Alvi Ataur Khalil

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CURRENT POSITION

Southern Illinois University, Carbondale, IL, USA   Aug. 2025 - Present
Tenure-Track Assistant Professor, Computer Science, School of Computing

KEY ACCOLADE/ACCOMPLISHMENTS

- Published 16 high-impact conference and journal papers (i.e., **13 as the first author**) focusing on the security and dependability of Blockchain systems and intelligent control of unmanned aerial vehicles (UAVs).

- Made key contributions to the successful completion of one National Science Foundation (NSF) project, one National Security Agency (NSA) project, and one Department of Energy (DoE) project, demonstrating strong collaborative skills and technical expertise.
  - Received the NSF I-Corps scholarship, securing a $50,000 financial and travel grant, and completed the training program as an Entrepreneurial Lead, conducting 105 customer interviews.

- Received multiple awards, including **Outstanding Graduate Scholar of the Year** at FIU for research contributions (2023-24), Second Place in Engineering at the FIU Graduate School Scholarly Forum 2023, IEEE Upsilon Pi Epsilon (UPE) Honor Society Scholarship 2024, and the NSF Student Travel Grant acknowledging academic excellence and research potential.

RESEARCH INTERESTS

- Blockchain security, with a focus on vulnerabilities in decentralized off-chain Layer 2 (L2) systems and mitigation.
- Artificial intelligence (AI)-based autonomous systems, particularly utilizing Reinforcement Learning (RL) for UAVs.
- Machine learning, data-driven security solutions, and threat detection techniques for the cybersecurity of cyber-physical system (CPSs).

FUNDED RESEARCH PROJECTS

Artificial Intelligence-Enabled Tools (ArtIT) for Cyber Hardening of Power Grids   Oct. 2022 – Dec. 2023
- *Funding organization:* Department of Energy (DOE)
- *Award ID:* DE-CR0000024
- *Role:* Graduate student contributor
- Collaborated with the principal investigator (PI) on project design, data analysis, tool development, evaluation, validation, and quarterly reporting to support DOE goals for improving power grid resilience.

I-Corps: Smart Healthcare System Threat Analyzer   Jul. 2021 – Jan. 2022
- *Funding organization:* National Science Foundation (NSF)
- *Award ID:* CNS 2138301
- *Role:* Graduate student contributor
- Conducted 105 customer discovery interviews as an **Entrepreneurial Lead** to explore the product ecosystem for our smart healthcare security research product.

EDUCATION

Florida International University (FIU), Miami, FL, USA   Aug. 2020 - Aug. 2025
M.S. leading to Ph.D. in Electrical and Computer Engineering

FIU, Miami, FL, USA   Aug. 2020 - Jul. 2024
M.S. in Computer Engineering

Khulna University of Engineering and Technology (KUET), Khulna, Bangladesh   Apr. 2014 - Mar. 2018
B.Sc. in Computer Science and Engineering

PUBLICATIONS

Journal Paper

[1] Tayebeh Rajabi*, **Alvi Ataur Khalil***, Mohammad Hossein Manshaei, Mohammad Ashiqur Rahman, Mohammad Dakhilalian, Maurice Ngouen, Murtuza Jadliwala, and A. Selcuk Uluagac.
"Feasibility Analysis for Sybil Attacks in Shard-Based Permissionless Blockchains."
In: ACM Distributed Ledger Technologies (DLT): Research and Practice.
Publication date: 14 December, 2023

[2] **Alvi Ataur Khalil**, Mohamed Y Selim, and Mohammad Ashiqur Rahman.
"Deep Learning-based Energy Harvesting with Intelligent Deployment of RIS-assisted UAV-CFmMIMOs."
In: ELSEVIER Computer Networks.
Publication date: 01 June, 2023
Impact factor: 4.4

[3] A. H. M. Jakaria, Mohammad Ashiqur Rahman, Muneeba Asif, **Alvi Ataur Khalil**, Hisham A. Kholidy, Matthew Anderson, and Steven Drager.
"Trajectory Synthesis for a UAV Swarm Based on Resilient Data Collection Objectives."
In: IEEE Transactions on Network and Service Management (TNSM).
Publication date: 25 October, 2022
Impact factor: 4.7

Conference Papers (Blockchain Security)

[4] **Alvi Ataur Khalil**, MGM Mehedi Hasan, and Mohammad Ashiqur Rahman.
"OptiGame: Game-Theoretic Enhancements for Optimistic Rollups through Bayesian Strategies"
In: 2025 EAI International Conference on Security and Privacy in Communication Networks (SecureComm).

[5] **Alvi Ataur Khalil** and Mohammad Ashiqur Rahman.
"RollGuard: Defending RPC Manipulation Attacks in Optimistic Rollups with Graph-Based AI."
In: 2025 26th International Symposium on Quality Electronic Design (ISQED).

[6] **Alvi Ataur Khalil** and Mohammad Ashiqur Rahman.
"PAROLE: Profitable Arbitrage in Optimistic Rollup with ERC-721 Token Transactions."
In: 2024 54th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN).
Publication date: 30 August, 2024.
Acceptance rate: 20%.

[7] **Alvi Ataur Khalil**, Mohammad Ashiqur Rahman, and Hisham A. Kholidy.
"FAKey: Fake Hashed Key Attack on Payment Channel Networks."
In: 2023 IEEE Conference on Communications and Network Security (CNS).
Publication date: 27 October, 2023.
Acceptance rate: 28%.

[8] **Alvi Ataur Khalil**, Javier Franco, Imtiaz Parvez, Selcuk Uluagac, Hossain Shahriar, and Mohammad Ashiqur Rahman.
"A Literature Review on Blockchain-enabled Security and Operation of Cyber-Physical Systems."
In: 2022 IEEE 46th Annual Computers, Software, and Applications Conference (COMPSAC).
Publication date: 10 August, 2022.

Conference Papers (UAV: Autonomous Navigation, Energy Harvesting, and Security)

[9] Alvaro Alva, Luis Martinez Moreno, Muneeba Asif, **Alvi Ataur Khalil**, Mohammad Ashiqur Rahman, Alfredo Cuzzocrea, and Shahriar Hossain.
"Secured UAV Navigation: A Novel Intrusion Detection System Based on PWM Signal Analysis."
In: 2024 11th IEEE Swiss Conference on Data Science (SDS).
Publication date: 18 September, 2024.

[10] **Alvi Ataur Khalil** and Mohammad Ashiqur Rahman.
"Adaptive Neuro-Fuzzy Inference System-Based Lightweight Intrusion Detection System for UAVs."
In: 2023 IEEE 48th Conference on Local Computer Networks (LCN).
Publication date: 06 September, 2023.
Acceptance rate: 26%.

[11] **Alvi Ataur Khalil** and Mohammad Ashiqur Rahman.
"FeD-UP: Federated Deep Reinforcement Learning-based UAV Path Planning against Hostile Defense System."
In: 18th International Conference on Network and Service Management (CNSM).
Publication date: 02 December, 2022.
Acceptance rate: 19%.

*Co-first Author

[12] **Alvi Ataur Khalil***, Alexander J Byrne*, Mohammad Ashiqur Rahman, and Mohammad Hossein Manshaei.
"REPlanner: Efficient UAV Trajectory-Planning using Economic Reinforcement Learning."
In: 2021 IEEE International Conference on Smart Computing (SMARTCOMP).
Publication date: 08 October, 2021.
Acceptance rate: 30%.

[13] **Alvi Ataur Khalil**, Mohamed Y Selim, and Mohammad Ashiqur Rahman.
"CURe: Enabling RF Energy Harvesting using Cell-Free Massive MIMO UAVs Assisted by RIS."
In: 2021 IEEE Conference on Local Computer Networks (LCN).
Publication date: 07 September, 2021.
Acceptance rate: 28%.

Other Conference Papers

[14] Md Hasan Shahriar, **Alvi Ataur Khalil**, Mohammad Ashiqur Rahman, Mohammad Hossein Manshaei, and Dong Chen.
"iAttackGen: Generative Synthesis of False DataInjection Attacks in Cyber-physical Systems."
In: 2021 IEEE Conference on Communications and Network Security (CNS).
Publication date: 10 February, 2022.
Acceptance rate: 26%.

[15] Nur Imtiazul Haque*, **Alvi Ataur Khalil***, Mohammad Ashiqur Rahman, M Hadi Amini, and Sheikh Iqbal Ahamed.
"BIOCAD: Bio-Inspired Optimization for Classification and Anomaly Detection in Digital Healthcare Systems."
In: 2021 IEEE International Conference on Digital Health (ICDH).
Publication date: September 05, 2021.
Acceptance rate: 20%.

[16] **Alvi Ataur Khalil**, Al Mahmud, and Asif Ahmed.
"FicBit: An improved Fractal Image Compression using Bio-Inspired Techniques."
In: 2021 5th International Conference on Electrical Information and Communication Technology (EICT)
Publication date: 16 March, 2022.

Under Review

[17] **Alvi Ataur Khalil**, Syed Ahmad Shah, Mohammad Ashiqur Rahman, Md Yusuf Sarwar Uddin, and Abusayeed Saifullah.
"DReUS: Disaster Response with UAV Swarm."
In: 2025 26th International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc).

[18] **Alvi Ataur Khalil** and Mohammad Ashiqur Rahman.
"xPoz-Hub: Privacy Infiltration in Payment Channel Hubs through Balance Probing and Transaction Discovery."
In: 2025 Annual Computer Security Applications Conference (ACSAC).

Provisional Patent (Under Review for Non-provisional US Patent)

[19] Mohammad Ashiqur Rahman and **Alvi Ataur Khalil**.
"Federated Deep Reinforcement Learning-Assisted UAV Trajectory Planning Against Hostile Defense System."
Filed with the United States Patent and Trademark Office (US 63/545,077).

*Co-first Author

POSTERS/ABSTRACTS

- Represented FIU at the Academy of Science, Engineering, and Medicine of Florida (ASEMFL) by presenting poster titled "State-root manipulation attack in optimistic rollup through updating the remote procedure call (RPC) address" at the Annual Meeting 2024.
- Presented a poster titled "SHiP: Securing Hashed Timelock Contracts in Payment Channel Networks" at the 2023 IEEE Conference on Communications and Network Security (CNS 2023).
- Presented a poster titled "Data-driven ANFIS-based IDS for UAV" at the FIU UGS Scholarly Forum 2023.

HONORS AND AWARDS

- Awarded the **Outstanding Graduate Scholar of the Year** by Outstanding Student Life Awards organized by the Division of Academic & Student Affairs at FIU for research contributions in the academic year 2023-24.
- Awarded FIU University Graduate School (UGS) **Dissertation Year Fellowship** for Spring and Summer 2025.
- Awarded **NSF Student Travel Grant** for the 2023 IEEE CNS, acknowledging academic excellence and research potential in secured communications and networking (Award #2331646).
- Awarded the Upsilon Pi Epsilon (UPE) Honor Society Scholarship 2024 from the Computing Sciences and the IEEE Computer Society (the largest association of computer professionals).
- Honored with **Second Place** *(among 81 posters)* in the Engineering category for the poster titled "Data-driven ANFIS-based IDS for UAV" at the FIU GSAW Scholarly Forum 2023.
- Completed the Fall 2021 **NSF I-Corps cohort as Entrepreneurial Lead** of team 2426, funded by National Science Foundation (NSF) under award #2138301. (Credential).
- Inducted by the Honor Society of **Phi Kappa Phi** by the election of the chapter at FIU for outstanding academic achievements in the academic year 2020-2021.
- Deans List award of the Faculty of EEE for Excellent Academic Performance in the 2016-17 and 2015-16 sessions.
- Awarded a general scholarship for outstanding performance in the Secondary School Certificate Examination during the 2010-11 academic year, as well as for exceptional results in the Higher Secondary School Certificate Examination in the 2012-13 academic year.

WORK EXPERIENCE

Analytics for Cyber Defense (ACyD) Laboratory, FIU, Miami, FL, USA   Aug. 2020 - Present
Graduate Assistant, Department of Electrical and Computer Engineering

- Collaborated and made substantive contributions to 1 NSF project, 1 NSA project, and 1 DOE project.
- Articulated defense mechanisms against cyber attacks on off-chain L2 solutions for **Blockchain**.
- Designed intelligent navigation for military drones/UAVs in hostile territory using reinforcement learning.
- Articulated deep learning-based energy harvesting models for IoT devices using cell-free massive MIMOs, and intelligent reflecting surfaces.
- Mentored 7 undergraduate and graduate researchers supported by NSF/NSA/DOE projects.

MazeGeek Technologies BD Ltd., Dhaka, Bangladesh   Aug 2018 - Jul. 2019
Software Developer

- Developed and launched 5 Android applications that collectively achieved over 1,000 downloads, enhancing user engagement by 15% within the first six months of release.
- Designed robust project architectures that streamlined application functionality, resulting in a 10% reduction in development time and improved performance.
- Managed client requirements and documentation, ensuring 100% adherence to project specifications and timelines.
- Participated in key client meetings, fostering relationships and securing 2 new contracts through effective communication and project presentations.

Daffodil International University (DIU), Dhaka, Bangladesh   May 2018 - Jun. 2018
Lecturer, Department of Computer Science and Engineering

- Conducted classes and lab sessions for over 60 students in Artificial Intelligence (CSE 412 & 413), achieving a 90% student satisfaction rating through engaging instructional methods.
- Implemented hands-on projects that improved student proficiency in GUI development, resulting in 80% of students completing practical assignments on time.

TEACHING EXPERIENCE

Instructor, Florida International University   May. 2024 - Present
- Network Protocols for Internet of Things (CNT 4165)
  - Study of network protocols specifically tailored for IoT devices and systems.
  - Covered foundational networking concepts before diving into protocols used in IoT environments, such as MQTT, CoAP, and IPv6. Lab-based learning where students configured and tested IoT devices.

Graduate Teaching Assistant, Florida International University   Aug. 2020 - Apr. 2024
- Senior Design Projects (EEL 4920)
  - A capstone experience for senior students, challenging them to apply their academic knowledge to real-world projects.
  - Served as a **mentor for over 100 projects**, guiding students through project planning, design, and implementation phases.
- Digital Forensics (EEL 4802)
  - Exploration of techniques and tools used in digital forensics for the investigation of cyber crimes.
  - Emphasized hands-on labs where students worked on forensic analysis of different digital mediums. Included case studies of real cybercrimes to understand better how forensics is applied.

Lecturer, Daffodil International University   May 2018 - Jun. 2018
- Artificial Intelligence (CSE 412 & 413)
  - Comprehensive introduction to artificial intelligence concepts and techniques. Topics included machine learning, natural language processing, robotics, and intelligent agents.
  - Lectures combined with interactive lab sessions to give students hands-on experience. Emphasis on practical applications in AI, encouraging students to solve real-world problems using AI methodologies.

PEER-REVIEW ACTIVITIES

Journals

- IEEE Transactions on Information Forensics and Security (TIFS) *(impact factor:* 6.3)
- IEEE Transactions on Industrial Informatics (TII) *(impact factor:* 12.3)
- IEEE Internet of Things Journal (IoT-J) *(impact factor:* 10.2)
- IEEE Transactions on Big Data (TBD) *(impact factor:* 7.5)
- IEEE Transactions on Wireless Communications (TWC) *(impact factor:* 8.9)
- IEEE Transactions on Dependable and Secure Computing (TDSC) *(impact factor:* 7.3)
- IEEE Transactions on Vehicular Technology (TVT) *(impact factor:* 6.8)
- ELSEVIER Computers & Security *(impact factor:* 4.8)

Conferences

- IEEE International Conference on Communication (ICC)
- Blockchain Research & Applications for Innovative Networks and Services (BRAINS)
- IEEE Wireless Communications and Networking Conference (WCNC)
- Applied Cryptography and Network Security (ACNC)
- International Conference on Network and Service Management (CNSM)
- IEEE SmartGridComm
- IEEE International Conference on Metaverse Computing, Networking and Applications (MetaCom)
- IEEE International Conference on Digital Health (ICDH).

PROFESSIONAL CERTIFICATIONS

- Completed and obtained Microsoft: Security, Compliance, and Identity Fundamentals Certification (**SC-900 Credential**).
- Completed and obtained Microsoft: Azure Fundamentals Certification (**AZ-900 Credential**).
- Completed and obtained Microsoft: Azure Artificial Intelligence Fundamentals Certification (**AI-900 Credential**).

LEADERSHIP AND VOLUNTARY ACTIVITIES

Leadership Roles

- Elected **Secretary** of BSO (an official FIU student organization).   Aug. 2023 - Jul. 2024
- Elected **Registered Student Organizations** of **FIU IEEE E-board**.   Aug. 2022 - Jul. 2023
- Elected **Registered Student Organizations** of BSO.   Aug. 2022 - Jul. 2023
- Chief Technical Coordinator of **IEEE KUET Student Branch**.   June 2017 - Feb. 2018
- Former trainer of the software/web application development club **BitToByte**.   June 2016 - Apr. 2017
- Former trainer at Bangladesh physics olympiad.

Conference Volunteering

- 2023 IEEE/IFIP Network Operations and Management Symposium (NOMS).
- 2017 3rd International Conference on Electrical Information and Communication Technology (EICT).

PROFESSIONAL REFERENCES

[1] **Prof. Mohammad Ashiqur Rahman**
Associate Professor
Director of Analytics for Cyber Defense (ACyD) Lab
Department of Electrical and Computer Engineering
Knight Foundation School of Computing and Information Sciences
Florida International University

[2] **Prof. Sheikh Iqbal Ahamed**
Professor
Director of Ubicomp Research Lab
Department of Mathematics, Statistics and Computer Science
Marquette University

[3] **Prof. Mohammad Hossein Manshaei**
Professor
Computer Science Department, Hunter College
The City University of New York

[4] **Prof. M. Hadi Amini**
Assistant Professor
Founding Director of SOLID Lab
Knight Foundation School of Computing and Information Sciences
Florida International University

[5] **Dr. Anjan Debnath**
Power Systems Postdoctoral Researcher
Idaho National Laboratory