

YUANZHI ZHU

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RESEARCH INTERESTS: Signal Processing, 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**
- 07/2018 **Third MAINZ International Summer School**
- Attended lectures about micro-electronics and had fruitful discussions with lecturers

SKILLS & HIGHLIGHTS

- ★★★★★ **C/C++:** Setting up basic Heisenberg lattice point computing system and calculating excited state of energy
- ★★★★★ **MATLAB & Python:** Data processing and data visualization; good at using specific system function to realize required tasks
- ★★★★★ **Finite Element Method Framework:** skilled at simulating physical model (leveraging weak formulation)
- ★★★★★ **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)
(* These authors contributed equally to this work)

RESEARCH EXPERIENCES

- 07/2019-10/2019 **Logic Device based on Inverse Spin Hall Effect(ISHE)**, *Advisor: 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
 - Helped adopt a chamber system to deposit experimental sample, did the measurement
 - 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**, *Advisor: Prof. Yue Zhang*
Beijing Advanced Innovation Center for Big Data and Brain Computing (BDBC)
- Proposed a novel designed skyrmion-based logic gate for high-performance computing, and extended it for ultra-low power parallel 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
- 03/2019-06/2019 **Research on Handwritten Digit Recognition using Machine Learning**
Beihang University
- Self-studied machine learning by practicing, especially deep neural network through relevant online courses and online book
 - Used Python to build a neural network for deep learning; made the original pictures a little bit tortuous to enlarge the training set
 - Harvested an accuracy of 98% through adjusting hyper-parameters like the learning rate, the regularization parameter, etc.

COMPETITIONS & COURSE PROJECTS

- 03/2019-05/2019 **Introduction to Quantum Game Theory**
Course Project
- Researched the history development of quantum game theory
 - Applied quantum game theory to classical game theory problem and made comparison
 - Conducted basic simulation on IBM Q Experience to validate the theoretical results
- 02/2018 **2018 MCM Problem A: Multi-hop High Frequency (HF) Radio Propagation**
Meritorious Winner
- 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 **3rd 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
- 09/2016-05/2017 **Beihang Drama Club**
Member
- Played the role of Anthony Marston in *And Then There Were None* (by Agatha Christie)

SELECTED HONORS & AWARDS

- 09/2017, 09/2018 Second Prize in China Undergraduate Mathematical Contest in Model (Twice)
- 11/2018 First Prize in Beijing Undergraduate Mathematics Competition (Ranked 47/476, Beijing)
- 11/2017 First Prize in Beihang Science and Technology Competition
- 09/2017 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