Kazi Zakia Sultana

CONTACT INFORMATION	1 Normal Ave Montclair, New Jersey 07043	*Voice:* +19736554000 *Email:* sultanak@montclair.edu *Web:* https://kazizakiasultana.com/

INTERESTS Software Security, Software Quality, Empirical Software Engineering, Software Mining, Data Mining, Text Mining, Machine Learning, Graph Algorithms.

EDUCATION

Ph.D., Computer Science   **(August 2018)**
Mississippi State University, MS, USA
Lab: Empirical Software Engineering
Advisor: Byron Williams, Ph.D.

M.S., Computer Science   **(August 2011)**
Wayne State University, Detroit, MI, USA
Lab: Integration Informatics Laboratory (integra)
Advisor: Hasan Jamil, Ph.D.

B.Sc. (Engineering), Computer Science & Engineering   **(November 2006)**
Bangladesh University of Engineering & Technology (BUET), Dhaka, Bangladesh
Thesis: Vertex Orderings and Their Applications
Advisor: Md. Saidur Rahman, Ph.D.

PROFESSIONAL
EXPERIENCE

Assistant Professor   **(September, 2018 − Present)**
Montclair State University, New Jersey, USA

Graduate Research Assistant   **(August, 2016 − June, 2018)**
Mississippi State University, Mississippi, USA

Graduate Teaching Assistant   **(August, 2014 − July, 2016)**
Department of Computer Science and Engineering, Mississippi State University, Mississippi, USA

Assistant Professor   **(November, 2011 − July, 2014)**
Department of Computer Science and Engineering, Chittagong University of Engineering and Technology (CUET), Chittagong, Bangladesh

Lecturer   **(January, 2011 − November, 2011)**
School of Science, Engineering and Technology, East Delta University, Chittagong, Bangladesh

Graduate Student Assistant   **(January, 2008 − September, 2010)**
Testing and Evaluation Center, Wayne State University, Detroit, MI, USA
Job Description: Maintaining a fully integrated software application that provides testing and evaluation services to students, instructors, and professors.

Software Engineer   **(December 2006–December 2007)**
Therap Services LLC., Dhaka, Bangladesh
Job Description: To develop a suite of automated Individual, Staff, and Billing support applications to support the needs of the developmental disabilities community (http://www.therapservices.net/).

AWARDS/HONORS

1. **Best Paper Award** for "Mitigating Remote Code Execution Vulnerabilities: A Study on Tomcat and Android Security Updates" at IEMTRONICS 2021

2. **Best Paper Award** for "Examining the Relationship of Code and Architectural Smells with Software Vulnerabilities" at APSEC 2020

3. **Best Paper Award (Second place)** for "The Relationship between Traceable Code Patterns and Code Smells" at SEKE 2017

4. Computing Research Association-Women (CRA-W) Scholarship for Grad Cohort Workshop, 2016 and 2017

5. Grace Hopper Celebration of Women Scholarship, 2016

6. Scholarship for **Best Female Graduate Student** 2016 (nominated by Dept. of CSE, Mississippi State University)

7. BUET Academic Merit Scholarship, for eight semesters

8. 7th in combined merit list, and 3rd in female merit list, 2000

PUBLICATIONS

Journal Papers

[J1] *A Software Vulnerability Prediction Model using Traceable Code Patterns and Software Metrics*, **Kazi Zakia Sultana**, Charles B. Boyd, Byron J. Williams, SN Journal (Under Review).

[J2] *Security Metrics at Source Code Level - A Systematic Mapping Study*, Zadia Codabux, **Kazi Zakia Sultana**, Journal of Software: Evolution and Process (Under Review).

[J3] *Using Software Metrics for Predicting Vulnerable Classes in Java and Python Software*, **Kazi Zakia Sultana**, Vaibhav Anu, Tai-Yin Chong, Information Security Journal (Under Review).

[J4] *Using Software Metrics for Predicting Vulnerable Classes and Methods in Java Projects: A Machine Learning Approach*, **Kazi Zakia Sultana**, Vaibhav Anu, Tai-Yin Chong, Journal of Software: Evolution and Process, 2020.

[J5] *A Study Examining Relationships between Micro Patterns and Security Vulnerabilities*, **Kazi Zakia Sultana**, Byron J. Williams, Tanmay Bhowmik, Software Quality Journal, Volume 27, Issue 1, pp. 5-41, 2019.

[J6] *The Relationship between Code Smells and Traceable Patterns - Are they measuring the same thing?*, Zadia Codabux, **Kazi Zakia Sultana**, Byron J. Williams, International Journal of Software Engineering and Knowledge Engineering, Volume 27, Number 9-10, pp. 1529-1547, 2017.

[**J7**] *Assessing Software Defects Using Nano-Patterns Detection*, Ajay K. Deo, Zadia Codabux, **Kazi Zakia Sultana**, Byron J. Williams, International Journal of Computers and Their Applications (Special issue on Software Engineering using Data Engineering approaches), 2016.

[**J8**] *Protein disulfide engineering*, Alan A Dombkowski, **Kazi Zakia Sultana**, Douglas B Craig, FEBS letters 11/2013; 588(2). DOI:10.1016/j.febslet.2013.11.024.

[**J9**] *In silico Analysis of combinatorial microRnA Activity Reveals Target Genes and pathways Associated with Breast cancer Metastasis*, Alan A. Dombkowski, **Kazi Zakia Sultana**, Douglas B. Craig, Hasan Jamil, Cancer Informatics 2011; 10:13-29, doi:10.4137/CIN.S6631.

[**J10**] *Querying KEGG Pathways in Logic*, **Kazi Zakia Sultana**, Anupam Bhattacharjee, Hasan Jamil, International Journal of Data Mining and Bioinformatics (IJDMB), Vol. 9 Issue 1, pp. 1-21, November 2014.

Conference Papers

[**C1**] *Identifying Evolution of Software Metrics by Analyzing Vulnerability History in Open Source Projects*, Erik Maza, **Kazi Zakia Sultana**, 2022 National Symposium for NSF REU Research in Data Science, Systems, and Security (REU 2022 Symposium), December 6-9, 2022, Portland, Oregon, USA.

[**C2**] *Mining Common Programming Mistakes Leading to Information Disclosure: A Preliminary Study*, Gowri Sundarapandi, Raiyan Hossain, Chandana Jasrai, **Kazi Zakia Sultana**, Zadia Codabux, IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2022-ERA Track), March 15-18, 2022, Virtual.

[**C3**] *Investigating the Changes in Software Metrics after Vulnerability is Fixed*, Andy Zhou, **Kazi Zakia Sultana**, Bharath K. Samanthula, 2021 National Symposium for NSF REU Research in Data Science, Systems, and Security (REU 2021 Symposium) along with IEEE BigData 2021, December 15-18, 2021, Virtual.

[**C4**] *An Intelligent Tutoring System for Secure Coding via Mining Learner-friendly Security Patterns*, Sayem Mohammad Imtiaz, **Kazi Zakia Sultana**, Aparna S. Varde, 7th Special Session on Intelligent Data Mining along with IEEE BigData 2021, December 15-18, 2021, Virtual.

[**C5**] *Mitigating Remote Code Execution Vulnerabilities: A Study on Tomcat and Android Security Updates*, Stephen Bier, Brian Fajardo, Obinna Ezeadum, German Guzman, **Kazi Zakia Sultana**, Vaibhav Anu, 2021 IEEE International IOT, Electronics and Mechatronics Conference (IEMTRONICS), Toronto, Canada, April 21-24, 2021.

[**C6**] *SecureChange: An Automated Framework to Guide Programmers in Fixing Vulnerability*, Sayem Mohammad Imtiaz, **Kazi Zakia Sultana**, Tanmay Bhowmik, 32nd International Conference on Software Engineering Knowledge Engineering (SEKE 2020), KSIR Virtual Conference Cener, Pittsburgh, USA, 2020.

[**C7**] *Examining the Relationship of Code and Architectural Smells with Software Vulnerabilities*, **Kazi Zakia Sultana**, Zadia Codabux, Byron J. Williams, the 27th Asia-Pacific Software Engineering Conference (APSEC 2020), Singapore, December 1-4, 2020.

[**C8**] *Dev-HET: A Human Error Based Approach to Understanding Programmer-Induced Software Vulnerabilities*, Vaibhav Anu*, **Kazi Zakia Sultana***, Bharath Kumar Samanthula, 31st International Symposium on Software Reliability Engineering (ISSRE 2020) [* Both co-authors contributed equally].

[**C9**] *Diversity and Inclusion in Open Source Software(OSS) Projects: Where Do We Stand?*, Amiangshu Bosu, **Kazi Zakia Sultana**, ACM/IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM '19), Brazil, 2019.

[**C10**] *A Proposed Approach to Build an Automated Software Security Assessment Framework using Mined Patterns and Metrics*, **Kazi Zakia Sultana**, Tai-Yin Chong, 22nd IEEE International Conference on Computational Science and Engineering (IEEE CSE 2019), August 1-3, 2019, New York, USA.

[**C11**] *Using Software Metrics for Predicting Vulnerable Code-Components: A Study on Java and Python Open Source Projects*, Tai-Yin Chong, Vaibhav Anu, **Kazi Zakia Sultana**, the 22nd IEEE International Conference on Computational Science and Engineering (IEEE CSE 2019), August 1-3, 2019, New York, USA.

[**C12**] *Expressions of Sentiments during Code Reviews: Male vs. Female*, R. Paul, Amiangshu Bosu, **Kazi Zakia Sultana**, 26th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER '19), 2019, pp. 26-37, Hangzhou, China.

[**C13**] *A Comparison of Nano-patterns Vs. Software Metrics in Vulnerability Prediction*, **Kazi Zakia Sultana**, Byron J. Williams, Amiangshu Bosu, 25th Asia-Pacific Software Engineering Conference (APSEC), December 4-7, 2018, Nara, Japan.

[**C14**] *Correlation Analysis among Java Nano-patterns and Software Vulnerabilities*, **Kazi Zakia Sultana**, Ajay Deo, Byron J. Williams, 18th IEEE International Symposium on High Assurance Systems Engineering, HASE 2017, Jan 12-14, 2017, Singapore.

[**C15**] *The Relationship between Traceable Code Patterns and Code Smells*, Zadia Codabux, **Kazi Zakia Sultana**, Byron J. Williams, 29th International Conference on Software Engineering and Knowledge Engineering, SEKE 2017, July 5-7, 2017, Pittsburgh, USA.

[**C16**] *A Preliminary Study Examining Relationships Between Nano-Patterns and Software Security Vulnerabilities*, **Kazi Zakia Sultana**, Ajay Deo, Byron J. Williams, 40th IEEE Computer Society International Conference on Computers, Software & Applications, COMPSAC 2016, June 10-14, 2016, Atlanta, Georgia, USA.

[**C17**] *Stairway Detection Based on Extraction of Longest Increasing Subsequence of Horizontal Edges and Vanishing Point*, Kaushik. Deb, S. M. T. Islam, **Kazi Zakia Sultana**, Kang-Hyun Jo, In: Contemporary Challenges and Solutions in Applied Artificial Intelligence. Part of the Studies in Computational Intelligence book series (SCI, volume 489), Springer, Heidelberg, 2013.

[**C18**] *A Comprehensive Tool for Text Categorization and Text Summarization in Bioinformatics*, Md. Mustofa Kamal, **Kazi Zakia Sultana**, 15th International Conference on Computer & Information Technology (ICCIT), 2012, Bangladesh.

[**C19**] *Combinatorial microRNA activity associated with breast cancer metastasis is revealed through computational analysis of target genes and pathways*, Alan A. Dombkowski, **Kazi Zakia Sultana**, Hasan Jamil, Douglas Craig, American Association for Cancer Research 101st Annual Meeting, 2010, Washington DC, USA (abstract only).

[**C20**] *IsoKEGG: A Logic based System for Querying Biological Pathways in KEGG*, **Kazi Zakia Sultana**, Anupam Bhattacharjee, Hasan Jamil, IEEE International Conference on Bioinformatics & Biomedicine, BIBM'10, Hong Kong.

[**C21**] *A Model for Contextual Cooperative Query Answering in E-Commerce Applications*, **Kazi Zakia Sultana**, Anupam Bhattacharjee, Mohammad Shafkat Amin, Hasan Jamil, 8th International Conference on Flexible Query Answering Systems, FQAS'09, Roskilde, Denmark.

[**C22**] *On Resource Bipartitioning Problem*, Zalia Shams, Shahina Ferdous, **Kazi Zakia Sultana**, Md. Saidur Rahman, International Conference on Electrical & Computer Engineering ICECE, 2006, Dhaka, Bangladesh.

[**C23**] *New Constraints on Generation of Uniform Random Samples from Evolutionary Trees*, Anupam Bhattacharjee, Zalia Shams, **Kazi Zakia Sultana**, IEEE Canadian Conference on Electrical and Computer Engineering CCECE, 2006, Ottawa, Canada.

[**C24**] *Dynamic and Parallel Approaches to Optimal Evolutionary Tree Construction*, Anupam Bhattacharjee, **Kazi Zakia Sultana**, Zalia Shams, IEEE Canadian Conference on Electrical and Computer Engineering CCECE, 2006, Ottawa, Canada.

[**C25**] *Dynamic and Parallel Construction of Evolutionary Tree using Clustering*, Tanjil Ahmed, A. K. M. Saifun Nabi, Zalia Shams, **Kazi Zakia Sultana**, Anupam Bhattacharjee, International Conference on Computer and Information Technology ICCIT, 2006, Dhaka, Bangladesh.

[**C26**] *A Greedy Genetic Algorithm for Minimal Cost of Convergence of Gene Sequences*, Anupam Bhattacharjee, **Kazi Zakia Sultana**, Zalia Shams, Tanjil Ahmed, A. K. M. Saifun Nabi, International Conference on Computer and Information Technology ICCIT, 2006, Dhaka, Bangladesh.

Workshop Papers

[**W1**] Preliminary Study on Common Programming Mistakes that Lead to Buffer Overflow Vulnerability, Giovanni George, Jeremiah Kotey, Megan Ripley, **Kazi Zakia Sultana**, Zadia Codabux, The 15th IEEE International Workshop on Security, Trust Privacy for Software Applications (STPSA 2021), July, 2021.

[**W2**] *Evaluating Micro Patterns and Software Metrics in Vulnerability Prediction*, **Kazi Zakia Sultana**, Byron J. Williams, The 6th International Workshop on Software Mining, 32nd IEEE/ACM International Conference on Automated Software Engineering, ASE 2017, Urbana-Champaign, Illinois, USA.

[**W3**] *EpICS: A System for Genome-wide Epistasis and Genetic Variation Analysis using Protein-Protein Interactions*, **Kazi Zakia Sultana**, Anupam Bhattacharjee, Hasan Jamil, GTBN, IEEE BIBM'09, Washington D.C., USA.

Doctoral Symposium

[**D1**] *Towards a Software Vulnerability Prediction Model using Traceable Code Patterns and Software Metrics*, **Kazi Zakia Sultana**, Doctoral Symposium, 32nd IEEE/ACM International Conference on Automated Software Engineering, ASE 2017, Urbana-Champaign, Illinois, USA.

Poster Presentation

[**P1**] *An automated testing model for security vulnerabilities in software development*, **Kazi Zakia Sultana**, Byron J. Williams, Women in STEM Experience (WISE), 2016, Tuscaloosa, Alabama, USA.

RESEARCH
GRANTS

1. CS for All: Expanding Professional Learning Competitive (22-CZ06-G07) **Co-PI**.

2. CS for All: Implementing the 2020 Computer Science Student Learning Standards Competitive (22-CZ06-G07) **Senior Personnel**.

3. REU SITE: Enhancing Undergraduate Research Experiences in Cybersecurity and Privacy-Enhanced Technologies, NSF, **Senior Personnel**.

4. SaTC: CORE: Small: A Proposal on Building Learning-friendly Software Security Patterns and Rules for Vulnerability Education, NSF, $451,288, PI: Dr. Kazi Zakia Sultana, Co-PI: Dr. Aparna Varde (Submitted but not Funded).

5. Collaborative Research: Improving the Participation of Women in Free, Libre and Open Source Software (FLOSS) Projects, NSF, $209,934, PI. Kazi Zakia Sultana and Amiangshu Bosu (Submitted but not Funded).

TEACHING
EXPERIENCE

Assistant Professor, Dept. of Computer Science, Montclair State University, USA.

- *Software Engineering*: The course includes software process models, software testing and quality assurance, software maintenance, project management.
- *IT Project Management*: The course includes IT Project schedule/cost/scope/risks /stakeholders management processes, Project budget, Used tools, communications.
- *Computational Concepts*: The course includes the fundamentals of Python Programming.
- *Principles of Secure Programming*: This is a graduate course. The course includes the fundamentals of secure software development.

Graduate Teaching Assistant, Dept. of Computer Science and Engineering, Mississippi State University, USA.

- *Intro Computer Programming*: It is a course including three hours lecture and laboratory every week. I taught the introductory problem solving methods and theoretical and practical aspects of computer programming (Python).

Assistant Professor, Dept. of Computer Science and Engineering, Chittagong University of Engineering and Technology (CUET), Chittagong, Bangladesh.

- *System Analysis and Design*: Taught all phases of software development life cycle and different methods for software project management. It includes professional internships for the students to get hands-on experience on software development.
- *Algorithms*: Taught well-known computer algorithms, their implementation and cost analysis.

Lecturer, School of Science, Engineering and Technology, East Delta University, Chittagong, Bangladesh.

- *Computer Fundamental*: Taught the fundamental concepts of computer hardware and software.

KEY PROJECTS

Online Student Evaluation System: The system enables the students of Wayne State University to evaluate their course instructors at the end of the semester. It is available at http://www.set.wayne.edu/web/login.htm

EpICS: A tool to prioritize genome-wide epistasis study in human disease using genetic variations: EpICS (Epistasis by InDel, CNV, and SNP) is a tool that explores the epistatic effects of genes by analyzing the protein-protein interactions within the regions of different types of genetic variations.

miR-AT, An miRNA Target database Analysis Tool: miR-AT is a computational tool for the identification of all transcripts that are targets of a list of input miRNAs. Targets are identified using the Sanger miRBase Targets database, and the output provides a list of all computationally predicted targets, the number of sites in each transcript and the cumulative score. miR-AT was developed in the lab of Dr. Alan Dombkowski (http://cptweb.cpt.wayne.edu/miR-AT/search.jsp).

TRAINING

Teaching Assistant Training on Cybersecurity (2017)
Training program for the TAs by **Codepath** in partnership with **Facebook** on the basics of common vulnerabilities and cyber attacks, hands-on practice in both exploitation techniques and strategies for protecting applications.

SERVICES

Faculty Representative
Academic Alliance (AA) of the National Center for Women & Information Technology (Web: https://www.ncwit.org/alliances/aa).
LSAMP Committee Member at Montclair State University
Reviewer
IEEE Transactions on Reliability
Software Quality Journal
International Journal of Software Eng. & Knowledge Eng. (IJSEKE)
Journal of Systems and Software
Applied Soft Computing
Array
IEEE Access

Sub-Reviewer
The 28th ACM International Conference on Information and Knowledge Management (CIKM 2019)
IEEE International Conference on Data Mining (ICDM 2019 and ICDM 2020)
The 28th International IEEE Conference on Tools with Artificial Intelligence (IEEE ICTAI 2016)
The 33rd International IEEE Conference on Tools with Artificial Intelligence (IEEE ICTAI 2021)

Mentor (2017)
Bangladesh Women In Computer Science Group

Student Representative in Mississippi State University (2017)
Appointed as a representative for arranging Facebook and Codepath organized on-campus programs including seminars, interviews, talks and presentations in Mississippi State University.

Summer Camp Counselor (2016)

Mississippi State University developed a summer camp program called Bulldog Bytes in Summer 2016 for middle and high school students. The program was designed to teach students how cyber world can be explored safely through a well thought curriculum including robotics, programming and the liberal arts. I worked as a leader of this program and was responsible for coordinating all the counselors regarding their lesson plans and program design.

Technical Committee Member

- International Workshop on Mining Software Repositories Applications for Privacy and Security (MSR4P&S 2022)

- International Conference on Software Engineering and Knowledge Engineering (SEKE 2021 and SEKE 2022)

- 15th IEEE International Workshop on Security, Trust Privacy for Software Applications (STPSA 2021)

- 6th IEEE International Women in Engineering Conference on Electrical and Computer Engineering (WIECON-ECE 2020)

- IEEE Region 10 Symposium (TENSYMP 2020)

- 2nd International Workshop on Self-Protecting Systems (https://sites.google.com/view/sps20/), held in conjunction with 1st International Conference on Autonomic Computing and Self-Organizing Systems - ACSOS 2020

- 1st International Workshop on Self-Protecting Systems (https://sites.google.com/view/sps19/), co-located with the IEEE International Conference on Autonomic Computing (ICAC 2019, http://icac2019.cs.umu.se/)

- National Conference on Intelligent Computing and Information Technology (NCI-CIT 2013)

MEMBERSHIP

- Member, Association for Computing Machinery (ACM)
- Member, ACM SIGSOFT
- Member, ACM-W

REFERENCE   Available upon request