Jeongkeun Shin

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Education

Carnegie Mellon University School of Computer Science *Sep 2024 - Now*
Doctor of Philosophy (Ph.D.) in Societal Computing
Master of Science (M.S.) in Societal Computing
- Advisor: Professor Kathleen M. Carley

Carnegie Mellon University *Jan 2022 - Aug 2024*
Doctor of Philosophy (Ph.D.) in Electrical and Computer Engineering
- Advisor: Professor Kathleen M. Carley
- Completed Coursework Requirements / Transferred to Software and Societal Systems Department (S3D)

Carnegie Mellon University *Jan 2020 - May 2021*
Master of Science (M.S.) in Electrical and Computer Engineering
- Advisor: Professor Marios Savvides

University of Michigan, Ann Arbor *Class of 2019*
Bachelor of Science in Engineering (B.S.E.) in Computer Science
- Advisor: Professor Walter S. Lasecki

Experience

Graduate Research Assistant, CASOS Center *Pittsburgh, PA*
Advisor: Professor Kathleen M. Carley, Professor L. Richard Carley *Jan 2022 - Now*
- Developed OSIRIS, the simulation framework that allows users to design the unique organizational structures, incorporating diverse human behaviors, human factors, and social networks.
- Modeled various cyber attack scenarios, including phishing, data exfiltration, ransomware, and Denial of Service attacks, to assess their impact on different organizational types and evaluate the effectiveness of various cyber defense strategies.
- Simulated and analyzed the performance of different AI solutions for cybersecurity across various organizational environments.

Graduate Research Assistant, CyLab Biometrics Center *Pittsburgh, PA*
Advisor: Professor Marios Savvides *Jan 2020 - Dec 2020*
- Developed the user interface for a web system that detects various products in images uploaded from grocery markets, utilizing models trained with computer vision and deep learning algorithms.
- By leveraging computer vision and deep learning algorithms, contributed to improve the grocery market product detection accuracy.

Graduate Research Assistant, Human and Robot Partners Lab *Pittsburgh, PA*
Advisor: Professor Henny Admoni *Jan 2020 - May 2020*
- Developed a 3D simulation environment for a restaurant setting, incorporating diverse human behavior patterns to accurately simulate daily operations and interactions.

Undergraduate Research Assistant, Crowd and Machine Lab *Ann Arbor, MI*
Advisor: Professor Walter S. Lasecki *Jan 2018 - Jan 2019*
- Solely developed a web system optimized for enhancing research lab operations, enabling researchers to submit weekly progress reports and allowing professors to efficiently sort and review these reports by date, team, and research area. The portal also features functionality for broadcasting announcements to specific groups or the entire research lab.
- Designed and implemented web applications specifically for collecting human subject responses, facilitating research in misinformation classification and human-computer interaction.

Undergraduate Research Scholar, Illinois Geometry Lab *Champaign, IL*
Advisor: Professor Xin Zhang *Jan 2017 - May 2017*

- Developed a simulation system that enabled the generation of critical data to test mathematical hypotheses on the behavior of group orbits in local-global conjectures, focusing on the density of integers within specific ranges.
- Revealed variances in convergence rates linked to group structures and the critical exponents, which indicate significant implications for understanding the local-global conjecture across different subgroup behaviors.

Squad Leader, Sergeant, Republic of Korea Army *South Korea*
Engineering Department, 66th Infantry Division *Jan 2014 - Oct 2015*

- Led multiple mobilization exercises, developing and simulating plans for the allocation and operation of equipment, vehicles, and fuel in both peacetime and wartime scenarios.

Skills

Programming Languages: C, C++, C#, Java, Groovy, Python

Web Programming: HTML/CSS, JavaScript/jQuery, Node.js, React.js, TypeScript, Vue.js, PHP/MySQL

Simulation: NetLogo, Repast Simphony

Video Production: Davinci Resolve

Machine Learning: Weka, Pytorch

Game Development: Unity

Design: Adobe Photoshop, Google Sketchup, Blender

Publications - Conference Proceedings

Simulation of Human Organizations with Computational Human Factors Against Phishing Campaigns
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
International Conference on Cyber Warfare and Security (ICCWS) 2025 - *Under Review*

Design, Modeling and Simulation of Cybercriminal Personality-based Cyberattack Campaigns
Jeongkeun Shin, Geoffrey B. Dobson, L. Richard Carley, Kathleen M. Carley
Winter Simualtion Conference (WSC) 2024 - *Forthcoming*

Simulation-Based Study on False Alarms in Intrusion Detection Systems for Organizations Facing Dual Phishing and DoS Attacks
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
Annual Modeling and Simulation Conference (ANNSIM) 2024
🏆 **Best Paper Runner Up**

Integrating Human Factors into Agent-Based Simulation for Dynamic Phishing Susceptibility
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2023

Beyond Accuracy: Cybersecurity Resilience Evaluation of Intrusion Detection System against DoS Attacks using Agent-based Simulation
Jeongkeun Shin, Geoffrey B. Dobson, L. Richard Carley, Kathleen M. Carley
Winter Simualtion Conference (WSC) 2023

Modeling and Simulation of the Human Firewall against Phishing Attacks in Small and Medium-sized Businesses
Jeongkeun Shin, Geoffrey B. Dobson, L. Richard Carley, Kathleen M. Carley
Annual Modeling and Simulation Conference (ANNSIM) 2023

OSIRIS: Organization Simulation in Response to Intrusion Strategies
Jeongkeun Shin, Geoffrey B. Dobson, Kathleen M. Carley, L. Richard Carley
International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2022

Publications - Posters / Extended Abstracts

Impact of Operating System Updates on Cybercriminal Access Duration: A Simulation-Based Study
Jeongkeun Shin, Tanav Changal, L. Richard Carley, Kathleen M. Carley
Winter Simulation Conference (WSC) 2024 Poster Session - *Forthcoming*

Leveraging OSIRIS to Simulate Real-world Ransomware Attacks on Organization
Jeongkeun Shin, Geoffrey B. Dobson, L. Richard Carley, Kathleen M. Carley
Winter Simulation Conference (WSC) 2022 Poster Session

Finding Integers from Group Orbits
Jake Shin, Yike Xu, Catherine Zhang, Xin Zhang, Junxian Li, Xin Zhang
Illinois Geometry Lab (IGL) Spring 2017 Open House

Publications - Technical Reports

Revelation of System and Human Vulnerabilities Across MITRE ATT&CK Techniques with Insights from ChatGPT
Jeongkeun Shin, Geoffrey B. Dobson, L. Richard Carley, Kathleen M. Carley
CASOS Technical Report (2023)

Academic Services

Mentoring

- Han Corince Wang (01/2025 - Now)
  - Bachelor of Science in Information Systems @ Carnegie Mellon University
- Tong Adrianna Fu (01/2025 - Now)
  - Bachelor of Science in Mathematical Sciences & Statistics @ Carnegie Mellon University
- Siyuan Freya Zhai (10/2024 - Now)
  - Bachelor of Science in Mathematical Sciences & Statistics @ Carnegie Mellon University
- Tanav Changal (06/2024 - 07/2024)
  - High School Student @ Troy High School
- Devashish Ubale (05/2023 - 08/2024)
  - Master of Information Technology Strategy @ Carnegie Mellon University
  - First Position: FPrime AI

Peer Review

- The Journal of Artificial Societies and Social Simulation (JASSS) [2024]
- 2024 Annual IDeaS Conference: Disinformation, Hate Speech, and Extremism Online
- 2024 International Conference on Social Computing, Behavioral-Cultural Modeling and Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS)
- 2024 Winter Simulation Conference (WSC) Agent-Based Simulation Track

Guest Lecture

- CMU 17-821: Computational Modeling of Complex Socio-Technical Systems (Fall 2024)
  - Agent-based Modeling and Simulation (ABMS) for Cybersecurity with OSIRIS