

## Chulsoon Hwang

EMC Laboratory, Missouri University Science and Technology  
4000 Enterprise Dr., Rolla, MO 65401

Tel: +1-573-341-4455  
hwangc@mst.edu

---

---

### Research Interest

High-speed Digital System Design, RF/digital Integration (RF Desensitization), Electromagnetic Interference (EMI), Hardware Security/Intentional EMI, Machine-learning, and Electromagnetics

### Work Experience

- 09/2022 – present Associate Professor, Dept. Electrical and Computer Engineering, Missouri University Science and Technology, Rolla, MO (Formerly the University of Missouri Rolla, UMR)
- 09/2016 – 08/2022 Assistant Professor, Dept. Electrical and Computer Engineering, Missouri University Science and Technology, Rolla, MO
- 07/2015– 08/2016 Post-Doctoral Fellow, Dept. Electrical and Computer Engineering, Missouri University of Science and Technology, Rolla, MO
- 07/2012– 06/2015 Senior Engineer, HSI & Advanced Electromagnetic Compatibility Lab., Samsung Electronics Co., Ltd, Suwon, Korea
- 03/2007–06/2012 Graduate Research Assistant, Terahertz Laboratory, Dept. Electrical Engineering, KAIST, Daejeon, Korea

### Education

- 03/2009–06/2012 Ph. D. Dept. Electrical Engineering, KAIST, Daejeon, Korea (Advisor: Prof. Joungho Kim)  
*Thesis: On-chip Electromagnetic Bandgap Structures for Suppression of Simultaneous Switching Noise Coupling in on-chip Power Distribution Networks*
- 03/2007– 02/2009 M.S. Dept. Electrical Engineering, KAIST, Daejeon, Korea (Advisor: Prof. Joungho Kim)  
*Thesis: Wideband Narrow Pitch Via Electromagnetic Bandgap Structure for Suppression of P/G Noise Coupling to Signal in SiP*
- 03/2001– 02/2007 B.S. Dept. Electrical Engineering, KAIST, Daejeon, Korea  
(Served two years in the South Korean Army)

### Professional Service and Society Memberships

- Technical Committee Officer, Vice Chair, IEEE EMC Society SC5 - Power Electronics EMC 2020 ~ present  
Secretary, IEEE EMC Society SC5 - Power Electronics EMC 2016 ~ 2020
- Associate Editor, IEEE Transactions on Signal and Power Integrity, 2021 ~ present
- Technical Program Committee, Asia-Pacific International Symposium on EMC 2022
- Reviewer, IEEE Transactions (T-EMC, T-MTT, T-SIPI, T-VLSI, T-CAS1, T-CPMT, MWCL, and Access)  
*Conferences:* IEEE Int. Symp. on EMC+SIPI 2016-2022, Asia-Pacific Int. Symp. on EMC 2016-2022, Asia-Pacific Microwave Conference (APMC) 2019-2021, IEEE Electrical Design and Advanced Packaging & systems (EDAPS), IEEE EMC Magazine, ICPE 2019-ECCE Asia, IEEE Int. Symp. on Circuits & Systems (ISCAS) 2021.
- Session Organizer/Workshop Organizer at IEEE Int. Symp. on EMC+SIPI 2018-2022, Asia-Pacific Int. Symp. on EMC 2016-2019, 2022
- Senior Member, IEEE, 2018
- IEEE-HKN, 2019

## Honors & Awards

- Missouri S&T
  - CEC Dean’s Scholar, 2022-2023
  - Outstanding Teaching Commendation, 2021
  - Faculty Research Award, 2019, 2021
- Best Paper/Best Student Paper Awards
  - Best EMC Paper Award, *IEEE International Symposium on EMC&SIPI*, 2022 (last author)
  - Best EMC Paper Runner-Up, *IEEE International Symposium on EMC&SIPI*, 2022
  - Best SIPI Student Paper Runner-Up, *IEEE International Symposium on EMC&SIPI*, 2021 (last author)
  - Best Student Paper Award, *Asian Electromagnetics Conference (ASIAEM)*, 2019 (last author)
  - Best SIPI Paper Award, *IEEE International Symposium on EMC&SIPI*, 2019 (last author)
  - Best Paper Award, *DesignCon*, 2019
  - Best Paper Award, *DesignCon*, 2018 (last author)
  - Best Paper Award, *Asia-Pacific International Symposium on EMC*, 2017 (first author)
- Distinguished Reviewer of the IEEE Transactions on EMC for the year 2019, *IEEE T-EMC*, 2020
- Google Faculty Research Award, *Google*, 2020
- APEMC Young Scientist Award, *Joint IEEE International Symposium on EMC & Asia-Pacific Symposium on EMC*, 2018

### Awards received by advised students

- Outstanding Graduate Student Award, received by Shengxuan Xia, *IEEE St. Louis Section*, 2022
- IEEE James C. Klouda Memorial Scholarship Award, received by Anfeng Huang, *IEEE Int. Symp. EMC&SIPI*, 2021
- IEEE James C. Klouda Memorial Scholarship Award, received by Yin Sun, *IEEE Int. Symp. EMC&SIPI*, 2020
- Student Hardware Design Contest 1<sup>st</sup> place, received by Omid Hoseini Izadi, *IEEE Int. Symp. EMC&SIPI*, 2020

## Teaching

[Evaluation scale: 0.0-4.0, university average: 3.0-3.1, department average: 3.1-3.2]

| Course Title                         | Course Number | Terms  | Enrolled | Evaluation | Percent response |
|--------------------------------------|---------------|--------|----------|------------|------------------|
| Introduction to VLSI Design          | CpE 5210      | FS2022 | 14       | 3.54       | 78.6%            |
| SI                                   | EE 5620       | SP2022 | 13       | 3.36       | 84.6%            |
| SI                                   | CpE 5620      | SP2022 | 7        | 3.50       | 28.6%            |
| SI (DIS)                             | CpE 5620      | SP2022 | 4        | 3.00       | 75%              |
| Introduction to VLSI Design          | CpE 5210      | FS2021 | 13       | 3.40       | 76.9%            |
| Introduction to VLSI Design (DIS)    | CpE 5210      | FS2021 | 6        | 2.33       | 50%              |
| SI (Hybrid)                          | CpE 5620      | SP2021 | 7        | 3.50       | 28.6%            |
| SI (Hybrid)                          | EE 5620       | SP2021 | 6        | 3.67       | 50%              |
| SI (DIS)                             | CpE/EE5620    | SP2021 | 5        | 3.00       | 20%              |
| Introduction to VLSI Design (Hybrid) | CpE 5210      | FS2020 | 20       | 3.75       | 60%              |
| SI                                   | CpE 5620      | SP2020 | 8        | 3.75       | 50%              |
| SI                                   | EE 5620       | SP2020 | 18       | 3.36       | 77.8%            |
| Introduction to VLSI Design (DIS)    | CpE 5210      | FS2019 | 5        | 3.00       | 40%              |
| Introduction to VLSI Design          | CpE 5210      | FS2019 | 10       | 3.00       | 30%              |
| Introduction to Electronic Devices   | EE 2200       | SP2019 | 27       | 3.16       | 70.4%            |

|                                    |          |        |    |      |       |
|------------------------------------|----------|--------|----|------|-------|
| Introduction to VLSI Design        | CpE 5210 | FS2018 | 20 | 2.53 | 95%   |
| Introduction to Electronic Devices | EE 2200  | SP2018 | 35 | 2.84 | 88.6% |
| Introduction to VLSI Design        | CpE 5210 | FS2017 | 26 | 2.91 | 84.6% |
| Introduction to Electronic Devices | EE 2200  | SP2017 | 41 | 1.71 | 75.6% |
| Introduction to VLSI Design        | CpE 5210 | FS2016 | 10 | 2.25 | 80%   |

## Advising & Mentoring

- **Graduated Advisees: 7 Ph.D., 7 M.S.**

Ph.D.: Muqi Ouyang (2022), Ruijie He (2022), Anfeng Huang (2021), Jiayi He (2021), Ling Zhang (2021), Yin Sun (2020), Omid Hoseini Izadi (2020)

M.S.: Jack Juang (2022), Tanner Fokkens (2022), Xin Fang (2022), Woncheol Song (2021), Shun Liu (2021), Yang Zhong (2019), Harsh Shrivastav (2019)

- **Current Graduate Students: 8 Ph.D., 2 M.S.**

Ph.D.: Shengxuan Xia, Junho Joo, Xiangrui Su, Yifan Ding, Jiahuan Huang, Hanyu Zhang, Haran Manoharan, Wenchang Wang

M.S.: Kalkidan Woldemariam, Jongsuk Hyun

- **Undergraduate Research:** Alec Fitzmaurice (2023), Sumin Hwang (2022-2023), Mark Mitchell (2022-2023), Nicolas Spears (2019), Jack Juang (2019), William Ong (2019)

- **Postdoctoral Fellows:** Dr. Reza Yazdani (Jan. 2022– present), Dr. Seungtaek Jeong (Apr. 2021 – Nov. 2022), Dr. Taelim Song (Jan. 2020 – Nov. 2021), Dr. Zhifei Xu (July 2020 – Dec. 2020)

- **Visiting Scholars:** Seunghun Ryu (Mar. 2022 ~ Sep. 2022), Dr. Jonghwa Kwon (Sep. 2021 ~ Aug. 2022), Jaesik Moon (July 2021 ~ Aug. 2021), Yutao Tang (Oct. 2019 ~ Oct. 2020), Dr. Jongjoo Lee (Apr. 2019 ~ Feb. 2020), Cheolhan Kim (Aug. 2018 ~ Aug. 2019), Youngmin Ku (Jan. 2018 ~ Jan. 2019)

- **Ph.D. Thesis Titles:**

Muqi Ouyang: Accuracy Improvement of Cable Harness Modeling & Analytical Modeling of Multi-Reflections in High-Speed Signal Channels

Ruijie He: Modeling Methods for EMI Filter and Flyback Transformer

Anfeng Huang: Characterizing and Modeling Methods for Power Converters

Jiayi He: Machine Learning Based Modeling Techniques in EMC/SI and EMI Characterization for Power Supplies

Ling Zhang: PDN Modeling for High-Speed Multilayer PCB Boards and Decap Optimization Using Machine Learning Techniques

Omid Hoseini Izadi: Investigating the Effect of Operating Condition on ESD-induced Soft Failures

Yin Sun: Analysis and Characterization of Power Supply Induced Jitter (PSIJ) for High-speed Driver

## Research Expenditures

Total Awards: \$10.2M shared credit: \$3.0M expenditures: \$2.3M

| FY            | 2018        | 2019        | 2020        | 2021        | 2022        |
|---------------|-------------|-------------|-------------|-------------|-------------|
| Total Awarded | \$1,359,840 | \$1,842,626 | \$1,676,324 | \$2,501,480 | \$1,676,264 |
| Shared credit | \$322,309   | \$506,794   | \$469,739   | \$888,148   | \$684,375   |
| Expenditures  | \$239,023   | \$337,675   | \$408,097   | \$610,766   | \$665,204   |

## Research Grants and Contracts

### PI

- KAIST, “Research on 5I (Signal Integrity, Power Integrity, Thermal Integrity, Electromagnetic Interference, and Artificial Intelligence) to improve the performance and reliability of semiconductors, packages, and modules”,

\$180,000 (100%), 07/01/2022-06/30/2025

- SK Hynix, “Radiated Emission Improvement through EMI Source Modeling”, \$70,000 (100%), 09/01/2022-08/31/2023
- Google, “Studying Cellphone Tx Desense due to Loose Metal Contact”, \$260,000 (65%), 3/18/2021-4/04/2023
- Google, “Establishing a Parameterized Model of PMICs”, \$120,000 (100%), 11/17/2021-11/16/2022
- Hyundai Mobis, “Chamber-less Radiated Emission Estimation”, \$70,000 (100%), 11/10/2020-11/09/2021
- SK Hynix, “Component-level Assessment Techniques for RF Desense”, \$200,000 (100%), gift
- Google, “Studying Cellphone Tx Desense due to Loose Metal Contact”, \$110,000 (100%), 3/18/2020-3/17/2021
- Google, Faculty Research Award, “Machine Learning Based Design of Power Distribution Networks”, \$42,928 (100%), gift
- SK Hynix, “System-level Power Supply Induced Jitter Optimization”, \$70,000 (100%), gift
- Ford Motor Company, “Assessment of IEMI Threats on Automobiles”, \$70,000 (77%), gift
- Hyundai Motor Company, “Defensive Technologies against Intentional EMI of Automotive”, \$100,000 (100%), 08/01/2018-07/31/2019
- Samsung Electronics Co., Ltd., “Numerical Method of Electromagnetic Interference in High-Speed Serial Link Systems”, \$120,000 (100%), 01/01/2018-12/31/2018
- NSF I/UCRC CEMC, “Center for EMC Membership”
  - Meta (PIM), \$80,000 / year (50%), 02/01/2023 – Present
  - Clear Signal Solution, \$35,000 / year (60%), 01/01/2023 – Present
  - Meta (RFI), \$70,000 / year (60%), 12/08/2022 – Present
  - Google, \$70,000 / year (60%), 8/15/2022 – Present
  - Amazon, \$70,000 / year (60%), 05/20/2021 – Present
  - Cisco (PDN), \$70,000 / year (60%), 11/01/2021 – Present
  - Apple Computer, \$70,000 / year (60%), 09/28/2020 – Present
  - Kemet, \$35,000 / year (60%), 04/02/2020 – Present
  - IBM, \$70,000 / year (60%), 04/01/2020 – Present
  - Asustek Computer Inc., \$70,000 / year (60%), 02/01/2017 – Present
  - SONY EMCS Corp. (RFI), \$70,000 / year (60%), 04/01/2017 – 03/31/2023
  - Samsung (Mobile), “Center for EMC Membership”, \$70,000 / year (50%), 03/12/2021-3/11/2022
  - Google, \$70,000 / year (50%), 11/01/2020 – 10/31/2021
  - Deere and Company, \$70,000 / year (50%), 03/24/2017 – 03/23/2021
  - Samsung Electronics (Mobile), \$70,000 (50%), 04/15/2019-04/14/2020
  - Juniper Networks Inc., \$70,000 (50%), 04/12/2019-04/11/2020
  - Samsung Electronics (GTC), \$70,000 (50%), 03/11/2019-03/10/2020
  - Samsung Electronics (GTC), \$60,000 (20%), 05/01/2017-04/30/2018
  - Shenzhen Yichong Wireless Power Technology, \$30,000 (50%), 10/01/2016 - 09/30/2017

### **Co-PI**

- NSF, “S-STEM: APEX: An Accelerated Pipeline to Graduate Excellence in Electrical and Computer Engineering, \$1,499,991 (10%), 10/01/2022-09/30/2028 (PI: Sahra Sedigh Sarvestani).
- DoE, Graduate Assistance in Areas of National Need (GAANN), “Doctoral Research and Training in Cybersecurity through Electromagnetic Compatibility”, \$608,760 (21%), 10/01/2021-09/30/2024 (PI: Sahra Sedigh Sarvestani)

- NSF, “EAGER: SARE: Security and Functionality of Energy Storage Devices from an External Electromagnetic Attack”, \$300,000 (50%), 09/01/2020-08/31/2022 (PI: Jonghyun Park) CCSS-2028992
- NSF, Phase III I/UCRC Missouri S&T: Center for Electromagnetic Compatibility, \$500,000 (33%), 12/15/2019-12/14/2024 (PI: Daryl Beetner)
- DoE, Graduate Assistance in Areas of National Need (GAANN), “A Doctoral Program on Data-Enabled Assurance of Electromagnetic Compatibility”, \$597,000 (10%), 10/01/2018-09/30/2021 (PI: Sahra Sedigh Sarvestani)
- Boeing Co., “Task4 - 5G Wireless Integration Study/Analysis”, \$20,000 (20%), 09/02/2019-12/30/2020 (PI: Victor Khilkevich)
- Boeing Co., “Task 5 - Mission Optimized RF System Operation”, \$20,000 (20%), 09/02/2019-12/30/2020 (PI: Maciej Zawodniok)
- Amazon.com INC, “TV Noise Source Reconstruction”, \$35,000 (40%), 05/01/2019-08/31/2019 (PI: Jun Fan)
- NSF, Phase II I/UCRC Missouri S&T: Center for Electromagnetic Compatibility, \$166,680 (10%), 09/25/2017-07/31/2019 (PI: Jun Fan)
- Center for EMC Membership, about \$1M/year (roughly 15-20% share of credit), 09/01/2016-present  
Current members: Cisco, Deere, IBM, Intel, Sony, Juniper, Boeing, Asustek, Apple, LG, NExperia, Google, Samsung, Cadence, and the Army

## Department and University Service

- Faculty Search Committee for ECE Kummer Professor, 2022
- EE Undergraduate Studies/Curriculum Committee (department), 2020 ~ present
- Faculty Research Award Committee (university), 2020
- Library & Learning Resources Committee (university), 2019 ~ present
- NTT EMC Assistant Research Professor Search Committee (department), 2019
- Faculty Search Committee for Assistant Professor in Electromagnetics Position (department), 2019
- S&T Undergraduate Research Conference Judge, 4/16/2019
- NTT EMC Associate Research Professor Search Committee (department), 2018
- Graduate Research Showcase (GRS) Judge, 04/10/ 2017

## Tutorials and Lectures

- [1] “RF Desense/EMI boot camp”, *Amazon*, 8/15/2022-8/19/2022 (online)
- [2] “Power Integrity”, *C.P. Global University in IEEE Symposium on EMC&SIPI*, Spokane, WA, 8/03/2022
- [3] “Power Integrity”, *C.P. Global University in IEEE Symposium on EMC&SIPI*, Virtual Conference, 7/28/2021
- [4] “Power Integrity”, *C.P. Global University in IEEE Symposium on EMC&SIPI*, Virtual Conference, 7/29/2020
- [5] “Transmission Lines and Signal Integrity”, *C.P. Global University in IEEE Symposium on EMC&SIPI*, New Orleans, LA, 7/24/2019
- [6] “PCB Decoupling”, *Tutorial in IEEE Symposium on EMC&SIPI*, New Orleans, LA, 7/22/2019
- [7] “Statistical Analysis of HBM Channel Performance”, *Tutorial in IEEE EDAPS Symposium*, Chandigarh, India, 12/16/2018

## Invited Presentations

- [1] “Modeling and Mitigation of RF Desensitization for Wireless Devices” 2/8/2023, *Worcester Polytechnic Institute* (online)
- [2] “HSpice Compatible Non-linear VRM Model for PI Simulation”, 11/09/2022, *Microsoft Tech Talk* (online)
- [3] “Minimizing Number of Decoupling Capacitors with Genetic Algorithm Optimization”, 10/07/2022, *Microsoft Tech Talk* (online)
- [4] “An Analysis on the Effectiveness of 2 and 3 Terminal Capacitors in PDN Design”, 10/05/2022, *EDI CON Online* (webinar)
- [5] “RF Interference Modeling and Mitigation in Wireless Devices”, *Asia-Pacific Symposium on EMC 2022*, Beijing, China, 09/01/2022

- [6] “Efficient I-EMI Simulation”, *Chungnam National University*, Deajeon, Korea, 07/19/2022
- [7] “Board-level Shielding Can Shielding Effectiveness Measurement and Set Correlation”, *KTL*, Seoul, Korea, 07/15/2022
- [8] “Machine Learning Based Source Reconstruction for EMI Modeling and Analysis”, *EMC Korea*, Seoul, Korea, 07/14/2022
- [9] “Latest Trends in EMC – Consumer/Automotive Industry”, *Amazon Wireless Summit 2022*, 6/7/2022 (webinar)
- [10] “Machine Learning based Decoupling Capacitor Placement Optimization”, *Samsung*, 10/12/2021 (webinar)
- [11] “Machine Learning Applications in EMI/PI”, *Samsung*, 7/7/2021 (webinar)
- [12] “Inaudible Command Injection to Voice-Controlled Devices using EMI”, *MUELAN tech talk*, 08/31/2020 (webinar)
- [13] “IC/package Radiation Mechanism for RF Desense Analysis”, *EMC Korea 2020*, Seoul, Korea, 07/21/2020 (webinar)
- [14] “RF Desense in Wireless Devices”, *Samsung*, Hwasung, Korea, 06/10/2019
- [15] “Threats of Intentional EMI and Hardware Security”, *Mando R&D Center*, Pangyo, Korea, 5/31/2019
- [16] “Threats of Intentional EMI and Hardware Security”, *Samsung*, Suwon, Korea, 5/30/2019
- [17] “D-dot sensor and Intentional EMI”, *National Security Research Institute*, Daejeon, Korea, 5/28/2019
- [18] “RF/Digital Integration in IoT Devices”, *Sungkyunkwan University*, Suwon, Korea, 5/23/2019
- [19] “D-dot sensor and Intentional EMI”, *Replex*, Seoul, Korea, 5/22/2019
- [20] “RF Desense in Wireless Devices”, *KAIST*, Daejeon, Korea, 12/21/2018
- [21] “Exploration of Machine Learning in EMC Applications”, *Aju University*, Suwon, Korea, 12/20/2018
- [22] “Coupling Path Visualization Technique”, *EMC Workshop in Samsung Electronics*, Suwon, Korea, 12/19/2018
- [23] “Research in Electromagnetic Compatibility”, *IEEE Emphasis Area Workshop, Missouri S&T*, 11/14/2018
- [24] “Analysis and Modeling of RF Desense in Mobile Devices”, *Google*, Mountain View, CA, 08/27/2018
- [25] “PAM-4 Signaling Fundamentals and Challenges”, *Samsung EMC Conference 2018*, Yongin, Korea, 08/14/2018
- [26] “High-speed Channel Design for RF desense”, *Samsung EMC Conference 2018*, Yongin, Korea, 08/14/2018
- [27] “Fast and Accurate RFI Analysis for Wireless Devices”, *Samsung Electronics*, Hwasung, Korea, 08/13/2018
- [28] “Power Integrity Concepts for High-Speed Design on Multi-Layer PCBs”, *Workshop in IEEE Symposium on EMC*, Long Beach, CA, 08/03/2018
- [29] “Fast and Accurate RFI Analysis for Wireless Devices”, *Sungkyunkwan University*, Suwon, Korea, 12/22/2017
- [30] “Fast and Accurate RFI Analysis for Wireless Devices”, *Yonsei University*, Seoul, Korea, 12/21/2017
- [31] “Fast and Accurate RFI Analysis for Wireless Devices”, *Workshop in Samsung Electronics*, Suwon, Korea, 12/19/2017
- [32] “Source Reconstruction and RFI Estimation”, *Amazon*, CA, 10/16/2017
- [33] “Analysis and Modeling of RF Desensitization in Mobile Devices”, *UNIST*, Ulsan, Korea, 07/04/2017
- [34] “System Level Approach for RF Desensitization”, *ETRI*, Daejeon, Korea, 06/30/2017
- [35] “Mechanism and Modeling of Noise Source and Coupling for RF Desensitization”, *Samsung Electronics*, Hwasung, Korea, 06/28/2017
- [36] “Analysis and Modeling of RF Desensitization in Mobile Devices”, *Kwangwoon Univ.*, Seoul, Korea, 06/23/2017
- [37] “Mechanism and Modeling of Noise Source and Coupling for RF Desensitization”, *EMC Workshop in Samsung Electronics*, Suwon, Korea, 06/19/2017
- [38] “Analysis and Modeling of RF Desensitization in Mobile Devices” *UESTC*, Chengdu, China, 06/15/2017

## Publications

### ▪ Book/Chapters

- [1] C. Hwang, “RF Desensitization in Wireless Devices”, in *RF Systems, Circuits, and Components*, editor Xi Sung Loo, Intech, ISBN 978-953-51-6250-6, Nov. 2018.
- [2] C. Hwang, J. Kim, J. Fan, J. Kim, and J. L. Drewniak, “Modeling of On-Chip Power Distribution Network”, in *Noise Coupling in System-on-Chip*, editor Thomas Noulis, CRC Press, ISBN 9781498796774, Dec. 2017, Chapter 5, pp. 93 -138.

### ▪ Magazine

- [1] C. Hwang, “Mitigating Self-generated EMI for Wireless Devices”, *The Bridge*, no. 2, vol. 118, pp. 24-28, May 2022

## ▪ Refereed Journal Articles

### 2023

- [1] X. Wang, M. Wu, D. Kim, and C. Hwang, “Investigation of the Radiation Mechanism of Heatsinks based on Characteristic Mode Theory”, submitted to *IEEE Trans. on Electromagnetic Compatibility*.
- [2] X. Wang, D. Kim, and C. Hwang, “Addressing the Radio Frequency Interference Problem Through Characteristic Mode Analysis”, submitted to *IEEE Antennas and Wireless Propagation Letters*.
- [3] R. He<sup>2</sup>, A. Huang<sup>2</sup>, T. Fokkens<sup>2</sup>, Y. Gao, L. Du, C.-W. Lam, and C. Hwang<sup>1</sup>, “On the Relationship between Transformer Capacitance and Conducted Emissions in Flyback Converters” to be submitted to *IEEE Letters on Electromagnetic Compatibility Practice and Applications*.
- [4] J. Juang<sup>2</sup>, L. Zhang<sup>2</sup>, F. D. Paulis, and C. Hwang<sup>1</sup>, “Improved Genetic Algorithm for Minimizing the Number of Decoupling Capacitors Through Augmented Population Generation” submitted to *IEEE Trans. on Signal and Power Integrity*. (under revision).
- [5] X. Wang<sup>2</sup>, W. Zhang<sup>2</sup>, X. Fang<sup>2</sup>, T. Sekine, M. Murata, T. Enomoto, K. Araki, D. Kim<sup>4</sup>, J. Fan<sup>4</sup>, A. Ruehli<sup>4</sup>, and C. Hwang<sup>1</sup>, “Methodology for Analyzing Coupling Mechanisms in RFI problems based on PEEC” submitted to *IEEE Trans. on Electromagnetic Compatibility* (under revision).
- [6] S. Jeong<sup>4</sup>, J. Kwon, D. Pai, J. Rajagopalan, and C. Hwang<sup>1</sup>, “Visualization of Noise Coupling Paths based on Reciprocity Theorem” submitted to *IEEE Trans. on Electromagnetic Compatibility* (under revision).
- [7] A. Huang<sup>2</sup>, J. Sun<sup>2</sup>, H. Kim<sup>4</sup>, A. Xu, S. Jin, S. Wu, Z. Yang, K. Qiu, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “Averaged Behavior Model of Current-Mode Buck Converters for Transient Power Noise Analysis” accepted to *IEEE Trans. on Electromagnetic Compatibility*.
- [8] S. Xia<sup>2</sup>, H. Wang<sup>2</sup>, Y. Wang, Z. Wu, C. Hwang, and J. Fan<sup>1,4</sup>, “Dipole Moment Based Reciprocity for Practical Desensitization Identification and Mitigation” accepted to *IEEE Trans. on Electromagnetic Compatibility*.
- [9] L. Zhang<sup>2</sup>, L. Jiang, J. Juang<sup>4</sup>, Z. Yang, E.-P. Li, and C. Hwang<sup>1</sup>, “Decoupling Optimization for Complex PDN Structures Using Deep Reinforcement Learning” accepted to *IEEE Trans. on Microwave Theory and Techniques*.

### 2022

- [10] Y. Sun<sup>2</sup>, M. Ouyang<sup>2</sup>, X. Sun, and C. Hwang<sup>1</sup>, “Prediction of Power Supply Induced Jitter with PDN Design Parameters” *IEEE Trans. on Electromagnetic Compatibility*, vol. 64, no. 6, pp. 2238-2248, Dec. 2022.
- [11] H. Park, M. Kim, S. Kim, K. Kim, H. Kim, T. Shin, K. Son, B. Sim, S. Kim, S. Jeong, C. Hwang, and J. Kim, “Transformer Network-based Reinforcement Learning Method for Power Distribution Network (PDN) Optimization of High Bandwidth Memory (HBM)” *IEEE Trans. on Microwave Theory and Techniques*, vol. 70, no. 11, pp. 4772-4786, Nov. 2022.
- [12] M. Ouyang<sup>2</sup>, K. Cai, A. Gao, B. Pu, C. Li, B. Sen, C. Hwang, and D. Kim<sup>1,4</sup>, “Novel Formulations of Multi-Reflections and Their Applications to High-Speed Channel Design” *IEEE Trans. on Signal and Power Integrity*, vol.1, pp 43-54, 2022
- [13] W. Zhang<sup>2</sup>, S. Xia<sup>2</sup>, X. Fang<sup>2</sup>, X. Wang<sup>2</sup>, T. Enomoto, H. Shumiya, K. Araki, and C. Hwang<sup>1</sup>, “A SPICE-compatible Model to Simulate Buzz Noise Problems in a Camera” *IEEE Trans. on Electromagnetic Compatibility*, vol. 64, no.4, pp. 987-998, Aug. 2022
- [14] L. Zhang<sup>2</sup>, J. Juang<sup>2</sup>, Z. Kiguradze<sup>4</sup>, B. Pu<sup>4</sup>, S. Jin, S. Wu, Z. Yang, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “Efficient DC and AC Impedance Calculation for Arbitrary-shape and Multi-layer PDNs Using Boundary Integration” *IEEE Trans. on Signal and Power Integrity*, vol. 1, 2022.
- [15] S. Liu<sup>2</sup>, X. Fang<sup>2</sup>, T. Song<sup>4</sup>, M.-H. Kim, H.-W. Shim, and C. Hwang<sup>1</sup>, “Field Coupling Mechanism Investigation of mm-Wave Magnetic Near-Field Probe Based on a Generalized Equivalent Circuit” *IEEE Trans. on Instrumentation and Measurement*, vol. 71, pp. 1-9, 2022.
- [16] A. Huang<sup>2</sup>, X. Wang<sup>2</sup>, H. Zhang<sup>2</sup>, C. Hwang, D. Pommerenke<sup>4</sup>, and J. Fan<sup>1,4</sup>, “Improved Current Shunt Characterization Method for Core Loss Measurement”, *IEEE Trans. on Power Electronics*, vol. 37, no. 7, pp. 8290-8300, July 2022.
- [17] A. Huang<sup>2</sup>, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “Efficient and Accurate Phase Measurement Method for Core Loss Characterization” *Review of Scientific Instruments* 93, 024701 (2022) <https://doi.org/10.1063/5.0074290>
- [18] L. Zhang<sup>2</sup>, H. Yang<sup>2</sup>, Q. Huang<sup>2</sup>, J. Rajagopalan, D. Pai, C. Hwang, and J. Fan<sup>1,4</sup>, “Radio-Frequency Interference Estimation for Multiple Random Noise Sources” *IEEE Trans. on Electromagnetic Compatibility*, vol. 64, no. 2, pp. 358-366, April 2022.
- [19] T. Song<sup>4</sup>, J. Lee, and C. Hwang<sup>1</sup>, “A Stub Equalizer for Bi-directional and Single-ended Channels in NAND Memory Storage Device System” *IEEE Trans. on Electromagnetic Compatibility*, vol. 64, no. 1, pp. 172-181, Feb. 2022.
- [20] L. Zhang<sup>2</sup>, J. Juang<sup>2</sup>, Z. Kiguradze<sup>4</sup>, B. Pu<sup>4</sup>, S. Jin, S. Wu, Z. Yang, and C. Hwang<sup>1</sup>, “Fast PDN Impedance Prediction using Deep Learning”, *International Journal of Numerical Modeling: Electronic Networks, Devices, and Fields*, vol. 35, no. 2, March 2022.

## **2017-2021**

- [21] H. Shrivastav<sup>2</sup>, T. Enomoto, S. Seto, K. Araki, and C. Hwang<sup>1</sup>, “Near Field Scanning Based Shielding Effectiveness Extraction for Board Level Shielding Cans” *IEEE Trans. on Electromagnetic Compatibility*, vol. 63, no. 4, pp. 1035-1045, Aug. 2021.
- [22] Z. Xu<sup>4</sup>, Z. Wang, Y. Sun<sup>2</sup>, C. Hwang, H. Delingette, and J. Fan<sup>1,4</sup>, “Jitter Aware Economic PDN Optimization with Genetic Algorithm”, *IEEE Trans. on Microwave Theory and Techniques*, vol. 69, no. 8, pp. 3715-3725, Aug. 2021.
- [23] Y. Sun<sup>2</sup>, J. Lee, and C. Hwang<sup>1</sup>, “A Generalized Power Supply Induced Jitter Model Based on Power Supply Rejection Ratio Response” *IEEE Trans. on Very Large Scale Integration Systems*, vol. 29, no. 6, pp. 1052-1060, June 2021.
- [24] Z. Xu<sup>4</sup>, R. Hua<sup>2</sup>, J. Juang<sup>2</sup>, S. Xia<sup>2</sup>, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “Inaudible Attack on Smart Speakers with Intentional Electromagnetic Interference” *IEEE Trans. on Microwave Theory and Techniques*, vol. 69, no. 5, pp. 2642-2650, May 2021.
- [25] Y. Zhong<sup>2</sup>, T. Enomoto, S. Seto, K. Araki, and C. Hwang<sup>1</sup>, “A New Reconstruction Method for the Source above A Non-ideal Ground Plane,” *IEEE Trans. on Electromagnetic Compatibility*, vol. 63, no. 2, pp. 627-630, April 2021.
- [26] Y. Sun<sup>2</sup>, S. Wu, J. Zhang, C. Hwang, and Z. Yang<sup>1</sup>, “Simulation Methodologies for Acoustic Noise Induced by Multilayer Ceramic Capacitors of Power Distribution Network in Mobile Systems”, *IEEE Trans. on Electromagnetic Compatibility*, vol. 63, no. 2, pp. 589-597, April 2021.
- [27] Q. Huang<sup>2</sup>, L. Zhang<sup>2</sup>, J. Rajagopalan, D. Pai, C. Chen, A. Gaikwad, C. Hwang, and J. Fan<sup>1,4</sup>, “A Novel RFI Mitigation Method Using Source Rotation” *IEEE Trans. on Electromagnetic Compatibility*, vol. 63, no.1, pp.11-18, Feb. 2021.
- [28] Y. Sun<sup>2</sup>, J. Kim<sup>4</sup>, M. Ouyang<sup>2</sup>, and C. Hwang<sup>1</sup>, “Improved Target Impedance Concept with Jitter Specification” *IEEE Trans. on Electromagnetic Compatibility*, vol. 62. no.4, pp.1534-1545, Aug. 2020.
- [29] Y. Liu<sup>2</sup>, J. Li<sup>2</sup>, C. Hwang, and V. Khilkevich<sup>1,4</sup>, “Near-Field Scan of multiple non-correlated sources using blind source separation”, *IEEE Trans. on Electromagnetic Compatibility*, vol. 62. no.4, pp.1376-1385, Aug. 2020.
- [30] Y. Zhong<sup>2</sup>, W. Song<sup>2</sup>, C. Kim, and C. Hwang<sup>1</sup>, “Coupling Path Visualization and Its Application in Preventing Electromagnetic Interference” *IEEE Trans. on Electromagnetic Compatibility*, vol. 62. no.4, pp.1485-1492, Aug. 2020.
- [31] Y. Sun<sup>2</sup>, S. Wu, J. Zhang, C. Hwang, and Z. Yang<sup>1</sup>, “Measurement Methodologies for Acoustic Noise Induced by Multilayer Ceramic Capacitors of Power Distribution Network in Mobile Systems” *IEEE Trans. on Electromagnetic Compatibility*, vol. 62. no.4, pp.1515-1523, Aug. 2020.
- [32] Y. Sun<sup>2</sup>, H. Lin, B. Tseng, D. Pommerenke<sup>4</sup>, and C. Hwang<sup>1</sup>, “Mechanism and Validation of USB 3.0 Connector Caused Radio Frequency Interference” *IEEE Trans. on Electromagnetic Compatibility*, vol. 62. no.4, pp.1169-1178, Aug. 2020.
- [33] K. Kim, H.W. shim, and C. Hwang<sup>1</sup>, “Analysis and Solution for RF Interference caused by PMIC Noise in Mobile Platforms,” *IEEE Trans. on Electromagnetic Compatibility*, vol. 62, no. 3, pp. 682-690, June 2020.
- [34] Y. Ku, H. H. Park<sup>4</sup>, and C. Hwang<sup>1</sup>, “Zero-Height and Broadband Magnetic Dipole Source Generation for Board-level Shield Can Evaluation,” *IEEE Trans. on Electromagnetic Compatibility*, vol. 61, no. 6, pp. 1860-1866, Dec. 2019
- [35] Q. Huang<sup>2</sup>, T. Enomoto, S. Seto, K. Araki, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “A Transfer Function Based Calculation Method for Radio Frequency Interference” *IEEE Trans. on Electromagnetic Compatibility*, vol. 61, no. 4, pp. 1280-1288, Aug. 2019.
- [36] H. Kim<sup>4</sup>, J. Kim<sup>4</sup>, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “Precise Analytical Model of Power Supply Induced Jitter (PSIJ) Transfer Function at Inverter Chains” *IEEE Trans. on Electromagnetic Compatibility*, vol. 60, no. 5, pp. 1491-1499, Oct. 2018.
- [37] C. Hwang<sup>1</sup>, D. Pommerenke<sup>4</sup>, J. Fan<sup>4</sup>, T. Enomoto, J. Maeshima, and K. Araki, “Wideband Noise Measurement Technique in Duplex Systems for RF Interference,” *IEEE Trans. on Electromagnetic Compatibility*, vol. 60, no. 4, pp. 1038-1044, Aug. 2018.
- [38] Q. Huang<sup>2</sup>, L. Li<sup>2</sup>, X. Yan<sup>2</sup>, B. Bae, H. Park, C. Hwang, and J. Fan<sup>1,4</sup>, “MoM Based Ground Current Reconstruction in RFI Application”, *IEEE Trans. on Electromagnetic Compatibility*, vol. 60, no. 4, pp. 1121-1128, Aug. 2018.
- [39] G. Maghlagelidze<sup>2</sup>, X. Yan<sup>2</sup>, L. Guan<sup>2</sup>, S. Marathe<sup>2</sup>, Q. Huang<sup>2</sup>, B. Bae, C. Hwang, J. Fan<sup>4</sup>, and D. Pommerenke<sup>1,4</sup>, “SNR Analysis and Optimization in Near-Field Scanning and EMI Applications”, *IEEE Trans. on Electromagnetic Compatibility*, vol. 60, no. 4, pp. 1087-1094, Aug. 2018.
- [40] K. Kim, H.W. Shim, A. C. Scogna, and C. Hwang<sup>1</sup>, “SMPS Ringing Noise Modeling and Managing Methodology for RFI Solutions in Mobile Platforms” *IEEE Trans. on Components, Packaging and Manufacturing Technology*, vol. 8, no. 4, pp. 554-561, April 2018.
- [41] C. Hwang<sup>1</sup>, M. Ouyang<sup>2</sup>, and J. Fan<sup>4</sup>, "Return Path Discontinuity Analysis of an Edge Mount SMA Launch Structure in Multilayer Boards," *IEEE Trans. on Electromagnetic Compatibility*, vol. 60, no. 2, pp. 453-458, April 2018.



- [42] X. Chu<sup>4</sup>, C. Hwang, J. Fan<sup>4</sup> and Y. Li<sup>4</sup>, "Analytic Calculation of Jitter Induced by Power and Ground Noise Based on IBIS I/V Curve," *IEEE Trans. on Electromagnetic Compatibility*, vol. 60, no. 2, pp. 468-477, April 2018.
- [43] C. Hwang<sup>1</sup>, D. Pommerenke<sup>4</sup>, J. Fan<sup>4</sup>, T. Enomoto, J. Maeshima, and K. Araki, "Modeling and Estimation of LCD Noise Modulation for Radio Frequency Interference" *IEEE Trans. on Electromagnetic Compatibility*, vol. 59, no. 6, pp. 1685-1692, Dec. 2017.
- [44] Q. Huang<sup>2</sup>, F. Zhang<sup>2</sup>, T. Enomoto, J. Maeshima, K. Araki, and C. Hwang<sup>1</sup>, "Physics-Based Dipole Moment Source Reconstruction for RFI on a Practical Cellphone," *IEEE Trans. on Electromagnetic Compatibility*, vol. 59, no. 6, pp. 1693-1700, Dec. 2017.
- [45] Q. Wang<sup>2</sup>, J. Cho<sup>4</sup>, N. Erickson<sup>2</sup>, C. Hwang, F. De Paulis, S. Piersanti, A. Orlandi<sup>4</sup>, B. Achkir, and J. Fan<sup>1,4</sup>, "Novel De-Embedding Methodology and Broadband Microprobe Measurement for Through-Silicon Via Pair in Silicon Interposer," *IEEE Trans. on Electromagnetic Compatibility*, vol. 59, no. 5, pp. 1565-1575, Oct. 2017.
- [46] G.Y. Cho, J. Jin, H.B. Park, H.H. Park, and C. Hwang<sup>1</sup>, "Assessment of Integrated Circuits Emissions with an Equivalent Dipole Moment Method" *IEEE Tran. on Electromagnetic Compatibility*, vol. 59, no. 2, pp. 633-638, April 2017

#### **2011-2016**

- [47] B. Ko, J. Kim, J. Ryoo, C. Hwang, J. Song, and S.-W. Kim, "Simplified Chip Power Modeling Methodology Without Netlist Information in Early Stage of SoC Design Process", *IEEE Trans. on Components, Packaging and Manufacturing Technology*, vol. 6, no. 10, pp. 1513-1521, Oct. 2016.
- [48] B. Ko, J. Kim, J. Ryoo, C. Hwang, C.-K. Kwon, S.-W. Kim, "Practical approach to power integrity-driven design process for power-delivery networks," *IET Circuits, Devices & Systems*, vol. 10, no. 5, p. 448 – 455, Sep. 2016.
- [49] L. Li, J. Pan, C. Hwang, and J. Fan, "Radiation Noise Source Modeling and Application in Near-Field Coupling Estimation," *IEEE Trans. on Electromagnetic Compatibility*, vol. 58, no. 4, pp. 1314-1321, Aug. 2016.
- [50] C. Hwang, H.B. Park, and H. H. Park, "A Simple Estimation of TRP and Radiation Pattern for Mobile Antennas Using Planar Near-Field Scanning Method" *Microwave and Optical Technology Letters*, Vol. 58, No. 6, pp.1437-1443, June 2016.
- [51] C. Hwang, J.-D. Lim, G.Y. Cho, H.B. Park, and H.H. Park, "A Novel Shielding Effectiveness Matrix of Small Shield Cans Based on Equivalent Dipole Moments for RF Interference Applications." *IEEE Trans. on Electromagnetic Compatibility*, vol. 58, No. 3, pp. 766-775, June 2016.
- [52] C. Hwang, B. Achkir, and J. Fan, "Capacitance Enhanced Through-Silicon Via for Power Distribution Networks in 3D-ICs," *IEEE Electron Device Letters*, vol. 37, No. 4, pp. 478-481, April 2016.
- [53] J. Pan, H. Wang, X. Gao, J. Fan, C. Hwang, E. Song, and H.B. Park, and J. Fan, "Radio-Frequency Interference Estimation Using Equivalent Dipole-Moment Models and Decomposition Method Based on Reciprocity, *IEEE Trans. on Electromagnetic Compatibility*, vol. 58, no. 1, pp. 75-84, Feb. 2016.
- [54] E. Song, H.B. Park, C. Hwang, and H.H. Park, "Placement Optimization of Integrated Circuits for Reduced Radio-Frequency Interferences in Mobile Devices," *Microwave and Optical Technology Letters*, vol. 58, no. 1, pp.31-37, Jan. 2016.
- [55] H.H. Park, C. Hwang, K.Y. Jung, and Y.B. Park, "Mode Matching Analysis of Via-Plate Capacitance in Multilayer Structures with Finite Plate Thickness," *IEEE Trans. on Electromagnetic Compatibility*, vol.57, no.5, pp.1188-1196, Oct. 2015
- [56] J. Kim, J. Lee, S. Cho, C. Hwang, C. Yoon, and J. Fan, "Analytical Probability Density Calculation for Step Pulse Response of a Single-Ended Buffer with Arbitrary Power-Supply Voltage Fluctuations," *IEEE Trans. on Circuits and Systems I: Regular Papers*, vol. 61, no. 7, pp. 2022-2033, July 2014.
- [57] S. Ahn, C. Hwang, and H.H. Park, "Optimized shield design for reduction of EMF from wireless power transfer systems" *IEICE Electronics Express*, vol. 11, no. 2, Jan. 2014.
- [58] M. Kim, K. Koo, C. Hwang, Y. Shim, J.S. Pak, S. Ahn, and J. Kim, "Vertical Stepped Impedance EBG (VSI-EBG) Structure for Wideband Suppression of Simultaneous Switching Noise in Multi-layer PCBs," *IEEE Trans. on Electromagnetic Compatibility*, vol. 55, no. 2, pp. 307-314, Apr. 2013.
- [59] C. Hwang, J. Kim, B. Achkir, and J. Fan, "Analytical Transfer Functions relating Power and Ground Voltage Fluctuations to Jitter at a Single-Ended Full-Swing Buffer," *IEEE Trans. on Components, Packaging and Manufacturing Technology*, vol. 3, no. 1, pp.113-125, Jan. 2013.
- [60] K. Kim, C. Hwang, K. Koo, J. Cho, H. Kim, J. Kim, J. Lee, H. Park, and J.S. Pak, "Modeling and Analysis of a Power Distribution Network in TSV-based 3D IC including P/G TSVs, On-chip Decoupling Capacitors, and Silicon Substrate Effects," *IEEE Trans. on*

*Components, Packaging and Manufacturing Technology*, vol. 2, no. 12, pp.2057-2070, Dec. 2012.

- [61] M. Kim, K. Koo, C. Hwang, Y. Shim, J. Kim, and J. Kim, "A Compact and Wideband Electromagnetic Bandgap Structure Using a Defected Ground Structure for Power/Ground Noise Suppression in Multilayer Packages and PCBs," *IEEE Trans. on Electromagnetic Compatibility*, vol. 54, no. 3, pp. 689-695, Jun. 2012.
- [62] C. Hwang, Y. Shim, K. Koo, M. Kim, J.S. Pak, and J. Kim, "An On-Chip Electromagnetic Bandgap Structure using an On-Chip Inductor and a MOS Capacitor," *IEEE Microwave and Wireless Components Letters*, vol.21, no.8, pp.439-441, Aug. 2011.
- [63] C. Hwang, J. Kim, E. Song, Y. Shim, and J. Kim, "A Wideband and Compact Partial Electromagnetic Bandgap Structure with a Narrow Via Pitch for a Signal Via Shield," *IEEE Trans. on Electromagnetic Compatibility*, vol.53, no.1, pp.241-244, Feb. 2011.
- [64] C. Hwang, K. Kim, J.S. Pak, and J. Kim, "Modeling of an On-Chip Power/Ground Meshed Plane Using Frequency Dependent Parameters," *Journal of Electromagnetic Engineering and Science*, vol. 11, no. 3, pp. 192-200, Sep 2011.

## ▪ Refereed Conference Papers

### 2023

- [1] H. Manoharan, X. Wang, M. Wu, J. Rajagopalan, and C. Hwang, "Experimental Verification of Characteristic Mode Analysis (CMA) using Reverberation Chamber" accepted to AP-EMC 2023.
- [2] J. Joo, M. K. Mathew, C. Hwang, A. Chada, B. Mutnuri, and D. Kim, "Analysis of Voltage Regulator Module (VRM) Noise Coupling to High-Speed Signals with VRM Via Designs" accepted to AP-EMC 2023
- [3] E. Olugbade, H. Pham, Y. He, H. Wang, H. Zhou, N. McDonnell, C. Hwang, and J. Park, "Impact of Defects on Oxidation Layer Formation on Aluminum Substrates using Molecular Dynamics Simulation" accepted to *IEEE EMC+SIPI 2023*.
- [4] X. Fang and C. Hwang, "Analysis of Electromagnetic Interference Problems Caused by Split Reference Plane on High-Speed Multilayer Boards" accepted to *IEEE EMC+SIPI 2023*.
- [5] Y. Ding, J. Zhang, M. Xue, X. Hua, B. Leung, and C. Hwang, "Extraction for Multilayer Ceramic Capacitor Vibration Induced Force" accepted to *IEEE EMC+SIPI 2023*.
- [6] Y. Ding, J. Zhang, M. Xue, X. Hua, B. Leung, and C. Hwang, "On Finding an Equivalent Force to Mimic Multilayer Ceramic Capacitor Vibration" accepted to *IEEE EMC+SIPI 2023*.
- [7] S. Xia, B. Dogruoz, Y. Wang, S. Wu, S. Bai, Z. Wu, and C. Hwang, "Co-Simulation of Thermal-aware DC-IR Drop Analysis for 2.5D IC" accepted to *IEEE EMC+SIPI 2023*.
- [8] H. Park, T. Shin, S. Kim, K. Son, K. Kim, B. Sim, H. Kang, S. Choi, J. Yoon, H. Kim, C. Hwang, and J. Kim, "Power Supply Induced Jitter (PSIJ) Modeling, Optimization, and Analysis of High Bandwidth Memory (HBM) I/O Interface" accepted to *IEEE EMC+SIPI 2023*.
- [9] Y. Ding, F. de Paulis, M. Cocchini, S. Connor, M. Doyle, A. Ruehli, C. Hwang, and J. Drewniak, "System Level PDN Impedance Optimization Utilizing the Zeros of the Decoupling Capacitors" accepted to *IEEE EMC+SIPI 2023*.
- [10] K. W. Anjajo, Y. Xu, S. Xia, Y. He, H. Zhou, H. Wang, J. Park, and C. Hwang, "Static I-V based PIM Evaluation for Spring and Fabric-over-Foam Contacts" accepted to *IEEE EMC+SIPI 2023*.
- [11] X. Su, W. Huang, J. Cho, J. Paek, and C. Hwang, "Near Field Scanning Based EMI Radiation Root Cause Analysis in an SSD" accepted to *IEEE EMC+SIPI 2023*.
- [12] J. Juang, J. Huang, A. Huang, K. Qiu, H. Wang, Y. Wang, Z. Yang, and C. Hwang, "An Analysis on the Effectiveness of 2 and 3 Terminal Capacitors in PDN Design" accepted to *IEEE EMC+SIPI 2023*.
- [13] H. Manoharan, J. Juang, H. Wang, J. Pan, K. Qiu, and C. Hwang, "Augmented Genetic Algorithm v2 with Reinforcement Learning for PDN Decap Optimization" accepted to *IEEE EMC+SIPI 2023*.
- [14] T. Fokkens, S. Xia, A. Harmon, and C. Hwang, "Coupling Path Analysis for Smart Speaker Intentional Electromagnetic Interference Attacks" accepted to *IEEE EMC+SIPI 2023*.
- [15] W. Huang, J. Huang, M. Kim, B. Bae, S. Kim, and C. Hwang, "Machine Learning Based PCB/Package Stack-up Optimization for Signal Integrity" accepted to *IEEE ECTC 2023*.
- [16] J. Joo, H. Zhang, Z. Liang, L. Cao, J. S. Rentmeister, H. Wang, and C. Hwang, "SPICE-Compatible Behavior Model of Multiphase Voltage Regulator Module for End-to-End Power Integrity Simulation" *DesignCon*, Santa Clara, CA, 2023.
- [17] J. Juang, H. Wang, and C. Hwang, "Scalable Capacitor ESL Curve Fitting for Various Stack-ups" *DesignCon*, Santa Clara, CA, 2023.
- [18] F. Paulis, Y. Ding, M. Cocchini, C. Hwang, S. Conner, M. Doyle, A. Ruehli, and J. Drewniak, "Package and IC Aware PCB PDN

Design by Optimizing Decoupling Capacitors While Evaluating PDN Voltage Ripple Noise” *DesignCon*, Santa Clara, CA, 2023.  
**(best paper finalist)**

**2022-2017**

- [19] S. Xia, Y. Xu, E. Olugbade, Y. He, Y. Wang, H. Wang, K. Rao, M. Poort, H. Zhou, W. Lee, N. McDonnell, J. Park, J. Fan, and C. Hwang, “Passive Intermodulation Under Different Spring Contact Conditions”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 12-16.
- [20] S. Xia, J. Fan, and C. Hwang, “Clock Duty Cycle Tuning for Desense Mitigation in Modulation-involved Cases”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 23-27. **(winner of best EMC paper)**
- [21] S. Xia, Y. Xu, J. Li, Y. He, Y. Wang, H. Wang, H. Zhou, W. Lee, N. McDonnell, J. Fan, and C. Hwang, “Practical Fixture Design for Passive Intermodulation Tests for Flexible Metallic Contacts”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 17-22. **(best EMC student paper finalist)**
- [22] F. Ma, R. He, S. Walunj, T. Makharashvili, C. Hwang, D. Beetner, B. Booth, and K. Martin, “Predicting Radiated Emissions from a Complex Transportation System Wiring Harness”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 146-151. **(winner of best EMC paper, 2<sup>nd</sup> place)**
- [23] J. Joo, S. Singh, Seema PK, C. Hwang, B. Mutnury, and J. Drewniak, “Analysis of Switching Voltage Regulator Noise Coupling to a High-Speed Signal”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 460-464. **(best SIPI paper finalist)**
- [24] L. Zhang, D. Li, J. He, B. Mutnury, B. Pu, X.D. Cai, C. Hwang, J. Fan, J. Drewniak, and E.P. Li, “A DNN-Ensemble Method for Error Reduction and Training Data Selection in DNN based Modeling”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 175-180.
- [25] S. Xia, J. Hunter, A. Harmon, M. Hamdalla, A. M. Hassan, C. Hwang, V. Khilkevich, and D.G. Beetner, “A Fast Cascading Method for Predicting the Coupling from External Plane Waves to PCBs”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 152-157.
- [26] F. De Paulis, Y. Ding, M. Cocchini, C. Hwang, S. Connor, M. Doyle, S. Scarce, W. D. Becker, A. Ruehli, and J. Drewniak, “A Methodical Approach for PCB PDN Decoupling Minimizing Overdesign with Genetic Algorithm Optimization”, *IEEE EMC+SIPI*, Aug. 1-5, 2022, pp. 238-243.
- [27] A. Huang, H. Zhang, L. Du, C. W. Lam, and C. Hwang, “Fixture Design for Parasitic Capacitances of MOSFETs for EMI Applications”, *AP-EMC 2022*, Beijing, China, Sept. 1-4 2022, pp. 267-269.
- [28] J. Joo, W. Song, T. Song, S. Kong, J. Lim, I. Song, J. Lee, and C. Hwang, “Modeling of RF Interference Caused by Solid-State Drive Noise”, *AP-EMC 2022*, Beijing, China, Sept. 1-4 2022, pp. 685-687.
- [29] S. Jeong, M. Kim, S. Cheon, H. Shim, and C. Hwang, Noise Coupling Path Visualization in Complex Electronic Systems, *DesignCon 2022*, Santa Clara, CA. **(best paper finalist)**
- [30] J. Joo<sup>2</sup>, A. Huang<sup>2</sup>, R. Hua<sup>2</sup>, B.C. Tseng, H. Lin, and C. Hwang<sup>1</sup>, “A Behavior Model of Voltage Regulator Module with Adaptive Voltage Positioning and PCB Parasitics for Power Distribution Network Design”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.
- [31] J. Joo<sup>2</sup>, Y. Sun<sup>2</sup>, J. Lee, K. Kwon, S. Kong, S. Kang, I. Song, and C. Hwang<sup>1</sup>, “Modeling of Power Supply Noise Generated by an On-Chip LDO Regulator and Package Power Distribution Network Parasitics”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.
- [32] T. Fokkens<sup>2</sup>, Z. Xu<sup>4</sup>, O. Hoseini Izadi<sup>2</sup>, and C. Hwang<sup>1</sup>, “Machine Learning Voice Synthesis for Intention Electromagnetic Interference Injection in Smart Speaker Devices”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.
- [33] J. Juang<sup>2</sup>, L. Zhang<sup>2</sup>, Z. Kiguradze<sup>4</sup>, B. Pu<sup>4</sup>, S. Jin, and C. Hwang<sup>1</sup>, “A Modified Genetic Algorithm for the Selection of Decoupling Capacitors in PDN Design”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021. **(winner of best SIPI student paper runner-up)**
- [34] J. Li<sup>2</sup>, S. Xia<sup>2</sup>, Z. Xu<sup>4</sup>, Y. Xu<sup>2</sup>, Y. Wang, Y. He, K. Wu, N. McDonnell, W. Lee, H. Zhou, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “Self-contact Introduced Passive Intermodulation Characterizations for O-shaped Springs”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.
- [35] S. Xia<sup>2</sup>, J. Li<sup>2</sup>, Y. Xu<sup>2</sup>, Z. Xu<sup>4</sup>, Y. Wang, Y. He, K. Wu, N. McDonnell, W. Lee, H. Zhou, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “Gaussian Process Regression Analysis of Passive Intermodulation Level and DCR for Spring Contacts”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021. **(best student paper finalist)**
- [36] Y. Sun<sup>2</sup> and C. Hwang<sup>1</sup>, “Improving Power Supply Induced Jitter Simulation Accuracy for IBIS Model”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.

- [37] Y. Sun<sup>2</sup>, J. Lee, J. Joo<sup>2</sup>, and C. Hwang<sup>1</sup>, “Analysis of Power Supply Induced Jitter of High-Speed Output Buffer with On-Die Low-Dropout Voltage Regulator”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.
- [38] A. Huang<sup>2</sup>, J. Sun, H. Kim<sup>4</sup>, J. Fan<sup>4</sup>, Z. Xu<sup>4</sup>, S. Jin, and C. Hwang<sup>1</sup>, “Time Domain Continuous-Time Model of Current Mode Buck Converter for Power Delivery Network Design”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021. **(best student paper finalist)**
- [39] X. Yan<sup>2</sup>, C. Wu, T. Zhang, D. Zhang, S. Jin, J. Fan<sup>4</sup>, and C. Hwang<sup>1</sup>, “RF Desense Investigation and Mitigation of Flexible Flat Cable and Connector”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.
- [40] W. Zhang<sup>2</sup>, S. Liu<sup>2</sup>, X. Yan<sup>2</sup>, T. Enomoto, H. Shumiya, K. Araki, and C. Hwang<sup>1</sup>, “Improvement on the Accuracy of Near-Field Scanning Using Tangential Electric Field Probe”, *IEEE EMC+ SIPI*, virtual conference, July 26-Aug.20, 2021.
- [41] M. Ouyang<sup>2</sup>, J. Lee, and C. Hwang<sup>1</sup>, “Divide and Conquer Approach to Radio Frequency Interference Simulation”, *DesignCon 2021*, San Jose, CA, Aug. 16-18, 2021. **(best paper finalist)**
- [42] Y. Sun<sup>2</sup>, J. Lee, and C. Hwang<sup>1</sup>, “A Generalized PSIJ Sensitivity Analysis Method Based on PSRR Response”, *DesignCon 2021*, San Jose, CA, Aug. 16-18, 2021.
- [43] W. Song, Y. Zhong, C. Kim, C. Park, and C. Hwang, “Transfer Function Measurement for Automotive Intentional Electromagnetic Interference” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 276-281.
- [44] J. Joo, W. Song, B. Bae, H. Kim, S. Lee, Y. Kwon, and C. Hwang, “Complex Permittivity Extraction using Substrate Integrated Waveguide Cavity Resonator without Cross-Sectioning” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 113-117.
- [45] M. Ouyang, Y. Sun, J. Lee, J. Kim, and C. Hwang, “Mechanism Analysis on Radio Frequency Radiation in IC/Package with Bonding Wires” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 133-138. **(best student paper finalist)**
- [46] O. H. Izadi, K. Frazier, N. Altunyurt, S. Sedighsarvestani, D. Pommerenke, and C. Hwang, “A New Tunable Damped Sine-like Waveform Generator for IEMI Applications” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 282-286.
- [47] L. Zhang, W. Huang, J. Juang, H. Lin, B.C. Tseng, and C. Hwang, “An Enhanced Deep Reinforcement Learning Algorithm for Decoupling Capacitor Selection in Power Distribution Network Design” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 245-250. **(best student paper finalist)**
- [48] Y. Sun, S. Wu, J. Zhang, C. Hwang, and Z. Yang, “Decoupling Capacitor Layout Design Guidelines with Acoustic Noise Consideration in Power Distribution Network” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 357-362.
- [49] S. Waluji, T. Makharashvili, C. Hwang, D. Beetner, B. Booth, and K. Martin, “Direct Measurement and Representation of Common-mode Sources in Cable Harnesses” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 118-120.
- [50] Y. Sun, S. Wu, J. Zhang, C. Hwang, and Z. Yang, “Measurement Investigation of MLCC Mounting Variation Impact on Acoustic Noise in Power Distribution Network,” *IEEE EMC+ SIPI 2020*, Reno, NV, 2020, pp. 363-368.
- [51] Y. Zhong, W. Song, C. Kim, C. Park, and C. Hwang, “Coupling Path Visualization for Automotive Intentional Electromagnetic Interference” *Asian Electromagnetics Conference (ASIAEM)*, Xi’an, China, Sep. 16-20, 2019. **(winner of best student paper award)**
- [52] Y. Sun, J. Kim, and C. Hwang, “Jitter-aware Target Impedance” *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 217-222. **(winner of the best paper award, best student paper finalist)**
- [53] Y. Sun, J. Zhang, Z. Yang, C. Hwang, S. Wu, “Simulation Investigation on Acoustic Noise caused by “Singing” Capacitors on Mobile Devices” *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 406-410.
- [54] S. Walunj, F. Ma, T. Makharashvili, R. He, C. Hwang, D. Beetner, B. Booth, K. Martin, “Experimental Characterization of the Common-mode Current Sources in a Cable Harness” *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 292-297.
- [55] Q. Huang, Y. Zhong, Z. Sun, T. Enomoto, S. Seto, K. Araki, J. Fan, and C. Hwang, “Reciprocity Theorem Based RFI Estimation for Heatsink Emission” *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 590-594.
- [56] J. Xu, S. Bai, B. Zhao, K. Nalla, M. Sapozhnikov, J. L. Drewniak, C. Hwang, and J. Fan, “A Novel System-Level Power Integrity Transient Analysis Methodology using Simplified CPM Model, Physics-based Equivalent Circuit PDN Model, and Small Signal VRM Model” *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 205-210.
- [57] L. Zhang, Z. Zhang, C. Huang, H. Deng, H. Lin, B. C. Tseng, J. Drewniak, and C. Hwang, “Decoupling Capacitor Selection Algorithm for PDN Based on Deep Reinforcement Learning” *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 616-620.

- [58] J. Xu, S. Bai, B. Zhao, K. Nalla, M. Sapozhnikov, J. L. Drewniak, C. Hwang, and J. Fan, "Power Delivery Network Optimization Approach using an Innovative Hybrid Target Impedance" *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 211-216.
- [59] Y. Sun, J. Zhang, Z. Yang, C. Hwang, S. Wu, "Measurement Investigation on Acoustic Noise caused by "Singing" Capacitors on Mobile Devices" *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 505-510. **(best student paper finalist)**
- [60] Y. Zhong, W. Song, C. Kim, C. Park, and C. Hwang, "Efficient Automotive Simulation Using Reciprocity for Intentional Electromagnetic Interference" *IEEE EMC+ SIPI 2019*, New Orleans, LA, July 22-26, 2019, pp. 600-604. **(best student paper finalist)**
- [61] Y. Zhong, Z. Sun, Q. Huang, T. Enomoto, S. Seto, K. Araki, and C. Hwang, "Measurement-Based Quantification of Buzz Noise in Wireless Devices" *EMC Sapporo/AP-EMC 2019*, Sapporo, Japan, June 3-7, 2019
- [62] Y. Zhong, W. Song, C. Kim, C. Park, and C. Hwang, "Intentional Electromagnetic Interference Source Reconstruction for Automotive Simulation" *EMC Sapporo/AP-EMC 2019*, Sapporo, Japan, June 3-7, 2019
- [63] L. Zhang, Q. Huang, X. Su, J. Rajagopalan, D. Pai, A. Gaikwad, C. Hwang, and J. Fan, "Accurate RFI Prediction of 3D Non-planar Connector with Half Magnetic Dipole Pattern" *EMC Sapporo/AP-EMC 2019*, Sapporo, Japan, June 3-7, 2019
- [64] Q. Huang, L. Zhang, Y. Zhong, J. Rajagopalan, D. Pai, C. Chen, A. Gaikwad, C. Hwang, and J. Fan, "A Fast and Simple RFI Mitigation Method without Compromising Signal Integrity" *Designcon 2019*, Santa Clara, CA, Jan. 28-30, 2019. **(winner of the best paper award)**
- [65] Y. Sun, H. Lin, B. C. Tseng, and C. Hwang, "RFI Noise Source Quantification Based on Reciprocity" *IEEE EMC+ SIPI 2018*, Long Beach, CA, 2018, pp. 548-553.
- [66] Y. Zhong, Q. Huang, T. Enomoto, S. Seto, K. Araki, and C. Hwang, "Measurement-Based Characterization of Buzz Noise in Wireless Devices" *IEEE EMC+ SIPI 2018*, Long Beach, CA, 2018, pp. 134-138.
- [67] Q. Huang, Y. Zhong, J. Rajagopalan, D. Pai, A. Gaikwad, C. Hwang, and J. Fan, "Desense Prediction and Mitigation from DDR Noise Source" *IEEE EMC+ SIPI 2018*, Long Beach, CA, 2018, pp. 139-144.
- [68] T. Makharashvili, S. A. Walunj, R. He, B. Booth, K. Martin, C. Hwang, and D. Beetner, "Prediction of Common Mode Current in Cable Harnesses" *2018 IEEE Electromagnetic Compatibility and Asia-Pacific Symp. Electromagnetic Compatibility (EMC/APEMC)*, Singapore, 2018, pp. 321-326.
- [69] S. Lee, Y. Zhong, Q. Huang, T. Enomoto, S. Seto, K. Araki, J. Fan, and C. Hwang, "Analytical Intra-System EMI Model using Dipole Moments and Reciprocity" *2018 IEEE Electromagnetic Compatibility and Asia-Pacific Symp. Electromagnetic Compatibility (EMC/APEMC)*, Singapore, 2018, pp. 1169-1173.
- [70] Q. Huang, T. Enomoto, S. Seto, K. Araki, J. Fan, and C. Hwang, "Accurate and Fast RFI Prediction based on Dipole Moment Sources and Reciprocity" *Designcon 2018*, Santa Clara, CA, Jan. 30-Feb. 1, 2018. **(winner of the best paper award)**
- [71] Q. Huang, C. Hwang, and J. Fan, "Machine Learning based Source Reconstruction for RF Desensitization Analysis" *Designcon*, Santa Clara, CA, Jan. 30-Feb. 1, 2018.
- [72] C. Hwang, T. Enomoto, J. Maeshima, K. Araki, D. Pommerenke, and J. Fan, "Wideband Characterization of LCD Baseband Noise Modulation for RF Interference in Mobile Phones," *IEEE EMC*, Washington, DC, 7-11 Aug. 2017, pp. 130-134. **(best paper finalist)**
- [73] H. Kim, J. Fan, and C. Hwang, "Modeling of Power Supply Induced Jitter (PSIJ) Transfer Function at Inverter Chains," *IEEE EMC*, Washington, DC, 7-11 Aug. 2017, pp. 591-596.
- [74] Q. Huang, L. Li, X. Yan, B. Bae, H.B. Park, C. Hwang, and J. Fan, "MoM Based Current Reconstruction Using Near-Field Scanning," *IEEE EMC*, Washington, DC, 7-11 Aug. 2017, pp. 549-554. **(best paper finalist)**
- [75] C. Hwang and Q. Huang, "IC Placement Optimization for RF Interference based on Dipole Moment Sources and Reciprocity" *Asia-Pacific Int. Sym. Electromagnetic Compatibility (AP-EMC)*, Seoul, Korea, 20-23 June 2017, pp. 331-333.
- [76] C. Hwang, S. Kong, T. Enomoto, J. Maeshima, K. Araki, D. Pommerenke, and J. Fan, "LCD BaseBand Noise Modulation Estimation for Radio Frequency Interference in Mobile Phones" *Asia-Pacific Int. Symp. Electromagnetic Compatibility (AP-EMC)*, Seoul, Korea, 20-23 June 2017, pp. 226-228. **(winner of the best paper award)**
- 2008-2016**
- [77] C. Hwang, S. Kong, T. Enomoto, J. Maeshima, K. Araki, D. Pommerenke, and J. Fan, "Noise Coupling Path Analysis for RF Interference caused by a LCD Noise Modulation," *IEEE EMC*, Ottawa, ON, 25-29 July 2016, pp. 348-352.

- [78] C. Hwang, M. Ouyang, and J. Fan, "A Bandwidth Improvement Technique for An Edge Mount SMA Launch Structure in Multi-layer Boards," *IEEE EMC*, Ottawa, ON, 25-29 July 2016, pp. 308-311.
- [79] L. Li, J. Pan, C. Hwang, G. Cho, H. Park, Y. Zhang, and J. Fan, "Radio-frequency interference estimation by reciprocity theorem with noise source characterized by Huygens's equivalent model," *IEEE EMC*, Ottawa, ON, 25-29 July 2016, pp. 358-363.
- [80] Q. Wang, N. Erickson, J. Cho, C. Hwang, J. Fan, F. Paulis, S. Piersanti, A. Orlandi, and B. Achkir, "Electrical Performance Analysis and Modeling Optimization of Test Patterns Used in De-embedding Method for Through Silicon Via (TSV) Pair in Silicon Interposer" *IEEE EMC*, Ottawa, ON, 25-29 July 2016, pp. 412-417.
- [81] J. He, C. Hwang, G. Cho, H.B. Park, B. Bae, and J. Fan, "Extracting characteristic impedance of a transmission line referenced to a meshed ground plane," *IEEE EMC*, Ottawa, ON, 25-29 July 2016, pp. 651-656.
- [82] L. Li, J. Pan, C. Hwang, G. Cho, H.B. Park, Y. Zhang, and J. Fan, "Measurement validation for radio-frequency interference estimation by reciprocity theorem," *IEEE EMC*, Dresden, 2015, pp. 154-159.
- [83] J. Pan, L. Li, X. Gao, J. Fan, C. Hwang, G. Cho, H. Park, "Application of dipole-moment model in EMI estimation" *IEEE EMC*, Dresden, Germany, 16-22 Aug. 2015, pp. 350-354.
- [84] L. Li, J. Pan, C. Hwang, G. Cho, H. Park, Y. Zhang, and J. Fan, "Near-field coupling estimation by source reconstruction and Huygens's equivalence principle," *IEEE EMC+SIPI*, Santa Clara, CA, 15-21, March 2015, pp. 324-329. **(winner of best student paper award)**
- [85] B. Ko, J. Kim, J. Ryo, C. Hwang, S.B. Park, and S.W. Kim, "Practical Verification of Power Networks for Smart TV Applications," *IEEE Int. Conference on Consumer Electronics (ICCE)*, Las Vegas, NV, 9-12 Jan. 2015, pp. 594-595.
- [86] Q. Wang, K. Shringarpure, B. Chen, J. Fan, C. Hwang, S. Pan, and B. Achkir, "Effectiveness Analysis of De-Embedding Method for Typical TSV Pairs in a Silicon Interposer", *IEEE 23rd Conf. on Electrical Performance of Electronic Packaging and Systems*, Portland, OR, 26-29 Oct. 2014, pp. 239-242.
- [87] Q. Wang, K. Shringarpure, J. Fan, C. Hwang, S. Pan, and B. Achkir, "Designing Test Patterns for Effective Measurement of Typical TSV Pairs in a Silicon Interposer", *Int. Symp. Electromagnetic Compatibility*, Tokyo, Japan, 12-16 May 2014, pp. 382-385.
- [88] N. Erickson, K. Shringarpure, J. Fan, B. Achkir, S. Pan, and C. Hwang, "De-embedding techniques for transmission lines: An exploration, review, and proposal," *IEEE EMC*, Denver, CO, 5-9 Aug. 2013, pp.840-845.
- [89] J. Kim, D. Shin, J. Lee, S. Cho, C. Hwang, and J. Fan, "Statistical BER Analysis due to Supply Voltage Fluctuations at a Single-Ended Buffer", *DesignCon*, Santa Clara, CA, 2013.
- [90] C. Hwang, K. Kim, J.S. Pak, and J. Kim, "Protection of a Delay-Locked Loop from Simultaneous Switching Noise Coupling using an On-Chip Electromagnetic Bandgap Structure," *IEEE EMC*, Pittsburgh, PA, 6-10 Aug. 2012, pp.544-548. **(best paper finalist)**
- [91] L. Li, C. Hwang, T. Wang, Y. Takita, H. Takeuchi, K. Araki, and J. Fan, "Switching-current Measurement for Multiple ICs Sharing a Common Power Island Structure", *IEEE EMC*, Pittsburgh, PA, 6-10 Aug 2012, pp. 560-564. **(best student paper finalist)**
- [92] S. Kong, C. Hwang, K. Kim, H. Kim, L. Park, U. Park, J. Kim, and J. Kim, "Analytical model for predicting the electromagnetic fields intensity in wireless power transfer systems," *IEEE Electrical Design of Advanced Packaging and Systems Symposium (EDAPS)*, Hanzhou, China, 12-14 Dec. 2011. pp. 1-4.
- [93] C. Hwang, M. Shin, J.S. Pak, and J. Kim, "Differential Signal Via Shield with Narrow Via Pitch Partial Electromagnetic Bandgap Structure," *IEEE EMC*, Fort Lauderdale, FL, 26-30 July 2010, pp. 451-454.
- [94] M. Kim, C. Yoon, K. Koo, C. Hwang, H. Sung, and J. Kim, "Suppression of Power/Ground Noise Using Meshed-Planar Electromagnetic Bandgap (MP-EBG) Structure for Ultra-Wideband (UWB) System-in-Package (SiP)," *IEEE EMC*, Fort Lauderdale, FL, 26-30 July 2010, pp. 28-31.
- [95] C. Hwang, J. Kim, Y. Shim, and J. Kim, "Analytical modeling of power distribution network with embedded electromagnetic bandgap structure," *IEEE EMC*, Austin, TX, 17-21 Aug. 2009, pp.69-73.
- [96] C. Hwang, J. Park, J. Kim, K. Koo, and J. Kim, "Vertical Electromagnetic Bandgap Structure for Noise Suppression in Single-ended and Differential Signaling on a Multi-layer Backplane Board," *20th Int. Zurich Symp. Electromagnetic Compatibility*, Zurich, Switzerland, 12-16 Jan. 2009, pp. 197-200.
- [97] M. Shin, J. Shim, J. Kim, J.S. Pak, C. Hwang, C. Yoon, J. Kim, H. Kim, K. Park, and Y. Kim, "A 6.4Gbps on-chip eye opening monitor circuit for signal integrity analysis of high-speed channel," *IEEE EMC*, Detroit, MI, 18-22 Aug. 2008.