Siyu Wu

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https://siyuwu528.github.io/
Google Scholar

EDUCATION

Pennsylvania State University *University Park, PA*
PhD in Informatics: Information Sciences & Technology *Expected Grad May 2026*

- Research Area: Neural Symbolic AI & Data Science & HCI & Instructional Tech
- Course(s): Data Mining I and II; Projects using machine learning, statistical modeling, and deep learning in data science: https://github.com/SiyuWu528/data_science

Utah State University *Logan, UT*
Master of Science: Instructional Technology & Learning Science *Aug 2022*

- Research Thesis: Modeling a Pandemic: Investigating Student Learning about Disease Spread in the Context of Agent-Based Modeling (2022). All Graduate Theses and Dissertations. 9706.

TECHNICAL SKILLS

Programming: Fluency in Python, especially the scientific Python stack (Jupyter/Pandas/Sklearn/PyTorch, Stan), Cognition architecture (ACT-R) programming, NetLogo Programming, HTML, CSS, PHP, SQL, JavaScript
Learning Design Technologies: Agent-based modeling, UX/UI, Articulate Storyline
Software: SPSS, Tableau

WORK EXPERIENCE

Bosch Research and Technology Center
AI Intern *Pittsburgh, PA May 2024 – August*

Pennsylvania State University *University Park, PA*
Learning Design Assistant*:* Office of Learning Design, College of IST *Jan 2024 – Current*

- Heads to conduct accessibility evaluation in IST World campus courses, resolved 1 full online course document accessibility issues, and enhanced 1 full online course CSS accessibility issues.
- Collaborates to conduct mixed method analysis on course assessment, qualitatively uses grounded theory to develop a coded theme of instructional obstacle and conducts quantitative analysis using descriptive and inferential statistics.

Research Assistant: Applied Cognitive Science Lab *Dec 2022 – Jan 2024*

- Heads to conduct experiments on using ChatGPT-4 and Google Bard to create artificially intelligent cognitive models. Pioneering the presentation of a framework of prompt patterns that maximize LLMs' interaction for artificial cognitive architectures, aiming to achieve conversational excellence.
- Collaborates to train LLMs for broader applications in the development of cognitive artificial intelligence agents.
- Leads a team to design an autonomous driving agent using intelligent systems incorporating cognitive modeling techniques (ACT-R) & extended robotic hands & eyes. Achieves 1200% performance improvement compared to previous agent for the same task.
- Designs, develops, and simulates two autonomous driving agents to test two hypotheses of human driving behavior using different declarative chunks and production rules. Optimizes the approach for creating cognitive intelligent agents & provides an outperformed solution in terms of accuracy in danger identification.
- Collaborates to prototype and wireframe the UX/UI of an intelligent chemistry tutoring system, creates three game interfaces that demonstrate a significant improvement in

satisfaction for content experts compared to previous tutor systems, which results in the adoption of a design for the product roadmap.

Model Developer: Center for Science and Schools (CSATS) *June 2023 – July 2023*

- Headed team to reinvigorate a stagnant Nettango project. Improved an agent-based computational Nettango model in the context of Pollinator phenomenon. Specifically, incorporated student intuition by adding relevant blocks to the model, and created a flowchart and an e-learning curriculum focused on modeling.

Research Assistant: National Science Foundation Grant Project *Aug 2022 – May 2023*

- Supported to conduct statistical data analysis using SPSS & perform data visualization using Tableau to examine & present how feedback design in an automatic writing analysis system, leveraging Natural Language Processing, could enhance students' scientific writing skills

Utah State University *Logan, UT*

Research Assistant: National Science Foundation Grant Project *Jan 2020 – Aug 2022*

- Self-started the deployment & implementation of agent-based block-based computational models using the NetLogo programming language & Nettango platform. Created a suite of models for middle school students. Qualitative analysis demonstrated the effectiveness of this instructional tool for learning about complex public health phenomena

Research Assistant: National Institute of Food Agriculture Grant Project Sep *2021– Aug 2022*

- Headed the development of a user-centered website. Used HTML, CSS, and JavaScript for the front-end, and JavaScript, PHP, and SQL for the back-end database. Successfully delivered an accessible website that allowed users to search through over 100 curricula via a user-friendly interface
- https://smartfoodscapes.com/education/ed-home.html

Teaching Assistant: Native America in STEM Mentorship Program *Feb 2021– Aug 2022*

Web Accessibility Evaluator: WebAim, Disability Research center *Sep 2021– Oct 2021*

Brex Inc. *San Francisco, CA*

Instructional Designer *May 2021– Dec 2021*

- Coordinated to develop the online training courses for onboarding using Articulate Storyline, Photoshop, and Adobe Suite, resulting in the conversion of a week of onboarding training to an online format

AWARDS

- Future Leaders Summit Recipient (Fully funded and only one in PSU) hosted by the Michigan Institute for Data Science (MIDAS), University of Michigan. Nominated by C Lee Giles *April 2024*
- SBP-BRIMS 2023 conference scholarship *Sep 2023*
- Dr. William Rothwell Distinguished Professor Fund *Apr2023 – 2024*
- Robert Graham Endowed Fellowship, Penn State University *Aug 2022 – 2024*
- Graduate Enhancement Award, Utah State University *Aug 2021– Aug 2022*

GRANT PROPOSAL

Enhancing LLMs with a Neuro-Symbolic Architecture (ACT-R) for explanation, decision making, and reasoning by Frank E Ritter, C Lee Giles, and Siyu Wu. Proposal submitted to OpenAI: Superalignment Fast Grant. My role: Co-PI and collaborator Submitted not funded

SELECTED RELEVANT PUBLICATIONS

(Published and accepted, complete list of publications see google scholar)

- VSM-ACT-R: Toward Using Cognitive Architecture For Manufacturing Solutions. (June, 2024) Siyu Wu, Alessandro Oltramari, Frank E Ritter. Accepted to 17th International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRIMs)
- Wu, S., Ferreira, R., Ritter, F. E., Walter., L. (2024) Comparing LLMs for Prompt-Enhanced ACT-R and Soar Model Development: A Case Study in Cognitive Simulation. Proceedings of 38th Annual Association for the Advancement of Artificial Intelligence (AAAI) Conference on Artificial Intelligence Fall Symposium Series on Integrating Cognitive Architecture and Generative Models at Arlington, Virginia, USA.DOI: https://doi.org/10.1609/aaaiss.v2i1.27710
- Wu, S., Bagherzadeh, A., Ritter, F. E., Tehranchi, F. (2023) Long Road Ahead: Lessons Learned from the (soon to be) Longest Running Cognitive Model. Proceedings of 21st International Conference on Cognitive Modeling (ICCM) at the University of Amsterdam, the Netherlands. 281-287.
- Wu, S., Bagherzadeh, A., Ritter, F. E., Tehranchi, F. (2023) Cognition Models Bake-off: Lessons Learned from Creating Long-Running Cognitive Models. In proceedings 16th International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRIMs) 342-343.
- Wu, S., Swanson, H., Sherin, B., Wilensky, U. (2023). Using Agent-based Computational Modeling Microworlds to Help Middle School Students Learn about Epidemiology. Paper presented at the [2023] annual meeting of the American Educational Research Association. Retrieved [March, 4th. 2024], from the AERA Online Paper Repository.
- Wu, S., Swanson, H., Sherin, B., Wilensky, U. (2022). Investigating student learning about disease spread and prevention in the context of agent-based computational modeling. Proceedings of the 16th International Conference of the Learning Sciences - ICLS 2022. (pp. 1245 - 1248). Hiroshima, Japan: International Society of the Learning Sciences
- Kim. C., Puntambekar. S., Lee. E., Gnesdilow D., Dey, I., Cang, X., Wu, S., Passonneau, R. (2023) Understanding of a Law of Science and Its Relation to Science Writing with Automated Feedback. Proceedings of 17th International Conference of the Learning Sciences - ICLS 2023

WORKING MANUSCRIPTS

- Data-Driven Insights: LinkedIn-Based Prediction of Career Success for Alumni from Master of Engineering and Management Programs. By Stephanie Bowles, Dusan Ramljak, and Siyu Wu. Paper is going to venues like Journals of big data. My role: data analysis using ML and statistic modeling.

SELECTED RELEVANT PRESENTATIONS

(Complete list of presentations available upon request)

- Wu, S.(2024). LLAMA-ACT-R: Use Neuro-Symbolic Architecture (ACT-R) for LLM Decision Making in Manufacturing. 2024 Soar Workshop Presentation at University of Michigan, Ann Arbor.
- Wu, S., Giles, C. L., & Ritter, F. E. (2024). LLAMA-ACT-R, a neuro-symbolic architecture (ACT-R) for LLM decision making. In Poster presented in Annual Ethical AI Symposium. University of Michigan Institute for Data Science.
- Wu, S., Jackson, S., Strauss, S., Dai, X., Dinç, E., Kim, E., Kim, G., Luo, Y., Zhao. R. (2024, Mar). Heus omnibus linguistae audite vocem populi: Hey all you linguists, listen to the people's voices. Poster presented to the 2024 Conference of the American Association for Applied Linguistics (AAAL), Houston, TX.
- Wu, S., Bagherzadeh, A., Ritter, F., Tehranchi, F. (2023, Sep) Cognition Models Bake-off: Lessons Learned from Creating Long-Running Cognitive Models. Poster and Lightening Talk in 16th International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMs)

- Wu, S. Bagherzadeh, A., Ritter, F., Tehranchi, F (2023, June). Long Road Ahead: Lessons Learned from the (soon to be) Longest Running Cognitive Model. Poster for the 2023 Graduate Women in Science National Conference, PA, USA
- Wu.S. (2023, March). Student Learning in the Context of Agent-based Computational Modeling Microworlds. Lightening talk for the 2023 Symposium for Teaching and Learning with Technology at Penn State University Park Campus
- Northup. J., Wu. S. (2022, November). CSS Pitfalls for Screen Readers. Conference workshop presentation in 25th annual Accessing Higher Ground Accessible Media, Web and Technology Conference, Denver, Colorado

SERVICE TO THE PROFESSION AND COMMUNITY

• **Program Committee &Reviewer**	International Conference on Neural symbolic Reasoning and Learning (NeSy)	*May 2024- Current*
• **Reviewer**	IEEE Transactions on Knowledge and Data Engineering	*April 2024 – Current*
• **Reviewer**	Journal of Neurosymbolic Artificial Intelligence	*Dec 2023 – Current*
• **Member**	Advanced Association of Artificial Intelligence (AAAI)	*Sep 2023 – Current*
• **Member**	IEEE, Institute of Electrical and Electronics Engineers	*Jul 2023 – Current*
• **Member**	Center for Socially Responsible Artificial Intelligence, PSU	*Jul 2023 – Current*
• **Program Committee &Reviewer**	ICLS/CSCL 2023, International Society of Learning Sciences	*Nov 2022 – 2023*
• **Digital Committee Co-Chair**	Leading Organizational Change Through Innovation Conference	*May 2023– 2024*
• **Member**	American Educational Research Association	*Jul 2021 – Current*

MEDIA COVERAGE

Penn State News (March 2024): Informatics student to attend MIDAS future leaders summit
Utah State University News (Aug 2022): Spotlight: Siyu Wu

OTHER

Traditional Chinese art enthusiast, LEGO robotics instructor, love Zumba and managed a farm for over 10 yrs.