

# **2022 IEEE Workshop on Signal Processing Systems (SiPS 2022)**

**Rennes, France  
2-4 November 2022**



**IEEE Catalog Number: CFP22SIG-POD  
ISBN: 978-1-6654-8525-8**

**Copyright © 2022 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:	CFP22SIG-POD
ISBN (Print-On-Demand):	978-1-6654-8525-8
ISBN (Online):	978-1-6654-8524-1
ISSN:	1520-6130

**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

BERTPerf: Inference Latency Predictor for BERT on ARM big.LITTLE Multi-Core Processors .....	1
<i>Mohamed Abdelgawad, Seyyed Hasan Mozafari, James Clark, Brett Meyer and Warren Gross</i>	
Bayesian Optimization for Simultaneous Deconvolution of Room Impulse Responses .....	7
<i>Sunil Bharitkar</i>	
Beam Alignment for the Cell-Free mmWave Massive MU-MIMO Uplink .....	13
<i>Jannik Brun, Victoria Palhares, Gian Marti and Christoph Studer</i>	
Understanding and Optimizing INT4 Convolution for Accelerated DNN Inference on Tensor Cores .....	19
<i>Junkeyeong Choi, Hyucksung Kwon, Woongkyu Lee, Jieun Lim and Jungwook Choi</i>	
Co-optimizing Dataflow Graphs and Actors with MLIR .....	25
<i>Pedro Ciambra, Mickaël Dardaillon, Maxime Pelcat and Hervé Yviquel</i>	
Ultra-Fast Machine Learning Inference through C Code Generation for Tangled Program Graphs .....	31
<i>Karol Desnos, Thomas Bourgoïn, Nicolas Sourbier, Mickaël Dardaillon, Olivier Gesny and Maxime Pelcat</i>	
COSMIC: a real-time platform for signal processing pipelines .....	37
<i>Florian Ferreira, Julien Bernard, Arnaud Sevin, Nicolas Doucet and Damien Gratadour</i>	
Common Spatial Patterns with Deep Learning for Fetal Heart Rate Monitoring .....	43
<i>Hamidreza Ghonchi, Saideh Ferdowsi and Vahid Abolghasemi</i>	
Virtual Triggering: a Technique to Segment Cryptographic Processes in Side Channel Traces .....	49
<i>Jeremy Guillaume, Maxime Pelcat, Amor Nafkha and Ruben Salvador</i>	
Statistical and morphological component separation of foregrounds in convolved HI skymaps .....	55
<i>Yanis Guimard, Ming Jiang, Zhenghao Zhu, Huanyuan Shan, Jalal Fadili and Jean-Luc Starck</i>	
Multi-Factor Pruning for Recursive Projection-Aggregation Decoding of RM Codes .....	61
<i>Marzieh Hashemipour-Nazari, Kees Goossens and Alexios Balatsoukas-Stimming</i>	
Robust Singular Values based on L1-norm PCA .....	67
<i>Duc Le and Panos Markopoulos</i>	
An Adjustable Farthest Point Sampling Method for Approximately-sorted Point Cloud Data .....	73
<i>Jingtao Li, Jian Zhou, Yan Xiong, Xing Chen and Chaitali Chakrabarti</i>	
Configuration through Optimization for In-Memory Computing Hardware and Simulators	79
<i>Ke-Han Li, Chih-Fan Hsu, Yu-Sheng Lin, Shao-Yi Chien and Wei-Chao Chen</i>	
A Modified BP Bit-Flipping Algorithm for Polar Codes .....	85
<i>Lijuan Li, Hangxuan Cui, Yangcan Zhou and Zhongfeng Wang</i>	

A Computational-Efficient Deformable Convolution Network Accelerator via Hardware and Algorithm Co-Optimization.....	91
<i>Shan Li, Shan Cao, Lanqing Hui, Zhiyuan Jiang, Yanzan Sun and Shugong Xu</i>	
Accelerator Design for Deformable Convolution Networks.....	97
<i>Yuan Meng, Hongjiang Men and Viktor Prasanna</i>	
A Robust EM Algorithm for Radio-interferometric Imaging in The Presence of Outliers...	103
<i>Yassine Mhiri, Mohammed-Nabil El Korso, Arnaud Breloy and Pascal Larzabal</i>	
Multi-core multi-node parallelization of the radio interferometric imaging pipeline DDFacet.....	108
<i>Nicolas Monnier, David Guibert, Cyril Tasse, Nicolas Gac, François Orioux, Erwan Raffin, Oleg Smirnov and Benjamin Hugo</i>	
Reconfigurable FIR Lowpass Equalizers .....	114
<i>Oksana Moryakova, Yinan Wang and Håkan Johansson</i>	
A Fast HDR Image TMO based on a Simplified Eye Sensitivity Model.....	120
<i>Naureen Mujtaba, Ishtiaq Rasool Khan, Nadeem Ahmad Khan and Muhammad Awais Bin Altaf</i>	
Efficient Model Evidence Computation in Tree-structured Factor Graphs.....	126
<i>Hoang M. H. Nguyen, Bart van Erp, Ismail Senoz and Bert de Vries</i>	
BILLNET: A Binarized Conv3D-LSTM Network with Logic-gated residual architecture for hardware-efficient video inference .....	132
<i>Van Thien Nguyen, William Guicquero and Gilles Sicard</i>	
Regularizing Activation Distribution for Ultra Low-bit Quantization-Aware Training of MobileNets .....	138
<i>Seongmin Park, Wonyong Sung and Jungwook Choi</i>	
Methodology to adapt Neural Network on Constrained Device at Topology level.....	144
<i>Logan Saint-Germain, Christophe Jego, Bertrand Le Gal, Jeremie Crenne, Fabien Baldacci and Sébastien Loty</i>	
Variational Bayes for Robust Radar Single Object Tracking .....	150
<i>Alp Sari, Tak Kaneko, Lense Swaenen and Wouter M. Kouw</i>	
A Fast CU Partition Algorithm for VVenC Encoder in Intra Configuration .....	156
<i>Ibrahim Taabane, Daniel Menard, Anas Mansouri and Ali Ahaitouf</i>	
Learnable Mixed-precision and Dimension Reduction Co-design for Low-storage Activation .....	162
<i>Yu Shan Tai, Cheng Yang Chang, Chieh Fang Teng and An Yeu Wu</i>	
Efficient Reconfigurable Vandermonde Matrix Inverter for Erasure-Correcting Generalized Integrated Interleaved Decoding .....	168
<i>Yok Jye Tang and Xinmiao Zhang</i>	
Leveraging Structured Pruning of Convolutional Neural Networks .....	174
<i>Hugo Tessier, Vincent Gripon, Mathieu Léonardon, Matthieu Arzel, Thomas Hannagan and David Bertrand</i>	

DE-DPCTnet: Deep Encoder Dual-path Convolutional Transformer Network for Multi-channel Speech Separation .....	180
<i>Zhenyu Wang, Yi Zhou, Hongqing Liu, Lu Gan, Xinyu Tang and Rilin Chen</i>	
Physical-Layer Security for THz Communications via Orbital Angular Momentum Waves .	185
<i>Jongchan Woo, Muhammad Khan, Mohamed Ibrahim, Ruonan Han, Anantha Chandrasekaran and Rabia Yazicigil</i>	