

# Kara Schatz

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## EDUCATION

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### Doctorate of Philosophy in Computer Science

July 2024

*North Carolina State University, Raleigh, North Carolina*

College of Engineering — Department of Computer Science

GPA: 4.0

Dissertation Title: *Domain- and Task-Aware Knowledge Graphs: From Construction to Completion*

Dissertation co-advisors: Dr. Rada Chirkova and Dr. Alexander Tropsha

### Master of Science in Computer Science

May 2023

*North Carolina State University, Raleigh, North Carolina*

College of Engineering — Department of Computer Science

GPA: 4.0

### Bachelor of Science in Mathematics and Computer Science, Minor in Statistics

May 2020

*Xavier University, Cincinnati, Ohio*

College of Arts and Sciences — Department of Mathematics and Department of Computer Science

University Scholars Program; Summa Cum Laude; GPA: 3.966

## TEACHING EXPERIENCE

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### Assistant Professor

August 2024 – Present

*Xavier University Department of Computer Science*

- CSCI 170 Computer Science I: Fall 2024
- CSCI 180 Computer Science II: Spring 2025 (planned)
- CSCI 335 Databases: Spring 2025 (planned)

### Co-Instructor

January 2024 – May 2024

*North Carolina State University Department of Computer Science*

- Course: CSC/ST 442 Introduction to Data Science

### Adjunct Instructor of Computer Science Applications

October 2023 – March 2024

*Wake Technical Community College*

- Course: Software Developer Using Python

### Online Instructor of Mathematics and Computer Science

May 2023 – December 2023

*iD Tech*

### Game Design and Development Enrichment Session Assistant

October 2022 – March 2024

*FLAMES@MSEN Outreach Program*

### Python Camp Teacher Team Lead

June 2021 – August 2021

*North Carolina State University The Engineering Place*

### Supplemental Instruction Leader

August 2018 – May 2020

*Xavier University Office of Academic Support*

- CSCI 180 Computer Science II (Fall 2018, Spring 2019, Fall 2019, Spring 2020)
- MATH 225 Foundations of Higher Math (Discrete Math) (Fall 2018)

### Math Tutor

August 2017 – May 2020

*Xavier University Math Tutoring Lab*

### Mathematics Enrichment Session Leader

October 2017 – February 2020

*Xavier University Xploratory*

### STEM Camp Lead

June 2017 – August 2017

*Xavier University NOYCE Summer Program*

## MENTORING EXPERIENCE

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### Graduate Students

- Nahed Abu Zaid (NCSU, Ph.D. expected 2028)
- Ezio Mei (NCSU, Ph.D. Expected 2026)

### High-School Students

- Aman Patel (2022)

RESEARCH EXPERIENCE

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- NCATS Biomedical Data Translator: ARAGORN Team Member** November 2020 – Present  
*Renaissance Computing Institute (RENCI)*
- Graduate Research Assistant** August 2022 – May 2023, August 2023 – May 2024  
*Research Triangle Institute International*
- Graduate Research Assistant** August 2021 – August 2022, May 2023 – August 2023  
*Science and Technologies for Phosphorus Sustainability (STEPS) Center*
- Research Experiences for Undergraduates (REU) Participant** May 2019 – February 2020  
*University of Central Florida (UCF) Center for Research in Computer Vision (CRCV)*
- Hello Research Workshop** October 26 – 28, 2018  
*Indiana University*
- Research Experiences for Undergraduates (REU) Participant** May 2018 – July 2018  
*University of North Carolina Greensboro (UNCG) Department of Mathematics and Statistics and Department of Biology*

PUBLICATIONS

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- Nahed Abu Zaid, **Kara Schatz**, Kimberly Bourne, Darrell Harry, Christine Hendren, Anna-Maria Marshall, Khara Grieger, Jacob Jones, Alexey V. Gulyuk, Yaroslava G. Yingling, and Rada Chirkova, “INTEGRATE-KG: A Workflow For Unifying Heterogeneous Data Driven by Shared Languages.” Accepted to *IEEE International Conference on Big Data*.
- Zhuocheng Mei, **Kara Schatz**, Nahed Abu Zaid, and Rada Chirkova, “Semantics-Aware Path Ranking on Information Extracted from Knowledge Graphs.” Accepted to *IEEE International Conference on Big Data*.
- Daniel Korn, Jon-Michael Beasley, **Kara Schatz**, Pei-Yu Hou, Alexander Tropsha, and Rada Chirkova. “FPP-Hunter: Expert-Guided Discovery of Functional Path Patterns.” Accepted to *IEEE International Conference on Big Data*.
- Kara Schatz**, Alexander Tropsha, and Rada Chirkova, “GAME: Improving Efficiency and Effectiveness of Knowledge-Graph Rule Mining via Data Reduction,” in *IEEE International Conference on Big Data*, pp. 4248–4257, IEEE, December 2023.
- Kara Schatz**, Pei-Yu Hou, Alexey V. Gulyuk, Yaroslava G. Yingling, and Rada Chirkova, “BUILD-KG: Integrating Heterogeneous Data Into Analytics-Enabling Knowledge Graphs,” in *IEEE International Conference on Big Data*, pp. 2965–2974, IEEE, December 2023.
- Pei-Yu Hou, Jing Ao, **Kara Schatz**, Alexey V. Gulyuk, Yaroslava G. Yingling, and Rada Chirkova, “Provenance-Aware Data Integration and Querying for Knowledge Graphs,” in *25th International Conference on Information Integration and Web Intelligence (iiWAS)*, pp. 293–308, Springer, December 2023.
- Jing Ao, **Kara Schatz**, and Rada Chirkova, “Trend Surfing: Effective and Efficient Retrieval of Unusual Temporal Trends,” in *9th International Conference on Data Mining (DTMN)*, pp. 100–123, Computer Science & Information Technology (CS & IT), September 2023.
- Kara Schatz**, Daniel Korn, Alexander Tropsha, and Rada Chirkova, “Workflow for Domain- and Task-Sensitive Curation of Knowledge Graphs, with Use Case of DRKG,” in *IEEE International Conference on Big Data*, pp. 3692–3701, December 2022.
- Kara Schatz**, Cleber Melo-Filho, Alexander Tropsha, and Rada Chirkova, “Explaining Drug-Discovery Hypotheses Using Knowledge-Graph Patterns,” in *IEEE International Conference on Big Data*, pp. 3709–3716, IEEE, December 2021.
- Kara Schatz**, Erik Quintanilla, Shruti Vyas, and Yogesh Rawat, “A Recurrent Transformer Network for Novel View Action Synthesis,” in *Computer Vision—ECCV 2020: 16th European Conference, Glasgow, UK, August 23–28, 2020, Proceedings, Part XXVII 16*, pp. 410–426, Springer International Publishing, August 2020.

MANUSCRIPTS

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- Kara Schatz**, Jon-Michael Beasley, Alexander Tropsha, and Rada Chirkova, “GAME+: Lossless Knowledge-Graph Compression for Improving the Efficiency and Effectiveness of Rule Mining.” Submitted for publication in October 2024.
- Kara Schatz**, Jon-Michael Beasley, Cleber Melo-Filho, Alexander Tropsha, and Rada Chirkova. “Using Extraction and Evaluation of Explanations for Drug-Repurposing on Knowledge Graphs.” Submitted for publication in October 2023.
- Daniel Korn, Pei-Yu Hou, **Kara Schatz**, Jon-Michael Beasley, Rada Chirkova, and Alexander Tropsha. “Towards Improving the Efficiency of Drug Repurposing by Leveraging Node Promiscuity in Biomedical Knowledge Graphs.” Submitted for publication in May 2023. Revision submitted in November 2024.

PRESENTATIONS

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- “Knowledge-graph compression to enable efficient and effective rule mining.” Graduate Student Research Symposium. North Carolina State University, Raleigh, North Carolina, April 3, 2024
- “GAME: Improving efficiency and effectiveness of knowledge-graph rule mining via data reduction.” IEEE International Conference on Big Data. Virtual/Sorrento, Italy, December 15, 2023
- “BUILD-KG: Integrating heterogeneous data into analytics-enabling knowledge graphs.” IEEE International Conference on Big Data. Virtual/Sorrento, Italy, December 15, 2023

“Provenance-aware data integration and querying for knowledge graphs.” 25th International Conference on Information Integration and Web Intelligence (iiWAS). Bali, Indonesia, December 5, 2023

“Trend Surfing: Effective and efficient retrieval of unusual temporal trends.” 9th International Conference on Data Mining (DTMN). Virtual/Copenhagen, Denmark, September 16, 2023

“Workflow for domain- and task-sensitive curation of knowledge graphs, with use case of DRKG.” IEEE International Conference on Big Data. Virtual/Osaka, Japan, December 17, 2022

“Large-scale biomedical knowledge graph mining to support drug discovery.” Graduate Student Research Symposium. North Carolina State University, Raleigh, NC, April 26, 2022

“Explaining drug-discovery hypotheses using knowledge-graph patterns.” IEEE International Conference on Big Data. Virtual, December 15, 2021

“A recurrent transformer network for novel view action synthesis.” 16th European Conference on Computer Vision – ECCV. Virtual, August 25, 2020

## PROFESSIONAL DEVELOPMENT

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### Building Future Faculty Program

March 20 – 22, 2024

*North Carolina State University*

- Workshop for doctoral students and post-doctoral scholars who are interested in pursuing academic careers and who are committed to promoting diversity in higher education.
- Attended sessions covering life as a faculty member at a research-extensive university, expectations of new faculty and resources available to faculty for help with research and teaching. Participants attend presentations on research, teaching and faculty development and have discussion sessions with current faculty at all levels from assistant to full professor.

### Strategic Practice Certificate – Justice, Equity, Diversity, and Inclusion Track

February 2024

*North Carolina State University Office for Institutional Equity and Diversity*

- Certificate aimed at helping identify individual and/or organizational inclusive practices to incorporate into workplace environments, encouraging advocacy for policy shifts that reflect a more equitable and inclusive culture, and allowing the development of strategic relationships in order to foster impactful and meaningful changes within campus environments.
- Workshops: Intersectionality in Higher Education, Exploring Professional Dynamics, The Emotional Labor of Inclusion, Applied Allyship.

### Graduate Teaching Certificate

December 2023

*North Carolina State University Graduate Professional Development Team*

- Certificate to hone teaching skills through a series of workshops, teaching experience, and reflection.
- Workshops: Teaching College, Engaging Diverse Learners, Using Learning Outcomes, Mentoring 101, Helping Undergraduate Students with Common Research Challenges, Student Engagement Using Digital Tools, Processing Course Evaluations.

### Information Technology Specialist – Databases Certificate

November 2023

*Certiport*

### Inclusive Excellence Certificate

October 2023

*North Carolina State University Office for Institutional Equity and Diversity*

- Certificate to develop awareness, knowledge, and skills to understand and demonstrate cultural competence, understand historical systems of oppression and their impact, and learn strategies to integrate inclusive practices into workplace and learning environments.
- Workshops: Applied Cultural Identity, Understanding Unconscious Bias, The Macro of Microaggressions, Fundamentals of Equal Opportunity.

### Graduate Writing Certificate

June 2023

*North Carolina State University Graduate Professional Development Team*

- Certificate to hone academic and professional writing skills through a series of workshops, a writing experience, and a final work product.
- Workshops: Writer’s Toolkit, How to Write Concise Sentences, How to Organize Reports, How to Craft Abstracts and Introductions, How to Synthesize Literature Reviews, How to Structure Results and Discussion Sections, How to Summarize Your Work, How to Compose Professional Emails.

### Reflective Educational Design Inclusive Teaching Certificate

May 2023

*North Carolina State University Office for Faculty Excellence*

- Certificate focused on developing resources and skills for applying inclusive course pedagogical practices that support all learners.
- Topics: Inclusive Teaching Methodology, Cultural Relevance and Responsiveness, Community and Belonging, Access and Empowerment, Awareness and Perspectives, Global Learning.

## PROFESSIONAL AFFILIATIONS

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### Pi Mu Epsilon (Mathematical Honor Society)

Inducted November 2017

*Member of the Ohio Theta Chapter*

### Phi Beta Kappa (Academic Honor Society)

Inducted April 2020

*Member of the Pi of Ohio Chapter*

### Institute of Electrical and Electronics Engineers (IEEE)

Since 2021

*Member*

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**SKILLS AND RELEVANT COURSEWORK**


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**Programming Languages:** Python, Java, C++, C, SQL, Cypher, MIPS, Scheme, MATLAB, Golang

**Programming Tools:** Git, Neo4j, Pytorch, Google Cloud

**Graduate Courses:** Computational Logic, Design and Analysis of Algorithms, Databases, Artificial Intelligence, Graph Data Mining, Graph Theory, Technical Communication for Engineering Research, Algorithms on Strings, Human-Computer Interaction, Automated Learning and Data Analysis

**Undergraduate Courses:** Data Structures and Algorithms, Machine Organization, Programming Languages, Databases, Artificial Intelligence, Operating Systems, Networking, Security, Graph Theory, Data Mining

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**AWARDS**


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**NCSU College of Engineering Mentored Teaching Fellowship** January – May 2024

- Awarded to provide engineering graduate students with an opportunity to co-teach a college-level course.
- Award amount: \$1000

**NCSU Department of Computer Science Outstanding Research Award** March 2024

- Recognizes a doctoral student for outstanding research contributions in the previous calendar year.
- Award amount: \$250

**NCSU College of Engineering Research Award Nomination** March 2024

- Recognizes a doctoral student for outstanding research contributions in the previous calendar year.

**International Conference on Information Integration and Web Intelligence Best Paper Award** December 2023

- Awarded for paper entitled “Provenance-Aware Data Integration and Querying for Knowledge Graphs”

**NCSU College of Engineering Graduate Enhancement Award** April 2023

- Awarded to a small number of outstanding graduate students.
- Award amount: \$2,850

**NCSU Department of Computer Science Outstanding Research Award Nomination** February 2023

- Recognizes a doctoral student for outstanding research contributions in the previous calendar year.

**NCSU Provost’s Doctoral Fellowship** August 2020 – July 2021

- Awarded to support outstanding doctoral students entering the program.
- Award amount: \$30,000

**Clare Boothe Luce Scholarship Recipient** May 2018 – May 2020

- Awarded to an undergraduate woman in a STEM field who embodies the characteristics of the Clare Boothe Luce legacy and plans to attend graduate school in her STEM field.

**John F. Niehaus Award in Computer Science** April 2020

- Given in memory of John F. Niehaus to an outstanding senior majoring in computer science.

**Kramer-Miller Mathematics Award** April 2019 & April 2020

- Presented to a senior mathematics major for having achieved great distinction in the study of mathematics.

**Consortium for Mathematics and its Applications (COMAP) Meritorious Award** February 2018

- Awarded for my team’s submission to the COMAP Interdisciplinary Contest in Modeling.
- Scored in the top 11% of all submissions for this problem.

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**SERVICE ACTIVITIES**


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**Workshop on Knowledge Graphs and Big Data in conjunction with IEEE Big Data** 2023 – Present

*Program Committee Member*

**FLAMES@MSEN Outreach Program** October 2022 – March 2024

*Volunteer Enrichment Session Assistant*

**ACM Transactions on Knowledge Discovery from Data** May 2023

*Submission Reviewer*

**DiamondHacks Hack-a-thon** March 26 – 27, 2022

*Volunteer Mentor*

**46th International Conference on Very Large Databases (VLDB)** August 31 – September 4, 2020

*Volunteer*

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**OTHER ACTIVITIES**


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**NCSU STARS Computing Corps** August 2021 – May 2024

*Member*

**NCSU Women in Computer Science** August 2020 – May 2024

*Member*

**Xavier University Math Club** August 2018 – May 2020

*President*

**Xavier University Women in Computing** August 2018 – May 2020

*Member*

**Xavier University Computer Science Club** August 2018 – May 2020

*Member*

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COMPETITIONS

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<b>William Lowell Putnam Mathematical Competition</b> <i>Participant</i>	December 1, 2018
<b>Association for Computing Machinery – International Collegiate Programming Contest</b> <i>Team Member</i>	November 10, 2018
<b>Consortium for Mathematics and its Applications Interdisciplinary Contest in Modeling</b> <i>Team Member</i>	February 8 – 12, 2018