

# **2025 13th International Symposium on Topics in Coding (ISTC 2025)**

**Los Angeles, California, USA  
18-22 August 2025**



**IEEE Catalog Number: CFP25W24-POD  
ISBN: 979-8-3315-8984-4**

**Copyright © 2025 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:	CFP25W24-POD
ISBN (Print-On-Demand):	979-8-3315-8984-4
ISBN (Online):	979-8-3315-8983-7

**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

Ensemble Average Analysis of Non-Adaptive Group Testing with Sparse Pooling Graphs .....	1
<i>Emna Ben Yacoub, Gianluigi Liva, Enrico Paolini, Marco Chiani</i>	
Geometric and Probabilistic Shaping to Enable LDPC Encoding with Linear Complexity.....	6
<i>Semira Galijasevic, Gianluigi Liva, Dariush Divsalar, Richard Wesel</i>	
Syndrome Sphere Decoding of Linearly Expurgated Tail-Biting Convolutional Codes .....	11
<i>Wenhui Sui, Zihan Qu, Richard Wesel</i>	
Bounded-Metric List Decoding of Linearly Expurgated Tail-Biting Convolutional Codes .....	16
<i>Zihan Qu, Wenhui Sui, Gianluigi Liva, Dariush Divsalar, Richard Wesel</i>	
Fano Decoding of BCH and CRC Codes on BPSK and Noncoherent QFSK Channels .....	21
<i>Jacob King, William E. Ryan</i>	
SASH: Decoding Community Structure in Graphs .....	26
<i>Allison Beemer, Jessalyn Bolkema</i>	
Fractional Doping of Protograph-Based Spatially Coupled LDPC Codes .....	31
<i>Daniel J. Costello, Min Zhu, David G. M. Mitchell, Michael Lentmaier</i>	
Quantum LDPC Codes with Enhanced Error-Floor Performance Under Min-Sum Decoding .....	36
<i>Michele Pacenti, Dimitris Chytas, Bane Vasic</i>	
Deep Unfolded Optical Decoder for LDPC Codes with System Noise Mitigation.....	41
<i>Lantian Wei, Tadashi Wadayama, Kazunori Hayashi</i>	
Subcode Ensemble Decoding of Polar Codes.....	46
<i>Henning Lulei, Jonathan Mandelbaum, Marvin Rübenacke, Holger Jäkel, Stephan Ten Brink, Laurent Schmalen</i>	
Enhancing oFEC Using MAP Decoding of BCH Component Codes .....	51
<i>Søren Forchhammer, Jakob Dahl Andersen, Knud J. Larsen</i>	
Serially Concatenated Codes for Data Center Networks.....	56
<i>Balázs Matuz, Emna Ben Yacoub, Stefano Calabrò</i>	
Rptu.de/Channel-Codes: An Update on the Maximum Likelihood Decoding Performance of 5G-NR Channel Codes .....	61
<i>Oliver Griebel, Kira Kraft, Lucas Johannsen, Claus Kestel, Gabriel Machado Dick, Norbert Wehn</i>	
Probabilistic Shaping in MIMO: Going Beyond 1.53dB AWGN Gain with the Non-Linear Demapper .....	66
<i>Kirill Ivanov, Wei Yang, Jing Jiang</i>	
AI/ML Based Encoder and Decoder Design for PUCCH HARQ-ACK Payload.....	71
<i>Akash Doshi, Pinar Sen, Kirill Ivanov, Wei Yang, June Namgoong, Taesang Yoo, Jing Jiang, Tingfang Ji</i>	
A Decoding Algorithm for Terminated Convolutional Codes Over the Blockwise Noncoherent Channel.....	76
<i>Matteo Ferro, Riccardo Schiavone, Gianluigi Liva, Maurizio Magarini</i>	

Quantum CSS LDPC Codes with Quasi-Dyadic Structure .....	81
<i>Alessio Baldelli, Massimo Battaglioni, Paolo Santini</i>	
Learning Variable Node Selection for Improved Multi-Round Belief Propagation Decoding .....	86
<i>Ahmad Ismail, Raphaël Le Bidan, Elsa Dupraz, Charbel Abdel Nour</i>	
Binary Images of Generalized Reed-Solomon Codes Are Capacity Achieving .....	91
<i>Xiangping Zheng, Xiao Ma</i>	
Adaptive T-Detector Exploiting Outer SISO Decoder in Time-Selective Channels.....	96
<i>Martina Magnaldi, Guido Montorsi</i>	
Automorphism Ensemble Decoding of Polar Codes with Reduced Number of Routes.....	101
<i>Jiajie Li, Huayi Zhou, Ryan Seah, Warren J. Gross</i>	
A Novel Parallel Concatenated Convolutional Code Structure Based on Frame Decomposition .....	106
<i>Mohammad Bazzal, Jeremy Nadal, Stefan Weithoffer, Charbel Abdel Nour, Catherine Douillard</i>	
On the Redundancy of Function-Correcting Codes Over Finite Fields.....	111
<i>Hoang Ly, Emina Soljanin</i>	
Error Detection Based on Generalized Successive Cancellation List Decoding for Polar Codes .....	116
<i>Alexander Sauter, Mustafa Cemil Coskun, Gianluigi Liva</i>	
Simplified Syndrome-Based Decoding of Punctured Convolutional Codes .....	121
<i>Jeremy Nadal, Joseph Jabour, Stefan Weithoffer, Charbel Abdel Nour, Catherine Douillard</i>	
Efficient Ordered Statistics Decoder with Unfolded Gaussian Elimination.....	126
<i>Leyu Zhang, Yuqing Ren, Chuan Zhang, Andreas Burg, Yifei Shen</i>	
Quantum Error Correction with Girth-16 Non-Binary LDPC Codes Via Affine Permutation Construction .....	131
<i>Kenta Kasai</i>	
High Girth Spatially-Coupled LDPC Codes with Hierarchical Structure .....	136
<i>Haizheng Li, Sisi Miao, Laurent Schmalen</i>	
Polar Codes Achieve Classical Capacity for Erasure and Unital Markovian Quantum Channels.....	141
<i>Jaswanthi Mandalapu, Vikesh Siddhu, Krishna Jagannathan</i>	
Two Families of Entanglement-Assisted Quantum Codes from Algebraic Plane Curves .....	146
<i>Lin Sok, San Ling</i>	
Marker Guess & Check Plus (MGC+): An Efficient Short Blocklength Code for Random Edit Errors.....	151
<i>Ramy Khabbaz, Marc Antonini, Serge Kas Hanna</i>	
Neural Network Decoding of Polar Codes with Large Kernels.....	156
<i>Valerio Bioglio, Gastón De Boni Rovella, Meryem Benammar</i>	
Optimizing Schedulers for Layered BP Decoding: From Code-Specific to Universal Decoding .....	161
<i>Ahmed Elkelesh, Jonathan Ling</i>	
Computing the Low-Weight Codewords of Punctured and Shortened Pre-Transformed Polar Codes.....	166
<i>Malek Ellouze, Romain Tajan, Camille Leroux, Christophe Jégo, Charly Poulliat</i>	

Graph Constructions of Error-Detecting Codes for Nanopore Sequencers .....	171
<i>Maciej Piwowarczyk, Christine A. Kelley</i>	
Soft-Output from Covered Space Decoding of Product Codes .....	176
<i>Tim Janz, Simon Obermüller, Andreas Zunker, Stephan Ten Brink</i>	
Mixed-Integer ADMM Decoding for LDPC Codes .....	181
<i>Anthony Ho, Stark C. Draper</i>	
Advancing Finite-Length Quantum Error Correction Using Generalized Bicycle Codes.....	186
<i>Olai Å. Mostad, Hsuan-Yin Lin, Eirik Rosnes, De-Shih Lee, Ching-Yi Lai</i>	
Coded Secure Delivery for Anonymous Information Retrieval .....	191
<i>Omer Lauer, Yuval Cassuto</i>	
A Class of Quasi-Cyclic Binary Parity-Check Codes from Reed-Solomon Codes .....	196
<i>Kathryn Haymaker, Emily McMillon</i>	
Efficient Probabilistic Parity Shaping for Irregular Repeat-Accumulate LDPC Codes .....	201
<i>Diego Lentner, Thomas Wiegart, Richard D. Wesel</i>	
Action-List Reinforcement Learning Decoders.....	206
<i>Milad Taghipour, Bane Vasic</i>	
Channel Coding for Binary Neural Networks Implemented with Noisy Memristor Crossbars .....	211
<i>Elsa Dupraz, François Leduc-Primeau</i>	
Improved Construction of Generalized Quantum Tanner Codes.....	216
<i>Olai Å. Mostad, Eirik Rosnes, Hsuan-Yin Lin</i>	
Rank Modulated Composite Encoding for Data Storage in DNA .....	221
<i>Tomer Cohen, Zhiying Wang, Eitan Yaakobi, Zohar Yakhini</i>	
Effect of Redundancy on Syndrome-Based Decoding for QLDPC Codes .....	226
<i>Kirsten D. Morris, Tejfol Pllaha, Christine A. Kelley</i>	
Decimation Strategies for Belief Propagation Decoding of Quantum LDPC Codes.....	231
<i>Masoumeh Alinia, David G. M. Mitchell, Hanwen Yao, Henry D. Pfister</i>	
Cryptanalysis of a McEliece Cryptosystem Based on Cascaded Goppa-Ldpc Code Encryption.....	236
<i>Benjamin Arnesen, David G. M. Mitchell, Willie K. Harrison</i>	

## **Author Index**