Chris Bryan

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Research Interests

Data visualization, human-computer interaction, augmented and virtual reality, data privacy and security, explainable AI/ML, collaborative analytics, 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 Full Papers (Journal Articles & Conference Proceedings)

1. 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 & Applications (2022).*

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. 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* (2021).

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* (2020).

7. 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.

8. 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.

9. 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.

10. 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.

11. 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**

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

17. 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.

18. 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 Short Papers & Other

1. 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.

2. Anjana Arunkumar, Shashank Ginjpalli, and Chris Bryan. "Bayesian Modelling of Alluvial Diagram Complexity." In *2021 IEEE Visualization Conference (VIS)*, pp. 51-55. IEEE, 2021.

3. 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**

4. 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*.

5. 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)*.

6. 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.*

7. Hidekazu Shidara, Chris Bryan, Oh-Hyun Kwon, Kwan-Liu Ma. "North Korea: Real or Paper Tiger?" In *IEEE PacificVis 2018 Visual Storytelling Contest*.

8. Chris Bryan, Keshav Dasu, Sravya Divakarla, Kwan-Liu Ma. "Summarizing the U.S. Presidential Election Day 2016" In *IEEE PacificVis 2017 Visual Storytelling Contest*.

9. 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*.

10. 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.*

Pre-Prints & Papers Currently Under Review

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" arXiv preprint arXiv:2204.01888 (2022).

2. Anjana Arunkumar, Andrea Pinceti, Lalitha Sankar, and Chris Bryan. "PMU Tracker: A Visualization Platform for Egocentric Event Propagation Analysis in the Power Grid"

3. Swaroop Mishra, Anjana Arunkumar, Bhavdeep Sachdeva, Chris Bryan, and Chitta Baral. "DQI: Measuring Data Quality in NLP." *arXiv preprint arXiv:2005.00816* (2020).

4. Swaroop Mishra, Anjana Arunkumar, Bhavdeep Sachdeva, Chris Bryan, and Chitta Baral. "DQI: A Guide to Benchmark Evaluation." *arXiv preprint arXiv:2008.03964* (2020).

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

2022 – present	IEEE VIS Conference
2021	EuroGraphics Conference on Visualization (EuroVis)
2020 – 2021	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 – 2021	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,	IEEE International Conference On Big Data Service And Applications (BigData-

2022	Service)
2018, 2022	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)

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

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 – present	**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 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

2022 – present   Shubham Sharma

2021 – present   Jose Elenes

2019 – 2020   Michael Kintscher (Thesis: "Exploring the Impact of Augmented Reality on Collab-
                   orative Decision-Making in Small Teams")

Research Assistantships

2022 – present   Yash Deshpande

2020 – 2021   Nitin Gupta

Undergraduate Students

Barrett Honors College Thesis Students

2021 – present   Andrew Murwin

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)
2022	Graziano Blasilli (Dissertation: "Cyber Threats Management using Visual Analytics," Advisor: Giuseppe Santucci, University: Sapienza Università di Roma)
2021 – present	Jordan Miller (Advisor: Troy McDaniel)
2020 – present	Venkata Meduri (Advisor: Mohamed Sarwat)
2019 – present	Tiankai Xie (Advisor: Ross Maciejewski)

MS Students

| 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	(PI) *Developing and Evaluating a Classroom Orchestration Toolkit for Visualization Education*. $300,000.
Edson Foundation 2021 – present	(PI) *Developing CarePro Virtual*. $15,000.
Adobe Research 2021	(PI) *Researching Collaborative Creative Systems* (Unrestricted Gift). $10,000.
Phoenix Children's Hospital 2020 – 2021	(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, personal share: 20%).