

CONTACT
INFORMATION

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RESEARCH
INTERESTS

- High Performance Mobile Computing System
- Machine Learning and Neuromorphic Computing Acceleration
- Mobile and IoT System Security Enhancement
- Graphic Computing Optimization for Virtual/Augmented Reality Technologies
- Hardware/Software Co-design for Mobile Display System (*esp.* OLED Technology)
- Human-Computer Interaction and Sensor System
- Mobile Application and Cyber-Physical System Development
- Digital Circuit, CMOS VLSI, FPGA Design and *etc.*

EDUCATION
BACKGROUND

University of Pittsburgh, Pittsburgh, PA, USA

- Degree: Ph.D. 2012~2016
- Degree: M.S. 2010~2012
- Major: Computer Engineering
- Advisor: Professor **Yiran Chen**

Northeastern University, Shenyang, China

2006~2010

- Degree: Bachelor
- Major: Automation

RESEARCH
GRANTS

- **National Science Foundation:** Xiang Chen (PI), Yiran Chen (Co-PI),
 "CSR: Small: Collaborative Research: EURECa: Enabling Untethered VR/AR System
 via Human-centric Graphic Computing and Distributed Data Processing,"
\$249,997. 9/1/2017~8/31/2020.
- **Innovation Works TCC University Grant:** Yiran Chen (PI), Xiang Chen (Student PI),
 "Invisible Shield: Device Security via Gesture Authentication,"
\$25,000. 9/1/14~8/31/15.
- **University of Pittsburgh Innovation Institute Pitt Ventures:**
 Yiran Chen (PI), Xiang Chen (Student PI),
 "The Invisible Shield: User Classification and Authentication for Mobile Device Based
 on Continuous Gesture Recognition,"
\$6,000. 1/1/2014~1/31/2015.
- **Intel Cornell Cup USA 2013:** Xiang Chen (Student Team Leader),
 "Koalakollar: Squad Tracking and Isolation Event Alert System,"
\$3,000, 1/2014~5/2014.

HONORF &
AWARDS

- **Best Paper Award**, "MoDNN: Local Distributed Mobile Computing System for Deep
 Neural Network," The Design Automation and Test in Europe (DATE), 2017.
- **Best Paper Nomination**, "Scope - Quality Retaining Display Rendering Workload Scal-
 ing based on User-Smartphone Distance," The International Conference on Computer-
 Aided Design (ICCAD), 2016.

- **Most Popular Poster Award**, Student Research Forum (SRC) Competition, ACM Special Interest Group on Design Automation (SIGDA), The Asia and South Pacific Design Automation Conference (ASPDAC), 2015.
- **Microsoft Excellence Award**, Star of Tomorrow Internship Program (1% of 5000 interns), Microsoft Research Asia, 2015.
- **Second Prize**, Randall Family Big Idea Start-up Competition, Pittsburgh PA, 2014.
- **Second Prize**, ACM Special Interest Group on Design Automation (SIGDA) Student Research Forum (SRC), The Design Automation Conference (DAC), 2012.

**RESEARCH
EXPERIENCES**

High Performance Mobile System for Deep Learning

- Distributed Deep Neural Network (DNN) system on mobile devices;
- Accelerated Generative Adversarial Networks (GAN) on mobile devices.

Mobile System Security and Authentication

- Fast generation and detection framework of adversarial attack examples;
- Residual learning network for restoration of adversarial attack examples;
- Machine learning based user finger operation modeling, and its application on mobile device authentication.

Low Power Mobile Computing Systems

- Real-time power consumption analysis for mobile system and applications;
- Performance retaining real-time CPU/GPU scheduling for mobile graphic system;
- User motion based low-frequency GPS sampling and route reconstruction system for low power navigation on wearable device.

Mobile Graphic and Display Related Technologies

- Distributed parallel rendering framework for local wireless mobile device cluster;
- Mobile OLED-friendly recording and playback system for low power video streaming;
- Dynamic tone mapping for OLED display power saving based on video classification;
- Low-power circuit design of OLED pixel for fine-grained dynamic voltage scaling;
- Sensing & compensation circuit design of OLED panel for display enhancement of non-uniformity & degradation.

Digital Circuit, CMOS VLSI and other Related Works

- Circuit modeling & performance analysis for STT-RAM crossbar circuits;
- Circuit implementation & performance analysis for classic neural synapse circuits;
- Chip tape-out of a 4K STT-RAM chip set, a joint project with SMIC and Chinese Academy of Science Physics Institute.

**WORK
EXPERIENCES**

Caritas Institute of Higher Education, Visiting Scholar. HK. Jul. 2017~Aug. 2017

- Mobile display system optimization.

City University of Hong Kong, Visiting Scholar. Hong Kong. Jun. 2015~Aug. 2015

- Mobile power consumption analysis for DDR RAM and GPU on Android platform;
- Mater student research advising.

Microsoft Research Asia, Intern. Beijing, China.

Jun. 2014~Sep. 2014

- “FingerShadow” system modeling finger-gaze behavior, which has been widely reported by technique news websites;
- Human-Computer Interaction analysis, and Low-power smartphone UI design.

Samsung Research and Development Lab, Senior Intern. Dallas, TX.

Jul. 2013~Nov. 2013

- Samsung 5G FD-MEMO station project, FPGA & DSP development.

Samsung Research and Development Lab, Intern. Dallas, TX. Sep. 2012~Dec. 2012

- “Dynamic Tone Preference” UI system, which is a low-power OLED based system UI running in Galaxy series now;
- Mobile power and user behavior analysis for Galaxy series smartphones & tablets;
- Low-power analysis for OLED display panel dynamic voltage scaling performance.

TRAVEL
GRANT

- 2015 ICCAD ACM Student Travel Grant
- 2015 ICCAD Student Research Competition (SRC) Travel Grant
- 2015 ASPDAC Student Research Competition (SRC) Travel Grant
- 2012 DAC ACM Student Research Competition (SRC) Travel Grant
- 2012 Non-Volatile Memories Workshop Travel Grant
- 2012 DAC ACM Special Interest Group on Design Automation (SIGDA) Young Student Support Program

CONFERENCE
PUBLICATIONS

27. [ICCAD '17] Z. Qin, Z. Xu, Q. Dong, Y. Chen, and X. Chen. **VoCaM: Visualization Oriented Convolutional Neural Network Acceleration on Mobile System.** *The 36th International Conference on Computer-Aided Design*, to appear, Nov. 2017. (Invited Paper)

26. [ICCAD '17] J. Mao, Z. Qin, Z. Xu, K. Nixon, X. Chen, H. Li, and Y. Chen. **AdaLearner: An Adaptive Distributed Mobile Learning System for Neural Networks.** *The 36th International Conference on Computer-Aided Design*, to appear, Nov. 2017.

25. [ICCAD '17] J. Mao, Z. Yang, W. Wen, C. Wu, L. Song, K. Nixon, X. Chen, H. Li, and Y. Chen. **MeDNN: A Distributed Mobile System with Enhanced Partition and Deployment for Large-Scale DNNs.** *The 36th International Conference on Computer-Aided Design*, to appear, Nov. 2017.

24. [SOCC '17] L. Broyde, K. Nixon, X. Chen, and H. Li. **MobiCore: An Adaptive Hybrid Approach for Power-Efficient CPU Management on Android Devices.** *The 30th International System On-Chip Conference*, to appear, 2017.

23. [DATE '17][Best Paper Award] J. Mao, X. Chen, K. Nixon, C. Krieger, and Y. Chen. **MoDNN: Local Distributed Mobile Computing System for Deep Neural Network.** *The 20th International Conference on Design Automation and Test in Europe*, Page: 1396-1401, Mar. 2017. (acceptance rate: 193/794 = 24.3%)

22. [ICCAD '16][Best Paper Nomination] K. Nixon, X. Chen, and Y. Chen. **Scope - Quality Retaining Display Rendering Workload Scaling based on User-Smartphone Distance.** *The 35th International Conference on Computer-Aided Design*, Page: 1~6, Nov. 2016. (acceptance rate: 97/408 = 23.8%)

21. [SOCC '16] X. Chen, K. Nixon, and Y. Chen. **Practical Power Consumption Analysis with Current Smartphones.** *the IEEE International System-on-Chip Conference*, Page: 333-337, Oct. 2016.

20. [DAC '16] **X. Chen, J. Mao, J. Gao, K. Nixon, and Y. Chen. MORPh: Mobile OLED-friendly Recording and Playback System for Low Power Video Streaming.** *The 53rd Design Automation Conference*, Page: 1~6, Jun. 2016. (acceptance rate: 152/876 = 17%)
19. [ASPDAC '16] **K. Nixon, X. Chen, and Y. Chen. Footfall: GPS Polling Scheduler for Power Saving on Wearable Devices.** *The 21st Asia and South Pacific Design Automation Conference*, Page: 563~568, Jan. 2016.
18. [ASPDAC '16] **K. Nixon, X. Chen, and Y. Chen. SlowMo: Enhancing Mobile Gesture – Based Authentication Schemes via Sampling Rate Optimization.** *The 21st Asia and South Pacific Design Automation Conference*, Page: 462~467, Jan. 2016.
17. [DAC '15] **X. Chen, C. J. Xue, and Y. Chen. DaTuM: Dynamic Tone Mapping Technique for OLED Display Power Saving based on Video Classification.** *The 52nd Design Automation Conference*, Page: 8~12, Jun. 2015. (acceptance rate: 162/789 = 20%)
16. [USENIX HotPower '14] **X. Chen, K. W. Nixon, H. Zhou, Y. Liu, and Y. Chen. Finger-Shadow: An OLED Power Optimization based on Smartphone Touch Interactions.** *The 6th International Workshop on Power-Aware Computing and System*, No. 6, Oct. 2014.
15. [USENIX HotPower '14] **K. W. Nixon, X. Chen, H. Zhou, Y. Liu, and Y. Chen. Mobile GPU Power Consumption Reduction via Dynamic Resolution and Frame Rate Scaling.** *The 6th International Workshop on Power-Aware Computing and System*, No. 5, Oct. 2014.
14. [DAC '14] **X. Chen, M. Dong, C. Zhang, and Y. Chen. Demystify Smartphone Power Consumption: The Evolution of Smartphone Communication Modules.** *The 51st Design Automation Conference*, Page: 1~6, Jun. 2014. (Invited Paper)
13. [CODES+ISSS '13] **M. Zhao, X. Chen, Y. Chen, and C. J. Xue. Online OLED Dynamic Voltage Scaling for Video Streaming Applications on Mobile Devices.** *International Conference on Hardware/Software Co-design and System Synthesis*, Page: 1~10, Oct. 2013.
12. [RTSS '13] **M. Zhao, X. Chen, Y. Chen, and C. J. Xue. Online OLED Dynamic Voltage Scaling for Video Streaming Applications on Mobile Devices.** *IEEE Real-Time Systems Symposium*, Volume 10, Issue 2, Page: 18, Jul. 2013. (acceptance rate: 35/157 = 22%)
11. [DAC-WIP '13] **X. Chen, Z. Ma, F. C. A. Fernandes, C. J. Xue, and Y. Chen. Dynamic Tone Mapping on OLED Display Based on Video Classification.** *The 50th Design Automation Conference*, Jun. 2013.
10. [DAC-WIP '13] **X. Chen, and H. Li. P-Spectrum: A Personalized Smartphone Power Management Technique based on Real-time Battery and User Behavior Monitoring.** *The 50th Design Automation Conference*, Jun. 2013.
9. [DAC-WIP '13] **K. W. Nixon, X. Chen, Z. Mao, K. Li, and Y. Chen. The Invisible Shield: User Classification and Authentication for Mobile Device based on Gesture Recognition.** *The 50th Design Automation Conference*, Jun. 2013.
8. [USENIX HotMobile '13] **X. Chen, Y. Chen, Zhan Ma, and Felix C. A. Fernandes. How is Energy Consumed in Smartphone Display Applications?** *The 16th International Workshop on Mobile Computing Systems and Applications*, No. 3, Feb. 2013.
7. [ASPDAC '13] **K. Nixon, X. Chen, Z. H. Mao, Y. Chen, and K. Li. Mobile User Classification and Authorization based on Gesture Usage Recognition.** *The 18th Asia and South Pacific Design Automation Conference*, Page: 384~389, Jan. 2013.
6. [ICCAD '12] **X. Chen, C. J. Xue, and Y. Chen. Mobile Devices User – The Subscriber and also the Publisher of Real-Time OLED Display Power Management Plan.** *The 31st International Conference on Computer-Aided Design*, Page: 687~690, Nov. 2012. (Invited Paper)

- CONFERENCE PUBLICATIONS (CONT'D)
5. [ICCAD '12] **X. Chen, B. Liu, M. Zhao, C. J. Xue, X. Guo and Y. Chen. Active Compensation Technique for the Thin-Film Transistor Variations and OLED Aging of Mobile Device Displays.** *The 31st International Conference on Computer-Aided Design*, Page: 516~522, Nov. 2012. (acceptance rate: 82/338 = 24%)
 4. [DAC '12] **X. Chen, M. Zhao, J. Zeng, J. Xue, and Y. Chen. Quality-retaining OLED Dynamic Voltage Scaling for Video Streaming Applications on Mobile Devices.** *The 49th Design Automation Conference*, Page: 1000~1005, Jun. 2012. (acceptance rate: 164/741= 22%)
 3. [ASPDAC '12] **X. Chen, J. Zeng, Y. Chen, and H. Li. Fine-grained Dynamic Voltage Scaling on OLED Display.** *The 17th Asia and South Pacific Design Automation Conference*, Page: 807~812, Jan. 2012.
 2. [CICC '11] **P. Wang, X. Chen, Y. Chen, H. Li, S. Kang, X. Zhu, and W. Wu. A 1.0V 45nm Nonvolatile Magnetic Latch Design and its Robustness Analysis.** *IEEE Custom Integrated Circuits Conference*, Page: 1~4, Sep. 2011.
 1. [WCSE '09] **X. Chen, Z. Zhang, and R. Chen. A Real-Time Driving Fatigue Monitoring DSP Device based on Computing Complexity of Binarized Image.** *IEEE International Workshop on Computer Science and Engineering*, Volume. 1, Page: 84~89, Oct. 2009.
- JOURNAL PUBLICATIONS
1. **Z. Sun, X. Chen, Y. Zhang, H. Li, and Y. Chen. Nonvolatile Memories as the Data Storage System for Implantable ECG Recorder** *ACM Journal on Emerging Technologies in Computing Systems*, Volume 8, Issue 2, Jun. 2012.
- INVITED TALKS & CONFERENCE PRESENTATION
15. **"Challenges and Opportunities in Next-gen VR/AR Development"**
Lenovo Beijing Innovation Center, Beijing, China. 12/15/2016;
Huawei Research Center, Beijing, China. 01/09/2017.
 14. **"Challenges and Opportunities in Mobile Development"**
Beihang University, Beijing, China. 12/18/2016;
Beijing University of Technology, Beijing, China. 12/19/2016;
Shandong University, Jinan, China. 12/21/2016;
Beijing University of Post and Telecommunication, Beijing, China. 12/26/2016;
Peking University, Beijing, China. 12/28/2016;
Northeastern University, Shenyang, China. 12/29/2016.
 13. **"Smartphone Sensor: Soul of User-Centric Study"**
Huawei Research Center, Beijing, China. 8/27/2015.
 12. **"From Device to End-user: The Evolution in Smartphone Power Optimization"**
Hong-Kong City University, Hong Kong, China. 8/19/2015;
Peking University, Beijing, China. 7/24/2015.
 11. **"Smartphone and Display Power Consumption Analysis and Optimization"**
Tsinghua University, Beijing, China. 8/29/2014.
 10. **"OREO: Tri-layer Optimization for Power Efficient OLED Display"**
Microsoft Research Asia, Beijing, China. 6/4/2014.
 9. **"OLED Display Power Optimization in Android UI System"**
Samsung R&D Lab, Dallas, TX. 12/15/2012.
 8. **"Practical Power Consumption Analysis with Current Smartphones"**
IEEE International System-on-Chip Conference (SoCC), Seattle, WA. 9/9/2016.
 7. **"MORPh: Mobile OLED-friendly Recording and Playback System for Low Power Video Streaming"**
Design Automation Conference (DAC), Austin, TX. 6/9/2016.

INVITED TALKS
&
CONFERENCE
PRESENTATION
(CONT'D)

6. **"DaTuM: Dynamic Tone Mapping Technique for OLED Display Power Saving based on Video Classification"**
Design Automation Conference (DAC), San Francisco, CA. 6/10/2015.
5. **"FingerShadow: An OLED Power Optimization based on Smartphone Touch Interactions"**
International Workshop on Power-Aware Computing and System (USENIX HotPower), Denver, CO. 10/5/2014.
4. **"How is Energy Consumed in Smartphone Display Applications?"**
International Workshop on Mobile Computing Systems and Applications (HotMobile), Jekyll Island, GA. 2/26/2013.
3. **"Active Compensation Technique for the Thin-Film Transistor Variations and OLED Aging of Mobile Device Display"**
International Conference on Computer-Aided Design (ICCAD), Austin, TX. 12/7/2012.
2. **"Quality-retaining OLED Dynamic Voltage Scaling for Video Streaming Applications on Mobile Device"**
Design Automation Conference (DAC), San Francisco, CA. 6/19/2012.
1. **"A Real-Time Driving Fatigue Monitoring DSP Device based on Computing Complexity of Binarized Image"**
IEEE International Workshop on Computer Science and Engineering, Volume, Qingdao, China. 10/28/2012.

PROFESSIONAL
SERVICE

Event Organization

- Program Committee — ASPDAC-SRF 2018
Student Research Forum
The 23rd Asia and South Pacific Design Automation Conference
- Technical Program Committee — SOCC 2017
The 30th International System On-Chip Conference
- Technical Program Committee, Euro-Par 2017
The 23rd International Conference on Parallel and Distributed Computing
Workshops, Advanced Parallel Processing Technology for Artificial Intelligence
- Technical Program Committee — GLVLSI 2017
The 27th ACM Great Lakes Symposium on VLSI
- Technical Program Committee — IPCCC-CCNSPS 2016
The International workshop on Communication, Computing, and Networking
in Cyber Physical Systems (CCNSPS)
IPCCC (International Performance Computing and Communications Conference)
- Technical Program Committee — DC 2016
Workshop on Energy-Aware Data Centers: Design, Analysis, and Implementation
- Local Chair — NanoCom 2017
The 4th ACM International Conference
on Nanoscale Computing and Communication
- Conference Arrangement — ICFC 2016
Future Chip 2016 by Tsinghua University
- Contest Arrangement — CADthon 2016
ACM Special Interest Group Design Automation (SIGDA) CADathlon
at IEEE/ACM International Conference on Computer-Aided Design (ICCAD)

**PROFESSIONAL
SERVICE
(CONT'D)**

- Session Chair — HALO 2017
Sigda Workshop on Hardware and Algorithms for Learning On-a-Chip
- Session Chair — ISVLSI 2016
IEEE Computer Society Annual Symposium on VLSI

Journalist

- Column Writer — TC-CPS 2017 Cyber-Physical Systems Newsletter,
- Editor — ACM Special Interest Group Design Automation (SIGDA) E-Newsletter

Paper Review

- Reviewer — CCNCPS 2017, International workshop on Communication, Computing, and Networking in Cyber Physical Systems
- Reviewer — DT 2017, IEEE Journal of Design & Test
- Reviewer — ESL 2017, IEEE Embedded Systems Letters
- Reviewer — GLSVLSI 2017, ACM Great Lakes Symposium on VLSI
- Reviewer — JEDS 2017, IEEE Journal of the Electron Devices Society
- Reviewer — JETC 2017, ACM Journal on Emerging Technologies in Computing Systems
- Reviewer — NCAA 2017, International Journal of Neural Computing and Applications
- Reviewer — PATMOS 2017, IEEE International Symposium on Power and Timing Modeling, Optimization and Simulation
- Reviewer — SOCC 2017, IEEE International SoC (System-on-Chip) Conference
- Reviewer — TCAD 2017, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
- Reviewer — TECS 2017, ACM Transactions on Embedded Computing Systems
- Reviewer — TSMC 2017, IEEE Transactions on systems, Man and Cybernetics: Systems
- Reviewer — TVLSI 2017, IEEE Transactions on Very Large Scale Integration Systems
- Reviewer — UIST 2017, ACM Symposium on User Interface Software and Technology
- Reviewer — DSN 2016, International Journal of Distributed Sensor Network
- Reviewer — DT 2016, IEEE Journal of Design & Test
- Reviewer — NAS 2016, IEEE International Conference on Networking, Architecture, and Storage
- Reviewer — NCAA 2016, International Journal of Neural Computing and Applications
- Reviewer — SOCC 2016, IEEE International SoC (System-on-Chip) Conference
- Reviewer — TCAD 2016, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
- Reviewer — THMS 2016, IEEE Transactions on Human-Machine Systems
- Reviewer — MDPI 2015, International Journal of Sustainability
- Reviewer — IET 2014, International Journal of Image Processing
- Reviewer — RTCSA 2013, IEEE International Conference on Embedded and Real-Time Computing Systems and Applications
- Reviewer — ISIE 2013, IEEE Industrial Electronics Society International Symposium on Industrial Electronics