

# Sriram Karthik Badam

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## Links

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## Broad Interests

Visualization | Visual Analytics  
Human-Computer Interaction  
Machine Learning

## Specific Interests

Collaborative Visualization  
Post-WIMP Interaction  
Mixed-Initiative Interaction

## Technologies

C | C++ | Java  
PHP | Python | NodeJS  
JavaScript | React | Angular  
HTML5 | CSS3  
Hadoop | MongoDB | MySQL

## Techniques

**Elastic Documents:** reading (J10)  
**VisFer:** visual data transfer (J7)  
**Group Awareness:** collab. VA (C8)  
**TimeFork:** visual prediction (C5)  
**Proxemic Lens:** 3D interaction (C6)

## Systems

**Vistrates:** ubiquitous analytics (J11)  
**PVA:** progressive analytics (J6)  
**PolyChrome:** collaborative vis. (C4)  
**Munin:** ubiquitous analytics (J3)  
**skWiki:** collab. sketching (C1)

## Education

Since 2014	<b>Ph.D.</b> in Computer Science Thesis title: Enabling <b>collaborative visual analysis</b> across heterogeneous devices	University of Maryland, College Park, MD, USA
2012–2014	<b>M.S.</b> in Computer Engineering Thesis title: Developing digital media platforms for <b>early design</b>	Purdue University, West Lafayette, IN, USA
2008–2012	<b>B.Tech.</b> in Computer Science Major project: <b>Mobile applications</b> to support rescue and recovery operations in <b>post-disaster situations</b> through a novel multi-hop, peer-to-peer synchronization protocol.	Indian Institute of Technology Hyderabad, India

## Professional Experience

Since 2017	College of Information Studies, University of Maryland <b>Graduate Teaching Assistant (Instructor)</b> I teach grad courses—Visual Analytics (in Spring) and Data Visualization (in Fall)—in the College of Information Studies at UMD. I am responsible for lecturing, developing course content, and advising students in their course projects.	College Park, MD, USA
Since 2014	HCIL, University of Maryland <b>Graduate Research Assistant</b> I work on funded projects under the supervision of Dr. Niklas Elmquist at UMD. I focus on creating efficient collaborations between analysts and their devices to understand data visually and make complex decisions.	College Park, MD, USA
Summer 2018	Microsoft Research <b>Research Intern</b> I worked with Dr. Bongshin Lee on data-driven storytelling across devices. We are currently building a tool for authoring data-driven stories to support data journalists.	Redmond, WA, USA
Summer 2017	Creative Intelligence Lab, Adobe Research <b>Research Intern</b> I worked with Dr. Zhicheng (Leo) Liu on responsive visual interfaces that aid document reading. We focused on data-rich documents that contain information in tables and charts coupled with text describing the narrative.	Seattle, WA, USA
Summer 2016	AVIZ research team, INRIA <b>Visiting PhD Student</b> I worked with Dr. Jean-Daniel Fekete on a progressive visual analytics system for Twitter data using natural language processing.	Saclay, France
2012–2014	Purdue University <b>Graduate Research Assistant</b> My research focused on developing a sketching platform for early design, called skWiki to enable design teams efficiently share their ideas in the form of sketches.	West Lafayette, IN, USA
Summer 2011	Hewlett Packard (HP) R&D <b>Undergraduate Intern</b> I built a performance analysis tool for HP-UX filesystem using a high-performance computing approach. I designed a variant of a parallel out-of-core algorithm for RNA secondary structure prediction to conduct stress tests on the distributed file system.	Bangalore, India

# Publications

## Journal Papers (peer-reviewed)

- J11 S. K. Badam, A. Mathisen, R. Rädle, C. N. Klokmoose, N. Elmqvist. Vistrates: A Component Model for Ubiquitous Analytics. In *IEEE Transactions on Visualization and Computer Graphics (Proc. Infovis)*, to appear, 2019.
- J10 S. K. Badam, Z. Liu, N. Elmqvist. Elastic Documents: Coupling Text and Tables through Contextual Visualizations for Enhanced Document Reading. *IEEE Transactions on Visualization and Computer Graphics (Proc. Infovis)*, to appear, 2019.
- J9 Z. Cui, S. K. Badam, A. Yalcin, N. Elmqvist. DataSite: Proactive Visual Data Exploration with Computation of Insight-based Recommendations *Information Visualization Journal*, in press, 2019.
- J8 Z. Cui, S. Sen, S. K. Badam, N. Elmqvist. VisHive: Supporting Web-based Visualization through Ad-hoc Computational Clusters of Mobile Devices. *Information Visualization Journal*, 2018.
- J7 S. K. Badam, N. Elmqvist. Visfer: Camera-Based Visual Data Transfer for Cross-Device Visualization. *Information Visualization Journal*, 2017.
- J6 S. K. Badam, N. Elmqvist, J-D. Fekete. Steering the Craft: UI Elements and Visualizations for Supporting Progressive Visual Analytics. *Computer Graphics Forum (Proc. EuroVis)*, 36(3): 491-502, 2017.
- J5 S. Chandrasegaran, S. K. Badam, L. Kisselburgh, N. Elmqvist, and K. Ramani. Integrating Visual Analytics Support for Grounded Theory Practice in Qualitative Text Analysis. *Computer Graphics Forum (Proc. EuroVis)*, 36(3): 201-212, 2017.
- J4 S. Chandrasegaran, S. K. Badam, L. Kisselburgh, K. Peppler, N. Elmqvist, K. Ramani. VizScribe: A Visual Analytics Approach to Understand Designer Behavior. *International Journal of Human-Computer Studies*, 100, 66–80, 2017.
- J3 S. K. Badam, E. R. Fisher, N. Elmqvist. Munin: A Peer-to-Peer Middleware for Ubiquitous Analytics and Visualization Spaces. *IEEE Transactions on Visualization and Computer Graphics*, 21(2): 215-228, 2015.
- J2 J. C. Roberts, P. D. Ritsos, S. K. Badam, D. Brodbeck, J. Kennedy, N. Elmqvist. Visualization Beyond the Desktop – The Next Big Thing. *IEEE Computer Graphics and Applications*, 34(6): 26-34, 2014.
- J1 E. R. Fisher, S. K. Badam, N. Elmqvist. Designing Peer-to-Peer Distributed User Interfaces: Case Studies on Building Distributed Applications. *International Journal of Human-Computer Studies*, 72(1): 100-110, 2014.

## Conference Papers (peer-reviewed)

- C9 S. K. Badam - T. Horak, N. Elmqvist, R. Dachsel. When David meets Goliath: Combining Smartwatches with a Large Vertical Display for Visual Data Exploration. In *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI)*, 2018. **Equal contribution from first two authors.** [25.7% acc. rate]
- C8 S. K. Badam, Z. Zeng, E. Wall, A. Endert, N. Elmqvist. Supporting Team-First Visual Analytics through Group Activity Representations. *Graphics Interface*, 2017.
- C7 S. Chandrasegaran, S. K. Badam, N. Zhou, Z. Zhao, L. Kisselburgh, K. Peppler, N. Elmqvist, K. Ramani. Merging Sketches for Creative Design Exploration: An Evaluation of Physical and Cognitive Operations. *Graphics Interface*, 2017.
- C6 S. K. Badam, F. Amini, N. Elmqvist, P. Irani. Supporting Visual Exploration for Multiple Users in Large Display Environments. In *Proceedings of the IEEE Conference on Visual Analytics Science and Technology (VAST)*, 2016.
- C5 S. K. Badam, J. Zhao, S. Sen, N. Elmqvist, D. S. Ebert. TimeFork: Interactive Prediction of Time Series. In *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI)*, pp. 5409-5420, 2016. [23.4% acc. rate]
- C4 S. K. Badam, N. Elmqvist. PolyChrome: A Cross-Device Framework for Collaborative Web Visualization. In *Proceedings of the ACM Conference on Interactive Tabletops and Surfaces (ITS)*, pp. 109-118, 2014. [29% acc. rate]
- C3 S. Chandrasegaran, S. K. Badam, Z. Zhao, N. Elmqvist, L. Kisselburgh, K. Ramani. Collaborative Sketching with skWiki: A Case Study, In *Proceedings of the ASME IDETC/CIE Conference*, 2014.
- C2 S. K. Badam - S. Chandrasegaran, N. Elmqvist, K. Ramani. Tracing and Sketching Performance using Blunt-Tipped Styli on Direct-Touch Tablets. In *Proc. of the ACM Conference on Advanced Visual Interfaces (AVI)*, pp. 193–200, 2014. **Equal contribution from first two authors.** [28% acc. rate]
- C1 Z. Zhao, S. K. Badam, S. Chandrasegaran, D. G. Park, N. Elmqvist, L. Kisselburgh, K. Ramani. skWiki: A Multimedia Sketching System for Collaborative Creativity. In *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI)*, pp. 1235–1244, 2014. [22.8% acc. rate]

### Extended Abstracts (peer-reviewed)

- E1 L. Kisselburgh, J. Foote, S. Chandrasegaran, N. Zhou, S. K. Badam, N. Elmqvist, K. Ramani. Wearable sociometric sensors for measuring real-time collaboration. *Extended Abstract to be presented at the International Communication Association, 2017.*

### Workshop Papers (juried)

- W5 S. K. Badam, R. Rädle, C. N. Klokmoose, N. Elmqvist. Towards a Unified Visualization Platform for Ubiquitous Analytics. Workshop paper presented at Data Visualization on Mobile Devices at ACM CHI 2018.
- W4 S. K. Badam, A. Srinivasan, N. Elmqvist, J. Stasko. Affordances of Input Modalities for Visual Data Exploration in Immersive Environments. Workshop paper presented at Immersive Analytics: Exploring Future Interaction and Visualization Technologies for Data Analytics at IEEE VIS 2017.
- W3 S. K. Badam, C. Kinkeldey, P. Isenberg. Haztrailz: Exploratory Analysis of Trajectory and Sensor Data. Workshop paper presented at VAST Challenge at IEEE VIS 2016.
- W2 S. K. Badam, N. Elmqvist. Design Considerations for Mid-Air Interaction with Holographic Projections. Workshop paper presented at Mid-Air Haptics and Displays: Systems for Un-instrumented Mid-Air Interactions at ACM CHI 2016.
- W1 S. K. Badam, N. Elmqvist. Projector Display Systems in Visualization. Workshop paper presented at Death of the Desktop: Envisioning Visualization without Desktop Computing at IEEE VIS 2014.

### Posters (peer-reviewed)

- P3 L. Kisselburgh, N. Zhou, S. Chandrasegaran, S. K. Badam, N. Elmqvist, K. Peppler, K. Ramani. Creative Collaboration and Flow: Validating the Use of Trace Data to Measure Dynamics of Creative Flow in Collaborative Design Teams. Poster presented at International Conference on Computer Supported Collaborative Learning (CSCL), 2015.
- P2 N. Zhou, L. Kisselburgh, S. Chandrasegaran, S. K. Badam, N. Elmqvist, K. Peppler, K. Ramani. Using Real-time Trace Data to Predict Collaboration Quality and Creative Fluency in Design Teams. Poster presented at International Conference on Computer Supported Collaborative Learning (CSCL), 2015.
- P1 S. K. Badam, J. Zhao, N. Elmqvist, D. S. Ebert. TimeFork: Mixed Initiative Time-Series Prediction. Poster presented at IEEE Conference on Visual Analytics Science and Technology (VAST), 2014.

### Technical Reports

- R1 S. Sen, S. K. Badam, N. Elmqvist. VisHive: Creating Ad-hoc Computational Clusters using Mobile Devices in Web-based Visualization. *HCIL Technical Report, 2016.*

## Contributions to Funded Projects

- **Ubilytics**: Harnessing Existing Device Ecosystems for Anywhere Sensemaking.  
(PI: N. Elmqvist) National Science Foundation.  
Relevant publications: J11, J9, J8, C9, J7, C8, C6, J6, J4, J3, J1, C4, R1.
- **C3DaR**: Collection, Creation, and Collaboration for Engineering Design and Reflection  
(PI: N. Elmqvist) National Science Foundation.  
Relevant publications: J5, J4, C8, C7.
- **V-ICED**: Visually-Integrated Cyber Exploratorium for Design.  
(PI: K. Ramani; Co-PIs: N. Elmqvist, L. Kisselburgh) National Science Foundation.  
Relevant publications: C8, C7, J5, C3, C2, C1, P3, P2.
- Natural Interaction Spaces for Early Engineering Design.  
(PI: N. Elmqvist; Co-PI: K. Ramani) National Science Foundation.  
Relevant publications: C1.

## Teaching Experience

- Instructor: INST760 - Data Visualization - Fall 2018. A project-oriented course on the science and technology of visualization offered in Information Studies at UMD taken by 26 graduate students.

- Instructor: INST762 - Visual Analytics - Spring 2018. A practical course on the theory and application of visual analytics in Information Studies at UMD taken by 22 graduate students.
- Instructor: INST760 - Data Visualization - Fall 2017. A project-oriented course on the science and technology of visualization offered in Information Studies at UMD taken by 31 graduate students.
- Instructor: INST728Q - Visual Analytics - Spring 2017. An advanced topics course on the synthesis of visualization and data science in Information Studies at UMD taken by 24 graduate students.
- Instructor: Workshop on Data Visualization at SESYNC - Annapolis, MD, USA - December 2016. I discussed topics on visualization scripting and storytelling.
- Supervisor: Advised Zhe Cui, a junior graduate student in University of Maryland, College Park on computational aids for visual exploration. Relevant publications: J9, J8.
- Supervisor: Advised Shivalik Sen, an intern from BITS Pilani Goa Campus in India, on developing adhoc computational clusters using mobile phones to support big data visualization. Relevant publications: R1.
- Instructor: Freshman C-programming lab (CS101) - Fall 2009. Supervised a group of 10 undergraduate students at Indian Institute of Technology Hyderabad.

## Invited Talks

- I7 “**Visualization Beyond the Desktop**,” Interactive Data Lab (IDL), University of Washington, Seattle, WA, USA, August 23, 2018.
- I6 “On Internships & Research,” INST362: User-Centered Design, College of Information Studies, University of Maryland, College Park, MD, USA, October 31, 2017.
- I5 “Introduction to Data Visualization,” CMSC320: Introduction to Data Science, Department of Computer Science, University of Maryland, College Park, MD, USA, December 07, 2016.
- I4 “Supporting **Collaborative Visual Analysis** across Heterogenous Devices,” Chalmers University of Technology, Gothenburg, Sweden, November 16, 2016.
- I3 “Time-Series Analytics,” INST728Q: Visual Analytics, College of Information Studies, University of Maryland, College Park, MD, USA, March 10, 2016.
- I2 “Cross-Device Frameworks for **Collaborative Visualization**,” HCIL Brown Bag Lunch, College Park, MD, USA, February 5, 2015.
- I1 “Multimodal Interaction Design for **Ubiquitous Analytics**,” IEEE VIS 2014 Doctoral Colloquium, Paris, France, November 8, 2014.

## Awards

- Awarded **Schloss Dagstuhl - NSF Support Grant** for attending the Dagstuhl seminar on Progressive Data Analysis and Visualization in October, 2018.
- Awarded **Outstanding Graduate Assistant (top 2%)** for contributions in both research and teaching at University of Maryland, College Park, MD, USA.
- Awarded **Honorable Mention (top 5%)** for our Large Display + Smartwatch paper at ACM CHI 2018.
- Awarded **Best Use of Existing Tools** and honorable mention for **Clear Analysis Strategy** at IEEE VAST Challenge 2016.
- Awarded Human-Computer Interaction Consortium travel grant for attending HCIC 2015 workshop on HCI theories.
- Awarded travel grant for attending Doctoral Consortium, IEEE VIS (InfoVis 2014), Paris, France.
- Awarded University of Tokyo - Mori Seiki Co. IIT Undergraduate Scholarship for the years 2009-10, 2010-11 (Also known as ‘Todai IIT Scholarship’).

## Service

- Regular Program Committee Member for ACM IUI 2018.
- Student volunteer for HCIL symposium 2015-16, IEEE VIS 2016-17.
- Student reviewer for computer science graduate admissions at University of Maryland, College Park (2016, 2017).

- Reviewer for HCI and visualization conferences: ACM CHI 2019, ACM IUI 2019, IEEE VAST 2018, IEEE InfoVis 2017, GI 2017, EuroVis 2017, IEEE PacificVis 2017, IEEE VAST 2015-2016, ACM ITS 2015, ACM MobileHCI 2014, and IEEE SciVis 2013.

## Press

- UMIACS, April 2018. "HCIL Team Combines Large Display Monitors with Smartwatches for Better Data Analysis."  
Relevant publications: C9.
- NSF Discovery, June 2015. "Tools for real-time visual collaboration: Indiana and Purdue University Professors design cyber-learning system to make sharing ideas easier."  
Relevant publications: C3, C1.
- Huffington Post, June 2015. "7 Cyberlearning technologies transforming education."  
Relevant publications: C3, C1.
- MIT Technology Review, April 10, 2014. "Startup Makes One App Run on Many Screens."  
Relevant publications: C4.

## References

- **Niklas Elmqvist**, Associate Professor in College of Information Studies; Director of HCI Lab (HCIL);  
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