Jonathan Karr

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Bio: Jonathan Karr is a second-year Ph.D. student in Computer Science and Engineering at the University of Notre Dame, and he is concurrently pursuing an M.A. in Theology. His research focuses on AI for Social Good and specializes in bias detection and mitigation in large language models, with an emphasis on topics including homelessness and faith. He is a Lucy Graduate Scholar and is the founder of the Technology and Catholicism Club of Notre Dame.

EDUCATION

Ph.D. in Computer Science and Engineering, University of Notre Dame *Aug 2024 - Present*

- Research Focus: AI for Social Good - LLM bias detection regarding homelessness and faith using data mining, NLP, and graph learning
- Research Framework: How can we use LLMs and data as a force for good while aligning with the RISE Principles (Responsible, Inclusive, Safe, Ethical), the UN Sustainable Development Goals, and Catholic Social Teaching?
- **Advisor: Dr. Nitesh V. Chawla**

M.A. in Theology University of Notre Dame *May 2025 - Present*

M.S. in Computer Science and Engineering University of Notre Dame *Aug 2023 - Present*

B.S. in Computer Science University of Notre Dame *May 2024*

- Concentration: Cyber Security
- Minors: Engineering Corporate Practice, Theology

RESEARCH EXPERIENCE

Graduate Researcher, Lucy Institute for Data and Society, University of Notre Dame *Sep 2024 - Present*

- Developed a taxonomy and classification categories for LLMs to assess bias of people experiencing homelessness by creating a multi-modal dataset from social media, news articles, and meeting minutes
- Assess how different biases correlate with policy making
- PIs on Homelessness Project: Dr. Georgina Curto Rex and Dr. Matthew Hauenstein
- Analyzed how LLMs impact Catholic religious discourse through a theological lens
- Compare LLMs' biases across different religions
- PI on Theology LLM Project: Dr. Walter J. Scheirer
- Collect and analyze trends in collegiate club running
- Presented research at ACL'25 and IJCAI'25, and UNU Macau AI Conference 25, and will present at Adaptive Faith Technology and Religious Change in the Digital Age and MIT Sports Sloan '26

Undergraduate Researcher, CRC, University of Notre Dame *Sep 2022 - Aug 2024*

- Research Focus: Knowledge Graphs (KG) and NLP for Naval Weapons Systems Intelligence
- Developed NLP algorithms to process naval maintenance summaries using Python and LLMs under Dr. Paul Brenner
- Presented research at CRANE and the DoD Symposium

Publications

- Mealey, K., **Karr, J.**, Saboia Moreira, P., Brenner, P., & Vardeman II, C. (2024). "Trusted Knowledge Extraction for Operations and Maintenance Intelligence", *Natural Language Processing Journal*.
- **Karr, J.**, Herbst, B., Hauenstein, M., Curto, G., Chawla, N. "Can LLMs Contribute to Social Inclusion? A Zero-Shot Analysis of Homelessness Bias Detection on Reddit", *ACL SRW '25*.
- **Karr, J.**, Smith, E., Hauenstein, M., Curto, G., Chawla, N. "What is Behind Homelessness Bias? Using LLMs and NLP to Mitigate Homelessness by Acting on Social Stigma", *IJCAI'25 AI for Social Good*.
- **Karr, J.** "Measuring and Mitigating Homelessness Bias: Leveraging AI for Social Impact", *IJCAI'25 Doctoral Consortium*.

Pending Publications

- Kuangshi A.*, **Karr, J.***, Jiang, M., Chawla, N., Wang, C. "KEO: Knowledge Extraction on OMIn via Knowledge Graphs and RAG for Safety-Critical Aviation Maintenance", *Pending Publication / arXiv*.
- **Karr, J.**, Herbst, B., Hua, T., Hauenstein, M., Curto, G., Chawla, N. "Combating Homelessness Stigma with LLMs: A New Multi-Modal Dataset for Bias Detection", *Pending Publication / arXiv*.
- **Karr, J.**, Darden, B., Pell, N., Fryer, R., Ambrose, K., Hall, E., Bualuan. R., Chawla, N. "National Running Club Database: Assessing Collegiate Club Athletes' Cross Country Race Results", *Pending Publication / arXiv*.
- **Karr, J.**, Lad, D., Hernandez, D., Conwill, L., Scheirer, W., Chawla, N. "Equivocation and Erosion: How LLMs Undermine Catholic Religious Discourse", *Abstract Accepted: Adaptive Faith Technology and Religious Change in the Digital Age*.

Datasets

- Multimodal PEH Dataset v1.0.1: A dataset on homeless from Reddit, X, news, and meeting minutes from 2015-2025. **Karr, J.**, Herbst, B., Hua, T., Hauenstein, M., Curto, G., Chawla, N. (2025), Zenodo, 10.5281/zenodo.16877412
- National Running Club Dataset v1.0.0: A dataset from 2023-2024 NIRCA cross country runners **Karr, J.**, Darden, B., Pell, N., (2025), Zenodo, 10.5281/zenodo.16652625
- OMIn Dataset v1.0.0: A dataset for naval maintenance summaries Mealey, K., **Karr, J.**, Saboia Moreira, P., Finch, D., Riter, A., Brenner, P., & Vardeman II, C. (2024)., Zenodo, 10.5281/zenodo.13333825

Reports

- University of Notre Dame Generative AI Taskforce (Livingston, J., Rhoads, J., Abbasi, A., Behrens, J., Flanagan, T., Grisoli, B., Hockx-Yu, H., **Karr, J.**, Kuskova, V., Lee, Y. S., Metoyer, R., Nabrzyski, J., O'Connell, M. E., Roney, L., Russo, A., Schnell, S., Skendzel, D.). (2024, May). *Generative AI Taskforce Report and Recommendations*. University of Notre Dame.

Presentations

- **Karr, J.**, Herbst, B., Hua, T., Hauenstein, M., Curto, G., & Chawla, N. (2025). Using Local LLMs to Assess and Address Online Homelessness Bias *UNU Macau AI '25*.
- **Karr, J.**, Herbst, B., Hauenstein, M., Curto, G., & Chawla, N. (2025). Measuring and Mitigating Homelessness Bias: Leveraging AI for Social Impact *Notre Dame Graduate Research Symposium*.
- **Karr, J.** (2025). Hidden In Plain Sight: Language Bias and Homelessness. *Notre Dame 3MT Finalist Presentation*.

Posters

- **Karr, J.**, Herbst, B., Hauenstein, M., Curto, G., & Chawla, N. (2025). Measuring and Mitigating Homelessness Bias: Leveraging AI for Social Impact. *RISE '25*.
- Smith, E., **Karr, J.**, Hauenstein, M., Curto, G., & Chawla, N. (2025). Mapping and Mitigating Homelessness Bias: Leveraging AI for Social Impact. *Student Choice Best Research Award*.
- **Karr, J.**, Mealey, K., Finch, D., Riter, A., Moreira, P., Vardeman, C., & Brenner, P. (Spring 2024). Readiness of Knowledge Extraction Tools for Application to Maintenance Data.
- **Karr, J.**, Mealey, K., Finch, D., Riter, A., Moreira, P., Vardeman, C., & Brenner, P. (Fall 2023). Survey of Knowledge Extraction Tools for Maintenance Data.
- **Karr, J.**, Broussard, S., Hartlep, Z., Alcindor, S., Vardeman, C., Brenner, P., & Phillips, E. (Spring 2023). KG Construction with LLM (ChatGPT) Support.

TEACHING EXPERIENCE

- **Graduate TA**, University of Notre Dame *Aug 2024 - Dec 2024*
  - Served as a graduate TA for Algorithms under Dr. Danny Chen
  - Held weekly office hours and
  - Taught a lecture while Professor Chen was traveling for a conference
  - Hosted the first-ever final exam review session for Algorithms
  - Standardized exam grading via Gradescope
  - Awarded Computer Science & Engineering TA of the Year in May 2025
- **Undergraduate TA**, University of Notre Dame *Aug 2023 - May 2024*
  - Served as an undergrad TA for Computer Architecture (Fall '23) and Logic Design (Spring '24) under Dr. Aaron Dingler
  - Held office hours and graded assignments for over 75 students each semester
- **High School Coding Instructor**, Notre Dame Prep (Pontiac, MI) *Dec 2020 - Feb 2021*
  - Taught middle and high school students Python fundamentals, preparing them for the PCEP-30-01 certification
  - Created a course in line with certification curriculum and held sessions online during COVID
- **YouTube Coding Instructor** *Dec 2020 - Present*
  - Created educational Python and C tutorials for 1,900+ YouTube subscribers

WORK EXPERIENCE

Software Engineering Intern, Qualcomm, Auburn Hills, MI *Jun 2021 - Aug 2023*

- **Summer 2023**: Developed cross-platform code compilation, reducing build time by over 40% using CMake
- **Summer 2022**: Created over 30 unit tests for Qualcomm Audio Calibration Tool, saving developers significant time
- **Summer 2021**: Designed a dashboard for KATS (Kymera Automated Test Systems) to display the results of DSP code tests

Founder, National Running Club Database *Jun 2024 - Present*

- Developed a database for NIRCA running clubs to access over 100,000 race results
- Platform has over 19,000 unique users, with an average engagement of 1m 14s per session

LEADERSHIP & VOLUNTEERING

Student Representative, Notre Dame AI Innovation Council *Sep 2023 - Present*

- Led student rollout of Gemini and NotebookLM in May 25
- Represented student body for the Generative AI Taskforce to evaluate educational and research impacts of AI

Founder & President, Technology & Catholicism of Notre Dame Club *Sep 2024 - Present*

- Founded and lead discussions on the intersection of technology and Catholicism

Mentor, Catholic Ministry *Aug 2022 - Present*

- Mentor RCIA, Short Course, and OCIA candidates as sponsor/Godparent
- Collaborate with the Fischer Grad Faith Community asthe Student Advisor fo (May 2025-Present)
- Served as Stanford Hall Sacristan (Aug '22 - May '24)
- Assist the Basillica as an Altar Serve (Aug '24-Present)

Certifications

Certified Entry-Level Python Programmer (PCEP-30-01), CompTIA ITF+ (FC0-U61), Google Analytics, Microsoft Introduction to Programming Using Python (MTA 98-381), and CITI Social & Behavioral Research