YUANZHI ZHU

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RESEARCH INTERESTS: Data Science, Image Processing, Human-Computer Interaction

EDUCATION BACKGROUND

09/2016-06/2020 **Beihang University**
- Bachelor of Engineering in **Electrical Engineering**
- GPA: 3.76/4.0 (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 things

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)

Zhizhong Zhang, Yue Zhang, Yuanzhi Zhu, et al. *Multi-State Magnetic Tunnel Junction with Inhomogeneous Magnetic Anisotropy for Neuromorphic Computing*, 2019 MMM Conference(Accepted in Oct. 2019)

RESEARCH EXPERIENCES

07/2019-10/2019 *University of Tokyo*
Logic Device based on Inverse Spin Hall Effect(ISHE), *Advisor: Prof. Yoshichika Otani*
- 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 *Beihang Spintronics Interdisciplinary Center*
Skyrmion-based Ultra-low Power Electric-field-controlled Reconfigurable (SUPER) Logic Gate, *Advisor: Prof. Yue Zhang*
- 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 micromagnetic simulations to validate the logic operations and divisions
- Enabled reconfigurable logic operations including AND, OR, XOR, NOR, NAND to be implemented in single logic gate by leveraging voltage controlled magnetic anisotropy (VCMA) effect

11/2018-01/2019 **Research on Double-Ridged Waveguide (DRWG) and DRWG-based Devices**
- Explored properties of the double-ridged waveguide and realized three DRWG-based devices by HFSS simulation
- Compared DRWG Magic Tee structure with rectangular waveguide Magic Tee structure, and concluded former's superior properties such as greater bandwidth
- Studied four-port DRWG-based coupler and stripline coupler, simulated coupling properties at varied hole pitches, obtained bidirectional coupling structure

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 — *First Prize for Overall Performance (Ranked 10/150)*

3rd Beihang Undergraduate Physics Tournament

Project: Oiled Ring

- Conducted theoretical study on axial movement and experimented using a cardboard-made 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 — *2nd Prize in China Undergraduate Mathematical Contest in Model*

2017 CUMCM Problem A: Calibration and Imaging of CT System Parameter

- 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

03/2019-05/2019 — Course Project

Introduction to Quantum Game Theory

- Researched the brief history of quantum game theory
- Applied quantum game theory to several classical game theory problem and made comparison

SOCIAL PRACTICES & EXTRACURRICULAR ACTIVITIES

09/2016-05/2018 — *Team Leader & Member*

Public Relations Department, Beihang Student Union

- 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 — *Member*

Beihang Drama Club

- 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 2018 Academic Competition Scholarship
11/2018 2018 Academic Excellence Scholarship
10/2017 First-Class Scholarship, Beihang University
10/2017 2017 Merit-Based Scholarship