

2024 IEEE Information Theory Workshop (ITW 2024)

**Shenzhen, China
24-28 November 2024**



**IEEE Catalog Number: CFP24ITW-POD
ISBN: 979-8-3503-4894-1**

**Copyright © 2024 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:	CFP24ITW-POD
ISBN (Print-On-Demand):	979-8-3503-4894-1
ISBN (Online):	979-8-3503-4893-4
ISSN:	2475-420X

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Contents

Monday, November 25 9:40 - 11:00 (Asia/Shanghai)

MA1: Coding Theory 1

Meeting Room 1

Chair: Linqi Song (City University of Hong Kong, Hong Kong)

9:40 A Low-Latency Decoding of CA-Polar-SPC Product Codes

Zhao Xinwei and Xiao Ma (Sun Yat-sen University, China).....1

10:00 Pliable Index Coding with Restricted Decoding Sets

Junping Wu (University of Newcastle, Australia); Lawrence Ong (The University of Newcastle, Australia); Sarah J Johnson and Jin Yeong Tan (University of Newcastle, Australia)7

10:20 On the Hermitian Hulls of Two-Point Algebraic Geometry Codes

Lin Sok and Martianus Frederic Ezerman (Nanyang Technological University, Singapore); San Ling (NTU, Singapore)..... 13

10:40 New Cauchy MDS Array Codes With Flexible Sub-packetization and Efficient Decoding

Peikai Li (Shenzhen University, China); Jingjie Lv (Dongguan University of Technology, China); Linqi Song (City University of Hong Kong, Hong Kong); Li Zhang (Shenzhen University, China); Hanxu Hou (Dongguan University of Technology, China) 19

MA2: Security, Privacy, Fairness 1

Room: Junior Ballroom

Chair: Mahtab Mirmohseni (University of Surrey, United Kingdom (Great Britain))

9:40 On Information Theoretic Fairness: Compressed Representations With Perfect Demographic Parity

Amirreza Zamani, Borja Rodríguez-Gálvez and Mikael Skoglund (KTH Royal Institute of Technology, Sweden)..... 25

10:00 On Local Mutual-Information Privacy

Khac-Hoang Ngo (Linköping University, Sweden); Johan Östman (AI Sweden, Sweden); Alexandre Graell i Amat (Chalmers University of Technology, Sweden) 31

10:20 Secure Semantic Communication over Wiretap Channel

Denis Kozlov, Mahtab Mirmohseni and Rahim Tafazolli (University of Surrey, United Kingdom (Great Britain)) 37

10:40 Physical-Layer Security for MIMO Visible Light Communication Wiretap Channel

Sufang Yang (Tsinghua University, China); Longguang Li (East China Normal University, Shanghai, China); Jintao Wang (Tsinghua University, China) 43

MA3: Hypothesis Testing 1

Meeting Room 2

Chair: Lin Zhou (Beihang University, China)

9:40 Large Deviations for Outlier Hypothesis Testing of Continuous Sequences

Lina Zhu (Hangdian University, China); Lin Zhou (Beihang University, China) 49

10:00 One-Shot Achievability Region for Hypothesis Testing with Communication

Constraint

Yuanxin Guo (University of Toronto, Canada); Sadaf Salehkalaibar (University of Manitoba, Canada); Stark Draper and Wei Yu (University of Toronto, Canada)..... 55

10:20 Large Deviations for Outlier Hypothesis Testing with Distribution Uncertainty

Xiaotian Zhang, Jun Diao and Lin Zhou (Beihang University, China)..... 61

10:40 Covering Codes as Near-Optimal Quantizers for Distributed Hypothesis Testing against Independence

Fatemeh Khaledian and Reza Asvadi (Shahid Beheshti University, Iran); Elsa Dupraz (IMT Atlantique, France); Tad Matsumoto (Japan Advanced Institute of Science and Technology, France & IMT-Atlantic, Brest, France)..... 67

Monday, November 25 11:20 - 12:40 (Asia/Shanghai)

MB1: Coded Caching 1

Meeting Room 2

Chair: Qinyi Lu (Southeast University, China)

11:20 Demand Private Coded Caching: the Two-File Case

Qinyi Lu, Nan Liu and Wei Kang (Southeast University, China)..... 73

11:40 Optimal Memory-Rate Tradeoff for Secure Multi-Access Coded Caching: the Case of Largest Access Number

Han Fang, Qinyi Lu, Nan Liu and Wei Kang (Southeast University, China)..... 79

12:00 On the Regret of Coded Caching with Adversarial Requests

Anupam Nayak (IIT Bombay, India); Srinivas Reddy Kota (Indian Institute of Technology Madras, India); Nikhil Karamchandani (Indian Institute of Technology Bombay, India)..... 85

12:20 Coded Caching for Hierarchical Two-Layer Multi-Access Networks with Low Coding Delay

Rajlaxmi Pandey (Indian Institute of Science, Bangalore, India); B. Sundar Rajan (Indian Institute of Science, India)..... 91

MB2: Compression 1

Room: Junior Ballroom

Chair: Xinyang Li (Technical University of Munich, Germany)

11:20 Revisiting Distributed Source Coding for Efficient Downlink Transmission in Coded Edge Computing

Rong Hu (Wuhan University & Wuhan, China); Xiaofan He (Wuhan University, China) 97

11:40 Multi-terminal Strong Coordination with Degraded Source Observations

Viswanathan Ramachandran, Tobias J. Oechtering and Mikael Skoglund (KTH Royal Institute of Technology, Sweden).....103

12:00 An Achievable Rate-Distortion Region for Joint State and Message Communication over Multiple Access Channels

Xinyang Li (Technical University of Munich, Germany); Vlad Costin Andrei (Technische Universität München, Germany); Ullrich J Mönich (Technische Universität München, Germany); Holger Boche (Technical University Munich, Germany)109

12:20 Optimal Sampling for Uncertainty-of-Information Minimization in a Remote Monitoring System

Xiaomeng Chen and Aimin Li (Harbin Institute of Technology (Shenzhen), China); Shaohua Wu (Harbin Institute of Technology, China).....	115
--	-----

MB3: Age of Information

Meeting Room 1

Chair: Aimin Li (Harbin Institute of Technology (Shenzhen), China)

11:20 Sampling to Achieve the Goal: An Age-aware Remote Markov Decision Process

Aimin Li (Harbin Institute of Technology (Shenzhen), China); Shaohua Wu (Harbin Institute of Technology, China); Gary C. F. Lee (Institute for Infocomm Research & Agency for Science, Technology and Research, Singapore); Xiaomeng Chen (Harbin Institute of Technology (Shenzhen), China); Sumei Sun (Institute for Infocomm Research, Singapore).....

121

11:40 Information Freshness in Random Access Networks with Energy Harvesting

Shuyu Xiao, Xinghua Sun, Wen Zhan and Xijun Wang (Sun Yat-sen University, China)

127

12:00 Timely Offloading in Mobile Edge Cloud Systems

Nitya Sathyavageeswaran, Roy Yates and Anand D. Sarwate (Rutgers University, USA); Narayan Mandayam (WINLAB, Rutgers University, USA)

133

12:20 Age of Information in Multi-Source Broadcast Channel

Subhankar Banerjee and Sennur Ulukus (University of Maryland, USA)

139

Monday, November 25 14:10 - 15:30 (Asia/Shanghai)

MC1: Network Information Theory 1

Meeting Room 1

Chair: Yanlin Geng (State Key Lab. of ISN, Xidian University, China)

14:10 Capacity Bounds of Broadcast Channel With a Full-Duplex Base-User Pair

Yanlin Geng (State Key Lab. of ISN, Xidian University, China); Xueyan Niu (Theory Lab, Huawei Technologies, Hong Kong); Bo Bai (Huawei Technologies Co., Ltd., Hong Kong); Wei Han (Huawei Technologies Co Ltd, Hong Kong)

145

14:30 Zero-Error Capacity of Broadcast Channels with Two Binary Outputs

Qi Cao, Wu and Guanchong Niu (Xidian University, China); Yanlin Geng (State Key Lab. of ISN, Xidian University, China); Baoming Bai (Xidian University, China)

151

14:50 Variable-Length Feedback Codes over Known and Unknown Channels with Non-vanishing Error Probabilities

Recep Can Yavas (National University of Singapore & CNRS at CREATE, USA); Vincent Y. F. Tan (National University of Singapore, Singapore).....

157

15:10 Wireless MapReduce Arrays for Coded Distributed Computing

Elizabeth Peter, K. K. Krishnan Namboodiri and B. Sundar Rajan (Indian Institute of Science, India).....

163

MC2: Security, Privacy, Fairness 2

Meeting Room 2

Chair: Yanxiao Liu (The Chinese University of Hong Kong, Hong Kong)

14:10 One-Shot Information Hiding

Yanxiao Liu and Cheuk Ting Li (The Chinese University of Hong Kong, Hong Kong)

169

14:30 Secure Summation with User Selection and Collusion

Yizhou Zhao (Southwest University, China); Hua Sun (University of North Texas, USA).....	175
14:50 Common information in well-mixing graphs and applications to information-theoretic cryptography	
Andrei Romashchenko (LIRMM, CNRS & University Montpellier 2 & The Institute for Information Transmission Problems of RAS, France); Geoffroy Caillat-Grenier (LIRMM, Univ Montpellier and CNRS, France); Rustam Zyavgarov (Moscow State Univ, Russia).....	181
15:10 Reducing Ciphertext and Key Sizes for MLWE-Based Cryptosystems	
Georg Maringer (Technische Universität München, Germany); Antonia Wachter-Zeh (Technical University of Munich (TUM), Germany).....	187

Monday, November 25 15:50 - 17:30 (Asia/Shanghai)

MD1: Coding Theory 2

Meeting Room 1

Chair: Lev Tazs (University of California, Los Angeles, USA)

15:50 Theoretical Bounds for the Size of Elementary Trapping Sets by Graph Theory Methods

Haoran Xiong and Zicheng Ye (University of Chinese Academy of Sciences & Academy of Mathematics and Systems Science, CAS, China); Huazi Zhang (Huawei Technologies, Co. Ltd., China); Jun Wang (Huawei Technologies Co. Ltd, China); Ke Liu (Huawei Technologies, Co., Ltd., China); Dawei Yin and Guanghui Wang (Shandong University, China); Guiying Yan and Zhiming Ma (Chinese Academy of Sciences, China) 193

16:10 Block-MDS QC-LDPC Codes with Application to High-Dimensional Quantum Key Distribution with Energy-Time Entanglement

Lev Tazs and Debarbab Mitra (University of California, Los Angeles, USA); Murat Can Sarihan (University of California Los Angeles, USA); Jayanth Shreekumar (University of California, Los Angeles, USA); Lara Dolecek (UCLA, USA); Chee Wei Wong (University of California Los Angeles, USA) 199

16:30 Entanglement-assisted Quasi-cyclic LDPC codes

Pavan Kumar (Indian Institute of Science, Bengaluru, India); Abhi Kumar Sharma and Shayan Garani (Indian Institute of Science, Bangalore, India) 205

16:50 Explicit Constructions of Girth-Eight QC-LDPC Codes: A Unified Framework Motivated by TDGS

Guohua Zhang (Xi'an University of Posts and Telecommunications, China); Yulin Hu (Electronic Information School, Wuhan University, Wuhan, China); Defeng Ren (Xi'an University of Posts and Telecommunications, China); Yi Fang (Guangdong University of Technology, China) 211

17:10 Practical Coding Schemes based on LDPC Codes for Distributed Parametric Regression

Jiahui Wei (INSA Rennes & IMT-Atlantique, France); Elsa Dupraz (IMT Atlantique, France); Philippe Mary (Univ Rennes, INSA, CNRS, IETR, France) 217

MD2: Federated Learning

Meeting Room 2

Chair: Chee Wei Tan (Nanyang Technological University, Singapore)

15:50 Byzantine-Resilient Secure Aggregation for Federated Learning Without Privacy Compromises

Yue Xia, Christoph Hofmeister, Maximilian Egger and Rawad Bitar (Technical University of Munich, Germany).....223

16:10 A Communication-Efficient Semi-Decentralized Approach for Federated Learning with Stragglers

Chengxi Li (KTH Royal Institute of Technology, Sweden); Ming Xiao (Royal Institute of Technology, Sweden); Mikael Skoglund (KTH Royal Institute of Technology, Sweden)229

16:30 FedUHB: Accelerating Federated Unlearning via Polyak Heavy Ball Method

Yu Jiang, Chee Wei Tan and Kwok-Yan Lam (Nanyang Technological University, Singapore)235

16:50 Federated Learning Meets Network Coding: Efficient Coded Hierarchical Federated Learning

Tianli Gao, Jiahong Lin and Congdun Li (Sun Yat-sen University, China); Chee Wei Tan (Nanyang Technological University, Singapore); Jun Gao (China Unicom Online Information Technology Co.Ltd, China)241

17:10 Addressing Fluctuating Stragglers in Distributed Matrix Multiplication via Fountain Codes

Siyan Wang, Jianping Wang and Linqi Song (City University of Hong Kong, Hong Kong)247

Tuesday, November 26 9:40 - 11:00 (Asia/Shanghai)

TA1: Coding Theory 3

Meeting Room 1

Chair: Bo Bai (Huawei Technologies Co., Ltd., Hong Kong)

9:40 On the I/O Cost of Linear Repair Schemes for Arbitrary (n, k) Reed-Solomon Codes

Wenhao Liu, Zhengyi Jiang and Zhongyi Huang (Tsinghua University, China); Linqi Song (City University of Hong Kong, Hong Kong); Hanxu Hou (Dongguan University of Technology, China)253

10:00 Rack-aware Minimum-Storage Regenerating Codes with Optimal Access for Consecutive Node Failures

Jiaojiao Wang and Xun Guan (Tsinghua Shenzhen International Graduate School, China)259

10:20 Weight Distributions of Two Classes of Optimal (r, δ) -Locally Repairable Codes

Yao Tian, Hengfeng Jin and Fang-Wei Fu (Nankai University, China).....265

10:40 Conjugate-Piggybacking Codes: MDS Array Codes with Lower Repair Bandwidth over Small Field Size

Hao Shi, Zhengyi Jiang and Zhongyi Huang (Tsinghua University, China); Bo Bai (Huawei Technologies Co., Ltd., Hong Kong); Gong Zhang (Huawei Technologies Co., Ltd., China); Hanxu Hou (Huawei Technology Limited Company, Hong Kong).....271

TA2: Statistics and Learning Theory 1

Room: Junior Ballroom

Chair: Congduan Li (Sun Yat-sen University, China)

9:40 On the Asymptotic HGR Maximal Correlation of Gaussian Markov Chain

Tianren Peng and Xinyi Tong (Tsinghua University, China); Shao-Lun Huang (Tsinghua-Berkeley Shenzhen Institute, China).....277

10:00 Refined Statistical Bounds for Classification Error Mismatches with Constrained Bayes Error

Zijian Yang and Vahe Eminyan (RWTH Aachen, Germany); Ralf Schlüter (RWTH Aachen University, Germany); Hermann Ney (RWTH Aachen, Germany).....283

10:20 Convexity Results on Derivative of Negative Fisher Information Along Heat Flow

Ken Chen (Xidian University, China); Yanlin Geng (State Key Lab. of ISN, Xidian University, China)289

10:40 Truncated Non-Uniform Quantization for Distributed SGD

Guangfeng Yan (City University of Hong Kong, Hong Kong); Tan Li (The Hang Seng University of Hong Kong, Hong Kong); Yuanzhang Xiao (University of Hawaii at Manoa, USA); Hanxu Hou (Dongguan University of Technology, China); Linqi Song (City University of Hong Kong, Hong Kong); Congduan Li (Sun Yat-sen University, China).....295

TA3: Neural Networks

Meeting Room 2

Chair: Ziping Zhao (ShanghaiTech University, China)

9:40 An Information-Theoretic Analysis of Temporal GNNs

Amirmohammad Farzaneh (University of Oxford, United Kingdom (Great Britain)).....301

10:00 Improved Stability Bounds of Graph Convolutional Neural Networks Under Graph Perturbations

Jun Zhang and Ziping Zhao (ShanghaiTech University, China).....307

10:20 On Verifying Entropic Vectors with Distributions Generated by Neural Networks

Shuhao Zhang, Nan Liu and Wei Kang (Southeast University, China); Haim H Permuter (Ben-Gurion University of the Negev, Israel)313

10:40 Score Matching with Deep Neural Networks: A Non-Asymptotic Analysis

Evan Scope Crafts and Bo Zhao (University of Texas at Austin, USA); Xianyang Zhang (Texas A&M University, USA)319

Tuesday, November 26 11:20 - 12:40 (Asia/Shanghai)

TB1: Quantum Information Theory

Room: Junior Ballroom

Chair: Si-Hyeon Lee (KAIST, Korea (South))

11:20 No Advantage of Non-Local Cooperation in Distributed Compression of Classical Sources

Hyun-Young Park and Seung-Hyun Nam (Korea Advanced Institute of Science and Technology, Korea (South)); Si-Hyeon Lee (KAIST, Korea (South)).....324

11:40 Coordination Capacity for Classical-Quantum Correlations

Hosen Nator and Uzi Pereg (Technion - Israel Institute of Technology, Israel).....330

12:00 Entanglement Coordination Rates in Multi-User Networks

Hosen Nator and Uzi Pereg (Technion - Israel Institute of Technology, Israel).....336

12:20 Good Entanglement-Assisted Qubit Codes from Matrix Product Codes

Lin Sok and Martianus Frederic Ezerman (Nanyang Technological University, Singapore); San Ling (NTU, Singapore).....342

TB2: Compression 2

Meeting Room 1

Chair: Ying Jun (Angela) Zhang (The Chinese University of Hong Kong, Hong Kong)

11:20 On the quantization goodness of polar lattices

Ling Liu (Xidian University, China); Shanxiang Lyu (Jinan University, China); Cong Ling (Imperial College London, United Kingdom (Great Britain)); Baoming Bai (Xidian University, China)348

11:40 Lossy Compression for Sparse Aggregation

Yijun Fan (The Chinese University of Hong Kong, Hong Kong); Fangwei Ye (Nanjing University of Aeronautics and Astronautics, China); Raymond W. Yeung (The Chinese University of Hong Kong, Hong Kong)354

12:00 Rate-Distortion Tradeoff of Bistatic Integrated Sensing and Communication

Tian Jiao and Zhiqiang Wei (Xi'an Jiaotong University, China); Yanlin Geng (State Key Lab. of ISN, Xidian University, China); Kai Wan (Huazhong University of Science and Technology, China); Zai Yang (Xi'an Jiaotong University, China); Giuseppe Caire (Technische Universität Berlin, Germany)360

12:20 Lossy Compression with Data, Perception, and Classification Constraints

Yuhan Wang (The Chinese University of Hong Kong, Hong Kong); Youlong Wu (ShanghaiTech University, China); Shuai Ma (Peng Cheng Laboratory, China); Ying Jun (Angela) Zhang (The Chinese University of Hong Kong, Hong Kong).....366

TB3: Hypothesis Testing 2

Meeting Room 2

Chair: Neha Sangwan (University of California, San Diego, India)

11:20 Sequential Hypothesis Testing of Quantum States

Greg A Fields (UC San Diego, USA); Tara Javidi (UCSD, USA); Jack Postlewaite and Saikat Guha (University of Arizona, USA); Neha Sangwan (University of California, San Diego, India)372

11:40 Sequential Outlier Hypothesis Testing under Universality Constraints

Jun Diao and Lin Zhou (Beihang University, China).....378

12:00 High-dimensional sequential testing of multiple hypotheses

Yiming Xing (Tongji University, China); Shen Yan (University of Illinois at Urbana-Champaign, USA); Ziming Wang (University of Chinese Academy of Sciences, China).....384

12:20 Cascaded Group Testing

Waqar Mirza (Indian Institute of Technology, Bombay, India); Nikhil Karamchandani (Indian Institute of Technology Bombay, India); Niranjana Balachandran (Indian Institute of Technology, Bombay, India).....390

Tuesday, November 26 14:10 - 15:30 (Asia/Shanghai)

TC1: Coding Theory 4

Meeting Room 1

Chair: Baoming Bai (Xidian University, China)

14:10 A New Early-Termination Method for the Berlekamp-Massey Algorithm

Chao Chen (Xidian, China); Nianqi Tang (Shenzhen Institute for Advanced Study, UESTC, Shenzhen, China); Yunghsiung Sam Han (University of Electronic Science and Technology of China, China); Baoming Bai (Xidian University, China); Jiefei Zhang and Wenhao Zhou (The 54th Research Institute, China)396

14:30 New Reed-Solomon Codes with All XOR Operation for Better En/decoding Performance

Gefeng Deng (South China University of Technology, China); Zhengyi Jiang (Tsinghua University, China); Bo Bai (Huawei Technologies Co., Ltd., Hong Kong); Gong Zhang (Huawei Technologies Co., Ltd., China); Xiuyin Zhang (South China University of Technology, China); Hanxu Hou (Huawei Technology Limited Company, Hong Kong).....401

14:50 Improved Construction for Multiplicative Repetition Based Non-Binary Polar Codes

Rongchi Xu, Peiyao Chen, Ling Liu, Min Zhu and Baoming Bai (Xidian University, China) ...407

15:10 Fast Successive-Cancellation Decoding of Polar Codes with Reed-Solomon Kernel

Jianhan Zhao and Wei Zhang (Tianjin University, China); Yanyan Liu (Nankai University, China)413

TC2: Wireless Communication

Meeting Room 2

Chair: Zhiqiang Wei (Xi'an Jiaotong University, China)

14:10 Ultra-low Complexity Communication Algorithms Based on $(n, n(n-1), n-1)$ PGCs

Li Peng (Huazhong University of Science and Technology, China).....418

14:30 Analysis of Cross-Domain Message Passing for OTFS Transmissions

Ruoxi Chong (Queens University Belfast, United Kingdom (Great Britain)); Shuangyang Li (Technical University of Berlin, Germany); Zhiqiang Wei (Xi'an Jiaotong University, China); Michail Matthaiou (Queen's University Belfast, United Kingdom (Great Britain)); Derrick Wing Kwan Ng (University of New South Wales, Australia); Giuseppe Caire (Technische Universität Berlin, Germany)424

14:50 Systematic Construction of Golay Complementary Sets of Arbitrary Lengths and Alphabet Sizes

Abhishek Roy (None, India); Sudhan Majhi (Indian Institute of Science, India & Indian Institute of Technology Patna, India); Subhabrata Paul (IIT Patna, India).....430

15:10 Fast Iterative ELAA-MIMO Detection Exploiting Static Channel Components

Jiuyu Liu, Yi Ma and Rahim Tafazolli (University of Surrey, United Kingdom (Great Britain))436

Tuesday, November 26 15:50 - 17:30 (Asia/Shanghai)

TD1: Decoding Algorithms

Meeting Room 1

Chair: Xiao Ma (Sun Yat-sen University, China)

15:50 Locally Constrained Guessing Codeword Decoding of Short Block Codes

Xiangping Zheng and Xiao Ma (Sun Yat-sen University, China).....442

16:10 Order Skipping Ordered Statistics Decoding and Its Performance Analysis	
Xihao Li, Wenhao Chen and Li Chen (Sun Yat-sen University, China); Yuan Li (Huawei Technologies Co., Ltd., China); Huazi Zhang (Huawei Technologies, Co. Ltd., China).....	448
16:30 Reduced Complexity SISO Decoding Algorithm for the First-Order Reed-Muller Codes	
Liudmila Karakchieva and Peter Trifonov (ITMO University, Russia).....	454
16:50 Guessing What, Noise or Codeword?	
Xiao Ma (Sun Yat-sen University, China).....	460
17:10 An Efficient Adaptive Belief Propagation Decoder for Polar Codes	
Zhongjun Yang, Zuoxin Cai and Li Chen (Sun Yat-sen University, China); Huazi Zhang (Huawei Technologies, Co. Ltd., China).....	466

TD2: Coded Caching 2

Meeting Room 2

Chair: Charul Rajput (Indian Institute of Science, India)

15:50 Security, Privacy and Linear Function Retrieval in Multi-Access Combinatorial Topology with Private Cache	
Mallikharjuna Chinnapadamala and B. Sundar Rajan (Indian Institute of Science, India).....	472
16:10 A New Hotplug Coded Caching Scheme Using PDAs	
Mallikharjuna Chinnapadamala, Charul Rajput and B. Sundar Rajan (Indian Institute of Science, India).....	478
16:30 Hierarchical Caching System With Hotplug Model Using HpPDA	
Abhay Kumar Maurya (Indian Institute of Science, Bangalore, India); Charul Rajput and B. Sundar Rajan (Indian Institute of Science, India)	484
16:50 Reflecting Intelligent Surfaces-Assisted Multiple-Antenna Coded Caching	
XiaoFan Niu (Huazhong University of Science and Technology & School of Electronic Information and Communication, China); Minquan Cheng (Guangxi Normal University, China); Kai Wan and Robert C. Qiu (Huazhong University of Science and Technology, China); Giuseppe Caire (Technische Universität Berlin, Germany).....	490
17:10 A Novel Construction of Coded Caching Schemes with Polynomial Subpacketizations via Projective Geometry	
Wei (GuangXi Normal University, China).....	496

Wednesday, November 27 9:40 - 11:00 (Asia/Shanghai)

WA1: Emerging Applications 1

Meeting Room 1

Chair: Lifeng Lai (University of California, Davis, USA)

9:40 Multispectral band selection using Correlation Explanation for identification of discriminative bands related to grapevine diseases	
Shurong Zhang and Alban Goupil (Université de Reims Champagne-Ardenne, France); Valeriu Vrabie (Université de Reims Champagne-Ardenne, France); Eric Perrin (Université de Reims Champagne-Ardenne, France); Marie-Laure Panon (Comité Champagne, France).....	502
10:00 Maximizing User Admittance for Cognitive Satellite-Terrestrial Networks using ODE-inspired Spectral Radius Estimation	

Kai Wang and Chee Wei Tan (Nanyang Technological University, Singapore); Christopher G. Brinton (Purdue University, USA)	508
10:20 Geometric Analysis of Non-convex Optimization Landscapes for Robust M-Estimation of Location	
Hongyuan Yang and Ziping Zhao (ShanghaiTech University, China); Ying Sun (The Pennsylvania State University, USA)	514
10:40 Robust Risk-Sensitive Reinforcement Learning with Conditional Value-at-Risk	
Xinyi Ni and Lifeng Lai (University of California, Davis, USA)	520

WA2: Statistics and Learning Theory 2

Room: Junior Ballroom

Chair: Shao-Lun Huang (Tsinghua-Berkeley Shenzhen Institute, China)

9:40 The Second-Order Perspectives of Minimax Parameter Estimation in Restricted Space with Weighted Squared Error Loss

Tianren Peng and Xinyi Tong (Tsinghua University, China); Shao-Lun Huang (Tsinghua-Berkeley Shenzhen Institute, China)	526
--	-----

10:00 Neural Estimation of the Information Bottleneck Based on a Mapping Approach

Lingyi Chen (Tsinghua University, China); Shitong Wu (Tsinghua University & Huawei Technologies Co., Ltd., China); Sicheng Xu (University of Science & Technology of China, China); Wenyi Zhang (University of Science and Technology of China, China); Huihui Wu (RDA Technologies Limited, Hong Kong)	532
---	-----

10:20 Information-theoretic Analysis of the Gibbs Algorithm: An Individual Sample Approach

Yuheng Zhu (Huazhong University of Science and Technology, China); Yuheng Bu (University of Florida, USA)	537
---	-----

10:40 A Non-asymptotic Framework for Characterizing Dependency Structures in Multimodal Learning

Weida Wang (Tsinghua-Berkeley Shenzhen Institute, China); Tao Shi (Tsinghua, China); Yaoyuan Liang and Xinyi Tong (Tsinghua University, China); Shao-Lun Huang (Tsinghua-Berkeley Shenzhen Institute, China)	543
--	-----

Wednesday, November 27 11:20 - 12:40 (Asia/Shanghai)

WB1: Shannon Theory 1

Meeting Room 1

Chair: Baris Nakiboglu (Middle East Technical University, Turkey)

11:20 On the Paley RIP and Paley graph extractor

Shohei Satake (Kumamoto University, Japan)	549
--	-----

11:40 Capacity Bounds on Optical Wireless Relay Channels

Meiyun Huang (East China Normal University, China); Longguang Li (East China Normal University, Shanghai, China)	555
--	-----

12:00 Divergence Inequalities from Multivariate Taylor's Theorem

Ian George (National University of Singapore, Singapore); Alice Zheng and Akshay Bansal (Virginia Polytechnic Institute and State University, USA)	561
--	-----

12:20 Augustin Information In The Vicinity of Augustin Capacity-Achieving Input

Distributions

Hao-Chung Cheng (National Taiwan University, Taiwan); Baris Nakiboglu (Middle East Technical University, Turkey)567

WB2: Security, Privacy, Fairness 3

Room: Junior Ballroom

Chair: Kai Wan (Huazhong University of Science and Technology, China)

11:20 Optimal Rate Region for Key Efficient Hierarchical Secure Aggregation with User Collusion

Xiang Zhang (Technical University of Berlin, Germany); Kai Wan (Huazhong University of Science and Technology, China); Hua Sun (University of North Texas, USA); Shiqiang Wang (IBM T. J. Watson Research Center, USA); Mingyue Ji (University of Florida, USA); Giuseppe Caire (Technische Universität Berlin, Germany).....573

11:40 PoW Security-Latency under Random Delays and the Effect of Transaction Fees

Mustafa Doger and Sennur Ulukus (University of Maryland, USA); Nail Akar (Bilkent University, Turkey).....579

12:00 Existence and Algorithmic Construction of q -ary Secure Codes with List Decoding

Ling Jiang (Shanghai Ocean University, China); Yujie Gu (Kyushu University, Japan); Jinping Fan (Shanghai Normal University, China); Ying Miao (University of Tsukuba, Japan).....585

12:20 Secret-Key Generation with PUFs and Biometric Identifiers for Compound Authentication Channels

Vamoua Yachongka and Remi A Chou (University of Texas at Arlington, USA).....591

Thursday, November 28 9:40 - 11:00 (Asia/Shanghai)

RA1: Coding Theory 5

Meeting Room 1

Chair: Kenneth W. Shum (The Chinese University of Hong Kong (Shenzhen), Hong Kong)

9:40 On the New Rank Metric Codes Related to Gabidulin Codes

Ran Li and Fang-Wei Fu (Nankai University, China).....597

10:00 Linear-Function Correcting Codes

Rohit Premlal and B. Sundar Rajan (Indian Institute of Science, India)603

10:20 Computer Formalization of Deletion-Correcting Permutation Codes

Minhan Gao (The Chinese University of Hong Kong (Shenzhen), China); Kenneth W. Shum (The Chinese University of Hong Kong (Shenzhen), Hong Kong)609

10:40 A Tighter Distance Upper-Bound for Gottesman-Kitaev-Preskill Codes

Shobhit Bhatnagar (Indian Institute of Science, India); P Vijay Kumar (Indian Institute of Science & University of Southern California, India)615

RA2: Coding for DNA Systems

Room: Junior Ballroom

Chair: Yiwei Zhang (Shandong University, China)

9:40 Coding for Synthesis Defects

Ziyang Lu (Shandong University, China); Han Mao Kiah (Nanyang Technological University, Singapore); Yiwei Zhang (Shandong University, China); Robert N. Grass (ETH Zürich,

Switzerland); Eitan Yaakobi (Technion, Israel).....	621
10:00 How to Find Simple Conditions for Successful Sequence Reconstruction?	
Chen Wang (Shandong University, China); Eitan Yaakobi (Technion, Israel); Yiwei Zhang (Shandong University, China)	627
10:20 Studying the Cycle Complexity of DNA Synthesis	
Amit Zrihan and Eitan Yaakobi (Technion, Israel); Zoar Yakhini (IDC, Israel)	633
10:40 On the Expected Number of Views Required for Fixed-Error Sequence Reconstruction	
Vivian Papadopoulou (Technical University of Munich, Germany & Imperial College London, United Kingdom (Great Britain)); V. Arvind Rameshwar (India Urban Data Exchange, India); Antonia Wachter-Zeh (Technical University of Munich (TUM), Germany)	639

Thursday, November 28 11:20 - 12:40 (Asia/Shanghai)

RB1: Shannon Theory 2

Room: Junior Ballroom

Chair: Samir M. Perlaza (INRIA, France)

11:20 Leveraging Noisy Observations in Zero-Sum Games

Emmanouil Marios Athanasakos (Inria, France); Samir M. Perlaza (INRIA, France).....

11:40 Non-iterative algorithm for channel capacity

Masahito Hayashi (Chinese University of Hong Kong, Shenzhen, China)

12:00 Achievability Bounds on Unequal Error Protection Codes

Liuquan Yao and Shuai Yuan (University of Chinese Academy of Sciences & Academy of Mathematics and Systems Science, CAS, China); Yuan Li (Huawei Technologies Co., Ltd., China); Huazi Zhang (Huawei Technologies, Co. Ltd., China); Jun Wang (Huawei Technologies Co. Ltd, China); Guiying Yan and Zhiming Ma (Chinese Academy of Sciences, China)

12:20 Statistics of Random Binning Based on Tsallis Divergence

Masoud Kavian (Huawei Paris Research Center & Huawei Technologies, France); Mohammad Mahdi Mojahedian and Mohammad Hossein Yassaee (Sharif University of Technology, Iran); Mahtab Mirmohseni (University of Surrey, United Kingdom (Great Britain)); Mohammad Reza Aref (Sharif University of Tech., Iran).....

RB2: Feedback Channel

Meeting Room 1

Chair: Fan Cheng (Shanghai Jiaotong University, China)

11:20 Sum-Capacity for Symmetric Finite-State Gaussian Multiple Access Channel With Delayed Feedback

Dengfeng Xia and Han Deng (Southwest Jiaotong University, China); Peng Xu (Chongqing University of Posts and Telecommunications, China); Bin Dai (Southwest Jiaotong University, China)

11:40 Gaussian Relay Channel with Noiseless Feedback: Revisit

Han Deng and Dengfeng Xia (Southwest Jiaotong University, China); Peng Xu (Chongqing University of Posts and Telecommunications, China); Bin Dai (Southwest Jiaotong University, China)

12:00 Efficient Coding for Computation Over Gaussian Multiple-Access Channel With

Noiseless/Noisy Feedback

Yuhan Yang and Han Deng (Southwest Jiaotong University, China); Peng Xu (Chongqing University of Posts and Telecommunications, China); Bin Dai (Southwest Jiaotong University, China)681

12:20 Causal Vector-valued Witsenhausen Counterexamples with Feedback

Mengyuan Zhao (KTH Royal Institute of Technology, Sweden); Mael Le Treust (University Rennes, CNRS, Inria, IRISA, France); Tobias J. Oechtering (KTH Royal Institute of Technology, Sweden)687

Thursday, November 28 14:10 - 15:30 (Asia/Shanghai)

RC1: Quantum Security

Meeting Room 1

Chair: Shanxiang Lyu (Jinan University, China)

14:10 Semantic Security with Unreliable Entanglement Assistance: Interception and Loss

Meir Lederman (Technion, Israel); Uzi Pereg (Technion - Israel Institute of Technology, Israel)693

14:30 Towards Quantum-Safe Distributed Learning via Homomorphic Encryption: Learning with Gradients

Guangfeng Yan (City University of Hong Kong, Hong Kong); Shanxiang Lyu (Jinan University, China); Hanxu Hou (Dongguan University of Technology, China); Zhiyong Zheng (Renmin University of China, China); Linqi Song (City University of Hong Kong, Hong Kong)699

14:50 Quantum X-Secure B-Byzantine T-Colluding Private Information Retrieval

Mohamed Nomeir, Alptug Aytekin and Sennur Ulukus (University of Maryland, USA)705

15:10 Covert Communication with Positive Rate Over State-Dependent Quantum Channels

Hassan ZivariFard (Columbia University, USA); Remi A Chou (University of Texas at Arlington, USA); Xiaodong Wang (Columbia University, USA)711

RC2: Distributed Computing

Meeting Room 2

Chair: Jesús Gómez-Vilardebó (CTTC, Spain)

14:10 Algebraic Geometric Rook Codes for Coded Distributed Computing

Pedro Soto and Gretchen Matthews (Virginia Tech, USA)717

14:30 Generalized Multivariate Polynomial Codes for Distributed Matrix-Matrix Multiplication

Jesús Gómez-Vilardebó (CTTC, Spain); Burak Hasircioğlu (The Alan Turing Institute, United Kingdom (Great Britain)); Deniz Gündüz (Imperial College London, United Kingdom (Great Britain))723

14:50 Optimal Bandwidth for All-Linear-Reduce Operation

Zhengrui Li (HKUST, Hong Kong); Wai Ho Mow (Hong Kong University of Science and Technology, Hong Kong); Yungshiang Sam Han (University of Electronic Science and Technology of China, China); Yunqi Wan (Huawei Technology Co. Ltd., China)729

15:10 Network Function Computation for Vector Linear Functions

Qin Zhou (Nankai University & Chern Institute of Mathematics and LPMC, China); Fang-Wei

Fu (Nankai University, China).....735

Thursday, November 28 15:50 - 17:30 (Asia/Shanghai)

RD1: Network Information Theory 2

Meeting Room 1

Chair: Wenyi Zhang (University of Science and Technology of China, China)

15:50 Finite Field Multiple Access for Sourced Massive Random Access with Finite Blocklength

Qi-yue Yu and Shi-wen Lin (Harbin Institute of Technology, China); Shu Lin (UC Davis, USA)
.....741

16:10 Alternating Maximization Algorithm for Mismatch Capacity with Oblivious Relaying

Xinwei Li and Lingyi Chen (Tsinghua University, China); Shitong Wu (Tsinghua University & Huawei Technologies Co., Ltd., China); Huihui Wu (RDA Technologies Limited, Hong Kong); Hao Wu (Tsinghua University, China); Wenyi Zhang (University of Science and Technology of China, China).....747

16:30 Sparse Degree Optimization for BATS Codes

Hoover H. F. Yin (The Chinese University of Hong Kong, Hong Kong); Jie Wang (Georgia Institute of Technology, USA).....753

16:50 Random Alloy Codes and the Fundamental Limits of Coded Distributed Tensors

Pedro Soto (Virginia Tech, USA).....759

RD2: Emerging Application 2

Meeting Room 2

Chair: Amin Aminzadeh Gohari (The Chinese University of Hong Kong, Hong Kong)

15:50 Identification via Binary Uniform Permutation Channel

Abhishek Sarkar and Bikash K Dey (Indian Institute of Technology Bombay, India)765

16:10 Detecting Informationally-Dense Subsets

Chao Zhao (City University of Hong Kong, Hong Kong); Ali Al-Bashabsheh (Beijing Advanced Innovation Center for Big Data and Brain Computing (BDBC), Beihang University, China); Chung Chan (City University of Hong Kong, Hong Kong)771

16:30 Relative Fractional Independence Number

Sharareh Alipour (Tehran Institute for Advanced Studies Khatam University, Iran); Amin Aminzadeh Gohari (The Chinese University of Hong Kong, Hong Kong); Mehrshad Taziki (Carnegie Mellon University, USA).....777

16:50 Identification via Gaussian Multiple Access Channels in the Presence of Feedback

Yaning Zhao (Technical University of Braunschweig, Germany); Wafa Labidi (Technical University of Munich, Germany); Holger Boche (Technical University Munich, Germany); Eduard A Jorswieck (Technische Universität Braunschweig, Germany); Christian Deppe (Technical University of Braunschweig, Germany).....783