

# Tabassum Kakar

## Research Interests

Data Visualization, Visual Analytics, Human-Computer Interaction, Machine-Learning

## Summary

- Self-motivated data visualization enthusiast with > 5 years' experience working with real-world data-driven problems including projects from the FDA involving requirement gathering, storyboarding and designing interactive visual analytics to improve drug-safety review workflows.
- Strong leadership, communication, and teamwork skills established by managing projects across inter-disciplinary teams as well as industry stakeholders leading to multiple collaborations resulting in >10 peer reviewed scientific publications.
- Remarkable time management skills with a unique combination of detail-oriented mindset, problem-solving skills and proven ability to meet deadlines resulting in securing more than \$200,000 in scholarships.

## Work Experience

### Research Assistant

2014-2020

Worcester Polytechnic Institute

- Identified business needs and research questions and collaborated with cross-functional teams and industry stakeholders to design analytics and visualizations to explore and analyze data.
- Led the complete lifecycle of analytics projects from requirement gathering to designing mockups and storyboards to the final development of functional prototypes.
- Designed and conducted qualitative and quantitative studies to evaluate the effectiveness of designed visualizations and communicated insights and outcomes to diverse audience.
- Worked with IBM as a part of Graduate Qualifying Project to explore and analyze aviation maintenance reports to assess data quality for aircraft health and safety analysis.

### Oak Ridge Institute of Science & Education (ORISE) Fellow

2016-2019

U.S. Food and Drug Administration

- Elicited requirements by investigating user needs and workflow challenges via interviews.
- Designed and conducted studies to understand user behavior and derive use-cases.
- Designed and developed visual analytics prototypes through iterative design process.
- Communicated scientific and technical content to technical and non-technical staff and executives.

### Database Administrator

2013-2014

Microfinance Investment Support Facility (MISFA), Afghanistan

- Evaluated and investigated the design and functionality of the existing application.

- Gathered and documented functional specifications from 6 financial institutions.
- Redesigned the database and the application design meet user needs.

### Business Intelligence Developer

2012-2013

Mobile Telecommunication Network (MTN), Afghanistan

- Translated business needs into technical specifications by designing BI-reports.
- Developed SQL queries to generate reports with information to support decision making.
- Designed dashboard visualizations to monitor subscriber and revenue growth.

### Assistant Software Developer

Kardan University, Kabul Afghanistan

2011-2012

- Analyzed user requirements and derived use-cases for the finance and HR departments.
- Developed desktop applications using VB.Net and MySQL.
- Designed reports for generating cash flows for the university.

## ADDITIONAL EXPERIENCE:

- Graduate Student Assistant at Data Science Program, WPI, USA. May - Aug, 2016
- Teaching Assistant at Frontier & Launch program, WPI, USA. Jul - Aug, 2015
- Part Time Lecturer at Kardan University, Afghanistan. Sep 2011 - May 2012
- Database Developer Intern at GS Constructions, Afghanistan. May - Aug, 2010

## Education

**Ph.D. | Data Science** | GPA 4.0/4.0 | Worcester Polytechnic Institute (WPI), USA. 2014 - 2020

**B.S. | Software Engineering** | GPA 3.4/4.0 | GIKI, Pakistan. 2007 - 2011

## Publications:

- **[EuroVis'19]** *DIVA: Exploration and Validation of Hypothesized Drug-Drug Interactions.* **Tabassum Kakar**, Xiao Qin, Elke Rundensteiner, Lane Harrison, Sanjay Sahoo and Suranjan De.
- **[IVAPP'19]** *MEV: Visual Analytics for Medication Error Detection.* **Tabassum Kakar**, Xiao Qin, Cory Tapply, Derek Murphy, Daniel Yun, Oliver Spring, Elke A. Rundensteiner, Lane Harrison, Thang La, Sanjay K. Sahoo and Suranjan De.
- **[Drug Safety'19]** *Adverse Drug Event Detection from Electronic Health Records Using Hierarchical Recurrent Neural Networks with Dual-Level Embeddings.* Susmitha Wunnava, Xiao Qin, **Tabassum Kakar**, Cansu Sen, Elke A. Rundensteiner and Xiangnan Kong.
- **[URTC'18]** *Drug-Drug Interaction Signal Detection from Drug Safety Reports.* Brian Zylich, Brian McCarthy, Andrew Schade, Huy Quoc Tran, Xiao Qin, **Tabassum Kakar** and Elke A. Rundensteiner.

- **[CIKM'18 Demo]** *DEVES: Interactive Signal Analytics for Drug Safety*. **Tabassum Kakar**, Xiao Qin, Susmitha Wunnavu, Brian McCarthy, Andrew Schade, Huy Quoc Tran, Brian Zyllich, Elke A. Rundensteiner, Lane Harrison, Sanjay K. Sahoo and Suranjan De.
- **[AMIA'18 Poster]** *Deep Learning Strategies for the Automatic Detection of Medication and Adverse Drug Events from Electronic Health Records*. Susmitha Wunnavu, Xiao Qin, **Tabassum Kakar**, Elke A. Rundensteiner and Xiangnan Kong.
- **[MADE'18 Workshop]** *Bidirectional LSTM-CRF for Adverse Drug Event Tagging in Electronic Health Records*. Susmitha Wunnavu, Xiao Qin, **Tabassum Kakar**, Elke A. Rundensteiner and Xiangnan Kong.
- **[ICDE'18 Demo]** *Multi-Drug Adverse Reactions Analytics*. Xiao Qin, **Tabassum Kakar**, Susmitha Wunnavu, Brian McCarthy, Andrew Schade, Huy Quoc Tran, Brian Zyllich, Elke A. Rundensteiner, Lane Harrison, Sanjay K. Sahoo and Suranjan De.
- **[HEALTHINF'18]** *One Size Does Not Fit All: An Ensemble Approach Towards Information Extraction from Adverse Drug Event Narratives*. Susmitha Wunnavu, Xiao Qin, **Tabassum Kakar**, Xiangnan Kong, Elke Rundensteiner, Sanjay Sahoo and Suranjan De.
- **[BIOSTEC'18]** *Multi-layered Learning for Information Extraction from Adverse Drug Event Narratives*. Susmitha Wunnavu, Xiao Qin, **Tabassum Kakar**, M. L. Tlachac, Xiangnan Kong, Elke A. Rundensteiner, Sanjay K. Sahoo, and Suranjan De.
- **[KDD'17]** *MARAS: Signaling Multi-Drug Adverse Reactions*. Xiao Qin, **Tabassum Kakar**, Susmitha Wunnavu, Elke Rundensteiner and Lei Cao.
- **[SAC'17]** *Towards Transforming FDA Adverse Event Narratives into Actionable Structured Data for Improved Pharmacovigilance*. Susmitha Wunnavu, Xiao Qin, **Tabassum Kakar**, Vimig Socrates, Amber Wallace and Elke Rundensteiner.

## Talks/Posters

- *MedViz: Visual Analytics for Medication Error Detection*. International Conference on Information Visualization and Applications (IVAPP). Prague, Czech Republic. Feb 2019.
- *ConText: Supporting the Pursuit and Management of Evidence in Text-based Reporting Systems*. Graduate Research Innovation Exchange (GRIE). WPI, Worcester, MA. Feb 6, 2019.
- *ConText: Supporting the Pursuit and Management of Evidence in Text-based Reporting Systems*. New England Database Summit (NEDB). MIT, Cambridge, MA. Jan24, 2019.
- *DEVES: Interactive Signal Analytics for Drug Safety*. Conference on Information and Knowledge Management (CIKM). France, Paris. Apr 2018.
- *DIVA: Towards Validation of Hypothesized Drug-Drug Interactions via Visual Analysis*. New England Database Summit (NEDB). MIT, Cambridge, MA. Jan 19, 2018.
- *DIVA: Towards Validation of Hypothesized Drug-Drug Interactions via Visual Analysis*. Graduate Research Innovation Exchange (GRIE). WPI, Worcester, MA. Apr 11, 2017.
- *Towards Pharmacovigilance using Machine Learning to Identify Unknown Adverse Reactions Triggered by Drug-Drug Interaction*. UMCCTS Community Engagement and Research Symposium. UMass Medical School, Worcester, MA. March 25, 2016.

## Awards and Achievements

- ORISE fellowship to partially fund PhD at WPI, USA. 2016 - 2019
- 3rd place in WPI GRIE Poster Competition. Apr 2017
- Community Leadership Award from WPI's Data Science Program. May 2017
- WPI Travel Award. 2018, 2019
- Fulbright scholarship for fully funded MS at WPI, USA. 2014 - 2016
- Grace Hopper Conference (GHC) travel scholarship. 2015, 2016
- Lucky Cement scholarship for fully funded BS at GIKI, Pakistan. 2007 - 2011
- Gold medalist. Ranked (1/35) in Software Engineering Program, GIKI, Pakistan. Jun 2011

## Activities

- Executive member of WPI Data Science Council. 2015 - 2020
- Reviewer at VLDB, Applied Clinical informatics. 2018, 2020
- Executive member of WPI Muslim Student Association (MSA). Sep - Dec, 2015
- Volunteer at Boston Data Festival, Microsoft NERD Boston. Sep 18 - 23, 2015
- Volunteer at Touch Tomorrow Event, WPI. Jun 2015

## Technical Skills

Data Visualization	Programming	Tools	Other Skills
D3.js	Python	Weka	Data Manipulation
React	R	IBM Modeler	Machine Learning
Tableau	JavaScript	XLMiner	Statistical Analysis
<b>Databases</b>	CSS	MongoDB	Data Visualization
SQL	HTML	Pig	Storyboarding
MySQL, NoSQL	C/C++	Latex	Business Need Analysis

**Interests:** Hiking, Baking and Music

**References:** Available upon request