Jeongkeun Shin

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Education

Carnegie Mellon University, School of Computer Science — Pittsburgh, PA
Doctor of Philosophy (Ph.D.) in Societal Computing — *May 2028 (Expected)*
- Advisor: Professor Kathleen M. Carley
- Dissertation: Human-Centric Simulation for Organizational Cyber Defense
- Committee: Professor L. Richard Carley, Professor Lujo Bauer, Professor Robert Axtell

Carnegie Mellon University, School of Computer Science — Pittsburgh, PA
Master of Science (M.S.) in Societal Computing — *May 2025*
- Advisor: Professor Kathleen M. Carley

Carnegie Mellon University, College of Engineering — Pittsburgh, PA
Master of Science (M.S.) in Electrical and Computer Engineering — *May 2021*
- Advisor: Professor Marios Savvides

University of Michigan, College of Engineering — Ann Arbor, MI
Bachelor of Science in Engineering (B.S.E.) in Computer Science — *Dec 2019*

Awards & Recognitions

2026 Link Foundation Modeling, Simulation, and Training Fellowship **Honorable Mention**
2024 Annual Modeling and Simulation Conference (ANNSIM) **Best Paper Runner Up**

Publications - Journal

[J.4] When Susceptibility Meets Centrality: Structural Placement Alters the Relative Performance of Targeted Phishing Training
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
IEEE Transactions on Computational Social Systems - *Under Review*

[J.3] Cyber Attack Flow Intelligence Network: Backbone Analysis and Defense Strategy Optimization
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
IEEE Transactions on Network Science and Engineering

[J.2] Simulating Trust Dynamics Model for Interaction between Human and Intrusion Detection System under Hybrid Denial-of-Service and Spearphishing Campaigns
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
Simulation: Transactions of the Society for Modeling and Simulation

[J.1] Simulating Cyber Defense: The Impact of Phishing Training and System Updates on Mitigating Damage from Hybrid Phishing and Watering Hole Attacks
Jeongkeun Shin, Siyuan Zhai, L. Richard Carley, Kathleen M. Carley
The Journal of Defense Modeling and Simulation

Publications - Conference Proceedings

[C.14] Network-Based Cost-Aware Optimization of Ransomware Mitigation Strategies
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) 2026

[C.13] Network-Based Defense Optimization Against Ransomware Campaigns
Cathy Y. Wang, **Jeongkeun Shin**, Siyuan Zhai, L. Richard Carley, Kathleen M. Carley
International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2026

[C.12] Simulation-Based Evaluation of IDS Monitoring Strategies for Denial-of-Service Defense Using Attack Flow Analysis
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
Winter Simulation Conference (WSC) 2026 - *Forthcoming*

[C.11] The Illusion of Optimal Defense: Static Interdiction under Adaptive and Persistent Attackers
Jeongkeun Shin, Siyuan Zhai, L. Richard Carley, Kathleen M. Carley
Association for the Advancement of Artificial Intelligence (AAAI) 2026 Summer Symposium

[C.10] Towards Real-time Cyber Warfare Simulation: A High-efficiency Heuristic for Budget-constrained Attack Interdiction
Jeongkeun Shin, L. Richard Carley, Kathleen M. Carley
Annual Modeling and Simulation Conference (ANNSIM) 2026 - *Forthcoming*

[C.9] Network Analysis of Attack Flows in Ransomware Groups and Campaigns
Jeongkeun Shin, Siyuan Zhai, L. Richard Carley, Kathleen M. Carley
International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2025

[C.8] A Baseline Simulation of Hybrid Misinformation and Spearphishing Campaigns in Organizational Networks
Jeongkeun Shin, Han Wang, L. Richard Carley, Kathleen M. Carley
Winter Simulation Conference (WSC) 2025

[C.7] 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

[C.6] 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

[C.5] 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 Award**

[C.4] Integrating Human Factors into Agent-Based Simulation for Dynamic Phishing Susceptibility
Jeongkeun Shin, Kathleen M. Carley, L. Richard Carley
International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2023

[C.3] 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

[C.2] 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

[C.1] 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

[P.5] Emotion-Based Agent-based Modeling and Simulation of Hybrid Cyber Attack Scenarios
Jeongkeun Shin, Ellen Kim, Clarissa Chau, L. Richard Carley, Kathleen M. Carley
International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2026 Poster Session

[P.4] A Machine Learning Surrogate Approach for Scalable Design Optimization in Cybersecurity Simulation
Siyuan Zhai, **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) 2025 Poster Session

[P.3] 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

[P.2] 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

[P.1] 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

[T.2] Attack Flow Network Models of MITRE ATT&CK Groups and Campaigns
Jeongkeun Shin, Siyuan Zhai, L. Richard Carley, Kathleen M. Carley
CASOS Technical Report (2025) - *Forthcoming*

[T.1] 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)

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

Optimization: IBM CPLEX

Network Analysis: ORA

Teaching Experiences

Teaching Assistant

- (17-437 / 17-637) Web Application Development (Fall 2026 / Instructor: Professor Terry E. Lee)
- CASOS Summer Institute Teaching Assistant (2023 · 2024 · 2025)

Academic Services

Peer Review

- Journal of Defense Modeling and Simulation (JDMS) [2026]

- IEEE International Conference on System, Man, and Cybernetics (SMC) [2026]
- Computational and Mathematical Organization Theory (CMOT) [2025]
- The Journal of Artificial Societies and Social Simulation (JASSS) [2024 · 2025]
- 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 · 2025 · 2026]
- Winter Simulation Conference (WSC) Agent-Based Simulation Track [2024 · 2026]

Conference Services

- **Session Moderator**, International Conference on Social Computing, Behavioral-Cultural Modeling and Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2026, **Security & Networks Session**
- **Session Chair**, Annual Modeling and Simulation Conference (ANNSIM) 2026, **Modeling and Simulation in Cyber Security Track**

Talks

- University of Texas, El Paso, Cybersecurity and AI Reading Group, Guest Speaker [Spring 2026]
  - Network-Centric Cyber Defense: Optimizing Strategy and Resource Allocation in Multi-Stage Attacks
- CMU 17-821: Computational Modeling of Complex Socio-Technical Systems, Guest Lecturer [Fall 2024]
  - Agent-based Modeling and Simulation (ABMS) for Cybersecurity with OSIRIS

Mentoring

- **Clarissa Chau** (06/2026)
  - High School Student @ Troy High School
  - Co-authored **[P.5]**
- **Ellen Kim** (06/2026)
  - High School Student @ Troy High School
  - Co-authored **[P.5]**
- **Cathy Y. Wang** (01/2026 - Now)
  - Bachelor of Science (B.S.) in Information Systems @ Carnegie Mellon University
  - Co-authored **[C.13]**
- **Han (Corince) Wang** (01/2025 - 06/2025)
  - Bachelor of Science (B.S.) in Information Systems @ Carnegie Mellon University
  - Co-authored **[C.8]**
- **Tong (Adrianna) Fu** (01/2025 - 05/2025)
  - Bachelor of Science (B.S.) in Mathematical Sciences @ Carnegie Mellon University
  - First Placement: Master of Entertainment Technology (M.E.T.) @ Carnegie Mellon University
- **Siyuan (Freya) Zhai** (10/2024 - 05/2026)
  - Bachelor of Science (B.S.) in Mathematical Sciences & Statistics @ Carnegie Mellon University
  - First Placement: Algorithm Engineer @ Alibaba
  - Co-authored **[J.1][C.9][C.11][C.13][P.4][T.2]**
- **Tanav Changal** (06/2024 - 07/2024)
  - High School Student @ Troy High School
  - First Placement: Bachelor of Science (B.S.) in Mathematics @ University of California, Berkeley
  - Co-authored **[P.3]**
- **Devashish Ubale** (05/2023 - 08/2024)
  - Master of Information Technology Strategy (MITS) @ Carnegie Mellon University
  - First Placement: AI/ML Researcher @ FPrime AI
  - Current Position: Software Engineer @ Microsoft