

Dr. Rishabh Das

CRITICAL INFRASTRUCTURE SECURITY RESEARCHER · SECURITY ARCHITECT · SECURITY PRODUCT DEVELOPER

8864 United Lane, Athens, OH-45701 USA

☎ (+1) 256-658-0887 | ✉ das.rishabh92@gmail.com | 🌐 rishabhdascyber | 📧 Rishabh Das

"I protect critical infrastructure from cyber-attacks"

Summary

Dr. Rishabh Das is an Assistant Professor at the Scripps College of Communication, Ohio University. With over a decade of hands-on experience in operating, troubleshooting, and supervising control systems in the oil and gas industry, Dr. Das has become a recognized leader in the field of cybersecurity. His award-winning work in developing security architectures and detection algorithms has significantly advanced the protection of legacy industrial controllers against cyber threats.

Dr. Das's research portfolio is extensive, encompassing the virtualization of Industrial Control Systems (ICS), threat modeling, penetration testing in ICS, active network monitoring, and the application of Machine Learning (ML) in cybersecurity. His expertise has been sought after by military associations and commercial entities alike, guiding them in meeting their cybersecurity requirements for critical infrastructure.

Education

University of Alabama in Huntsville

DOCTOR OF PHILOSOPHY IN COMPUTER ENGINEERING

Huntsville, AL, USA

December 2020

- Advisor: Dr. Thomas Morris
- Research Focus: Critical Infrastructure Safety, Cyber Security, Artificial Intelligence, Cyber threat modelling

University of Alabama in Huntsville

MASTER OF SCIENCE IN COMPUTER ENGINEERING

Huntsville, AL, USA

August 2019

- Awarded Graduate Dean's list for Academic Excellence

University Institute of Technology

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Burdwan, WB, India

July 2014

- Thesis Advisor: Dr. Rimi Paul
- Final Year Thesis: Controller Designing For Liquid Level System

Work Experience

Ohio University

TENURE-TRACK ASSISTANT PROFESSOR

Athens, OH

Aug 2024 - Present

As a tenure-track assistant professor in cybersecurity, my primary research focuses on enhancing the security of critical infrastructures, with a specific emphasis on Industrial Control Systems (ICS). My work involves developing advanced intrusion detection systems and creating comprehensive threat modeling frameworks to identify and mitigate vulnerabilities within ICS environments.

Research Interests: *Critical Infrastructure Cybersecurity, Industrial Control Systems (ICS), Intrusion detection systems, ICS Threat modelling, ICS Testbeds*

Deloitte and Touche llp

ADVISORY SPECIALIST MASTER (MANAGER)

Richmond, VA

Jan 2021 - Aug 2024

My role is to protect commercial and government critical infrastructures from cyberattacks. I am also actively involved in the growth and development of Deloitte's CyberIoT Practice. Some of my contributions as a Deloitte practitioner are as follows.

Deloitte's Smart Factory:-

- **Cybersecurity lead:** Cybersecurity architect of a 45 million dollar smart factory located in Wichita, Kansas. The Smart Factory is a combined effort of 20 leading companies and it combines advanced manufacturing techniques with the

Internet of Things, Cloud, Computer Vision, and Cybersecurity, to create an interconnected production system. The facility showcases capabilities that can solve emerging industrial challenges.

- **Philanthropy through Smart factory initiatives** :The Smart factory manufactures STEM kits that are donated to partner schools. Over a span of five years, these kits will impact over 790,000 students across 695 schools.

Internal Practice Development Roles:-

- **Research and Development Lead**: I lead several teams and we focus on building novel solutions to address the ever-increasing cybersecurity concerns around critical infrastructure. Some of my notable contributions are towards creating digital twins and designing novel cyber scenarios aligned to critical infrastructure.
- **Critical infrastructure cybersecurity course developer**: Worked on developing two cybersecurity courses, the first course teaches new hires about emerging cyber security challenges. Four global Deloitte offices (Mexico, Netherlands, India, and United Kingdom) are currently using this course. The second course highlights the importance of cybersecurity in the field of Internet-of-Things(IoT). The IoT course familiarized over 1000+ Deloitte advisory personnel on Cybersecurity implications on IoT Devices.
- **IoT learning series coordinator**: Program coordinator for the IoT learning series. I identify market-leading topics and distinguished speakers for monthly presentations. IoT Learning series makes specialized knowledge accessible to over 120 Deloitte practitioners.

Client Facing Roles:-

- **Security architect**: Reviewed the cybersecurity posture for clients across cross-industrial sectors like O&G (oil and gas), pharmaceutical, and food & beverage. During the assignment, I helped the client identify cybersecurity gaps and designed a cyber security program to upkeep their critical processes.
- **Security auditor**: Worked closely with the internal audit manager and performed a comprehensive review and analysis of the OT infrastructure of an oil and gas company. During the assignment, I led meetings with the stakeholders and identified threats, vulnerabilities, and high-risk practices.
- **Offensive cyber penetration testing**: Analyzed cybersecurity gaps for an international container shipping terminal and for a fortune hundred pharmaceutical client. During the assignment, we used non-invasive tools to identify and mitigate potential security weaknesses that malicious actors can exploit to compromise the client's infrastructure.

Center for Cybersecurity Research and Education, University of Alabama

Huntsville, AL

RESEARCH ASSISTANT

Aug 2015 - Dec 2020

- **Digital twin**: Developed a novel framework that can build a digital replica (digital twin) of industrial control systems. Using the framework, the UAH team developed digital twins of several systems, like water tanks, gas pipelines, mid-stream oil terminals, heat exchangers, active mass damper systems, robotic arms, army missiles, and water dam systems.
- **Embedded intrusion prevention system**: Designed a novel intrusion prevention system that can protect industrial controllers from denial of service scenarios. The intrusion prevention system uses a combination of peer-to-peer communication and AI algorithms to detect a wide range of malicious cyber-scenarios.
- **AI algorithm for securing power systems**: Worked on an AI-based detection algorithm to protect power systems from cyber attacks. The algorithm detects cyber attacks on SEL 421 relays and can notify end users using a SPLUNK dashboard.
- **Cyber-threat modeling**: Combined STRIDE and Attack Trees to create a systematic workflow for identifying threats against critical infrastructure.
- **Graduate course development**: Developed technical coursework for teaching critical infrastructure security to graduate and undergraduate students. The course has supported seven universities (The University of Alabama in Huntsville, Dakota State University, Tennessee Tech University, the University of Alabama at Birmingham, Augusta University, Mississippi State University, University of South Alabama) and has prepared over 140 students for modern cybersecurity needs.

- **Oil and gas operations:** Supervising oil and gas operations in accordance with ISGOTT (International Safety Guide for Oil Tankers and Terminals).
- **Programming industrial controllers:** Developing Human Machine Interfaces (HMIs) and ladder logic to add novel functionalities to existing control systems. Actively used WinCC, SCADAbr, and Step7 software suite.
- **Oil terminal automation engineer:** Supervising a team of nine engineers to upkeep the Information Technology (IT) and Operational Technology (OT) communication framework in an oil and gas terminal.

Publications

TOTAL CITATIONS- 425, (AUG 2024)

PATENT

- (Pending) **Das et al.**, [Embedded Intrusion Detection System for detection attacks on interdependent controllers from industrial control systems](#), U.S. Provisional Patent Application No.63/143,430.

DISSERTATION

- **Das, R.**, [An Embedded Defense-in-depth Module for Detecting Cyberattacks on Interdependent SCADA Controllers](#), University of Alabama in Huntsville Digital Collections, December, 2020.

PEER-REVIEWED JOURNAL PAPERS

- **Das, R.**, [Internet of Things: Vulnerabilities & proposed mitigations](#), *IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE)*, Volume 7, Issue 5, Pages 13-20, Sep-Oct, 2022.
- Alves, T., **Das, R.**, Werth, A., Morris, T., [Virtualization of SCADA Testbeds for Cybersecurity Research: A Modular Approach](#), *Computers & Security*, Volume 77, Pages 531-546, August, 2018.
- Alves, T., **Das, R.**, Morris, T., [Embedding Encryption and Machine Learning Intrusion Prevention Systems on Programmable Logic Controller](#), *IEEE Embedded Systems Letters*, Volume 10, Issue 3, Pages 99-102, September, 2018.
- **Das, R.**, Dutta, S., Samanta, K. and Sarkar, A., [Automation of Tank Level Using PLC and Establishment of HMI by SCADA](#), *IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE)*, Volume 7, Issue 2, Pages 61-67, July-August, 2013.
- Dutta, S., **Das, R.** and Sarkar, A., [Microcontroller Based Data Acquisition System](#), *International Journal of Engineering and Technology*, July edition 2013.

PEER-REVIEWED BOOK CHAPTERS

- **Das, R.**, Morris, T., [Modeling a Midstream Oil Terminal for Cybersecurity Risk Evaluation](#), *Critical Infrastructure Protection XII*, Sujeet Sheno and Jason Staggs, Eds. IFIP Advances in Information and Communication Technology, Springer Berlin Heidelberg, 2018.

PEER-REVIEWED CONFERENCE PAPERS

- Gaede, R. K., Morris, T., **Das, R.**, Lei, Y., Alves, T., Zhou, H., Fahimi, F. (2019, June), [Work in Progress: Layering Cybersecurity on Domain Engineering Instruction](#), *2019 ASEE Annual Conference & Exposition*, Tampa, Florida.
- **Das, R.**, Menon, V. and Morris, T., [On the Edge Realtime Intrusion Prevention System for DoS Attack](#). *5th International Symposium for ICS & SCADA Cyber Security Research 2018 (ICS-CSR 2018)*, Hamburg, Germany, August 29-30, 2018.
- **Das, R.**, Morris, T., [Machine Learning and Cyber Security](#), *International Conference on Computer, Electrical & Communication Engineering*, Kolkata, West Bengal, India, December 22-23, 2017. ****Best Presenter****
- Gunti, N., Lingasubramanian, K., Alves, T., **Das, R.**, Morris, T., [Virtual Simulation Platform for Studying Hardware Trojan Vulnerabilities in SCADA Systems](#), *Proceedings of the 2017 National Cyber Summit Research Track*, Huntsville, AL, June 6-8, 2017.
- Alves, T., **Das, R.**, Morris, T. [Virtualization of Industrial Control System Testbeds for Cybersecurity](#). *Second Annual Industrial Control System Security (ICSS) Workshop at the 2016 Annual Computer Security Applications Conference.*, Los Angeles, CA. December 5-9, 2016.

- S. Dutta, A. Sarkar, K. Samanta, **R. Das** and A. Ghosh, [Supervision of control valve characteristics using PLC and creation of HMI by SCADA](#), *First International Conference on Automation, Control, Energy and Systems (ACES)*, Hooghly, Pages 1-5, 2014.
- S. Das, N. Debabhuti, **R. Das**, S. Dutta and A. Ghosh, [Embedded system for home automation using SMS](#), *First International Conference on Automation, Control, Energy and Systems (ACES)*, Hooghly, Pages 1-6, 2014.
- **Das, R.**, Dutta, S., Samanta, K., Sarkar, A. and Das, D., [Security Based Domotics](#), *1st International Conference On Computational Intelligence: Modeling, Techniques and Applications (CIMTA-2013)*, Kalyani, India. Vol-10, Pages 942-948, Paper No.-113, Sept 27-28th, 2013.

Talks

WORKSHOP PRESENTATIONS

Oct-21	“5G Security 101: From Radio to Cloud” , GridSecCon 2021	Washington, DC, USA
Oct-19	“Intrusion Detection/Prevention Systems for Industrial Controllers” , Scholar’s Studio, Louis Salmon Library	Huntsville, AL, USA
Apr-19	“SCADA Hands-On Workshop” , Southeastcon 2019	Huntsville, AL, USA
Sep-17	“Modelling a Midstream Oil Terminal for Cybersecurity Research” , Southeast Symposium on Contemporary Engineering Topics (SSCET) 2017	New Orleans, LA, USA
Jun-17	“Lectures and Lab Exercises to Teach SCADA Cybersecurity” , Critical Infrastructure and Industrial Control Systems Security Workshop	Huntsville, AL, USA
Feb-17	“Virtualizing Industrial Control System for Cybersecurity Research” , OPAL-RT Regional Seminar	Atlanta, GA, USA
Aug-16	“Modeling Industrial Control Systems for Cybersecurity Research” , Southeast Symposium on Contemporary Engineering Topics (SSCET) 2016	Jackson, MS, USA

CONFERENCE PRESENTATIONS

Nov-23	“Navigating the Threat Horizon: Enhancing Oil and Gas Cybersecurity Through Digital Twin” , 18th API Cybersecurity Conference for the Oil and Natural Gas Industry	Houston, TX, USA
Nov-23	“From Risk to Resilience: Secure Software Bill of Material (SBOM) management for Operational Technology (OT) systems” , 18th API Cybersecurity Conference for the Oil and Natural Gas Industry	Houston, TX, USA
Oct-23	“Cybersecurity and Future of EV Charging” , Ford: Cybersecurity awareness and Educational Services	Dearborn, MI, USA
Sep-23	“The intersection of Industrial Control System and Metaverse” , CyberSaint STRONGER 2.0	Boston, MA, USA
Apr-23	“Anchored in Safety: Cybersecurity Measures for Modern Ports” , Port of the Future	Houston, TX, USA
Nov-22	“Creating A Sustainable Digital Future” , BizTech	Jamaica
Sep-22	“Cyber Security Challenges in Industry 4.0 transformation” , CyberSaint STRONGER	Boston, MA, USA
Aug-18	“On-the-Edge Realtime Intrusion Prevention System for DoS Attack” , 5th International Symposium for ICS & SCADA Cyber Security Research (ICS-CSR)	Hamburg, Germany
Mar-18	“Modeling a Midstream Oil Terminal for Cybersecurity Risk Evaluation” , Twelfth IFIP WG 11.10 International Conference on Critical Infrastructure Protection	Arlington, VA, USA

Dec-17	“Machine Learning and Cyber Security”, International Conference on Computer, Electrical & Communication Engineering	Kolkata, WB, India
Dec-16	“Virtualization of Industrial Control System Testbeds for Cybersecurity”, Second Annual Industrial Control System Security (ICSS)	Los Angeles, CA, USA
Feb-14	“Supervision of control valve characteristics using PLC and creation of HMI by SCADA”, First International Conference on Automation, Control, Energy and Systems	Hooghly, WB, India
Feb-14	“Embedded system for home automation using SMS”, First International Conference on Automation, Control, Energy and Systems	Hooghly, WB, India
Sep-13	“Security Based Domotics”, 1st International Conference on Computational Intelligence: Modeling, Techniques and Applications	Kalyani, WB, India

Media Coverage

ARTICLE ON DELOITTE’S SMART FACTORY AT WICHITA

- **kwch.com**, Deloitte opens The Smart Factory in Wichita, 2022
- **wichita.edu**, Brand-new Industry 4.0 immersive experience center demonstrates smart factory technologies re-shaping business today, 2020
- **plasticsmachinerymanufacturing.com**, Deloitte unveils Smart Factory @ Wichita, 2022
- **siteselection.com**, Wichita State University plunges ahead in its mission to innovate, 2021
- **todaysmedicaldevelopments.com**, The Smart Factory @ Wichita aims to advance the future of manufacturing, spur innovation through digital transformation, 2022
- **authority.com**, Deloitte Opens New US Smart Factory in Wichita, Kansas, Convenes Ecosystem of Innovators to Make Industry 4.0 a Reality, 2022
- **theconsultingreport.com**, Deloitte Assembles Smart Factory at Wichita State University Innovation Campus, 2022
- **bizjournals.com**, Deloitte ‘smart factory’ puts industrial tech ideas to the test, 2022
- **kmuw.org**, New smart factory at WSU promises to improve manufacturing, provide student learning, 2022
- **kansas.com**, Artificial intelligence, robot baristas? You can find both at new Smart Factory at WSU, 2022
- **aviationweek.com**, Deloitte Opens Wichita Smart Factory To Advance Manufacturing Of The Future, 2022
- **cnctimes.com**, Deloitte opens new smart factory, 2022
- **prnewswire.com**, Deloitte Opens Wichita Smart Factory To Advance Manufacturing Of The Future, 2022
- **news-sap-com.cdn.ampproject.org**, The Smart Factory @ Wichita: Experience the Future of Manufacturing, 2022
- **yahoo.com**, Deloitte Opens New US Smart Factory in Wichita, Kansas, Convenes Ecosystem of Innovators to Make Industry 4.0 a Reality, 2022
- **kwch.com**, Smart Factory at WSU’s Innovation Campus explores potential future of aviation manufacturing, 2022
- **digitalengineering247.com**, How to Secure Your Digital Thread, 2022
- **dragos.com**, Securing Digital Transformation in Manufacturing, 2021

ARTICLE ON HIGH ACHIEVING DELOITTE PRACTITIONERS

- **Deloitte Advisory** 2022

ARTICLE ON PATENT DISCLOSURE

- **UAH OTC**, Embedded System for Detecting Attacks on Interdependent Controllers from Industrial Control Systems, 2021

ARTICLES ON CSAW WIN

- **UAH News**, Two UAH graduate students take first place in prestigious embedded security challenge, 2017
- (Highlights) **engineering.com**, Finding Future Cyber Protectors at World’s Biggest Student-Led Cybersecurity Games, 2017

- (Highlights) **prnewswire.com**, Found: Our Best Future Cyber Protectors in World's Biggest Student-Led Cybersecurity Games, 2017
- (Highlights) **NYU News**, NYU Tandon Becomes a Center of Influence in the World of Hardware Security, 2017

Honors & Awards

Practitioner of the Month

CYBER IoT PRACTICE, DELOITTE

Selected from a group of 119 practitioners

Richmond, VA, USA

April 2022

Best Presenter

INTERNATIONAL CONFERENCE ON COMPUTER, ELECTRICAL
& COMMUNICATION ENGINEERING

Kolkata, WB, India

December 2017

First place in Embedded Security Challenge

CYBER SECURITY AWARENESS WEEK 2017 (CSAW-2017)

12,000 participants from 98 countries

NYU Tandon, NY, USA

November 2017

Academic and Professional Services

TECHNICAL REVIEWER (TOTAL REVIEWS-39)

- [Automation](#) (ISSN 2673-4052), 2024 (1)
- [Entropy](#) (ISSN 1099-4300), 2022, 2024 (2)
- [Electronics](#) (ISSN 2079-9292), 2022 (1)
- [Sensors](#) (ISSN 1424-8220), 2022 (2)
- [Sustainability](#) (ISSN 2071-1050), 2022 (1)
- [Remote Sensing](#) (ISSN 2072-4292), 2022 (3)
- [Cells](#) (ISSN: 2073-4409), 2022 (1)
- [Applied Sciences](#) (ISSN 2076-3417) (3)
- [Internet of Things and Cyber-Physical Systems](#) (ISSN 2667-3452), 2022 (1)
- [International Workshop on Big Data and Computing](#) (WBDC 2022) (1)
- [International Journal of Advanced Computer Science and Applications](#) (ISSN 2156-5570), 2022, 2023, 2024 (7)
- [3rd International Conference on Software Engineering, Security and Blockchain](#) (SESBC 2022) (3)
- [Practical Applications of Explainable Artificial Intelligence Methods](#) (PRAXAI @ IEEE-DSAA 2022) (3)
- [IEEE Transactions on Circuits and Systems for Video Technology](#), 2023 (2)
- [Telecom](#) (ISSN 2673-4001), 2023 (1)
- [Information](#) (ISSN 2078-2489), 2023 (1)
- [3rd IEEE International Conference on Electrical, Computer and Energy Technologies](#) (ICECET 2023 & 2024) (2)
- [International Workshop on Big Data and Computing](#) (WBDC 2023) (2)
- [Smart Cities](#) (ISSN 2624-6511), 2023 (1)
- [International Conference on Artificial Intelligence, Computer, Data Sciences and Applications](#) (ACDSA'24), 2024 (1)

CONFERENCE SESSION CHAIR

- [IEEE Southeastcon 2019](#), Huntsville, AL, (April 2019).

PANELIST

- [Why Critical infrastructures are vulnerable?: SPARK](#), (Washington, DC, Sept 2022).
- [Exploration of Cybersecurity Career: Ford](#), (Dearborn, MI, Oct 2022).

- Discussion on Cyber Impact of Modernization on Legacy Infrastructure: United States Agency for International Development (USAID) Cybersecurity Forum, (Richmond, VA, May 2022).
- Future-proofing Your Organization through Cybersecurity: BizTech 2023, (Jamaica, Nov 2022).

PROFESSIONAL MEMBERSHIP

- **ISACA** Professional Member
- **GIAC** Advisory Board Member
- **IAENG** Member
- **IEEE** Member
- **(CS)²** Member

JOURNAL GUEST EDITOR

- Application of Artificial Intelligence and Machine Learning in Biology (ISSN: 2073-4409)

ACADEMIC COMMITTEE MEMBER

- Energy Politics in Eurasia (ENERPO)
- The International Association of Electrical, Electronic and Energy Engineering (IAEEEE)
- International Journal of Engineering Research and Technology (IJERT), (ISSN: 2278-0181)
- International Journal of Advanced Computer Science and Applications (IJACSA)
- International Conference on Big data, IoT, and Cloud Computing (ICBICC 2022)
- International Symposium on Computer Science and Intelligent Control (ISCSIC 2022)
- International Workshop on Big Data and Computing (WBDC 2022)
- Practical Applications of Explainable Artificial Intelligence Methods (PRAXAI @ IEEE-DSAA 2022)
- International Conference on Data, Information and Computing Science (CDICS 2023)
- International Conference on Cyber Welfare and Security (ICCWS 2025)

Teaching Experience

Instructor and Course Developer, OT Academy

March, June, Sept 2022, Oct 2023

CYBER IOT PRACTICE, DELOITTE AND TOUCHE LLP

Developed a critical infrastructure security course to train incoming consultants and analysts. Globally dispersed Deloitte practices (Mexico, India, Netherlands, and United Kingdom) use this course to up skill their new hires on cybersecurity challenges.

Instructor and Course developer, Cyber Security Awareness Class

Spring 2018, Fall 2018, Spring 2019

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

Taught a hands-on cybersecurity course to Mechanical, Chemical, Electrical, Civil, and Aerospace Engineers. Over 120 students were prepared for modern cybersecurity industry needs.

Certifications

- Application oriented training on OPAL-RT Simulator: RT-LAB, ARTEMiS, RT-EVENTS, Communication protocols, and OPAL-RT Simulator OP5600
- GRID- GIAC Response and Industrial Defense
- GICSP- Global Industrial Cyber Security Professional
- CSX- Cybersecurity Fundamentals Certificate

- Certified User Course on Dragos
- Tenable Certified Sales Associate – OT
- Tenable Certified Sales Associate – VM
- Tenable Certified Sales Engineer – OT
- Armis Technical Architect