfoVis)*, 2016.

C31. Beste F Yuksel, Kurt Oleson, Lane Harrison, Evan M Peck, Daniel Afergan, Remco Chang, and Robert JK Jacob. **Best Paper Award (Top 1%)** "Learn Piano with BACh: An Adaptive Learning Interface that Adjusts Task Difficulty based on Brain State." *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2016.

C32. Eun Youb Lee, Beste F Yuksel, Daniel Afergan, Samuel W Hincks, Tomoki Shibata, Erin Solovey, AJ Jenkins, Kurt B Oleson, Lane Harrison, Evan M Peck, Remco Chang, and Robert JK Jacob. "Using Brain States to Enhance User Experience." *In SICASE: Seoul International Conference on Applied Science and Engineering*, 2016.

C33. Beste F Yuksel, Daniel Afergan, Evan M Peck, Garth Griffin, Lane Harrison, Nick WB Chen, Remco Chang, and Robert JK Jacob. "BRAAHMS: A Novel Adaptive Musical Interface Based on Users Cognitive State." *In New Interfaces for Musical Expression (NIME)*, 2015.

C34. Lane Harrison, Katharina Reinecke, and Remco Chang. "Infographic Aesthetics: Designing for the First Impression." *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2015.

C35. Alvitta Ottley, Evan M. Peck, Lane Harrison, Daniel Afergan, Caroline Ziemkiewicz, Holly A. Taylor, Paul K. J. Han, and Remco Chang. "Improving Bayesian Reasoning: The Effects of Phrasing, Visualization, and Spatial Ability." *IEEE Transactions on Visualization and Computer Graphics (Proc InfoVis)*, 2015.

C36. Drew Skau, Lane Harrison, and Robert Kosara. "An Evaluation of The Impact of Visual Embellishments In Bar Charts." *In Computer Graphics Forum (Proc. EuroVis)*, 2014.

C37. Lane Harrison, Fumeng Yang, Steven Franconeri, and Remco Chang. "Ranking Visualizations of Correlation Using Weber's Law." *IEEE Transactions on Visualization and Computer Graphics (Proc. InfoVis)*, 2014.

C38. Diane Staheli, Tamara Yu, Jordan Crouser, Suresh Damodaran, Kevin Nam, David O'Gwynn, Sean McKenna, and Lane Harrison. "Visualization Evaluation for Cyber Security: Trends and Future Directions." *Proceedings of the Eleventh International Symposium on Visualization for Cyber Security (VizSec)*, 2014.

C39. Lane Harrison, Drew Skau, Steven Franconeri, Aidong Lu, and Remco Chang. "Influencing Visual Judgment through Affective Priming." *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2013.

C40. Lane Harrison, Riley Spahn, Mike Iannacone, Evan Downing, and John R Goodall. "nv: Nessus Vulnerability Visualization for the Web." *In Proceedings of the Ninth International Symposium on Visualization for Cyber Security (VizSec)*, 2012.

C41. Xianlin Hu, Huaguang Song, Lane Harrison, Aidong Lu, Jinzhu Gao, and Weichao Wang. "Towards Effective Collaborative Analysis for Distributed Intrusion Detection." *In The 6th IASTED International Conference on Human-Computer Interaction*, 2011.

C42. Wenwen Dou, Caroline Ziemkiewicz, Lane Harrison, Dong Hyun Jeong, Roxanne Ryan, William Ribarsky, Xiaoyu Wang, and Remco Chang. "Comparing Different Levels of Interaction Constraints for Deriving Visual Problem Isomorphs." *In IEEE Symposium on Visual Analytics Science and Technology (VAST)*, 2010.

C43. Lane Harrison, Xianlin Hu, Xiaowei Ying, Aidong Lu, Weichao Wang, and Xintao Wu. "Interactive Detection of Network Anomalies via Coordinated Multiple Views." *In Proceedings of the Seventh International Symposium on Visualization for Cyber Security (VizSec)* 2010.

Peer Reviewed Workshops

W1. Evan M. Peck and Lane Harrison. "Empowering Sensemaking in the Web's Emerging Visualization Ecosystem." *ACM SIGCHI Workshop on Sensemaking in a Senseless World*, 2018.

W2. Hamid Mansoor and Lane Harrison. "Data Visualization Literacy and Visualization Biases: Cases for Merging Parallel Threads." *DECISIV Workshop on Visualization Literacy*, 2018.

W3. Jordan Sechler, Lane Harrison, and Evan M. Peck. "SightLine: Building on the Web's Visualization Ecosystem." *ACM SIGCHI Late Breaking Work*, 2017.

W4. Jordan R Crouser, Lane Harrison, Daniel Afergan, and Evan M. Peck. "Beyond Detection: Investing in Practical and Theoretical Applications of Emotion and Visualization." *ACM Conference on Intelligent User Interfaces (IUI), Workshop on Emotion and Visualization*, 2016.

W5. Alvitta Ottley, Evan M Peck, Lane Harrison, and Remco Chang. "The Adaptive User: Priming to Improve Interaction." *ACM SIGCHI Workshop: Many People Many Eyes*, 2013.

W6. Evan M Peck, Beste F Yuksel, Lane Harrison, Alvitta Ottley, and Remco Chang. "ICD3: Towards a 3-Dimensional Model of Individual Cognitive Differences." *IEEE VisWeek BELIV Workshop (Beyond Time and Errors: Novel Evaluation Methods for Information Visualization)*, 2012.

W7. Xianlin Hu, Lane Harrison, Aidong Lu, Li Yu, Huaguang Song, and Jinzhu Gao. "Evaluation of Co-located and Distributed Collaborative Visualization." *In Proceedings of the 5th International Symposium on Visual Information Communication and Interaction*, 2012.

W8. Lane Harrison, Thomas Butkiewicz, Xiaoyu Wang, William Ribarsky, and Remco Chang. "A Linked Feature Space Approach to Exploring LIDAR Data." *In SPIE Defense, Security, and Sensing*, 2010.

Posters / Misc. Pubs

P1. Akarsh Singh, Michael Wan, Lane Harrison, Anne Breggia, Robert Christman, Raimond L. Winslow, and Saeed Amal. "Visualizing Decisions and Analytics of Artificial Intelligence based Cancer Diagnosis and Grading of Specimen Digitized Biopsy: Case Study for Prostate Cancer" *Companion Proceedings of the 28th International Conference on Intelligent User Interfaces*, 2023.

P2. Mallak Alkhathlan, ML Tlachac, Elke Rundensteiner, and Lane Harrison. "Improving Image Accessibility by Combining Haptic and Auditory Feedback" *Proceedings of the 24th International ACM SIGACCESS Conference on Computers and Accessibility*, 2022.

P3. Henintsoa Andrianarivony, Taratra Raharison, Tamby Rakotoniaina, Mirindra Ramarokoto, Noelle Rakotondravony, and Lane Harrison. "Investigating the Use of Native and Secondary Language with Data Visualization in Madagascar" *Posters Proceedings of 2022 IEEE Visualization and Visual Analytics (VIS)*, 2022.

P4. Kevin Beltran, Cody Rowland, Nicki Hashemi, Anh Nguyen, Lane Harrison, Sophie Engle, and Beste Yuksel. "Reducing implicit gender bias using a virtual workplace environment"

Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems, 2021.

P5. Jared Chandler, Remco Chang, and Lane Harrison. DirViz: Interactively Scale Treemaps for File Permission Visualization. In Poster: IEEE Symposium on Visualization for Cyber Security, 2016.

P6. Lane Harrison, Jason Laska, Riley Spahn, Mike Iannacone, Evan Downing, Erik M Ferragut, and John R Goodall. situ: Situational Understanding and Discovery for Cyber Attacks. In Poster: Visual Analytics Science and Technology (VAST), 2012 IEEE Conference on, pages 307–308. IEEE, 2012.

P7. Lane Harrison, Remco Chang, and Aidong Lu. Best Poster: Exploring the Impact of Emotion on Visual Judgement. In Poster: Visual Analytics Science and Technology (VAST), 2012 IEEE Conference on, pages 227–228. IEEE, 2012.

P8. Lane Harrison, Wenwen Dou, Aidong Lu, William Ribarsky, and Xiaoyu Wang. Poster: Analysts Aren't Machines: Inferring Frustration through Visualization Interaction. In Visual Analytics Science and Technology (VAST), 2011 IEEE Conference on, pages 279–280. IEEE, 2011.

P9. Lane Harrison, Wenwen Dou, Aidong Lu, William Ribarsky, and Xiaoyu Wang. Poster: Guiding Security Analysis through Visualization. Award: High Potential for Scalability. In IEEE VAST Challenge, pages 317–318, 2011.

P10. Samantha L Finkelstein, Andrea Nickel, Lane Harrison, Evan A Suma, and Tiffany Barnes. Poster: cMotion: A New Game Design to Teach Emotion Recognition and Programming Logic to Children using Virtual Humans. In Virtual Reality Conference, 2009. VR 2009. IEEE, pages 249–250. IEEE, 2009.

Book Chapters

B1. Lane Harrison, Andrew Hampton. "Walk Me Through This: Utilizing Kinesthetic Effect in Data Storytelling" *Design Recommendations for Intelligent Tutoring Systems: Volume 8-Data Visualization*, 2020.

B2. Lane Harrison. "Opportunities for Visualization Design and Evaluation" *Design Recommendations for Intelligent Tutoring Systems: Volume 8-Data Visualization*, 2020.

B3. Lane Harrison. "Data Visualization for Cyber Security." *Big Data Analytics in Cybersecurity (Taylor & Francis)*, 2016.

B4. Lane Harrison and Aidong Lu. "Incorporating Uncertainty in Intrusion Detection to Enhance Decision Making." *Scientific Visualization (Springer)*, 2014.

Magazine Articles

M1. Lane Harrison and Aidong Lu. "The Future of Security Visualization: Lessons from Network Visualization". *IEEE Network*, 2012.

4. Grant and Contract Funding

Awarded at Worcester Polytechnic Institute

G1. **Primary Investigator**, *Collaborative Research: CCRI: New: reVISit: Scalable Empirical Evaluation of Interactive Visualizations.*, NSF Division of Information & Intelligent Systems.
Amount: $747,283 over 3 years (7/2022-7/2025) (WPI share $747,283).
Co-Investigators: Alexander Lex (University of Utah), Carolina Nobre (University of Toronto).

G2. **Co-Investigator**, *Fair Decision Making by Consensus: Interactive Bias Mitigation Technology*, NSF Division of Information & Intelligent Systems.
Amount: $499,991 over 3 years (8/2020-8/2023) (WPI Share $499,991).
Principal Investigator: Elke Rundensteiner. Co-Investigators: Lane Harrison.

G3. **Co-Investigator**, *Scaling Teachers' Professional Development for ASSISTments (EIR)*, US Department of Education.
Amount: $4,980,445 over 5 years (10/2019-10/2024) (WPI Share $1,621,207).
Principal Investigator: Neil Heffernan. Co-Investigators: Lane Harrison.

G4. **Co-Investigator**, *Teachers are the Learners: Providing Automated Feedback on Classroom Inter-Personal Dynamics*, NSF Division of Information & Intelligent Systems.
Amount: $749,969 over 3 years (8/2018-8/2021) (WPI Share $664,527).
Principal Investigator: Jacob Whitehill. Co-Investigators: Lane Harrison, Erin Ottmar.

G5. **Primary Investigator**, *Collaborative Research: Validating and Communicating Model-based Approaches for Data Visualization Ability Assessment*, NSF Division of Information & Intelligent Systems.
Amount: $487,185 over 3 years (8/2018-8/2021) (WPI share $248,337).
Co-Investigators: Matthew Kay (Northwestern University).

5. Graduate Theses and Dissertations Advised at WPI

WPI Doctoral Dissertations

D1. Mi Feng, "Quantifying, Modeling, and Managing How People Interact with Visualizations on the Web", May 2019. *Mia is working at Adobe as of May 2023.*

D2. Tabassum Kakar, "Visual Analytics for Multi-Level Triage and Investigation of Incident Reports", December 2020. (Co-advised with Elke Rundensteiner) *Tabassum is working at a biotech startup as of Aug 2022.*

WPI Master's Theses

MT1. Russ Davis, "Quantifying and Modeling Individual Differences in Graphical Perception Ability", *May 2023.*

MT2. Hilson Shrestha, "Help or Hinder? Evaluating Fairness Metrics and Algorithms in Visualization Systems for Consensus Ranking", May 2023.

MT3. Noelle Rakotondravony, "Probablement, Likely, Wahrscheinlich? – A Cross-Language Study of the Verbalization of Probabilities through Data Visualizations", May 2022.

MT4. Meijie Wang, "Flame Perception App: Enabling Fire Engineers and Researchers to Understand and Analyze Flame Data", July 2020.

Membership on External Student Committees

SC1. Sarah Weintraub, PhD Committee, WPI Chemical Engineering Dept. (Worcester, MA), *on-going*. Primary Advisor: Eric Young.

SC2. Aaron Haim, PhD Committee, WPI Computer Science Dept. (Worcester, MA), *on-going*. Primary Advisor: Neil Heffernan.

SC3. Huaming Sun, PhD Committee, WPI Computer Science Dept. (Worcester, MA), *on-going*. Primary Advisor: Scarlet Shell.

SC4. Andi Dhroso, PhD Committee, WPI Bioinformatics and Computational Biology. (Worcester, MA), *on-going*. Primary Advisor: Dmitry Korkin.

SC5. Yunsen Lei, PhD Committee, WPI Computer Science Dept. (Worcester, MA), *December 2023*. Primary Advisor: Craig Shue.

SC6. Justin Raynor, PhD Committee, Northeastern University, CS. (Boston, MA), *December 2023*. Primary Advisor: Cody Dunne.

SC7. Ashish Gurung, PhD Committee, WPI Computer Science Dept. (Worcester, MA), *August 2023*. Primary Advisor: Neil Heffernan.

SC8. Ermal Toto, PhD Committee, WPI Computer Science Dept. (Worcester, MA), May 2021. Primary Advisor: Elke Rundensteiner.

SC9. Tabassum Kakar, PhD Committee, WPI Computer Science Dept. (Worcester, MA), December 2020. Co-Advisor: Elke Rundensteiner.

SC10. Caitlin Kuhlman, PhD Committee, WPI Computer Science Dept. (Worcester, MA), completed May 2020. Primary Advisor: Elke Rundensteiner.

SC11. Bram Cappers, PhD Committee, TU Eindhoven. (Eindhoven, Netherlands), completed December 2019. Primary Advisor: Jarke van Wijk.

SC12. Jeffery Garae, PhD Committee, University of Waikato. (Hamilton, New Zealand), completed 2019. Primary Advisor: Ryan Ko.

SC13. Heric Flores-Huerta, MS Thesis, WPI Computer Science Dept. (Worcester, MA), completed 2019. Primary Advisor: Craig Shue.

SC14. Andres Francisco Guerrero, MS Thesis, WPI Computer Science Dept. (Worcester, MA), completed 2018. Primary Advisor: Carolina Ruiz.

SC15. Natasha Danas, MS Thesis, WPI Computer Science Dept. (Worcester, MA), completed 2016. Primary Advisor: Dan Dougherty.

6. Undergraduate Projects Advised at WPI

WPI Major Qualifying Projects

Students and advisors with affiliations other than CS denoted in parentheses.

MQP1. Reilly Norum, "K-means Clustering of Student Behavioral Patterns and Advanced Visualization Methods of Learning Technology Data", Harrison, Lane T. and Ottmar, Erin R, 2022.

MQP2. Luke Bodwell, Cameron Jacobson, and Owen Aguirre, "GeoBlade: An Audio-Driven Action-Adventure Game", Moriarty, Brian J., Harrison, Lane T., and Zizza, Keith, 2022.

MQP3. Syreneti Delacruz, Sean Morrissey, and Johvanni Perez, "C3: COILS Clip Cut Visualization for Classroom Video Analysis", 2022.

MQP4. Ryan Birchfield, Maddison Caten, Errica Cheng, Madyson Kelly, Truman Larson, and Hoan Phan Pham, "VisQuiz: Improving Visualization Literacy with Interactive Feedback", 2022.

MQP5. Van Le, and Adrian Orszulak, "The Effects of mRNA Abundance on Degradation Rate", Shell, Scarlet and Harrison, Lane T., 2022.

MQP6. Caleb Farwell, Amy Orozco, and Benjamin Robinson, "Audio Journal App Continuation", Neamtu, Rodica and Harrison, Lane T., 2022.

MQP7. Kate Sincaglia, Olajumoke Jackson, Marissa Thomas, and Nicole Whipkey, "Improving Director Preferences and Creating a User Interface for the Global Opportunities Allocation Tool", Trapp, Andrew C and Harrison, Lane T., 2022.

MQP8. Andrew Shanaj, Philip Rago, and Evan Hatton, "Predictive Models For NBA Sports Gambling", Wills, Craig E. and Harrison, Lane T., 2021.

MQP9. Ryan Doyle, Irakli Grigolia, and Kyria G. Nelson, "Creating an App For Audio Journal's Print Disabled Listeners" Neamtu, Rodica and Harrison, Lane T., 2021.

MQP10. Sarah Akbar, Nathan Walzer, Veronica E. Gurnawan, and Daniel J. Alvarado, "Secure Humanitarian App Development", Harrison, Lane T. and DeCarli, Lorenzo, 2021.

MQP11. Jacob Pardue (MA/CS), "Improving Visualization Literacy Feedback and Analysis", Co-Advisor with Oren Mangoubi (MA), 2020.

MQP12. Josephine Bowen (ME), Blake Dobay, Benjamin Thornton (BE), Marc Reardon, "Visualization Tool for Biomechanical Rowing Analysis", Co-Advisor with Tiffiny Butler (BE), Selcuk Guceri (ME), 2020.

MQP13. John Amaral, Grace Pellela, Shuxing Li, "Realtime Feedback in Coding Games", Co-Advisor with Charlie Roberts, 2020.

MQP14. Peter Christakos, Andrew Morrison, Julian Pinzer, Katherine Thompson, "Visualizing SGA's Budget", 2020.

MQP15. Meixintong Zha, "Designing and Evaluating Feedback Schemes for Improving Data", 2020.

MQP16. Madeline Burke, John Dyer, Luke Gardner, "ReVisIt: Capturing and Visualizing Interaction Data", 2019.

MQP17. Ryan Wittenberg, Michael Prindle, "Influence of End User Activity on Firewalling Decisions", Co-Advisor with Craig Shue, 2019.

MQP18. Josiah Boucher, Jerry Brown, Erika Snow, Alexandra Wheeler, "Diagnosing Robotic Swarms (Dr. Swarm)", Co-Advisor with Carlo Pinciroli (RBE/CS), 2019. **Provost MQP Award (Honorable Mention).**

MQP19. Alex Dyer, "Sight.JS Data Analysis with Splunk", 2018.

MQP20. Tyler Jaskoviak (CS/Psych), "Human Perception of Outliers in Data", Co-advisor with Jeanine Skorinko (SSPS), 2018.

MQP21. Natasha Kononenko (IMGD/CS), Chris Griffin (IMGD/CS), Chris Bianco (IMGD/CS), Brian Copeland (IMGD/CS), Will Craft, "Data and Dynasties: Using Games to Improve Data Literacy", 2018

MQP22. Gina Gonzalez-Roundey, "An Ovulation Tracking Application", Co-advisor with Alex Agloro (IMGD), 2018.

MQP23. Aura Verlarde, Kevin Guth (Math), Erik D. Sola, "Anomaly Detection Using Robust Principal Component Analysis", Co-advisor with Randy Paffenroth (Math), 2018.

MQP24. Andrew Mokotoff, Zachary Robbins, Barrett Wolfson, "Visualizing Contextual Information for Network Vulnerability Management", 2017.

MQP25. Clark Jacobsohn, Will Hartman, "EyeSite: A Framework for Browser-Based Eye Tracking Studies", 2017.

MQP26. Devon Coleman, Chris Navarro, Jean-Marc Touma, "Safety or Security: What Notifications do we Notice?", Co-advisor with Krishna Venkatasubramian, 2017.

MQP27. Heric Flores-Huerta, Jacob Link, Cassidy Litch (Math/CS), "Cyber Security Network Anomaly Detection and Visualization", Co-advisor with Randy Paffenroth (Math), 2017.

MQP28. Rosemary Lindsay (IMGD, ECE), Kyle Stack (IMGD) Alex Hebert (IMGD), Chandler Reynolds (IMGD), "Lock_Out: A Cybersecurity MQP and Game", Co-advisor with Lee Sheldon (IMGD), and Alex Wyglinski (ECE), 2017.

MQP29. Sam Mailand, "Freedom Trail Tour Guide App", Co-advisor with Wilson Wong, 2016.

WPI Interactive Qualifying Projects

IQP1. Quyen Hoang (CS), Hung Hong (CS), Amanda Ezeobiejesi (CS), "Meetup Culture at WPI", 2018.

7. Summer Research Experience Advising

At WPI, I have advised several groups of undergraduate and high school students in research experiences, primarily in Data Science and Bioinformatics and Computational Biology.

RE1. Karen Bonilla (Babson College), Jiehui Luo (Mt Holyoke). Data Science REU, Summer 2018.

RE2. Gayathri Nandyalam (Mass Academy), Rachel Wang (AMSA), Keerthi Kamath (Acton Boxborough High School). BCB Summer Research Experience, 2018.

RE3. Cole Polychronis (Westminster College), Apoorva Nori (New York University), Data Science REU, Summer 2017.

RE4. Joyce Fang (Algonquin High School), Ohemaa Prempeh (Worcester Technical High School). BCB Summer Research Experience, 2017.

RE5. Allan La (Bucknell University), Rebekah Eversole (Bowling Green State University), Data Science REU, Summer 2017.

RE6. Kartik Thoopall Vasu (WPI). WPI Summer Undergraduate Research Fellowship (SURF), Summer 2016.

8. Honors, Awards, and Other Recognition Related to Teaching

HT1. Data Science Outstanding Faculty Award, 2022.

HT2. A MQP Co-advised with Carlo Pinciroli (MQP18) received Honorable Mention for the Provost MQP Award.

HT3. A summer undergraduate research team (RE3.) received recognition as "Best Project" at WPI, and the team was invited to present at a Research Experience for Undergraduates symposium in Alexandria, VA.

9. Professional Presentations

PP1. Shaping Visualization Ecosystems in a Changing Technosocial Landscape. Data61, Monash University, October 2023, Host: Sevvandi Kandanaarachchi

PP2. Charting a Course through Data Complexity using Interactive Visualization. Doha Data Forum for Inclusive Data Ecosystems, October 2023

PP3. Shaping Visualization Ecosystems in a Changing Technosocial Landscape. Qatar Computing Research Institute, October 2023, Host: Mohamed Eltabakh

PP4. Shaping Visualization Ecosystems in a Changing Technosocial Landscape. University of Konstanz, May 2023, Host: Daniel Keim

PP5. Visualization in a Changing World. University of Utah, November 2022, Host: Alexander Lex

PP6. Quantifying the Individual Experience of Visualizations. Indiana University, April 2022, Host: Katy Borner

PP7. Quantifying the Individual Experience of Visualizations. Brown University, November 2021, Host: David Laidlaw

PP8. Quantifying the Individual Experience of Visualizations. UMASS Amherst, December 2021, Host: Narges Mahyar, Cindy Xiong

PP9. Quantifying the Individual Experience of Visualizations. INEGI and CMAT Mexico, October 2021, Host: Ricardo Rodriguez Lopez, Johan Van Horebeek

PP10. Panel: Visualization Literacy for General Audiences. IEEE VIS Conference, October 2021, Host: Alark Joshi

PP11. Quantifying Individual Experiences with Visualizations. University of Michigan, March 2020, Host: Matthew Kay

PP12. Guest Lecture on Visualization. UMass Medical School, October 2019, Host: Thomas Reimonn

PP13. Model-based Approaches for Data Visualization Ability Assessment. GIFT Intelligent Tutoring Systems Workshop, August 2019

PP14. Model-based Approaches for Data Visualization Ability Assessment. UMass Medical School, April 2019, Host: Bruce Barton

PP15. Human Centered Data Visualization. Northeastern University, March 2018, Host: Michelle Borkin

PP16. Human Centered Data Visualization. UMass Dartmouth, November 2017, Host: David Koop

PP17. Human Centered Data Visualization. Southern Connecticut State University, April 2017, Host: Winnie Yu

PP18. Quantitative Models for User-Centered Visualization Systems. Pacific Northwest National Lab, April 2016, Host: Dustin Arendt

PP19. Data Visualization: Trees and Networks. Smith College, April 2016, Host: Jordan Crouser

PP20. Re-Centering Human Centered Visualization. Keene State University, March 2016, Host: Elvis Foster

PP21. Re-Centering Human Centered Visualization. BostonCHI, IBM Cambridge, February 2016, Host: Elizabeth Hinkelman

PP22. Quantitative Models for User-Centered Visualization Systems. MIT Lincoln Labs, August 2015, Host: Dianne Staheli

PP23. Quantitative Models for User-Centered Visualization Systems. Harvard, May 2015, Host: Alexander Lex

PP24. Quantitative Models for User-Centered Visualization Systems. SUNY Korea, April 2015, Host: Klaus Mueller

PP25. Data Visualization. Tufts Data Science Meetup, November 2014

PP26. User-Centered Visualization. Microsoft NERD, Boston DataVis Meetup, September 2014

PP27. User-Centered Visualization. Charles River Analytics, September 2014

PP28. Hacking and Debugging the User in Visual Analytics. MIT Systems Engineering Advanced Research Initiative (SEAri), August 2014

PP29. Human-Computer Interaction and Visualization Research. Ipswich Middle School Technology Initiative, June 2014

PP30. Nessus Vulnerability Visualization and VizSec. MIT Lincoln Labs, December 2013

PP31. NV: Nessus Vulnerability Visualization for the Web. Charlotte Visualization Center, October 2012

PP32. Student Research in the Charlotte Visualization Center. UNC-Charlotte, February 2012

PP33. Interactive Detection of Network Anomalies via Coordinated Multiple Views. Charlotte Visualization Center, March 2011

PP34. Advice for new Ph.D. Students. Introduction to Ph.D. Research, UNC-Charlotte, September 2011

PP35. Philosophy of High School Outreach Revisited. STARS Symposium, August 2009

PP36. Philosophy of High School Outreach. STARS Symposium, August 2008

10. Patents

Patents Awarded

PA1. Erik Ferragut, John R. Goodall, Michael D. Iannacone, Jason A. Laska, Lane Harrison, "Real-Time Detection and Classification of Anomalous Events in Streaming Data", US Patent 9319421 B2, granted April 19, 2016.

PA2. Craig Shue, Lane Harrison, "Method and Apparatus for Providing Isolated Asset Access in a Layered Security System", US Patent 17/946,595, granted September 16, 2022.

PA3. Craig Shue, Julian Lanson, Lane Harrison, Yunsen Lei, Matthew Puentes, "Method and Apparatus for Identifying a Logic Defect in an Application", US Patent 17/939254, granted September 7, 2022.

11. Editorial and Referee Activities

RA1. **Program Committee:**

(a) IEEE VIS Program Committee: 2020-2023

(b) ACM SIGCHI Associate Chair: 2020-2022

(c) IEEE InfoVis Program Committee: 2017-2019

(d) IEEE EuroVis Program Committee: 2017-2019

(e) OpenVisConf Program Committee: 2017-2018
(f) EuroVis Short Papers Program Committee: 2016
(g) EuroVis Workshop on Visual Analytics (EuroVA) Program Committee: 2015-2016
(h) ACM Creativity and Cognition (C&C) Program Committee: 2015
(i) ACHI Program Committee: 2014
(j) VizSec Program Committee: 2013

RA2. **Reviewer:**

(a) IEEE Transactions on Visualization and Computer Graphics (TVCG), 2015-2023
(b) ACM Special Interest Group on Computer Human Interaction (SIGCHI), 2014-2023
(c) IEEE Conference on Information Visualization (InfoVis), 2011-2020
(d) IEEE Conference on Visual Analytics Science and Technology (VAST), 2014-2018
(e) ACM Symposium on User Interface Software and Technology (UIST), 2018
(f) APA Journal of Experimental Psychology: Applied, 2016
(g) ACM Transactions on Computer Human Interaction (TOCHI), 2015
(h) Graphics Interface (GI), 2015
(i) Human Computation Journal, 2015
(j) Information Security Journal, 2015
(k) ACM Transactions on Interactive Intelligent Systems (TiiS), 2014-2015
(l) IEEE-VGTC Symposium on Visualization (Eurovis) – State of the Art Reports, 2016
(m) IEEE-VGTC Symposium on Visualization (Eurovis), 2014-2015
(n) IEEE Symposium on Visualization for Cyber Security (VizSec), 2012-2014
(o) IBM Journal of Research, 2012
(p) IEEE VIS Posters, 2011-2013

RA3. **Grant Review Panels:**

(a) NSF Panels (one or more): 2015, 2016, 2017, 2019, 2021, 2022, 2023
(b) Canada Research Chairs (one or more): 2022, 2023
(c) Canada MITACS (one or more): 2019, 2021

12. Honors, Awards, and Other Scholarship Recognition

Honors and Awards

HS1. Best Paper Award (top 1%), ACM SIGCHI Conference on Human Factors in Computing Systems, 2016.

HS2. Honorable Mention: BioVis 2015 Design Contest Challenge (with WPI BCB Graduate student Alyssa Tsiros), 2015.

13. Service to the Profession

SP1. IEEE VIS Organizing Committee: 2017-2023

SP2. IEEE VizSec Steering Committee: 2017-2020

SP3. Sponsorship/Publicity Chair: IEEE Symposium on Visualization and Cyber Security (VizSec), 2016

SP4. General Chair: IEEE Symposium on Visualization and Cyber Security (VizSec), 2015

SP5. Publications Chair: IEEE Symposium on Visualization and Cyber Security (VizSec), 2014

14. Service to the University and Department

SU1. Global Health Faculty Advisory Committee, 2023

SU2. Data Science Steering Committee, 2015–2022

SU3. Bioinformatics and Computational Biology Steering Committee, 2015–2022

SU4. Interactive Media and Game Development Steering Committee, 2015–2022

SU5. CS External Assessment Committee, 2020–2022

SU6. Committee on Academic Advising and Student Life (CASL), 2019–2020

SU7. CS Colloquium Committee, 2018–2019

SU8. Enterprise Resource Planning Selection Committee, 2016–2017

SU9. IQP Presidents' Award Selection Committee, 2016

SU10. CS Graduate Admissions Committee, 2015–2016