Dr. sc. techn. Christian Schuster

Full Professor and Head of Institute of EM Theory at Hamburg University of Technology (TUHH)

Christian Schuster received the Diploma degree in physics from the University of Konstanz, Germany, in 1996, and the Ph. D. degree in electrical engineering from the Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, in 2000. Since 2006 he is full professor and head of the Institute of Electromagnetic Theory at the Hamburg University of Technology (TUHH), Germany. Prior to that he was with the IBM T. J. Watson Research Center, Yorktown Heights, NY, where he was involved in high-speed optoelectronic package and backplane interconnect modeling and signal integrity design for new server generations. His currents interests include signal and power integrity of digital systems, multiport measurement and calibration techniques, and development of electromagnetic simulation methods for communication electronics.

Dr. Schuster received IEEE Transactions on EMC Best Paper Awards in 2001 and 2015, IEEE Transactions on CPMT Best Paper Awards in 2012 and 2016, IEC DesignCon Paper Awards in 2005, 2006, 2010, 2017, and 2018, three IBM Research Division Awards between 2003 and 2005, and IBM Faculty Awards in 2009 and 2010. He is a member of the German Physical Society (DPG), a Senior Member of the IEEE, and a member of several technical program committees of international conferences on signal and power integrity, and electromagnetic compatibility. Within the IEEE he was serving as a Distinguished Lecturer for the EMC Society in the period 2012-2013, as a member of the Board of Directors of the EMC Society in 2015, and as the Chair of the German IEEE EMC Chapter in the period 2016-2019. Currently he is an Associate Editor for the IEEE Transactions on EMC and again a member of the Board of Directors of the EMC Society. At TUHH he was serving as Dean of the School of Electrical Engineering, Computer Science and Mathematics in the period 2017-18. Since April 2020 he is an Adjunct Associate Professor at the School of Electrical and Computer Engineering of the Georgia Institute of Technology.

August 2021

Curriculum Vitae

Employment History:

10/06	to	today	Full professor of Electrical Engineering at **Hamburg University of Technology (TUHH)**, Germany, and head of the Institute of Electromagnetic Theory (full-time). Directing applied research in the areas of computational electromagnetics and electrical design of high speed digital systems. Managing positions held at TUHH: Director of the Electrical Engineering program, Vice-Dean and Dean of the School of Electrical Engineering, Computer Science, and Mathematics, Speaker of Deans at TUHH.
7/01	to	9/06	Research staff member at the **IBM T.J. Watson Research Center**, Yorktown Heights, NY, USA, in the in the High-Speed Electrical and Optical Packaging Group of the Communication Technologies Department (full-time). Research in the areas of high speed optical transceiver packaging, broadband backplane interconnects, high frequency measurement techniques, electromagnetic field and link modeling.
3/00	to	4/01	Software engineer at **Integrated Systems Engineering (ISE) AG**, Zurich, Switzerland (now Synopsis), a company in the field of semiconductor device and process simulation (full-time). Development, application, and support of a commercial electromagnetic field solver. 5/01 to 6/01 active as a part-time consultant for ISE.
8/96	to	1/00	Research and teaching assistant at the Integrated Systems Laboratory, Department of Information Technology and Electrical Engineering, **Swiss Federal Institute of Technology (ETH)**, Zurich, Switzerland (full-time). Ph.D. thesis on electromagnetic field simulation and application to signal integrity and electromagnetic interference problems.
7/95	to	6/96	Intership at **Dornier GmbH** (DaimlerChrysler Group), Friedrichshafen, Germany (full-time). Research on charge storage mechanisms at the phase boundary between metal oxides and electrolytes (“super-caps”).

Education and Research Scholarships:

3/19	to	6/19	Visiting Scholar with the Institute for Electronics and Nanotechnology at the **Georgia Institute of Technology**, Atlanta, GA, USA. Conducting research in collaboration with Prof. Madhavan Swaminathan and the Center for Co-Design of Chip, Package, and System (C3PS) as well as the Center for Advanced Electronics through Machine Learning (CAEML).
8/96	to	1/00	Ph. D. thesis at the **Swiss Federal Institute of Technology (ETH)**, Zurich, Switzerland (Integrated Systems Institute, Department of Information Technology and Electrical Engineering). Degree: “Doktor der Technischen Wissenschaften” (Ph.D. of Technical Sciences). Topic: “Simulation, Analysis, and Parameter Extraction of Electronic Components and Circuits Using the Finite Difference Time Domain Method”.
10/90	to	7/96	Studying physics at the **University of Konstanz**, Germany. Degree: “Diplom-Physiker” (equiv. to a Master Degree in Physics).

Areas of Expertise:

- Signal integrity (SI) and power integrity (PI) of high-speed digital systems.
- Electromagnetic compatibility (EMC) and electromagnetic interference (EMI).
- High frequency (HF) measurement methods.
- Packaging technologies for digital, and millimeter-wave devices, components, and systems.
- Electromagnetic fields and waves and their equivalent circuit modeling.
- Computational electromagnetics (CEM) and electronic design automation (EDA).
- Bioelectromagnetics (BEM), i.e. physical effects and modeling of electromagnetic fields within the human body.

Professional Activities at Hamburg University of Technology (TUHH):

- From 1/20 till today speaker and organizer of the research initiative "Machine Learning in Engineering (MLE)" with over 100 participating researchers.
- From 4/18 to 1/19 Speaker of Deans at TUHH representing all seven schools in academic and administrative affairs.
- From 2/17 to 1/19 Dean of the School of Electrical Engineering, Computer Science and Mathematics. Overseeing the education of 1200+ students at undergraduate and graduate level in four bachelor and five master programs, two of which being international.
- From 2/09 to 6/10 and from 2/15 till 1/17 Vice Dean of the School of Electrical Engineering, Computer Science and Mathematics.
- From 2/07 to 1/09 and from 7/10 till 12/15 coordinator for the bachelor and master programs in Electrical Engineering. Overseeing the introduction of the Bologna process' framework for higher-education qualifications.
- Teaching courses at Bachelor's and Master's level since 10/06 in:

  - electromagnetic field theory
  - foundations of electrical engineering
  - electrical design and characterization of packages and interconnects
  - bioelectromagnetics
  - waveguides and antennas
  - signal and power integrity
  - electromagnetic compatibility

- Supervision of students at all levels (Bachelor, Master, Ph.D.).
- Current Ph.D. students:

  - Christian Morten Schierholz – since 11/19
  - Michael Wulff – since 11/19
  - Torben Wendt – since 8/17

- Former Ph.D. students:

  - Ömer Faruk Yildiz – graduation expected 12/21

- Katharina Scharff – graduation 6/21
- Torsten Reuschel – graduation 10/18
- David Dahl – graduation 12/17
- Jan Birger Preibisch – graduation 6/17
- Alexander Vogt – graduation 4/16
- Andreas Hardock – graduation 11/15
- Sebastian Müller – graduation 10/14
- Arne Schröder – graduation 4/14
- Miroslav Kotzev – graduation 2/13
- Xioamin Duan – graduation 4/12
- Renato Rimolo-Donadio – graduation 12/10

- Host for Alexander-von-Humboldt Research Fellowships:

  - Prof. Dr. Qi Wu, Beihang University, China – period 3/14 till 2/16
  - Dr. Lei Wang, currently AvH Fellow at TUHH – period 2/18 till 1/20

Further Professional Activities:

- Associate Editor of the IEEE Transaction on Electromagnetic Compatibility since January 2019.

- Member of the Steering Committee of the IEEE Transactions on Signal and Power Integrity since January 2021.

- Chair of the German Chapter of the IEEE Society on Electromagnetic Compatibility from April 2016 till December 2019. Vice-Chair in the period 2013-2015. Introduction of EMC boot camps and student contests with participation from industry as well as fostering of a network of EMC professionals.

- Program Co-Chair of the IEEE Workshops on Signal and Power Integrity 2015 in Berlin, Germany, and 2020 & 2021 in Siegen, Germany.

- Guest Editor of the IEEE Transaction on Electromagnetic Compatibility for a special section on "Advances in Modeling, Measurement and Design of Discontinuities and Their EMC and SI/PI Effects on Wired Communication Links", February 2018.

- Member of the Steering Committee of the IEEE Journal on Multiscale and Multiphysics Computational Techniques from June 2015 till December 2019.

- Technical program committee member (intermittent) of:

  - the UBM DesignCon Conference
  - the IEEE Workshop on Signal and Power Integrity (SPI)
  - the IEEE Asia-Pacific International Symposium on EMC (APEMC),
  - the IEEE Electrical Design of Advanced Packaging and Systems Symposium (EDAPS)
  - the IEEE International Symposium on Electromagnetic Compatibility (EMCS)
  - the EMC Europe Symposium and Exhibition (EMC Europe)
  - the IEEE International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO).

- Reviewer for international journals and conferences (intermittent):

  - the Electrical Components and Technology (ECTC) Conference
  - the German Microwave Conference (GEMIC)
  - the IEEE International Symposium on Electromagnetic Compatibility (EMCS)
  - the IEEE Microwave and Wireless Technology Letters
  - the IEEE Transactions on Advanced Packaging
  - the IEEE Transactions on Electromagnetic Compatibility
  - the IEEE Transactions on Components, Packaging, and Manufacturing Technology.

- Chair of conference sessions, workshops, and programs at:

  - the IEEE Workshop on Signal and Power Integrity (SPI)
  - the European Conference on Electromagnetic Compatibility (EMC Europe)
  - the European Microwave Week (EuMW)
  - the IEEE International Symposium on Electromagnetic Compatibility (EMCS).

- Reviewer for the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG).

- Point of contact for teachers and students at a technical high school in Hamburg that are interested in electrical engineering and TUHH ("Schulpatenschaft").

- Senior Member of the IEEE and member of the German Physical Society (DPG).

Honors, Awards:

- IEEE UK-China Emerging Technologies (UCET) Best Paper Award in the Propagation Track in 2020.

- IEEE Electromagnetic Compatibility Society Award for Sustained Service to the Society in 2019.

- IEEE Transactions on Components, Packaging and Manufacturing Technology Best Paper Award in 2016 (category "Electrical Performance of Integrated Systems").

- IEEE Transactions on Electromagnetic Compatibility Best Paper Award (Richard Schulz Transactions Prize Paper Award) in 2015.

- IEEE Transactions on Components, Packaging and Manufacturing Technology Best Paper Award in 2012 (category "Electrical Performance of Integrated Systems").

- IEEE Transactions on Electromagnetic Compatibility Best Paper Award in 2001.

- Serving on the Board of Directors of the IEEE EMC Society in 2015.

- Elected to be Distinguished Lecturer on behalf of the IEEE EMC Society in the period 2012-2013.

- IEEE Electromagnetic Compatibility Society Certificates of Appreciation for:

  - outstanding contributions to the development of IEEE Standard 1597.2-2010 in 2010
  - outstanding service as an EMC Distinguished Lecturer for the term 2012-2013 in 2014
  - outstanding service 2015 as a member of the IEEE EMC Society Board of Directors in 2016.

- Elevated to IEEE Senior Member Grade in 2005.

- Five DesignCon Paper Awards:

  - "The Recessed Probe Launch – A New Signal Launch for High Frequency Characterization of Board Level Packaging" in 2005
  - "Developing a 'Physical' Model for Vias" in 2006
  - "Fast Physics-Based Via and Trace Models for Signal and Power Integrity Co-Analysis" in 2010
  - "Systematic Analysis of Electrical Link Bottlenecks and Strategies for Their Equalization" in 2017
  - "Efficient Sensitivity-Aware Assessment of High-Speed Links Using PCE and Implications for COM" in 2018

- Three IBM Research Division Awards:

  - "10 Gbps Ethernet Transceiver Development" in 2003
  - "Characterization of Board Dielectric for Systems Group" in 2005
  - "Next Generation 10 Gb/s Serial Link Operating over Legacy and Advanced Packaging

Technology” in 2005.

- IBM Invention Achievement Award (First Plateau) in 2006.

- IBM Faculty Awards in 2009 and 2010.

- Invited presenter at several occasions, e.g.:

  - the European Conference on Circuit Theory and Design in 1999,
  - the IEEE Symposium on EMC in 2002,
  - the IEC EuroDesignCon Conference in 2005,
  - the Asia-Pacific EMC Week in 2010,
  - the IEEE Electrical Design of Advanced Packaging and Systems Symposium in 2010,
  - the IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) in 2017.
  - the IEEE Latin American Symposium on Circuits and Systems (LASCAS) in 2020.

- Eight U.S. patents issued (nos. 7303113, 7335976, 7375290, 7412172, 7509053, 7854368, 8089006, 8203206).

Supervised Student’s Awards:

- Best Ph.D. Thesis of the Year Award of the IEEE German Chapter on EMC in 2019 (student: Torsten Reuschel).

- Best Student Paper Award of the 2018 IEEE Workshop on Signal and Power Integrity (student: Katharina Scharff).

- Best Master Thesis of the Year Award of the IEEE German Chapter on EMC in 2017 (student: Ömer Yildiz).

- Best MasterThesis of the Year Award of the IEEE German Chapter on EMC in 2016 (student: Alexander Vogt).

- Third Prize in the Student Paper Contest of the 2015 IEEE Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (student: Jan Birger Preibisch).

- Best Bachelor Thesis of the Year Award of the IEEE German Chapter on EMC in 2014 (student: Jan Birger Preibisch).

- Best Student Paper Award of the 2014 IEEE Workshop on Signal and Power Integrity (student: David Dahl).

- Best Student Paper Award at the Asia-Pacific EMC Conference in 2013 (student: Alexander Vogt).

- First Runner Up Student Paper Award of the IEEE EMC Symposium in 2012 (student: Alexander Vogt).

- Best Paper Award of the EMV Düsseldorf trade show and congress in 2012 (student: Arne Schröder).

- Best Ph.D. Thesis of the Year Award of the IEEE German Chapter on EMC in 2011 (student: Renato Rimolo-Donadio).

- TUHH Diplompreis in 2010 (student: Sebastian Müller).

- IBM Ph.D. Fellowship Award in 2010
(student: Xioamin Duan).

- Best Student Symposium Paper Award at the International IEEE EMC Symposium in 2009
(student: Xioamin Duan).

- Best Bachelor Thesis of the Year Award of the IEEE German Chapter of the EMC Society in 2008
(student: Sebastian Müller).

- Best Interactive Presentation Award at the Design, Automation, and Test in Europe (DATE) conference in 2008
(student: Renato Rimolo-Donadio).

External Fund Raising:

- ≃ € 340.000 from the European Union (7th Framework Programme) within the project "High Intensity Radiated Field Synthetic Environment" (funding period: 2008-2012).

- ≃ € 240.000 from the German Research Foundation (DFG) for the project "Via-Arrays in Mehrlagen-substraten für den Einsatz in schnellen, energie- und ressourcensparenden digitalen Systemen" (funding period: 2010-2013).

- ≃ € 240.000 from the German Research Foundation (DFG) for the project "Entwurf von passiven Hochfrequenz-Komponenten in Mehrlagensubstraten mit Hilfe von funktionalen Vias" (funding period: 2011-2014).

- ≃ € 220.000 from the German Research Foundation (DFG) for the project "Elektrische Modellbildung und Entwurf von Through Silicon Vias für integrierte Systeme" in collaboration with Technical University of Berlin (funding period: 2012-2015).

- ≃ € 160.000 from IBM Germany Research & Development for the project "Exploration of Power Supply Noise Effects on Maximum Data Rates of High Speed Digital Links in Advanced Server Systems" (funding period: 2010-2013).

- ≃ € 70.000 from the German Research Foundation (DFG) for a follow-up project to "Via-Arrays in Mehrlagensubstraten für den Einsatz in schnellen, energie- und ressourcensparenden digitalen Systemen" (funding period: 2014-2015).

- ≃ € 240.000 from the German Research Foundation (DFG) for the project to "Stochastic Contour Integral Methodology for the Computation of Two-Dimensional Electromagnetic Wave Propagation" (funding period: 2015-2018).

- ≃ € 250.000 from the German Research Foundation (DFG) for the project "Hybrid Simulation of Electromagnetic Field Interaction with Metallic Structures Showing Massive Nonlinear Loading" (funding period: 2017-2020).

- ≃ € 11.000 from the German Research Foundation (DFG) for the development of international collaborations with the Georgia Institute of Technology in the field of artificial neural networks for printed circuit board design (funding period: 2019).

- ≃ € 196.000 from the State of Hamburg (Landesforschungsförderung) within the project HELIOS - Hamburg Electronics Lab for Integrated Optoelectronical Systems (funding period: 2018-2020).

- Support as one of four PIs of a project headed by Prof. Trieu of TUHH. Total funds ≃ € 3.540.00 from the German Federal Ministry of Education and Research within the project "Forschungslabore Mikroelektronik Deutschland (ForLab)"" (funding period: 2019-2021).

- ≃ € 271.000 from the German Research Foundation (DFG) for the project "Properties of Orbital Angular Momentum (OAM) Waves with Respect to Wireless Communication in Complex Environments and to Electromagnetic Interference" (funding period: 2020-2023).

Publications

Peer-Reviewed Conference Contributions:

1. C. Yang, M. Schierholz, E. Trunczik, L. Helmich, H.-D. Brüns, **C. Schuster**, “Efficient and Flexible Huygens’ Source Replacement of mm-scale Human Brain Implants”, Joint IEEE International Symposium on Electromagnetic Compatibility, Signal and Power Integrity (EMCS+SIPI) and Symposium on EMC Europe (EMC Europe), virtual event, Glasgow, Scotland, July 26 - August 20, 2021.
2. Ö. Yildiz, N. Pathe, M. Bochard, C. Yang, **C. Schuster**, “Analysis of Differential Crosstalk and Transmission for Via Arrays in Low Temperature Cofired Ceramics”, IEEE Workshop on Signal and Power Integrity (SPI), virtual event, Siegen, Germany, May 10-12, 2021.
3. A. Sanchez-Masıs, A. Carmona-Cruz, M. Schierholz, X. Duan, K. Roy, C. Yang, R. Rimolo-Donadio, **C. Schuster**, “ANN Hyperparameter Optimization by Genetic Algorithms for Via Interconnect Classification”, IEEE Workshop on Signal and Power Integrity (SPI), virtual event, Siegen, Germany, May 10-12, 2021.
4. L. Wang, M. Wulff, C. Yang, **C. Schuster**, “Numerical Analysis of Two MIMO Channels Carrying Orbital Angular Momentum (OAM)”, EurAAP European Conference on Antennas and Propagation (EuCAP), virtual event, Düsseldorf, Germany, March 22-26, 2021.
5. Ö. Yildiz, O. Thomsen, M. Bochard, C. Yang, **C. Schuster**, “Vertically Integrated Microwave Filters Using Functional Via Structures in LTCC”, European Microwave Conference (EuMC), virtual event, Utrecht, The Netherlands, January 10-15, 2021.
6. K. Scharff, C. M. Schierholz, C. Yang, **C. Schuster**, “ANN Performance for the Prediction of High-Speed Digital Interconnects over Multiple PCBs”, IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), virtual event, October 4-7, 2020.
7. K. Scharff, H. Torun, C. Yang, M. Swaminathan, **C. Schuster**, “Bayesian Optimization for Signal Transmission Including Crosstalk in a Via Array”, International Symposium on EMC Europe (EMC Europe), virtual event, Rome, Italy, September 23-25, 2020.
8. L. Wang, M. Wulff, C. Yang, W. Park, **C. Schuster**, “Numerical Investigation of OAM Based Indoor Communication in a Corridor with Electrical Conducting Walls”, IEEE International Conference on UK-China Emerging Technologies (UCET), virtual event, Glasgow, United Kingdom, August 20-21, 2020.

   UCET BEST PAPER AWARD (PROPAGATION TRACK)
9. C. M. Schierholz, C. Yang, K. Roy, M. Swaminathan, **C. Schuster**, “Comparison of Collaborative versus Extended Artificial Neural Networks for PDN Design”, IEEE Workshop on Signal and Power Integrity (SPI), Cologne, Germany, May 17-20, 2020.
10. M. Wulff, L. Wang, C. Yang, H.-D. Brüns, **C. Schuster**, “Using Orbital Angular Momentum (OAM) Modes on Multi-Conductor Cables for Crosstalk Mitigation”, ”, IEEE Workshop on Signal and Power Integrity (SPI), Cologne, Germany, May 17-20, 2020.
11. Ö. Yildiz, **C. Schuster**, “Design of Wideband Functional Via Structures for LTCC Multilayer Substrates up to 110 GHz”, IEEE Electrical Design of Advanced Package & Systems Symposium (EDAPS), Bangalore, Kaohsiung, Taiwan, December 16-18, 2019.
12. C. M. Schierholz, K. Scharff, **C. Schuster**, “Evaluation of Neural Networks to Predict Target Impedance Violations of Power Delivery Networks”, IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), Montreal, Canada, October 6-9, 2019.
13. T. Wendt, C. Yang, **C. Schuster**, S. Grivet-Talocia, “Numerical Complexity Study of Solving Hybrid Multiport Field-Circuit Problems for Diode Grids”, accepted for presentation at the IEEE International Conference on Electromagnetics in Advanced Applications (ICEAA), Grenada, Spain, September 9-13, 2019.
14. L. Wang, C. Yang, H.-D. Brüns, **C. Schuster**, “Effect of the Interference from Conducting Plates on OAM Based Wireless Communication”, accepted for presentation at the IEEE International

Conference on Electromagnetics in Advanced Applications (ICEAA), Grenada, Spain, September 9-13, 2019.

15. Z. Wen, Q. Wu, Ö. Yildiz, **C. Schuster**, "Design of Experiments for Analyzing the Efficiency of a Multi-Coil Wireless Power Transfer System Using Polynomial Chaos Expansion", IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC), Sapporo, Japan, June 3-7, 2019.
16. K. Scharff, H.-D. Brüns, **C. Schuster**, "Performance Metrics for Crosstalk on Printed Circuit Boards in Frequency Domain", IEEE Workshop on Signal and Power Integrity (SPI), Chambery, France, June 18-21, 2019.
17. A. Carmona-Cruz, K. Scharff, J. Cedeno-Chavez, H.-D. Brüns, R. Rimolo-Donadio, **C. Schuster**, "Via Transition Optimization Using a Domain Decomposition Approach", IEEE Workshop on Signal and Power Integrity (SPI), Chambery, France, June 18-21, 2019.
18. J. Cedeno-Chaves, K. Scharff, A. Carmona-Cruz, H.-D. Brüns, R. Rimolo-Donadio, **C. Schuster**, "Mode Conversion Due To Residual Via Stubs in Differential Signaling", IEEE Workshop on Signal and Power Integrity (SPI), Chambery, France, June 18-21, 2019.
19. T. Hillebrecht, D. Dahl, **C. Schuster**, "Prediction of Frequency Dependent Shielding Behavior for Ground Via Fences in Printed Circuit Boards", IEEE Workshop on Signal and Power Integrity (SPI), Chambery, France, June 18-21, 2019.
20. Ö. Yildiz, D. Dahl, **C. Schuster**, "Quantifying the Impact of RF Probing Variability on TRL Calibration for LTCC Substrates", IEEE Electronic Components and Technology Conference (ECTC), Las Vegas, USA, May 28 - 31, 2019.
21. L. Wang, W. Park, H.-D. Brüns, D. Kam, C. Schuster, "Numerical Investigation of the Impact of Array Orientations on Orbital Angular Momentum (OAM) Based Communication Using a Mixed-Mode Matrix", German Microwave Conference (GeMiC), Stuttgart, Germany, March 25-27, 2019.
22. E. Frick, D. Dahl, C. Seifert, M. Lindner, **C. Schuster**, "An Intrusive PCE Extension of the Contour Integral Method and its Application in Electrical Engineering", Annual Meeting of the Gesellschaft für Angewandte Mathematik und Mechanik (GAMM), February 18-22, Vienna, Austria, 2019.
23. E. Carrera-Retana, R. Rimolo-Donadio, **C. Schuster**, "Efficient Construction of Interconnect Passive Macromodels Through Segmented Analysis", IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), San Jose, CA, USA, October 14-17, 2018.
24. E. Frick, D. Dahl, C. Seifert, M. Lindner, **C. Schuster**, "Novel Method for Error Estimation in Applications of Polynomial Chaos Expansion to Stochastic Modeling of Multi-Resonant Systems",IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), San Jose, CA, USA, October 14-17, 2018.
25. L. Wang, **C. Schuster**, "Investigation of Radiated EMI from Printed Circuit Board Edges up to 100 GHz by using an Effective Two-Dimensional Approach", International Symposium on EMC Europe (EMC Europe), Amsterdam, Netherlands, August 27-30, 2018.
26. K. Scharff, D. Dahl, H.-D. Brüns, **C. Schuster**, "Physical Scaling Effects of Differential Crosstalk in Via Arrays up to Frequencies of 100 GHz", IEEE Workshop on Signal and Power Integrity (SPI), Brest, France, May 22-25, 2018.

    SPI BEST STUDENT PAPER AWARD
27. T. Wendt, T. Reuschel, **C. Schuster**, "Direct Prediction of Linear Equalization Coefficients Using Raised Cosine Pulse Shaping in Frequency Domain", IEEE Workshop on Signal and Power Integrity (SPI), Brest, France, May 22-25, 2018.
28. W. Park, D. Kam, H.-D. Brüns, **C. Schuster**, "Numerical Investigation of Orbital Angular Momentum Density of Antenna Arrays Based on the Method of Moments", Joint IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) and IEEE International Symposium on Electromagnetic Compatibility (EMCS), Singapore, May 14-17, 2018.
29. D. Dahl, Ö. Yildiz, E. Frick, C. Seifert, M. Lindner, **C. Schuster**, "Feasibility of Uncertainty Quantification for Power Distribution Network Modeling Using PCE and a Contour Integral Method", Joint IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) and IEEE International Symposium on Electromagnetic Compatibility (EMCS), Singapore, May 14-17, 2018.
30. P. Liang, Q. Wu, H.-D. Brüns, **C. Schuster**, "Efficient Modeling of Multi-Coil Wireless Power Transfer Systems using Combination of Full-Wave Simulation and Equivalent Circuit Modeling",

Joint IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) and IEEE International Symposium on Electromagnetic Compatibility (EMCS), Singapore, May 14-17, 2018.

31. T. Reuschel, Ö. Yildiz, J. Balachandran, C. Filip, N. Bhagwath, B. Sen, C. Schuster, "Efficient Sensitivity-Aware Assessment of High-Speed Links Using PCE and Implications for COM", UBM DesignCon Conference, Santa Clara, CA, USA, January 30 - February 1, 2018.

DESIGNCON PAPER AWARD

32. E. Carrera-Retana, R. Rimolo-Donadio, **C. Schuster**, "Evaluation of Concatenation Techniques for State-Space Interconnect Macromodels", IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), San Jose, CA, USA, October 15-18, 2017.

EPEPS BEST POSTER PRESENTATION AWARD

33. Ö. Yildiz, J. Preibisch, Jan Niehof, **C. Schuster**, "Sensitivity Analysis and Empirical Optimization of Cross-Domain Coupling on RFICs using Polynomial Chaos Expansion", IEEE Symposium on Electromagnetic Compatibility, Signal and Power Integrity (EMC+SIPI), Washington, DC, USA, August 7-11, 2017.

34. E. Frick, J. Preibisch, C. Seifert, M. Lindner, **C. Schuster**, "Variability Analysis of Via Crosstalk Using Polynomial Chaos Expansion", IEEE International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization for RF, Microwave and Terahertz Applications (NEMO), Sevilla, Spain, May 17-19, 2017.

35. T. Reuschel, J. Preibisch, **C. Schuster**, "Efficient Design of Continuous Time Linear Equalization for Loss Dominated Digital Links", IEEE Workshop on Signal and Power Integrity (SPI), Baveno, Italy, May 7-10, 2017.

36. D. Dahl, I. Ndip, K.-D. Lang, **C. Schuster**, "Effect of 3D Stack-Up Integration on Through Silicon Via Characteristics", IEEE Workshop on Signal and Power Integrity (SPI), Baveno, Italy, May 7-10, 2017.

37. K. Scharff, T. Reuschel, X. Duan, H.-D. Brüns, **C. Schuster**, "Exploration of Differential Via Stub Effect Mitigation by Using PAM4 and PAM8 Line Coding", IEEE Workshop on Signal and Power Integrity (SPI), Baveno, Italy, May 7-10, 2017.

38. J. Speichert, T. Kiehl, R. God, H.-D. Brüns, **C. Schuster**, "Simulation-Based Validation of Near Field Communication Effects on Aircraft Wiring", International Workshop on Aircraft System Technologies (AST), Hamburg, Germany, February 21–22, 2017.

39. Y. Zhao, R. Grünheid, G. Bauch, T. Reuschel, **C. Schuster**, "Redundant and Non-Redundant Spectrum Shaping Schemes for Reflection-Limited Chip-to-Chip Communication", International ITG Conference on Systems, Communication and Coding (SCC), Hamburg, Germany, February 6-9, 2017.

40. J. Preibisch, J. Balachandran, T. Reuschel, K. Scharff, B. Sen, C. Schuster, "Systematic Analysis of Electrical Link Bottlenecks and Strategies for Their Equalization", UBM DesignCon Conference, Santa Clara, CA, USA, January 31 - February 2, 2017.

DESIGNCON PAPER AWARD

41. L. Carrera-Retana, R. Rimolo-Donadio, **C. Schuster**, "Evaluation of Vector Fitting for Compact Interconnect Model Representation", IEEE Convention of Central America and Panama Region (CONCAPAN), San Jose, Costa Rica, November 9-11, 2016.

42. J. Preibisch, **C. Schuster**, "Extension of the Contour Integral Method for the Modeling of TE Scattering in Two-Dimensional Photonic Structures Using the Duality Principle", International Congress on Advanced Electromagnetic Materials in Microwaves and Optics (Metamaterials), Crete, Greece, September 17-22, 2016.

43. X. Duan, M. Böttcher, D. Dahl, **C. Schuster**, C. Tschoban, I. Ndip, K.-D. Lang, "High Frequency Characterization of Silicon Substrate and Through Silicon Vias", IEEE Electronic Components and Technology Conference (ECTC), Las Vegas, USA, May 31 - June 3, 2016.

44. Q. Wu, H.-D. Brüns, **C. Schuster**, "Evaluation of isolation between blade antennas in pre-design phase using a synthesized model", IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC), Shenzhen, China, May 17-21, 2016.

45. C. Yang, P. Liu, H.-D. Brüns, **C. Schuster**, “Design Aspects for HIRF Protection of a Rectangular Metallic Cavity Using Energy Selective Diode Grids”, IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC), Shenzhen, China, May 17-21, 2016.

46. J. Preibisch, T. Reuschel, K. Scharff, **C. Schuster**, “Impact of Continuous Time Linear Equalizer Variability on Eye Opening of High-Speed Links”, IEEE Workshop on Signal and Power Integrity (SPI), Turin, Italy, May 8-11, 2016.

47. D. Dahl, T. Reuschel, X. Duan, I. Ndip, K.-D. Lang, **C. Schuster**, “On the Upper Bound of Total Uncorrelated Crosstalk in Large Through Silicon Via Arrays“, IEEE Workshop on Signal and Power Integrity (SPI), Turin, Italy, May 8-11, 2016.

48. A. Vogt, H.-D. Brüns, **C. Schuster**, “Auswirkung absorbierender Materialien auf die Verkopplung von Komponenten innerhalb eines PC-Gehäuses“, Internationale Fachmesse und Kongress für Elektromagnetische Verträglichkeit, Düsseldorf, Germany, February 23-25, 2016.

49. Y. Kwark, T. Reuschel, R. Rimolo-Donadio, D. Kaller, T.-M. Winkel, H. Harrer, **C. Schuster**, “Systematic Analysis of Electrical Link Bottlenecks and Strategies for Their Equalization”, UBM DesignCon Conference, Santa Clara, CA, USA, January 19 - 21, 2016.

50. X. Duan, M. Böttcher, S. Dobritz, D. Dahl, **C. Schuster**, I. Ndip, K.-D. Lang, “Comparison of Passivation Materials for High frequency 3D Packaging Application up to 110 GHz”, European Microelectronics and Packaging Conference and Exhibition (EMPC), Friedrichshafen, Germany, September 14-16, 2015.

51. Q. Wu, A. Vogt, J. B. Preibisch, A. Hardock, H.-D. Brüns, **C. Schuster**, “Modeling of Mutual Coupling between Coaxial Probes in Flat Metallic Casings Using the Contour Integral Method”, IEEE International Conference on Electromagnetics in Advanced Applications (ICEAA), Torino, Italy, September 7-11, 2015.

52. C. Yang, H.-D. Brüns, P.G. Liu, **C. Schuster**, “Validation of a Flexible Causality Treatment for Transient Analysis of Nonlinearly Loaded Structures “, IEEE Symposium on Electromagnetic Compatibility, Dresden, August 16-22, 2015.

53. Q. Wu, A. Vogt, H.-D. Brüns, F. Gronwald, **C. Schuster**, “Numerical and Experimental Evaluation of Electromagnetic Coupling between Radiating Antenna Structures inside a Computer Casing“, IEEE Symposium on Electromagnetic Compatibility, Dresden, August 16-22, 2015.

54. J. Preibisch, P. Triverio, **C. Schuster**, “Efficient Stochastic Transmission Line Modeling Using Polynomial Chaos Expansion with Multiple Variables“, IEEE International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO), Ottawa, Canada, August 11-14, 2015.

    THIRD PRIZE NEMO BEST STUDENT PAPER AWARD

55. X. Duan, D. Dahl, **C. Schuster**, I. Ndip, K.-D. Lang, “Efficient Analysis of Wave Propagation for Through-Silicon-Via Pairs Using Multipole Expansion Method”, IEEE Workshop on Signal and Power Integrity (SPI), Berlin, Germany, May 10-13, 2015.

56. J. Preibisch, P. Triverio, **C. Schuster**, “Sensitivity Analysis of Via Impedance Using Polynomial Chaos Expansion”, IEEE Workshop on Signal and Power Integrity (SPI), Berlin, Germany, May 10-13, 2015.

57. A. Hardock, D. Dahl, H.-D. Brüns, **C. Schuster**, “Efficient Calculation of External Fringing Capacitances for Physics-Based PCB Modeling”, IEEE Workshop on Signal and Power Integrity (SPI), Berlin, Germany, May 10-13, 2015.

58. A. Hardock, **C. Schuster**, “Using Coupled Vias for Band-Pass Filters in Multilayered Printed-Circuit Boards”**,** German Microwave Conference (GeMic), Nürnberg, Germany, March 16-18, 2015.

59. D. Dahl, S. Müller, **C. Schuster**, “Effect of Layered Media on the Parallel Plate Impedance of Printed Circuit Boards“, IEEE Electrical Design of Advanced Package & Systems Symposium (EDAPS), Bangalore, India, December 14-16, 2014.

60. Y. Kwark, R. Rimolo-Donadio, C. Baks, S. Müller, **C. Schuster**, “Proximity Effects Between Striplines and Vias“, International Conference on Signal and Power Integrity (SIPI) embedded within the International Symposium on Electromagnetic Compatibility, Raleigh, NC, USA, August 3-8 2014.

61. X. Duan, A. Hardock, I. Ndip, C. Schuster, K.-D. Lang, “Optimization of Microstrip-to-Via Transition for High-Speed Differential Signaling on Printed Circuit Boards by Suppression of the Parasitic Modes in Shared Antipads“, International Conference on Signal and Power Integrity (SIPI)

embedded within the International Symposium on Electromagnetic Compatibility, Raleigh, NC, USA, August 3-8 2014.

62. T. Reuschel, S. Müller, H.-D. Brüns, **C. Schuster**, “Investigation of Long Range Differential Crosstalk on Printed Circuit Boards”, IEEE Workshop on Signal and Power Integrity (SPI), Ghent, Belgium, May 11-14, 2014.

63. D. Dahl, A. Beyreuther, X. Duan, I. Ndip, K.-D. Lang, **C. Schuster**, “Analysis of Wave Propagation along Coaxial Through Silicon Vias Using a Matrix Method”, IEEE Workshop on Signal and Power Integrity (SPI), Ghent, Belgium, May 11-14, 2014.

SPI BEST STUDENT PAPER AWARD

64. S. Müller, H.-D. Brüns, **C. Schuster**, “Einfluss der Routing-Lage in Via-Arrays auf die Signalqualität bei hohen Datenraten“, Internationale Fachmesse und Kongress für Elektromagnetische Verträglichkeit, Düsseldorf, Germany, March 11-13, 2014.

65. A. Vogt, H.-D. Brüns, **C. Schuster**, “Einfluss von absorbierenden Materialien auf die elektromagnetische Strahlung von Leiterplatten“, Internationale Fachmesse und Kongress für Elektromagnetische Verträglichkeit, Düsseldorf, Germany, March 11-13, 2014.

66. D. Dahl, X. Duan, A. Beyreuther, I. Ndip, K.-D. Lang, **C. Schuster**, “Applying a Physics-Based Via Model to the Simulation of Through Silicon Vias”, IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), San Jose, CA, USA, October 27-30, 2013.

67. J. Preibisch, X. Duan, **C. Schuster**, “Extensions to the Contour Integral Method for Efficient Modeling of TM Scattering in Two-Dimensional Photonic Crystals”, International Congress on Advanced Electromagnetic Materials in Microwaves and Optics (Metamaterials), Bordeaux, France, September 16-21, 2013.

68. A. Vogt, H.-D. Brüns, H. Fielitz, **C. Schuster**, “Modeling Absorbing Materials in Cavities with Apertures Using the Thin Sheet Approximation”, IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC), Melbourne, Australia, May 20-23, 2013.

APEMC BEST STUDENT PAPER AWARD

69. D. Dahl, X. Duan, A. Beyreuther, I. Ndip, K.-D. Lang, **C. Schuster**, “Application of the Transverse Resonance Method for Efficient Extraction of the Dispersion Relation of Arbitrary Layers in Silicon Interposers”, IEEE Workshop on Signal and Power Integrity (SPI), Paris, France, May 12-15, 2013.

70. S. Müller, A. Hardock, R. Rimolo-Donadio, H.-D. Brüns, **C. Schuster**, “Analytical Extraction of Via Near-Field Coupling Using a Multiple Scattering Approach, IEEE Workshop on Signal and Power Integrity (SPI), Paris, France, May 12-15, 2013.

71. R. Rimolo-Donadio, X. Duan, Y. Kwark, X. Gu, C. Baks, S. Müller, T.-M. Winkel, T. Strach, L. Shan, H. Harrer, **C. Schuster,** “Signal and Power Integrity (SPI) Co-Analysis for High-Speed Communication Channels”, UBM DesignCon Conference, Santa Clara, CA, USA, January 28 - 31, 2013.

72. T.-M. Winkel, H. Harrer, T. Strach, R. Rimolo-Donadio, Y. Kwark, X. Duan, C. **Schuster**, “Framework for Co-Simulation of Signal and Power Integrity in Server Systems”, IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), Tempe, AZ, USA, October 21-24, 2012.

73. A. Hardock, S. Müller, X. Duan, H.-D. Brüns, **C. Schuster**, “Minimizing Displacement Return Currents in Multilayer Via Structures”, IEEE Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), Tempe, AZ, USA, October 21-24, 2012.

74. X. Duan, A. Vogt, H.-D. Brüns, **C. Schuster**, “Progress Toward a Combined CIM/MoM Approach for EMI Analysis of Electronic Systems”, International Symposium on Electromagnetic Compatibility Europe (EMC Europe), Rome, Italy, September 17-21, 2012.

75. S. Müller, X. Duan, **C. Schuster**, “Energy-Aware Analysis of Electrically Long High-Speed I/O Links“, International Conference on Energy-Aware High Performance Computing (ENA-HPC), Hamburg,
September 12, 2012 (paper published in Computer Science – Research and Development by Springer, August 2012, and an erratum ibidem, November 2012).

76. A. Vogt, H.-D. Brüns, S. Connor, B. Archambeault, **C. Schuster**, “Applicability of the Thin Sheet Approximation to the Analysis of EM Emission from Coated PCBs”, IEEE Symposium on Electromagnetic Compatibility, Pittsburgh, PA, USA, August 5-10, 2012.

FIRST RUNNER UP EMC SYMPOSIUM BEST STUDENT PAPER AWARD

77. A. Hardock, R. Rimolo-Donadio, H.-D. Brüns, **C. Schuster**, "Double Stub Matching in Multilayered Printed Circuit Board Using Vias", IEEE Electronic Components and Technology Conference (ECTC), San Diego, USA, May 29 - June 1, 2012.

78. S. Müller, R. Rimolo-Donadio, X. Duan, H.-D. Brüns, **C. Schuster**, "Analytical Calculation of Conduction and Displacement Current Contributions in PCB Return Current Paths", IEEE Asia-Pacific EMC Symposium (APEMC), Singapore, May 21-24, 2012.

79. D. Timmermann, R. Rimolo-Donadio, Y. Kwark, T.-M. Winkel, C. Siviero, H. Harrer, **C. Schuster**, "Methods for Calculation of Eye Diagrams for Digital Links with Multiple Aggressors Having Unknown Time Offsets", IEEE Workshop on Signal and Power Integrity (SPI), Sorrento, Italy, May 13-16, 2012.

80. A. Schröder, H.-D. Brüns, **C. Schuster**, "Efficient Compression of Far Field Matrices in Multipole Algorithms Based on Spherical Harmonics and Radiating Modes", Advanced Electromagnetics Symposium (AES), Paris, France, April 16-19, 2012 (extended version published in Advanced Electromagnetics, vol. 1, no. 2, pp. 5-11, 2012).

81. S. Müller, R. Rimolo-Donadio, H.-D. Brüns, **C. Schuster**, "Anwendung quasianalytischer Via-Modelle zur schnellen Simulation dichter Via-Arrays", Internationale Fachmesse und Kongress für Elektromagnetische Verträglichkeit, Düsseldorf, Germany, March 7-9, 2012.

82. A. Schröder, H.-D. Brüns, **C. Schuster**, "Beschleunigung schneller Löser in der Momentenmethode bei Einkopplungsproblemen mit Mehrfachanregung", Internationale Fachmesse und Kongress für Elektromagnetische Verträglichkeit, Düsseldorf, Germany, March 7-9, 2012.

EMV DÜSSELDORF BEST PAPER AWARD

83. X. Gu, Y. Kwark, D. Liu, Y. Zhang, J. Fan, R. Rimolo-Donadio, S. Müller, **C. Schuster**, F. de Paulis, "Backplane Channel Design Optimization: Recasting a 3Gb/s Link to Operate at 25Gb/s and Above", UBM DesignCon Conference, Santa Clara, CA, USA, January 30 - February 2, 2012.

84. X. Duan, R. Rimolo-Donadio, S. Müller, K- Han, X. Gu, Y. Kwark, H.-D. Brüns, **C. Schuster**, "Impact of Multiple Scattering on Passivity of Equivalent-Circuit Via Models", IEEE Electrical Design of Advanced Package & Systems Symposium (EDAPS), Hangzhou, China, December 12-14, 2011.

85. A. Schröder, G. Rasek, S. Loos, H.-D. Brüns, **C. Schuster**, "Numerical and Experimental Investigations on a Metallic Fuselage Model with Apertures", International Symposium on EMC Europe (EMC Europe), York, United Kingdom, September 26-30, 2011.

86. A. Schröder, H.-D. Brüns, G. South, **C. Schuster**, "Investigation of Field Coupling into a Carbon Fiber Aircraft Model with the Method of Moments", International Conference on Electromagnetics in Advanced Applications (ICEAA), Torino, Italy, September 12-16, 2011.

87. Y. Kwark, M. Kotzev, C. Baks, X. Gu, **C. Schuster**, "Novel Multiport Probing Fixture for High Frequency Measurements in Dense Via Arrays", International Microwave Symposium (IMS), Baltimore, USA, June 5-10, 2011.

88. X. Duan, R. Rimolo-Donadio, H.-D. Brüns, **C. Schuster**, "A Hybrid CIM/MoM Approach for Power Plane Analysis Including Radiation Loss", IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC), Jeju Island, Korea, May 16-19, 2011.

89. M. Kotzev, Y. Kwark, C. Baks, X. Gu, **C. Schuster**, "Electrical Performance of a Multiport Interposer for Measurements of Dense Via Arrays", IEEE Workshop on Signal Propagation on Interconnects (SPI), Naples, Italy, May 8-11, 2011.

90. R. Rimolo-Donadio, T.-M. Winkel, C. Siviero, D. Kaller, H. Harrer, H.-D. Brüns, **C. Schuster**, "Fast Parametric Pre-Layout Analysis of Signal Integrity for Backplane Interconnects", IEEE Workshop on Signal Propagation on Interconnects (SPI), Naples, Italy, May 8-11, 2011.

91. M. Kotzev, **C. Schuster**, "Custom-Made Calibration Standards for Measurements of Multilayer Substrates", German Microwave Conference (GeMic), Darmstadt, Germany, March 14-16, 2011.

92. X. Gu, Y. Kwark, Y.-J. Zhang, J. Fan, A. Ruehli, M. Kotzev, S. Müller, R. Rimolo-Donadio, **C. Schuster**, B. Archambeault, "Validation and Application of Physics-based Via Models to Dense Via Arrays", IEC DesignCon Conference, Santa Clara, CA, USA, January 31 - February 3, 2011.

93. S. Müller, X. Duan, R. Rimolo-Donadio, H.-D. Brüns, **C. Schuster**, "Non-Uniform Currents on Vias and Their Effects in a Parallel-Plate Environment", IEEE Electrical Design of Advanced Package & Systems Symposium (EDAPS), Singapore, December 7-9, 2010.

94. M. Kotzev, H.-D. Brüns, **C. Schuster**, "Effect of Via Stubs on the TRL Calibration Technique for Measurement of Embedded Multilayer Structures", European Microwave Conference (EuMC), Paris, France, September 28 – October 1, 2010.

95. A. Schröder, H.-D. Brüns, **C. Schuster**, "Exploiting Planes of Magnetic Symmetry in the Fast Multipole Method", International Symposium on Electromagnetic Compatibility Europe (EMC Europe), Wroclaw, Poland, September 13-17, 2010.

96. M. Kotzev, R. Frech, H. Harrer, D. Kaller, A. Huber, T.-M. Winkel, H.-D. Brüns, **C. Schuster**, "Crosstalk Analysis in High Density Connector Via Pin Fields for Digital Backplane Applications Using a 12-Port Vector Network Analyzer", IEEE Electronics System Integration Technology Conferences (ESTC), Berlin, Germany, September 13-16, 2010.

97. M. Kotzev, R. Rimolo-Donadio, H-D. Brüns, **C. Schuster**, "Multiport Measurement and Deembedding Techniques for Crosstalk Study in Via Arrays", IEEE Workshop on Signal Propagation on Interconnects (SPI), Hildesheim, Germany, May 9-12, 2010.

98. S. Müller, R. Rimolo-Donadio, M. Kotzev, H.-D. Brüns, **C. Schuster**, "Effect of Mixed-Reference Planes on Single-Ended and Differential Links in Multilayer Substrates", IEEE Workshop on Signal Propagation on Interconnects (SPI), Hildesheim, Germany, May 9-12, 2010.

99. S. Müller, R. Rimolo-Donadio, H.-D. Brüns, **C. Schuster**, „Schnelle Simulation verlustbehafteter Verbindungsstrukturen auf Leiterplatten auf der Grundlage quasianalytischer Via-Modelle und der Leitungstheorie", Internationale Fachmesse und Kongress für elektromagnetische Verträglichkeit (EMV Düsseldorf), Düsseldorf, Germany, March 9-11, 2010.

100. A. Schröder, M. Astner, H.-D. Brüns, **C. Schuster**, "Ausnutzung magnetischer Symmetrie bei der numerischen Analyse von Feldproblemen mit der schnellen Multipolmethode", Internationale Fachmesse und Kongress für elektromagnetische Verträglichkeit (EMV Düsseldorf), Düsseldorf, Germany, March 9-11, 2010.

101. X. Gu, R. Rimolo-Donadio, Z. Yu, F. de Paulis, Y. H. Kwark, M. Cocchini, M. B. Ritter, B. Archambeault, A. Ruehli, J. Fan, **C. Schuster**, "Fast-Physics-Based Via and Trace Models for Signal and Power Integrity Co-Analysis", IEC DesignCon Conference, Santa Clara, CA, USA, February 1-4, 2010.

DESIGNCON PAPER AWARD

102. X. Duan, R. Rimolo-Donadio, H.-D. Brüns, B. Archambeault, **C. Schuster**, "Contour Integral Method for Rapid Computation of Power/Ground Plane Impedance (Special Session on Power Integrity Techniques)", IEC DesignCon Conference, Santa Clara, CA, USA, February 1-4, 2010.

103. R. Rimolo-Donadio, X. Duan, H.-D. Brüns, **C. Schuster,** "Comprehensive Multilayer Substrate Models for Co-Simulation of Power and Signal Integrity", International Microelectronics and Packaging Symposium (IMAPS), San Jose, CA, USA, November 1-5, 2009.

104. X. Duan, B. Archambeault, H.-D. Brüns, **C. Schuster**, "EM Emission of Differential Signals Across Connected Printed Circuit Boards in the GHz Range", IEEE Symposium on Electromagnetic Compatibility, Austin, TX, USA, August 17-21, 2009.

EMC SYMPOSIUM BEST STUDENT PAPER AWARD

105. R. Rimolo-Donadio, X. Duan, H.-D. Brüns, **C. Schuster**, "Differential to Common Mode Conversion Due to Asymmetric Ground Via Configurations", IEEE Workshop on Signal Propagation on Interconnects (SPI), Strasbourg, France, May 12-15, 2009.

106. M. Kotzev, R. Rimolo-Donadio, **C. Schuster**, "Extraction of Broadband Error Boxes for Microprobes and Recessed Probe Launches for Measurement of Printed Circuit Board Structures", IEEE Workshop on Signal Propagation on Interconnects (SPI), Strasbourg, France, May 12-15, 2009.

107. M. Kotzev, X. Gu, Y. H. Kwark, M. B. Ritter, R. Rimolo-Donadio, **C. Schuster**, "Bandwidth Study of Recessed Probe Launch Variations for Broadband Measurement of Embedded PCB Structures", German Microwave Conference (GeMiC), Munich, Germany, March 16-18, 2009.

108. X. Gu, F. de Paulis, R. Rimolo-Donadio, K. Shringarpure, Y. Zhang, B. Archambeault, S. Connor, Y. H. Kwark, M. B. Ritter, J. Fan, **C. Schuster**, "Fully Analytical Methodology for Fast End-to-End

Link Analysis on Complex Printed Circuit Boards including Signal and Power Integrity Effects", IEC DesignCon Conference, Santa Clara, CA, USA, February 2-5, 2009.

109. R. Rimolo-Donadio, H.-D- Brüns, **C. Schuster**, "Including Stripline Connections into Network Parameter Based Via Models for Fast Simulation of Interconnects", EMC Zurich Conference, Zurich, Switzerland, January 12-16, 2009.

110. S. Wu, X. Chang, **C. Schuster**, X. Gu, J. Fan, "Eliminating Via-Plane Coupling Using Ground Vias for High-Speed Signal Transitions", IEEE Topical Meeting on Electrical Performance of Electronic Packaging (EPEP), San Jose, CA, USA, October 27-29, 2008.

111. M. Ritter, P. Pepeljugoski, X. Gu, Y. Kwark, D. Kam, R. Rimolo-Donadio, B. Wu, C. Baks, R. John, L. Shan, **C. Schuster**, "The Viability of 25 Gb/s On-board Signalling", IEEE Electronic Components and Technology Conference (ECTC), Lake Buena Vista, FL, USA, May 27-30, 2008.

112. R. Rimolo-Donadio, A. Stepan, H. Brüns, J. Drewniak, **C. Schuster**, "Simulation of Via Interconnects Using Physics-Based Models and Microwave Network Parameters", IEEE Workshop on Signal Propagation on Interconnects (SPI), Avignon, France, May 12-15, 2008.

113. R. Rimolo-Donadio, **C. Schuster**, Y. Kwark, X. Gu, M. Ritter, "Analysis and Optimization of the Recessed Probe Launch for High Frequency Measurements of PCB Interconnects", IEEE Design, Automation and Test in Europe Conference and Exhibition (DATE), Munich, Germany, March 10-14, 2008.

BEST INTERACTIVE PRESENTATION AWARD

114. **C.** Schuster, G. Selli, Y. Kwark, M. Ritter, J. Drewniak, "Progress in Representation and Validation of Physics-Based Vias Models", IEEE Workshop on Signal Propagation on Interconnects (SPI), Genova, Italy, May 13-16, 2007.

115. G. Selli, **C. Schuster** , Y. Kwark, M. Ritter, J. Drewniak, "Developing a Physical Model for Vias – Part II: Coupled and Ground Return Vias", IEC DesignCon Conference, Santa Clara, CA, USA, January 29 - February 1, 2007.

116. **C. Schuster**, Y. Kwark, M. Ritter, G. Selli, J. Drewniak, "Accuracy and Application of Physics Based Circuit Models for Vias", International Microelectronics and Packaging Symposium (IMAPS), San Diego, CA, USA, October 8-12, 2006.

117. G. Selli, **C. Schuster**, Y. Kwark, J. Drewniak, "Model-to-Hardware Correlation of Physics-Based Via Models With the Parallel Plate Impedance Included", IEEE Symposium on Electromagnetic Compatibility (EMCS), Portland, OR, USA, August 14-18, 2006.

118. B. Archambeault, S. Connor, D. de Araujo, A. Ruehli, **C. Schuster**, "Fullwave Simulation and Validation of a Complex Packaging Structure", IEEE Electronic Components and Technology Conference (ECTC), San Diego, CA, USA, May 30-June 2, 2006.

119. **C. Schuster**, A. Deutsch, E. Klink, R. Krabbenhoft, "Attenuation Measurement Technique for Printed Circuit Board Traces in a Production Environment", IEEE Workshop on Signal Propagation on Interconnects (SPI), Berlin, Germany, May 9-12, 2006.

120. A. Deutsch, R. Krabbenhoft, C. Surovic, T.-M. Winkel, **C. Schuster**, Y. Kwark, E. Klink, "Practical Considerations in the Modeling and Characterization of Printed-Circuit Board Wiring", IEEE Workshop on Signal Propagation on Interconnects (SPI), Berlin, Germany, May 9-12, 2006.

121. J. Kash, F. Doany, L. Schares, C. Schow, **C. Schuster**, D. Kuchta, P. Pepeljugoski, J. Trewhella, C. Baks, R. John, L. Shan, Y. Kwark, R. Budd, P. Chiniwalla, F. Libsch, J. Rosner, C. Tsang, C. Patel, J. Schaub, D. Kucharski, D. Guckenberger, S. Hegde, H. Nyikal, R. Dangel, F. Horst, B. Offrein, C. Lin, A. Tandon, G. Trott, M. Nystrom, D. Bour, M. Tan, D. Dolfi, "Chip-to-Chip Optical Interconnects", IEEE & OSA Optical Fiber Communications Conference (OFC), Anaheim, CA, USA, March 5-10, 2006.

122. **C. Schuster**, Y. Kwark, G. Selli, P. Muthana, "Developing a Physical Model for Vias", IEC DesignCon Conference, Santa Clara, CA, USA, February 6-9, 2006.

DESIGNCON PAPER AWARD

123. B. **Archambeault**, S. Connor, D. de Araujo, M. Hashemi, R. Mittra, **C. Schuster**, A. Ruehli, "Full-Wave Simulation and Validation of a Simple Via Structure", IEC DesignCon Conference, Santa Clara, CA, USA, February 6-9, 2006.

124. **C. Schuster**, Y. Kwark, L. Shan, P. Pepeljugoski, Z. Chen, A. Haridass, B. Truong, D. Altabella, D. Kaller, E. Klink, "S-Parameter Based Eye Diagrams of High-Speed Links in Comparison to Direct

Measurements in Time Domain ", IEC Euro DesignCon Conference, Munich, Germany, October 24-27, 2005.

125. D. Kaller, **C. Schuster**, Y. Kwark, D. Altabella, B. Truong, Z. Chen, A. Haridass, E. Klink, "Using S-Parameters Successfully in Time Domain Link Simulations", IEEE Topical Meeting on Electrical Performance of Electronic Packaging (EPEP), Austin, TX, USA, October 24-26, 2005.

126. J. Kash, F. Doany, D. Kuchta, P. Pepeljugoski, L. Schares, J. Schaub, C. Schow, J. Trewhella, C. Baks, Y. Kwark, **C. Schuster**, L. Shan, C. Patel, C. Tsang, J. Rosner, F. Libsch, R. Budd, P. Chiniwalla, D. Guckenberger, D. Kucharski, R. Dangel, B. Offrein, M. Tan, G. Trott, D. Lin, A. Tandon, M. Nystrom, "Terabus: A Chip-to-Chip Parallel Optical Interconnect", IEEE Lasers & Electro-Optics Society (LEOS) Annual Meeting, Sydney, Australia, October 23-27, 2005.

127. F. Doany, J. Kash, D. Kuchta, P. Pepeljugoski, L. Schares, J. Schaub, C. Schow, J. Trewhella, C. Baks, Y. Kwark, **C. Schuster**, L. Shan, C. Patel, C. Tsang, J. Rosner, F. Libsch, R. Budd, P. Chiniwalla, R. Dangel, B. Offrein, D. Guckenberger, D. Kucharski, M. Tan, G. Trott, D. Lin, A. Tandon, M. Nystrom, "Terabus: A Waveguide-Based Parallel Optical Interconnect", OSA Annual Meeting on Frontiers in Optics (FiO) Tucson, AZ, USA, October 16-20, 2005.

128. J. Diepenbrock, G. Edlund, R. Frech**, C. Schuster**, "Novel Time Domain Scaling Technique for Crosstalk Characterization", IEC DesignCon East Conference, Worcester, MA, USA, September 19-21, 2005.

129. J. Knickerbocker, C. Patel, P. Andry, C. Tsang, L. Buchwalter, E. Sprogis, H. Gan, R. Horton, R. Polastre, S. Wright, **C. Schuster**, C. Baks, F. Doany, J. Rosner, S. Cordes, "Three Dimensional Silicon Integration Using Fine Pitch Interconnection, Silicon Processing and Silicon Carrier Packaging Technology", IEEE Custom Integrated Circuits Conference (CICC), San Jose, CA, USA, September 18-21, 2005.

130. D. Kuchta, D. Kucharski. Y. Kwark, R. John, **C. Schuster**, "> 100 Gb/s VCSEL-Based Parallel Optical Interconnects", OptoElectronics and Communications Conference (OECC), Seoul, Korea, July 4-8, 2005.

131. C. Patel, C. Tsang, **C. Schuster**, F. Doany, H. Nyikal, C. Baks, R. Budd, L. Paivikki, P. Andry, D. Canaperi, D. Edelstein, R. Horton, J. Knickerbocker, T. Krywanczyk, Y. Kwark, K. Kwietniak, J. Magerlein, J. Rosner, E. Sprogis, "Silicon Carrier with Deep Through-Vias, Fine Pitch Wiring, and Through Cavity for Parallel Optical Transceiver", IEEE Electronic Components and Technology Conference (ECTC), Lake Buena Vista, FL, USA, May 30-June 3, 2005.

132. Y. Kwark, **C. Schuster**, L. Shan, C. Baks, J. Trewhella, "The Recessed Probe Launch – A New Signal Launch for High Frequency Characterization of Board Level Packaging", IEC DesignCon Conference, Santa Clara, CA, USA, January 31-February 5, 2005.

DESIGNCON PAPER AWARD

133. J. Diepenbrock, G. Edlund, R. Frech**, C. Schuster**, "Novel Time Domain Scaling Technique for Crosstalk Characterization", IEC DesignCon Conference, Santa Clara, CA, USA, January 31-February 5, 2005.

134. D. Kuchta, Y. Kwark, **C. Schuster**, C. Baks, C. Haymes, J. Schaub, P. Pepeljugoski, L. Shan, R. John, D. Kucharski, D. Rogers, M. Ritter, J. Jewell, L. Graham, K. Schrodinger, A. Schild, H. Rein, "120 Gb/s VCSEL Based Parallel Optical Link and Custom 120 Gb/s Testing Station", IEEE Electronic Components and Technology Conference (ECTC), Las Vegas, NV, USA, June 1-4, 2004.

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Invited or Non-Peer-Reviewed Papers and Presentations:

1. **C. Schuster**, “Artificial Neural Networks for EMC Engineering“, Tech Expert Talk for the Bangalore Chapter of the IEEE Electronics Packaging Society (EPS), online, June 12, 2020.
2. F. Gronwald, J. Hansen, C. Karch, **C. Schuster**, M. Tröscher, “Auf die Verträglichkeit kommt es an: Von der Kunst, elektromagnetische Felder und Wellen zu kontrollieren“, Physik-Journal, Juni 2020.
3. **C. Schuster**, “Artificial Neural Networks for EMC Engineering“, IEEE Latin American Symposium on Circuits and Systems (LASCAS), San José, Costa Rica, February 25-28, 2020.

   KEYNOTE SPEECH
4. K. Scharff, **C. Schuster**, “SI-PI-EMI: Three Problems for Every Electronic Design “, Electronic Design and Test Day 2020, Rohde & Schwarz, Munich, Germany, February 20, 2020.

   KEYNOTE SPEECH
5. **C. Schuster**, “Methods of Machine Learning in EMC“, EMC Boot Camp of the IEEE German EMC Chapter, Darmstadt, Germany, November 6, 2019.
6. **C. Schuster**, “Update on Signal and Power Integrity Research in Electromagnetic Compatibility“, C3PS Distinguished Speaker Seminar at Georgia Institute of Technology, Atlanta, GA, USA, March 26, 2019.
7. **C. Schuster**, “Signal and Power Integrity for High Speed Serial Links“, Bosch Corporate Research Colloquium on EMC, Renningen, Germany, November 27, 2018.
8. Ö. Yildiz, H.-D. Brüns, **C. Schuster**, “The Method of Moments in EMC Modeling & Simulation“, Joint IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) and IEEE International Symposium on Electromagnetic Compatibility (EMCS), contribution to the tutorial “Introduction to EMI Modeling Techniques”, Singapore, May 14-17, 2018.
9. C. Yang, H.-D. Brüns, **C. Schuster**, “Using the Method of Moments for Computation of Nonlinear Shielding“, Joint IEEE Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC) and IEEE International Symposium on Electromagnetic Compatibility (EMCS), contribution to the workshop “Computational Electromagnetics (CEM) for EMC Applications”, Singapore, May 14-17, 2018.
10. Ö. Yildiz, H.-D. Brüns, **C. Schuster**, “Integral Equation Methods (MoM) in Numerical Modeling “,IEEE Symposium on Electromagnetic Compatibility, Signal and Power Integrity (EMC+SIPI), Workshop on EMC DESIGN - Modeling Fundamentals, Washington, DC, USA, August 7-11, 2017.
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13. **C. Schuster**, “Ensuring Signal and Power Integrity for High-Speed Digital Systems“, IEEE International Conference on Consumer Electronics (ICCE), Berlin, Germany, September 6-9, 2016.
14. **C. Schuster**, “Signal Integrity Engineering for High-Speed Links“, Global University Lecture at the IEEE Symposium on Electromagnetic Compatibility, Dresden, August 16-22, 2015.
15. **C. Schuster**, “Using the Contour Integral Method for Solving Large EMC Problems on Printed Circuit Boards“, Workshop on Computational Electromagnetics and Multiphysics Methods for Characterizing Complex EMC/EMI Effects (WS8) at the IEEE Symposium on Electromagnetic Compatibility, Dresden, August 16-22, 2015.
16. A. Vogt, H.-D. Brüns, Q. Wu, F. Gronwald, **C. Schuster**, “Electromagnetic Interference in Digital Systems“, IEEE Electrical Design of Advanced Package & Systems Symposium (EDAPS), Bangalore, India, December 14-16, 2014.
17. **C. Schuster**, R. Rimolo-Donadio, “Modeling of Power Supply Noise Effects on High Speed Interconnects” Workshop on Power and Signal Integrity Co-Design for High-Speed Circuits (WS7), IEEE Asia-Pacific EMC Symposium (APEMC), Melbourne, Australia, May 20-23, 2013.
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19. **C. Schuster**, X. Duan, ”How to Analyze the EMC of a Complete Server System?”, Workshop on Hybrid Computational Electromagnetic Methods for EMC/EMI (WS10), International Symposium on Electromagnetic Compatibility Europe (EMC Europe), Rome, Italy, September 17-21, 2012.
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