

Jeng-Hau Lin

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EDUCATION

University of California, San Diego (UCSD), CA, USA

Ph.D., Computer Science and Engineering

- Advisor: Prof. Zhuowen Tu and Prof. Rajesh K. Gupta
- Research topics: Design energy-efficient and error-resilient deep learning algorithms.

09/2013-06/2019

National Taiwan University (NTU), Taipei, Taiwan

Master of Science, Graduate Institution of Communication Engineering

National Taiwan University (NTU), Taipei, Taiwan

Bachelor of Science in Engineering, Department of Electrical Engineering

09/2005-06/2007

09/2001-06/2005

RESEARCH EXPERIENCE

Local Binary Pattern Networks - UCSD

- Advisor: Prof. Zhuowen Tu and Prof. Rajesh K. Gupta
- Design the algorithm of LBPNet, an alternative algorithm to CNN based on optical flow theory for image recognition.

02/2017-06/2019

High-Level Synthesis of Deep Learning Accelerators, DARPA - UCSD

- Advisor: Prof. Rajesh K. Gupta and Prof. Zhuowen Tu
- Introduce separable filters to Binarized Convolutional Neural Networks (BCNN) to push hardware to the limit for image classification.

04/2015-01/2017

Contextual Robots for Disaster Response, Northrop Grumman - UCSD

- Advisor: Prof. Rajesh K. Gupta
- Apply reinforcement learning for resource management inside robots for disaster response.

09/2015-09/2016

Non-Contact Bio-Potential Sensing System with Motion Artifact Suppression, UCSD

- Advisor: Prof. Chung-Kuan Cheng and Prof. Patrick P. Mercier
- Design a system (including hardware devices and algorithm) to remove motion artifacts during ECG measurement.

09/2014-06/2015

Low-Density Parity-Check Decoders in 3-D ICs, Qualcomm - UCSD

- Advisor: Prof. Chung-Kuan Cheng
- Apply simulated-annealing algorithm to optimize the placement and rectilinear routes for LDPC decoders in 3-D ICs.

01/2014-08/2014

Noise Mechanism and Mitigation for TV Tuner Cards, AVerMedia - NTU

- Advisor: Prof. Ruey-Beei Wu
- Analyze and designing shielding cases for RF modules and utilize genetic algorithm on optimizing decoupling capacitors.

01/2011-12/2011

Signal and Power Integrity Analyses in IC Packaging Integration, TSMC - NTU

- Advisor: Prof. Tian-Wei Huang and Prof. Ruey-Beei Wu
- Solve the causality issue of lossy transmission line simulation (Best paper award of the 2009 IEEE Transactions of Advanced Packaging).

02/2006-07/2006

Anti-Resonant Reflecting Optical Waveguides (ARROW), NTU

- Advisor: Prof. Hung-Chun Chang
- Design ARROW structure for specified frequencies.

09/2003-01/2004

WORK EXPERIENCE

Qualcomm, CA, USA

Software Research Engineer

- Build Adreno-DNN library on Adreno GPUs.
- Design applications extracting Adreno-DNN's power.

08/2019-present

TuSimple, CA, USA

Software Infrastructure Engineer (part-time summer internship)

- Port trained deep neural networks to low-power devices with Nvidia TensorRT.

06/2018-09/2018

TA COGS185, CA, USA

Teaching Assistant of Advanced Machine Learning

- Develop course materials for students to understand supervised learning algorithms.
- Lead discussion/lab sessions to improve the students' learning.

03/2018-06/2018

TA CSE143, CA, USA

Teaching Assistant of Microelectronic System Design

- Design materials/projects for students to implement deep learning algorithms with VHDL.
- Lead discussion/lab sessions to improve the students' learning.

03/2017-06/2017

Huami, CA, USA

Data Scientist (summer internship)

- Analyze bio-signals with wavelet and discrete cosine transformation and apply learning method for human identification.

08/2015-09/2015

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AVerMedia, Taipei, Taiwan

01/2008-02/2012

Advanced Engineer

- Design of front-end lumped filters and baseband digital modules for TV signals, Wi-Fi, TD-SCDMA.
- Develop the testing software application for image compression, video streaming, television signal, and infrared remote controllers.

Army Taiwan R.O.C. (Compulsory military service), Hsinchu, Taiwan

10/2007-01/2008

Corporal

- Three months military training for high-pressure working environment.

AWARD

2009 IEEE Best Paper Award on Advanced Packaging

2010-06

- Fast Methodology for Determining Eye Diagram Characteristics of Lossy Transmission Lines.

2013 UCSD CSE 25-th Anniversary Excellent Poster Award

2013-09

- An Interdigitated Non-Contact ECG Electrode for Impedance Compensation and Signal Restoration.

SKILLS & LANGUAGES

Programming: Python, C/C++, Lua, MATLAB, Assembly, VHDL

Working language: C and Python

Software tools: Assemblers, Compilers, Debuggers, CUDA, BLAS, Torch, Caffe, Theano, Lasagne, MXNet, TensorRT

Operating Systems: UNIX-like, MS-DOS, windows

Languages: English (fluent), Mandarin Chinese (Native), Taiwanese (Native)

PUBLICATIONS & PATENTS

Publications

- [0] **Jeng-Hau Lin**, Xun Jiao, Mulong Luo, Zhuowen Tu, and Rajesh K. Gupta. "Vulnerability of Hardware Neural Networks to Operation Point Variations." *[submitted to IEEE Journal of Design and Test (D&T)]*
- [1] **Jeng-Hau Lin**, Justin Lazarow, Yunfan Yang, Dezhi Hong, Rajesh Gupta, and Zhuowen Tu. "Local Binary Pattern Network." In *Proceedings of IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2020.
- [2] **Jeng-Hau Lin (co-first author)**, Atieh Lotfi (co-first author), Vahideh Akhlaghi, Zhuowen Tu, and Rajesh K. Gupta. "Accelerating LBPnets with Software Programmable FPGA", In *Proceedings of IEEE Conference on Design, Automation and Test in Europe (DATE)*, pp. 1106-1111, 2019.
- [3] Zhou Fang, **Jeng-Hau Lin**, Mani B. Srivastava, and Rajesh K. Gupta. "Multi-Tenant Mobile Offloading Systems for Real-Time Computer Vision Applications." In *Proceedings of the 2019 International Conference on Distributed Computing and Networking (ICDCN)*, 2019.
- [4] Xun Jiao, Mulong Luo, **Jeng-Hau Lin**, and Rajesh K. Gupta. "An Assessment of Vulnerability of Hardware Neural Networks to Dynamic Voltage and Temperature Variations." In *IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*, Irvine, USA. 2017.
- [5] **Jeng-Hau Lin**, Tianwei Xing, Ritchie Zhao, Zhiru Zhang, Mani Srivastava, Zhuowen Tu, and Rajesh K. Gupta. "Binarized Convolutional Neural Networks with Separable Filters for Efficient Hardware Acceleration." In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, pp. 27-35, 2017.
- [6] Ritchie Zhao, Weinan Song, Wentao Zhang, Tianwei Xing, **Jeng-Hau Lin**, Mani Srivastava, Rajesh K. Gupta, and Zhiru Zhang. "Accelerating Binarized Convolutional Neural Networks with Software-programmable FPGAs." In *Proceedings of the ACM/SIGDA International Symposium on Field-Programmable Gate Arrays (FPGA)*, pp. 15-24, 2017.
- [7] Hao Zhuang, Wenjian Yu, Shih-Hung Weng, Ilgweon Kang, **Jeng-Hau Lin**, Xiang Zhang, Ryan Coutts, and Chung-Kuan Cheng. "Simulation Algorithms with Exponential Integration for Time-Domain Analysis of Large-Scale Power Delivery Networks." In *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, vol. 35, issue 10, pp. 1681-1694, 2016.
- [8] **Jeng-Hau Lin**, Hao Liu, Chia-Hung Liu, Phillip Lam, Gung-Yu Pan, Hao Zhuang, Ilgweon Kang, Patrick P. Mercier, and Chung-Kuan Cheng. "An Interdigitated Non-Contact ECG Electrode for Impedance Compensation and Signal Restoration." In *IEEE Biomedical Circuits and Systems Conference (BioCAS)*, pp. 1-4. IEEE, 2015.
- [9] Ilgweon Kang, Xinan Wang, **Jeng-Hau Lin**, Ryan Coutts, and Chung-Kuan Cheng. "Impulse Response Generation from S-parameters for Power Delivery Network Simulation." In *IEEE Symposium on Electromagnetic Compatibility and Signal Integrity (EMC+SIPI)*, pp. 277-282. IEEE, 2015.
- [10] Hao Zhuang, Ilgweon Kang, Xinan Wang, **Jeng-Hau Lin**, and Chung-Kuan Cheng. "Dynamic Analysis of Power Delivery Network with Nonlinear Components Using Matrix Exponential Method." In *IEEE Symposium on Electromagnetic Compatibility and Signal Integrity (EMC+SIPI)*, pp. 248-252. IEEE, 2015.
- [11] Hao Zhuang, Shih-Hung Weng, **Jeng-Hau Lin**, and Chung-Kuan Cheng. "MATEX: A Distributed Framework for Transient Simulation of Power Distribution Networks." In *Proceedings of the 51st Annual Design Automation Conference (DAC)*, pp. 1-6. ACM, 2014.
- [12] Haibing Su, Hao Liu, Shih-Hung Weng, Hui Wang, Aliasgar Presswala, Hao Zhuang, **Jeng-Hau Lin**, Patrick Mercier, and Chung-Kuan Cheng. "A Non-Contact Biopotential Sensing System with Motion Artifact Suppression." In *International Conference on Communications, Circuits and Systems (ICCCAS)*, pp. 314-318. IEEE, 2013.
- [13] Wei-Da Guo (co-first author), **Jeng-Hau Lin (co-first author)**, Guang-Hwa Shiue, Chien-Ming Lin, Tian-Wei Huang, and Ruey-Beei Wu, "Fast Methodology for Determining Eye Diagram Characteristics of Lossy Transmission Lines," In *IEEE Transactions on Advanced Packaging*, vol. 32, no. 1, pp.175-183, Feb. 2009.
- [14] **J.H. Lin**, Wei-Da Guo, Guang-Hwa Shiue, Chien-Ming Lin, Tian-Wei Huang, and Ruey-Beei Wu, "Fast Algorithm for Determining Eye-Diagram Characteristics of Lossy Transmission Lines," In *IEEE 16th Topical Meeting on Electrical Performance of Electronic Packaging*, pp.119-122, Oct. 2007.
- ### **Patents**
- [15] **Jeng-Hau Lin**, Yunfan Yang, Zeyu Chen, Rajesh K. Gupta, and Zhuowen Tu, "Local Binary Pattern Network (LBPn)" US Patent, filed May. 2018.
- [16] **Jeng-Hau Lin**, Hong-Wei Liu, Yu-Hsiang Chen, and Chien-Ming Yeh, "Reset Signal Generator and a Method for Generating Reset Signal" Taiwan Patent 201310907, filed Aug. 2011, issued Mar. 2013.