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Indiana University - Bloomington — 1275 E. 10th Street, Bloomington, IN 47401

EDUCATION

Doctor of Philosophy (Ph.D.)
Indiana University, Kelley School of Business — 2021 - 2026 (Expected)
- **Advisor:** Dr. Sagar Samtani
- **Major:** Management Information Systems (Minor: Data Science)
- **Research Associate,** Kelley's Data Science and Artificial Intelligence Lab (DSAIL)
- **Graduate Fellow,** Irsay Institute for Sociomedical Sciences Research

Master of Science (M.S.)
Duke University, Fuqua School of Business — 2019 - 2020
- **Major:** Quantitative Management, Business Analytics (Minor: Finance)

Bachelor of Science (B.S.)
Centre College — 2015 - 2019
- **Majors:** Mathematics, Economics, and Finance

DISSERTATION

Title (Proposal Defended April 2025): Multi-Modal Artificial Intelligence (AI)-Enabled Mental Health Analytics: Disorder Identification and Therapeutic Support
Dissertation Committee Members: Sagar Samtani (Chair), Bernice Pescosolido (Member), Ramesh Venkataraman (Member), Jingjing Zhang (Member), and Haizhen Lin (Member)
Abstract: Mental health disorders remain a significant public health concern. Traditional assessment methods provide valuable clinical insights but can be resource-intensive, rely on self-reports, and may not capture objective or continuous indicators essential for assessment and intervention. Artificial Intelligence (AI)-enabled analytics such as multimodal sensor data and large language models (LLMs), offer new opportunities to improve mental health risk detection and enhance therapeutic support. This dissertation explores two key research thrusts underpinned in Cognitive Behavioral Theory: (1) detecting mental health risks through sensor signal data and (2) developing AI-driven chatbot-based therapeutic interventions with LLMs. This first essay develops a deep learning model that captures sensor dependencies at feature and aggregate levels for depression risk detection. The second essay maintains predictive performance while minimizing reliance on sensitive data by introducing a privacy-preserving attention mechanism that adjusts feature importance based on privacy sensitivity scores. The second research thrust begins with a systematic review of LLM-based mental health chatbots to identify prevailing approaches. A reinforcement learning-optimized accountable LLM that aligns responses with mental health guidelines is presented. The final essay presents a multimodal AI chatbot integrating a modality fusion strategy to enhance emotional awareness and adaptability through speech and facial expressions. This dissertation contributes to the Information Systems (IS) knowledge base by introducing design principles for privacy-aware sensor-based mental health detection and accountable LLM designs. This research also advances IS health literature by developing structured methods for AI-based risk assessment and early mental health support. These contributions offer practical benefits to key stakeholders developing ethical and privacy-preserving AI models, policymakers establishing guidelines for responsible AI in mental health, and care providers seeking scalable, AI-assisted tools to support early mental health monitoring and intervention efforts.

RESEARCH INTERESTS

1. **Applications:** health informatics, mental health, sensor signal, mobile applications
2. **Methods:** AI, machine learning, deep learning, time series analysis, large language models

JOURNAL PAPERS

1. **A. Yuan**, H. Song, E. Garcia Colato, B. Pescosolido, and S. Samtani, "Improving Workplace Well-being in Modern Organizations: A Review of Large Language Model-based Mental Health Chatbots" ***ACM Transactions on Management Information Systems (TMIS)*****,** 16(1), 1-26, 2025.

2. **A. Yuan**, Y. Gao, and S. Samtani, "Identifying Emotional Distress on Social Media: A Replication Study" ***Forthcoming at AIS Transactions on Replication Research (TRR).***

JOURNAL PAPERS UNDER REVIEW

1. E. Garcia, **A. Yuan**, S. Samtani, and B. Pescosolido, "Developing Artificial Intelligence (AI)-Enabled Mental Health Analytics to Identify and Measure Depressive Behaviors in College Students: A Protocol for the Mental Health AI Pilot Study" ***Invited for 2nd Round Review at PLOS ONE.***

WORKING JOURNAL PAPERS

1. **A. Yuan**, H. Zhu, E. Garcia, and S. Samtani, "Detecting the Human Behaviors Associated with Depression via Sensor Signal Analysis: A Multiview-based Self-Attention Approach" ***Targeted at Management Information Systems Quarterly (MISQ).***

2. **A. Yuan**, S. Samtani, H. Zhu, and E. Garcia, "Privacy-Preserving Depressive Behavior Detection Using Sensor Signal Data: An Attention-based Knowledge Distillation Approach" ***Targeted at Information Systems Research (ISR).***

3. A. Dennis, M. Seymour, L. Yuan, **A. Yuan**, and B. Lazarine, "Diversity, Equity, and Inclusion of AI-Controlled Digital Humans".

REFEREED CONFERENCE PAPERS

1. **A. Yuan**, S. Samtani, and L. Yan, "Privacy-Aware AI for Mental Health: Advancing Sensor-Based Early Detection" ***2025 Conference on Health IT and Analytics (CHITA).***

2. S. Kadiyala, **A. Yuan**, and S. Samtani, "Large Language Model-Powered Anxiety-Focused Chatbot for Adolescents & Caregivers: A Few-Shot Learning Approach" ***2025 Conference on Health IT and Analytics (CHITA).***

3. **A. Yuan**, E. Garcia, H. Zhu, and S. Samtani, "Depressive Behavior Detection Using Sensor Signal Data: An Attention-based Privacy-Preserving Approach" ***2025 Hawaii International Conference on System Sciences (HICSS)*****.**

4. A. Nikam, S. Chaudhary, **A. Yuan**, E. Garcia, H. Zhu and S. Samtani, "Aligning Large Language Models with Mental Health Guidelines: A Low-Rank Adaptation Approach" ***2024 Conference on Health IT and Analytics (CHITA)*****.**

5. **A. Yuan**, H. Zhu, E. Garcia, and S. Samtani, "Detecting the Human Behaviors Associated with Depression via Sensor Signal Analysis: A Multiview-based Self-Attention Approach" ***2023 Conference on Health IT and Analytics (CHITA)***. **Best Student Paper Award.**

6. **A. Yuan**, H. Zhu, S. Samtani, E. Garcia, and M. Xu "Towards Privacy-Preserving Depression Detection: Experiments on Passive Sensor Signal Data" ***2023 IEEE International Conference on Digital Health (ICDH).***

7. **A. Yuan**, H. Zhu, E. Garcia, and S. Samtani, "Detecting the Human Behaviors Associated with Depression via Sensor Signal Analysis: An Agreement-based Self-Attention Deep Learning Approach" ***2022 INFORMS Workshop on Data Science (WDS).*** **Best Student Paper Award Nominee.**

INVITED PRESENTATIONS

1. POMS 2024 Annual Conference. **Presentation Title:** Privacy-Preserving Depressive Behavior Detection Using Sensor Signal Data: An Attention-based Knowledge Distillation Approach. Minneapolis, MN. Apr.26, 2024.
2. Digital Unleashed: Bridging Research and Practice on AI, Cybersecurity, and Digital Transformation. **Presentation Title:** Privacy-Preserving Depressive Behavior Detection Using Sensor Signal Data: An Attention-based Knowledge Distillation Approach. Bloomington, IN. Apr.19, 2024.
3. INFORMS 2022 Annual Meeting. **Presentation Title:** Detecting the Human Behaviors Associated with Depression via Sensor Signal Analysis. Indianapolis, IN. Oct.16, 2022.

GRANT WRITING EXPERIENCE

1. **Year**: 2025. **Grant Title:** "EAGER: FDASS: Designing Accountable Mental Health Large Language Model Therapy Software" **Funding source:** National Science Foundation. **Funding Amount:** $300,000. **Status:** Recommended for Funding. **Role**: Supporting Grant Writer.
2. **Year**: 2024. **Grant Title:** "SCH" **Funding source:** National Science Foundation. **Funding Amount:** $1,200,000. **Status:** Declined. **Role**: Supporting Grant Writer.

TEACHING EXPERIENCE

Indiana University, Kelley School of Business — Fall 2023, Fall 2024
Instructor, K353: Business Analytics and Modeling
Teaching Score: 6.3/7

Centre College, Department of Mathematics — 2017 - 2018
Teaching Assistant, Calculus I and Calculus III

PROFESSIONAL SERVICES

Reviewer

- ACM Conference on Human Factors in Computing Systems (CHI), 2025
- ACM Designing Interactive Systems Conference (DIS), 2025
- International Conference on Information Systems (ICIS), 2024
- International Conference on Information Systems (ICIS), 2023
- INFORMS Workshop on Data Science (WDS), 2023
- Pacific Asia Conference on Information Systems (PACIS), 2023
- INFORMS Workshop on Data Science (WDS), 2022. **Best Reviewer Award.**
- INFORMS Conference on Information Systems and Technology (CIST), 2022
- International Conference on Information Systems (ICIS), 2022

Volunteer

- INFORMS Conference on Information Systems and Technology (CIST), 2022
- INFORMS Workshop on Data Science (WDS), 2022
- International Conference on Information Systems (ICIS), 2021
- INFORMS Workshop on Data Science (WDS), 2021

AWARDS AND RECOGNITION

1. Alan R. Dennis Doctoral Fellow, 2025
2. Irsay Institute Graduate Fellow, 2025/2026
3. Participation in Doctoral Consortium, America's Conference on Information Systems, 2025
4. Participation in Doctoral Consortium, Pacific Asia Conference on Information Systems, 2025
5. Participation in Doctoral Consortium, Conference on Health IT and Analytics, 2023, 2025
6. Best Student Paper Award, Conference on Health IT and Analytics, 2023
7. Best Student Paper Award Nominee, INFORMS Workshop on Data Science, 2022
8. Best Reviewer Award, INFORMS Workshop on Data Science, 2022
9. Membership in Phi Beta Kappa Honor Society, 2019
10. Membership in Pi Mu Epsilon Honor Society, 2019
11. Colonel Scholarship, Centre College, 2015 – 2019

COMPUTER SKILLS

Python, R, SQL, Tableau, Matlab, Stata, SPSS, Mathematica, Qualtrics, NodeXL

PROFESSIONAL AFFILIATIONS AND SOCIETIES

1. Association of Information Systems (AIS), Student Member
2. Association of Computing Machinery (ACM), Student Member
3. Institute for Operations Research and the Management Sciences (INFORMS), Student Member
4. Production and Operations Management Society (POMS), Student Member
5. Institute of Electrical and Electronics Engineers (IEEE), Student Member

PROFESSIONAL REFERENCES

1. **Sagar Samtani, Ph.D. (Dissertation Committee Chair)**
   Associate Professor and Arthur M. Weimer Faculty Fellow
   Executive Founding Director, Data Science and Artificial Intelligence Lab
   Founding Editor-in-Chief, *ACM Transactions on AI Security and Privacy*
   Kelley School of Business, Indiana University
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2. **Bernice Pescosolido, Ph.D. (Dissertation Committee Member)**
   Distinguished Professor of Sociology
   Executive Director, Irsay Institute
   Department of Sociology
   College of Arts and Sciences, Indiana University
   1020 E. Kirkwood Ave, Ballantine Hall 744
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3. **Alan Dennis, Ph.D.**
   Distinguished Professor of Information Systems
   Department of Operations and Decision Technologies
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4. **Hongyi Zhu, Ph.D.**
Assistant Professor of Information Systems
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