Vector Gaussian Two-Terminal CEO Problem Under Sum Distortion
Yinfei Xu (Southeast University, P.R. China), Qiao Wang (Southeast University, P.R. China) 766

On the Three-Terminal Interactive Lossy Source Coding Problem
Leonardo Rey Vega (University of Buenos Aires, Facultad de Ingeniería & CONICET, Argentina), Pablo Piantanida (SUPELEC, France), Alfred Hero III (University of Michigan, USA) 771

Network Security

Coded Cooperative Data Exchange for a Secret Key
Thomas Courtade (University of California, Berkeley, USA), Thomas R Halford (TrellisWare Technologies, Inc., USA) 776

Triangle Network Secrecy
László Czap (Ecole Polytechnique Fédérale de Lausanne, EPFL, Switzerland), Vinod M Prabhakaran (Tata Institute of Fundamental Research, India), Suhas Diggavi (University of California Los Angeles, USA), Christina Fragouli (EPFL, Switzerland) 781

Optimality of Routing on the Wiretap Network with Simple Network Topology
Fan Cheng (The Chinese University of Hong Kong & Institute of Network Coding, Hong Kong) 78£
Active Adversaries from an Information-Theoretic Perspective: Data Modification Attacks
Mahtab Mirmohseni (Sharif University of Technology, Iran), Panagiotis (Panos) Papadimitratos (KTH, Sweden) 791

Energy Harvesting 1

Capacity of the Discrete Memoryless Energy Harvesting Channel with Side Information
Omur Ozel (University of Maryland, College Park, USA), Kaya Tutuncuoglu (Pennsylvania State University, USA), Sennur Ulukus (University of Maryland, USA), Aylin Yener (Pennsylvania State University, USA) 796

Approximate Capacity of Energy Harvesting Communication with Finite Battery
Yishun Dong (Stanford University, USA), Ayfer Özgür (Stanford University, USA) 801

An Energy Harvesting AWGN Channel with a Finite Battery
Varun Jog (UC Berkeley, USA), Venkat Anantharam (University of California at Berkeley, USA) 806

Achievable Rate for Energy Harvesting Channel with Finite Blocklength
Jing Yang (University of Arkansas, USA) 811

Videos, Tweets and Emails

A Hybrid Algorithm for Content Placement in Distributed Video on Demand Systems
James Yang (University of Illinois at Urbana-Champaign, USA), Bruce Hajek (University of Illinois, USA) 816

Dynamic Control of Video Quality for AVS
Ankit Singh Rawat (The University of Texas at Austin, USA), Emina Soljanin (Bell Labs, Alcatel-Lucent, USA) 821

Information in Tweets: Analysis of a Bufferless Timing Channel Model
Mehrnaz Tavan (Rutgers, the State University of New Jersey, USA), Roy Yates (Rutgers University, USA), Waheed U. Bajwa (Rutgers University, USA) 826

Information Overload and Human Priority Queuing
Aseem Sharma (Indian Institute of Technology Madras, India), Krishna P Jagannathan (Indian Institute of Technology Madras, India), Lav R. Varshney (University of Illinois at Urbana-Champaign, USA) 831

Interference Channels 1

Degrees of Freedom for Multiple-Multicast Traffic
Shaileshh Bojja Venkatakrishnan (University of Illinois Urbana-Champaign, USA), Pramod Viswanath (University of Illinois, Urbana-Champaign, USA), Sreeram Kannan (University of California, Berkeley, USA) 836

On the Optimality of Treating Interference as Noise for Parallel Deterministic Interference Networks
Hua Sun (University of California, Irvine, USA), Syed Ali Jafar (University of California Irvine, USA) 841

Topological Interference Management with Transmitter Cooperation
Xinping Yi (EURECOM, France), David Gesbert (Eurecom Institute, France) 846

The Separability and Ergodic Sum-Rate of Parallel Gaussian Interference Channels
Ali Haghi (University of Waterloo, Canada), Amir K. Khandani (University of Waterloo, Canada) 851
Emerging Problems in Network Coding and Distributed Storage

One Extra Bit of Download Ensures Perfectly Private Information Retrieval
Nihar B Shah (University of California, Berkeley, USA), K. v. Rashmi (University of California at Berkeley, USA), Kannan Ramchandran (University of California at Berkeley, USA) ................................ 856

The MDS Queue: Analysing the Latency Performance of Erasure Codes
Nihar B Shah (University of California, Berkeley, USA), Kangwook Lee (University of California, Berkeley, USA), Kannan Ramchandran (University of California at Berkeley, USA) ...... 861

Sending Perishable Information: Coding Improves Delay-Constrained Throughput Even for Single Unicast
Chih-Chun Wang (Purdue University, USA), Minghua Chen (The Chinese University of Hong Kong, P.R. China) ........................................................................................................ 866

Multi-Version Coding in Distributed Storage
Zhiying Wang (Stanford University, USA), Viveck Cadambe (MIT, USA) ............................................................ 871

Analysis of Spatially Coupled Codes

Performance Comparison of Non-Binary LDPC Block and Spatially Coupled Codes
Kechao Huang (Sun Yat-sen University, P.R. China), David G. M. Mitchell (University of Notre Dame, USA), Lai Wei (University of Notre Dame, USA), Xiao Ma (Sun Yat-sen University, P.R. China), Daniel J. Costello, Jr. (University of Notre Dame, USA) ...................................................... 876

Threshold Analysis of Non-Binary Spatially-Coupled LDPC Codes with Windowed Decoding
Lai Wei (University of Notre Dame, USA), Toshiaki Koike-Akino (MERL & Harvard University, USA), David G. M. Mitchell (University of Notre Dame, USA), Thomas E Fuja (University of Notre Dame, USA), Daniel J. Costello, Jr. (University of Notre Dame, USA) ........................................ 881

Absorbing Set Characterization of Array-Based Spatially Coupled LDPC Codes
David G. M. Mitchell (University of Notre Dame, USA), Lara Dolecek (UCLA, USA), Daniel J. Costello, Jr. (University of Notre Dame, USA) ........................................................................ 886

Analyzing Finite-length Protograph-based Spatially Coupled LDPC Codes
Markus Stinner (Technische Universität München, Germany), Pablo M. Olmos (Universidad Carlos III de Madrid, Spain) ...................................................................................... 891

Quantum Error Control Codes 1

Constructions of Pure Asymmetric Quantum Alternant Codes Based on Subclasses of Alternant Codes
Jihao Fan (Southeast University, P.R. China), Han-wu CHen (school of computer science & engineering of Southeast University, P.R. China) ................................................. 896

Superadditivity of Quantum Channel Coding Rate with Finite Blocklength Quantum Measurements
Hye Won Chung (Massachusetts Institute of Technology, USA), Saikat Guha (Raytheon BBN Technologies, USA), Lizhong Zheng (Massachusetts Institute of Technology, USA) ....................... 901

Quantum Error-Correcting Codes for Amplitude Damping
Markus Grassl (Universität Erlangen-Nürnberg & Institut für Optik, Information und Photonik, Germany), Zhaohui Wei (Nanyang Technological University & Centre for Quantum Technologies, Singapore), Zhang-Qi Yin (Tsinghua University, P.R. China), Bei Zeng (University of Guelph, Canada) ........................................................................ 906

The MacWilliams Identity for Quantum Convolutional Codes
Ching-Yi Lai (University of Technology, Sydney, Australia), Min-Hsiu Hsieh (University of Technology, Sydney, Australia) ................................................................. 911
Information Theoretic Approaches to Prediction

Control your Information for Better Predictions
Michal Moshkovitz (The Hebrew University of Jerusalem, Israel), Naftali Tishby (The Hebrew University, Israel) ................................................................. 916

Randomized Sketches of Convex Programs with Sharp Guarantees
Mert Pilanci (University of California, Berkeley, USA), Martin J. Wainwright (University of California, Berkeley, USA) ................................................................. 921

Sparse Feature Selection by Information Theory
Guangyao Zhou (Brown University, USA), Stuart Geman (Brown University, USA), Joachim Buhmann (ETH Zurich, Switzerland) ................................................................. 926

On Efficiency and Low Sample Complexity in Phase Retrieval
Youssef Mroueh (MIT-IIT, USA), Lorenzo Rosasco (DIBRIS, Unige and LCSL - MIT, IIT, USA) .............................. 931

Multiterminal Source Coding 3

Rate-Distortion Functions for Source Coding When Side Information with Unknown Delay May Be Present
Tetsunao Matsuta (Tokyo Institute of Technology, Japan), Tomohiko Uyematsu (Tokyo Institute of Technology, Japan) ................................................................. 936

On Multiterminal Source Coding with List Decoding Constraints
Yeow-Khiang Chia (Institute for Infocomm Research & Agency for Science, Technology and Research, Singapore) ................................................................. 941

Justification of Logarithmic Loss via the Benefit of Side Information
Jiantao Jiao (Stanford University, USA), Thomas Courtade (University of California, Berkeley, USA), Kartik Venkat (Stanford University, USA), Tsachy Weissman (Stanford University, USA) ................................................................. 946

Vector Gaussian Rate-Distortion with Variable Side Information
Sinem Unal (Cornell University, USA), Aaron Wagner (Cornell University, USA) ................................................................. 951

Coding Schemes for Secrecy

Explicit capacity-achieving coding scheme for the Gaussian wiretap channel
Himanshu Tyagi (University of California, San Diego, USA), Alexander Vardy (University of California, San Diego, USA) ................................................................. 956

Polar Lattices for Strong Secrecy Over the Mod-$\Lambda$ Gaussian Wiretap Channel
Yanfei Yan (Imperial College London, United Kingdom), Ling Liu (Department of Electrical and Electronic Engineering Imperial College London, United Kingdom), Cong Ling (Imperial College London, United Kingdom) ................................................................. 961

An Analysis of Small Dimensional Fading Wiretap Lattice Codes
Jerome Ducoat (Nanyang Technological University, Singapore), Frederique Oggier (Nanyang Technological University, Singapore) ................................................................. 966

Secrecy gain, flatness factor, and secrecy-goodness of even unimodular lattices
Fuchun Lin (Nanyang Technological University, Singapore), Cong Ling (Imperial College London, United Kingdom), Jean-Claude Belfiore (Ecole Nationale Supérieure des Télécommunications, France) ................................................................. 971
Energy Harvesting 2

**Improved Capacity Bounds for the Binary Energy Harvesting Channel**
Kaya Tutuncuoglu (Pennsylvania State University, USA), Omur Ozel (University of Maryland, College Park, USA), Aylin Yener (Pennsylvania State University, USA), Sennur Ulukus (University of Maryland, USA) 976

**Energy Efficient Random Multiple Access with Strict Delay Constraints**
Sreejith Sreekumar (IIT Bombay, India), Sibi Raj B Pillai (IIT Bombay, India), Bikash K Dey (Indian Institute of Technology Bombay, India) 981

**Energy Harvesting Diamond Channel with Energy Cooperation**
Berk Gurakan (University of Maryland, USA), Sennur Ulukus (University of Maryland, USA) 986

**Constrained Codes for Joint Energy and Information Transfer with Receiver Energy Utilization Requirements**
Ali Mohammad Fouladgar (New Jersey Institute of Technology, USA), Osvaldo Simeone (New Jersey Institute of Technology, USA), Elza Erkip (NYU Polytechnic School of Engineering, USA) 991

Cellular Networks

**Cellular Network Coverage with Inter-cell Interference Coordination and Intra-cell Diversity**
Xinchen Zhang (The University of Texas at Austin, USA), Martin Haenggi (University of Notre Dame, USA) 996

**Elastic Routing in Wireless Networks With Directional Antennas**
Jangho Yoon (KAIST, Korea), Won-Yong Shin (Dankook University, Korea), Sang-Woon Jeon (Andong National University, Korea) 1001

**A New Achievability Scheme for Downlink Multicell Processing with Finite Backhaul Capacity**
Nan Liu (Southeast University, P.R. China), Wei Kang (Southeast University, P.R. China) 1006

**Market-Based Power Allocation for a Differentially Priced FDMA Systems**
Mohammad Hassan Lotfi (University of Pennsylvania, USA), George Kesidis (Pennsylvania State University, USA), Saswati Sarkar (University of Pennsylvania, USA) 1011

Interference Channels 2

**Characterizing per Node Degrees of Freedom in an Interference Network**
Mohammad Khojastepour (NEC Laboratories America, USA), Mohammad Farajzadeh-Tehrani (Simons Center for Geometry and Physics, Stony Brook University, USA) 1016

**Symmetric Decentralized Interference Channels with Noisy Feedback**
Samir M. Perlaza (INRIA, France), Ravi Tandon (Virginia Tech, USA), H. Vincent Poor (Princeton University, USA) 1021

**Achievable Regions for Interference Channels with Generalized and Intermittent Feedback**
Abdellatif Zaidi (Université Paris-Est Marne La Vallée, France) 1026

**Interference Channels with Very Weak Interference**
Sida Liu (The Chinese University of Hong Kong, Hong Kong), Chandra Nair (Chinese University of Hong Kong, Hong Kong), Lingxiao Xia (Chinese University of Hong Kong, Hong Kong) 1031

Distributed Storage - Repair and Generation 1

**New Codes and Inner Bounds for Exact Repair in Distributed Storage Systems**
Sreechakra Goparaju (Princeton University, USA), Salim El Rouayheb (Illinois Institute of Technology, USA), Robert Calderbank (Duke University, USA) 1036
On the minimum storage overhead of distributed storage codes with a given repair locality
Henk D.L. Hollmann (Nanyang Technological University, Singapore) ........................................... 1041

Regenerating Codes over a Binary Cyclic Code
Kenneth W. Shum (Institute of Network Coding, Hong Kong), Hanxu Hou (Peking University Shenzhen Graduate School, P.R. China), Minghua Chen (The Chinese University of Hong Kong, P.R. China), Huanle Xu (The Chinese University of Hong Kong, Hong Kong), Hui Li (Peking University Shenzhen Graduate School, P.R. China) ................................. 1046

Interdisciplinary Coding Theory

Channel-Code Detection by a Third-Party Receiver via the Likelihood Ratio Test
Arti Yardi (Indian Institute of Technology Bombay, India), Animesh Kumar (Indian Institute of Technology Bombay, India), Saravanan Vijayakumaran (IIT Bombay, India) ................................................................. 1051

Synchronizing Rankings via Interactive Communication
Lili Su (University of Illinois at Urbana-Champaign, USA), Olgica Milenkovic (UIUC, USA) ............ 1056

Approximate Capacities of Two-Dimensional Codes by Spatial Mixing
Yi-Kai Wang (Nanjing University, P.R. China), Yitong Yin (Nanjing University, P.R. China), Sheng Zhong (Nanjing University, P.R. China) ................................................................. 1061

Correction of Samplable Additive Errors
Kenji Yasunaga (Kanazawa University, Japan) .............................................................................. 1066

Quantum Error Control Codes 2

A decoding algorithm for CSS codes using the X/Z correlations
Nicolas Delfosse (Université de Sherbrooke, Canada), Jean-Pierre Tillich (INRIA, France) .......... 1071

Quantum codes and symplectic matroids
Pradeep K Sarvepalli (Indian Institute of Technology Madras, India) ...................................... 1076

Branching MERA codes: a natural extension of classical and quantum polar codes
David Poulin (Université de Sherbrooke, Canada), Andrew Ferris (Institut de Ciencies Fotòniques, Spain) .................................................................................................................. 1081

Numerical techniques for finding the distances of quantum codes
Ilya Dumer (University of California at Riverside, USA), Alexey Kovalev (University of Nebraska at Linkoln, USA), Leonid P Pryadko (University of California, Riverside, USA) ................. 1086

Markov Models and Estimation

Information Geometry Approach to Parameter Estimation in Markov Chains
Masahito Hayashi (Nagoya University, Japan), Shun Watanabe (Tokushima University, Japan) ........ 1091

Large Deviation Property of Waiting Times for Markov and Mixing Processes
Vatsal Sharan (Indian Institute of Technology Kanpur, India), Rakesh K. Bansal (Indian Institute of Technology Kanpur & India, India) ................................................................. 1096

The Value of Noise for Informational Cascades
Tho Ngoc Le (Northwestern University, USA), Vijay Subramanian (Northwestern University, USA), Randall A Berry (Northwestern University, USA) ............................................... 1101

Local statistical models from deterministic state space models, likelihood filtering, and local typicality
Lukas Bruderer (ETH Zurich, Switzerland), Hans-Andrea Loeliger (ETH Zurich, Switzerland), Nour Zalmai (ETH Zurich, Switzerland) ............................................................................. 1106
Interdisciplinary Information Theory

**Analogy Between Gambling and Measurement-Based Work Extraction**
Dror A. Vinkler (Ben-Gurion University, Israel), Haim H Permuter (Ben-Gurion University, Israel), Neri Merhav (Technion, Israel) 1111

**A Proof of the Ahlswede-Cai-Zhang Conjecture**
Christoph Bunte (ETH Zurich, Switzerland), Amos Lapidoth (ETHZ, Switzerland), Alex Samorodnitsky (The Hebrew University of Jerusalem, Israel) 1116

**New Upper Bounds for Grain-Correcting and Grain-Detecting Codes**
Artyom Sharov (Technion, Israel), Ron M. Roth (Technion, Israel) 1121

**A Heisenberg Limit for Quantum Region Estimation**
Michael Walter (ETH Zurich, Switzerland), Joseph M. Renes (ETH Zurich, Switzerland) 1126

**On Topological Properties of Wireless Sensor Networks under the q-Composite Key Predistribution Scheme with On/Off Channels**
Jun Zhao (Carnegie Mellon University, USA), Osman Yaşan (Carnegie Mellon University & CyLab, USA), Virgil Gligor (Carnegie Mellon University, USA) 1131

Secret-Key Capacity

**Secret key agreement: general capacity and second-order asymptotics**
Masahito Hayashi (Nagoya University, Japan), Himanshu Tyagi (University of California, San Diego, USA), Shun Watanabe (Tokushima University, Japan) 1136

**Secret Key-Private Key Generation over Three Terminals: Capacity Region**
Huishuai Zhang (Syracuse University, USA), Lifeng Lai (Worcester Polytechnic Institute, USA), Yingbin Liang (Syracuse University, USA), Hua Wang (Qualcomm Inc., USA) 1141

**Key Capacity with Limited One-Way Communication for Product Sources**
Jingbo Liu (Princeton University, USA), Paul Cuff (Princeton University, USA), Sergio Verdú (Princeton University, USA) 1146

**On the Communication Complexity of Secret Key Generation in the Multiterminal Source Model**
Manuj Mukherjee (Indian Institute of Science, India), Navin Kashyap (Indian Institute of Science, India) 1151

**Achieving SK Capacity in the Source Model: When Must All Terminals Talk?**
Manuj Mukherjee (Indian Institute of Science, India), Navin Kashyap (Indian Institute of Science, India), Yogesh Sankarasubramaniam (None, India) 1156

Resource Allocation and Energy Harvesting

**A Game-Theoretical Model for Wireless Information and Power Transfer in Relay Interference Channels**
He Chen (The University of Sydney, Australia), Jiang Yunxiang (The Hong Kong Polytechnic University & Beijing Jiaotong University, Hong Kong), Yonghui Li (University of Sydney, Australia), Yuanye Ma (University of Sydney, Australia), Branka Vucetic (The University of Sydney, Australia) 1161

**Optimal Energy-Bandwidth Allocation for Energy Harvesting Interference Networks**
Zhe Wang (Columbia University, USA), Vaneet Aggarwal (AT&T Labs - Research, USA), Xiaodong Wang (Columbia University, USA) 1166

**Achieving Nearly 100% Throughput without Feedback in Energy Harvesting Wireless Networks**
Omer M Gul (Middle East Technical University, Turkey), Elif Uysal-Biyikoglu (METU, Turkey) 1171

**Finite Horizon Online Lazy Scheduling with Energy Harvesting Transmitters over Fading Channels**
Tan Bacinoglu (METU, Turkey), Elif Uysal-Biyikoglu (METU, Turkey) 1176
On Lossy Source-Channel Transmission in Energy Harvesting Communication Systems
Meysam Shahrbaf Motlagh (University of Waterloo, Canada), Masoud Badiei Khuzani (University of Waterloo, Canada), Patrick Mitran (University of Waterloo, Canada) 1181

Cooperative Communications

Asymmetric Cooperative Multiple Access Channels with Delayed CSI
Abdellatif Zaidi (Université Paris-Est Marne La Vallée, France), Shlomo (Shitz) Shamai (The Technion, Israel) 1186

Multicasting in Linear Deterministic Relay Network by Matrix Completion
Tasuku Soma (University of Tokyo, Japan) 1191

Capacity Bounds for a Class of Diamond Networks
Shirin Saeedi Bidokhti (Technische Universität München, Germany), Gerhard Kramer (Technische Universität München, Germany) 1196

Energy-Efficient Communication over the Unsynchronized Gaussian Diamond Network
Ritesh Kolte (Stanford University, USA), Urs Niesen (Bell Labs, Alcatel-Lucent, USA), Piyush Gupta (Bell Labs, Alcatel-Lucent, USA) 1201

Achievable Partition Information Rate over Noisy Multi-Access Boolean Channel
Shuhang Wu (Tsinghua University, P.R. China), Shuangqing Wei (Louisiana State University, USA), Yue Wang (Tsinghua University, P.R. China), R Vaidyanathan (Louisiana State University, USA), Jian Yuan (Tsinghua University, P.R. China) 1206

Interference Alignment

Channel Diversity needed for Vector Interference Alignment
Cheuk Ting Li (Stanford University, USA), Ayfer Özgür (Stanford University, USA) 1211

Interference Alignment with Diversity for the 2x2 X-Network with three antennas
Abhinav Ganesan (Indian Institute of Science, Bangalore, India), B. Sundar Rajan (Indian Institute of Science, India) 1216

Degrees of Freedom Of Interference Channel with Rank-Deficient Transfer Matrix
Abinesh Ramakrishnan (University of California, Irvine, USA), Sundar Rajan Krishnamurthy (University of California Irvine, USA), Syed Ali Jafar (University of California Irvine, USA), Yarning Yu (University of California, Irvine, USA) 1221

Unstructured Linear Beamforming Design for Interference Alignment in MIMO Cellular Networks
Gokul Sridharan (University of Toronto, Canada), Wei Yu (University of Toronto, Canada) 1226

Coding and Computer Science

Linear Boolean classification, coding and 'the critical problem'
Emmanuel Abbe (Princeton University, USA), Noga Alon (Tel Aviv University, Israel), Afonso Bandeira (Princeton University, USA) 1231

List Decoding of Crisscross Error Patterns
Antonia Wachter-Zeh (Technion - Israel Institute of Technology, Israel) 1236

Identification Codes to Identify Multiple Objects
Hirosuke Yamamoto (The University of Tokyo, Japan), Masashi Ueda (The University of Tokyo, Japan) 1241

Codes for Correcting Three or More Adjacent Deletions or Insertions
Ling Cheng (University of the Witwatersrand, South Africa), Theo G. Swart (University of Johannesburg, South Africa), Hendrik C Ferreira (University of Johannesburg, South Africa), Khaled Abdel-Ghaffar (University of California, USA) 1246
Linear inverse problems on Erdos-Renyi graphs: Information-theoretic limits and efficient recovery
Emmanuel Abbe (Princeton University, USA), Afonso Bandeira (Princeton University, USA), Annina Bracher (ETH Zurich, Switzerland), Amit Singer (Princeton University, USA) 1251

Bounds on Codes

Generalized Sphere Packing Bound: Basic Principles
Arman Fazeli (University of California, San Diego, USA), Alexander Vardy (University of California, San Diego, USA), Eitan Yaakobi (Technion, Israel) 1256

Generalized Sphere Packing Bound: Applications
Arman Fazeli (University of California, San Diego, USA), Alexander Vardy (University of California, San Diego, USA), Eitan Yaakobi (Technion, Israel) 1261

Generalized sphere-packing upper bounds on the size of codes for combinatorial channels
Daniel F Cullina (University of Illinois at Urbana-Champaign, USA), Negar Kiyavash (University of Illinois at Urbana-Champaign, USA) 1266

New Bounds on the Probability of a Finite Union of Events
Jun Yang (Queen's University, Canada), Fady Alajaji (Queen's University, Canada), Glen Takahara (Queen's University, Canada) 1271

An Elias Bound on the Bhattacharyya Distance of Codes for Channels with a Zero-Error Capacity
Marco Dalai (University of Brescia, Italy) 1276

Problems in Bioinformatics and Neuroscience

Scaling laws for molecular communication
Andrew Eckford (York University, Canada), Chan-Byoung Chae (Yonsei University, Korea) 1281

DNA Assembly From Paired Reads as 2-D Jigsaw Puzzles
Eren Şaşoğlu (University of California, Berkeley, USA), David Tse (Stanford University, USA) 1286

Directed Information Between Connected Leaky Integrate-and-Fire Neurons
Nima Soltani (Stanford University, USA), Andrea Goldsmith (Stanford University, USA) 1291

Quadratic-backtracking algorithm for string reconstruction from substring compositions
Jayadev Acharya (University of California, San Diego, USA), Hirakendu Das (Yahoo Labs, USA), Olgica Milenkovic (UIUC, USA), Alon Orlitsky (University of California, San Diego, USA), Shengjun Pan (Google, USA) 1296

The Capacity of String-Duplication Systems
Farzad Farnoud (Hassanzadeh) (California Institute of Technology, USA), Moshe Schwartz (Ben-Gurion University of the Negev, Israel), Jehoshua Bruck (California Institute of Technology, USA) 1301

Sampling and Sensing

Variable-Density Sampling on the Dual Lattice
Peng Zhang (Imperial College London, United Kingdom), Sumei Sun (Institute for Infocomm Research, Singapore), Cong Ling (Imperial College London, United Kingdom) 1306

Information-Theoretic Bounds for Adaptive Sparse Recovery
Cem Aksoylar (Boston University, USA), Venkatesh Saligrama (Boston University, USA) 1311

To average or not to average: Trade-off in compressed sensing with noisy measurements
Kei Sano (Graduate School of Informatics Kyoto University, Japan), Ryosuke Matsushita (NTT DATA Mathematical Systems Inc., Japan), Toshiyuki Tanaka (Kyoto University, Japan) 1316

Faster SVD-truncated Regularized Least-squares
Christos Boutsidis (IBM, USA), Malik Magdon-Ismail (RPI, USA) 1321
Generalized Binary Independent Component Analysis
Amichai Painsky (Tel Aviv University, Israel), Saharon Rosset (Tel Aviv University, Israel), Meir Feder (Tel-Aviv University, Israel) 1326

Distributed Lossless Source Coding

Lossless Coding of Correlated Sources with Actions in Acyclic Directed Networks
Oron Sabag (Ben-Gurion University, Israel), Haim H Permuter (Ben-Gurion University, Israel), Asaf Cohen (Ben-Gurion University of the Negev, Israel) 1331

Revisiting the Slepian-Wolf Coding Problem for General Sources: A Direct Approach
Tomohiko Uyematsu (Tokyo Institute of Technology, Japan), Tetsunao Matsuta (Tokyo Institute of Technology, Japan) 1336

The Ahlswede-Korner Coordination Problem with One-Sided Encoder Cooperation
Ziv Goldfeld (Ben-Gurion University, Israel), Haim H Permuter (Ben-Gurion University, Israel), Gerhard Kramer (Technische Universität München, Germany) 1341

Equating the achievable exponent region to the achievable entropy region by partitioning the source
Eric Graves (University of Florida, USA), Tan Wong (University of Florida, USA) 1346

Reed-Solomon Codes for Secrecy

A Secret Sharing Scheme Based on a Systematic Reed-Solomon Code and Analysis of its Security for a General Class of Sources
Hiroki Koga (University of Tsukuba, Japan), Shuntaro Honjo (University of Tsukuba, Japan) 1351

Three-Level Storage and Nested MDS Codes for Perfect Secrecy in Multiple Clouds
Ping Hu (City University of Hong Kong, Hong Kong), Chi Wan Sung (City University of Hong Kong, Hong Kong), Siu-Wai Ho (University of South Australia, Australia), Terence H. Chan (University of South Australia, Australia) 1356

Constructing Boolean Functions With Potential Optimal Algebraic Immunity Based on Additive Decompositions of Finite Fields (Extend Abstract)
Baofeng Wu (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China), Qingfang Jin (Academy of Mathematics and Systems Science, Chinese Academy of Sciences, P.R. China), Zhuojun Liu (Academy of Mathematics and Systems Science, Chinese Academy of Sciences, P.R. China), Dongdai Lin (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China) 1361

Weakly Secure Data Exchange with Generalized Reed Solomon Codes
Muxi Yan (Texas A&M University, USA), Alex Sprintson (Texas A&M University, USA), Igor Zelenko (Texas A&M University, USA) 1366

Scheduling and Power Control

Opportunistic Scheduling with Limited Channel State Information: A Rate Distortion Approach
Matthew Johnston (Massachusetts Institute of Technology, USA), Eytan Modiano (MIT, USA), Yury Polyanskiy (MIT, USA) 1371

Traffic-Aware Training and Scheduling for the 2-user MISO Broadcast Channel
Apostolos Destounis (Huawei Technologies France Research Center, France), Mohamad Assaad (Supelec, France), Mérouane Debbah (Supelec, France), Bessem Sayadi (Alcatel-Lucent Bell-Labs, France) 1376

QoS-Driven Power Control for Fading Channels with Arbitrary Input Distributions
Gozde Ozcan (Syracuse University, USA), M. Cenk Gursoy (Syracuse University, USA) 1381
ZigZag Neighbor Discovery in Wireless Networks
Arash Saber Tehrani (University of Southern California, USA), Giuseppe Caire (University of Southern California, USA) 1386

Cognitive Radios

Energy Efficiency and SINR Maximization Beamformers for Cognitive Radio Utilizing Sensing Information
Abdulrahman Al-Abbasi (King Abdullah University of Science and Technology (KAUST), Saudi Arabia), Zouheir Rezki (King Abdullah University of Science and Technology (KAUST), Saudi Arabia), Basem Shihada (KAUST, Saudi Arabia) 1391

A Combined Underlay and Interweave Strategy for Cognitive Radios
Ali Hesammohseni (University of Waterloo, Canada), Kamyar Moshksar (University of Waterloo, Canada), Amir K. Khandani (University of Waterloo, Canada) 1396

On the Power Efficiency for Cognitive Radio Networks with Multiple Relays
Mahmoud Ashour (Qatar University, Qatar), Majid Butt (Qatar University, Qatar), Amr Mohamed (Qatar University Wireless Innovations Center, Qatar) 1401

Enhanced Access Schemes Based on Channel Statistics for Cognitive Wireless Networks
Anthony Fanous (Qualcomm Inc., USA), Anthony Ephremides (University of Maryland at College Park, USA) 1406

Interference Channel with Cooperation

Symmetric Two-User Gaussian Interference Channel with Common Message with Very Low Interference
Quan Geng (University of Illinois at Urbana Champaign, USA), Tie Liu (Texas A&M University, USA) 1411

Capacity Theorems for the Cognitive Radio Channel with Confidential Messages
Reza K. Farsani (Institute for Research in Fundamental Sciences (IPM), Iran), Reza Ebrahimpour (Shahid Rajaee Teacher Training University, Tehran, Iran) 1416

Constant-Gap Results and Cooperative Strategies for a Class of Interference Relay Channels
German Bassi (Supelec, France), Pablo Piantanida (SUPELEC, France), Sheng Yang (Supélec, France) 1421

New Outer Bounds for the Interference Channel with Unilateral Source Cooperation
Martina Cardone (Eurecom, France), Daniela Tuninetti (University of Illinois at Chicago, USA), Raymond Knopp (Institut Eurecom, France), Umer Salim (Intel Mobile Communications, France) 1426

Algebraic Coding Theory 1

Constructions for Constant-Weight ICI-Free Codes
Scott Kayser (University of California, San Diego, USA), Paul H. Siegel (University of California, San Diego, USA) 1431

Decompositions of Edge-Colored Digraphs: A New Technique in the Construction of Constant-Weight Codes and Related Families
Yeow Meng Chee (Nanyang Technological University, Singapore), Fei Gao (Agency for Science, Technology and Research, Singapore), Han Mao Kiah (University of Illinois at Urbana-Champaign, USA), Alan Ling (University of Vermont, USA), Hui Zhang (Nanyang Technological University, Singapore), Xiande Zhang (Nanyang Technological University, Singapore) 1436
Product Construction of Affine Codes
Yeow Meng Chee (Nanyang Technological University, Singapore), Han Mao Kiah (University of Illinois at Urbana-Champaign, USA), Punarbasu Purkayastha (Nanyang Technological University, Singapore), Patrick Solé (Telecom ParisTech, France) .......................................................... 1441

A Polynomial Time Attack against Algebraic Geometry Code Based Public Key Cryptosystems
Alain Couvreur (INRIA, France), Irene Márquez-Corbella (INRIA Saclay & LIX, Spain), Ruud Pellikaan (Technical University of Eindhoven, The Netherlands) .......................................................... 1446

Universal Polarization

Universal Polar Codes
S. Hamed Hassani (EPFL, Switzerland), Ruediger L Urbanke (EPFL, Switzerland) .......................................................... 1451

Universal Polarization
Eren Şaşoğlu (University of California, Berkeley, USA), Lele Wang (UCSD, USA) .......................................................... 1456

Universal Polar Codes for More Capable and Less Noisy Channels and Sources
David Sutter (ETH Zurich, Switzerland), Joseph M. Renes (ETH Zurich, Switzerland) .......................................................... 1461

A Note on Polarization Martingales
Erdal Arikan (Bilkent University, Turkey) .......................................................... 1466

Quantum Communication and Security

Fundamental Finite Key Limits for Information Reconciliation in Quantum Key Distribution
Marco Tomamichel (National University of Singapore, Singapore), Jesus Martinez-Mateo (Universidad Politecnica de Madrid, Spain), Christoph Pacher (AIT Austrian Institute of Technology, Austria), David Elkouss (Universidad Complutense de Madrid (UCM), Spain) .......................................................... 1469

Variations on Classical and Quantum Extractors
Mario Berta (California Institute of Technology, USA), Omar Fawzi (ETH Zuerich, Switzerland), Volkher Scholz (ETH Zurich, Switzerland), Oleg Szehr (TU Munich, Switzerland) .......................................................... 1474

Trading permutation invariance for communication in multi-party non-locality distillation
Helen Ebbe (University of Lugano, Switzerland), Stefan Wolf (USI Lugano, Switzerland) .......................................................... 1479

Lower bounds on the communication complexity of two-party (quantum) processes
Alberto Montina (University of Lugano (USI), Switzerland), Stefan Wolf (USI Lugano, Switzerland) .......................................................... 1484

Estimation and Statistical Physics

Markov Chain Monte Carlo Algorithms for Lattice Gaussian Sampling
Zheng Wang (Imperial College London, United Kingdom), Cong Ling (Imperial College London, United Kingdom), Guillaume Hanrot (École Normale Supérieure de Lyon, France) .......................................................... 1489

Replica Analysis and Approximate Message Passing Decoder for Superposition Codes
Jean Barbier (École Normale Supérieure, France), Florent Krzakala (École Normale Supérieure, France) .......................................................... 1494

Variational Free Energies for Compressed Sensing
Florent Krzakala (École Normale Superieure, France), Andre Manoel (École Supérieure de Physique et de Chimie Industrielles, France), Eric W Tramel (École Normale Supérieure, France), Lenka Zdeborova (Institut de Physique Theorique IPhT, CEA Saclay and CNRS, France) .......................................................... 1499

On Stochastic Estimation of the Partition Function
Ali Al-Bashabsheh (University of Ottawa, Canada), Yongyi Mao (University of Ottawa, Canada) .......................................................... 1504
Joint Source-Channel Coding

On Robustness of Hybrid Digital Analog Source-Channel Coding with Bandwidth Mismatch
Erman Köken (UC Riverside, USA), Ertem Tuncel (UC Riverside, USA) .................................................. 1509

Source-Channel Coding with Multiple Classes
Irina Bocharova (St. Petersburg University of Information Technologies, Mechanics and Optics, Russia), Albert Guillén i Fàbregas (ICREA and Universitat Pompeu Fabra & University of Cambridge, Spain), Boris Kudryashov (St. Petersburg University of Information Technology, Mechanics and Optics, Russia), Alfonso Martinez (Universitat Pompeu Fabra, Spain), Adrià Tauste Campo (Universitat Pompeu Fabra, Spain), Gonzalo Vazquez-Vilar (Universitat Pompeu Fabra, Spain) .......................................................................................................................... 1514

Source Broadcasting to the Masses: Separation has a Bounded Loss
Uri Mendlovic (Tel Aviv University, Israel), Meir Feder (Tel-Aviv University, Israel) ......................... 1519

Optimal Strategies for Dynamic Joint Source-Channel Coding with Feedback
Se Yong Park (UCSD, USA), Tara Javidi (UCSD, USA), Andrea Goldsmith (Stanford University, USA) ........................................................................................................................................... 1524

Cryptography and Secrecy

Intercepting Tokens in Cryptographic Protocols: The Empire Strikes Back in the Clone Wars
Özgür Dagdelen (Technische Universität Darmstadt, Germany), Marc Fischlin (Technische Universität Darmstadt, Germany) ........................................................................................................................................ 1529

Cryptographic Boolean Functions with a Large Number of variables
Qichun Wang (National University of Singapore, Singapore), Chik How Tan (National University of Singapore, Singapore) .................................................................................................................................. 1534

The Oblivious Transfer Capacity of the Wiretapped Binary Erasure Channel
Manoj Mishra (Indian Institute of Technology - Bombay, India), Bikash K Dey (Indian Institute of Technology Bombay, India), Vinod M Prabhakaran (Tata Institute of Fundamental Research, India), Suhas Diggavi (University of California Los Angeles, USA) .............................................................................. 1539

Single-Use OT Combiners with Near-Optimal Resilience
Yuval Ishai (Technion, Israel), Hemanta Maji (--, USA), Amit Sahai (UCLA, USA), Juerg Wullschleger (Université de Montréal, Canada) ................................................................................................................................. 1544

Modulation and Demodulation

Media-based Modulation: Converting Static Rayleigh Fading to AWGN
Amir K. Khandani (University of Waterloo, Canada) .............................................................................. 1549

Phase Modulation for Discrete-time Wiener Phase Noise Channels with Oversampling at High SNR
Hassan Ghozlan (University of Southern California, USA), Gerhard Kramer (Technische Universität München, Germany) ......................................................................................................................... 1554

Early Decoding for Transmission over Finite Transport Blocks
Cenk Sahin (University of Kansas, USA), Lingjia Liu (University of Kansas, USA), Erik S. Perrins (University of Kansas, USA) .................................................................................................................... 1558

A Novel Trellis-Based PAPR Reduction Technique for OFDM Signals
Ryota Yoshizawa (Yokohama National University, Japan), Hideki Ochiai (Yokohama National University, Japan) ........................................................................................................................................... 1563
Wireless Network Protocols

Protocol Sequences for Multiple-Packet Reception: Throughput Invariance and User Irrepressibility
Yijin Zhang (Nanjing University of Science and Technology, P.R. China), Yuan-Hsun Lo (National Taiwan Normal University, Taiwan), Feng Shu (NUST, P.R. China), Wing Shing Wong (The Chinese University of Hong Kong, P.R. China) ............................................................. 1568

ITLinQ: A New Approach for Spectrum Sharing in Device-to-Device Communication Systems
Navid NaderiAlizadeh (University of Southern California, USA), Salman Avestimehr (University of Southern California, USA) ......................................................................................................................... 1573

Slotted Aloha for Networked Base Stations with Spatial and Temporal Diversity
Dusan Jakovetic (BioSense Center, University of Novi Sad, Serbia), Dragana Bajovic (BioSense Center, University of Novi Sad, Serbia), Dejan Vukobratović (University of Novi Sad, Serbia), Vladimir Crnojević (Novi Sad, Serbia) .............................................................................................................. 1578

Age of Information with Packet Management
Maice Costa (University of Maryland at College Park, USA), Marian Codreanu (University of Oulu, Finland), Anthony Ephremides (University of Maryland at College Park, USA) ................................................................. 1583

Interference Management for Cellular

Opportunistic Downlink Interference Alignment
Hyun Jong Yang (UNIST, Korea), Won-Yong Shin (Dankook University, Korea), Bang Chul Jung (Gyeongsang National University, Korea), Changho Suh (KAIST, Korea), Arogyaswami Paulraj (Stanford University, USA) ................................................................................................. 1588

Degrees of freedom of uplink-downlink multiantenna cellular networks
Sang-Woon Jeon (Andong National University, Korea), Changho Suh (KAIST, Korea) .................................................................................................................. 1593

Cellular Interference Alignment
Vasilis Ntranos (University of Southern California, USA), Mohammad Ali Maddah-Ali (Bell Labs, Alcatel Lucent, USA), Giuseppe Caire (University of Southern California, USA) ................................................. 1598

Enhanced Interference Management in Heterogeneous Cellular Networks
Narayan Prasad (NEC Labs America, Princeton, USA), Mustafa Y. Arslan (NEC Laboratories America, Inc., USA), Sampath Rangarajan (NEC Labs America, USA) .............................................................. 1603

Coding for Storage Systems

Counting Balanced Sequences w/o Forbidden Patterns via the Bethe Approximation and Loop Calculus
Pascal Vontobel (Stanford University, USA) .................................................................................................................. 1608

Enumerative Modulation Codes Based on Sliding-Window Substitutions
Thomas Mittelholzer (IBM Zurich Research Laboratory, Switzerland), Roy Cideciyan (IBM Zurich Research Laboratory, Switzerland) ........................................................................................................ 1613

GBP-Based Detection and Symmetric Information Rate for Rectangular-Grain TDMR Model
Seyed Mehrdad Khatami (University of Arizona & Sharif University, USA), Vida Ravanmehr (University of Arizona, USA), Bane Vasić (University of Arizona, USA) .......................................................... 1618

Oblivious Transfer in the Bounded Storage Model with Errors
Rafael Dowsley (Karlsruhe Institute of Technology & Institute of Theoretical Informatics, Germany), Felipe Lacerta (University of Brasilia, Brazil), Anderson Clayton Alves Nascimento (University of Brasilia, Brazil) ............................................................................................................ 1623