

# Shijie Bian | Curriculum Vitae

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**Research Interest:** Machine Learning, Computer Vision, Knowledge Engineering, Data Mining  
**Skills:** Python, Tensorflow, R, C, C++, PyTorch, JavaScript, Keras, Scikit-learn, NetworkX, etc.

## Education

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**University of California, Los Angeles** **Los Angeles, United States**  
*B.S. candidate in Mathematics of Computation (Minor: Statistics)* *Sept. 2018 - Present*

- **GPA: 3.86/4.0** (Major GPA: **3.89/4.0**, Upper Division GPA: **3.92/4.0**)
- **Relevant Coursework:**
  - **Mathematics:** Linear Algebra, Discrete Mathematics, Optimization, Graph Theory, Real Analysis, Complex Analysis, Mathematical Modeling, Data Theory, Applied Numerical Methods, etc.
  - **Computer Science:** Machine Learning, Artificial Intelligence, Computer Algorithms, Software Construction, Operating System Principles, Computer Organization, Computer Networks, etc.
  - **Statistics:** Data Analysis and Regression, Design and Analysis of Experiments, Statistical Models and Data Mining, Linear Models, Mathematical Statistics, Statistical Programming with R, etc.

## Publications

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- **Machine Learning-based Real-time Monitoring System for Smart Connected Worker to Improve Energy Efficiency**
  - **Shijie Bian**, Chen Li, Yongwei Fu, Yutian Ren, Tongzi Wu, Guann-Pyng Li, Bingbing Li\*
  - **Journal of Manufacturing Systems** (JCR Ranking: **Q1**, 2020 Impact Factor: **8.633**), 2021
  - DOI: <https://doi.org/10.1016/j.jmsy.2021.08.009>
- **Real-time Object Detection for Smart Connected Worker in 3D Printing**
  - **Shijie Bian**, Tiancheng Lin, Chen Li, Yongwei Fu, Mengrui Jiang, Tongzi Wu, Xiyi Hang, Bingbing Li\*
  - **International Conference on Computational Science (ICCS, Rank A Conference)**, 2021
  - DOI: [https://doi.org/10.1007/978-3-030-77970-2\\_42](https://doi.org/10.1007/978-3-030-77970-2_42)

## Research Experience

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- **NASA Jet Propulsion Laboratory (JPL) and Autodesk Inc.**  
*Project: AI-assisted Knowledge Graph Design* *May 2021 - Present*  
Advisor: Dr. Thomas Lu, Prof. Bingbing Li, Senior Engineer Daniele Grandi
  - Built a pipeline to extract and encode features of CAD models and to transform them into graphical representations using NetworkX.
  - Proposed a novel TechNet-based method to capture useful information from disordered user-customized semantic names through seeking correlations between keywords and entities.
  - Developed a machine learning model that passes graphical connectivity information along with encoded features through a Graph Neural Network and a multilayer perceptron for embedding generation and learning.

- Established a knowledge base that could learn best practices from existing designs and provide designers with feasible suggestions.
- o **UC Irvine (UCI) and California State University Northridge (CSUN)**  
**Project: *The Smart Connected Worker*** *June 2020 - Present*  
 Advisor: Prof. Guann-Pyng Li, Prof. Bingbing Li
    - Exploited the memory-backtracking functionality of RNNs to build an LSTM-based module that automatically disaggregates power signatures of devices in real-time.
    - Developed a fault-detection module for automated machine state monitoring by implementing a YOLO-based object detection model with a machine-state filtering algorithm.
    - Constructed a CRAFT-based finger and text recognition model for human-machine interaction control. The proposed novel color identification algorithm boosted the real-time performance of the module.
    - Proposed and designed a ready-to-deploy automated system with an interactive GUI for real-time workplace monitoring and information analysis.
  - o **Center for Vision, Cognition, Learning, and Autonomy (VCLA) at UCLA**  
**Project: *An Optimizing Compiler for Deep Learning*** *June 2020 - Oct. 2020*  
 Advisor: Dr. Feng Shi
    - Investigated, analyzed and debugged numerous baseline models.
    - Conducted statistical experiments on baseline models and grasped their principles, features, and application scopes.
    - Designed a suitable experiment that verified the performance of the proposed Heterogeneous Graph Transformer model.

## Awards

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- o **Oral presentation** at the 2021 International Conference on Computational Science (ICCS).
- o Mathematical Contest in Modeling (MCM) 2021: **Honorable Mention (Top 24%)**.

## Programming Projects

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### **The Smart Connected Worker (SCW) Project** **June 2020 - June 2021**

*Keywords: Machine Learning, Computer Vision, Intelligent Manufacturing, IoT, HCI*

- o A machine learning-assisted automated system for real-time workplace monitoring.
- o  <https://github.com/BrandonBian/SCW-V1.0>


### **Real-time Human-Machine Interaction Monitoring Project** **June 2020 - May 2021**

*Keywords: Machine Learning, Computer Vision, Object Detection, Text Recognition, HCI*

- o A CRAFT-based finger detection and text recognition model for the real-time human-machine interaction control of a 3D printer.
- o  <https://github.com/BrandonBian/SCW-finger-text-detection>

### **Real-time 3D Printer State Monitoring Project** **June 2020 - March 2021**

*Keywords: Machine Learning, Computer Vision, Object Detection, Automated System*

- o A YOLO-based object detection model and a filtering algorithm for the real-time machine state identification of a 3D printer.
- o  <https://github.com/BrandonBian/SCW-object-detection>