Dalya Manatova

Postdoctoral Researcher

College of Computing and Informatics,
UNC Charlotte

dalya.manatova@charlotte.edu | www.dalya.info | dalyapraz | dalyapraz | dalyapraz

Research Interests

Cybercrime ecosystems; illicit communities; community resilience; ransomware;
Applied network science; robustness of graph learning (GNNs); threat intel methods; adversarial obfuscation.

Education

Indiana University *Bloomington IN*

Ph.D. Security Informatics *April 2026*

- Minor: Computer Science
- Dissertation: Modeling Resilience in Cybercrime Networks
- Developed computational and organizational models of cybercrime resilience using network science, graph learning, and organizational theory-informed quantitative analysis.
- Committee: L. Jean Camp (Chair), Inna Kouper (Co-chair), Cathleen McGrath, Filippo Radicchi, Cici Ling

California Institute of Technology *Pasadena CA*

Exchange Program - Applied Computational Mathematics *2019*

California State University, Los Angeles *Los Angeles CA*

M.S. Information Systems *2019*

- Advisors: Arun Aryal, Jongwook Woo

Nazarbayev University *Kazakhstan*

B.S. Mathematics *2015*

Research Experience

University of North Carolina at Charlotte, College of Computing and Informatics *Charlotte, NC*

Postdoctoral Researcher *2026 – Present*

- Research area: resilience and vulnerability in open-source software communities.

Oak Ridge National Laboratory, Computer Science and Mathematics Division *Oak Ridge, TN*

Visiting Doctoral Researcher *Summer 2025*

- Project: “Hiding Community from Unsupervised Graph Learning-Based Clustering.”
- Studied adversarial community concealment from graph neural network-based clustering methods.
- Mentor: Pablo Moriano

USC Information Sciences Institute, Networking and Cybersecurity Division *Marina del Rey, CA*

Visiting Doctoral Researcher *Summer 2024*

- Project: “Measuring Contribution and Management in the Open-Source Software Community of the Linux Kernel Mailing List.”
- Studied contributor expertise in Linux kernel development by exploring file-activity clustering as a feature-based representation of contributor specialization.
- Mentor: Jim Blythe

Indiana University *Bloomington, IN*

Graduate Research Assistant *2021 – 2026*

- **Luddy School of Informatics, Computing, and Engineering** 2022 – 2026
  Dissertation: "Modeling Resilience in Cybercrime Networks."
  Developed computational and organizational models of cybercrime resilience using network science, graph learning, and theory-informed qualitative analysis.
  Advisors: L. Jean Camp, Inna Kouper, and Cathleen McGrath

- **The Media School** 2024 – 2025
  Project: "Analysis of Satire and Humor as a Coping Mechanism of Resistance to Propaganda."
  Contributed to linguistic codebook development for analyzing humor elements in war-related memes; performed initial content coding; designed the coding interface; recruited and trained coders and translators; conducted preliminary data analysis; and reviewed translated materials for quality. PI: Julia Fox

- **Luddy School of Informatics, Computing, and Engineering** Summer 2023
  Project: "Interaction Strategies of Russian Telegram Channels on the 2022 Russian Invasion of Ukraine."
  Developed a Telegram scraper and collected data for analysis; conducted initial analysis of reference strategies and user-response activity across propaganda-aligned and resistance-oriented channels.
  Supervisor: Inna Kouper

- **Research Security Operations Center & OmniSOC** 2021 – 2022
  Project: "Vulnerability Management Designs for Security Analysts' Decision-Making Processes."
  Analyzed data, synthesized literature on vulnerability management workflows, and developed designs for vulnerability reporting interfaces supporting security analysts' decision-making.
  Supervisor: Inna Kouper

Publications

Published

** outstanding paper award*

Manatova, D., McGrath, C., & Camp, L. J. (2026). The Organizational Anatomy of Cybercrime: A Multilayer Framework for Modeling Resilience. *Journal of Cybersecurity*. In press. https://doi.org/10.1093/cybsec/tyag014.

Gray, I. W., **Manatova, D.**, Oosthoek, K., & McCoy, D. (2025). From Lamborghinis to Ladas: Empirical Analysis of LockBit's Business Operations. *In 2025 APWG Symposium on Electronic Crime Research (eCrime)*

Gurjar, A., **Manatova, D.**, Staples, B., Chambers, S. & Camp, L. J. (2025). Is Ransomware an Economically Distinct Attack Type? An Event Study of Market Reactions. *In 2025 APWG Symposium on Electronic Crime Research (eCrime)*

Manatova, D., DeVries, C., & Samtani, S. (2024). Understand your shady neighborhood: An approach for detecting and investigating hacker communities. *Decision Support Systems*, 184, 114271. https://doi.org/10.1016/j.dss.2024.114271

Manatova, D., Camp, L. J., Fox, J. R., Kuebler, S., Shardakova, M. A., & Kouper, I. (2023). An argument for linguistic expertise in cyberthreat analysis: LOLSec in Russian language eCrime landscape. *In IEEE European Symposium on Security and Privacy Workshops (EuroS&PW)* https://doi.org/10.1109/EuroSPW59978.2023.00024

Manatova, D., Sharma, D., Samtani, S., & Camp, L. J. (2022). Building and testing a network of social trust in an underground forum: Robust connections and overlapping criminal domains. *In 2022 APWG Symposium on Electronic Crime Research (eCrime)* https://doi.org/10.1109/eCrime57793.2022.10142120

Manatova, D., & Woo, J. (2023). Machine learning vs. deep learning on a tabular traffic dataset in big data. *In KSII The 18th Asia Pacific International Conference on Information Science and Technology (APIC-IST)*.

Manatova, D., Kouper, I., & Samtani, S. (2022). Designing a vulnerability management dashboard to enhance security analysts' decision-making processes. *In Practice and Experience in Advanced Research Computing 2022 (PEARC '22)* https://doi.org/10.1145/3491418.3535176

Dauletbak, D., Heo, J., Kim, S., Kim, P. Y., & Woo, J. (2021). Scalable traffic predictive analysis using GPU in big data. ArXiv. https://arxiv.org/abs/2106.15151

***Dauletbak, D.**, & Woo, J. (2020). Big data analysis and prediction of traffic in Los Angeles. *KSII Transactions on Internet & Information Systems*, 14(2), 841-854.

In Review

Manatova, D., Moriano, P., & Camp, L. J. Hiding Community from Graph Neural Network

In Prep

Manatova, D., McGrath, C., Kouper, I., & Camp, L. J. Relationships matter: Reconstructing the organizational structure of a ransomware syndicate

Manatova, D., Gray, I. W., McGrath, C., & Camp, L. J. A Network-Based Simulation of Ransomware Operations

Talks & Presentations

† *invited talk, * paper presentation*

October 2025†. *The Business of Cybercrime: Detection, Resilience, Relationships*. Guest Lecturer, MIS, **California State University**, Los Angeles, CA.

August 2025. *Hiding a Group of Nodes from Unsupervised Graph Learning-Based Clustering*. **Mathematics in Computation Seminar Series, Oak Ridge National Laboratory (ORNL)**, Oak Ridge, TN.

June 2025. *WiP: A Network-based Simulation for Analyzing Recovery and Disruption of Ransomware Operations*. **Cambridge Cybercrime Conference**, Cambridge, UK.

January 2025†. *Relationships Matter: Modeling Dynamics of Cybercriminal Commodity-based Groups Using Linguistic Analysis and Theories of Organization*. **Cybersecurity at MIT Sloan (CAMS MIT)**.

November 2024†. *Marketplaces: History and Trends in Cryptomarkets*. Guest Lecturer, Economics of Information Security (Graduate Course), **Indiana University**, Bloomington, IN.

October 2024†. *Relationships Matter: Linguistic Analysis behind the Organizational Dynamics of a Ransomware Gang*. **Cognitive Security Institute (CSI)**.

September 2024†. *Relationships Matter: Reconstructing the Organizational Structure of a Ransomware Group*. Invited Talk, **APWG eCrime 2024**, Boston, MA.

August 2024. *Relationships Matter: Reconstructing the Organizational Structure of a Ransomware Group*. **Black Hat 2024**, Las Vegas, NV.

June 2024†. *Relationships Matter: Reconstructing the Organizational Structure of a Ransomware Group*. **Information Sciences Institute, USC (ISI USC)**, Marina del Rey, CA.

June 2024. *Relationships Matter: Reconstructing the Organizational Structure of a Ransomware Group*. **Cambridge Cybercrime Conference**, Cambridge, UK.

April 2024. *Relationships Matter: Reconstructing the Organizational Structure of a Ransomware Group*. **23rd Workshop on the Economics of Information Security (WEIS)**, Dallas, TX.

April 2024†. *Social, Linguistic, and Organizational Analyses of Russian eCrime Forums*. **Rose-Hulman Institute of Technology**, Terre Haute, IN.

April 2024*. *Building and Testing a Network of Social Trust in an Underground Forum*. **HotSoS Symposium 2024**.

March 2024. *Organizational and Social Dynamics of a Cybercriminal Group: A Case of Russian Ransomware Gang*. Research Series Talk, **Ostrom Workshop**, Bloomington, IN.

February 2024†. *Social, Linguistic, and Organizational Analyses of Russian eCrime Forums*. **M^{3}AAWG 2024**, San Francisco, CA.

May 2023. *Social Network of Crimes on Dark Web*. **Cybersecurity Summer Institute at GeorgiaTech**, Atlanta, GA.

January 2023†. *Exploring Social Network of Trust Across Major Crime Types in an Underground Forum*. Guest Lecturer, MIS, **California State University**, Los Angeles, CA.

November 2022*. *Exploring Social Network of Trust Across Major Crime Types in an Underground Forum*. **APWG eCrime 2022**.

Posters (selected)

** presenting author, + mentored undergraduate*

Dalya Manatova, L Jean Camp*, Julia R Fox, Sandra Kuebler, Maria A Shardakova and Inna Kouper. 2024. Satire and Humor Analysis of Resistance to Propaganda. NSA Crane, Bloomington, IN.

Maksat Sharshekeev*+, **Dalya Manatova**, L Jean Camp. 2023. Cybercriminal Organized Group: Social Network of a Hacker. Research Poster Panel, Indiana University, Bloomington, IN

Nadia Sabry*+, **Dalya Manatova**, L Jean Camp. 2023. Uncovering the Organizational Hierarchy of a Cybercriminal Group: Story of a Ransomware Gang. Research Poster Panel, Indiana University, Bloomington, IN

Awards, Fellowships, & Grants

2023	**Ostrom Fellowship for Doctoral Research**, Indiana University	*1 year*
2022	**Travel Support Award**, NSF for IEEE Conference on Secure and Trustworthy ML	*1,000 USD*
2022	**Cybersecurity Summer Institute Fellow**, Georgia Institute of Technology	
2019	**Paper with Honors**, Teradata Analytics Conference	
2019	**Development Program Fellowship**, California Institute of Technology & California State University	
	Travel Scholarship Support, California State University, Los Angeles	*1,000 USD*
	Recognition as ASI Outstanding Achievement in Professional & Public Service, California State University, Los Angeles	
2010-2015	**Full Educational Scholarship**, Nazarbayev University	

Teaching Experience

Spring'26	**Mathematics of Cybersecurity (Intro to Cryptography)**, Associate Instructor	*IU*
Fall'24	**Economics of Information Security (Graduate Course)**, Lead Associate Instructor	*IU*
Spring'23	**Mathematics of Cybersecurity (Intro to Cryptography)**, Lead Associate Instructor	*IU*
Fall'22	**Economics of Information Security (Graduate Course)**, Associate Instructor	*IU*
2020-2021	**Design and Development of Information Systems (Capstone Course)**, Associate Instructor	*IU*
2018-2019	**Fundamentals of Information Systems**, Teaching Assistant	*CSULA*

Service and Outreach

Program Committee and Journal Reviewing

Decision Support Systems – Journal reviewer
WEIS – Workshop on the Economics of Information Security
NDSS Workshop on AI Systems with Confidential Computing – Network and Distributed System Security Symposium

Mentoring

Fall'23	**Maksat Sharshekeev**, Undergraduate Research Opportunities in Computing, Indiana University
2022-2023	**Nadia Sabry**, Undergraduate Research Opportunities in Computing, Indiana University

Volunteering

2021	**Design Thinking Class at CSULA**, Project Mentor for MSIS & MBA students	*Los Angeles*
2019-2020	**Data Science Class at Data Application Lab**, Project Tutor	*Los Angeles*
2019-2021	**SheLovesData**, Python & SQL Instructor	*Los Angeles*
2018-2020	**International Data Engineering and Science Association (IDEAS)**, Community Manager	*Los Angeles*

Industry Experience

2019-2020	**Cybersecurity Data Analyst**, IT Security Department, California State University, Los Angeles
2016-2018	**Consultant** ↗ **then** **Senior Consultant**, Operational Management, KPMG Central Asia
2015-2016	**Consultant**, PwC Central Asia

Skills

F = Frequent user| E = Have Experience | U = Used in the past

Prog (F)	**Python**, NumPy, Pandas, NetworkX, Scikit-learn, Matplotlib, seaborn
Prog (E)	**Python**, PyTorch, PyTorch Geometric, spaCy, HuggingFace Transformers
Prog (E)	**Scripting**, Bash, HPC job scripts (SLURM), Git
Prog (E)	**Web/Markup**, LaTeX, Markdown, HTML, JavaScript
Prog (U)	**Databases**, SQL, NoSQL (MongoDB), MySQL
Prog (U)	**Low-level**, Assembly (x86 basics), C, C++
Other Tools	**Data/DevOps**, Jupyter, Docker, VS Code, GitHub, HPC Environments (IU Big Red 200)

Professional Memberships

Association for Computing Machinery (ACM)
Association for the Advancement of Artificial Intelligence (AAAI)