Taigon SONG

455 N Mary Ave bldg. 2, Sunnyvale, CA 94085
Cell# available upon request, taigon.song@synopsys.com
http://www.linkedin.com/pub/taigon-song/66/57/697

EDUCATION

Georgia Institute of Technology - *Atlanta, Georgia* Dec. 2015
- Ph.D. in Electrical and Computer Engineering
- Advisor: Sung Kyu Lim (GTCAD Laboratory)

Korea Advanced Institute of Science and Technology (KAIST) - *Daejeon, South Korea* Aug. 2009
- M.S. in Electrical Engineering
- Advisor: Joungho Kim (Terahertz Interconnection and Package Laboratory)

Yonsei University - *Seoul, South Korea* Aug. 2007
- B.S. in Electrical & Electronics Engineering

RESEARCH/PROFESSIONAL EXPERIENCE

Senior R&D Engineer
Synopsys Inc. – ***Mountain View, California*** Jan. 2016 – Present
- Research and product development in Synopsys StarRC

Research Assistant, GTCAD Lab.
Georgia Institute of Technology - ***Atlanta, Georgia*** Aug. 2010 – Dec. 2015
- Studied low-power design methodologies for 3D ICs – with Intel
- Studied face-to-face parasitic extraction and analysis on 3D ICs – with Mentor Graphics
- Studied the full-chip impact of CNFET ICs – with Stanford Univ.
- Performed multi-TSV (through silicon via) to TSV coupling analysis on 3D IC
- Studied 3D IC-package-board co-analysis methodology for 3D EM simulation – with CST
- Devised thermal analysis methodology of 3D ICs with integrated voltage regulators – with Columbia Univ.
- Performed chip, package, PCB co-IR-drop analysis of silicon interposer on 3D IC

Software Intern
Cadence Design Systems, Inc. – ***San Jose, California*** Aug. 2015 – Oct. 2015
- Research in implementing 3D IC design features in Cadence Innovus.

Technical Intern, StarRC team
Synopsys Inc. – ***Mountain View, California*** May 2014 – Aug. 2014
- Parasitic extraction of 3D ICs

Researcher, SI Group, On-Line Electric Vehicle (OLEV) Business Development
Korea Advanced Institute of Science and Technology (KAIST) - ***Daejeon, South Korea***
Jan. 2010 - June 2010
- Performed shielding design in on-line electric vehicle

Research Assistant, Terahertz Interconnection and Packaging Lab.
Korea Advanced Institute of Science and Technology (KAIST) - *Daejeon, South Korea*
Aug. 2007 – Aug. 2009

- Designed 2.5D silicon interposer considering SI/PI
- Analyzed EMI / EMC on DC/DC converters
- Thesis: *Design Methodology of High-Density Silicon Interposer for Integrated 3D IC GPU Package*

Design Consultant Team Leader, On-Line Package Design Consultant Team
Silicon Image - *Sunnyvale, California* July 2008 - Aug. 2009

- Remotely consulted on the commercial package designs

JOURNAL PUBLICATIONS

[1] **Taigon Song**, Shreepad Panth, Yoo-Jin Chae, and Sung Kyu Lim, "More Power Reduction with 3-Tier Logic-on-Logic 3D ICs," IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2016 – to appear

[2] **Taigon Song**, Chang Liu, Yarui Peng, and Sung Kyu Lim, "Full-Chip Signal Integrity Analysis and Optimization of 3D ICs," IEEE Transactions on Very Large Scale Integration (TVLSI) Systems, 2015

[3] Moongon Jung, **Taigon Song**, Yarui Peng, and Sung Kyu Lim, "Fine-Grained 3D IC Partitioning Study with A Multi-core Processor," IEEE Transactions on Components, Packaging, and Manufacturing Technology (TCPMT), 2015

[4] **Taigon Song** and Sung Kyu Lim, "Full-Chip Power/Performance Benefits of Carbon Nanotube-Based Circuits," Journal of Information and Communication Convergence Engineering, 2015

[5] **Taigon Song** and Sung Kyu Lim, "Die-to-Die Parasitic Extraction Targeting Face-to-Face Bonded 3D ICs," Journal of Information and Communication Convergence Engineering, 2015

[6] Yarui Peng, **Taigon Song**, Dusan Petranovic, and Sung Kyu Lim, "Silicon Effect-aware Full-chip Extraction and Mitigation of TSV-to-TSV Coupling", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2014

[7] Dae Hyun Kim, Krit Athikulwongse, Michael B. Healy, Mohammad M. Hossain, Moongon Jung, Ilya Khorosh, Gokul Kumar, Young-Joon Lee, Dean L. Lewis, Tzu-Wei Lin, Chang Liu, Shreepad Panth, Mohit Pathak, Minzhen Ren, Guanhao Shen, **Taigon Song**, Dong Hyuk Woo, Xin Zhao, Joungho Kim, Ho Choi, Gabriel H. Loh, Hsien-Hsin S. Lee, and Sung Kyu Lim, "Design and Analysis of 3D-MAPS (3D Massively Parallel Processor with Stacked Memory)," IEEE Transactions on Computers (TC), 2014

[8] Jonghyun Cho, Eakhwan Song, Kihyun Yoon, Jun So Pak, Joohee Kim, Woojin Lee, **Taigon Song**, Kiyeong Kim, Junho Lee, Hyungdong Lee, Kunwoo Park, Seungtaek Yang, Minsuk Suh, Kwangyoo Byun, and Joungho Kim, "Modeling and Analysis of Through-Silicon Via (TSV) Noise Coupling and Suppression Using a Guard Ring," Components, Packaging and Manufacturing Technology, IEEE Transactions on (CPMT), 2011.

[9] Joohee Kim, Jun So Pak, Jonghyun Cho, Eakhwan Song, Jeonghyeon Cho, Heegon Kim, **Taigon Song**, Junho Lee, Hyungdong Lee, Kunwoo Park, Seungtaek Yang, Min-Suk Suh, Kwang-Yoo Byun, and Joungho Kim, "High-Frequency Scalable Electrical Model and Analysis of a Through Silicon Via (TSV)," Components, Packaging and Manufacturing Technology, IEEE Transactions on (CPMT), 2011.

[10] Jun So Pak, Joohee Kim, Jonghyun Cho, Kiyeong Kim, **Taigon Song**, Seungyoung Ahn, Junho Lee, Hyungdong Lee, Kunwoo Park, and Joungho Kim, "PDN Impedance Modeling and Analysis of 3D TSV IC by Using Proposed P/G TSV Array Model Based on Separated P/G TSV and Chip-PDN Models," Components, Packaging and Manufacturing Technology, IEEE Transactions on (CPMT), 2011.

CONFERENCE PUBLICATIONS

[1] **Taigon Song**, Shreepad Panth, Yoo-Jin Chae, and Sung Kyu Lim, "Three-Tier 3D ICs for More Power Reduction: Strategies in CAD, Design, and Bonding Selection," IEEE International Conference on Computer-Aided Design (ICCAD), 2015

[2] Yarui Peng, **Taigon Song**, Dusan Petranovic, and Sung Kyu Lim, "Full-chip Inter-die Parasitic Extraction in Face-to-Face-Bonded 3D ICs," IEEE International Conference on Computer-Aided Design (ICCAD), 2015

[3] **Taigon Song**, Moongon Jung, Yang Wan, Yarui Peng, and Sung Kyu Lim, "3D IC Power Benefit Study Under Practical Design Considerations," IEEE International Interconnect Technology Conference (IITC), 2015.

[4] Yarui Peng, Moongon Jung, **Taigon Song**, Yang Wan, and Sung Kyu Lim, "Thermal Impact Study of Block Folding and Face-to-Face Bonding in 3D IC", IEEE International Interconnect Technology Conference (IITC), 2015.

[5] **Taigon Song**, Arthur Nieuwoudt, and Sung Kyu Lim, "Coupling Capacitance in Face-to-Face (F2F) Bonded 3D ICs: Trends and Implications", IEEE Electronic Components and Technology Conference (ECTC), 2015.

[6] Moongon Jung, **Taigon Song**, Yang Wan, Yarui Peng, and Sung Kyu Lim, "On Enhancing Power Benefits in 3D ICs: Block Folding and Bonding Styles Perspective", ACM Design Automation Conference (DAC) 2014.

[7] Moongon Jung, **Taigon Song**, Yang Wan, Young-Joon Lee, Debabrata Mohapatra, Hong Wang, Greg Taylor, Devang Jariwala, Vijay Pitchumani, Patrick Morrow, Clair Webb, Paul Fischer, and Sung Kyu Lim, "How to Reduce Power in 3D IC Designs: A Case Study with OpenSPARC T2 Core", IEEE Custom Integrated Circuits Conference (CICC), 2013.

[8] Yarui Peng, **Taigon Song**, Dusan Petranovic, and Sung Kyu Lim, "On Accurate Full-Chip Extraction and Optimization of TSV-to-TSV Coupling Elements in 3D ICs," IEEE International Conference on Computer-Aided Design (ICCAD), 2013.

[9] **Taigon Song**, Chang Liu, Yarui Peng, and Sung Kyu Lim, "Multiple TSV-to-TSV Coupling Extraction, Analysis, and Optimization in 3D ICs," SRC TECHCON Conference, 2013.

[10] Moongon Jung, Young-Joon Lee, **Taigon Song**, Yang Wan, and Sung Kyu Lim, "Design Methodologies for Low Power 3D Processors," SRC TECHCON Conference, 2013.

[11] **Taigon Song**, Chang Liu, Yarui Peng, and Sung Kyu Lim, "Full-Chip Multiple TSV-to-TSV Coupling Extraction and Optimization in 3D ICs," ACM Design Automation Conference (DAC), 2013.

[12] Darryl Kostka, **Taigon Song**, and Sung Kyu Lim, "3D IC-Package-Board Co-analysis Using 3D EM Simulation for Mobile Applications," IEEE Electronic Components and Technology Conference (ECTC), 2013.

[13] **Taigon Song**, Noah Sturcken, Krit Athikulwongse, Kenneth Shepard, and Sung Kyu Lim, "Thermal Analysis and Optimization of 2.5-D Integrated Voltage Regulator," IEEE Electrical Performance of Electronic Packaging and Systems (EPEPS), 2012.

[14] Dae Hyun Kim, Krit Athikulwongse, Michael B. Healy, Mohammad M. Hossain, Moongon Jung, Ilya Khorosh, Gokul Kumar, Young-Joon Lee, Dean L. Lewis, Tzu-Wei Lin, Chang Liu, Shreepad Panth, Mohit Pathak, Minzhen Ren, Guanhao Shen, **Taigon Song**, Dong Hyuk Woo, Xin Zhao, Joungho Kim, Ho Choi, Gabriel H. Loh, Hsien-Hsin S. Lee, and Sung Kyu Lim, "3D-MAPS: 3D Massively Parallel Processor with Stacked Memory," IEEE International Solid-State Circuits Conference (ISSCC), 2012.

[15] **Taigon Song** and Sung Kyu Lim, "A Fine-Grained Co-Simulation Methodology for IR-drop Noise in Silicon Interposer and TSV-based 3D IC," IEEE Electrical Performance of Electronic Packaging and Systems (EPEPS), 2011.

[16] **Taigon Song** and Sung Kyu Lim, "Co-design and Co-simulation of 3D IC and Silicon Interposer Power Distribution Network," IEEE Workshop on Chip-Packaging Co-Design for High Performance Electronic Systems (CPCW), 2011.

[17] Chang Liu, **Taigon Song**, Jonghyun Cho, Joohee Kim, Joungho Kim, and Sung Kyu Lim, "Full-Chip TSV-to-TSV Coupling Analysis and Optimization in 3D IC," ACM Design Automation Conference (DAC), 2011.

[18] **Taigon Song**, Chang Liu, Dae Hyun Kim, Jonghyun Cho, Joohee Kim, Jun So Pak, Seungyoung Ahn, Joungho Kim, Kihyun Yoon, and Sung Kyu Lim, "Analysis of TSV-to-TSV coupling with high-impedance termination in 3D ICs," Quality Electronic Design (ISQED), 2011 12th International Symposium on, 2011.

[19] Chang Liu, **Taigon Song**, and Sung Kyu Lim, "Signal integrity analysis and optimization for 3D ICs," Quality Electronic Design (ISQED), 2011 12th International Symposium on, 2011.

[20] Kiyeong Kim, Woojin Lee, Jaemin Kim, **Taigon Song**, Joohee Kim, Jun So Pak, Joungho Kim, Hyungdong Lee, Yongkee Kwon, and Kunwoo Park, "Analysis of power distribution network in TSV-based 3D-IC," Electrical Performance of Electronic Packaging and Systems (EPEPS), 2010 IEEE 19th Conference on, 2010.

[21] Joohee Kim, Jonghyun Cho, Jun So Pak, **Taigon Song**, Joungho Kim, Hyungdong Lee, Junho Lee, and Kunwoo Park, "I/O power estimation and analysis of high-speed channels in through-silicon via (TSV)-based 3D IC," Electrical Performance of Electronic Packaging and Systems (EPEPS), 2010 IEEE 19th Conference on, 2010.

[22] Jonghyun Cho, Joohee Kim, **Taigon Song**, Jun So Pak, Joungho Kim, Hyungdong Lee, Junho Lee, and Kunwoo Park, "Through silicon via (TSV) shielding structures," Electrical Performance of Electronic Packaging and Systems (EPEPS), 2010 IEEE 19th Conference on, 2010.

[23] Seungyoung Ahn, **Taigon Song**, Heejae Lee, Junggun Byun, Deogsoo Kang, Yangbae Chun, Jae-Ha Yim, Junso Pak, Chun-taek Rim, Dong-Ho Cho, and Joungho Kim, "Active Shield to Minimize Magnetic Flux Density for On-Line Electric Vehicle (OLEV) Application," Electromagnetic Compatibility Europe (EMC Europe), 2010 IEEE International Symposium on, 2010.

[24] **Taigon Song**, Seungyoung Ahn, Heejae Lee, Junggun Byun, Dong-Ho Cho, and Joungho Kim, "An Analog Switching (Non PWM) High Power Inverter for EMI Suppression in On-Line Electric Vehicle (OLEV)," Electromagnetic Compatibility Europe (EMC Europe), 2010 IEEE International Symposium on, 2010.

[25] Seungyoung Ahn, Junso Pak, **Taigon Song**, Heejae Lee, Junggun Byun, Deogsoo Kang, Cheol-Seung Choi, Eunjung Kim, Jiyun Ryu, Mijoo Kim, Yangbae Chun, Jae-Ha Yim, Dong-Ho Cho, and Joungho Kim, "VLF Electromagnetic Field Design for On-Line Electric Vehicle," Asia-Pacific Radio Science Conference (AP-RASC), 2010.

[26] Seungyoung Ahn, Junso Pak, **Taigon Song**, Heejae Lee, Jung-Gun Byun, Deogsoo Kang, Cheol-Seung Choi, Eunjung Kim, Jiyun Ryu, Mijoo Kim, Yumin Cha, Yangbae Chun, Chun-Taek Rim, Jae-Ha Yim, Dong-Ho Cho, and Joungho Kim, "Low frequency electromagnetic field reduction techniques for the On-Line Electric Vehicle (OLEV)," Electromagnetic Compatibility (EMC), 2010 IEEE International Symposium on, 2010.

[27] Seungyoung Ahn, Heejae Lee, Junggun Byun, Deogsoo Kang, **Taigon Song**, Eunjung Kim, Jiyun Ryu, Mijoo Kim, Yangbae Chun, Jae-Ha Yim, Dong-Ho Cho, and Joungho Kim, "Design of Electromagnetic Field (EMF) for a Novel On-Line Electric Vehicle (OLEV)," 32nd Annual Meeting The Bioelectromagnetics Society (BEMS), 2010.

[28] Sangrok Lee, Gawon Kim, Jaemin Kim, **Taigon Song**, Junho Lee, Hyungdong Lee, Kunwoo Park, and Joungho Kim, “Modeling and analysis of die-to-die vertical coupling in 3-D IC,” Electronics Packaging Technology Conference (EPTC), 2009.

[29] Kihyun Yoon, Gawon Kim, Woojin Lee, **Taigon Song**, Junho Lee, Hyungdong Lee, Kunwoo Park, and Joungho Kim, “Modeling and analysis of coupling between TSVs, metal, and RDL interconnects in TSV-based 3D IC with silicon interposer,” Electronics Packaging Technology Conference (EPTC), 2009.

[30] **Taigon Song**, Jiseong Kim, Junso Pak, and Joungho Kim, “Chip-Package Co-modeling & Verification of Noise Coupling & Generation in CMOS DC/DC Buck Converter,” Electromagnetic Compatibility, 20th International Zurich Symposium on (EMC Zurich), 2009.

[31] Jeongsik Yoo, Jongbae Park, Hyunjeong Park, Junchul Kim, Yujeong Shim, **Taigon Song**, and Joungho Kim, ″Analysis of the Vertical Electromagnetic Bandgap Structures in the Power Distribution Network for the Multi-layer Printed Circuit Board,” Electronics Packaging Technology Conference (EPTC), 2008.

HONORS / AWARDS/SCHOLARSHIPS

Research Assistant (1/2), ECE Department at the Georgia Institute of Technology 2010 - 2015
Government Scholarship, Republic of Korea (2 years) 2007 - 2009
Honors Student (Yonsei University) – Fall Semester 2006
Yonsei University Scholarship (2.5 years) 2001 - 2007

Teaching/Lectures / Seminars

Two Studies on 3D ICs: TSV-to-TSV coupling analysis and design methodologies for low-power 3D ICs May 7, 2014
- Seminar
- Design Technology Team, System LSI Business, Samsung Electronics Co., Ltd, *Hwasung, South Korea*

ECE 2020 Fundamentals of Digital System Design SPRING 2014
- Assistant Instructor (Instructor: Prof. Sung Kyu Lim)
- Department of Electrical and Computer Engineering, Georgia Institute of Technology, *Atlanta, GA*

ECE 2020 Fundamentals of Digital System Design FALL 2013
- Assistant Instructor (Instructor: Prof. Sung Kyu Lim)
- Department of Electrical and Computer Engineering, Georgia Institute of Technology, *Atlanta, GA*

ECE 2020 Fundamentals of Digital System Design SPRING 2013
- Assistant Instructor (Instructor: Prof. Sung Kyu Lim)
- Department of Electrical and Computer Engineering, Georgia Institute of Technology, *Atlanta, GA*

ECE 4754 Electronics Packaging Assembly, Reliability, Thermal Management, and Test Mar. 28, 2013
- Guest lecturer (Instructor: Prof. Rao Tummala)
- Department of Electrical and Computer Engineering, Georgia Institute of Technology, *Atlanta, GA*

The Theory & Design for RF Board (SI design/EMI) July 7-9, 2010
- Lecturer
- KAIST EMDEC, *Seoul, Korea*

The Theory & Design for RF Board (SI design/EMI) Mar. 3-5, 2010
- Lecturer
- KAIST EMDEC, *Seoul, Korea*

ED 100 Freshman Design SPRING 2009
- Teaching assistant
- Department of Electrical Engineering, KAIST, *Daejeon, Korea*

Signal Integrity, Measurement and Practice Apr. 9, 2009

- Lecturer
- Samsung Advanced Technology Training Institute, *Suwon, Korea*

ED 100 Freshman Design FALL 2008

- Teaching assistant
- Department of Electrical Engineering, KAIST, *Daejeon, Korea*

SKILLS

Programming: C, C++, Perl, Python
Engineering Tools: Ansys {Fluent, HFSS, Maxwell, Q3D Extractor, SIwave}, Cadence {Allegro Package Designer, SOC Encounter, Encounter Library Characterizer, Innovus, RTL Compiler, Spectre, Virtuoso}, CST MWS, Keysight ADS, Matlab, Mentor Graphics {Calibre, Modelsim, xCalibrate}, Synopsys {Custom Explorer, Custom Designer, Design Compiler, HSPICE, Nanosim, SiliconSmart, StarRC, Primerail, Primetime, QuickCap NX, Raphael, Sentaurus TCAD, VCS, Waveview}
Measurement Devices: DPO (oscilloscope), Probe Station, TDR (time domain reflectometer), VNA (Vector Network Analyzer)
Languages: English (fluent), Korean (native)

PROFESSIONAL SERVICE

Journal Reviewer, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
Apr. 2015 - Current
Journal Reviewer, IEEE Transactions on Computers Feb. 2015 - Current
Journal Reviewer, IEEE Transactions on VLSI Systems Aug. 2014 - Current
Journal Reviewer, IEEE Transactions on Circuits and Systems II Mar. 2014 - Current
Public Relations Secretary, IEEE Electrical Design of Advanced Packaging & Systems Symposium (EDAPS) 2008
Seoul, Korea Mar. 2008 - Dec. 2008

- Committee
- Acted as a liaison between conference participants and the committee of the symposium
- Generated all communications with participants

OTHERS

Military Services (Korean Army) Dec. 2003 – Dec. 2005