Syedah Zahra Atiq, Ph.D.

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SUMMARY STATEMENT

I am an engineering and computing education scholar. I am interested in understanding the non-cognitive factors (e.g., emotions and motivation) that affect engineering and computing students' success, particularly in the context of introductory programming courses. For my dissertation research, I was awarded the Bilsland dissertation fellowship by the graduate school of Purdue University in 2018. I have extensive experience teaching computer science at the undergraduate level, and engineering education at the graduate level.

EXPERIENCE

Fall 2019 – present — **Assistant Professor of Practice**, Department of Computer Science and Engineering
The Ohio State University, Columbus OH, USA
Courses taught:
- Introduction to Programming in Java

Fall 2018 — **Faculty Apprentice,** School of Engineering Education
Purdue University, West Lafayette
Course designed and taught:
- Motivations and Emotions in Engineering Education

2009 - 2014 — **Assistant Professor**, Department of Computer Science
Forman Christian College, A Chartered University (FCC), Lahore *http://www.fccollege.edu.pk*
Courses taught:
- Introduction to Computing
- Fundamentals of Programming
- Object-Oriented Programming
- Discrete Mathematics
- Hardware Logic and Design
- Data Structures & Algorithms
- Introduction to Software Engineering
- Introduction to Artificial Intelligence
- Computer Graphics

2003 & 2006 — **Teaching Assistant**, Department of Computer Science
Lahore University of Management Sciences *http://www.lums.edu.pk*
Courses taught:
- Introduction to Artificial Intelligence
- Research Trends in Artificial Intelligence

2004 - 2005 — **Visiting Faculty,** Department of Computer Science
Kinnaird College for Women, Lahore *http://www.kinnaird.edu.pk*
Course taught:
- Computer Graphics

EDUCATION

2014 - 2019 **Doctor of Philosophy**, Engineering Education (College of Engineering)
Purdue University, West Lafayette, IN, USA
Dissertation: Emotions Experienced by First-Year Engineering Students During Programming Tasks
Advisers: Dr. Michael C. Loui and Dr. Jennifer J. DeBoer

2003 - 2005 **Master of Science**, Computer Science (Syed Babar Ali School of Science and Engineering)
Lahore University of Management Sciences (LUMS), Pakistan - *http://www.lums.edu.pk*
Thesis: Resolution of the Noun Attachment Problem in Urdu Machine Translation
Adviser: Dr. Mian Muhammad Awais

1999 - 2002 **Bachelor of Science**, Computer Sciences and Business
Kinnaird College for Women, Pakistan - *http://www.kinnaird.edu.pk/*
Capstone Project: Ligature Based Optical Character Recognition of Urdu-Nastaleeq Script
Adviser: Dr. Sarmad Hussain

RESEARCH

2021 - 2023 **Principal Investigator,** National Science Foundation CRII: IIS: HCC: Interplay of Emotions and Self-Efficacy of Novice Students during Programming Tasks: A Multi-Modal Approach (Award amount: $174,955)

2020 - 2021 **Senior Personnel,** National Science Foundation Convergence Accelerator- Track C: QuSTEAM (Award # 2040581): Convergent Undergraduate Education in Quantum Science, Technology, Engineering, Arts, and Mathematics (Award amount: $709,707, My share: $30,000)

2019 - present **Senior Personnel,** Volunteering to assist the research team with the qualitative analysis of the project funded by the National Science Foundation Research Initiation for Engineering Formation (RIEF): *Analyzing inequities in undergraduate workforce opportunities between biomedical and other engineering disciplines*. Nocera, T. (PI) & Delaine, D. (Co-PI and research mentor), Ortiz-Rosario, A. (2018). Departments of Engineering Education and Biomedical Engineering, Ohio State University

2015 - 2018 **Research Assistant,** (DeBoer Lab - http://www.deboer-lab.engineer), School of Engineering Education
Purdue University, West Lafayette, USA

- Lead graduate student on a project funded by National Science Foundation's EHR-Core (Award # 1561507): *COLLABORATIVE: Women's Engineering Participation in the US: What can the US Learn from Women's Decisions to Pursue Engineering in Diverse Cultural Contexts?* I have been involved in this project since the grant writing process. I drafted the methods section of the grant, which was then revised by my adviser. I also collected data from women engineers in Tunisia, Jordan, and Malaysia in Spring 2017
- Investigating student learning and interaction behaviors in a neuroscience MOOC offered via the edX platform

2006 - 2007 **Research Assistant**, Department of Computer Science, Lahore University of Management Sciences

- Microsoft funded multi-phased project, for capacity building of the IT trainers of the Punjab Vocational Training Council (PVTC).
- Fuzzy Rule extraction using support vector machines.

AWARDS

2018 Bilsland Dissertation Fellowship, Graduate School - Purdue University

2018 ACM ICER doctoral consortium candidate, Espoo – Finland

2017 Best action plan, 13th Global Student Forum, SPEED, Kuala Lumpur – Malaysia

2014 Exploration Fellowship, Purdue University School of Engineering Education

2012 Travel grant awarded by Forman Christian College **($1000 equivalent in PKR)**

2006 Travel grant awarded by the Higher Education Commission of Pakistan **($800 equivalent in PKR)**

2003 Special prize, 14th All Pakistan software competition and exhibition

PUBLICATIONS

Peer Reviewed Journal Publications

Atiq, S. Z., Loui, M. C. (under review). A Qualitative Study of Emotions Experienced by First-Year Engineering Students during Programming Tasks. *ACM Transactions on Computing Education*.

DeBoer, J., Haney, C., **Atiq, S. Z.**, Smith, C., & Cox, D. (2017). Hands-on engagement online: using a randomised control trial to estimate the impact of an at-home lab kit on student attitudes and achievement in a MOOC. *European Journal of Engineering Education*, DOI: https://doi.org/10.1080/03043797.2017.1378170

Shah, Z. A., Awais, M. M., & Shamail, S. (2010). Automatic case generation for pattern classification. *Expert Update*, BCS Specialist Group on Artificial Intelligence, 10(1), 25 – 30. Retrieved from: http://www.expertupdate.org/papers/10-1/4.pdf

Atiq, S. Z., Grifski, J., Wert, E., (in preparation). Triangulation of Multi-Modal Data to Assess Students' Emotions During Programming Tasks. *Journal of Engineering Education*.

Atiq, S. Z., Wert, E., (in preparation). Self-Regulation Strategies adopted by First-Year Engineering Students during Programming Tasks. *Computer Science Education.*

Shermadou, A., **Atiq, S. Z.,** Nocera, T., Delaine, D. (in preparation). Exploring the supports and barriers experienced by engineering students on the pathway to career attainment. *European Journal of Engineering Education*.

Peer Reviewed Conference Publications (Name underlined if presented)

Haney, C., Atiq, S. Z., Qureshey, J., Cox, D., DeBoer, J. (2019). Motivations and Offline Experience in a Blended STEM MOOC, Research in Engineering Education Symposium (REES), Cape Town, South Africa.

DeBoer, J., Dridi, A. M., Atiq, S. Z., Lee, D., Morton, S., Montppellier, A. D., Abu-Lail, N., Ater-Kranov, A., Kmec, J. (2019). Identity in Practice: Reflections from Malaysian Women who are Practicing Engineers, Research in Engineering Education Symposium (REES), Cape Town, South Africa.

Atiq, S. Z. (2018). WIP - A multi-modal method for assessing student emotions during programming tasks. Proceedings of the 124th American Society for Engineering Education Annual Conference and Exposition, Salt Lake City, UT.

Atiq, S. Z., Morton, S., Ater-Kranov, A., Abu-Lail, N. I., Kmec, J. A., DeBoer, J. (2018). Women's motivation to pursue engineering education and careers: A case study of Malaysia. Proceedings of the 124th American Society for Engineering Education Annual Conference and Exposition, Salt Lake City, UT.

Haney, C. L., Qureshey, J., **Atiq, S. Z.**, Cox, D., & DeBoer, J. (2017). Understanding lived experiences of students in a blended-learning neuroscience MOOC. Proceedings of American Society of Engineering Education Zone II Conference, Puerto Rico.

Haney, C. L., **Atiq, S. Z**., DeBoer, J., & Cox, D. D. (2016). Comparing different learning activities in a global neuroscience MOOC. Proceedings of the 123rd American Society for Engineering Education Annual Conference and Exposition, New Orleans, LA.

Atiq, S. Z., Haney, C. L., DeBoer, J., & Cox, D. D. (2016). Understanding student experiences in a blended learning MOOC: A phenomenographic study. Proceedings of the 123rd American Society for Engineering Education Annual Conference and Exposition, New Orleans, LA.

Ortega-Alvarez, J. D., **Atiq, S. Z.**, Rodríguez-Simmonds, H. E. (2016). A qualitative study investigating how first-year engineering students' value beliefs influence their choice of selecting an engineering major. Proceedings of the 123rd American Society for Engineering Education Annual Conference and Exposition, New Orleans, LA.

Atiq, S. Z., Xin, C., DeBoer, J., Oertelt, N., & Cox, D. (2016). Backgrounds and intentions of MOOC learners in a neuroscience course using at-home laboratory kits. Annual meeting of American Education Research Association, Washington DC, USA.

Rodríguez-Simmonds, H. E., Sánchez-Peña, M., **Atiq, S. Z.**, Coutinho, G. S., & Jesiek, B. K. (2015). A letter to the future engineer: Exploring cross-cultural engineering identities through practitioners' letters of advice. *Frontiers in Education (FIE) Annual Conference,* El Paso, TX.

DeBoer, J., Chen, X., **Atiq, S. Z.**, Oertelt, N., & Cox, D. (2015). Work in progress – MOOCs and remote lab equipment: Using at-home DIY kits to enhance the online learning experience. Research in Engineering Education Symposium (REES), Dublin, Ireland.

Atiq, S. Z., Chen, X., Cox, D. D., & DeBoer, J. (2015). International STEM classrooms: The experiences of students around the world using physical remote laboratory kits. American Society of Engineering Education International Forum, Seattle, WA.

Rodríguez-Simmonds, H. E., Ortega-Alvarez, J. D., **Atiq, S. Z.**, & Hoffmann, S. R. (2015). Identifying sources of information that students use in deciding which engineering major to pursue. Proceedings of the 122nd American Society for Engineering Education Annual Conference and Exposition, Seattle, WA.

Atiq, Z., & Anwar, S. (2012). Training IT-aware Pakistani's (A Case Study). Proceedings of International Conference on Business Management & IS (No. 1).

Syed, A., **Shah, Z. A**., & Awais, M. M. (2004). Resolution of the noun attachment problem in Urdu machine translation. Proceedings of IEEE International Multitopic Conference (INMIC), Lahore – Pakistan.

Shah, Z. (2002). Ligature based optical character recognition of Urdu-Nastaleeq font. Proceedings of IEEE International Multitopic Conference (INMIC), Karachi– Pakistan.

White Papers

Kmec, J. A., Ater Kranov, A., **Atiq, S. Z.**, Abu-Lail, N., Bradley, K., DeBoer, J. (2017). *Managing Research Collaborations: Strategies for conducting interdisciplinary, international research collaborations*. Retrieved from: http://womeninengineeringpmcs.org/white-papers/.

Round Table Discussions

Atiq, Z., Loui, M. (2020). The Power of Emotions in an Introductory College Course. Hawai'i International Conference on Education, January 4–7, 2020.

Media Mentions

METHODS with Dr. Zahra Atiq, Assistant Professor of Practice in Computer Science and Engineering at The Ohio State University (2020). Retrieved from: http://bit.ly/SZA_Podcast2020.

The STEM Paradox: Why Are Muslim-Majority Countries Producing So Many Female Engineers? Retrieved from: http://bit.ly/the-stem-paradox, Slate.

New project to study why certain predominantly Muslim nations have higher rates of women engineers than U.S. Retrieved from: http://bit.ly/purdue_wie_press_release, Purdue University.

PRESENTATIONS

Invited Talks

Atiq, S. Z., Grifski, J., (2020). Triangulation of Multi-Modal Data to Assess Students' Emotions During Programming Tasks. Seminar speaker, Engineering Education Department, The Ohio State University.

Atiq, S. Z., (2020). Triangulation of Multi-Modal Data to Assess Students' Emotions During Programming Tasks. Seminar speaker, STEM Transformation Institute, Florida International University

Atiq, S. Z., (2019). Emotions Experienced by First-Year Engineering Students During Programming Tasks. Seminar speaker for the ROCkETEd research group. Polytechnic Institute, Purdue University.

Atiq, S. Z., (2018). Emotions Experienced by First-Year Engineering Students During Programming Tasks. Seminar speaker for the computers and education research group. Department of Computer Science. University of Illinois at Urbana-Champaign.

Ater-Kranov, **Atiq, S. Z.**, Sharifa Zaida Nurlisha Syed Ibrahim. (2017). High Participation of Women in Engineering in Predominantly Muslim Countries: A Multinational Study and a Malaysian Example. World Engineering Education Forum, Kuala Lumpur, Malaysia.

Discussion Panels

DeBoer, J., Ater-Kranov, A., Abu-Lail, N. I., Kmec, J. A., **Atiq, S. Z.**, Global Women's Voices: Insights from Women in Predominately Muslim Countries with High Female Engineering Participation. 123rd American Society for Engineering Education Annual Conference and Exposition, Columbus, OH.

Posters

Atiq, Z. (2018). Emotions Experienced by First-Year Engineering Students During Programming Tasks. Proceedings of the 2018 ACM Conference on International Computing Education Research (258 – 259), Espoo, Finland.

Atiq, S. Z. (2017). The Relationship between Engineering Students' Self-Efficacy Beliefs and Their Experience Learning Computer Programming: A Sequential Explanatory Mixed-Methods Investigation. 123rd American Society for Engineering Education Annual Conference and Exposition, Columbus, OH.

Atiq, S. Z. (2016). Teaching and Learning in an Introductory Undergraduate Programming Class: A Reflective Autoethnography. In *Proceedings of the 47th ACM Technical Symposium on Computing Science Education* (pp. 693-693). ACM.

Extended Abstract

Atiq, S. Z., Haney, C. L., Cox, D. D., & DeBoer, J. (2016). The need for and affordances of qualitative insights in MOOC research. Learning with MOOCs III, October 2016, Philadelphia USA.

Others

DeBoer, J., **Atiq, S. Z.**, Case Study Descriptions from Four Predominately Muslim Countries with High Participation of Women in Engineering. Presented to the Spring 2017 Women in Engineering Program seminar at Purdue.

Atiq, S. Z. (2013). Impact of Social Media on Students. Presented at the faculty retreat of Forman Christian College (A Chartered University), Lahore - Pakistan.

Atiq, S. Z. (2006). Automatic Case Generation for Pattern Classification. Presented at the 11th UK Case Based Reasoning workshop, held at Peterhouse College, Cambridge, UK.

TRAINING & CONSULTANCY

2012 – 2013 Worked as a *Subject Specialist*, a part-time consultant for an online course development company Synergis Global (formerly known as Higher Education Online – London, United Kingdom). Developed the learning and assessment materials for a six-week online course module titled *Grand Challenges of Artificial Intelligence* for University of Aberdeen, United Kingdom.

2011 - 2018 Independently led and facilitated training workshops for the *Centre for Learning and Teaching* at FCC.
Trainings conducted:
- Scholarship of teaching and learning (2018)
- Mixed-methods research (2018)
- Aligning content assessment and pedagogy of your course (2015)
- Developing course websites (2011 & 2012)
- Getting started with Moodle (2011)

2007 Trained the master trainers of Punjab Vocational Training Council (PVTC) on the IT curriculum developed by Microsoft. Audited the training conducted by the master trainers.

PROFESSIONAL DEVELOPMENT

2020 OSU University Institute for Teaching and Learning Teaching Support Program (Teaching Practices Inventory and Teaching@Ohio State and Reading List Reflection)

2019 *Planning and Writing Successful Grant Proposals*, conducted by Atkisson Training Group at Ohio State University

2017 13th Global Student Forum (GSF), arranged by Student Platform for Engineering Education Development (SPEED), Kuala Lumpur, Malaysia

2016 *Education Data Mining* track of the LearnLab summer school held at Carnegie Mellon University, Pittsburgh PA

2014 *Edward de Bono CoRT Thinking Programme*, conducted by Dr. Sunil Gupta, Lahore College for Women University

2012 *Symposium on Document Image analysis* at Lahore University of Management Sciences.

2012 *Third Workshop on Internationalized Domain Names for Local Content Development* at University of Engineering and technology.

2011 *Introduction to Artificial Intelligence* MOOC facilitated by Sebastian Thrun and Peter Norvig and secured a score of 92% on the course - http://www.ai-class.com

2010 *Digital Photography*, Continuing Education Programs, Lahore University of Management Sciences

2010 - 2014 Attended the following workshops organized by Centre for Learning and Teaching, Forman Christian College:
- Creative Teacher Talk
- Using Questions to Develop Critical Thinking
- Developing Rubrics
- Effective Principles of Educational Leadership
- Writing Across Curriculum

2009 *Course Design* and *Evaluating Student Learning* by Dr. Dee L. Fink, held at the faculty retreat of Forman Christian College, Lahore - Pakistan

ADVISING & MENTORING

2014 – 2019
- Mentored two undergraduate students of DeBoer lab.
- Regularly mentor and recruit potential graduate students for Purdue. My efforts have helped recruit 3 Ph.D. students for the School of Engineering Education.

- Regularly mentor junior Ph.D. students in my lab and in the department regarding what choices to make during their education and how to deal with challenges related to their graduate studies.

2010 - 2013 Adviser for undergraduate capstone projects at Forman Christian College.
Notable projects:
- 3D reconstruction from images
- Analyzing cricket video sequences

2009 - 2014 Designated faculty adviser for undergraduate students at FCC (30-45 advisees per year)

STUDENT COMMITTEES AND RESEARCH

Independent Studies

2021 Ethen Wert Undergraduate Student, Computer Science and Engineering, Ohio State University (*Developing Graphics to Visualize and Triangulate Multi-Modal Biometric Data to Understand Self-regulation of Students during Programming Tasks*)

2021 Sijia Luo Undergraduate Student, Computer Science and Engineering, Ohio State University (*Self-regulation of Students during Programming Tasks*)

2021 Smera Palanivel, Undergraduate Student, Computer Science and Engineering, Ohio State University (*Developing a Dashboard in Python for displaying Course Analytics*)

2021 Sarthak Awashthi, MS Student, Computer Science and Engineering, Ohio State University (*Introduction to Data Mining and Machine Learning*)

2020 Jeremy Grifski, MS Student, Computer Science and Engineering, Ohio State University (*Using a Mixed-Methods Approach to Validate the Achievement Emotions Questionnaire for Programming*)

Ph.D. Student Supervision

2021 Sarthak Awasthi

2021 Rakhi Batra

Master's Student Supervision

2021 Jeremy Grifski, MS Student, Computer Science and Engineering, Ohio State University (*Developing Graphics to Visualize and Triangulate Multi-Modal Biometric data*)

Undergraduate Thesis Committee

2020 Ada E. Barach, Computer Science and Engineering, Ohio State University (*Developing MCS1: A MATLAB Programming Concept Inventory for Assessing First-Year Engineering Courses*)

PROFESSIONAL SERVICE

REVIEWER FOR CONFERENCES, JOURNALS, AND GRANTS

Conferences: ACM SIGCSE, World Engineering Education Forum, IEEE Frontiers in Education, Research in Engineering Education Symposium, and American Society for Engineering Education annual conference.

Journals: IEEE Software, Elsevier's Computers and Education, Wiley's Journal of Engineering Education, IEEE Transactions on Education, and The International Review of Research in Open and Distributed Learning.

Grants: National Science Foundation Panel Reviewer, IUSE – EHR, Purdue Graduate Student Government (PGSG) sponsored travel and professional grants

ACADEMIC AND ADMINISTRATIVE

OSU Computer Science and Engineering: Member of these departmental committees:

- Diversity and Inclusion Coordinator and Faculty adviser for ACM-W OSU chapter – (2020 – present)
- Curriculum - (2019 – 2020)
- Wellness - (2019 – 2020)

OSU College of Engineering:

- Member of Women's Faculty Advisory Board to the Dean.

OSU Translational Data Analytics Institute (TDAI):

- Faculty Affiliate
- Started the Reading group "Bias in AI" for TDAI (https://tdai.osu.edu/book-group/). I facilitate the monthly meetings of the group.

Forman Christian College: Member of these departmental and university-level committees:

- Academic council
- Faculty board of studies for computer science
- Hiring search committee for the School of Business

OUTREACH

2020 - 2021	Acted as a judge for the year-long "TechnoFashion" workshop for middle school girls in collaboration with OHI/O, the ElectroScience lab at OSU, and CoolTechGirls (a non-profit organization).
2019 - 2020	Organized a year-long "TechnoFashion" workshop for middle school girls in collaboration with OHI/O, the ElectroScience lab at OSU, and CoolTechGirls (a non-profit organization).

OTHERS

- Social Media Coordinator for ACM SIGCSE (2020 -2023)
- Student volunteer at ACM SIGCSE technical symposium (2018 – 2019)
- Judge for the Student Undergraduate Research Forum symposium at Purdue University (2017)
- Graduate School global ambassador of Purdue University (2016 – 2017)
- Public relations chair for ASEE student chapter at Purdue University (2015 – 2016)
- Adviser of the Forman photography society (2012 – 2014)
- Judge for the All Pakistan Software Competition SOFTEC (2012).