

# JASMINE LIANG

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## SUMMARY

Highly motivated and experienced researcher in Machine Learning with strong problem-solving and communication skills through extensive multidisciplinary research experience (2014-Present) with the ability to work independently. Special expertise in the following areas: Artificial Intelligence/Machine Learning (AI/ML), Quantitative Analytics, Data Analysis, Experimental Design, Statistical Analysis, Health Data Analysis, Motion Analysis.

## TECHNICAL SKILLS AND CERTIFICATIONS

**Stanford University** - Machine Learning Certificate

**Programming Languages:** Java, Python, MATLAB, SQL

**Machine Learning and AI Tools:** PyTorch, TensorFlow, Scikit-learn, Time-Series Analysis, OpenCV, OpenPose, LLM, NLP, Generative AI

**Statistical Computing / Data Visualization / Libraries:** R, SPSS, Tableau, Matplotlib, pandas, NumPy

## EDUCATION

### Iowa State University

*Ph.D. Computer Science, and Biomechanics - Double Major*

- Awarded University Research Excellent
- Relevant Coursework: Advanced Artificial Intelligence, Machine Learning, Design and Analysis of Algorithms

### University of Michigan

*DPT concentration in Biomechanics*

### National Cheng Kung University

*B.S. concentration in Biomechanics*

- Awarded National Undergraduate Research Fellowship, National Science Council

Iowa

June 2024

Michigan

2021

Taiwan

2017

## PROFESSIONAL EXPERIENCE

### Graduate Researcher in Machine Learning

Aug 2019 – Present

*Iowa State University*

*Ames, IA*

- Deployed deep learning models incorporating attention layers to integrate wearable sensor data, significantly enhancing early-stage knee osteoarthritis diagnosis to 92.5% accuracy with explainable AI methodologies.  
- Python / TensorFlow / RNN / LSTM / Time-Series Analysis / Machine Learning / Visual3D / Signal Processing
- Optimized prediction time for intention and motion detection by 90% using machine learning-enhanced pipelines with IMU.  
- Python / Time-Series Analysis / TensorFlow / Deep Learning / RNN / Motion Capture / Signal Processing / Robotics
- Advanced fall risk quantification for in a one million CDC-funded research project with 84% accuracy by developing and deploying a machine learning pipeline using IMU and time-series data.  
- Python / Time-Series Analysis / Scikit-learn / Machine Learning / MATLAB / Signal Processing / Wearables / IMU / Health Data
- Developed a machine learning model utilizing motion camera and wearable sensor data to decrease time by 95% to estimate kinematics across diverse locomotion activities, enhancing insights into balance perturbation analysis.  
- Python / Time-Series Analysis / PyTorch / MATLAB / Signal Processing / Wearables / IMU / Motion Capture Camera / Visual3D / Gait / Robotics

### Course Developer - Analytics and AI Health Strategies

June 2024 – Present

*Iowa State University*

*Ames, IA*

- Developing DH5160 - Analytics and AI Health Strategies course in the newly launched Master of Digital Health Program focused on analyzing health data using machine learning models and visualization tools.  
- Python / Azure Automated Machine Learning / SQL / R / Tableau / Business Intelligence Tools / Health Data
- Led curriculum development to ensure student gain comprehensive understanding of AI and analytics in digital health using GitHub Classroom.  
- Cross-functional Leadership / Git / Instructional design / Communication / Collaboration

### Data Analytics

Jan 2018 – June 2019

*National Olympic Training Center*

*Kaohsiung, Taiwan*

- Implemented data analysis pipelines using MySQL and pandas, optimizing insights into athlete performance and injury prevention strategies, resulting in a 25% reduction in data processing time and a 15% improvement in injury prediction accuracy.  
- SQL / pandas / Communication / Collaboration
- Achieved a 15% increase in KPIs by leveraging motion capture systems and IMUs to analyze sports biomechanical data using Tableau and R.  
- Tableau / R / Biomechanical / Motion Capture

PROJECTS

<b>Anomaly Detection for Failing Servers On Networks</b>   <i>Python, sklearn, pandas, matplotlib</i>	Jan 2021 – May 2021
<ul style="list-style-type: none"><li>Implemented anomaly detection algorithms to identify abnormal server behavior based on throughput (mb/s) and latency (ms) metrics.</li><li>Developed and applied Gaussian models to detect anomalies in a 2D dataset, visualizing algorithm performance and identifying outliers.</li><li>Extended anomaly detection to high-dimensional datasets, achieving detection accuracy and identifying anomalies by cross-validation.</li><li>Optimized anomaly detection thresholds using precision-recall metrics, enhancing algorithm performance in identifying true anomalies.</li></ul>	
<b>Recommendation Systems</b>   <i>Python, scipy, NumPy, sklearn</i>	Jan 2022 – May 2022
<ul style="list-style-type: none"><li>Implemented collaborative filtering algorithms to predict movie ratings based on a dataset of 1682 movies and 943 users.</li><li>Developed and optimized collaborative filtering cost functions and gradients, achieving accurate predictions by minimizing squared error.</li><li>Implemented regularization techniques to enhance model generalization and mitigate overfitting in collaborative filtering algorithms.</li><li>Personalized movie recommendations by integrating user preferences into collaborative filtering model, enhancing engagement and satisfaction.</li></ul>	
<b>System for Enhancing Fair Judgment in Gymnastics Through Advanced Pose Estimation</b>   <i>Python, OpenPose, OpenCV, Caffe</i>	Jan 2024 – May 2024
<ul style="list-style-type: none"><li>Developed deep learning-based pose estimation algorithms using OpenPose to track dynamic gymnastics movements in real-time.</li><li>Designed data structures for key body points and movement trajectories, with interactive tools for real-time visualization and feedback.</li><li>Conducted thorough testing with diverse video datasets, evaluating joint detection accuracy, pose estimation error, and tracking consistency.</li><li>Integrated feedback from gymnasts and coaches to refine algorithms and enhance the user interface for practical usability.</li></ul>	

PUBLICATIONS AND CONFERENCE PRESENTATIONS

<b>Publication</b>   <i>6 first-authored peer-reviewed journal articles</i>	
<ul style="list-style-type: none"><li><b>Selected Publications:</b> Liang, J, Bian, H., Zhang, W., Chang, C.K., Chou, L.S. (2024) Striding into Clarity: Wearable Sensor-Driven Estimation of Knee Adduction Moment, Unveiling the Black Box with Sequence-Based Neural Networks and Explainable Artificial Intelligence. AAAI 2024 Spring Symposium on Clinical Foundation Models</li></ul>	
<b>Presentations and Talks</b>   <i>8 first-authored, 2 co-author presentations at international conferences</i>	
<ul style="list-style-type: none"><li>Invited talk on <i>AI in Biomechanics</i> to a diverse, international audience from 5 countries.</li></ul>	
<b>Services</b>   <i>Served as a peer reviewer for the Proceedings of AAAI 2024 Spring Symposium Series</i>	

LEADERSHIP EXPERIENCE

<b>Iowa State University</b>   <i>Graduate Instructor, Biomechanics</i>	Aug 2019 - Present
<ul style="list-style-type: none"><li>Instructed, organized, and managed 4 weekly 75-minute sections.</li></ul>	
<b>Iowa State University</b>   <i>President, Taiwan Student Association</i>	Sept 2020 - Sept 2021
<ul style="list-style-type: none"><li>Orchestrated biannual culturally enriching events attended by 50+ participants, fostering cultural diversity and inclusion.</li><li>Developed and implemented review metrics, increased productivity by 18%, and reduction of 35% in operational costs.</li></ul>	