

# **2021 IEEE 25th Workshop on Signal and Power Integrity (SPI 2021)**

**Virtual Conference  
10 – 12 May 2021**



**IEEE Catalog Number: CFP21SPI-POD  
ISBN: 978-1-6654-2389-2**

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP21SPI-POD
ISBN (Print-On-Demand):	978-1-6654-2389-2
ISBN (Online):	978-1-6654-2388-5

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

BAYESIAN OPTIMIZATION OF HYPERPARAMETERS IN KERNEL-BASED DELAY RATIONAL MODELS .....	1
<i>Felipe Treviso, Riccardo Trincherio, Flavio G. Canavero</i>	
FAST AND STABLE TRANSIENT SIMULATION OF NONLINEAR CIRCUITS USING THE NUMERICAL INVERSION OF THE LAPLACE TRANSFORM.....	5
<i>Bardia Bandali, Emad Gad, Michel Nakhla</i>	
AN AUTOMATED FRAMEWORK FOR VARIABILITY ANALYSIS USING SIMULATED ANNEALING .....	9
<i>Aksh Chordia, Surendra Hemaram, Jai Narayan Tripathi</i>	
A COMPACT AND BROADBAND ON-CHIP DELAY LINE DESIGN BASED ON THE BRIDGED T-COIL .....	13
<i>Siddarth Rai Mahendra, Andreas Weisshaar</i>	
PCB ANALYSIS METHOD BY S-PARAMETERS FOR POWER INVERTERS WITH GAN DEVICES IN PARALLEL.....	17
<i>Roger Franchino, Radoslava Mitova</i>	
NON-DESTRUCTIVE PCB SUBSTRATE HEIGHT EXTRACTION WITH MULTI-MEASUREMENT TECHNIQUE.....	21
<i>Tim Wang Lee, Francesco De Paulis, Mike Resso, Melinda Piket-May, Eric Bogatin</i>	
IMPACT OF CHUCK BOUNDARY CONDITIONS ON WIDEBAND ON-WAFER MEASUREMENTS .....	25
<i>Gia Ngoc Phung, Uwe Arz</i>	
ELECTROTHERMAL MODELING AND CHARACTERIZATION OF GRAPHENE-BASED THIN STRIPS .....	29
<i>A. Maffucci, L. Ferrigno, S. Sibilia, F. Bertocchi, S. Chiodini, F. Cristiano, G. Giovinco</i>	
INVESTIGATION OF AN INTEGRATED DIRECTIONAL COUPLER MANUFACTURED BY A FIELD-ASSISTED DIFFUSION PROCESS .....	33
<i>Daniel Uebach, Thomas Kühler, Elmar Griese</i>	
DE-MYSTIFYING THE IMPACT OF INTRA-PAIR SKEW ON HIGH-SPEED SERDES INTERCONNECT .....	37
<i>Hansel Dsilva, Scott McMorrow, Adam Gregory, Steve Krooswyk, Richard Mellitz, Beomtaek Lee</i>	
THE SENSITIVITY OF ENRZ TO SKEW - IN COMPARISON TO NRZ, PAM3, AND PAM4 .....	41
<i>Sherman S. Chen, Zhefei Xu</i>	
HIGH DENSITY RRAM ARRAYS WITH IMPROVED THERMAL AND SIGNAL INTEGRITY .....	45
<i>K. Lahbacha, H. Belgacem, W. Dghais, F. Zayer, Antonio Maffucci</i>	
ERROR PROPAGATION IN CHANNEL OPERATING MARGIN .....	49
<i>Longfei Bai</i>	
INTRA-PAIR SKEW METRIC, EIPS (EFFECTIVE INTRA-PAIR SKEW).....	53
<i>Se-Jung Moon, Jianting Li, Xinjun Zhang, Chien-Ping Kao, Beomtaek Lee, Hansel Dsilva, Jong-Ru Guo</i>	

ANALYSIS OF DIFFERENTIAL CROSSTALK AND TRANSMISSION FOR VIA ARRAYS IN LOW TEMPERATURE COFIRED CERAMICS.....	57
<i>Ömer F. Yildiz, Nico Pathé, Marc Bochar, Cheng Yang, Christian Schuster</i>	
GENERALIZED CCICN (COMPONENT CONTRIBUTION INTEGRATED CROSSTALK NOISE) FOR PAM-N .....	61
<i>Se-Jung Moon, Zuoguo Wu, Mohiuddin Mazumder</i>	
A MULTIVARIATE ADAPTIVE SAMPLING SCHEME FOR PASSIVITY CHARACTERIZATION OF PARAMETERIZED MACROMODELS.....	65
<i>Marco De Stefano, Stefano Grivet-Talocia</i>	
A TUNABLE MACRO-MODELING METHOD FOR SIGNAL TRANSITION IN MM-WAVE FLIP-CHIP TECHNOLOGY .....	68
<i>Pouya Namaki, Nasser Masoumi, Mohammad-Reza Nezhad-Ahmadi, Safieddin Safavi-Naeini</i>	
COMPARATIVE STUDY OF MACHINE LEARNING METHODS FOR VARIABILITY ANALYSIS IN HIGH-SPEED LINK .....	72
<i>Thong Nguyen, Bobi Shi, Jose Schutt-Aine</i>	
MACHINE LEARNING-BASED VERILOG-A MODELING FOR POWER DISTRIBUTION NETWORK OF ON-DIE REGULATOR .....	75
<i>Michael Chang, Simon Kao, Stephen Chu, Bryant Hsu, Mark Ciou, Kevin Chung, Robby Ho</i>	
ANN HYPERPARAMETER OPTIMIZATION BY GENETIC ALGORITHMS FOR VIA INTERCONNECT CLASSIFICATION .....	79
<i>Allan Sánchez-Masís, Allan Carmona-Cruz, Morten Schierholz, Xiaomin Duan, Kallol Roy, Cheng Yang, Renato Rimolo-Donadio, Christian Schuster</i>	
A MULTI-FIDELITY POLYNOMIAL CHAOS APPROACH FOR UNCERTAINTY QUANTIFICATION OF MWCNT INTERCONNECT NETWORKS IN THE PRESENCE OF IMPERFECT CONTACTS .....	83
<i>Surila Guglani, Km Dimple, Brajesh K. Kaushik, Sourajeet Roy, Rohit Sharma</i>	
A NONPARAMETRIC SURROGATE MODEL FOR STOCHASTIC CROSSTALK ANALYSIS INCLUDING CONFIDENCE BOUNDS .....	87
<i>Paolo Manfredi, Riccardo Trincherò</i>	
STOCHASTIC ANALYSIS METHOD FOR TREE-TYPE PDNS ON MIXED-SIGNAL PCB.....	91
<i>Milad Mehri</i>	
UNCERTAINTY QUANTIFICATION OF MEMRISTOR CROSSBAR ARRAY FOR VECTOR MATRIX MULTIPLICATION.....	95
<i>Rohan Kumar, Aksh Chordia, Ar Aswani, Alex James, Jai Narayan Tripathi</i>	

**Author Index**