

# SINONG(SIMON) ZHAN

Github◇ Personal Page◇ Google Scholar

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## EDUCATION

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**Northwestern University**

*Sept 2023 - Now*

Major in Computer Engineering

**University of California, Berkeley**

*August 2018 - December 2022*

Major in Computer Science and Applied Mathematics(Statistic cluster)

## TECHNICAL STRENGTHS

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**Computer Languages**

C/C++, Python, Java, R, C#, RISC-V, MATLAB, Julia

**Software & Tools**

HTML, Excel, Mathematica, Unity3D, Simulink, L<sup>A</sup>T<sub>E</sub>X, Autodesk Fusion360

**Language**

Academic proficiency in Chinese and English, Limited proficiency in German

## RESEARCH EXPERIENCE

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**University of California, Berkeley**

April 2022-April 2023

*Undergrad Researcher*

*Advised by Prof.Sanjit Seshia*

- I'm working on LOGiCS Project, the STR pipeline. We design a set of automated design-optimization, simulation, control/path planning, SMT-based 3D bin packing problem solver, and verification tool-chain on various robots' designs.

**IDEAS Lab, Northwestern University**

March 2022-April 2023

*Research Assistant*

*Advised by Prof.Qi Zhu*

- I'm researching how to provide formal verified aspects(safety or stability guarantee) to the Cyber-Physical Systems. We implemented a framework that jointly conducts learning and formal verification by formulating and solving a bi-level optimization problem, which can cope with deterministic and stochastic continuous systems.

**Human Computing Lab, ISCAS and XDiscovery Lab, Dartmouth**

May 2019-Sep 2021

*Research Assistant*

*Advised by Prof Feng Tian & Prof Teng Han & Prof Xingdong Yang*

- I have researched the new fabrication and novel interaction techniques under the HCI context. Specifically, I have worked on developing novel input and feedback devices, using fast prototyping techniques, in the VR environment.

## WORK EXPERIENCE

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**CAS Ruiyi Technology Co., Ltd**

May 2020-Aug 2021

*Software Developer*

- Collected and Analyzed patients' and health people's performance data for product robustness testing.
- Participated in developing WeChat programs for both doctor and patient sides on test analysis.
- Pitched and Conducted live demos to various clients including top-tier hospitals and investors.

## PUBLICATION(\* STANDS FOR EQUAL CONTRIBUTION)

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**Enforcing Hard Constraints with Soft Barriers: Safe Reinforcement Learning in Unknown Stochastic Environments** Yixuan Wang, Simon Sinong Zhan, Ruochen Jiao, Zhilu Wang, Wanxin Jin, Zhuoran Yang, Zhaoran Wang, Chao Huang, Qi Zhu. *ICML 2023*. link: <https://arxiv.org/abs/2209.15090>

**LightSticker: Enabling Contextual Sensing of Legacy Devices with a Thin Light Sensor** Simon Zhan\*, Wei Sun\*, Zengqi Huang, Tingqing Wu, Jiaxuan Ren, Chutian Jiang, Prof. Dr. Meng Su, Teng Han, Feng Tian, Xing-Dong Yang. **In Submission**.

**Joint Differentiable Optimization and Verification for Certified Reinforcement Learning** Yixuan Wang\*, Simon Sinong Zhan\*, Zhilu Wang, Chao Huang, Zhaoran Wang, Zhuoran Yang, Qi Zhu. *ICCPs 2023*. link: <https://arxiv.org/abs/2201.12243>

**MicroFluID - A Reconfigurable RFID Platform for Robust Interaction Sensing Based on Microfluidics** Wei Sun, Yuwen Chen, Yanjun Chen, Simon Zhan, Yixin Li, Jiecheng Wu, Teng Han, Feng Tian, Jingxian Wang, Haipeng Mi, Xing-Dong Yang. *UbiComp 2022*. link: <https://dl.acm.org/doi/abs/10.1145/3550296>

**RElectrode: A Reconfigurable Electrode For Multi-Purpose Sensing Based on Microfluidics**. Wei Sun, Yanjun Chen, Simon Zhan, Teng Han, Feng Tian, Hongan Wang, Xing-Dong Yang. *CHI 2021*. link: <https://doi.org/10.1145/3411764.3445652>

## TALK

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- **RElectrode: A Reconfigurable Electrode For Multi-Purpose Sensing Based on Microfluidics**. Poster session of *ACM CHI 2021*.

## PATENT

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No.CN201710953534.X **The Device generating control instruction for multi-targets based on EMG(electromyography) signal** Simon Zhan, Junjun Fan, Feng Tian, Wei Sun. *Protected by Patent Law of the People's Republic of China*

No.CN202110377915.4 **A complex microfluidic pipeline composite structure and microfluidic pattern deformation system based on microfluidic technology** Wei Sun, Yanjun Chen, Simon Zhan, Teng Han, Feng Tian, Hongan Wang, Xing-Dong Yang. *Protected by Patent Law of the People's Republic of China*

No.CN202110378536.7 **A fluid pattern re-configurable system based on microfluidic technology** Wei Sun, Yanjun Chen, Simon Zhan, Teng Han, Feng Tian, Hongan Wang, Xing-Dong Yang. *Protected by Patent Law of the People's Republic of China*

## PROJECTS

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### MARS

*Participant*

Python/Simulink/HTML

*Github*

- Developed blocks feature of simulation tool in MARS system same as blocks in Simulink.
- Conducted testing on existing features of the simulation tool and automatic translation tool.
- Formulated demonstration of MARS system using textbook examples such as Feedback system, etc.
- Developed both online and local GUI for graphing system using python Tkinter, flask, and HTML

### Get a Grip

*Participant(CHI 2020 Best Paper Honorable Mention)*

SteamVR/Unity3D/C#

*Video*

- Designed and fabricated the pen model with 3D printing technologies
- Implemented button events on a pen model using a Bluetooth module for transmission

- Tracked pen movements using OptiTrack V120:Trio and OptiTrack Motive software (Spec detail)
- Mapped pen motions into VR environment using HTC Vive, SteamVR API, and Unity3D
- Reflected button event on the pen as SELECT in VR environment
- Constructed a VR environment for experiment use in Unity3D

### **Geocentric**

*Group Project*

Dynamic System/ Sensors fusion and network/ Simulation

*Github*

- Constructed robot cars to symbolize different planets such as Moon and Earth
- Implemented BLE controller on mother planet to control its trajectory
- Formulate Dynamic System equation for orbiting movement
- Simulated the dynamic system as mother planet moves in arbitrary trajectory in Simulink
- Designed and built sensors network using IR and EO(electrical optic) sensors on Berkeley Buckler

### **EMG(electromyography) controlled vehicle**

*Individual project*

Arduino Uno/C++

*Github*

- Collected EMG data through Myo armband and analyzed the EMG signal based on the FFT algorithm.
- Constructed the vehicle and Bluetooth module based on Arduino Uno board.
- Implemented instruction sets on the vehicle using Myo built-in API and Bluetooth module for transmission.
- Collected testing data and trained SVM model based on LIBSVM in C++.

## **TEACHING**

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Fall 2022: Math 128A TA

## **TECHNICAL COURSES WORK(TAKING/TAKEN)**

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|--------------------------------------|---|
| 1. Linear Algebra(Math110)           | 10. Neural Network(CS182/282A)              |
| 2. Abstract Algebra(Math113)         | 11. Machine Learning(CS189/289A)            |
| 3. Numerical Analysis(Math128A)      | 12. Embedded System(EECS149/249A)           |
| 4. Optimization Models(EECS127/227A) | 13. Complex Analysis(Math185)               |
| 5. Probability theory(Stat134)       | 14. Time Series(Stat153)                    |
| 6. Statistical methods(Stat135)      | 15. Partial Differential Equation(Math 126) |
| 7. Efficient Algorithm(CS170)        | 16. Nonlinear System(EE C222)               |
| 8. Database(CS W186)                 | 17. Reinforcement Learning(CS 285)          |
| 9. Real Analysis(Math104)            |   |