POORNA TALKAD SUKUMAR

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Research Interests

Human-Computer Interaction (HCI); Information Visualization; Computer-Supported Cooperative Work (CSCW); Personal Data Visualization; Cognitive Biases in Visualizations; Empirical Studies; Future of Work

Education

University of Notre Dame *Notre Dame, IN, USA*
Ph.D. Computer Science and Engineering *08/15/2015 - 08/20/2021*
- *Dissertation:* Contextual and Qualitative Approaches for Visualization Design
- Advisors: Dr. Aaron Striegel and Dr. Ronald Metoyer
- *GPA:* 4.0/4.0

Lancaster University *Lancashire, UK*
M.Sc. Mobile and Ubiquitous Computing *10/01/2009 - 09/30/2010*
- *Thesis:* Enhanced Stance Phase Detection and Extended Kalman Filtering for Strapdown Pedestrian Dead Reckoning
- Thesis Supervisor: Dr. Mike Hazas

Dayananda Sagar College of Engineering *Bengaluru, India*
B.E. Computer Science and Engineering *06/01/2004 - 05/31/2008*

Professional Appointments

Assistant Professor Schenectady, NY, USA
Department of Computer Science, Union College *09/01/2021 - Present*
-Responsible for teaching five undergraduate courses per year, performing research, advising students, and providing service to the college.

Graduate Research Assistant Notre Dame, IN, USA
Department of Computer Science and Engineering, University of Notre Dame *05/15/2016 - 08/20/2021*
-Performed research towards a Ph.D. under the supervision of Dr. Aaron Striegel and Dr. Ronald Metoyer.

Graduate Teaching Assistant Notre Dame, IN, USA
Department of Computer Science and Engineering, University of Notre Dame *08/15/2015 - 05/14/2016*
-Performed research towards a Ph.D. under the supervision of Dr. Aaron Striegel and Dr. Ronald Metoyer.
-Assisted instructors with their courses by developing course content, delivering lectures, grading exams and assignments, and holding office hours.

Project Associate Bengaluru, India
Department of Computer Science and Automation, Indian Institute of Science *01/01/2012 - 07/15/2015*
-Developed a low-cost system with multiple inertial sensors to assess gait used in the treatment of post-stroke patients and patients with cerebral palsy .

Software Developer Bristol, UK
Matter 2 Media *01/01/2011 - 09/01/2011*
-Successfully developed applications where touch technologies, such as NFC/RFID and QR codes, are associated with physical objects and on interacting with these objects embedded in the real world, the applications delivered location-specific content and experiences to users.

Research Assistant Lancashire, UK

Computing Department, Lancaster University *10/01/2010 - 12/31/2010*

-Continued to work on my Master's thesis and implemented an improved stand-alone pedestrian-tracking system using shoe-mounted inertial sensors aimed at addressing the needs of emergency responders.

Publications

Refereed Journal Articles

Reinholz, D., Ridgway, S., **Talkad Sukumar, P.**, and Shah, N. 2022. Visualizing Inequity: How Data Visualizations Can Support Sensemaking About Racial Inequity (*Under Review, CBE—Life Sciences Education Journal*).

Breideband, T., Martinez, G., **Talkad Sukumar, P.**, Caruso, M., D'Mello, S., Striegel, A.D., and Mark, G. 2022. Collaborating from Home during COVID-19: Examining Individual Sleep and Sleep Alignment in Teams. *CSCW, 2022* (*To appear*).

Breideband, T., **Talkad Sukumar, P.**, Mark, G., Caruso, M., D'Mello, S., and Striegel, A.D. 2022. Home-Life and Work Rhythm Diversity in Distributed Teamwork: A Study with Information Workers during the COVID-19 Pandemic. *CSCW, 2022* (*To appear*).

Talkad Sukumar, P., Metoyer, R., He, S. 2018. Making a Pecan Pie: Understanding and Supporting The Holistic Review Process in Admissions. *Proceedings of the ACM on Human-Computer Interaction, 2(CSCW), 1-22.* [25.6% Acceptance Rate].

Fischer, C., **Talkad Sukumar, P.**, Hazas, M. 2012. Tutorial: implementation of a pedestrian tracker using foot-mounted inertial sensors. *IEEE Pervasive Computing,12(2), 17-27.*

Refereed Conference and Workshop Articles

Talkad Sukumar, P., Dey, A., Mark, G., Metoyer, R., and Striegel, A.D. 2022. Triggers and Barriers to Insight Generation on a Personal Visualization Interface. *Graphics Interface, 2022* (*To appear*).

Talkad Sukumar, P., Martinez, G.J., Grover, T., Mark, G., D'Mello, S.K., Chawla, N.V., Mattingly, S.M. and Striegel, A.D. 2020. Characterizing Exploratory Behaviors on a Personal Visualization Interface Using Interaction Logs. *EuroVis 2020 - Short Papers.* [45.7% Acceptance Rate]

Talkad Sukumar, P. and Metoyer, R. 2019. Mobile Devices in Programming Contexts: A Review of the Design Space and Processes. *In Proceedings of the 2019 on Designing Interactive Systems Conference (pp. 1109-1122).* [25% Acceptance Rate]

Zhi, Q., Lin, S., **Talkad Sukumar, P.**, and Metoyer, R. 2019 GameViews: Understanding and Supporting Data-driven Sports Storytelling. *In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (pp. 1-13).* [23.8% Acceptance Rate, **Best Paper Honorable Mention Award (top 5%)**]

Talkad Sukumar, P., Liu, A., and Metoyer, R. 2018. Replicating User-defined Gestures for Text Editing. *In Proceedings of the 2018 ACM International Conference on Interactive Surfaces and Spaces (pp. 97-106).* [26.7% Acceptance Rate]

Talkad Sukumar, P. and Metoyer, R. 2018. Towards Designing Unbiased Replication Studies in Information Visualization. *In 2018 IEEE Evaluation and Beyond-Methodological Approaches for Visualization (BELIV) (pp. 93-101).*

Talkad Sukumar, P., He, S., and Metoyer, R. 2017. Holistic Reviews in Admissions: Reviewer Biases and Visualization Strategies to Mitigate Them. *In DECISIVe: Workshop on Dealing with Cognitive Biases in Visualizations. IEEE VIS.*

Book chapter and Theses

Talkad Sukumar, P. 2021. Contextual and Qualitative Approaches for Visualization Design. *Doctoral Dissertation, University of Notre Dame.*

Talkad Sukumar, P. and Metoyer, R. 2018. A Visualization Approach to Addressing Reviewer Bias in Holistic College Admissions. *In Cognitive Biases in Visualizations (pp. 161-175). Springer, Cham.*

Talkad Sukumar, P. 2010. Enhanced Stance Phase Detection and Extended Kalman Filtering for Strapdown Pedestrian Dead Reckoning. *Master's Thesis, Lancaster University, UK*

Panel, Case study, Poster

Talkad Sukumar, P., Breideband, T., Martinez, G., Caruso, M., Rose, S., Steputis, C., D'Mello, S., Mark, G., and Striegel, A. 2021. Designing an Interactive Visualization System for Monitoring Participant Compliance in a Large-scale, Longitudinal Study. *In Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (pp. 1-8).* [21% Acceptance Rate]

Talkad Sukumar, P., Avellino, I., Remy, C., DeVito, M. A., Dillahunt, T. R., McGrenere, J., and Wilson, M. L. 2020. Transparency in Qualitative Research: Increasing Fairness in the CHI Review Process. *In Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems (pp. 1-6).* [28.6% Acceptance Rate].

Talkad Sukumar, P., Reinholz, D., Shah, N., and Striegel, A. 2020. Visualizing Participatory Inequities in Classroom Data. *IEEE VIS 2020 Electronic Conference Proceedings [Poster].*

Selected Projects

Visualizing Classroom Participation Data to Promote Equity in Classrooms

2020 - Present

Univ. of Notre Dame, Collaboration with Prof. Daniel Reinholz, SDSU

- Designed potential solutions, informed by visualization design principles and guidelines, for visualizing classroom participation data disaggregated by race and gender
- The solutions are aimed at making teachers aware of their implicit biases and to enable them to consciously enforce participatory equity in their classrooms
- Currently designing a quantitative empirical study to measure effectiveness of visualizations for tasks specific to understanding equity and identifying inequities in class participation data, e.g., do students belonging to Race A participate as much as those belonging to Race B?

Intelligent Facilitation of Teamwork via Longitudinal Sensing in Context

Univ. of Notre Dame, Collaboration with Prof. Gloria Mark, UCI and Prof. Sidney D'Mello, CU Boulder *2019 - 2021*

- This project aims to understand and build models to facilitate team behavior by tracking physical characteristics, psychological traits, and other aspects of teams through wearables, Bluetooth beacons, and surveys
- Contributed to all activities pertaining to the large-scale tracking study including designing the study protocol, recruitment and enrollment of teams, monitoring participant compliance, and analyzing collected data

Methods for Studying Personal Data Visualizations

2019 - 2021

Univ. of Notre Dame

- Implemented an interface presenting visualizations of the personal data gathered in the *Tesserae study*, a large-scale, yearlong study where various personal data attributes of 757 information workers were tracked through wearables and Bluetooth beacons
- Explored empirical methods, including think-aloud protocol and analysis of interaction logs, towards obtaining a realistic understanding of personal visualizations through this interface

Replication and Research Transparency Initiatives

2018 - 2020

Univ. of Notre Dame

- Contributed to the CHI conference reviewing guidelines, as part of the *Transparent Statistics Group*
- *In collaboration with Dr. Ignacio Avellino (UMBC) and Dr. Christian Remy (Aarhus University)*, organized and moderated a virtual panel at CHI 2020 on transparency in qualitative-research CHI submissions

Understanding the Holistic Admissions Process – A Visualization Design Study *2017 - 2019*

Univ. of Notre Dame

- Domain Characterization: Characterized the holistic review process commonly employed in the United States to make undergraduate admissions decisions through contextual interviews and observations
- Data and Task Abstraction: Translated the data and task requirements gathered from domain-specific language into abstractions that a user can address through visualization
- Identified possible leverage points for applying visualization decision-support tools within the holistic review process, including the use of visualization approaches to mitigate potential cognitive biases of the reviewers identified in the study

Enhanced Stance Phase Detection and Extended Kalman Filtering for Strapdown Pedestrian Dead Reckoning *2010*

Master's Thesis, Lancaster University

- Implemented an improved stand-alone pedestrian-tracking system (using shoe-mounted inertial sensors) aimed at addressing the needs of emergency responders
- Evaluated various methods to detect the stationary periods when walking and formulated a Kalman filter for updating the velocity during the detected stationary periods
- Our tracking system yielded significantly better results than the algorithms previously proposed in the literature

Awards and Recognitions

2019-2022	**Special Recognition for Outstanding Reviews**, *CHI'22, CHI'20, and CSCW'19 Papers*	
2020	**Participant**, *Doctoral Colloquium, IEEE VIS conference*	
2019	**Outstanding Graduate TA Award**, *Dept of Computer Science and Engineering, University of Notre Dame*	
	Best Paper Honorable Mention Award, *ACM CHI conference ("GameViews: Understanding and Supporting Data-driven Sports Storytelling")*	
2017	**Joseph F. Downes Memorial Award for Conference Travel**, *University of Notre Dame*	*$ 1,500*
	CRA-W Grad Cohort Scholarship, *Computing Research Association (CRA)*	*$ 1,500*

Presentations

Invited Talk

Invited talk (virtual): At **Union College,** Schenectady, NY. May 2021. "Towards a Realistic Understanding Of Personal Visualization."

Conference and Workshop Paper Presentations

EuroVis conference (virtual). May 2020. Presented paper, "Characterizing Exploratory Behaviors on a Personal Visualization Interface Using Interaction Logs."

Designing Interactive Systems (DIS) conference, San Diego, USA. June 2019. Presented paper, "Mobile Devices in Programming Contexts: A Review of the Design Space and Processes"

Interactive Surfaces and Spaces (ISS) conference, Tokyo, Japan. Nov 2018. Presented paper "Replicating User-defined Gestures for Text Editing"

CSCW conference, Jersey City, USA. Nov 2018. Presented paper "Making a Pecan Pie: Understanding and Supporting The Holistic Review Process in Admissions"

Evaluation and Beyond-Methodological Approaches for Visualization (BELIV) Workshop, IEEE VIS, Berlin, Germany. Oct 2018. Presented mini-tutorial "Towards Designing Unbiased Replication Studies in Information Visualization."

Dealing with Cognitive Biases in Visualisations (DECISIVe) Workshop, IEEE VIS, Phoenix, Arizona. Oct 2017. Presented paper "Holistic Reviews in Admissions: Reviewer Biases and Visualization Strategies to Mitigate them."

Teaching Experience

Union College *Schenectady, NY, USA*
Assistant Professor, Department of Computer Science *Sept 2021 - Present*

- **CSC 105 - Game Development: Introduction to Computer Science** [F21] [W22]
- **CSC 250 - Algorithm Design and Analysis** [S22]
- **CSC 380 - User Interfaces** [S22]

University of Notre Dame *Notre Dame, IN, USA*
Graduate Teaching Assistant, Department of Computer Science and Engineering *2015-2016, 2018*

- **Human-Computer Interaction (HCI)** [S16] [S18]
  Instructor: Prof. Ronald Metoyer
- **Data Mining** [F15]
  Instructor: Prof. Nitesh Chawla

Service

2019-	**Reviewer**, ACM CHI 2019–2022, ACM CSCW 2019-2022, IEEE VIS 2021, ACM MobileHCI 2022, IEEE TVCG 2015–2016, ACM UIST 2021.
2022	**Member of Faculty Search Committee (Visiting Assistant Professor)**, Union College
2022	**Member of Union Coalition for Inclusiveness and Diversity (UCID)**, Union College
2019	**Session Chair**, ACM DIS and CHI conferences
2019 - 2020	**Graduate Student Union representative**, Dept of Computer Science and Engineering, University of Notre Dame

References

Dr. Aaron Striegel
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University of Notre Dame
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https://sites.nd.edu/aaron-striegel/

Dr. Ronald Metoyer
Professor, Dept of Computer Science and Engineering
University of Notre Dame
rmetoyer@nd.edu
https://sites.nd.edu/ronald-metoyer/

Dr. Gloria Mark
Professor, Dept of Informatics
University of California, Irvine
gmark@uci.edu
https://www.ics.uci.edu/ gmark/