

Adelson N. Chua

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EDUCATION

Ph.D. in Electrical Engineering and Computer Science, University of California, Berkeley – in progress (2023)

- Cumulative GPA: 3.729/4.00
 - Major: Integrated Circuits. Minor: Computer Architecture and Digital Signal Processing
 - Outside minor: Statistical modeling and Time series analysis
- Graduate Student Researcher in Berkeley Wireless Research Center (BWRC)

Master of Science in Electrical Engineering (Microelectronics), University of the Philippines, Diliman, 2014

- GWA: 1.281/1.00
- Thesis: BER-aware, PVT-resilient, All-digital BPSK Demodulator for Energy Harvesting Nodes
- Project: A Reliable and Power-Aware 0.5V Management Unit for Energy Harvesting Sensor Nodes
 - 1st place UPEEEI Postgraduate Poster Competition, EEE Institute, UP Diliman, 2013

Bachelor of Science in Computer Engineering, University of the Philippines, Diliman, 2012

- GWA: 1.515/1.00, *Cum Laude*
- Capstone Project: An Aggressive Power Optimization of the ARM9-based core using RAZOR
 - UPEEEAAI President's Medals for Outstanding Undergraduate Student Projects 2012
 - Top 10 Undergraduate Projects Competition, College of Engineering, UP Diliman, 2012
- Research Project: Verification of the Razorized ARM9 Core through ARM9TDM Co-processing
 - Best Academe Paper. Analog Devices (Philippines) Technical Symposium 2013

RESEARCH (University of California, Berkeley)

Seizure Prediction with Online Unsupervised Machine Learning (2018-present)

- Apply machine learning implemented in an application-specific integrated circuit to process EEG signals and identify patterns leading to epileptic seizures
- Different EEG features will be calculated, and algorithms will be implemented that will enable dynamic (real-time and unsupervised) adaptation of learned models on variances of EEG data
- End goal is to compute for the probability of a seizure within a given time window that would initiate anti-epileptic drug delivery at high probabilities, preventing seizures from happening

Neurodetect: Seizure Detection in Hardware (2017-2018)

- Mentored Masters of Engineering students in UC Berkeley to implement a hardware-based platform that enables real-time seizure detection
- Implement some feature selection scheme for a patient-specific detection, characterize different machine learning algorithms that enables high accuracy seizure detection
- Translate MATLAB-based feature calculations into Hardware Description Language that can be synthesized into a Field Programmable Gate Array (FPGA)

TEACHING

Graduate Student Instructor II, University of California - Berkeley (2022)

- CS 61C: Great Ideas in Computer Architecture (Machine Structures)
- Class of more than 500 students (Spring 2022).
- Led laboratory sessions, homework development, online forum management, consultation hours.

Assistant Professor, University of the Philippines - Diliman (2014 – present) *On Study Leave*

- Courses taught: Advanced Digital Design, Computer Architecture, Semiconductor Devices
- Taught a graduate course on Modern VLSI Design
- Developed a Basic Electronics course for senior high school students in the university

Instructor, University of the Philippines -Diliman (2012 – 2014)

- Courses taught: Digital Logic Design, Embedded Systems, Computer Organization

PAST PROJECTS (University of the Philippines, Diliman, 2012-2017)

Research staff for Resilient Sensory Swarms for Smart Energy and Environmental Monitoring (2015-2017)

- Collaborated with researchers in University of California, Berkeley (UCB) in a series of four 1-month workshops to create an open sensory swarm hardware and software platform
- Led the system design of the sensor node platform and the prototyping of the actual hardware

Workshop Consultant and Lecturer for Philippine Institute for Integrated Circuits (PIIC) (2014-2016)

- Conducted 15 1-week workshops on microelectronics to different universities in the Philippines
- Courses handled: HDL-based Design, Full Custom Digital Design, RTL Modelling, Synthesis of Digital Circuits, RTL to GDSII Backend Design (Place and Route)

Research staff for the Smart-Wire Program (2013-2016)

- Collaborated with a team of 8 graduate students to create a self-powered power-line monitoring sensor node complete with power regulation and communication in a single integrated circuit
- Led the system integration, verification, and actual hardware testing of the fabricated chip

Research staff for the Eye-C: Design of a Vision-capable Microcontroller project (2012-2013)

- Collaborated with faculty members from six universities of the ERDT consortium to create a microcontroller from the ground up featuring a basic serial, analog, and camera interfaces
- Led the system integration, verification, and actual hardware testing of the fabricated chip

PUBLICATIONS

- Chua, A., Jordan, M., Muller, R., "SOUL: An Energy-Efficient Unsupervised Online Learning Seizure Detection Classifier," To appear in the IEEE Journal of Solid-State Circuits (JSSC), 2022.
- Chua, A., Jordan, M., Muller, R., "A 1.5nJ/cIs Unsupervised Online Learning Classifier for Seizure Detection," 2021 Symposia on VLSI Technology and Circuits. 13-19 June 2021. Kyoto, Japan.
- Chua, A., Jordan, M., Muller, R., "Unsupervised Online Learning for Long-term High Sensitivity Seizure Detection," 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 20-24 July 2020. Montreal, Canada.
- Chua, A., Alarcón, L., "A 450kHz PVT-Resilient All-Digital BPSK Demodulator for Energy Harvesting Sensor Nodes," IEEE International Symposium on Circuits & Systems (ISCAS), 28-31 May 2017. Baltimore, MD.
- Chua, A., Maestro, R.J., Jardin, J.C., Monisit, K., Nuestro, R., Fabay, K.B., Pelayo, B.R., Lofamia, W.V., Ortiz, J.R., Madamba, J.A., Alarcón, L., "Smart-Wire: A 0.5V 44uW OC to 100C Power-line Energy Harvesting Sensor Node," 2017 Custom Integrated Circuits Conference (CICC), 1-3 May 2017. Austin, Texas.
- Lim, E.; Chua, A., "Error Rate Control through Frequency Scaling for Minimum-Energy Point Operation in Razor-based processors," TENCON 2016 – 2016 IEEE Region 10 Conference, 22-25 Nov. 2016. Singapore.
- Chua, A.; Maestro, R.J.; Alba, M.E.; Lofamia, W.V.; Fabay, K.B.; Jardin, J.C.; Jocson, K.J.; Pelayo, B.R.; Madamba, J.A.; Hizon, J.R.E.; Alarcón, L.P., "Delay Variation Compensation through Error Correction using Razor," 6th International Workshop on CMOS Variability (VARI 2015). 1-4 September 2015. Bahia, Brazil.
- Chua, A.; Luna, A.L.; Roque, C.R.; Alarcón, L.; Oppus, C.; Yap, R.; Zafra, E.A.; Lambino, M.; Garcia, R.; Hizon, J.R., "Driving Philippine Microelectronics Education Development with Multi-university Collaboration," Microelectronic Systems Education (MSE), 2013 IEEE International Conference on, vol., no., pp.52,55, 2-3 June 2013. Austin, Texas.
- Chua, A.; Luna, A.L.; Roque, C.R.; Alarcón, L.; Oppus, C.; Yap, R.; Zafra, E.A.; Lambino, M.; Garcia, R.; Hizon, J.R., "Eye-C: Design of a Vision-Capable Microcontroller IC for a Mobile Robot Explorer," In Electrical and Electronics Engineering, Proceedings. The 5th AUN/SEED-Net Regional Conference, pages 285–288, February 2013. Bangkok, Thailand.
- Alba, M.E.V.; Chua, A.N.; Lofamia, W.V.V.; Maestro, R.J.M.; Hizon, J.R.E.; Madamba, J.A.R.; Aquino, H.R.O.; Alarcón, L.P., "An Aggressive Power Optimization of the ARM9-based core using RAZOR," TENCON 2012 - 2012 IEEE Region 10 Conference, vol., no., pp.1,5, 19-22 Nov. 2012. Cebu, Philippines.