YUANZHI ZHU

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RESEARCH INTERESTS: Machine Learning, Computer Vision, Inverse Problems

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:** Excellent foundations with data structure and algorithms; rich experience with deep learning framework PyTorch and other modules

★★★★☆ **MATLAB**: Data processing and visualization; signal processing and communication related 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

05/2022-12/2022 *CVL, ETH zurich*
Denoising Diffusion Models for Plug-and-Play Image Restoration, *Supervisor: Prof. Luc Van Gool; Advisor: Dr. Kai Zhang, Jingyun Liang, Jiezhang Cao*
- Investigated general image restoration tasks with score-based diffusion models
- Combined the diffusion sampling algorithm (DDIM) with half-quadratic splitting (HQS) algorithm for conditional generation with less than 100 sampling steps
- Image restoration with details for severely ill-posed image restoration tasks, including image inpainting, image deblurring and super resolution

10/2021-03/2022 *Disco, ETH zurich*
Using Affordances to Understand Fan-Idol Interaction on Social Media, *Supervisor: 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 *University of Tokyo*
Logic Device based on Inverse Spin Hall Effect (ISHE), *Supervisor: 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
- 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 *Beijing Advanced*
Skyrmion-based Ultra-low Power Electric-field-controlled Reconfigurable (SUPER) Logic Gate, *Supervisor: Prof. Yue Zhang*

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 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
First Prize for Overall Performance (Ranked 6/150)

3rd Beihang Undergraduate Physics Tournament

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
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

SOCIAL PRACTICES & EXTRACURRICULAR ACTIVITIES

09/2016-05/2018
Team Leader

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