RUICONG(RAY) CHEN

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SKILLS

Programming Languages Python (Pytorch), MATLAB, C/C++, Java, Javascript

EDUCATION

- Ph.D., Department of Electrical Engineering and Computer Science (EECS), **MIT** *2019-Present, Cambridge, MA*
  - Masters of Science in EECS *2021*
  - Commlab Fellowship
  - Related course: Machine Learning; Quantitative Methods for Natural Language Processing
- B.S., EECS, **Peking University** *2015-2019, Beijing, China*
  - Ranking the **1st** in the department
  - National Scholarship (**1%**)

MAIN RESEARCH EXPERIENCE

Research advisors: Anantha Chandrakasan and Hae-Seung Lee *Cambridge, MA, MIT*

- **Bit-flip attacks for Convolutional Neural Networks** *Sept 2022-present*
  - Attack Convolutional Neural Networks (CNNs) with bit-flip attacks
  - Degrade CNNs into a random selector by tweaking 2 out of 10Million CNNs' parameters
  - Improve the bit search efficiency by 50% using incremental bit search
- **Statistical modeling of analog neural networks**[3] *June 2021-Aug 2022*
  - Modeled the analog neural networks performance with circuit parameters
  - Reduced the modeling time by 10 times using linear regression model
  - Increased the accuracy of analog neural networks from 30% to 80% with non-linear quantization
- **Machine learning attacks for Internet-of-thigns (IoT) devices**[1,2] *Sept 2019-June 2021*
  - Increased side-channel attack success from 2% to 98% with CNNs
  - Improved the robustness of IoT devices by 100 times with randomization
  - Analyzed different vulnerability sources for IoT devices

FEATURED PUBLICATIONS

1. Sniff-SAR: A 9.8fJ/c.-s 12b secure ADC with detection-driven protection against power and EM side-channel attack, The 2023 International Solid-state Circuit Conference (**ISSCC 2023**), submitted
   R.-C Chen, A. Chandrakasan, H.-S Lee
2. RaM-SAR: A Low Energy and Area Overhead, 11.3fJ/conv.-step 12b 25MS/s Secure Random-Mapping SAR ADC with Power and EM Side-channel Attack Resilience, The 2022 International Symposium on VLSI Circuits (**VLSI-C 2022**)
   R.-C Chen, H.-R Wang, A. Chandrakasan, H.-S Lee
3. A Bit-level Sparsity-aware SAR ADC with Direct Hybrid Encoding for Signed Expressions for AIoT Applications, The 2022 International Symposium on Low Power Electronics and Design (**ISLPED 2022**)
   R.-C Chen, H. T. Kung, A. Chandrakasan, H.-S Lee
4. Enabling Self-Reconfigurability for Wireless and Batteryless Micro-Implant, The 26th Annual International Conference on Mobile Computing and Networking (**MobiCOM 2020**)
   M.-R, Abdelhamid, **R.-C Chen**, J.-Y Chou, A. Chandrakasan, F. Adib

PHYSICS OLYMPIAD AWARDS

- 1st Prize, 33th National Physics Competition of Undergrad 2016 *2016, Beijing, China*
- Bronze medal, 31th Chinese National Physics Olympiad *2014, Hangzhou, China*
- Gold medal, Pan-Pearl River Delta and Chinese Elite Schools Physics Olympiad *2014, Shenzhen, china*

LEADERSHIP AND SERVICE

- Session Chair of MIT MTL Annual Research Conference (MARC) 2021
- Reviewers of TVLSI, T-CAS I, and T-CAS II Current
- MIT Faculty Search Student Advisory Committee 2020-2021