February 4, 2019

Dear Hiring Team Member,

I am a Ph.D. candidate in computer science at the University of Maryland, College Park, graduating in May 2019. I create data analytics techniques to help people interact with data and computational models over heterogeneous devices—large displays, desktops, smartphones, and smartwatches—to extract and communicate insights. In this process, I use data visualization as a means to establish the connection between the human and the machine to leverage the best of both. I am currently in the job market searching for opportunities in data science and human-computer interaction.

In the past few years, I have worked as a graduate assistant for Prof. Niklas Elmqvist with research (since 2014) and teaching (since 2017) duties. I have led 10+ research projects, published at top-tier HCI and visualization venues such as IEEE TVCG, ACM CHI, IEEE VAST, and EuroVis with collaborators across the world. Before joining the Ph.D. program, I earned a Master's degree in computer engineering from Purdue University in West Lafayette, IN working on sketching tools for early design.

My research is generally in the area of **interactive data science**. This is exemplified in my recent project, a web platform called Vistrates, published in IEEE TVCG. Vistrates supports the creation of user interfaces for data analytics that enable collaboration across many heterogeneous devices for a wide range of tasks—data cleaning, data transformation, modeling, machine learning, visualization, and insight communication. This open platform (maintained at vistrates.org) has started to gather attention in the visualization community. Before Vistrates, my research on combining large and small displays for data analysis received a *Best Paper Honorable Mention* (top 4%) at ACM CHI 2018.

Rooted in HCI design and data analytics, my research includes (1) an engineering component to create new analytical systems to utilize data mining and machine learning models and (2) an interaction design component to help people effectively work with these models. For instance, my work at Adobe Research identified challenges in reading data-rich PDF documents. Our Elastic Documents approach (published in IEEE TVCG) used pattern search to extract data from these documents and generated visualizations relevant to the content being read. My TimeFork project (published at ACM CHI 2016) for stock market prediction allowed a "what-if" analysis of neural networks through user interaction to combine human knowledge of impactful events with the machine's predictive capabilities.

I'm excited to contribute this experience in the synthesis of human and machine intelligence. My research along with blog articles are available for a quick glance at karthikbadam.com. For further inquiries, you can reach me via email at sbadam@umd.edu or by phone at +1 (765) 491 1767.

Yours sincerely,

Sriram Karthik Badam

Data visualization, the use of interactive graphics to represent data, plays a pivotal role in generating and communicating insights. Since it can be applied to many forms of data, visual analysis and visual communication methods can integrate into many domains such as healthcare, finance, and journalism. My research in data science and human-computer interaction empowers analysts by enabling collaboration with others while harnessing emerging device technologies as instruments for data analysis. These heterogeneous device technologies—such as large and small displays and input and sensing devices, as well as fixed, portable, and wearable form factors—enable heterogeneous groups of analysts to work together to consolidate their viewpoints and combine their cognitive processing power to develop insights from data. In my Ph.D. research, I designed interaction models and developed analytical systems to showcase the power of these device and user ecosystems in visual analytics—the science of analytical reasoning enabled by interactive visualization interfaces. Moving forward, I plan to build on this work by applying it to modern **analytical enterprises**, organizations containing multiple analysts with diverse expertise working with heterogeneous devices to make decisions.

Analytical enterprises are very common in the current data-driven world. They are sociotechnical in nature. For example, a business organization is an analytical enterprise with data scientists, product designers, engineers, and marketers, as well as stakeholders working together across distributed locations to drive the products. A police department is an analytical enterprise with detectives, data analysts, and officers in the field working with crime data to create better patrol routes, solve open crimes, and communicate safety guidelines to the public. An air traffic control center is an analytical enterprise with many controllers monitoring flight traffic in an office setting to make coordinated decisions. Even, a small coffee shop is an analytical enterprise with the small business owner tracking day-to-day sales and supplies on a personal device to enhance profitability. These enterprises capture unique analytical contexts with users performing a range of analytical activities, such as monitoring, exploration, development, communication, and presentation of insights, in groups across many devices for decision making.

RESEARCH AGENDA

My current work targets the effective use of heterogeneous devices in enabling collaboration between humans and devices for analytical tasks. Utilizing these solutions in the context of analytical enterprises is essential to improve the analytical activities performed by subjects within these enterprises to reach their target outcomes. To answer this vision, I plan to explore two research directions. Here I explain them along with my corresponding research.

FROM INDIVIDUAL TO COLLABORATIVE: CREATING DEVICE ECOSYSTEMS FOR A COLLECTIVE MIND

Group activity is the cornerstone of any modern analytical enterprise; after all, many minds are better than one. Early collaborative visual analytics platforms showcased the power of collective mind in analytical processes. However, developing visual analytic applications that can inherently support multi-user analyses is challenging in that it requires explicit management of interaction and insights developed by the users across their devices. In response, I developed the Munin and PolyChrome frameworks [J3, C4][1] early in my Ph.D. studies, published in **IEEE TVCG and ACM ITS 2014** respectively. PolyChrome utilizes web frameworks for enabling collaborative data analysis. It connects user interaction across their devices by translating it into serialized interaction events. Furthermore, parts of the interface can appear on mobile devices with limited space or spread across multiple monitors; thus, supporting smart analytical environments consisting of rich input, sensing, and output modalities.

Since there is a plethora of novel input and output technologies out there, it is not straightforward to utilize them in visual data exploration. Going beyond interaction, I theorized the roles of the devices situated in a multi-device

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[1] Reference to the publication list provided in my Curriculum Vitae.

environment to combine the best of all the technologies while complementing their limitations. For instance, for multiple users working with a large display, it is hard to keep track of the individual user interactions and avoid interference between them.

Hence, a secondary device added to this large display environment can mediate the interactions from multiple analysts while tracking their activities and provide ways to coordinate between them. In this direction, our **ACM CHI 2018** paper *(awarded*
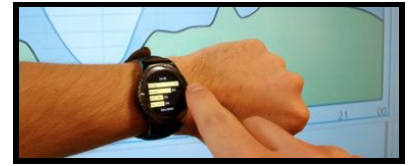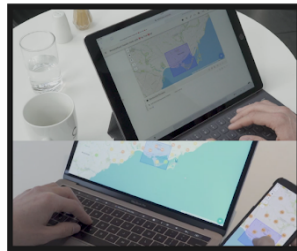

Best Paper Honorable Mention) presented a visual analytic system with the extremes of devices—large displays and smartwatches—for visual data exploration [C9].
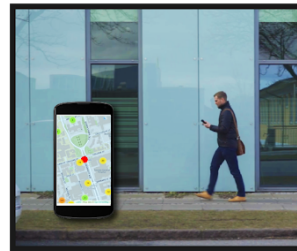
A culmination of my dissertation research in this direction is a web platform called [Vistrates](). Published very recently at **IEEE TVCG (Proc. InfoVis 2018)**, this platform introduces a component-based model for creating visual analytic systems [J11]. Each component—say, a data mining model, a visual representation, or an interaction technique—connects to other components within a vistrate to form a cohesive analytical system. This system can be viewed in different interface abstractions such as a programming view as in Jupyter notebooks, a dashboard view as in Tableau or Power BI, or even a presentation view as in Microsoft Powerpoint. Vistrates is by nature collaborative—the states of the components are propagated across devices similar to PolyChrome. Vistrates can also be used in heterogeneous devices by utilizing interface abstractions that adapt to the device modality. This versatility in the user interface is crucial when supporting many analytical activities, users of diverse expertise, and devices of different capabilities. The power of this platform lies in its ability to act as a base for future research. By its collaborative and cross-device nature, Vistrates can answer the challenges of modern analytical enterprises.
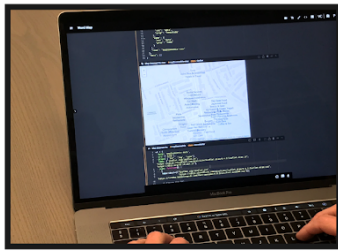
| DEVELOPMENT OF ANALYTICAL TOOLS | COLLABORATIVE ANALYSIS | MOBILE VISUALIZATION | COMMUNICATION OF INSIGHTS |

Next steps. New methods for decision making, coordination, group awareness, and social interaction can be built on top of this work to study and leverage the power of a collective mind. There are many open research opportunities in this space: How to capture analytical outcomes and contextual knowledge through provenance and annotation? How to transform the analytical process into presentable summaries? Which collaborative workflows help in different visual analytic tasks? Thus, creating a formal understanding of the utility of group work.

I plan to also solidify the understanding of the affordances of emerging technologies in analytical activities. Our **paper** at the **immersive analytics workshop** at IEEE VIS 2017 begins to unravel their affordances in visualization tasks [W4]. Moving forward, I will explore: How to leverage emerging device modalities to represent and interact with information? How to combine modalities for effective multimodal input and output in visual analytics? Also, in general, how to construct new device form factors to encapsulate emerging technologies? Within this space, speech, gaze, multi-device, and augmented reality settings are of primary interest to me.

FROM INTERACTION TO COALITION: TRANSFERRING USER KNOWLEDGE INTO ANALYTICAL SYSTEMS

Supporting modern analytical enterprises also involves finding ways to better connect analysts with the powerful computational models that drive automated analyses within these contexts. Our **ACM CHI 2016** paper on the interactive prediction of time series [C5] introduces a "what-if" analysis of the prediction space for stock markets

generated by neural network models. For instance, *if* Apple's stock increases tomorrow, *what* happens to Samsung and Google? This technique helped novice stock traders understand the trends within the stock market data to combine their own qualitative understanding of impactful events from the real world with the predictive power of the machines. In a similar vein, our **EuroVis 2017** paper introduces a progressive analytics system [J6] for microblog data from Twitter that helps the users see early results of tweet embeddings in a two-dimensional space based on keyword similarity, to guide the models into extracting and presenting better themes from the tweets. More recently, to enable better reading of data-rich documents, my Elastic Documents approach published in **IEEE TVCG (Proc. InfoVis 2018)** used pattern search methods to extract data from the long tables within these documents and generated visualizations on demand to help the user during the reading. Our user evaluation from this project showed that this synergy between automatic data extraction and visualization led to more informative summaries and a better understanding of the data-rich documents.

Next steps. I am excited about opening the black box of computational models to promote transparency and establish a coalition between the human and the machine. This is essential in modern analytical enterprises in health, finance, and urban development dealing with large, heterogeneous datasets. Working with data scientists and domain experts situated in these analytical enterprises, I will target mixed-initiative systems for visual prototyping and debugging of data analytic techniques, explorable explanations of models, and techniques for transferring human knowledge into computing models. Interactive visualization is an essential tool for me in this space to leverage the best of human and machine intelligence.

VISION

My agenda to create better visual analytic solutions within modern analytic enterprises is ambitious, but I am excited to tackle this agenda in the next years. I am driven by two philosophies that will guide my target goals for the immediate future research.

Anyone can be an analyst! Let's empower people in making better data-driven decisions using their personal devices.

Analytical activities are not just performed by data experts and scientists. They are now seamlessly integrated into the everyday lives of people and into their own personal devices. Imagine a small business owner of a coffee shop: she needs to keep track of the amount of milk, coffee, cream, etc. consumed each day for a data-driven approach towards inventory management. She also needs to manage her finances to develop new marketing strategies that can improve sales. Creating visual analytic systems that help such a novice user analyze her data on her personal devices—a smartphone or a tablet—while she is in the store or at her home is an exciting immediate direction.

Collective minds work better! Let's enable collaborative thinking and promote diversity in expression, experience, and expertise.

As a student, I collaborated with many researchers across the world. I learned from them and together we were successful. I strongly believe that collective minds are more powerful but creating perfect collaborations is challenging. In visual analytics, it is even more important to bring together the perspectives of multiple analysts with diverse expertise and experiences—after all, the construction and interpretation of a visualization also rely on the contextual knowledge of the user. Therefore, bringing together diverse people and perspectives into analytical tasks is also an exciting—and logical—immediate direction for me.

- **Dr. Niklas Elmqvist**
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  College of Information Studies,
  University of Maryland, College Park, USA.
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- **Dr. Pourang Irani**
  Professor,
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  Phone number: +33 1 74 85 42 97

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  Head of the Interactive Media Lab,
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Links

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linkedin://karthikbadam

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

2014–2019	**Ph.D.** in Computer Science	University of Maryland, College Park, MD, USA

Thesis title: Enabling **collaborative visual analysis** across heterogeneous devices

2012–2014	**M.S.** in Computer Engineering	Purdue University, West Lafayette, IN, USA

Thesis title: Developing digital media platforms for **early design**

2008–2012	**B.Tech.** in Computer Science	Indian Institute of Technology Hyderabad, India

Major project: **Mobile applications** to support rescue and recovery operations in **post-disaster situations** through a novel multi-hop, peer-to-peer synchronization protocol.

Professional Experience

Since 2014 — HCIL, University of Maryland — College Park, MD, USA
Graduate Research Assistant
I work on funded projects under the supervision of Dr. Niklas Elmqvist at UMD. I focus on creating efficient collaborations between analysts and their devices to understand data visually and make complex decisions.

Since 2017 — College of Information Studies, University of Maryland — College Park, MD, USA
Graduate Teaching Assistant (Instructor)
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.

Summer 2018 — Microsoft Research — Redmond, WA, USA
Research Intern
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.

Summer 2017 — Creative Intelligence Lab, Adobe Research — Seattle, WA, USA
Research Intern
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.

Summer 2016 — AVIZ research team, INRIA — Saclay, France
Visiting PhD Student
I worked with Dr. Jean-Daniel Fekete on a progressive analytics system for understanding themes discussed on Twitter using natural language processing.

2012–2014 — Purdue University — West Lafayette, IN, USA
Graduate Research Assistant
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.

Summer 2011 — Hewlett Packard (HP) R&D — Bangalore, India
Undergraduate Intern
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.

Publications

Journal Papers (peer-reviewed)

J11 S. K. Badam, A. Mathisen, R. Rädle, C. N. Klokmose, N. Elmqvist. Vistrates: A Component Model for Ubiquitous Analytics. In IEEE Transactions on Visualization and Computer Graphics (Proc. InfoVis), 25(1): 586-596, 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), 25(1): 661-671, 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 T. Horak* - S. K. Badam,* N. Elmqvist, R. Dachselt. 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]   🎖 **Received Honorable Mention (Top 4%)**

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, <u>S. K. Badam</u>, 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 <u>S. K. Badam</u>, R. Rädle, C. N. Klokmose, N. Elmqvist. Towards a Unified Visualization Platform for Ubiquitous Analytics. Workshop paper presented at Data Visualization on Mobile Devices at ACM CHI 2018.

W4 <u>S. K. Badam</u>, 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 <u>S. K. Badam</u>, C. Kinkeldey, P. Isenberg. Haztrailz: Exploratory Analysis of Trajectory and Sensor Data. Workshop paper presented at VAST Challenge at IEEE VIS 2016.

W2 <u>S. K. Badam</u>, 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 <u>S. K. Badam</u>, 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, <u>S. K. Badam</u>, 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, <u>S. K. Badam</u>, 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 <u>S. K. Badam</u>, 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, <u>S. K. Badam</u>, 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

I8 "Introduction to Data Visualization and Tableau," INST 201: Introduction to Information Science, College of Information Studies, University of Maryland, College Park, MD, USA, November 14, 2018.

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 4%)** 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 2019.
- 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 information visualization conferences: EuroVis 2019, 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.

- UMIACS, May 2016. "UMIACS Researchers Advancing Techniques to Improve the Predictive Capabilities of Big Data."
  Relevant publications: C5.

- 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.