Fatemeh Jamshidi

Curriculum Vitae

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https://scholar.google.com/citations?user=24P2bWoAAAAJ&hl=en

WORK EXPERIENCE

- **Assistant Professor,** *Computer Science Department*, **California State Polytechnic University, Pomona (CPP)**
  August 2024 – Present
  - Director of IMMERSYNC Lab, mentoring students in AR/VR, Music AI, Game Music, and Game Development research.
  - Co-Director of the VR Lab, overseeing immersive systems research and collaboration.
  - Advise undergraduate and graduate students on research and professional growth.
- **Web Development Lead Architect,** *Military REACH*, **Auburn University**
  February 2019 – July 2024 *(Funded by the DoD's Office of Military Community and Family Policy)*
  - Led web and mobile development efforts to support a military family knowledge platform.
  - Developed an iOS app using SwiftUI and Firebase for research evaluation and user studies.
  - Mentored graduate students in full-stack development and ML applications.
  - Enhanced database systems, implemented content management with Cascade, and built APIs with SpringBoot.
  - Improved back-end infrastructure to support advanced features like chatbot and semantic search.

PARTICULARS

EDUCATION

Auburn University — Auburn, AL
Ph. D. in Computer Science and Software Engineering — *Aug 2020 - Aug 2024*

Auburn University — Auburn, AL
M. S. in Music Education — *Aug 2021 - May 2023*

Auburn University — Auburn, AL
M. S. in Computer Science and Software Engineering — *Jan 2018 - Aug 2020*

University of Isfahan — Isfahan, Iran
B. S. in Computer Science — *Aug 2011 - May 2015*
Minored in Music: Piano Performance

DISSERTATION

Title: "PianoMentor: A Technological Framework to Teach and Practice Piano/Keyboard Online via Machine Learning with an Embedded Practice Lesson Generator"
Advisor: Dr. Richard Chapman

CONTRACTS AND GRANTS

- **2025–30**
  Mirzaei, S.(PI); Sotoudeh, Z., Jamshidi, F., Xiao, M., Masehian, E. (Co-PIs)
  Center for Research Advancement in Smart Manufacturing (CREST-RASM)
  Funding Source: National Science Foundation (NSF CREST Phase I Center)
  Total Award: $7,500,000
  Established a multidisciplinary research center integrating artificial intelligence into robotics, digital twin technology, extended reality, and cybersecurity to advance Industry 4.0. The project prepares future engineers and scientists through hands-on research, Ph.D. bridge programs, and national collaborations. Over 120 students (80 undergraduate and 40 graduate) will participate annually in research, outreach, and workforce development initiatives.

- **2025–26**
  Jamshidi, F. (PI); Xiao, M. (Co-PI)
  Immersive Learning: Developing Augmented and Virtual Reality Course Content for Introductory Computer Science Courses
  Funding Source: Cal Poly Pomona Internal Grant – Special Projects for Improving the Classroom Experience (SPICE)
  Total Award: $25,000
  Designed interactive VR/AR modules to enhance student understanding of cybersecurity and object-oriented programming. The project includes immersive simulations of network attacks and 3D visualizations of code structures. A student-led VR symposium will showcase outcomes.

- **2025–26**
  Kim, J. (PI); Jamshidi, F. (Co-PI)
  Code, Create, Compose (CCC): A STEAM Pathway for Expanding Computer Science Education in Early Childhood and Elementary Classrooms
  Funding Source: Cal Poly Pomona Internal Grant – Strategic Interdisciplinary Research Grant (SIRG)
  Total Award: $19,000
  This interdisciplinary project prepares preservice elementary teachers to introduce computer science and digital literacy using developmentally appropriate pedagogies. The initiative addresses gaps in the CSU teacher preparation pipeline to meet California's K–12 CS standards.

ACADEMIC HONORS and AWARDS

- **2022 NCWIT Collegiate Award Finalist ($10000), Feb 2022**
  National Center for Women and Information Technology
  Awarded for technical contributions to projects demonstrating high innovation and potential impact. The NCWIT Collegiate Award recognizes graduate students who are developing applications of AI and other technologies to solve real-world problems. My contributions involved leveraging Machine Learning for music transcription and generating adaptive lessons to improve music pedagogy.
- **J. Alley Family Fellowship ($2000), Apr 2021**
  Fellowship recipients are selected based on their academic excellence, extracurricular activities, and leadership abilities.
- **100+ Women Strong Graduate Leadership Award ($3000), Apr 2021**
  The 100+ Women Strong Leadership Award recognizes graduate students in the College of Engineering who have demonstrated outstanding leadership qualities.

RESEARCH EXPERIENCE

- **Assistant Professor / PI, Cal Poly Pomona, (August 2024 – Present)**
  Immersive Learning, Music Technology, and Game AI Research
  - Lead researcher at the IMMERSYNC Lab focusing on AI-driven music learning, game AI, and immersive learning environments.
  - Developed VR and AR content for core CS courses, including cybersecurity and object-oriented programming, funded by SPICE Grant ($25,000).
  - Co-PI on interdisciplinary grant integrating CS education into early childhood STEAM curricula (SIRG Grant, $19,000).

  - Mentored students in implementing semantic search, chord progression analysis, and generative music systems.
  - Organized a VR student showcase to increase accessibility and engagement with immersive technologies in education.

- **Research Assistant, Auburn University, (Aug 2020 – Aug 2024)**
  Automatic Music Transcription, AI and Machine Learning in Music Assessment and Generation
  - Identified open problems in Machine Learning and Reinforcement Learning for music education tools.
  - Developed a CNN+LSTM model for real-time polyphonic piano transcription to MIDI.
  - Proposed a hierarchical autonomous score-following framework using reinforcement learning.
  - Created a deep learning model for chord detection in classical piano performances.
  - Constructed a practice lesson dataset integrating MAPS, MAESTRO, and GiantMIDI-Piano corpora.
  - Designed an auto-generative piano lesson recommender system based on RL and student learning styles.
  - Published and presented results at ACM and HCI venues.

- **Researcher, Auburn University, (May 2022 – Aug 2024)**
  AR/VR Technologies in Agriculture
  Funding: NSF Grant ($10M)
  - Developed AR prototypes to teach K–12 students crop diagnostics and sustainable farming practices.
  - Built VR simulations for safe machinery operation in agricultural settings.
  - Integrated remote sensing data with immersive VR environments for crop monitoring.
  - Collaborated with Biosystems Engineering to evaluate impact in real-world agricultural education.

- **Researcher, Auburn University, (May 2021 – Aug 2022)**
  Educational App to Teach Math to Students with Visual Impairment
  - Developed MyAccessible Math web prototype using JavaScript and Java libraries.
  - Conducted user testing with 10 visually impaired students across K–12 levels in Alabama.
  - Redesigned interface based on educator feedback to enhance accessibility.
  - Created an adaptive survey tool to support efficacy studies and data collection.

- **Researcher / App Developer, Auburn University, (May 2021 – Aug 2022)**
  Audiology Ear Training iOS Game Application
  - Designed an interactive iOS game to assess preschool children's hearing levels using SwiftUI and Firebase.
  - Collaborated with the Auditory and Music Perception Lab and the CS department.
  - Implemented RNN-based music generation model for game interactions.

TEACHING EXPERIENCE

- **Assistant Professor, Computer Science Department**
  Cal Poly Pomona, (Fall 2024 – Present)
  - Taught undergraduate and graduate courses, combining theoretical foundations with hands-on practical work.
  - Courses taught:
    * CS 5170 – *Advanced natural Language Processing* (Graduate Program) – Spring 2026
    * CS 5250 – *Advanced Computer Architecture* (Graduate Program) – Summer 2025
    * CS 4700 – *Game Development* (Undergraduate Program) – Fall 2024, Spring 2025, Fall 2025
    * CS 4350 – *Database Systems* (Undergraduate Program) – Winter 2025
    * CS 4080 – *Concepts of Programming Languages* (Undergraduate Program) – Fall 2024, Summer 2025
    * CS 3560 – *Object Oriented Programming* (Undergraduate Program) – Spring 2025, Fall 2025

  - Designed and delivered interactive lectures, curated course materials, and supervised student projects.
  - Guided undergraduate research projects and mentored students on career pathways in CS.

- **Graduate Teaching Assistant/Instructor, Computer Science and Software Engineering**
  Auburn University, (Aug 2018 – July 2024)
  - Taught in-person and online courses at Undergraduate and Graduate levels such as Algorithm and Data Structures, Object Oriented Programming, Web Application Development, and Human-Computer Interaction. Student enrollment of 18–50 each semester.
  - Developed syllabus, quizzes, exams, and homework.
  - Revised the syllabus to meet accreditation standards.
  - Coordinated grading and labs/office hours.
  - Supervised students' research work, maintained office hours to assist students, etc.

- **Director, Persian Music Ensemble**
  Auburn University, Music Department, (Aug 2021 – July 2024)
  - Directed adult Persian band and coordinated all musical repertoire.
  - Prepared and performed appropriate preludes, postludes, and other piano music.
  - Conducted instrumentalists for 1–2 major works per year.
  - Played the piano for special Persian events.
  - Attended weekly staff meetings and helped with coordinating all Persian musical activities.

- **Coordinator, Computer + Music Program**
  Auburn University, (Aug 2018 – July 2024)
  - Designed a curriculum that integrated music education with technology, subsequently evaluated by graduate students as part of a high-level music curriculum assessment project.
  - Successfully recruited students from Alabama and neighboring regions, resulting in a 50% increase in enrollment over three years.
  - Created engaging content, including assignments, hands-on exercises, and instructional videos to enrich student learning.
  - Spearheaded a pilot study, collecting and analyzing data to refine and optimize the program's effectiveness.
  - Collaborated in grant-writing initiatives and secured a **$10,000** NCWIT Grant to embed music principles in introductory AI and computer science modules.
  - Authored and led two research papers published in ACM SIGCSE 2019 and 2020, focusing on the enhancement of creativity and engagement in computer education.

- **Teaching Assistant, Computer Engineering Department**
  University of Isfahan, Isfahan, Iran, (Sep 2015 – Sep 2017)
  - Held several lectures on Audio Signal Processing and Real-Time Systems, Artificial Intelligence, and Machine Learning.
  - Developed course hands-on activities and recorded several lectures for outreach and online asynchronous courses.
  - Designed assignments, and rubrics for grading the assignments and exams.
  - Assisted students with solving problems and mentored them towards better performance in their course.

SELECTED PUBLICATIONS

PAPERS

1. **Fatemeh Jamshidi**, Maryam Bigonah, Daniela Marghitu, "Striking a Chord: A Mixed-Methods Study of Music-Based Learning to Leverage Music and Creativity to Bridge the Gender Gap in Computer Science", *ACM Transactions on Computer Science Education (ACM SIGCSE)*, **March 2024**.
2. Abhishek Jariwala, **Fatemeh Jamshidi**, Daniela Marghitu, Richard Chapman, "Development and Assessment of MyAccessible Math: Promoting Self Learning for Students with Vision-Impairment", *Universal Access in the Information Society*, **November 2023**.

3. Prashamsa Pandey, **Fatemeh Jamshidi**, Daniela Marghitu, "Introducing Computer Science and Arts for All (CSA4ALL): Developing an Inclusive Curriculum and Portal for K5 Children". *International Conference on Human-Computer Interaction*, **July 2023**.
4. Nancy Barry, **Fatemeh Jamshidi**, Chase Moore, "Technology Applications for the Post-COVID Music Classroom: Implications and Applications for 21st Century Teaching and Learning", *Mid-South Educational Research Association (MSERA) Conference*, **November 2022**.
5. **Fatemeh Jamshidi**, "Re-imaging the Future of Music Learning and Practicing by Developing a Machine Learning Web Application for Music Teaching and Learning in Blended Environments", *Mid-South Educational Research Association (MSERA) Conference*, **November 2022**.
6. **Fatemeh Jamshidi**, "A Technological Framework to Teach Music Online via Machine Learning with the Focus on Automated Chord Detection.", *Auburn University*, **June 2021**.
7. **Fatemeh Jamshidi**, Daniela Marghitu, Richard Chapman, "Developing an Online Music Teaching and Practicing Platform via Machine Learning: A Review Paper", *International Conference on Human-Computer Interaction (pp. 95-108)*, **March 2021**.
8. **Fatemeh Jamshidi**, Abhishek Jariwala, Bibhav Bhattarai, Katherine Abbate, Daniela Marghitu, Mallory Lucier-Greer, "Military REACH: A University-wide Collaboration", *International Journal on Advances in Internet Technology*, **June 2021**.
9. **Fatemeh Jamshidi**, Abhishek Jariwala, Bibhav Bhattarai, Katherine Abbate, Daniela Marghitu, Mallory Lucier-Greer, "Building Web-Based Environment to Support Sponsored Research and University-wide Collaborations", *WEB 2020: The Eighth International Conference on Building and Exploring Web Based Environments*, **July 2020**.
10. Meenakshi Das, Daniela Marghitu, **Fatemeh Jamshidi**, Mahender Mandala, Ayanna Howard, "Accessible Computer Science for K-12 Students with Hearing Impairments", *International Conference on Human-Computer Interaction (pp. 173-183)*, **July 2020**.
11. **Fatemeh Jamshidi**, Daniela Marghitu, "A Web-Based Platform to Teach Music Online", *WEB 2020: The Eighth International Conference on Building and Exploring Web Based Environments*, **July 2020**.
12. **Fatemeh Jamshidi**, Daniela Marghitu, "Using Music to Foster Engagement in Introductory Computing Courses", *ACM Technical Symposium on Computer Science Education (ACM SIGCSE)*, **February 2019**.

PENDING PAPERS

13. **Fatemeh Jamshidi**, Maryam Bigonah, Daniela Marghitu, "Adaptive Music Instruction: Application of Artificial Intelligence, Virtual Reality, and Augmented Reality in Music Education", In preparation for *Annual AAAI Conference on Artificial Intelligence*, **February 2025**.
14. **Fatemeh Jamshidi**, Richard Chapman, Daniela Marghitu, "Reinforcement Learning for Personalized Piano Education: An AI System for Generating Tailored Exercises and Instant Feedback", In preparation for *IEEE Transactions on Pattern Analysis and Machine Intelligence*, **2024**.
15. **Fatemeh Jamshidi**, Richard Chapman, Daniela Marghitu, "From Audio Waveforms to Sheet Music: A Systematic Review of Automatic Music Transcription", In preparation for *International Society for Music Information Retrieval (ISMIR)*, **2024**.

INVITED/ CONFERENCE TALKS

16. Served as an invited speaker for CAFE's workshop, Designing Specific Assignments With AI Awareness, and the AI in Education Unconference at Cal Poly Pomona, sharing insights on AI applications in education.
17. Maryam Bigonah, **Fatemeh Jamshidi**, Aparana Pant, and Daniela Marghitu, "Transforming Agricultural Education: Harnessing Gamified Augmented Reality and Virtual Reality Technologies for Student Learning", *Auburn Graduate Student Research Symposium*, **October 2023**.
18. Xiaowen Gong, Thaddeus Roppel, Daniela Marghitu, Melody Russell, Chih-hsuan Wang, and **Fatemeh Jamshidi**, "Project-Based Learning for Rural Alabama STEM Middle School Teachers in Machine Learning and Robotics", *2023 ASEE Annual Conference and Exposition*, **July 2023**.
19. Prashamsa Pandey, **Fatemeh Jamshidi**, and Daniela Marghitu, "Introducing Computer Science And Arts For All (CSA4ALL): Developing An Inclusive Curriculum And Portal For K5 Children", *Auburn Graduate Student Research Symposium*, **October 2022**.
20. **Fatemeh Jamshidi**, "A Computer-Based Multi-Media Tutor for Practicing Piano", *Auburn Graduate Student Research Symposium*, **October 2021**.

21. **Fatemeh Jamshidi**, Nancy H Barry, Daniela Marghitu, "Mentoring Alabama Girls in Computing and Music (MAGIC + M)", *ACM SIGCSE 2020 Pre-Symposium Event on Liberal Arts Computing Curricula: Innovations, Challenges, and Opportunities*, **March 2020**.

STUDENT MENTORSHIP AND SUPERVISION

Current Graduate Students (Thesis/Project Supervision)

- **Bill Kim**
  Emotion Extraction from K-Pop Korean Songs
  Uses AI to analyze lyrics, vocal tone, and musical elements to reveal emotional depth in K-Pop, enhancing fan connection and engagement.
- **Trung Vu**
  Communicating Flood Risk and Mitigation Using Augmented Reality
  Developed an AR tool and web portal to visualize property-level flood risk and suggest mitigation strategies, with a focus on environmental justice for vulnerable communities.
- **Keita Katsumi**
  Personalized Music Recommendations Using Deep Learning and User Behavior Analysis
  Designed a recommendation system trained on a curated dataset from iPalPiti to address popularity bias and cold-start issues through deep learning and behavioral modeling.

Current Undergraduate Students (Senior Project Supervision)

- **Dhruv Bhatnagar**
  Generative Music AI for Games
  Real-time adaptive soundtracks that dynamically respond to gameplay mechanics and player emotions to enhance immersion.
- **Farid Vakili**
  ML and Generative AI for Personalized XR Therapy in Palliative Care
  Combines machine learning and generative AI to deliver personalized music and visual therapy in immersive XR environments for improved patient well-being.
- **Hans Jeremy**
  Adaptive Game NPC AI
  Implements machine learning to create non-playable characters that respond to player emotions and performance to provide dynamic support or challenge.

Graduate Alumni – Thesis/Project Supervision

- **Dhruvi H. Choksi**
  VR Prototype for Reducing Motion Sickness
  Designed immersive VR mechanics like web-swinging and jetpack flight to study and reduce VR motion sickness.
- **Amir Mohideen Basheer Khan**
  MindPool: VR Mind-Mapping Tool
  Developed a holographic mind-mapping VR tool with AI and web connectivity to support brainstorming and idea generation.
- **Rubayet Mujahid**
  Integrating Amesim with Unity to Visualize Aircraft Flight Path
  Bridged engineering simulations and interactive 3D visualizations by connecting Amesim-generated flight data with Unity through a Python interface for educational and design purposes.

ACADEMIC SERVICE

- **Invited Speaker** - *Artificial Intelligence for Music, IEEE ICME 2025*
- **Reviewer** - *NSF Applications 2025*
- **Invited Reviewer** - *Discover Applied Sciences Journal 2024, IGI Global Book Chapter 2024*
- **Reviewer (Conference Posters)** - *ACM SIGCSE 2022, 2023, 2024 Conference Posters*
- **Reviewer (Demonstrations)** - *ACM SIGCSE 2021 Conference Demo Presentations*
- **Director, Persian Music Ensemble**
  Auburn University, Music Department (2021 - 2023)

COMPUTER SKILLS

- **LMS Tools** - *Canvas, Piazza, Panopto, Vocareum*
- **Programming Languages** - *C, C++, C#, Java, Python, React Js*
- **Databases** - *MySQL, Spark SQL*
- **Web Development** - *HTML, CSS, JSP/Servlet, AWS, React Js, Java SpringBoot*
- **Machine Learning Frameworks** - *TensorFlow, PyTorch, Keras, Scikit-learn*
- **Speech Recognition** - *Kaldi, DeepSpeech, SpeechRecognition*
- **Music Notation Tools** - *Sibelius, Finale, Encore, Autoscore, Overture, Rhapsody, Music Time, NoteFlight*
- **Music Composition Tools** - *Studio One, Audacity, Logic*

PROFESSIONAL TRAINING

- **2023**. Preparing Future Faculty Workshop, Auburn University.
- **2021**. Grant Writing Certification, Academy for Writing, Auburn University.
  - Led the grant proposal of **$100,205.97**, titled "A Technological Proposal to Support Music Education for Both Blind and Sighted Students," emphasizing the integration of technology in inclusive education **(Pending, has not been submitted).**
- **2021**. Re-Orientation to Teaching, Biggio Center for the Enhancement of Teaching and Learning, Auburn University.
- **2020**. Course Re-design, Biggio Center for the Enhancement of Teaching and Learning, Auburn University.
- **2020**. Integrating Writing in Large Enrollment Classes, Biggio Center for the Enhancement of Teaching and Learning, Auburn University.

UNIVERSITY SERVICE

- **Laboratory Committee Member** *Fall 2024 – Present*
  Participating in planning and evaluation of laboratory needs and resource allocation at Cal Poly Pomona.
- **Scholarship Committee Member** *Fall 2024 – Present*
  Reviewed student applications and contributed to scholarship award decisions at Auburn University.
- **Curriculum Committee Member** *Fall 2024 – Present*
  Contribute to curriculum development with a focus on integrating artificial intelligence (AI) concepts into core computer science and programming courses. Collaborate with faculty to research innovative instructional strategies and design AI-enhanced learning modules.
- **Advisor, Game Development Club, Cal Poly Pomona** *Fall 2024 – Present*
  Mentoring undergraduate students in game development and coordinating campus-wide outreach activities.
- **Member, Society of Women Engineers (SWE)** *2021 – Present*
  Supporting diversity and inclusion in STEM through advocacy and event participation.
- **Member, 100+ Women Strong, Auburn University** *2020 – 2024*
  Recruited and mentored underrepresented students in computer science through workshops and outreach.
- **Ambassador, GSC Event Committee** *2021 – 2022*
  Represented graduate students and coordinated social and academic events.
- **E-Day Volunteer for Prospective Ph.D. Students** *Fall 2019 – Fall 2020*
  Assisted with graduate program orientation and engagement events at Auburn University.
- **Engineering Day Volunteer** *Fall 2019, Fall 2020, Fall 2021*
  Contributed to outreach events to inspire future engineers through hands-on demonstrations.
- **Pianist, Symphonic Winds and Concert Band** *Spring 2022*
  Performed with Auburn University's music ensembles as part of cross-disciplinary university service.
- **Webmaster, Iranian Student Association (IRSA)** *2020 – 2021*
  Maintained website, coordinated event promotion, and supported community engagement.

REFERENCES

Dr. Richard Chapman
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