

HANH-PHUC LE

University of Colorado, Boulder

hanhphuc@colorado.edu, <http://www.colorado.edu/lab/ipower3es/>

EDUCATION

Ph.D	12/2013	UC Berkeley, CA, USA	with Seth R. Sanders and Elad Alon
M.S.	08/2006	KAIST, Daejeon, Korea	with Gyu-Hyeong Cho
B.S.	06/2003	HUST, Hanoi, Vietnam	with Hoa-Binh Phi, VAST, VN

EXPERIENCE AND EMPLOYMENT

- Assistant Professor** **University of Colorado Boulder** **01/2016 ~ current**
- Principle investigator of the integrated Power Electronics and Energy-Efficient Systems (iPower3Es) group with 3 current PhD students.
- Chief Technology Officer** **Lion Semiconductor Inc., CA** **01/2013 ~ 10/2015**
- Lead the team to develop a fully integrated voltage regulation solution for mobile and wearable applications, targeting a next generation PMIC.
- Consultant** **Rambus, Sunnyvale, CA** **03/2012 ~ 05/2012**
- Evaluate a power management technology
- Graduate Student Intern** **Intel, Beaverton, OR** **05/2009 ~ 07/2009**
- Integrated Switch-capacitor Voltage Regulator (SCVR)
 - Output impedance characterization and improvement
- Graduate Student Intern** **Oracle, Santa Clara, CA** **05/2008 ~ 08/2008**
- Power integrity for high-performance microprocessors
 - High-speed close-loop supply noise detection and control, *applied in Oracle SPARC T4 processors*
 - Power supply grid modeling and analysis
- Senior Engineer** **JDA Technology and KAIST, KR** **09/2004 ~ 05/2007**
- Power supply ICs for AM-OLED LCDs with 2 main projects
 - Single-Inductor Multiple-Output DC-DC Converter chip with 5 Outputs and Ordered Power-Distributive Control, *adopted in LG AM-OLED phone, SH150A, for SK Telecom*
 - Single-Inductor Bipolar-Output DC-DC Converter chip with 1 positive output (4.6V ~ 6.5V) and 1 negative output (-6.4V ~ -8V)
- Researcher** **Vietnam Acad. of Sci. and Tech. (VAST), VN** **10/2002 ~ 08/2004**
- Responsible for product prototypes
 - DC Power Supply series: 2 modes – manual (0 - 30V/2A and 0 – 60V / 250mA) and programmable (0-10V precisely and 0 – 60V), w/ current limiter
 - Giant Magneto Impedance (GMI) Measurement System, applied in HUT's materials research
 - Gauss Meter series (0 – 100mT, 0 – 2T)
 - Data Acquisition System (DAS) – Bachelor's Thesis
 - Switching power supply (AC–DC and DC–DC Converter)
-

PROFESSIONAL ACTIVITIES

Editorial Boards and Conference Committees

- Associate Editor
 - IEEE Journal of Emerging and Selected Topics in Power Electronics (JESTPE), since 2017
- TPC Member and/or Session Chair:
 - International Workshop on Power Supply on Chip (PowerSoC), 2012, 2014, 2016;
 - *Technical Program Chair for the PwrSoC 2018*
 - Applied Power Electronics Conference and Exposition (APEC), 2019
 - IEEE Energy Conversion Congress and Exposition (ECCE), 2018
 - IEEE Custom Integrated Circuits Conference (CICC), since 2017
 - IEEE PELS Workshop on Emerging Technology: Wireless Power, WOW 2015

- Vice Chair of of the Technical Committee TC2 of the IEEE Power Electronics Society, since 2016

Reviewing Activities (Journals and Conferences)

- IEEE Transaction of Power Electronics (since 2011), IEEE Journal of Solid-State Circuits (since 2010), IEEE Journal of Emerging and Selected Topics in Power Electronics (since 2013), IEEE Transactions on Very Large Scale Integration Systems (since 2010), IEEE International Symposium on Circuits and Systems (since 2009), IEEE Transactions on Circuits and Systems I (since 2011), Microelectronics Journal - Elsevier (2010), IEEE Design and Test (2014).

HONORS

Awards

- 2013 Sevin Rosen Funds Award for Innovation, at Dept. of EECS, UC Berkeley
- IEEE Solid-State Circuits Society Predoctoral Achievement Award 2012-2013
- 1st place in Cleaning & Sustainable Energy Alternatives at Big Ideal @ Berkeley, 2013
- 3rd place at Berkeley Energy & Resources Collaborative (BERC) Innovation Expo 2012
- IEEE Young Professional/Student Profile of the Month, 2013-2014

Fellowships

- Fellowships from Center for Circuit & System Solutions (C2S2) and Interconnect Focus Center (IFC), Semiconductor Research Center (SRC), 2008-2012
- UC Berkeley Regents Fellowship, 2007-2008

Scholarships

- Institute of Information Technology Advancement (IITA) Honor Scholarship for IT-related Excellent Foreign Students in Korea, Korea, 2004-2006
- Scholarship for Excellent Students, Hanoi University of Technology, Hanoi, Vietnam, 1999

PUBLICATIONS ([Google Scholar citations: 1800+](#))

Book Chapter

2. H-P. Le, "Circuit Design Techniques for Fully Integrated Voltage Regulator Using Switched Capacitors," in the *CICC 2017 Tutorial Media Book*, Ali Sheikholeslami, Yanjie Wang, Jan Van der Spiegel (co-editors), (to be published)
1. E. Alon, H-P. Le, John Crossley, Seth R. Sanders, "Fully Integrated Switched-Capacitor DC-DC Conversion" in *Frequency References, Power Management for SoC, and Smart Wireless Interfaces*, A. Baschiroto, K. A.A. Makinwa, P. Harpe (editors), Springer, 2014.

Grid, Bus, and Integrated Power Conversions

11. C. Hardy, and H-P. Le, "A 10.9W 93.4%-Efficient (27W 97%-Efficient) Flying-Inductor Hybrid DC-DC Converter Suitable for 1-Cell (2-Cell) Battery Charging Applications," *IEEE International Solid-State Circuits Conference (ISSCC)*, 2019. (Accepted)
10. R. Das, and H-P. Le, "A Regulated 48V-to-1V/90A 90.8%-Efficient Hybrid Converter for POL Applications in Data Centers and Telecommunication Systems," *2019 IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2019. (Accepted for Lecture Presentation)
9. R. Das, G-S. Seo, and H-P. Le, "An 80-W 95%-Efficient 48V-to-1V/2V Multi-Phase Multi-Inductor Hybrid Converter," *2019 IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2019. (Accepted for Lecture Presentation)
8. T. Xie, R. Das, G-S. Seo, and H-P. Le, "Multiphase Control for Robust and Complete Soft-charging Operation of Dual Inductor Hybrid Converter," *2019 IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2019. (Accepted for Lecture Presentation)
7. G-S. Seo, R. Das, and H-P. Le, "A 95%-Efficient 48V-to-1V/10A VRM Hybrid Converter Using Interleaved Dual Inductors," *2018 IEEE Energy Conversion Congress and Exposition (ECCE)*, Portland, OR, 2018.
6. R. Das, G-S. Seo, and H-P. Le, "A 120V-to-1.8V 91.5%-Efficient 18-W Dual-Inductor Hybrid Converter with Natural Soft-charging Operations for Direct Extreme Conversion Ratios," *2018 IEEE Energy Conversion Congress and Exposition (ECCE)*, Portland, OR, 2018.
5. L. Pham-Nguyen, V-Q. Nguyen, D-M. Nguyen, H-D. Han, K-H. Nguyen, and H-P. Le, "A 14-W 92%-Efficient Hybrid DC-DC Converter with Advanced Bootstrap Gate Drivers for Smart Home LED Applications," *2018 IEEE Energy Conversion Congress and Exposition (ECCE)*, Portland, OR, 2018.

4. G. S. Seo and H-P. Le, "Hybrid Converters with Reduced Inductor Loss for Integratable Power Conversion," the 2018 International Power Electronics Conference - ECCE ASIA, Niigata, May 2018. *(invited)*
3. G. S. Seo and H-P. Le, "Small-signal analysis of S-hybrid step-down DC-DC converter," *2017 IEEE 18th Workshop on Control and Modeling for Power Electronics (COMPEL)*, Stanford, CA, 2017, pp. 1-6.
2. R. Goel, G. S. Seo and H-P. Le, "A smart-USB-cable buck converter with indirect control," *2017 IEEE 18th Workshop on Control and Modeling for Power Electronics (COMPEL)*, Stanford, CA, 2017, pp. 1-6.
1. G-S. Seo and H-P. Le, "An inductor-less hybrid step-down DC-DC converter architecture for future smart power cable," *2017 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Tampa, FL, 2017, pp. 247-253.

Fully-Integrated Power Conversions

6. H-P. Le, "Fully integrated power conversion and the enablers," in *Power Electronics and ECCE Asia (ICPE-ECCE Asia)*, 2015 9th International Conference on, pp.1778-1783, Jun 2015. *(invited)*
5. S. Sanders, E. Alon, H-P. Le, M. Seeman, M. John, V. Ng, "The Road to Fully Integrated DC-DC Conversion via the Switched-Capacitor Approach," *Power Electronics, IEEE Transaction on*, pp. 4146 - 4155, Vol. 28, Iss. 9, Sept. 2013.
4. H-P. Le, J. Crossley, S. Sanders and E. Alon, "A Sub-ns Response Fully-Integrated Battery-Connected Switched-Capacitor Voltage Regulator Delivering 0.19W/mm² at 73% Efficiency," *ISSCC Dig. Tech. Papers*, pp. 372-373, Feb. 2013.
3. H-P. Le, S. Sanders and E. Alon, "Design Techniques for Fully Integrated Switched-Capacitor DC-DC Converters," *JSSC*, pp. 2120 - 2131, Vol. 46, Iss. 9, Sep. 2011.
2. M. Seeman, V. W. Ng, H-P. Le, M. Johns, E. Alon, S.R. Sanders, "A Comparative Analysis of Switched-Capacitor and Inductor-Based DC-DC Conversion Technologies," *Control and Modeling for Power Electronics (COMPEL)*, *2010 IEEE 12th Workshop on*, pp. 1-7, June 2010.
1. H-P. Le, M. Seeman, S. Sanders, V. Sathe, S. Naffziger and E. Alon, "A 32nm Fully Integrated Reconfigurable Switched-Capacitor DC-DC Converter Delivering 0.55W/mm² at 81% Efficiency," *ISSCC Dig. Tech. Papers*, pp. 210-211, Feb. 2010.

Energy-Efficient and Low-Power Systems

6. B. Zimmer, et al., "A RISC-V Vector Processor With Simultaneous-Switching Switched-Capacitor DC-DC Converters in 28 nm FDSOI," *IEEE Journal of Solid-State Circuits*, vol.PP, no.99, pp.1-1, March 2016 *(invited)*
5. R. Muller, H-P. Le, W. Li, et al., "A Minimally Invasive 64-Channel Wireless μ ECoG Implant", *Solid-State Circuits, IEEE Journal of*, Vol. 50, No.1, pp. 344-359, Jan. 2015. *(invited)*
4. B. Zimmer, Y. S. Lee, A. Puggelli, J.H. Kwak, R. Jevtic, et. al, "A RISC-V Vector Processor with Tightly-Integrated Switched-Capacitor DC-DC Converters in 28nm FDSOI," *VLSI Circuits Digest of Technical Papers, 2014 Symposium on*, June 2015.
3. R. Jevtic, H-P. Le, M. Blagojevic, et al., "Per-Core DVFS with Switched-Capacitor Converters for Energy Efficiency in Many-core Processors," *Very Large Scale Integration (VLSI) Systems, IEEE Transactions on*, Iss. 99, pp.1, May 2014.
2. R. Muller, H-P. Le, W. Li, et al., "A Miniaturized 64-Channel 225 μ W Wireless Electrocardiographic Neural Sensor", *IEEE International Solid-State Circuits Conference (ISSCC) Dig. Tech. Papers*, pp. 412-443, Feb. 2014.
1. M. J. Turnquist, J. Makipaa, M. Hienkari, H-P. Le and L. Koskinen, "Rethinking DC-DC Converter Design Constraints for Adaptable Systems that Target the Minimum-Energy Point," *The International Symposium on Low Power Electronics and Design (ISPLED)*, pp.383-388, Sept. 2013.

Single Inductor Multiple Output (SIMO) DC-DC Converter

8. S-W. Wang, H-P. Le, Y-J. Woo, et al., "Low-Power Consumptive Luminance Compensation for a Digital Driving AMOLED Display using a Multiple Output Boost Converter," *Symposia and International Display (SID) Research Conferences*, May 2010.
7. C-S. Chae, H-P. Le, K-C. Lee, G.H. Cho and G-H. Cho, "A Single Inductor Step-up DC-DC Switching Converter with Bi-polar Outputs for AMOLED Mobile Display Panels," *JSSC*, Vol. 44, Iss.2, pp. 509-524, Feb. 2009.
6. Y-J. Woo, H-P. Le, G.H. Cho, G-H. Cho, S-I. Kim, "Load-Independent Control of Switching DC-DC Converters with Freewheeling Current Feedback," *JSSC*, Vol. 43, Iss.12, pp. 2798-2808, Dec. 2008.

5. Y-J. Woo, H-P. Le, G.H. Cho, G-H. Cho, S-I. Kim, "Load-Independent Control of Switching DC-DC Converters with Freewheeling Current Feedback," *ISSCC Dig. Tech. Papers*, pp. 446-447, Feb. 2008.
4. H-P. Le, C-S. Chae, K-C. Lee, G.H. Cho, S-W. Wang and G-H. Cho, "A Single-Inductor Switching DC-DC Converter with 5 Outputs and Ordered Power-Distributive Control," *JSSC*, Vol. 42, Iss.12, pp. 2706-2714, Dec. 2007. (*invited paper*)
3. H-P. Le, C-S. Chae, K-C. Lee, G-H. Cho, S-W. Wang, G.H. Cho, S-I. Kim, "A Single-Inductor Switching DC-DC Converter with 5 Outputs and Ordered Power-Distributive Control," *ISSCC Dig. Tech. Papers*, pp. 534-620, Feb. 2007.
2. C-S. Chae, H-P. Le, K-C. Lee, G.H. Cho and G-H. Cho, "A Single Inductor Step-up DC-DC Switching Converter with Bi-polar Outputs for AMOLED Mobile Display Panels," *ISSCC Dig. Tech. Papers*, pp. 132-592, Feb. 2007.
1. H-P. Le, C.S. Chae, M.C. Lee, et al., "Integrated zero-inductor-current detection circuit for step-up DC-DC converters," *Electronics Letters*, Vol. 42, Issue 16, pp. 943-944, Aug. 2006.

Miscellaneous

9. J. Crossley, A. Puggelli, H-P. Le, et al., "BAG: A Designer-Oriented Integrated Framework for the Development of AMS Circuit Generators," *ICCAD*, pp. 74-81, Nov. 2013.
8. J. Crossley, A. Puggelli, H-P. Le, et al., "AMS Circuit Generation, It's in the BAG," *the Workshop on Frontiers in Analog CAD*, Feb. 2013.
7. R. Muller, P. Ledochowitsch, H-P. Le, et al., "A Minimally Invasive, Wireless Platform for Electroencephalography," (Poster and Abstract) *Society for Neuroscience Conference*, October 2012.
5. R. Muller, W. Li, H-P. Le, et al., "Low-Power, Wireless Platform for Implantable Brain-Machine Interfaces." (Poster) *Global Technology Leaders Conference*, Nov. 2011.
5. T-W. Kwak, M-C. Lee, B-K. Choi, H-P. Le and G-H. Cho, "A 2W CMOS Hybrid Switching Amplitude Modulator for EDGE Polar Transmitter," *ISSCC Dig. Tech. Papers*, pp. 518-619, Feb. 2007.
4. Y-U. Hong, B-K. Choi, Y-J. Woo, M-C. Lee, T-W. Kwak, H-P. Le and G-H. Cho, "Optimum efficiency-tracking gate driver using adaptive deadtime control for single chip DC-DC converter", *Power Electronics Specialists Conference (PESC) 37th*, pp. 1-5, Jun. 2006.
3. H.N. Nguyen, H.B. Phi, H-P. Le, et al., "Giant Magnetoimpedance Measurement System Applied to Researches of Amorphous and Nanocrystalline Materials and Sensors," *Proceedings of 9th Biennial Vietnam Conference on Radio & Electronics (REV 2004)*, Hanoi, Vietnam, pp. 235-238, November, 2004.
2. L. V. Phi, H.N. Nguyen, H-P. Le, and H.B. Phi, "Luminescence of SiO_x defects – Influence of SiO_x on photoluminescence spectra of nc-Si in SiO_x," *National Physics Conference on Hard Materials VLCR^{IV}*, Vietnam, Nov. 2003.
1. H.N. Nguyen, L. V. Phi, H-P. Le, and H.B. Phi, "Simulation of J-V characteristics of MOS structures containing silicon crystals in LED applications," *National Physics Conference on Hard Materials VLCR^{IV}*, Vietnam, Nov. 2003.

Selected Patents

12. H-P. Le, R. Das, G-S. Seo, "Hybrid Converter Family for Large Conversion Ratios and Methods Thereof", Provisional Patent Application, 2018.
11. R Das, H-P. Le, "Switched Capacitor Inverting Network for Large Conversion Ratio Converters and Method Thereof", Provisional Patent Application, 2018.
10. R Das, H-P. Le, "Multi-output Hybrid Converter and Method Thereof", Provisional Patent Application, 2018.
9. H-P. Le, G-S. Seo, "Smart Cable and Methods Thereof," International Patent Application, No. WO2017210279A1, 2017.
8. H-P. Le, J. Crossley, A. Puggelli, W. Kim, "Feedback control in hybrid voltage regulators," US Patent App., 20150097538 A1
7. J. Crossley, H-P. Le, A. Puggelli, "Asymmetric switching capacitor regulator," US Patent, US 9,899,919 B2
6. H-P. Le, J. Crossley, A. Puggelli, W. Kim, "Hybrid regulator including a buck converter and a switched capacitor converter," US Patent, US 9,601,998 B2

5. H-P. Le, J. Crossley, W. Kim, "Apparatus, systems, and methods for providing a hybrid power regulator," US Patent, US 9,143,032 B2
 4. H-P. Le, R. Masleid, "Precision Sampling Circuit," US Patent, US 8,179,165 B2
 3. H-P. Le, R. Masleid, "Delay Chain Initialization," US Patent, US 8,242,823 B2
 2. H-P. Le, R. Masleid, D. Greenhill, "Fine Grain Timing," US Patent, US 8,198,931 B2
 1. H-P. Le, R. Masleid, D. Greenhill, "Minimal Bubble Voltage Regulator," US Patent, US 8,283,960 B2
-

TEACHING

University of Colorado at Boulder, Boulder, CO

- ECEN 3250 - Microelectronics, Fall 2018
- ECEN 5007 - Integrated Circuits and Devices for Power Management ICs, Spring 2018
- ECEN 5837 - Mixed-Signal Integrated Circuit Design, Spring 2016, 2017
- ECEN 4827/5827 - Analog IC Design, Fall 2016, 2017

University of California at Berkeley, Berkeley, CA

- Guest Lecture: EE290C Advanced Topics in Circuit Design, Spring 2012
- Teaching Assistant: EE 141 Introduction to Digital Integrated Circuits, E. Alon instructor, Fall 2010
- Teaching Assistant: EE 140 Analog Integrated Circuits, S. Sanders instructor, Spring 2010
- Graduate Student Mentor: Summer Undergraduate Program in Engineering Research at Berkeley (SUPERB), Summer 2012

Korea Advanced Institute of Science and Technology, Daejeon, Korea

- Teaching Assistant: EE 571 Advanced Electronics Circuits, G-H. Cho instructor, Spring 2006

Canberra English Center and UNSY English Center, Hanoi, VN

- English Teacher: Intermediate Level Classes using Oxford Headway program, 08/2001 ~ 06/2004
-

LEADERSHIP AND OTHER EXPERIENCE

- | | | |
|------------------------------|--------------------------------|-------------------|
| • Chief Technology Officer | Lion Semiconductor Inc. | 01/2013 ~ 10/2015 |
| • EE Ombudsperson | EECS, UC Berkeley | 09/2011 ~ 09/2012 |
| • EE social hour coordinator | EECS, UC Berkeley | 09/2008 ~ 09/2011 |
| • President | English Speaking Club, IOGT-VN | 07/2000 ~ 09/2001 |