Subash Neupane

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Dept. of Computer & Data Science
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Research Interests

Generative AI, Natural Language Processing, Neuro-Symbolic AI, Knowledge Graphs, Healthcare, Cybersecurity

Current Appointment

Assistant Professor (Tenure-Track)
Dept. of Computer & Data Science
School of Applied Computational Sciences
Meharry Medical College
Nashville, TN, 37203

Education

Ph.D., Computer Science   2021 - 2025
Mississippi State University, Starkville, MS
M.Sc., Information Systems & Security   2019 - 2020
Tuskegee University, Tuskegee, Alabama
M.Sc., Information Technology   2014 - 2015
Swinburne University of Technology, Melbourne, Australia
B.E., Computer Engineering   2007 - 2011
Kathmandu University, Kathmandu, Nepal

Publications

Refereed Journal Papers

1. **Neupane, S.**, Mitra, S., Mittal, S., Golilarz, N. A., Rahimi, S., Amirlatifi, A. , & Gaur, M *MedInsight: A Multi-Source Context Augmentation Framework for Generating Patient-Centric Medical Responses using Large Language Models*, ACM Transactions on Computing for Healthcare, 2024.
2. Khatib, H. S. A., **Neupane, S.**, Manchukonda, H. K., Golilarz, N. A., Mittal, S., Amirlatifi, A., & Rahimi, S., *Patient-Centric Knowledge Graphs: A Survey of Current Methods, Challenges, and Applications,* Frontiers in Artificial Intelligence, 2024.
3. **Neupane, S.**, Mitra, S., Fernandez, I. A., Saha, S., Mittal, S., Chen, J.,& Rahimi, S,*Security Considerations in AI-Robotics: A Survey of Current Methods, Challenges, and Opportunities*, IEEE Access, 2024.
4. **Neupane, S.**, Ables, J., Anderson, W., Mittal, S., Rahimi, S., Banicescu, I., & Seale, M., *Explainable intrusion detection systems (x-ids): A survey of current methods, challenges, and opportunities,* IEEE Access, 10, 112392-112415, 2022.
5. Baba, A. I., **Neupane, S.**, Wu, F., & Yaroh, F. F., *Blockchain in accounting: challenges and future prospects.* International Journal of Blockchains and Cryptocurrencies, 2(1), 44-67, 2021.

Refereed Conference Papers

1. Tripathi H., Crowell C., Newlin k., *Neupane S.*, Rahimi S., Keith J., *ACE-TA: An Agentic Teaching Assistant for Grounded Q&A, Quiz Generation, and Code Tutoring*, FLAIRS, 2026 (Under Review)
2. Keith, J. M., Amirlatifi, A., Mittal, S., **Neupane, S.**, & Tripathi, H. (2025, June). *Barkplug 2.0 and Beyond-a Chatbot for Assisting Students in High DFW Courses.* In 2025 ASEE Annual Conference & Exposition.
3. **Neupane, S.** *Intelligent Clinical Assistant for Personalized Responses and Clinical Summaries.* Proceedings of the AAAI Conference on Artificial Intelligence. Vol. 39. No. 28. 2025. (Doctoral Consortium)

4. **Neupane, S**. Mitra, I. A. Fernandez, S. Mittal and S. Rahimi, *TwinExplainer: Explaining Predictions of an Automotive Digital Twin*, 2025 IEEE Conference on Artificial Intelligence (CAI), Santa Clara, CA, USA, 2025, pp. 1070-1077, doi: 10.1109/CAI64502.2025.00186.

5. **Neupane, S.**, Tripathi, H., Mitra, S., Bozorgzad, S., Mittal, S., Rahimi, S., & Amirlatifi, A, *CLINICSUM: Utilizing Language Models for Generating Clinical Summaries from Patient-Doctor Conversations.*, IEEE International Conference on Big Data (Big Data and AI for Healthcare), ICBD, 2024.

6. Mitra, S., **Neupane, S.**, Chakraborty, T., Mittal, S., Piplai, A., Gaur, M., & Rahimi, S.,*Localintel: Generating organizational threat intelligence from global and local cyber knowledge.*, International Symposium on Foundations & Practice of Security (FPS), 2024. **(Best Paper Award)**

7. Panigrahi, D., Mitra, S., **Neupane, S.**, Mittal, S., & Blakely, B. A., *IRSKG: Unified Intrusion Response System Knowledge Graph Ontology for Cyber Defense.* IEEE International Conference on Big Data (IEEE BigCyber), 2024.

8. **Neupane, S.**, Hossain, E., Keith, J., Tripathi, H., Ghiasi, F., Golilarz, N. A.,& Rahimi, S., *From Questions to Insightful Answers: Building an Informed Chatbot for University Resources,* Frontiers in Education, ASEE, 2024.

9. Rosas, S. R., **Neupane, S.**, Mitra, S., & Mittal, S., *ReVisE: Emulated Visual Outfit Generation from User Reviews using Generative-AI*, SEDE Conference: Software & Data Engineering, 2024.

10. Fernandez, I. A., **Neupane, S.**, Chakraborty, T., Mitra, S., Mittal, S., Pillai, N.,& Rahimi, S., *A Survey on Privacy Attacks Against Digital Twin Systems in AI-Robotics,* IEEE International CIC, 2024.

11. Keith, J. M., Amirlatifi, A., Rahimi, S., **Neupane, S.**, & Mittal, S., *Bark Plug: The ChatGPT of the Bagley College of Engineering at Mississippi State University,* ASEE Annual Conference & Exposition, 2024.

12. **Neupane, S.**, Fernandez, I. A., Patterson, W., Mittal, S., & Rahimi, S., *A temporal anomaly detection system for vehicles utilizing functional working groups and sensor channels,* IEEE CIC, 2022.

Posters

1. Pham, K., Penchala, S., Al Khatib, H. S., Golilarz, N. A., **Neupane, S.**, Mittal, S., ... & Bozorgzad, S. *A Knowledge Graph for Geriatric Patient Journeys*, IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI'25), 2025.

2. **Neupane, S.**, *Intelligent Clinical Assistant for Personalized Responses and Clinical Summaries,* Annual AAAI Conference on Artificial Intelligence (AAAI/SIGAI Doctoral Consortium), 2025 **(Best Poster Award)**.

3. Al Khatib, H., **Neupane, S.**, Mitra, S., Tripathi, H., Mittal, S., Rahimi, S., & Bozorgzad, S., *Large Language Models for Engineering Patient Journey Knowledge Graphs,* AAAI Fall Symposium Series, 2024.

4. Fernandez, I. A., **Neupane, S.**, Mittal, S., & Rahimi, S., *Poison attacks and adversarial prompts against an informed university virtual assistant,* ACM ACSAC '24: Annual Computer Security Applications Conference, 2024.

5. Patterson, W., Fernandez, I., **Neupane, S.**, Parmar, M., Mittal, S., & Rahimi, S., *A white-box adversarial attack against a digital twin*, ACM ACSAC '22: Annual Computer Security Applications Conference, 2022.

Pre-prints

1. Manzoor, F., Gupta, V., Pinky, L., Wang, Z., Chen, Z., Deng, Y., & **Neupane, S.** (2025). *A Systematic Review of Multimodal Deep Learning and Machine Learning Fusion Techniques for Prostate Cancer Classification.* medRxiv (Under Review).

2. **Neupane, S.**, Mittal, S., & Rahimi, S. (2025). *Towards a HIPAA Compliant Agentic AI System in Healthcare.* arXiv preprint arXiv:2504.17669.

3. Al Khatib, H. S., **Neupane, S.**, Mittal, S., Rahimi, S., Marhamati, N., & Bozorgzad, S. *Patient Journey Ontology: Representing Medical Encounters for Enhanced Patient-Centric Applications*, AAAI Fall Symposium, 2025 (Accepted for Lightening Talk).

4. Mitra, S., Chakraborty, T., **Neupane, S.**, Piplai, A., & Mittal, S. (2024). *Use of Graph Neural Networks in Aiding Defensive Cyber Operations.* arXiv preprint arXiv:2401.05680.

5. **Neupane, S.**, Fernandez, I. A., Mittal, S., & Rahimi, S. (2023). *Impacts and Risk of Generative AI Technology on Cyber Defense.* arXiv preprint arXiv:2306.13033.

Grants and Contracts (Current & Pending)

1. **NSF 23-598** : *Excellence in Research: Causal, Logic-grounded AI for Interpretable Clinical Reasoning (CLAIRE)*
   - **Funding Agency**: NSF
   - **Principal Investigator**: Subash Neupane
   - **Requested Amount**: $530,762
   - **Period**: 2026-2029
   - **Status**: Pending

2. **ARA** : *Agentic AI for Trustworthy Clinical Reasoning and Adaptive Care Coordination*
   - **Funding Agency**: Amazon
   - **Principal Investigator**: Subash Neupane
   - **Requested Amount**: $120,000
   - **Period**: 2026-2027
   - **Status**: Pending

3. **ED-GRANTS-111225-001**: *MAPLE: Multi-Agent AI Personalized Learning Experience*
   - **Funding Agency**: U.S. Department of Education
   - **Role**: Co-Principal Investigator
   - **Amount Requested**: $4,000,000
   - **Status**: Not Funded

4. **SBIR/STTR**: *MyDocSaid: Deep Learning for Patient-Centric Record, Summarization, and Analysis of Medical Conversations*
   - **Funding Agency**: National Institutes of Health
   - **Principal Investigator**: Nina Marhamati
   - **Amount**: $284,317
   - **Grant Number**: R41NR021089
   - **Role**: Senior Personnel

Teaching Experience

Course Instructor, Meharry Medical College
- MSDS 560 - Natural Language Processing   Fall 2025
- MSDS 570 - Visualization & Unstructured Data Analysis   Spring 2026

Senior Project Mentor, Mississippi State University   Spring 2023 - Fall 2024
- Supervised a senior design team of four graduate students in the development of the chatbot.

Lead Mentor, Mississippi State University   Spring 2024
- Provided mentorship to a high school scholar on integrating generative AI and Stable Diffusion, designing experiments, developing evaluation methods, and writing reports, culminating in a successful research paper.

Lead JROTC Cyber Academy Mentor, Mississippi State University   Summer 2022
- Represented Mississippi State University (MSU) as a mentor, providing academic and technical assistance to camp students in virtual lab environments.
- Facilitated breakout sessions, supporting students with team projects and individual activities, ensuring a collaborative and productive learning atmosphere.
- Assisted in running review sessions for the CompTIA IT (A+) Fundamentals, offering guidance on technical concepts and problem-solving strategies.

Teaching Assistant for "Operating Systems (CSE 4733)," Mississippi State University   Spring 2022
- Assisted with office hours, grading, and lab lectures.

Teaching Assistant for "Systems Programming (CSE 3183)," Mississippi State University   Spring - Fall 2021
- Assisted with office hours, grading, and lab lectures.

Teaching Assistant for "Intro to Computer Concepts (CSCI 100)," Tuskegee University Fall 2019 - Spring 2020
- Assisted with office hours, grading, and lab lectures.

Academic Honor (Award)

- AAAI/SIGAI Doctoral Consortium **(Best Poster Award)** — Spring 2025
- Foundations & Practice of Security (FPS – 2024) **(Best Paper Award)** — Fall 2024
- Inducted into Phi Kappa Phi Honor Society — Spring 2022

Professional Affiliation (Membership)

- Association for the Advancement of Artificial Intelligence (AAAI) - **Member**
- Association for Computing Machinery (ACM) - **Member**
- Institute of Electrical and Electronics Engineers (IEEE) - **Member**
- AI Club Committee Member, Mississippi State University

Professional Service

NSF IUSE Data Science Panel: — 2025

Served as review panelist:
- Panel: IUSE ESL L2/3 (Data Science) - **9 Federal Grant Proposal**

Scholarly Service: Journal and Conference Peer Review:
- Nature - **4 Journal Papers** — 2026
- IEEE Conference on Artificial Intelligence - **9 Conference papers** — 2026
- Nature - **12 Journal Papers** — 2025
- Journal of Ambient Intelligence and Humanized Computing - **1 Journal Paper** — 2025
- ICCECE **1 Conference Paper** — 2025
- ASEE Annual Conference & Exposition - **2 Conference Papers** — 2025
- ACM Transactions on Intelligent Systems and Technology- **1 Journal Paper** — 2025
- Frontiers in Medicine - **1 Journal Paper** — 2025
- ACM Transactions on Computing for Healthcare- **2 Journal Papers** — 2024
- ASEE Annual Conference & Exposition - **2 Papers** — 2024
- KDD 2024 Workshop KiL - **2 Conference Papers** — 2024
- Frontiers in Artificial Intelligence **- 1 Journal Paper** — 2024
- ACM CODASPY **- 1 Conference Paper** — 2023
- IEEE International Conference on Big Data - **2 conference Paper** — 2022

Presentations

- "Intelligent Clinical Assistant for Personalized Responses and Clinical Summaries", AAAI, (February 2025)
- "CLINICSUM: Utilizing Language Models for Generating Clinical Summaries from Patient-Doctor Conversations", IEEE Big Data, (December, 2024)
- "IRSKG: Unified Intrusion Response System Knowledge Graph Ontology for Cyber Defense", IEEE Big Data (BigCyber), (December, 2024)
- "Poison attacks and adversarial prompts against an informed university virtual assistant", ACM ACSAC, (December, 2024)
- "Large Language Models for Engineering Patient Journey Knowledge Graphs", AAAI Fall Symposium Series, (November, 2024)
- "A Survey on Privacy Attacks Against Digital Twin Systems in AI-Robotics", IEEE CIC (October, 2024)
- "Generative AI for Chatbots", The Office of the Provost and Executive Vice President, Mississippi State University (September, 2023)
- "A temporal anomaly detection system for vehicles utilizing functional working groups and sensor channels," IEEE CIC (December, 2022)