

# Jeongkeun Shin

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## Education

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### 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

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### 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 2021 - May 2021

- 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

Advisor: Professor Xin Zhang

Champaign, IL

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

Engineering Department, 66th Infantry Division

South Korea

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

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**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

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### 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 (ICWS) 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 Simulation 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 Simulation 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

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### **Impact of Operating System Updates on Cybercriminal Access Duration: A Simulation-Based Study**

**Jeongkeun Shin**, Tanav Chagal, 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

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### **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

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### **Mentoring**

- Tanav Chagal [06/2024 - 07/2024]: Troy High School
- Devashish Ubale [05/2023 - 08/2024]: Carnegie Mellon University - Master of Information Technology Strategy, 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 - **Agent-based Modeling and Simulation (ABMS) for Cybersecurity with OSIRIS**