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# Aijia Yuan

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Department of Operations and Decision Technologies  
Indiana University, Bloomington

Kelley School of Business  
1275 E. 10th Street, Bloomington, IN 47401

## EDUCATION

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### 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)
- **Lead 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

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**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. Grounded in Cognitive Behavioral Theory (CBT), this dissertation investigates two research thrusts: (1) detecting mental health risks using sensor signal data and (2) developing Large Language Model (LLM)-based therapeutic interventions. Essay 1 develops a deep learning model to capture sensor dependencies at both feature and aggregate levels for depression risk detection. Essay 2 minimizes the reliance on sensitive sensor data with a privacy-preserving attention mechanism that adjusts feature importance based on privacy sensitivity scores. The second research thrust begins with a systematic review (Essay 3) of mental health chatbots. Essay 4 introduces a stage-aware LLM with a novel reinforcement learning reward function and synthetic data generation to address data scarcity while ensuring clinical grounding and inter-session therapeutic quality. Essay 5 presents a multimodal LLM that integrates 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-based inter-session augmentation systems, grounded in clinical theory. These contributions provide practical value for stakeholders developing responsible AI in mental health and shaping related guidelines, as well as for healthcare providers seeking scalable AI-assisted tools to support early monitoring and continuity of care.

## RESEARCH INTERESTS

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1. **Applications:** health informatics, mental health, sociomedical sciences, behavioral health
2. **Methods:** AI, machine learning, deep learning, time series analysis, large language models

## PUBLISHED JOURNAL PAPERS

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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” *PLOS ONE*, 20(10): e0335847, 2025.
2. **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.
3. **A. Yuan**, Y. Gao, and S. Samtani, “Identifying Emotional Distress on Social Media: A Replication Study” *Communications of the Association for Information Systems (CAIS)*, 57, 1134-1146, 2025.

## JOURNAL PAPERS UNDER REVIEW

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1. **A. Yuan**, S. Samtani, and E. Garcia, “Privacy-Preserving Depressive Behavior Detection Using Sensor Signal Data: An Attention-based Knowledge Distillation Approach” *Major Revision at Information Systems Research (ISR)*.

## WORKING JOURNAL PAPERS

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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)*; **manuscript complete, final editing**.
2. A. Dennis, M. Seymour, L. Yuan, **A. Yuan**, and B. Lazarine, “Diversity, Equity, and Inclusion of AI-Controlled Digital Humans” *Targeted at Journal of Information Technology (JIT)*; **manuscript complete, final editing**.
3. **A. Yuan**, B. Ampel, Y. Gao, E. Garcia, and S. Samtani, “Stage-Aware Inter-Session Augmentation in Mental Health Therapy: A Fidelity-Optimized Large Language Model (LLM) Approach” *Targeted at Information Systems Research (ISR)*; **manuscript complete, final editing; Job Market Paper**.
4. B. Pescosolido, **A. Yuan**, and E. Garcia, “Mapping the Landscape of Mental Health Stigma in the United States: Insights from Adults and Children” *Targeted at Science*; **conceptualization phase**.

## REFEREED CONFERENCE AND WORKSHOP PAPERS

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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

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1. IS Student Presentations Over the Cloud (ISPOC) Seminar Series. Invited job market presentation. **Presentation Title:** Multi-Modal Artificial Intelligence (AI)-Enabled Mental Health Analytics: Disorder Identification and Therapeutic Support. Online. Oct. 30, 2025.
2. 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.
3. 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.
4. 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

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1. **Year:** 2025. **Grant Title:** “EAGER: FDASS: Designing Accountable Mental Health Large Language Model Therapy Software” **Funding source:** National Science Foundation. **Funding Amount:** \$299,524. **Status:** Funded. **Role:** Supporting Grant Writer.
2. **Year:** 2024. **Grant Title:** “SCH: Developing Artificial Intelligence (AI)-Enabled Mental Health Analytics to Objectively Identify and Measure Mental Health Disorders” **Funding source:** National Science Foundation. **Funding Amount:** \$1,184,840. **Status:** Declined (Rated Low Competitive). **Role:** Lead Grant Writer.
3. **Year:** 2023. **Grant Title:** “SCH: Developing Artificial Intelligence (AI)-Enabled Mental Health Analytics to Objectively Identify and Measure Mental Health Disorders” **Funding source:** National Science Foundation. **Funding Amount:** \$1,195,929. **Status:** Declined (Rated Not Competitive). **Role:** Lead Grant Writer.

#### TEACHING EXPERIENCE

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Indiana University, Kelley School of Business

Fall 2024

**Instructor, K353: Business Analytics and Modeling**

**Indiana University, Kelley School of Business**

Fall 2023

**Instructor, K353: Business Analytics and Modeling**

**Centre College, Department of Mathematics**

2017 - 2018

**Teaching Assistant, Calculus I and Calculus III**

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## **PROFESSIONAL SERVICES**

### **Reviewer**

- Workshop on Information Technologies and Systems (WITS), 2025
- 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

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## **AWARDS AND RECOGNITION**

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

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## **PRESS AND MEDIA MENTIONS**

- [“HWD professor/ IUB graduate plays crucial role in NSF-funded AI software training to expand mental health accessibility”](#) Notes From the Dean's Desk, August 19, 2025.
- [“Irsay Institute fights mental illness stigma through research, local and national partnerships”](#) IU Today, August 16, 2024.
- [“Irsay Institute fights mental illness stigma through research, local and national partnerships”](#) IU Today, August 16, 2024.

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## **COMPUTER SKILLS**

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

## **PROFESSIONAL AFFILIATIONS AND SOCIETIES**

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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**

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### **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 Co-Editor-in-Chief, *ACM Transactions on AI Security and Privacy*  
Kelley School of Business, Indiana University  
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Bloomington, IN 47405  
Email: [ssamtani@iu.edu](mailto:ssamtani@iu.edu)  
Phone Number: +1 (520)-971-4274

### **2. Bernice Pescosolido, Ph.D. (Dissertation Committee Member)**

Distinguished Professor of Sociology  
Executive Director, Irsay Institute for Sociomedical Sciences Research  
Department of Sociology  
Inducted Member, National Academy of Medicine and National Academy of Sciences  
College of Arts and Sciences, Indiana University  
1020 E. Kirkwood Ave, Ballantine Hall 744  
Bloomington, IN 47405  
Email: [pescosol@iu.edu](mailto:pescosol@iu.edu)  
Phone Number: +1 (812)-855-6213

### **3. Ramesh Venkataraman, Ph.D.**

John R. Gibbs Professor and Professor of Information Systems  
Dean of the Edward L. Hutton Honors College  
Department of Operations and Decision Technologies  
Kelley School of Business, Indiana University  
1309 E. 10th St, HH 4100  
Bloomington, IN 47405  
Email: [venkat@iu.edu](mailto:venkat@iu.edu)  
Phone Number: +1 (812)-855-2641

### **4. Alan Dennis, Ph.D.**

Distinguished Professor of Information Systems  
Department of Operations and Decision Technologies  
Kelley School of Business, Indiana University  
1309 E. 10th St, HH 4100  
Bloomington, IN 47405  
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