

# YUANZHI ZHU

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Zurich, Switzerland



**RESEARCH INTERESTS:** Machine Learning, Data Science, Human-Computer Interaction

## EDUCATION BACKGROUND

- 09/2016-06/2020 **Beihang University**
- Bachelor of Engineering in **Electrical Engineering**
  - GPA: 3.762/4.0 (90.73/100)
- 10/2019-04/2020 **Technical University of Munich**
- Exchange Program in **Electrical and Computer Engineering**
  - GPA: 4.0/4.0 (1.0/1.0)
- 10/2020-now **Swiss Federal Institute of Technology in Zurich**
- Master in **Electrical Engineering and Information Technology**

## SKILLS & HIGHLIGHTS

- ★★★★★ **Python:** Familiar with basic data structure and algorithms; lot of experience with building neural networks using pytorch and other modules
- ★★★★★ **MATLAB:** Data processing and data visualization; good at using specific system function to realize required tasks
- ★★★★★ **C/C++:** Setting up basic Heisenberg lattice point computing system and calculating excited state of energy
- ★★★★★ **Physics & Math:** Great intuition enabling faster and better understanding in new concepts

## PUBLICATION

Zhizhong Zhang\*, Yuanzhi Zhu\*, Yue Zhang, Weisheng Zhao, et al. [Skyrmion-based Ultra-low Power Electric-field-controlled Reconfigurable \(SUPER\) Logic Gate](#), IEEE Electron Device Letters (Published as cover in 2019) (\* These authors contributed equally to this work)

Hayato Mizuno, Hironari Isshiki, Kouta Kondou, Yuanzhi Zhu, and Yoshichika Otani. [Influence of planar Hall effect on the output signal in a T-shaped spin conversion device](#), in Appl. Phys. Lett. 119, 092401 (2021)

## RESEARCH EXPERIENCES

- 06/2021-12/2022 **Score-based Diffusion Model for Real-noised Image Denoising**, Supervisor: Prof. Luc CVL, ETH zurich *Van Gool; Advisor: Dr. Kai Zhang, Jingyun Liang*
- Modified the architecture and sampling methods of score-based diffusion models
  - Explored the denoising ability of score-based model with different approach to utilize condition (noised image)
  - Investigated the diffusion trajectory of the SDE of score-based diffusion model
- 10/2021-03/2022 **Using Affordances to Understand Fan-Idol Interaction on Social Media**, Supervisor: Disco, ETH zurich *Prof. Roger Wattenhofer; Advisor: Dr. Ye Wang*
- Collected data from the social medias using Python
  - Pre-processed all the data collected and using several natural language models together with word embeddings for sentiment analysis of the posts from idols
  - Designed an interview protocol and conducted interviews with fans of SNH48
- 07/2019-10/2019 **Logic Device based on Inverse Spin Hall Effect (ISHE)**, Supervisor: Prof. Yoshichika Otani *University of Tokyo*
- Studied and used the spin transport property in different materials to get a clear Inverse Spin Hall Effect signal
  - Built a model using OOMMF and GetDP to study the magnetization reversal and spin transport property of different material with complex structure
  - Utilized the ISHE to propose logic device, performed current and harvested the logic output like 0 and 1 based on the magnetization direction of the ferromagnetic layer
- 08/2017-06/2019 **Skyrmion-based Ultra-low Power Electric-field-controlled Reconfigurable (SUPER) Logic Gate**, Supervisor: Prof. Yue Zhang *Beijing Advanced Innovation Center*
- Proposed a novel designed skyrmion-based logic gate for high-performance computing,

for Big Data and  
Brain Computing  
(BDBC)

- and extended it for ultra-low power parallel computing and brain-like computing
- Introduced artificial fishtail-shaped hollows for implementing skyrmion divisions, and performed micro-magnetic simulations to validate the logic operations and divisions
- Enabled re-configurable logic operations including AND, OR, XOR, NOR, NAND to be implemented in single logic gate by leveraging voltage-controlled magnetic anisotropy (VCMA) effect

## SELECTED HONORS & AWARDS

- 02/2018 Meritorious Winner in The Mathematical Contest in Modeling
- 09/2017, 09/2018 Second Prize in China Undergraduate Mathematical Contest in Model (Twice)
- 09/2017 First Prize in Beijing Undergraduate Mathematics Competition (Ranked 87/1276, Beijing)
- 12/2017 First Prize in Beijing Undergraduate Physics Competition (Ranked 59/1023, Beijing)
- 03/2018 China Undergraduate Physics Tournament (CUPT) (Ranked 47/305)
- 11/2018, 11/2019 Academic Competition Scholarship, Beihang University (Twice)
- 11/2018, 11/2019 Academic Excellence Scholarship, Beihang University (Twice)
- 10/2017 First-Class Scholarship, Beihang University

## COMPETITIONS & COURSE PROJECTS

- 02/2018 Meritorious Winner **2018 MCM Problem A: Multi-hop High Frequency (HF) Radio Propagation**
  - Described the turbulent sea surface as combination of superimposed sine waves, considered shadow effect & signals unable to be transmitted after reflection
  - Introduced Monte Carlo method (MCM) to eliminate the error caused by the diffraction, and constructed simulated annealing method to simulate the diffraction scene
  - Built modified Miller-Brown model to describe rough sea surface, identify how surface roughness factor varies along with changing HF's incident angle
- 03/2018-05/2018 **3<sup>rd</sup> Beihang Undergraduate Physics Tournament**
  - First Prize for Overall Performance (Ranked 6/150)*
  - Project: Oiled Ring*
    - Conducted theoretical study on axial movement and experimented using a cardboard ring traveling on the oiled and rotating horizontal cylindrical shaft
    - Studied ring's movement when tilting, verified by numerical simulation in MATLAB
  - Project: Radiant Lantern*
    - Generated cross diffraction patterns through rectangular diffraction patterns, performed Fourier transform to obtain diffraction pattern of the mesh diffraction model
    - Simulated the diffraction pattern with MATLAB and conducted the experiment with a self-made diffraction grating
- 09/2017 **2017 CUMCM Problem A: Calibration and Imaging of CT System Parameter**
  - 2nd Prize in China Undergraduate Mathematical Contest in Model*
  - Solved parameters such as center of rotation through plane geometry & function fitting
  - Established the contour reconstruction optimization model and reconstructed the scanned data according to Radon transform and the inverse Radon transform
  - Built a high-precision calibration model based on the level of goodness of fit

## SOCIAL PRACTICES & EXTRACURRICULAR ACTIVITIES

- 09/2016-05/2018 **Public Relations Department, Beihang Student Union**
  - Team Leader*
  - Responsible for seeking sponsorship for campus events
  - Organized a campus ball, and handled supplies purchase and the on-spot coordination
- 08/2018 **Aerospace Information Co., Ltd.**
  - Investigated the impact of emerging technology companies on tax policy
  - Studied technology companies' business philosophy and key technologies
- 07/2017-08/2017 **Practice at Mount. Dadingzi Navigation and Hydroelectric Junction**
  - Carried out the research into the operative and navigable situation of the Junction
  - Investigated on the living conditions of residents around the project