

Akhil Pandey Akella

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Areas of Interest: *Representational Learning, Large Language Models, Graph Neural Networks, Applied Machine Learning, Uncertainty Quantification, Science of Science, Computational Social Science*

EDUCATION

Northern Illinois University

Ph.D. Computer Science

Dekalb, IL, USA

August 2019 - August 2024

Northern Illinois University

M.S. Computer Science

Dekalb, IL, USA

August 2017 - August 2019

GITAM University

B.Sc. Computer Science

AP, India

August 2012 - May 2016

EXPERIENCE

Research Scientist (CSSI)

Kellogg School of Management , Northwestern University

Aug 2024 - Present

Evanston, IL

- Overseeing the AI, data analytics, and data management efforts at CSSI for NSF APTO project.
- Strategic research into training and fine-tuning policy specific large language models that assist with demonstrating policy implications of scientific work.
- Building optimized pipelines and user guides for data, model and pipeline parallelism and hardware accelerated training loops

Research Assistant (DATA Lab)

Dept. of Comp.Sci , Northern Illinois University

Sep 2017 - Aug 2024

Dekalb, IL

- Identifying Reproducible research using Human-in-the-Loop Machine Learning.
- Strategic research into models that address ways to comprehend, and estimate the Reproducibility crisis in AI.
- Create new datasets, ‘reproducibility’ metrics, and machine learning models that estimate confidence level in the reproducibility of a published work.
- Conducted comprehensive literature reviews and data analysis to support ongoing research projects.
- Presented findings at CIKM, JCDL, ACL-IJCNLP, Journal of Infometrics, enhancing the lab’s visibility in the Science of Science, and applied machine learning community.

MCS Division, Givens Research Associate

Argonne National Laboratory

May 2022 - Aug 2022

Lemont, IL

- Played an instrumental role in the v1.0 rollout of DeepHyper/MetalgPy onto PyPI (<https://pypi.org/project/metalgpy/>).
- Built NAS pipelines for Graph Neural Architecture Search using Pytorch-Geometric and MetalgPy.
- Exponentially increased the search space for Conditional Hyperparameter Optimization on GNN’s using DeepHyper and MetalgPy’s symbolic program manipulation.
- Gave a session on Graph neural architecture search for molecular property prediction for ALCF DeepHyper Automated Machine Learning Workshop (<https://deephypier.github.io/events/workshop-anl-2022-summer>)

MCS Division, ALCF Summer Student

May 2020 - Aug 2020

*Argonne National Laboratory**Lemont, IL*

- Spearheaded a first of a kind comparative study of Uncertainty Quantification Approaches for Graph Neural Networks (GNN) on MoleculeNet.
- Built an architecture agnostic ML pipeline to estimate aleatoric and epistemic uncertainty in predictive models for classification and regression tasks.
- Empirically proved the effectiveness of Simultaneous Quantile Regression + Orthonormal Certificates as the best Uncertainty Quantification technique(<https://github.com/akhilpandey95/uncertainty>) for GNN's on Quantum Chemistry datasets.

Research Assistant, CREATE Lab

Jun 2018 - Dec 2018

*Dept. of Education, Northern Illinois University**Dekalb, IL*

- Utilized NLP techniques such as Automatic Speech Recognition to build speech models that focused on using child speech data to identify the text.
- Developed a web application in NodeJS, and Angular JS to separate child speech data and transcribe into word documents.
- Built a software interface to interact with Furhat- an advanced social robot.

Technical Task Force member

Aug 2016 - Oct 2016

*Mozilla India**Hyderabad, India*

- webcompat/webcompat-reporter-extension – Co-maintained one of the largest software(<https://github.com/webcompat/webcompat-reporter-extensions>) repositories for Mozilla's webcompat project that focuses on checking web page compatibility across browsers.
- Built a JavaScript Linter that automatically recognizes the JS version and highlights the necessary changes before writing them to the disk.
- Built a software interface to interact with Furhat- an advanced social robot.

Summer of Code Student

Apr 2016 - Aug 2016

*Google**Hyderabad, India*

- sTeam web Interface – Built a UI framework in AngularJS that talks to services from a Pike Webserver.
- Weekly Blog posts – Summarized the work and published bi-weekly blogs to showcase the open-source work.
- Actively engaged with mentors from Google, and FOSSASIA Singapore.

PUBLICATIONS**Published:**

- **Akella, A. P.**, Choudhury, S.R., Koop, D. and Alhoori, H., “Navigating the Landscape of Reproducible Research: A Predictive Modeling Approach”. In Proceedings of the 33rd ACM International Conference on Information and Knowledge Management (pp. 24-33).
- **Akella, A. P.**, & Alhoori, H. “Influence of Reproducibility on Scientific Impact” Accepted as an extended abstract to 3rd International Conference on the Science of Science and Innovation (ICSSI).
- **Akella, A. P.**, Koop, D., & Alhoori, H. (2023, June). “Laying Foundations to Quantify the “Effort of Reproducibility”.” In 2023 ACM/IEEE Joint Conference on Digital Libraries (JCDL) (pp. 56-60). IEEE.
- **Akella, A. P.**, Alhoori, H., & Koop, D. (2022, November). “Reproducibility Signals in Science: A preliminary analysis.” In Proceedings of the first Workshop on Information Extraction from Scientific Publications (pp. 140-144).
- **Akella, A. P.** (2022). “A Brief Survey on Representation Learning based Graph Dimensionality Reduction Techniques.” arXiv preprint arXiv:2211.05594.

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- **Akella, A. P.**, Alhoori, H., Kondamudi, P. R., Freeman, C., & Zhou, H. (2021). “Early indicators of scientific impact: Predicting citations with altmetrics.” *Journal of Informetrics*, 15(2), 101128.
 - **Akella, A.P.**, “Using Machine Learning Models to Discover Promising Research”, MS thesis, Northern Illinois University, 2019.
 - Ibrahim Al Azher, Seethi, V.D.R., **Akella, A. P.** and Alhoori, H., “LimTopic: LLM-based Topic Modeling and Text Summarization for Analyzing Scientific Articles limitations” In 2024 ACM/IEEE Joint Conference on Digital Libraries (JCDL).
 - Siravuri, H. V., **Akella, A. P.**, Bailey, C., & Alhoori, H. (2018, May). Using social media and scholarly text to predict public understanding of science. In Proceedings of the 18th ACM/IEEE on Joint Conference on Digital Libraries (pp. 385-386).

PRESENTATIONS

- **Graph neural architecture search for molecular property prediction**, DeepHyper Automated Machine Learning Workshop, Argonne Leadership Computing Facility Hands-on Training, [Argonne National Laboratory], [July, 2024]
Gave a workshop and hands-on demo on utilizing symbolic programs to build expressive graph neural networks and expand the search space for an audience of over 100 people from top institutions all over the country. Created interactive notebooks on building graph neural networks to perform neural architecture search catered for high performance computing workflows.

HONORS & AWARDS

- **NSF 2024 Travel grant for CIKM'24** — October 2024
- **ICSSI 2024 Best poster award** — July 2024
- **SIGIR Student Travel Grant** — June 2023
- **Google Cloud Research Credits Program**, 274000118(2023-2024), 331845891(2024-2025)

SKILLS

Languages: C/C++, Python, Java, JavaScript/TypeScript, HTML/CSS, \LaTeX

Tools: Git/GitHub, Unix Shell, Webpack, VS Code, IntelliJ CLion/PyCharm/IDEA, Atom

OTHER PROFESSIONAL INFORMATION

Program Committee Member

- SIAM International Conference on Data Mining (SDM'25)
- WIESP @ ACL-IJCNLP 2023

Reviewer

- Scientometrics

Professional Memberships

- ACM

REFERENCES

Dr. Hamed Alhoori

Associate Professor - Computer Science

Northern Illinois University

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Dr. David Koop

Associate Professor - Computer Science

Northern Illinois University

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Dr. Nathan Krislock

Associate Professor - Mathematical Sciences

Northern Illinois University

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Dr. Tirthankar Ghosal

Scientist (HPC and AI)

Oak Ridge National Laboratory

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