# Xuefei Ning

foxdoraame@gmail.com · https://github.com/walkerning
https://nicsefc.ee.tsinghua.edu.cn/people/XuefeiNing

## Education

**Tsinghua University**, Bachelor of Electronic Engineering 2012 – 2016
*Score: 92/100* *Ranking: 12/231*

**Tsinghua University**, Doctor of Philosophy in Electronic Science and Technology 2016 – 2021
*Advisor: Prof. Yu Wang, Prof. Huazhong Yang* *GPA: 3.7/4.0*
**Thesis**: Neural Architecture Search for Efficient and Robust Convolutional Neural Networks

## Research Experiences

### Researches on Neural Architecture Search (Efficient NAS and NAS Application)

*Website:* https://sites.google.com/view/nas-nicsefc
*Code Repository:* https://github.com/walkerning/aw_nas

1. **Improving NAS Search Strategy**:
   - **[ECCV'20] Xuefei Ning**, Yin Zheng, Tianchen Zhao, Yu Wang, Huazhong Yang, A Generic Graph-based Neural Architecture Encoding Scheme for Predictor-based NAS, In ECCV 2020.
   - **[ECCV'20] Xuefei Ning***, Tianchen Zhao*, Wenshuo Li, Peng Lei, Yu Wang, Huazhong Yang, DSA: More Efficient Budgeted Pruning via Differentiable Sparsity Allocation, In ECCV 2020 (**Spotlight**).
   - **[NeurIPS'22] Xuefei Ning***, Zixuan Zhou*, Junbo Zhao, Tianchen Zhao, and Others, TA-GATES: An Encoding Scheme for Neural Network Architectures, In NeurIPS 2022 (**Spotlight**).
   - **[AAAI'23]** Junbo Zhao*, **Xuefei Ning***†, Enshu Liu, Binxin Ru, and Others, Dynamic Ensemble of Low-fidelity Experts: Mitigating NAS "Cold-Start", In AAAI 2023 (**Oral**).
   - **[TPAMI] Xuefei Ning**, Yin Zheng, Zixuan Zhou, Tianchen Zhao, Huazhong Yang, Yu Wang, A Generic Graph-based Neural Architecture Encoding Scheme with Multifaceted Information, In TPAMI 2023.
   - **[DATE'22 & TCAD'23]** Hanbo Sun, Zhenhua Zhu, Chenyu Wang, **Xuefei Ning**†, and Others, Gibbon: Efficient Co-Exploration of NN Model and Processing-In-Memory Architecture, In DATE 2022 & TCAD 2023.
2. **Improving NAS Evaluation Strategy**:
   - **[NeurIPS'21] Xuefei Ning**, Changcheng Tang, Wenshuo Li, Zixuan Zhou, and Others, Evaluating Efficient Performance Estimators of Neural Architectures, In NeurIPS 2021.
   - **[ECCV'22]** Zixuan Zhou*, **Xuefei Ning***, Yi Cai, Jiashu Han, and Others, CLOSE: Curriculum Learning On the Sharing Extent Towards Better One-shot NAS, In ECCV 2022.
3. **Other NAS Researches**:
   - **[ASP-DAC'20]** Wenshuo Li*, **Xuefei Ning***, Guangjun Ge, Xiaoming Chen, Yu Wang, Huazhong Yang, FTT-NAS: Discovering Fault-Tolerant Neural Architecture, In ASP-DAC 2020.
   - **[TODAES] Xuefei Ning**, Guangjun Ge, Wenshuo Li, Zhenhua Zhu, and Others, FTT-NAS: Discovering Fault-Tolerant Convolutional Neural Architecture, In TODAES 2021.

### Researches on Efficient Deep Learning

1. **Efficient Training**
   - **[TCAD]** Kai Zhong, **Xuefei Ning**, Guohao Dai, Zhenhua Zhu, and Others, Exploring the Potential of Low-bit Training of Convolutional Neural Networks, In TCAD 2022.
   - **[CVPR'22]** Minxue Tang, **Xuefei Ning**, Yitu Wang, Jingwei Sun, and Others, FedCor: Correlation-Based Active Client Selection Strategy for Heterogeneous Federated Learning, In CVPR 2022.
   - **[CVPR'22]** Tianchen Zhao, Niansong Zhang, **Xuefei Ning**, He Wang, Li Yi, Yu Wang, CodedVTR: Codebook-based Sparse Voxel Transformer with Geometric Guidance, In CVPR 2022.
2. **Efficient Inference**

- **[AAAI'23]** Xiangsheng Shi*, **Xuefei Ning***†, Lidong Guo*, Tianchen Zhao, and Others, Memory-Oriented Structural Pruning for Efficient Image Restoration, In AAAI 2023.
- **[ICML'23]** Enshu Liu, **Xuefei Ning**†, Zinan Lin, Huazhong Yang, Yu Wang, OMS-DPM: Deciding The Optimal Model Schedule for Diffusion Probabilistic Model, In ICML 2023.

**Researches on Other Topics**

1. **Adversarial Robustness**
   - **[NeurIPS'18 Comp] Xuefei Ning**, Wenshuo Li, Yu Wang, Mutual Adversarial Training with Diverse Early-Stop PGD, 2nd / 399 in NeurIPS 2018 Adversarial Vision Challenge Competition.
   - **[arXiv'20]** Tong Wu, **Xuefei Ning**, Wenshuo Li, Ranran Huang, Huazhong Yang, Yu Wang, Physical Adversarial Attack on Vehicle Detector in the Carla Simulator, A Technical Report, 2020.
   - **[AAAI'23]** Yi Cai, **Xuefei Ning**†, Yu Wang, Huazhong Yang, Ensemble-in-One: Ensemble Learning within Random Gated Networks for Enhanced Adversarial Robustness, In AAAI 2023.
   - **[Under Review]** Ye Mu*, Weilin Liu*, Chao Yu, **Xuefei Ning**†, and Others, Multi-Agent Vulnerability Discovery for Autonomous Driving with Hazard Arbitration Reward, Under Review (RAL), 2021.
2. **Other**
   - **[Neurocomputing] Xuefei Ning**, Yin Zheng, Zhuxi Jiang, Yu Wang, and Others, Nonparametric Topic Modeling with Neural Inference, In Journal of Neurocomputing 2020.

## Teaching Experiences

**C/UNIX Programming**, Tsinghua University — 2020 Autumn, 2022 Autumn

*Lecturer* Course Instructor: Prof. Huazhong Yang, Prof. Yu Wang

**Computer-Aided Design of Digital Circuits and Systems**, Tsinghua University — 2020 Spring

*Teaching Assistant* Course Instructor: Prof. Yu Wang

As the output of the course collaboration project, our survey paper "Machine Learning for Electronic Design Automation: A Survey" is accepted to TODAES 2021.

## Internship Experiences

**Douban**, Beijing, China — 2015-7 – 2015-9

*Software Engineer Intern of the Platform Group* Advisor: Guillaume Bouriez

- Participate in the development of the RPC system on the private application cloud of Douban. This system acts as a vital component of the Micro-Service Architecture in Douban.
- Optimize the RPC system: 1) Optimize "circuit breaker" of the RPC system; 2) Develop service supervisor that reports service status; 3) Support explicit interface declaration to increase the robustness of the system.

**DeePhi Tech (now part of Xilinx)**, Beijing, China — 2016-4 – 2016-7, 2018-7 – 2018-8

*Software Engineer Intern, IT Manager* Advisor: Hong Luo

- Build and maintain all the networking and servers in the startup.
- Lead a team to develop the supporting toolchain of deploying CNN (based on Caffe) and LSTM (based on Kaldi) onto FPGA, including pruning and quantization functionalities.

**Tencent AI Lab**, Beijing, China — 2019-3 – 2019-5

*Machine Learning Research Intern* Advisor: Yin Zheng

- Revise "Nonparametric Topic Modeling with Neural Inference" and submit to Neurocomputing (accepted).
- Develop a Gumbel-Softmax extension of differentiable neural architecture search.

## Skills

- Programming: Proficiency in Python; Familiar with C++; Experiences in other programming languages, including Golang, Node.js, Verilog (hardware).
- Envs & Tools: Linux, Bash scripts, Emacs, Git, etc.

- Deep learning framework: PyTorch, Tensorflow, Caffe.
- Language: English (fluent), Mandarin (native).

## ♡ Honors and Awards

| | |
|---|---|
| *Outstanding Graduate of Tsinghua University* 10% | 2016-7 |
| *Future Scholar Scholarship of Tsinghua University (2/103)* | 2016-7 |
| *Grand Prize*, the 5th Creativity Competition of Tsinghua University | 2016-4 |
| *National Scholarship for Encouragement*, Academic Excellence Award | 2015, 2014 |
| *First Prize* National High Schools Physics Competition | 2011 |