

**LOPAMUDRA ROYCHOUDHURI****Curriculum Vitae**

Associate Professor  
Department of Computer Science,  
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**PERSONAL PROFILE**

Faculty and researcher with twenty years of experience in teaching a wide spectrum of computer science undergraduate and graduate courses, with a current focus on networking and cybersecurity. Leadership role in cybersecurity curriculum development. Highly competent in course design and online/hybrid teaching at a Hispanic serving institution (HSI), founded on student-centered teaching and learning, with strong experience in teaching international students online. Active in scholarship of teaching and learning. Mentored a number of undergraduate research projects and capstone projects. Member of several high-impact university-wide committees. Author and co-author of four peer-reviewed journal and eleven conference publications. Collaborator in projects with Goodfellow Air Force Base and Texas Tech University. Presented at many national and international conferences.

Prior to academia, fourteen years of industry experience in system design, data distribution, database administration, security, and fault tolerance. Led and participated in the delivery of many highly visible projects for Fortune 500 customers. Certified Cisco, Oracle and Sybase Professional.

**ACADEMIC APPOINTMENTS (Selected)****Associate Professor, Computer Science, Midwestern State University, Wichita Falls, TX,  
08/22-Present**

- Responsibilities include curriculum development, teaching several undergraduate and graduate classes on security, programming, database management and computer architecture, conducting undergraduate research, and serving the graduate program evaluation committee.

**Associate Professor, Computer Science, Angelo State University, San Angelo, TX,  
09/18-08/22****Assistant Professor, Computer Science, Angelo State University, 09/12-08/18**

- Responsibilities included curriculum development, online/hybrid/face-to-face teaching a wide spectrum of classes that span cybersecurity and networking, computer organization and programming. Active in mentoring undergraduate research. Experience in teaching a robust body of online students.
- Leadership role in cybersecurity curriculum development.
  - Responsible for designing a minor in Cybersecurity Systems (2021) and a highly popular certificate of Cybersecurity Technologies (2018).
  - Collaborator with Goodfellow Air Force Base, San Angelo, in Computer Science program development at Angelo State catered towards military personnel. Key role in addition of Computer Science to the Bachelor of Applied Arts and Sciences (B.A.A.S) degree offered by Angelo State (2020). Organizer and instructor of summer cybersecurity workshops for military personnel (2017-2019).

## INDUSTRY POSITIONS (Selected)

### System Administrator, CNA Insurance, Chicago, IL , 01/98-02/01

- Administrator of a large (~200 Gigabyte) claim administration system, providing 24x7 support and performance monitoring of the Oracle database and web servers. Designed and implemented solutions for successful Y2K migrations.

### Senior Consultant, Professional Services, Sybase Inc., Chicago, IL , 09/95-01/98

- Led and participated in system design, programming, performance tuning, database administration, data distribution and replication solutions for various Fortune 500 clients.

## EDUCATION

- Ph.D., Computer Science, DePaul University, Chicago. Dissertation: *Proactive Rate and Error Control for Packet Multimedia Transmissions based on Loss Prediction*. Degree received: Fall 2008. Advisor: Dr. Ehab Al-Shaer.
- Master of Technology, Computer Science, Indian Statistical Institute, Calcutta, India, July 1988.
- Master of Science, Applied Mathematics, University of Calcutta, India, July 1986. Secured university-wide top position.
- Bachelor of Science, Mathematics, Presidency College, Calcutta, India, July 1982. Secured university-wide top position.

## RESEARCH PUBLICATIONS

### SoTL (Scholarship of Teaching and Learning - Selected)

- Presenter, "Teaching Ethics in Computing to Digital Natives – an Experiment", 41<sup>st</sup> Original Lilly Conference on College Teaching, Miami University, Oxford, OH, Nov 17-19, 2022.
- Lopamudra Roychoudhuri, "Towards an Engaging Hands-on Environment for a Beginning Networking and Security Undergraduate Class", JSCI (Journal of Systemics, Cybernetics and Informatics), September 2018.
- Lopamudra Roychoudhuri, "Towards an Engaging Hands-on Environment for a Beginning Networking and Security Undergraduate Class", paper published and presented at IMSCI-EISTA 2018 (The 12th International Multi-Conference on Society, Cybernetics and Informatics - Education and Information Systems, Technologies and Applications), Orlando, Florida, July 8 - 11, 2018.
- Presenter, "Learning Networking and Security in an Engaging Hands-on Environment", Lilly Conference, Austin, TX, January 4-8, 2018.
- Presenter, "Flipping a Highly Interactive Class—A Goal-Based Approach That Works", 35<sup>th</sup> Original Lilly Conference on College Teaching, Miami University, Oxford, OH, Nov 19-22, 2015.

### Journal publications (Selected)

- Lopamudra Roychoudhuri, "Towards an Engaging Hands-on Environment for a Beginning Networking and Security Undergraduate Class", JSCI (Journal of Systemics, Cybernetics and Informatics), September 2018.
- Lopamudra Roychoudhuri and Ehab Al-Shaer, "Autonomic QoS Optimization of Real-time Internet Audio using Loss Prediction and Stochastic Control", *International Journal of Adaptive, Resilient and Autonomic Systems (IJARAS)*, July-September, 2010.
- Lopamudra Roychoudhuri, Ehab Al-Shaer and Gregory B. Brewster, "On the Impact of Loss and Delay Variation on Internet Packet Audio Transmission", *Journal of Computer Communication (JComCom)*, Volume 29, Issue 10, June 2006.

- Lopamudra Roychoudhuri and Ehab Al-Shaer, "Real-Time Packet Loss Prediction based on End-to-end Delay Variation", *IEEE Transactions on Network and Service Management (TNSM)*, Volume 2, Number 1, November 2005.

### Conference publications (selected)

- Lopamudra Roychoudhuri, "Towards an Engaging Hands-on Environment for a Beginning Networking and Security Undergraduate Class", paper published and presented at IMSCI-EISTA 2018 (The 12th International Multi-Conference on Society, Cybernetics and Informatics - Education and Information Systems, Technologies and Applications), Orlando, Florida, July 8 - 11, 2018.
- Lopamudra Roychoudhuri and Ehab Al-Shaer, "Autonomic QoS Optimization of Real-time Internet Audio using Loss Prediction and Stochastic Control", *IFIP/IEEE Network Operations and Management Symposium (NOMS)*, Salvador, Brazil, April 2008.
- Lopamudra Roychoudhuri, Ehab Al-Shaer and Raffaella Settini, "Statistical Measurement Approach for On-line Audio Quality Assessment", *PAM (Passive and Active Measurement) Conference 2006*, March 30-31, 2006.
- Lopamudra Roychoudhuri and Ehab Al-Shaer, "Real-time Audio Quality Evaluation for Adaptive Multimedia Protocols", *IEEE MMNS (Management of Multimedia Networks and Services) 2005*, October 24-26, 2005.
- Lopamudra Roychoudhuri and Ehab Al-Shaer, "On Loss Prediction for Real-time Packet Audio", Poster Paper, *IEEE INFOCOM 2005*, March 14-17, 2005.
- Lopamudra Roychoudhuri and Ehab Al-Shaer, "Adaptive Rate Control for Real-time Packet Audio Based on Loss Prediction", *IEEE Globecom 2004*, November 30-December 2, 2004.
- Lopamudra Roychoudhuri and Ehab Al-Shaer, "Real Time Analysis of Delay Variation for Packet Loss Prediction", *IEEE MMNS (Management of Multimedia Networks and Services) 2004*, October 3-6, 2004. (Won Outstanding Student Paper Award).
- Lopamudra Roychoudhuri, Ehab Al-Shaer, "On Packet Loss Prediction for Real-time Packet Audio", *DePaul CTI PhD Symposium*, November 8, 2003.
- Lopamudra Roychoudhuri, Ehab Al-Shaer, Hazem Hamed, Gregory B. Brewster, "Audio Transmission over the Internet: Experiments and Observations", *IEEE ICC 2003*, May 11-15, 2003.
- Lopamudra Roychoudhuri, Ehab Al-Shaer, Hazem Hamed, Gregory B. Brewster, "On Studying the Impact of the Internet Delays on Audio Transmission" *IEEE IPOM 2002*, October 29-31, 2002.
- Jacob Furst et al, "Database Design for American Sign Language", *ISCA 15th International Conference on Computers and Their Applications (CATA-2000)*. 427-430.

### RESEARCH PRESENTATIONS (Selected)

- Edgar Zapata and Lopamudra Roychoudhuri, "On Analyzing the Accuracy of Financial Indicators in Predicting Stock Patterns Using Data Mining Tools", 20th Undergraduate Research and Creative Activities Forum, Midwestern State University, April 20, 2023.
- "Autonomic QoS Optimization of Real-time Internet Audio using Loss Prediction and Stochastic Control", Technical Session, *Network Operations and Management (NOMS)*, Salvador, Brazil, April 8, 2008.
- "Statistical Measurement Approach for On-line Audio Quality Assessment", Technical Session, *Passive and Active Measurement Conference*, Adelaide, Australia, March 31, 2006.
- "On Loss Prediction for Real-time Packet Audio", Poster, *IEEE Infocom*, Miami, FL, USA, March 15, 2005.

- "Adaptive Rate Control for Real-time Packet Audio Based on Loss Prediction", Technical Session, *IEEE Globecom, 2004*, Dallas, TX, USA, November 30, 2004.
- "Real Time Analysis of Delay Variation for Packet Loss Prediction", IEEE MMNS (Management of Multimedia Networks and Services) 2004, October 3-6, 2004. (Won Outstanding Student Paper Award).
- "Legacy Wrapping with Replication: An Effective and Reliable Interfacing Architecture", Technical Sessions, *Sybase European and North American Users' Conferences*, Barcelona, Spain, October 1996, Orlando, FL, April 1997.

## GRANTS AND AWARDS

- Recipient – Faculty Mentored Research Grants for yearlong undergraduate research projects at Angelo State University, 2014-2015 and 2018-2019.
- Recipient - Certificate of Appreciation from the 344th Military Intelligence Battalion, Goodfellow Air Force Base, "for exceptional support to the 344th Military Intelligence Battalion during the Computer and Network Security Workshop presented at Angelo State University.", July 2019.
- Recipient - two internal grants at Angelo State University – (i) a Faculty Research Enhancement grant in FY 2013 worth \$11,000 to set up a Networking and Security lab, (ii) a Faculty Research Enhancement grant in FY 2014 worth \$10,000 for research on Internet measurement using PlanetLab, a global research testbed.
- Outstanding Student Paper Award for the paper "Real Time Analysis of Delay Variation for Packet Loss Prediction", *IEEE MMNS (Management of Multimedia Networks and Services) 2004*.

## RESEARCH INTERESTS AND EXPERIENCE

**Current Research Interests** are in the areas of Scholarship of Teaching and Learning (SoTL), Offensive Security, Internet Measurements, Distributed Systems and Adaptive Systems.

**Scholarship of Teaching and Learning** (2017-present). Recent research is on design, implementation, and evaluation of active learner-centered environments for computer networking and security classes.

**Offensive Security evasion and detection techniques.** Mentor of several recent undergraduate research projects.

- *Anomaly detection in Real-time Streams using Data Mining (2018-2019)* – conducted a yearlong project under a Faculty Mentored Research Grant from Angelo State University in 2018-2019. The project involved the following steps: (i) creating Denial-of-Service datasets using current state-of-the-art real-world Denial-of-Service malware in virtual and real network environments, and (ii) applying Machine Learning techniques and tools to analyze the attack data and identifying patterns and signatures.
- *UDPNetDelay: Design and Implementation of a UDP Timing Covert Channel System (2019)* –A semester-long undergraduate honors research project was in network steganography, that is, the process of steganographic encoding data into network packets. Experiments were conducted on Timing Covert Channel, a communication channel in which the timing of communication is modulated to convey information. In the second part of the project, GapScan, a steganalysis tool, was

designed and developed to detect possible steganographic messages hidden in a network traffic using timing channel.

**Distributed Systems.** Adviser of a semester-long undergraduate honors research project.

- *Application of a Blockchain Architecture to a Digital License Trading System (2018)* –The project explored application of a blockchain to a digital trading system as a de-centralized peer-to-peer environment. The tasks included design and deployment of communicating peer systems on virtual machines using socket programming, and implementation of a blockchain in terms of transactions and consensus mechanisms that fit the purpose of a digital license trading system.

**Internet Measurements.** Mentor of the following undergraduate research project.

- *On Delay Variation for Internet Multimedia (2014-2015)* - conducted a yearlong project under a Faculty Mentored Research Grant from Angelo State University, 2014-2015. The research used sites, both US and international from PlanetLab, a global research network, and investigated the variation of delay that exists on the Internet today that would adversely affect multimedia communication. The student won best poster award at Undergraduate Research Expo in Computer Science, UT Dallas in 2015.

**Doctoral Research,** DePaul University (2000-2008). Projects included:

- *End-to-end Adaptive Quality Control Framework (2005-2008)* - A proactive error and rate control framework based on *packet loss prediction* and *on-line multimedia quality assessment* that achieves an optimal quality using multi-bitrate transmission and Forward Error Correction redundancy. The framework is applicable to IP multimedia applications, such as VoIP and emerging IPTV.
- *Packet Loss Predictor (2004-2005)* - A probabilistic framework to predict packet loss and congestion, based on evidences of one-way delay and inter-packet gap variation and trends.
- *Audio Genome (2002-2003)* - A passive statistical measurement framework for on-line audio quality assessment for a multi-codec transmission.
- *Audio transmission experiment over the Internet (2000-2001)* - A large-scale audio transmission experiment over the Internet for a 12-month period in order to evaluate the effects of delay variation, packet loss rate, type of encoder, and the correlation of such parameters on IP audio transmission.
- *American Sign Language Project (2000)* - An automated synthesizer for ASL that allows the deaf to participate in the exchanges among a hearing audience in classrooms, meetings, and other venues. Areas covered: computer graphics, data storage and retrieval, and language processing.

## COLLABORATION ACTIVITIES

- Participated at multiple collaborative projects with Texas Tech University, Lubbock, TX.
  - Co-PI, “Building a Secure and Resilient Nation through National Preparedness Education”, a joint grant proposal submitted by Texas Tech University, University of Illinois at Urbana-Champaign, Angelo State University and Group NIRE to DHS/FEMA Notice of Funding Opportunity, FY 2017, Homeland Security National Training Program, July 2017.
  - Attendee and presenter, ‘Red Teaming the Microgrid – SMART Center Workshop’, GLEAMM (Global Laboratory for Energy Asset Management and Manufacturing), Texas Tech University, June 2017.
  - Attendee- Workshop on Digital Forensics for Faculty, Computer Science Department, Texas Tech University, Lubbock, TX, May 30th – June 1st, 2018.
  - Attendee- Summer Cyber Security Workshop, Computer Science Department, Texas Tech University, July 14-18, 2014.

- PI of NSF grant proposal in collaboration with the department of Security Studies and Criminal Justice, Angelo State University.
  - Lopamudra Roychoudhuri (PI), Rob LeGrand, R. Mark Pullin and Susan Williams, “Certificate in Computer and Network Security: An Interdisciplinary Undergraduate Program”, submitted to NSF solicitation of CyberCorps(R) Scholarship for Service (SFS) Defending America's Cyberspace, Capacity track, Program Solicitation 15-584, December 2015 and December 2016.

#### **ACADEMIC SERVICES AND PROFESSIONAL ACTIVITIES**

- Article Editor, SAGE Open Publications (2019-present).
- Member, University Assessment Committee, Angelo State University (2021-2022).
- Member, Faculty Research Enhancement Program Committee, Angelo State University (2016-2021).
- Member, ACM (Association of Computing Machinery) (2020-present).
- Faculty Adviser, ACM Student Chapter at Midwestern State University (2023).
- Faculty Adviser, ACM Student Chapter at Angelo State University (2020-2022).
- Member, Graduate Program Evaluation Committee, Computer Science department, Midwestern State University (2023).
- Member, Faculty Senate, Angelo State University (2015-2021).
- Chair, Bylaws Committee, Faculty Senate, Angelo State University (2015-2018).
- Member, Academic Excellence Committee, Angelo State University (2018).
- Member, Curriculum Committee, College of Science and Engineering, Angelo State University (2016-2018).
- Member, Curriculum Committee, College of Arts and Sciences, Angelo State University (2015-2016).
- Member, University Disciplinary Committee, Angelo State University (2015-2016).
- Peer reviewer of many scholarly articles. A selected list of reviews:
  - *Conferences*: International Multi-Conference on Society, Cybernetics, and Informatics: (IMSCI) (2018 – present).
  - *Magazines*: IEEE Communications, May 2012.
  - *Journals*: Journal of Computer Communications (JComCom) (2008).
  - *Conferences*: NOSSDAV 2007, ICNP 2007, MMNS 2007, INFOCOM 2008, NOMS 2008.