Akhil Pandey Akella

akhilpandey95.github.io Akhil Pandey Akella akhilpandey95
akhilpandey akhilpandey.akella@kellogg.northwestern.edu +1 862-285-7252

Summary

My current research focus is bringing together the revolution of representational learning and language models to understand how it influences Science and broader research community. I build models and tools to understand how we can accelerate scientific discovery predominantly for furthering the causes of *AI4Science*.
Areas of Interest: *Representational Learning, Large Language Models, Graph Neural Networks, Applied Machine Learning, Uncertainty Quantification, Science of Science, Computational Social Science*

Experience

Applied Research Scientist (AERIS) July 2025 - Present
AllSci Corp, Sunwater Institute *Chicago, IL*

- Post-training and RL for *AERIS*, AllSci Enhanced Research Intelligence System.
- Post-training and data generation with frontier language models to break down scientific publications into hypotheses, research questions, and results.
- Build AI co-scientists to accelerate scientific discovery in life sciences.

Research Scientist (Kellogg Center for Science of Science & Innovation) Aug 2024 - July 2025
Kellogg School of Management , Northwestern University *Evanston, IL*

- Overseeing the AI, data analytics, data security, and data management efforts at CSSI for the *$ 20 Million* National Science Foundation grant for Assessing and predicting technological outcomes.
- Built SciScinet-v2, the largest data lake for open science encompassing 250 million papers, 2.5 Billion citations, 100 Million authors, and 45 Million patent connections. More: https://northwestern-cssi.github.io/sciscinet
- Created the dataset to bechmarking (policyLLM) policy brief generation for language models and did strategic research into training and fine-tuning policy specific large language models that assist with demonstrating policy implications of scientific work.
- Established hybrid High Performance Computing CPU-GPU nodes for accelerating computational research at Center for Science of Science and Innovation, and Ryan Institute of Complexity.

Research Assistant (DATA Lab) Sep 2017 - Aug 2024
Dept. of Comp.Sci , Northern Illinois University *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, AACL-IJCNLP, Journal of Infometrics, enhancing the lab's visibility in the Science of Science, and applied machine learning community.

MCS Division, Givens Research Associate May 2022 - Aug 2022
Argonne National Laboratory *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-Geoemetric 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://deephyper.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.

Education

Doctor of Philosophy (Ph.D), Northern Illinois University 2024, USA
Effort of Reproducibility: Metrics, Methods, & Models to Navigate the Landscape of Reproducible Research

Master of Science (M.S), Northern Illinois University 2019, USA
Using Machine Learning models to discover promising research

Bachelors in Computer Science (B.S), GITAM University 2016, India

Publications

Published:

- Wu, W., Furnas, A.C., Yang, E., **Akella, A. P.**, Song, X., Ye, G., Wang, D., Liu, H. "Sci2Pol-Bench: A Benchmark for LLM Policy Brief Generation from Scientific Research". *(under-review, NeurIPS, 2025).*
- 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).
- **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.
- **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.
- 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).

Selected working papers:

- **Akella, A. P.**, "Probing the Influence of Pretrained Scientific Language models".(Under-revision).
- **Akella, A. P.**, "Large Language models for Reproducible Science of Science". (Under-revision).
- **Akella, A. P.**, "Pre-review to Peer review: Pitfalls of Automating reviews using AI agents.".(Under-revision).

Research Presentations

- Invited talk: **Data and software for AI**, "Leadership Computing Facilty Seminar", **Argonne National Laboratory**, *Courtesy: Dr. Huiho Zheng, May 2025.*
- Invited talk: **Direct Policy Optimization training with Large language models**, CS Lecture, **University of North Texas**, *Courtesy: Dr. Sagnik Roy Choudhury, April 2025*
- Invited talk: **Is reasoning the path forward for scientific text generation?**, CSCI Lecture, **Northern Illinois University**, *Courtesy: Dr. Hamed Alhoori, April 2025.*
- Invited talk: **Large Language Models for Computational Social Science**, MORS Lecture, **Kellogg School of Management, Northwestern University**, *Courtesy: Dr. Dashun Wang, March 2025.*
- Hands-on Workshop Speaker: **Graph neural architecture search for molecular property prediction**, **Argonne National Laboratory**, *Argonne Leadership Computing Facility Hands-on Training, July, 2022*
- Invited Seminar: **Symbolic programming for Neural architecture search on Graphs using Metalgpy**, **Argonne National Laboratory**, *Courtesy: Dr Prasanna Balaprakash*, June 2022
- Invited Seminar: **A comparative study of uncertainty quantification approaches for graph neural networks**, **Argonne National Laboratory**, *Courtesy: Dr Prasanna Balaprakash*, August 2020.
- Invited talk: **Understanding Backpropagation in LSTMs**, Department of Statistics, **Northern Illinois University**, *Courtesy: Dr Haiming Zhou, August 2018.*
- Invited Seminar: **Javascript & IoT, FOSSASIA Singapore**, *Courtesy: Hong Phuc Dang, March 2016.*

Honors & Awards

- **National Science Foundation 2024 Travel grant for Conference on Information and Knowledge Management, CIKM'24** — October 2024
- **International Conference on Science of Science & Innovation (ICSSI) Best poster award** — July 2024
- **Northern Illinois University CS Department Travel Award** - June 2024
- **Special Interest Group on Information Retrieval (SIGIR) Student Travel Grant** — June 2023
- **Google Cloud Academic Research Grant**, Award: 274000118(2023-2024), Award: 331845891(2024-2025)
- **Lambda Labs Research Compute Grant** (2025-2026) .

Skills

Languages: C/C++, Python, Java, JavaScript/TypeScript, HTML/CSS, LaTeX
Tools: Git/GitHub, Unix Shell, Webpack, VS Code, IntelliJ CLion/PyCharm/IDEA, Atom

Peer Review and Service

Organizer/Co-Chair/Chair

- Resources Co-Chair ACM/IEEE Joint Conference on Digital Libraries, (JCDL'25) .
- Outreach and Publicity Chair ACM/IEEE Joint Conference on Digital Libraries, (JCDL'25) .

Program Committee Member

- Society for Industrial and Applied Mathematics (SIAM) International Conference on Data Mining (SDM'25)
- Workshop on Information Extraction for Scientific Publications @ AACL-IJCNLP 2023

Reviewer

- Scientometrics

Professional Memberships

- ACM

References

Dr. Dashun Wang
Professor and Kellogg Chair of Technology
Kellogg School of Management,
Northwestern University
Email: dashun.wang@kellogg.northwestern.edu
Website: dashunwang.com

Dr. Hamed Alhoori
Associate Professor - Computer Science
Northern Illinois University
Email: alhoori@niu.edu
Website: alhoori.github.io

Dr. Sagnik Roy Choudhury
Assistant Professor - Computer Science
University of North Texas
Email: Sagnik.Raychoudhury@unt.edu
Website: sagnik.github.io

Dr. Tirthankar Ghosal
Scientist (HPC and AI)
Oak Ridge National Laboratory
Email: ghosal@ornl.gov
Website: ornl.gov/tirthankar-ghosal