Chris Bryan

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Research Interests

Data visualization, human-computer interaction, augmented and virtual reality, data privacy and security, interfaces for explainable AI/ML, collaborative sensemaking, visual perception and cognition.

Education

2012 – 2018	**Ph.D. in Computer Science, University of California, Davis**. Dissertation: "Advanced Techniques and Cognitive Considerations for Explanatory Visualization and Data Storytelling." Committee: Kwan-Liu Ma (advisor), Zhou Yu, Michael Neff.
2004 – 2008	**B.S. *cum laude* in Computer Science (Honors College), University of Arkansas.** Minors: Mathematics, Spanish. Thesis: "A Performance and Productivity Study using MPI, Titanium, and Fortress." Advisor: Amy Apon.

Appointments & Prior Employment

2018 – present	**Assistant Professor**. School of Computing and Augmented Intelligence, Arizona State University (Tempe, AZ). (*Note:* This school was renamed from the School of Computing, Informatics, and Decision Systems Engineering in 2021.)
2018	**Adjunct Professor**. Department of Computer Science, University of San Francisco (San Francisco, CA).
2012 – 2018	**Graduate Student Researcher**. Visualization and Interface Design Innovation (VIDi) Group, University of California, Davis (Davis, CA).
2017	**Graduate Student Intern**. Center for Applied Scientific Computing (CASC), Lawrence Livermore National Laboratory (Livermore, CA).

2013 – 2016	**Graduate Student Intern**. Data Science at Scale (DSS) Group, Los Alamos National Laboratory (Los Alamos, NM).
2009 – 2012	**Programmer Analyst**. Integrated Capacity Solutions (ICS) Division, J.B. Hunt Transport Services, Inc. (Lowell, AR).

Research Publications

Peer-Reviewed Journal Publications

1. Jinbin Huang, Aditi Mishra, B.C. Kwon, and Chris Bryan. “ConceptExplainer: Understanding the Mental Model of Deep Learning Algorithms via Interactive Concept-based Explanations.” *IEEE Transactions on Visualization and Computer Graphics* 29, no. 1 (2022): 831-841.
2. Anjana Arunkumar, Andrea Pinceti, Lalitha Sankar, and Chris Bryan. “PMU Tracker: A Visualization Platform for Egocentric Event Propagation Analysis in the Power Grid.” *IEEE Transactions on Visualization and Computer Graphics* 29, no. 1 (2022): 1081-1090.
3. Anjana Arunkumar, Nitin Gupta, Andrea Pinceti, Lalitha Sankar, and Chris Bryan. “PMUVis : A Large Scale Platform to Assist Power System Operators in a Smart Grid.” *IEEE Computer Graphics and Applications* 42, no. 6 (2022): 84-95.
4. Jian Zhao, Shenyu Xu, Senthil Chandrasegaran, Chris Bryan, Fan Du, Aditi Mishra, Xin Qian, Yiran Li, and Kwan-Liu Ma. "ChartStory: Automated Partitioning, Layout, and Captioning of Charts into Comic-Style Narratives." *IEEE Transactions on Visualization and Computer Graphics* 29, no. 2 (2021): 1384-1399.
5. Chris Bryan, Aditi Mishra, Hidekazu Shidara, and Kwan-Liu Ma. "Analyzing Gaze Behavior for Text-Embellished Narrative Visualizations under Different Task Scenarios." *Visual Informatics* 4, no. 3 (2020): 41-50.
6. Xumeng Wang, Chris Bryan, Yiran Li, Rusheng Pan, Yanling Liu, Wei Chen, and Kwan-Liu Ma. "Umbra: A Visual Analysis Approach for Defense Construction against Inference Attacks on Sensitive Information." *IEEE Transactions on Visualization and Computer Graphics* 28, no. 7 (2020): 2776-2790.
7. Xumeng Wang, Wei Chen, Jia-Kai Chou, Chris Bryan, Huihua Guan, Wenlong Chen, Rusheng Pan, and Kwan-Liu Ma. "GraphProtector: A Visual Interface for Employing and Assessing Multiple Privacy Preserving Graph Algorithms." *IEEE Transactions on Visualization and Computer Graphics* 25, no. 1 (2018): 193-203.
8. Shenyu Xu, Chris Bryan, Jianping Kelvin Li, Jian Zhao, and Kwan-Liu Ma. "Chart Constellations: Effective Chart Summarization for Collaborative and Multi-User Analyses." In *Computer Graphics Forum*, vol. 37, no. 3, pp. 75-86. 2018.
9. Yang Shi, Chris Bryan, Sridatt Bhamidipati, Ying Zhao, Yaoxue Zhang, and Kwan-Liu Ma. "MeetingVis: Visual Narratives to Assist in Recalling Meeting Context and Content." *IEEE Transactions on*

Visualization and Computer Graphics 24, no. 6 (2018): 1918-1929.

🏆 **Honorable Mention at PacificVis 2017**

10. Chris Bryan, Kwan-Liu Ma, and Jonathan Woodring. "Temporal summary images: An Approach to Narrative Visualization via Interactive Annotation Generation and Placement." *IEEE Transactions on Visualization and Computer Graphics* 23, no. 1 (2016): 511-520.
11. Chris Bryan, Gregory Guterman, Kwan-Liu Ma, Harris Lewin, Denis Larkin, Jaebum Kim, Jian Ma, and Marta Farre. "Synteny Explorer: An Interactive Visualization Application for Teaching Genome Evolution." *IEEE Transactions on Visualization and Computer Graphics* 23, no. 1 (2016): 711-720.

Peer-Reviewed Conference & Symposium Publications

1. Anjana Arunkumar, Swaroop Mishra, Bhavdeep Sachdeva, Chitta Baral, and Chris Bryan. “Real-Time Visual Feedback to Guide Benchmark Creation: A Human-and-Metric-in-the-Loop Workflow.” *in press - accepted to the 16th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2023)*.
2. Aditi Mishra, Utkarsh Soni, Jinbin Huang, and Chris Bryan. "Why? Why Not? When? Visual Explanations of Agent Behavior in Reinforcement Learning." In *2022 IEEE Pacific Visualization Symposium (PacificVis)*, pp. 111-120. IEEE, 2022.
3. Aditi Mishra, Shashank Ginjpalli, and Chris Bryan. “News Kaleidoscope: Visual Investigation of Coverage Diversity in News Event Reporting.” In *2022 IEEE Pacific Visualization Symposium (PacificVis)*, pp. 131-140. IEEE, 2022.
4. Anjana Arunkumar, Shashank Ginjpalli, and Chris Bryan. "Bayesian Modelling of Alluvial Diagram Complexity." In *2021 IEEE Visualization Conference (VIS)*, pp. 51-55. IEEE, 2021.
5. Senthil Chandrasegaran, Chris Bryan, Hidekazu Shidara, Tung-Yen Chuang, and Kwan-Liu Ma. "TalkTraces: Real-time Capture and Visualization of Verbal Content in Meetings." In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, pp. 1-14. 2019.
6. Jia-Kai Chou, Chris Bryan, Jing Li, and Kwan-Liu Ma. "An Empirical Study on Perceptually Masking Privacy in Graph Visualizations." In *2018 IEEE Symposium on Visualization for Cyber Security (VizSec)*, pp. 1-8. IEEE, 2018.
7. Jacqueline Chu, Chris Bryan, Min Shih, Leonardo Ferrer, and Kwan-Liu Ma. "Navigable Videos for Presenting Scientific Data on Affordable Head-Mounted Displays." In *Proceedings of the 8th ACM on Multimedia Systems Conference*, pp. 250-260. 2017.
8. Jia-Kai Chou, Chris Bryan, and Kwan-Liu Ma. "Privacy Preserving Visualization for Social Network Data with Ontology Information." In *2017 IEEE Pacific Visualization Symposium (PacificVis)*, pp. 11-20. IEEE, 2017.
9. Chris Bryan,, Xue Wu, Susan Mniszewski, and Kwan-Liu Ma. "Integrating Predictive Analytics into a Spatiotemporal Epidemic Simulation." In *2015 IEEE Conference on Visual Analytics Science and Technology (VAST)*, pp. 17-24. IEEE, 2015.

10. Susan Mniszewski, C. A. Manore, Chris Bryan, Sara Y. Del Valle, and Douglas Roberts. "Towards a Hybrid Agent-Based Model for Mosquito Borne Disease." In *Summer Computer Simulation Conference:(SCSC 2014): 2014 Summer Simulation Multi-Conference: Monterey, California, USA, 6-10 July 2014. Summer Computer Simulation Conference (2014: Monterey, Calif.)*, vol. 2014. NIH Public Access, 2014.
11. Chris Bryan, Kwan-Liu Ma, and Yang-Chih Fu. "An Interactive Visualization Interface for Studying Egocentric, Categorical, Contact Diary Datasets." In *Proceedings of the 2013 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, pp. 771-778. 2013.

Peer-Reviewed Workshop Papers

1. Jinbin Huang, Shuang Liang, Qi Xiong, Yu Gao, Chao Mei, Yi Xu, and Chris Bryan. “SPARVIS: Combining Smartphone and Augmented Reality for Visual Data Analytics.” In *Workshop on Visual Analytics in Immersive Environments (VAinIE)* at ISMAR 2022.
2. Jinbin Huang, Jonathan Plasencia, Dianna Bardo, Nicholas Huber, Erik Ellsworth, Steven Zangwill, and Chris Bryan. "Phoenix Virtual Heart: A Hybrid VR-Desktop Visualization System for Cardiac Surgery Planning and Education." In *2021 IEEE Workshop on Visual Analytics in Healthcare (VAHC)*, pp. 36-40. IEEE, 2021.
3. Anjana Arunkumar, Swaroop Mishra, and Chris Bryan. “A Visual Exploration of Fair Evaluation for ML – Bridging the Gap Between Research and the Real World.” In *3rd Workshop on Visualization for AI Explainability at IEEE VIS 2020*.
4. Anjana Arunkumar, Swaroop Mishra, Bhavdeep Singh Sachdeva, Chitta Baral, and Chris Bryan. “Real-Time Visual Feedback for Educative Benchmark Creation: A Human-and-Metric-in-the-Loop Workflow.” In *NeurIPS 2020 Workshop on Human And Machine in-the-Loop Evaluation and Learning Strategies (HAMLETS 2020)*.
5. Swaroop Mishra, Anjana Arunkumar, Chris Bryan, and Chitta Baral. "Our Evaluation Metric Needs an Update to Encourage Generalization." In *ICML 2020 Workshop on Uncertainty and Robustness in Deep Learning.*
6. Chris Bryan, Susan Mniszewski, and Kwan-Liu Ma. “Integrating Predictive Visualization with the Epidemic Disease Simulation System.” In *IEEE VIS 2014 Workshop on Visualization for Predictive Analytics*.
7. Chris Bryan, Wes Emeneker, and Amy Apon. “A Performance and Productivity Study using MPI, Titanium, and Fortress.” In *IEEE International Conference on High Performance Computing (HiPC08) Student Symposium, 2008.*

Peer-Reviewed Contest Entries

8. Jinbin Huang, Aditi Mishra, Anjana Arunkumar, and Chris Bryan. “TotemFinder: A Visual Analytics Approach for Image-based Key Players Identification.” In 2020 IEEE Conference on Visual Analytics Science and Technology (VAST Challenge).
   🏆 **VAST Challenge 2020 Honorable Mention**

9. Hidekazu Shidara, Chris Bryan, Oh-Hyun Kwon, Kwan-Liu Ma. “North Korea: Real or Paper Tiger?” In *IEEE PacificVis 2018 Visual Storytelling Contest*.
10. Chris Bryan, Keshav Dasu, Sravya Divakarla, Kwan-Liu Ma. “Summarizing the U.S. Presidential Election Day 2016” In *IEEE PacificVis 2017 Visual Storytelling Contest*.

Invited Talks & Presentations

June 2022	Invited Talk	VIS Summer Camp (Atlantic City, NJ)
April 2022	Invited Talk	*Exploring and explaining complex data at the Sonoran Visualization Laboratory*, CNS Research Showcase (Indiana University via Zoom).
Aug 2021	Invited Talk	VIS Summer Camp (Minneapolis, MN).
Feb 2020	Invited Talk	*Human-centered Visualization Design*, ASU Tableau User Group (Tempe, AZ).
July 2019	Invited Talk	*Interactive Visualization for Exploring and Explaining Complex Data*, Los Alamos National Laboratory (Los Alamos, NM).
Nov 2019	Invited Talk	*Visualization of Complex Data for Nonexperts*, ASU SFIS Unplugged (Tempe, AZ).
Oct 2018	Conference Presentation	*An Empirical Study on Perceptually Masking Privacy in Graph Visualization*, IEEE VizSec (Berlin, Germany).
March 2018	Invited Talk	*From Explanatory to Exploratory Visualization*, University of San Francisco (San Francisco, CA).
June 2018	Conference Presentation	*Chart Constellations: Effective Chart Summarization for Collaborative and Multi-User Analyses*, EuroGraphics Conference on Visualization (Brno, Czech Republic).
June 2017	Conference Presentation	*Navigable Videos for Presenting Scientific Data on Affordable Head-Mounted Displays,* ACM Multimedia Systems Conference (Taipei, Taiwan).
April 2017	Conference Presentation	*North Korea: Real or Paper Tiger?*, IEEE Pacific Visualization Symposium (Seoul, South Korea).

Oct 2016	Conference Presentation	*Temporal summary images: An approach to narrative visualization via interactive annotation generation and placement*, IEEE VIS Conference (Baltimore, MD).
Oct 2016	Conference Presentation	*Synteny Explorer: An Interactive Visualization Application for Teaching Genome Evolution*, IEEE VIS Conference (Baltimore, MD).
March 2016	Invited Talk	*Developing New Visual Approaches that Provide Insight into Scientific and Social Media Data*, UC Davis RISE Symposium (Davis, CA).
Oct 2015	Conference Presentation	*Integrating Predictive Analytics into a Spatiotemporal Epidemic Simulation*, IEEE VIS Conference (Chicago, IL).
Nov 2014	Conference Presentation	*Integrating Predictive Visualization with the Epidemic Disease Simulation System*, IEEE VIS Conference (Paris, France).
Aug 2013	Conference Presentation	*An Interactive Visualization Interface for Studying Egocentric, Categorical, Contact Diary Datasets,* IEEE/ACM International Conference on Advances in Social Network Analysis and Mining (Niagara Falls, Canada).

Professional Activities & Service

Organizing Committee Member

2021	Arizona VIS 2021 (IEEE VIS Satellite Event)
2020 – 2021	IEEE PacificVis Visualization Symposium (PacificVis)
2019 – present	IEEE Symposium on Visualization for Cyber Security (VizSec)

Program Committee Member

2023	EuroGraphics Conference on Visualization (EuroVis), Short Papers Tract
2022 – present	IEEE VIS Conference
2021 – present	EuroGraphics Conference on Visualization (EuroVis)
2020 – present	IEEE VIS Conference, Short Papers Tract
2020	International Conference on Information Visualization Theory and Applications

	(IVAPP)
2020	ACM International Conference on Supporting Group Work (GROUP)
2019 – present	IEEE Pacific Visualization Symposium (PacificVis)
2019	IEEE VIS Conference (SciVis Short Papers Tract)
2018 – present	IEEE Symposium on Large Data Analysis and Visualization (LDAV)
2018 – 2020, 2022	IEEE International Conference On Big Data Service And Applications (BigData-Service)
2018, 2022 – present	International Symposium on Visual Computing (ISCV)

Journal Editing

2020 – 2022	Guest Associate Editor, *IEEE Computer Graphics & Applications*, Special Issue on Powering Visualization with Deep Learning (co-editors: Siwei Fu, Jian Zhao, Yingcai Wu) 🏆 **Outstanding Guest Editor Award**

Major Journals & Conferences for which I regularly review

IEEE VIS Conference, IEEE Transactions on Visualization and Computing (TVCG), IEEE Pacific Visualization Symposium (PacificVis), Eurographics Conference on Visualization (EuroVis), IEEE Virtual Reality (VR), ACM Conference on Human Factors in Computing Systems (CHI), ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW).

Proposal Reviewing

2019 – present	National Science Foundation

University & Departmental Service at ASU

2022 – present	**Search Committee Chair**, Human Centered and Affective Computing Faculty Search, School of Computing and Augmented Intelligence.
2021 – present	**Reviewer for Fulton Undergraduate Research Initiative (FURI)**, Ira A. Fulton Schools of Engineering.
2019 – present	**Speaker at E2 Camps for Incoming Freshmen Engineering Students**, Ira A. Fulton Schools of Engineering
2018 – 2022	**Graduate Admissions Committee**, School of Computing and Augmented Intelligence

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Teaching Experience

Note: Classes are taught at ASU unless otherwise specified.

Spring 2023	CSE 578: Data Visualization
Fall 2022	CSE 578: Data Visualization (148 students)
	CSE 494: Foundations of Data Visualization (100 students)
Spring 2022	CSE 494: Foundations of Data Visualization (88 students)
Fall 2021	CSE 578: Data Visualization (148 students)
	CSE 494: Foundations of Data Visualization (75 students)
Fall 2020	CSE 578: Data Visualization (173 students)
	CSE 494: Foundations of Data Visualization (94 students)
	ASU 101: The ASU Experience (49 students, 3 sections)
Fall 2019	CSE 578: Data Visualization (126 students)
Spring 2019	CSE 310: Algorithms & Data Structures (128 students)
Fall 2018	CSE 578: Data Visualization (128 students)
Spring 2017	CS 212: Software Development (30 students, at University of San Francisco)
Spring 2016	ECS 163: Information Interfaces (52 Students, at University of California, Davis)

Student Advising & Mentoring

Ph.D. Students

2021 – present	Michael Kintscher
2019 – present	Aditi Mishra
2019 – present	Jinbin Huang
2019 – present	Anjana Arunkumar

Masters Students

Thesis Students

2021 – 2022	Shubham Sharma (Thesis: “Why Pop? A System to Explain How Deep Learning Models Classify Music”)

2021 – 2022	Jose Elenes (Thesis: “Anomaly Mining and Visualization of Autonomous Aerial Vehicles”)
2019 – 2020	Michael Kintscher (Thesis: “Exploring the Impact of Augmented Reality on Collaborative Decision-Making in Small Teams”)

Research Assistantships

2022 – present	Yash Deshpande
2020 – 2021	Nitin Gupta

Undergraduate Students

Barrett Honors College Thesis Students

2021 – 2022	Andrew Murwin (Thesis: “The Efficacy of Different Time Steps in Data when Predicting Cryptocurrency Prices”)
2021 – 2022	Nandika Goyal (Thesis: “Augnosis: Self-Diagnosis in Augmented Reality”)
2020 – 2021	Shashank Ginjpalli (Thesis: “Modeling the Complexity of Sankey Diagrams”)
2019 – 2020	Avi Goodman (Thesis: “Predicting the Outcome of a Pitch Given the Type of Pitch for any Baseball Scenario”)

ASU Fulton Undergraduate Research Initiative (FURI) Students

2020 – 2021	Shashank Ginjpalli

Research Assistantships

2021 – present	Jaimie Liu
2019 – 2020	Danlin Li
2019	Sarthik Soni (IIT Bangalore)

Capstone Teams

2021 — present	Austin Frost, Evan Garvey, Jason Manuel, Matthew Zamora (Project: “Building A Collaborative Virtual Robotics IDE and Simulator for Teaching Engineering Concepts.”)

Student Committee Memberships

Note: Students and advisors are at ASU unless otherwise specified.

Ph.D. Students

2022 – present	Yixuan Wang (Advisor: Ross Maciejewksi)
2022 – present	Fan Lei (Advisor: Ross Maciejewski)

2022 – present	Kanchan Chowdhury (Advisor: Mohamed Sarwat)
2022 – present	Danielle Jacobs (Advisor: Troy McDaniel)
2022 – present	Vishnu Kakaraparthi (Advisor: Troy McDaniel)
2019 – present	Tiankai Xie (Advisor: Ross Maciejewski)
2022 – 2022	Graziano Blasilli (Dissertation: "Cyber Threats Management using Visual Analytics," Advisor: Giuseppe Santucci, University: Sapienza Università di Roma)
2021 – 2022	Jordan Miller (Dissertation: " "Can I consider you my friend?" Moving Beyond One-Sided Conversation in Social Robotics," Advisor: Troy McDaniel)
2020 – 2022	Venkata Meduri (Dissertation: "Human-in-the-Loop Machine Learning Systems for Data Integration and Predictive Analytics," Advisor: Mohamed Sarwat)
2019 – 2022	Rui Zhang (Dissertation: "Methods for Multiclass Geospatial Data Visualization," Advisor: Ross Maciejewski)

MS Students

2020 – 2021	Rostyslav Hnatyshyn (Thesis: "A Visual Analytics workflow for detecting transition regions in large-scale Molecular Dynamics simulations," Advisor: Ross Maciejewski)
2020 – 2021	Kushal Reddy Papakannu (Thesis: "Examining User Engagement via Facial Expressions in Augmented Reality with Dynamic Time Warping," Advisor: Sharon Hsaio)
2020 – 2021	Nithiya Uppara (Thesis: "Effects of Image Captioning with Description on the Working Memory," Advisor: Troy McDaniel)

Research Support

NSF 2022 – present	(Sole PI) *SaTC: CORE: Small: Effective Design and Recommendation for Privacy-Preserving Data Visualizations*. $550,000.
NSF 2022 – present	(PI) *Developing and Evaluating a Classroom Orchestration Toolkit for Visualization Education*. $300,000 (co-PI: Ashish Amresh, his share: 5%).
ASU Interplanetary Initiative 2022 – present	(Sole PI) *Global Heatmap of Space Activities*. $51,081.
Edson Foundation 2021 – 2022	(Sole PI) *Developing CarePro Virtual*. $15,000.

Adobe Research 2021	(Sole PI) *Researching Collaborative Creative Systems* (Unrestricted Gift). $10,000.
Phoenix Children's Hospital 2020 – 2021	(Sole PI) *Development of a Virtual Reality Experience for Treatment Planning and for Patient and Family Education*. $56,871.
NSF 2019 – 2022	(Co-PI) *Collaborative Research: High-Dimensional Spatio-Temporal Data Science for a Resilient Power Grid: Towards Real-Time Integration of Synchrophasor Data*. $1,330,040 (PI: Lalitha Sankar, my share: 20%).