

# Benjamin M. Ampel

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## EDUCATION

**Ph.D.**, Management Information Systems (MIS), University of Arizona, **Expected April 2024**

- **Dissertation Title:** Securing Cyberspace: AI-Enabled Cyber-Adversary Defense
- **Summary:** This dissertation proposes four essays that employ advanced AI-enabled techniques to automate and improve cyber threat intelligence (CTI). The essays focus on categorizing adversary tools by attack vectors, linking them to mitigation strategies, robustifying cybersecurity AI models against attacks, and generating novel adversarial attacks to defend against. By enhancing CTI, this dissertation aims to alleviate the workload of cyber analysts and empower organizations with proactive cybersecurity measures.
- **Dissertation Chair/Advisor:** Dr. Hsinchun Chen
- **Committee Members:** Dr. Sue Brown, Dr. Jay Nunamaker
- **Minor:** Cognitive Science, advised by Dr. Mary Peterson

**M.S.**, Management Information Systems (MIS), University of Arizona, 2019

**B.S.B.A.**, Management Information Systems (MIS), University of Arizona, 2017

## ACADEMIC EMPLOYMENT

Duration	Title	Organization
2021-Present	Adjunct Lecturer (Limited Term)	UArizona
2018-Present	Research Associate, Artificial Intelligence Lab	UArizona
2018-2021	NSF CyberCorps Scholarship-for-Service Fellow	UArizona

\*Note: NSF = National Science Foundation

## RESEARCH INTERESTS

Domain	Methodology
<b>Exploit Labeling</b> (MISQ; JMIS, 2 <sup>nd</sup> rnd)	Knowledge Distillation, BiLSTMs, Transfer Learning, Transformers
<b>Hacker Disruption</b> (1 <sup>st</sup> rnd; JAIS)	Network Science, Centrality Measure Attacks, Infection Modeling
<b>Hacker Threat Reporting</b> (WIP)	Natural Language Summarization, Unsupervised Deep Learning
<b>Adversarially Robust Phishing Detection</b> (ISR, 1 <sup>st</sup> rnd; DTRAP)	Foundation Models, Natural Language Generation, Adversarial Robustification

\*Note: DTRAP = Digital Threats: Research and Practice, ISR = Information Systems Research, JAIS = Journal of the Association for Information Systems, JMIS = Journal of Management Information Systems, MISQ = Management Information Systems, WIP = Work-in-Progress

## PUBLICATIONS

### Journal Publications (3 total)

1. **B. Ampel**, S. Samtani, H. Zhu, and H. Chen, “Creating Proactive Cyber Threat Intelligence with Hacker Exploit Labels: A Deep Transfer Learning Approach,” **Forthcoming at Management Information Systems Quarterly (MISQ)**.
2. Y. Gao, **B. Ampel**, S. Samtani, “Evading Anti-Phishing Models: A Field Note Documenting an Experience in the Machine Learning Security Evasion Competition 2022,” **Forthcoming at ACM Digital Threats: Research and Practice (DTRAP)**.

3. **B. Ampel** and S. Ullman, "Why Following Friends Can Hurt You: A Replication Study," **Forthcoming at AIS Transactions on Replication Research (TRR).**

#### **Manuscripts Under Review & Working Journal Papers (5 total)**

1. **B. Ampel**, S. Samtani, H. Zhu, and H. Chen, "Linking Hacker Exploits to a Cybersecurity Risk Management Framework: A Knowledge Distillation Approach," **Under Second Round Review at Journal of Management Information Systems (JMIS).**
2. **B. Ampel**, S. Samtani, and H. Chen, "Adversarially Robust Phishing Generation and Detection: A Large Language Model Approach," **Under First Round Review at Information Systems Research (ISR).**
3. **B. Ampel**, "A Computational Design Framework for Targeted Disruption of Hacker Communities," **Under First Round Review at Journal of the Association for Information Systems (JAIS).**
4. **B. Ampel**, S. Samtani, Y. Gao, H. Chen, "Automatic Detection of Malicious Voice Calls: A Large Voice Model Approach," **Targeted at Information Systems Research (ISR).**
5. **B. Ampel**, S. Samtani, H. Chen, "Automated Hacker Threat Reporting: A Joint Clustering and Summarization Approach," **Targeted at Journal of Management Information Systems (JMIS).**

#### **Refereed Conference Proceedings (12 total, \* Indicates I was Lead Presenter)**

1. **B. Ampel\***, T. Vahedi, S. Samtani, and H. Chen, "Mapping Exploit Code on Paste Sites to the MITRE ATT&CK Framework: A Multi-label Transformer Approach," Proceedings of 2023 IEEE International Conference on Intelligence and Security Informatics (ISI), Charlotte, North Carolina, October 2023.
2. **B. Ampel\***, K. Otto, S. Samtani, H. Zhu, and H. Chen, "Disrupting Ransomware Actors on the Bitcoin Blockchain: A Graph Embedding Approach," Proceedings of 2023 IEEE International Conference on Intelligence and Security Informatics (ISI), Charlotte, North Carolina, October 2023.
3. **B. Ampel\***, Y. Gao, J. Hu, S. Samtani, and H. Chen, "Benchmarking the Robustness of Phishing Email Detection Systems," Accepted to the Proceedings on the Americas' Conference on Information Systems (AMCIS), Panama City, Panama, August 2023.
4. **B. Ampel\***, "The Effect of Consensus Algorithm on Ethereum Price and Volume," Accepted to the Proceedings on the Americas' Conference on Information Systems (AMCIS), Panama City, Panama, August 2023.
5. C. Marx, **B. Ampel**, B. Lazarine, "The Influence of AI Agent Recommendations on Escalation of Commitment," Proceedings on the International Conference on Information Systems (ICIS), Austin, Texas, December 2021.
6. T. Vahedi, **B. Ampel**, S. Samtani, and H. Chen, "Identifying and Categorizing Malicious Content on Paste Sites: A Neural Topic Modeling Approach," Proceedings of 2021 IEEE International Conference on Intelligence and Security Informatics (ISI), San Antonio, Texas, November 2021.
7. K. Otto, **B. Ampel**, S. Samtani, H. Zhu, and H. Chen, "Exploring the Evolution of Exploit-Sharing Hackers: An Unsupervised Graph Embedding Approach," Proceedings of 2021 IEEE International Conference on Intelligence and Security Informatics (ISI), San Antonio, Texas, November 2021.
8. **B. Ampel\*** and H. Chen, "Distilling Contextual Embeddings into A Static Word Embedding for Improving Hacker Forum Analytics," Proceedings of 2021 IEEE International Conference on Intelligence and Security Informatics (ISI), San Antonio, Texas, November 2021.
9. **B. Ampel\***, S. Samtani, H. Zhu, S. Ullman, and H. Chen, "Labeling Hacker Exploits for Proactive Cyber Threat Intelligence: A Deep Transfer Learning Approach," Proceedings of 2020 IEEE International Conference on Intelligence and Security Informatics (ISI), Washington, D.C., November 2020 (**Recipient of Best Paper Award**).
10. S. Ullman, S. Samtani, B. Lazarine, H. Zhu, **B. Ampel**, M. Patton, and H. Chen, "Smart Vulnerability Assessment for Scientific Cyberinfrastructure: An Unsupervised Graph Embedding Approach," Proceedings of 2020 IEEE International Conference on Intelligence and Security Informatics (ISI), Washington, D.C., November 2020.
11. B. Lazarine, S. Samtani, M. Patton, H. Zhu, S. Ullman, **B. Ampel**, and H. Chen, "Identifying Vulnerable GitHub Repositories and Users in Scientific Cyberinfrastructure: An Unsupervised Graph Embedding Approach," Proceedings of 2020 IEEE International Conference on Intelligence and Security Informatics (ISI), Washington, D.C., November 2020.

12. **B. Ampel**, M. Patton and H. Chen, "Performance Modeling of Hyperledger Sawtooth Blockchain," Proceedings of 2019 IEEE International Conference on Intelligence and Security Informatics (ISI), Shenzhen, China, July 2019.

#### Refereed Workshop Papers (No Proceedings, 2 total, \* Indicates I was Lead Presenter)

1. Y. Gao, S. Samtani, H. Zhu, **B. Ampel**, and Y. Chai, "Generating Adversarial Phishing Websites to Evade Machine Learning-based Anti-Phishing Detectors: A Reinforcement Learning Approach," INFORMS Workshop on Data Science (WDS), Phoenix, Arizona, October 2023.
2. **B. Ampel\***, S. Samtani, S. Ullman, and H. Chen, "Linking Common Vulnerabilities and Exposures to the MITRE ATT&CK Framework: A Self-Distillation Approach," ACM KDD Workshop on AI-enabled Cybersecurity Analytics, Virtual Event, August 2021.

#### GRANT WRITING EXPERIENCE

1. **Year:** 2023. **Funding source:** NSF. **Grant Title:** "Cybersecurity Scholarship-for-Service Renewal at The University of Arizona: The AZSecure AI4Cyber SFS Program" **Funding Amount:** \$3M. **Role:** Lead Grant Writer. **Status:** In Review.
2. **Year:** 2021. **Funding source:** NSF. **Grant Title:** "D-ISN: Detecting and Disrupting Key Actors and Emerging Stolen Virtual Products in Dark Web Networks: A Multi-Disciplinary Deep Learning Approach" **Funding Amount:** \$1M. **Role:** Assisting Grant Writer. **Status:** Rejected (Low Competitive).
3. **Year:** 2020. **Funding source:** NSF. **Grant Title:** "D-ISN: Identifying and Disrupting Illicit Dark Web Hacker Community Networks: An Explainable AI Approach" **Funding Amount:** \$1M. **Role:** Assisting Grant Writer. **Status:** Rejected (Low Competitive).

#### TEACHING INTERESTS

##### Cybersecurity

- Cyber Threat Intelligence
- Artificial Intelligence for Cybersecurity
- Blockchain Applications/Security

##### Data Mining

- Data and Web Mining Strategies
- Classical Machine Learning and Deep Learning
- Data Visualization

#### TEACHING EXPERIENCE

Role	Course	Method	Semester	# Students	School	TE Score
<b>Lecturer</b>	MIS 562: Cyber Threat Intelligence	Online	Fall 2023	17	UArizona	-
<b>GTA</b>	MIS 611D: Topics in Data Mining	In Person	Spring 2023	9	UArizona	-
<b>GTA</b>	MIS 464: Data Analytics	In Person	Spring 2023	39	UArizona	-
<b>Lecturer</b>	MIS 562: Cyber Threat Intelligence	Online	Fall 2022	40	UArizona	4.7/5
<b>GTA</b>	MIS 561: Data Visualization	Online	Summer 2022	33	UArizona	-
<b>Lecturer</b>	MIS 562: Cyber Threat Intelligence	Online	Fall 2021	13	UArizona	4.5/5
<b>Lecturer</b>	MIS 562: Cyber Threat Intelligence	Online	Summer 2021	30	UArizona	4.0/5

\*Note: GTA = Graduate Teaching Assistant, TE = Teaching Evaluation

#### PROFESSIONAL ACTIVITIES

##### Ad-hoc Reviewer of Journal Papers (5 Unique Journals)

Deviant Behavior (UDBH), 2023; ACM Digital Threats: Research and Practice (DTRAP), 2022-2023; AIS Transactions on Replication Research (TRR), 2022; IEEE Transactions on Dependable and Secure Computing (TDSC), 2021; ACM Transactions on Management Information Systems (TMIS), 2019, 2022.

##### Ad-hoc Reviewer of Refereed Conference Proceedings (6 Unique Conferences)

INFORMS Workshop on Data Science (WDS), 2022; Hawaii International Conference on System Sciences (HICSS), 2021-2023; IEEE Deep Learning and Security Workshop (DLS), 2020; Pacific Asia Conference on Information Systems (PACIS), 2020-2023; International Conference on Information Systems (ICIS), 2020-2023; ICDM Workshop on Deep Learning for Cyber Threat Intelligence (DL-CTI), 2020.

### Conference Program Committees (3 Unique Conference Program Committees)

ACM Conference on Computer and Communications Security (CCS) AISEC Workshop 2021-2023; ICDM Data Mining for Cybersecurity, 2021; Workshop on Artificial Intelligence-enabled Cybersecurity Analytics (AI4Cyber-KDD), 2021-2023.

### Invited Talks and External Presentations (2 Total)

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1. **Event Title:** International Conference on Secure Knowledge Management (SKM). **Presentation Title:** Deep Learning for The Detection of Vishing Calls. September 22, 2023. Virtual.
2. **Event Title:** AI in Cybersecurity – Machine Learning / Deep Learning Data Analytics at HICSS-56. **Presentation Title:** Analytics and Visualizations/UI in AI for Cybersecurity. January 3, 2023. Hawaii.

### HONORS & AWARDS

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- Doctoral Consortium, International Conference on Information Systems (ICIS) (2023)
- Doctoral Consortium, Americas Conference on Information Systems (AMCIS) (2023)
- Paul S. and Shirley Goodman Scholarship (2023)
- Samtani-Garcia MIS PhD Commitment Scholarship (2022)
- James F. LaSalle Teaching Excellence Award (2022)
- Alan R. Dennis Travel Award (2022)
- Best Paper Award. IEEE Intelligence and Security Informatics (ISI) (2020)
- Nunamaker-Chen MIS Doctoral Scholarship Recipient (2020)
- National Science Foundation CyberCorps: Scholarship for Service Fellow (2018-2021)
- UArizona MIS Undergraduate Outstanding Senior (2017)
- William and Florence Schmidt Scholarship Recipient (2017)

### REFERENCES

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#### **Hsinchun Chen, Ph.D.**

Regents Professor and the Thomas R. Brown Chair in Management and Technology

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#### **Susan A. Brown, Ph.D.**

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#### **Jay F. Nunamaker, Ph.D.**

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