IEEE Information Theory Society Newsletter

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President's Column

Elza Erkip

Summer is almost here, and by the time you read this, hopefully summer will be in the Northern Hemisphere. Many people look forward to summer; it is synonymous with fun, relaxation, long and lazy days at the beach. For information theorists, summer is also synonymous with our flagship conference International Symposium on Information Theory (ISIT). I think many of you will agree that we have the best job in the world: Not only do we work in a field that we love, but we also get to travel to beautiful places, meet friends and learn new things, all as part of our jobs! So, no wonder we look forward to ISIT (and maybe some, like me, also look forward to beach time after the conference).

This year ISIT is in Vail, Colorado, in the beautiful Rocky Mountains. Thinking about ISIT in Vail, I cannot help but remember ISIT 1995 in Whistler, British Columbia. It was one of my early ISITs, and I was a PhD student. While I attended sessions, my boyfriend, who was doing his PhD in statistics, enjoyed walking, hiking and various other summer activities in Whistler. And being a graduate student, he also wanted to take advantage of the Spouse Breakfast (free food!). Unfortunately, he was almost kicked out, as no one would believe he was a "spouse" and not a conference participant. Luckily, one of my office mates' wife vouched for him, and he ended up meeting many of the spouses attending the breakfast. This meant that for the rest of the week, while I was exchanging greetings with the well-known senior people of the field, he was doing the same with their wives.

Times have changed since 1995, and now we have more women in the society. We even get to have our own free food at Women in Information Theory (WITHITS) events, which, by the way, is open to everyone. We would love to see more men attending WITHITS events, after all women's issues also benefit from diverse viewpoints (and did I say there is free food?).

While our society has made progress on participation of women, we still have a long way to go. For example, there are no women among the 125 authors of the 64 papers which won the Information Theory Paper Award since its inception in 1962. Even when we look at the Jack Keil Wolf ISIT Student Paper Award, which targets a younger, and, presumably, more diverse demographic, we see that none of the 32 award winning papers have been authored or co-authored by a woman student. Diversity includes, but is not limited to, gender diversity. The recently formed Information Theory Society Ad-Hoc Committee on Diversity and Inclusion is currently collecting statistics on society awards, committees, conferences, schools, and looking into ways of ensuring a broader, more diverse participation and representation in society awards and events. I would like to thank Stark Draper, Sid Jaggi, Tara Javidi, Muriel Médard and Emanuele Viterbo for agreeing to serve on the committee, which I am chairing. We plan to present our first report at the Board of Governors meeting in Vail, and hope to summarize our activities in a future Newsletter article.

In the last President's Column, I mentioned the society's five-year IEEE review. We provided the IEEE with a detailed report in January, and had a face-to-face meeting with IEEE's Society and Council Review Committee (SCRC) in February. In late March, we received feedback from the IEEE. The SCRC was quite positive in its response, and had several constructive comments on the society governance, strategy and operations, publications and finances. In addition, I am happy to report that the following two items were included in the SCRC's list of "Society and Council Effective Practices":

- A children's book entitled "Information in Small Bits" has been produced by Anna Scaglione and Christina Fragouli. The first copies will be distributed to Information Theory

(continued on page 3)

From the Editor

Salim El Rouayheb

A long time reader first time editor, I am happy to bring you the first issue this summer of our IT society newsletter. I am also thrilled and grateful to be entrusted this beloved publication of our society and committed to continue its success and growth. Michael Langberg, our outgoing editor, has left his mark on the newsletter. I would like to give him a million thanks on behalf of all of us.

We start this issue with a column from Elza Erkip, our society president, on different issues and activities this summer. Anthony Ephremides's historian's column continues with another installment, this time bringing us creative word play from our daily life as information theorists (may I add "spin class theory" to it?). This issue also features a special article by Friedrich Hagemeyer about his trip from East Germany to the US in 1977, where he spent 5 months interviewing more than 20 experts in our field as part of his PhD Dissertation. The result is more than 40 hours of interviews with Claude Shannon, Robert Fano, Robert Gallager, John Wozencraft , Peter Elias and others. The plan is to get these interviews transcribed and published successively here in the near future. This issue also includes reports on different workshops that took place in the past three months: The Dagstuhl Seminar on Coding Theory for Inference, Learning, and Optimization, The Munich Workshop on Coding and Cryptography and The Workshop on Coding and Information Theory at Harvard's Center of Mathematical Sciences and Applications (CMSA).

As a reminder, announcements, news, and events intended for both the printed newsletter and the website, such as award announcements, calls for nominations, and upcoming conferences, can be submitted at the IT Society website http://www.itsoc.org. Articles and columns can be e-mailed to me at salim.elrouayheb@rutgers.edu with a subject line that includes the words "IT newsletter."

The next few deadlines are:

July 10, 2018 for the issue of Sep. 2018.

Oct. 10, 2018 for the issue of Dec. 2018.

Please submit plain text, LaTeX, or Word source files; do not worry about fonts or layout as this will be taken care of by IEEE layout specialists. Electronic photos and graphics should be in high resolution and sent as separate files.

Salim El Rouayheb

IEEE Information Theory Society Newsletter

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Table of Contents

President's Column 1

From the Editor 2

Awards 3

Historian's Column 4

Recovering Old Sources for the History of Information Theory 5

Report on 2018 Dagstuhl Seminar on Coding Theory for Inference, Learning, and Optimization 7

Report on the Munich Workshop on Coding and Cryptography 2018 (MWCC 2018) 7

Workshop on Coding and Information Theory 9

Conference on Channels, Statistics, Information, Secrecy, Zero-error, and Randomness (CSISZÁR) 9

Book Review 9

Recent Publications 10

Call for Papers 13

Conference Calendar 16

Awards

Congratulations to the members of our community that have recently received prestigious awards and honors.

We are all honored as a community!

2018 ACM SIGMOBILE Test-of-Time Paper Award: Rudolf Ahlswede, Ning Cai, Shuo-Yen Robert Li and Raymond W. Yeung

Rudolf Ahlswede, Ning Cai, Shuo-Yen Robert Li and Raymond W. Yeung received the 2018 ACM SIGMOBILE Test-of-Time Paper award on their paper "Network Information Flow," 46(4), IEEE Transactions on Information Theory, July 2000.

"This is the seminal work on network coding that had a profound impact on the networking and mobile systems communities. The information theoretic analysis led to significant academic work for more than a decade in the networking community on leveraging network coding to build systems that achieve higher reliability and throughput."

The SIGMOBILE Test-of-Time awards recognize papers that have had a sustained and significant impact in the SIGMOBILE community over at least a decade. The award recognizes that a paper's influence is often not fully apparent at the time of publication, and it can be best judged with the perspective of time. All papers published at least 10 years ago in a SIGMOBILE venue are eligible for this award. In addition, papers published at least 10 years ago in other venues are also eligible if they have had an exceptional influence on the SIGMOBILE community.

Heinz Maier-Leibnitz Prize: Antonia Wachter-Zeh

Prof. Antonia Wachter-Zeh of the Institute for Communications Engineering of the Technical University of Munich (TUM) is the recipient of a 2018 Heinz Maier-Leibnitz Prize of the German Research Foundation (DFG). The prize is awarded to 10 young researchers annually, across all research disciplines, as a distinction for outstanding achievement.

Antonia is a Rudolf Mößbauer Tenure Track Assistant Professor, and a Fellow at the TUM Institute for Advanced Study. Her main research interests are coding theory, efficient algorithms, security (in particular code-based cryptography and physical unclonable functions), and applying error-correcting codes to communications and storage in general, in particular to network coding, non-volatile memories, distributed data storage, and DNA storage.

The Heinz Maier-Leibnitz Prize is named in honor and memory of the German physicist Heinz Maier-Leibnitz. The Prize is funded by the German Federal Ministry of Education and Research (BMBF) and is awarded by a selection committee appointed by the DFG and the BMBF. The award is accompanied by a cash prize of 20,000 euros.

President's Column *(continued from page 1)*

Society members during the yearly Information Theory and Applications (ITA) conference in San Diego in February 2018. A wider distribution (most likely via Amazon) is in preparation. The SCRC considers this a best practice because it is an impressive way to reach out to the younger generation and educate them in engineering. The SCRC believes that this is the youngest targeted audience future member recruitment by a society or council yet.

- The Society Outreach Subcommittee organizes mentor/mentee pairs, but also group mentoring with round table mentoring events at Society activities. Society group mentor events staff 10-15 tables with a mentor focused on topics of interest to junior members. These events attract well over 100 attendees. The SCRC considers this unique approach to group mentoring at round table events as a best practice because of the variety of topics, multiple experts available, casual face-to-face conversations, and the overall networking and learning opportunities with mentors and peers.

I would like to thank Anna Scaglione and Christina Fragouli for leading the children's book project, and Aaron Wagner and Joerg Kliewer for starting the group mentoring events during their tenure as the Outreach Subcommittee Co-Chairs.

For me, one of the highlights of being the President of Information Theory Society is the Awards Ceremony at ISIT, where I will get a chance to personally congratulate winners of various society awards and recognize the many volunteers whose terms have ended. We will also celebrate the accomplishments of society members who received IEEE level awards in 2018. As in past few years, we are keeping the identity of the 2018 Aaron D. Wyner Distinguished Award recipient as a surprise. Two more surprises come during the banquet where I will have the pleasure of announcing the 2019 Claude E. Shannon Award winner, and Emina Soljanin, society Vice President, will announce the winners of the 2019 Jack Keil Wolf ISIT Student Paper Award.

I am happy to hear from all of you; please feel free to contact me at elza@nyu.edu.

Historian's Column

Anthony Ephremides

The History context of this column is simply the fact that about 35 years ago a playful editor of our Newsletter was inspired to emulate a common wordplay game that was (and is) popular, especially in the United States. The idea is to choose standard terms, notions, or names from a discipline or a topic and "corrupt" them slightly to change their basic meaning and to make them sound hilarious, funny, or simply "weird" and provide a new definition that captures the intended meaning of the corrupted term.

Obviously, this cries out for examples and I intend to provide several (which, to my knowledge, are in fact "original").

To begin with, we know there are fellow human beings who have a phobia of information technology and who shed cold sweat when confronted with computer misfeasance. How do we measure the degree of their phobia? Perhaps an appropriate measure would be their "Bit Terror Rate".

How would we call machinations by evil people who happen to work on Information theory and who aim at illicit objectives? Perhaps the term should be "Shannonigans".

What should be the name for the kind of attire appropriate for presentations at our Symposia, especially in sessions on Coding Theory? How about "Dress Codes"!

As there is a movement in parts of the world by some governments to walk away from agreements on climate control and emission control and the like, we need a term for this phenomenon. My friend the WordSmith came up with "Eco-cancellation".

When we take samples of an ongoing process, we know that the sampling rate is an important variable that determines how well we can reconstruct the process form its samples. Of course, we may miss samples or we may make erroneous measurements of them. The rate at which this happens will affect the quality of the reconstruction and should be referred to as the "Stumbling Rate".

Fishermen who try to catch prized species of salmon know that there are intricate methods and procedures through which one can "read" the water as it flows in the river to determine where it is most likely that the big salmon is holding. These methods are known (or, should be known) as "Read-Salmon Codes".

We all know that people often tell lies, white lies, big lies, and, lately, news media are accused of spreading fake news. Of course, not everyone can lie to the same degree. There are fundamental limits that are different for every individual. Those limits should be referred to as "Lying Capacity". We do know that for some people no known bounds to that capacity are known.

It is a common habit today among most people who socialize through the electronic media to exchange text messages. Some people, especially youngsters, tend to overdo it. We could say that these people engage in "Textual Harassment". There should be zero tolerance for that!

There are people who are afraid of heights, or have a fear of flying or are terrified by different environmental phenomena or …other people (who sometimes are known as "forces of nature", after all). There should be therapeutic procedures that could be developed to reduce or eliminate such phobias. Such procedures could be called "Terror Correction Codes".

Wiener Filtering has been a major topic in Estimation Theory and there have been many variants of it proposed and/or used. Often these variants have pounded and "tenderized" the basic method to the point where the original method has become unrecognizable. Such as variant could be called "Wiener Schnitzel"!

Just in case you have had enough of that and just in case you may invent your own new terms, we could shift to a somewhat different approach to mixing terms from our field with extraneous entities. This approach uses acronyms that could be used to abbreviate common concepts in our field, yet they have their own independent meaning out there.

Consider the innocent sounding term "Inter Symbol Interference System". The acronym, ISIS, is rather ominous. How about "Machine Learning Digital Calculator"? Those with a knowledge of the Italian language would enjoy the resulting acronym MALEDICA (means Curse).

A term of interest for those who follow the special prosecutor investigations in Washington would be the "COLLaborative Unbiased Digital Estimator", or COLLUDE. In a different vein, we could consider the "Ultimate MAssive MImo", which brings visions of UMAMI.

And then we have the "System and Network Optimization for Wireless", or SNOW, which is actually a real annual workshop taking place in the winter months at a ski resort of a Scandinavian country. We just celebrated the 9th one this year.

There are other angles of approach to this nonsense as well. For example a colleague has on his door the following quote: "Avoid electric shock; it Hertz. But only Faraday. Then it Gauss away". Which reminds me of the joke about the thief who stole valuable impressionist paintings from the Jeux de Paume museum in Paris and put them in a van but was promptly caught. When asked how he managed to get caught he quipped: "I did not have the Monet to pay Degas to make the VanGhoh"!

One could go on but I am sure the readers are getting the... drift (or have had enough).

I would like to close with a reproduction of some distorted opera titles that show a sublime affinity of Opera to Fish. This was a joint exercise between Jerry Hayes and myself during a boring session of a NATO Advanced Study Institute in Italy in 1986. We were surprised by the … possibilities. Here are some examples:

Tannhaeuser can become Tannhoyster; Madama Butterfly could become Madama Butterfish; Rosenkavalier easily transforms to Frozenkavalier; and Porgy and Bess is one letter away from Porgy and Bass. When we related these stunning pairings to colleagues, their one-track mind attributed them to the…. Poisson assumption.

With that it's time to rest my case.

Recovering Old Sources for the History of Information Theory

Forty hours of interviews from 1977
Friedrich Hagemeyer, Berlin (Germany)

Claude Shannon's Work Goes East


Friedrich Hagemeyer

In 1973, when the war in Vietnam came to an end for the US, I finished my studies of physics at the other side of the globe. At the 500 years old university in the beautiful small town of Greifswald at the shores of the Baltic sea in East Germany I wrote my diploma thesis. In it, I tried to show how to use Walsh Functions for digital transformations instead of Fourier Analysis. With this, I was convinced to clear my way for a career in communications technology. During my research I came across the works of Claude Shannon. Bridging physics and communications by using 'entropy' to quantify information struck me as the foundation of a future information age which I was sure was going to come.

Sociology of Science and the Smell of Fresh Linen

Very strong rules of political compliance existed at that time in communist East Germany. People who, like me, were not members of the monopolized youth organization "FDJ" and who had siblings who fled the system with fake passports after the wall had been built in 1961 had no chance to pass the test.

I applied unsucessfully for research positions at East German industrial companies while I worked at a copy shop for nearly a year. All I could do was spend my time complaining with my friends about the communist system. However, on the more productive side, with Thomas S. Kuhn's "Structure of Scientific Revolutions" I discovered a new Western theory explaining the development of science. My aunt in West Germany fulfilled my Xmas wish. She sent this forbidden book to me - hidden in a box with washing detergent. Sociology of science happened to smell like fresh linen for me for the years to come.

If I ever would have the chance to follow my intentions in the West, I promised to myself I wanted to study the origins of the scientific revolution connected with Shannon's paradigm of the quantitative measure of information; I intended to describe the structure of this scientific revolution along the lines of Thomas Kuhn's program. Nobody so far had tried to apply his thoughts to a science originating in technology. I wanted to be the first.

Researching the History of a Scientific Revolution Goes West

After an extensive search for a job, I ended up working as an assistant to the director at the theatre of Karl-Marx-Stadt, a town in the southern part of East Germany.

Already in 1972 the German Bundeskanzler Willy Brandt had closed a deal with East Germany, to take care for cases of family reunifications. Practically this meant that people applying to be unified with their families in the West were finally bought out of the East. I decided to apply to be 'unified' with my West-German cousin whom I listed as my fiancée. We had great fun, writing heartbreaking love letters to each other, counting on the Stasi (the East German secret police) to intercept and open them and to put my case on the pile named "exit permit" from the East. Today, one could say these were my first experiences in applying proper coding to convey a credible message to the codebreakers: the all-present observers and final gate-keepers.

I arrived in West-Berlin in December 1974. One year later, in parallel with a condensed study of sociology and history of science, I started my PhD dissertation about "Concepts of information in 20th century communications technology" ("Die Entstehung von Informationskonzepten in der Nachrichtentechnik. Eine Fallstudie zur Theoriebildung in Industrie- und Kriegsforschung", Free University, Berlin 1979). My research was financed by a scientific foundation and by my aunt, who had sent me Kuhn's book. As the central part of it I planned visits to American archives and a series of interviews with experts of the field including Claude Shannon himself.

My thesis covers the years from 1920 to 1960. It looks at the evolution of the technical challenges in communications engineering in peace and war times, into the development of the associated research structures and into the progress of mathematical methods and the theoretical work. As Thomas Kuhn showed, a successful scientific paradigm is not simply giving better answers than competing theories. Rather, it is formulating new relevant questions that will give work to generations of scientists to come. It's exactly that which set Shannon's Information Theory apart from all the other concepts of the time.

From Berlin into the Archives of the Digital Age

So far, the theory and my ambitions. In practice, growing up in the East meant learning Russian instead of English at school first. This is why I had to start with English from nearly zero. Two weeks of a daily eleven hour crash-course at a Berlitz language school plus watching original American movies until late night at the wonderful little West-Berlin cinemas paved the way.

In order to train my capabilities as an interviewer, I started 1976 by interviewing early German experts in the field, like Karl Küpfmüller, who in 1924 had done similar work as Harry Nyquist. Some months later I put my English to the test and interviewed scientists in the UK who had concentrated rather on physical and physiological explorations around Information Theory, like Colin Cherry and Donald MacKay.

In 1977 I felt prepared enough to spend 5 months in the US in order to do further research at the archives of AT&T, the National

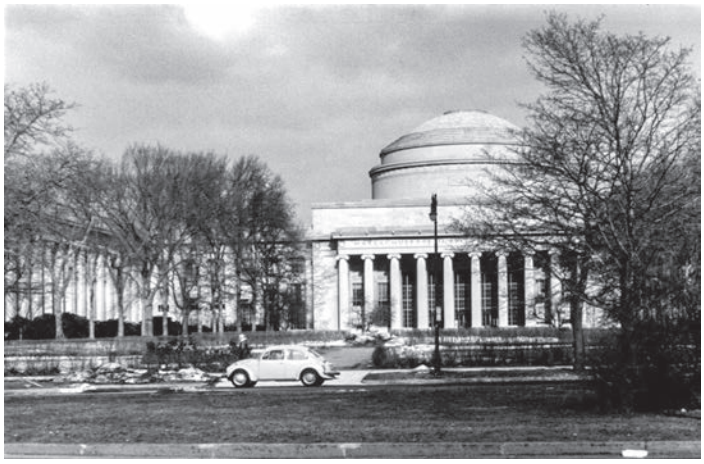
Institute of Physics of the University of Greifswald in 1973 (Source: Greifswald University Archive).

Archives, the Library of Congress in Washington D.C., and many archival collections at different universities. Therefore, I am able to provide a collection of rare copies of many of the original documents. Among those is the founding document of the digital age, a copy of the internal NDRC report, from may 15th 1942 by George Stibitz in which for the first time ever the proposal is elaborated to call these new machines not "pulse" but "digital computers". I had the privilege of being the first to rediscover a letter from Shannon to Vannevar Bush in which he set out his intent to develop a theory of communications as early as February 16th in 1939. Not even Shannon could remember this in an interview with Robert Price.

And then, of course, came the interviews, from Connecticut and Massachusetts to California and from New York to Arizona, from retirement homes to universities and company headquarters, with many people who had been deeply involved in the origins of information theory and in cooperation with Claude Shannon.

In the end, I could collect more than 40 hours of interviews with more than 20 experts, among them nearly 4 hours of two meetings with Claude Shannon.

I talked to Robert Fano, Robert Gallager, John Wozencraft, Peter Elias, and Jerome Wiesner at MIT, W.R. Bennett at Colts Neck,



A German at MIT (Source: Friedrich Hagemeyer).

Hendrik Bode at Harvard, Colin Cherry in London, Donald MacKay in Keele (UK), Karl Küpfmüller in Darmstadt (Germany), John Pierce at Caltech and Claude Shannon in Winchester, MA. I interviewed Bernard Oliver at HP, Edward Gilbert, David Slepian, M.D. Fagen and Stewart Lloyd at Bell Labs in Murray Hill. Thornton Fry in Carmel and Warren Weaver in Milford, Brockway McMillan in Whippany, and John Riordan at Rockefeller University (NY) also gave me their time for an interview.

While preparing a speech some years ago, I enjoyed a paradoxical moment of self-reflectivity when I reread the transcript of the very detailed interview Robert Price recorded with Shannon in 1982. There I could read that Shannon, his wife Betty, and the interviewer were looking up my thesis (which I did send to him, after it was finished in 1979). And Price remarked, *"I'm not undertaking to redo what Hagemeyer has already done. In fact, I think a lot of this must be going over old grounds, because you've already done this four years ago into a tape recorder. And when the Hagemeyer thesis eventually can get translated, you'll see it all there, probably a lot of duplication of what you're telling me right now."*

Going Over Old Ground

But a translation never happened. In 1980, the year after the 550 pages of the dissertation had been finished, I received the Kellermann Award for the best work in history of technology in Germany. In a letter to John W. Tukey, Robert Price called my thesis "an extremely thorough and perceptive study in the history of science." Publishers Suhrkamp and Springer offered to publish a condensed English book-version of it. However, at that time I had departed from history of science. I was already deeply involved into my new job at the engineering company Siemens in Munich. At a private level I was busy with getting a patent for an optical computing device which I later sold to Siemens. So, my thesis was never condensed into a book.

Every then and now during the last 40 years scholars contacted me and asked for transcripts of my interviews, which I never managed to write down. I very much hope that the fund of rich archival material and these interviews, as well as my old thesis, may find a new home to be of easy access to future scholars.

Report on 2018 Dagstuhl Seminar on Coding Theory for Inference, Learning, and Optimization

A Dagstuhl seminar on coding theory was held from March 11–16, 2018, at Schloss Dagstuhl in Germany. The meeting brought together 22 researchers from across the world specializing in information theory, machine learning, theoretical computer science, optimization, and statistics. The main goal of the seminar was to accelerate research in the growing field of coding theory for computation and learning, and maximize the transformative role of codes in non-traditional application areas.

The seminar featured tutorial talks by Sasha Barg ("Different facets of the repair problem"), Dimitris Achlioptas ("Error-correcting codes as samplers"), and Olgica Milenkovic ("Query and higher-order clustering: Some open problems"), as well as shorter talks by many of the seminar participants on recent or ongoing work. The afternoons and evenings were devoted to informal breakout sessions for groups to discuss open questions, in order to spark discussions and collaborations about how coding theory might be used to improve and inform modern techniques for data analytics. Two of the larger breakout sessions focused on distributed optimization and group testing.

Seminar participants reported that they enjoyed hearing about new ideas, as well as delving into deeper technical discussions about open problems in coding theory. Some topics deserving special mention include the use of techniques in statistical mechanics; locally decodable and recoverable codes; submodular function optimization; hypergraph clustering; private information retrieval; and contagion on graphs. All participants valued the ample time for discussions between and after talks, as it provided a fruitful atmosphere for collaborating on new topics. Some of the social highlights of the seminar included a group excursion to the historic Völklingen Steel Mill and an eventful road trip through the countryside to a local vineyard.

Group photo Dagstuhl seminar.

The organizers would like to sincerely thank the scientific and administrative staff at Schloss Dagstuhl for facilitating and coordinating all aspects of the seminar.

Po-Ling Loh, Arya Mazumdar, Dimitris Papailiopoulos, and Rüdi Urbanke

Report on the Munich Workshop on Coding and Cryptography 2018 (MWCC 2018)

Date and location: April 10–11, 2018,
Institute for Communications Engineering,
Technical University of Munich, Germany

Organizers: Ragnar Freij-Hollanti, Camilla Hollanti,
Vladimir Sidorenko, and Antonia Wachter-Zeh

The "Munich Workshop on Coding and Cryptography 2018" (MWCC 2018) was organized in Munich on April 10–11, by the "Coding for Communications and Data Storage" (COD) group headed by Antonia Wachter-Zeh. The workshop continues the tradition of MWCA 2017 organized by the same research group, as well as previous conferences by Gerhard Kramer, Norbert Hanik, Gianluigi Liva, and Georg Boecherer.

The two-day single-sesion workshop featured fourteen invited speakers, a very well-attended poster session, and more than 80 international scientists. A central theme of the workshop was private information retrieval (PIR), discussed by no less than half of the speakers, while many other topics in combinatorial, algebraic and applied coding theory were also discussed, including code-based cryptography and machine learning.

The social program included a typical Bavarian dinner at Wirtshaus Maxvorstadt.

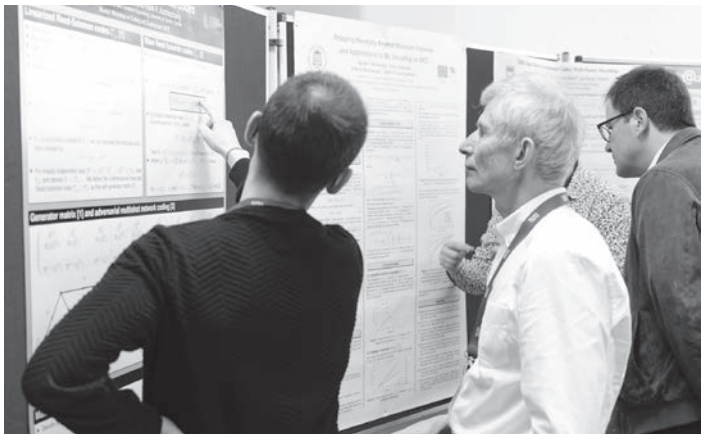
Invited Talks

Daniel Augot (INRIA, France): "On the Decoding of Interleaved Reed-Solomon Codes"

Angela Barbero (Valladolid, Spain): "On MDS Convolutional Codes. An Algorithm and Some Constructions of Superregular Matrices."

Group photo of MWCC 2018.

The audience during one of the invited talks.



Discussions during the poster session.

Simon Blackburn (Royal Holloway, UK): "Reducing the Download Complexity of PIR Schemes"

Christos Dimitrakakis (DLR, Germany): "Social Aspects of Machine Learning"

Salim El Rouayheb (Rutgers, USA): "The Curious Case of Single-Server Information Theoretic Private Information Retrieval"

Tuvi Etzion (Technion, Israel): "Locality, Availability, Subspaces, and their Connection to PIR Codes"

Ragnar Freij-Hollanti (TU Munich, Germany): "Star Product Schemes for Private Information Retrieval"

Alexandre Graell i Amat (Chalmers, Sweden): "Achieving Private Information Retrieval Capacity in Distributed Storage Using an Arbitrary Linear Code"

David Karpuk (Los Andes, Colombia): "Private Computation"

Katerina Mitrokotsa (Chalmers, Sweden): "Outsourcing Computations to a Cloud that you Don't Trust"

Joachim Rosenthal (U Zürich, Switzerland): "Convolutional Codes having good Distance Profile for a Particular Metric"

Antonia Wachter-Zeh (TU Munich, Germany): "On a Rank-Metric Code-Based Cryptosystem with Small Key Size"

Eitan Yaakobi (Technion, Israel): "On the Access Complexity of PIR Schemes"

Øyvind Ytrehus (Bergen, Norway): "Coding Techniques for Communication with Low Power Devices over Inductively Coupled Channels"

In addition to the invited talks, a total of 26 posters were presented during a session on the afternoon of April 10th. The posters were also exposed during the coffee breaks, and inspired many interesting discussions.

Funding for the workshop was provided by the German Research Foundation (DFG), the TUM Institute for Advanced Studies (IAS), and the TUM Institute for Communications Engineering.

As of yet, no details about the next edition of the MWCC workshop series is decided, but following the success of the last two workshops, the organisers are determined to continue the tradition in one form or another. Further details of the workshop including the Program and list of participants, and more photos are available at the web address:

https://www.lnt.ei.tum.de/events/munich-workshop-on-coding-and-cryptography-2018-mwcc-2018/.

Workshop on Coding and Information Theory

The Workshop on Coding and Information Theory took place April 9–13, 2018, as part of the year-long program on Combinatorics and Complexity being held at Harvard's Center of Mathematical Sciences and Applications (CMSA). The workshop focused on new developments on coding and information theory sitting at the intersection of combinatorics and complexity, and the goal was to bring together researchers from several different communities—coding theory, information theory, combinatorics, and complexity theory—to exchange ideas and share their work.

The week-long workshop featured 29 talks from researchers across mathematics, electrical engineering and computer science, with topics including (but not limited to!) list-decoding, index coding, communication over the deletion channel, coding in distributed storage and associated problems with locality constraints, combinatorial questions in coding theory, and applications of information theory in learning and optimization. Several of the talks gave an overview of a broad research area while most most others were devoted to specific recent results. The talks covered recent research in classic problems (for instance, the MDS conjecture, or explicit codes approaching the GV bound) as well as in a range of problems of current interest to the community such as the design of short codes for emerging communication systems, distributed testing, or information-theoretic aspects of machine learning.

There were also two unscheduled sessions devoted to speed talks and open problems, and plenty of free time for collaborative research (as well as coffee, snacks, and lunches) in CMSA's wonderful space in Cambridge MA. The generous support of the workshop by CMSA made it possible to hold an open reception on the first day, introducing the participants to each other and promoting research collaboration.

The organizers (Alexander Barg, Venkatesan Guruswami, and Mary Wootters) are very grateful to CMSA and the program on Combinatorics and Complexity for their hospitality and for their exceptional handling of all the logistics.

An overview of the year-long program and more information about the workshop can be found at https://cmsa.fas.harvard.edu/coding/

Conference on Channels, Statistics, Information, Secrecy, Zero-error, and Randomness (CSISZÁR)

A prominent member of the Information Theory community, Imre Csiszár, recipient of the 1996 Shannon Award and the 2015 IEEE Hamming Medal, has turned 80 in 2018. To celebrate this event, the Rényi Institute organizes a two-day conference on June 4–5, 2018, in Budapest. For further details please consult the website https://www.renyi.hu/conferences/csiszar80/

Book Review

Ezio Biglieri

Michele Elia, "An Introduction to Classic Cryptography (With an Exposition of the Mathematics of Private and Public Key Ciphers)", Canterano (Italy): Aracne Ed., 2018 (273 pp., € 20)

This book grows from notes of a course in Cryptography given by the author, and has maintained the same didactical flavor as it manages to make the information accessible to beginners. It covers both the history and the practical sides of cryptology, interleaving basic notions with the presentation of the classical algorithms, their history, and the analysis of their security. In addition to material usually covered in recent textbooks (e.g., Shannon theory of secrecy systems, random sequences, secret- and public-key cryptography, elliptic curve cryptosystems, cryptanalysis, and steganography), a few cryptography schemes are covered with an amount of detail generally not found in textbooks (e.g., Polybius', Alberti's, Bellaso's, Vigenère's, Hill's, Rabin's, Enigma). About a hundred reference titles will help the reader interested to go deeper into specific topics.

Recent Publications

IEEE Transactions on Information Theory

Table of content for volumes 64(3), 64(4), 64(5)

Vol. 64(3): Mar. 2018.

QUANTUM INFORMATION THEORY

A. Anshu, R. Jain, and N. A. Warsi	A One-Shot Achievability Result for Quantum State Redistribution	1425
A. Anshu, R. Jain, and N. A. Warsi	A Generalized Quantum Slepian–Wolf	1436
X. Wang and R. Duan	Separation Between Quantum Lovász Number and Entanglement-Assisted Zero-Error Classical Capacity	1454
L. Luo and Z. Ma	Non-Binary Quantum Synchronizable Codes From Repeated-Root Cyclic Codes	1461

CODING THEORY AND TECHNIQUES

S. Ahn, M. Chertkov, A. E. Gelfand, S. Park, and J. Shin	Maximum Weight Matching Using Odd-Sized Cycles: Max-Product Belief Propagation and Half-Integrality	1471
L. Natarajan, Y. Hong, and E. Viterbo	Lattice Codes Achieve the Capacity of Common Message Gaussian Broadcast Channels With Coded Side Information	1481
M. Blaum and S. R. Hetzler	Extended Product and Integrated Interleaved Codes	1497
K. Lee, M. Lam, R. Pedarsani, D. Papailiopoulos, and K. Ramchandran	Speeding Up Distributed Machine Learning Using Codes	1514
X. Fan, O. Kosut, and A. B. Wagner	Variable Packet-Error Coding	1530
C. Tian and J. Chen	Caching and Delivery via Interference Elimination	1548
N. di Pietro, G. Zémor, and J. J. Boutros	LDA Lattices Without Dithering Achieve Capacity on the Gaussian Channel	1561
L. Sok, J.-C. Belfiore, P. Solé, and A. Tchamkerten	Lattice Codes for Deletion and Repetition Channels	1595
X. Ma, K. Huang, and B. Bai	Systematic Block Markov Superposition Transmission of Repetition Codes	1604
K. V. Rashmi, N. B. Shah, K. Ramchandran, and P. V. Kumar	Information-Theoretically Secure Erasure Codes for Distributed Storage	1621
L. Liu, Y. Yan, and C. Ling	Achieving Secrecy Capacity of the Gaussian Wiretap Channel With Polar Lattices	1647

SPARSE RECOVERY, SIGNAL PROCESSING, LEARNING, ESTIMATION

K. Lee, Y. Wu, and Y. Bresler	Near-Optimal Compressed Sensing of a Class of Sparse Low-Rank Matrices Via Sparse Power Factorization	1666
R. Zhang and S. Li	A Proof of Conjecture on Restricted Isometry Property Constants δ_{tk} $(0 < t < \frac{4}{3})$	1699
E. Mohammadi and F. Marvasti	Sampling and Distortion Tradeoffs for Bandlimited Periodic Signals	1706
S. Vaiter, G. Peyré, and J. Fadili	Model Consistency of Partly Smooth Regularizers	1725
Y. Chen, X. Yi, and C. Caramanis	Convex and Nonconvex Formulations for Mixed Regression With Two Components: Minimax Optimal Rates	1738

Vol. 64(4): Apr. 2018.

PART I OF TWO PARTS

SHANNON THEORY

T. A. Courtade	A Strong Entropy Power Inequality	2173
S. Beigi and A. Gohari	Φ-Entropic Measures of Correlation	2193
Ł. Dębowski	Maximal Repetition and Zero Entropy Rate	2212
F. Cicalese, L. Gargano, and U. Vaccaro	Bounds on the Entropy of a Function of a Random Variable and Their Applications	2220
N. Merhav	Universal Decoding Using a Noisy Codebook	2231
L. Farkas and T. Kói	Universal Random Access Error Exponents for Codebooks of Different Blocklengths	2240
J. Scarlett, A. Martinez, and A. Guillén i Fàbregas	Mismatched Multi-Letter Successive Decoding for the Multiple-Access Channel	2253
A. Padakandla and S. S. Pradhan	Achievable Rate Region for Three User Discrete Broadcast Channel Based on Coset Codes	2267

S.-Y. Yeh and I.-H. Wang	Degrees of Freedom of the Bursty MIMO X Channel Without Feedback	2298
Y. Wu	Achievable Rates for Discrete Memoryless Multicast Networks With and Without Feedback	2321
L. V. Truong and V. Y. F. Tan	On Gaussian MACs With Variable-Length Feedback and Non-Vanishing Error Probabilities	2333
H. A. Inan, D. Shaviv, and A. Özgür	Capacity of the Energy Harvesting Gaussian MAC	2347
	PRIVACY AND SECRECY	
H. Sun and S. A. Jafar	The Capacity of Robust Private Information Retrieval With Colluding Databases	2361
C. Chan, M. Mukherjee, N. Kashyap, and Q. Zhou	On the Optimality of Secret Key Agreement via Omniscience	2371
	CODING THEORY AND TECHNIQUES	
S. Mesnager, C. Tang, and Y. Qi	Complementary Dual Algebraic Geometry Codes	2390
T. Etzion, M. Firer, and R. A. Machado	Metrics Based on Finite Directed Graphs and Coding Invariants	2398
S. Liu, C. Xing, and C. Yuan	List Decoding of Cover Metric Codes Up to the Singleton Bound	2410
H. Q. Dinh, B. T. Nguyen, A. K. Singh, and S. Sriboonchitta	On the Symbol-Pair Distance of Repeated-Root Constacyclic Codes of Prime Power Lengths	2417
T. G. Swart, J. H. Weber, and K. A. Schouhamer Immink	Prefixless q-Ary Balanced Codes With Fast Syndrome-Based Error Correction	2431
C. Galindo, O. Geil, F. Hernando, and D. Ruano	Improved Constructions of Nested Code Pairs	2444
T. Etzion and A. Wachter-Zeh	Vector Network Coding Based on Subspace Codes Outperforms Scalar Linear Network Coding	2460
O. Elishco, T. Meyerovitch, and M. Schwartz	On Encoding Semiconstrained Systems	2474
S. Buzaglo, Y. Cassuto, P. H. Siegel, and E. Yaakobi	Consecutive Switch Codes	2485

PART II OF TWO PARTS

SPECIAL ISSUE ON SHIFT REGISTER SEQUENCES, CODES AND CRYPTOGRAPHY IN MEMORY OF SOLOMON W. GOLOMB

S. W. Golomb and B. A. Golomb	A Career in Engineering	2805
A. Viterbi	Solomon Wolf Golomb 1932–2016	2837
J. Buhler, P. Cuff, A. Hales, and R. Stong	Puzzles in Memory of Solomon Golomb	2839
G. Gong, T. Helleseth, and P. V. Kumar	Solomon W. Golomb—Mathematician, Engineer, and Pioneer	2844
	SEQUENCES WITH GOOD CORRELATION	
S. Boztaş, F. Özbudak, and E. Tekin	Explicit Full Correlation Distribution of Sequence Families Using Plateaued Functions	2858
B. M. Popović	Optimum Sets of Interference-Free Sequences With Zero Autocorrelation Zones	2876
Y. M. Chee, H. M. Kiah, S. Ling, and H. Wei	Geometric Orthogonal Codes of Size Larger Than Optical Orthogonal Codes	2883
Z. Zhou, T. Helleseth, and U. Parampalli	A Family of Polyphase Sequences With Asymptotically Optimal Correlation	2896
M. K. Song and H.-Y. Song	A Construction of Odd Length Generators for Optimal Families of Perfect Sequences	2901
	SEQUENCES AND THEIR APPLICATIONS	
Y. Chen, Y.-H. Lo, K. W. Shum, W. S. Wong, and Y. Zhang	CRT Sequences With Applications to Collision Channels Allowing Successive Interference Cancellation	2910
R. Gabrys and E. Yaakobi	Sequence Reconstruction Over the Deletion Channel	2924
	NONLINEAR FEEDBACK SHIFT REGISTER SEQUENCES	
J.-M. Zhang, T. Tian, W.-F. Qi, and Q.-X. Zheng	On the Affine Sub-Families of Quadratic NFSRs	2932
M. Li and D. Lin	De Bruijn Sequences, Adjacency Graphs, and Cyclotomy	2941
	BOOLEAN FUNCTIONS AND CRYPTOGRAPHY	
A. Klapper and Z. Chen	On the Nonexistence of q-Bent Boolean Functions	2953
T. W. Cusick	Weight Recursions for Any Rotation Symmetric Boolean Functions	2962
C. Carlet and X. Chen	Constructing Low-Weight d th-Order Correlation-Immune Boolean Functions Through the Fourier-Hadamard Transform	2969
R. S. Coulter and S. Mesnager	Bent Functions From Involutions Over $\mathbb{F}_{2^n}$	2979
F. Zhang, Y. Wei, E. Pasalic, and S. Xia	Large Sets of Disjoint Spectra Plateaued Functions Inequivalent to Partially Linear Functions	2987
Z. Wang and G. Gong	Discrete Fourier Transform of Boolean Functions over the Complex Field and Its Applications	3000

Vol. 64(5): May 2018.

SPARSE RECOVERY, SIGNAL PROCESSING, LEARNING ESTIMATION

J. Unnikrishnan, S. Haghighatshoar, and M. Vetterli	Unlabeled Sensing With Random Linear Measurements	3237
V. Lyzinski	Information Recovery in Shuffled Graphs via Graph Matching	3254
A. V. Sambasivan and J. D. Haupt	Minimax Lower Bounds for Noisy Matrix Completion Under Sparse Factor Models	3274
A. Pananjady, M. J. Wainwright, and T. A. Courtade	Linear Regression With Shuffled Data: Statistical and Computational Limits of Permutation Recovery	3286
I. Waldspurger	Phase Retrieval With Random Gaussian Sensing Vectors by Alternating Projections	3301
W. Gao, S. Oh, and P. Viswanath	Breaking the Bandwidth Barrier: Geometrical Adaptive Entropy Estimation	3313
D. Dai, L. Han, T. Yang, and T. Zhang	Bayesian Model Averaging With Exponentiated Least Squares Loss	3331
G. Fellouris, E. Bayraktar, and L. Lai	Efficient Byzantine Sequential Change Detection	3346
A. Lhéritier and F. Cazals	A Sequential Non-Parametric Multivariate Two-Sample Test	3361

CODING THEORY AND TECHNIQUES

M. Mondelli, S. H. Hassani, and R. L. Urbanke	How to Achieve the Capacity of Asymmetric Channels	3371
C. Xing and C. Yuan	A New Class of Rank-Metric Codes and Their List Decoding Beyond the Unique Decoding Radius	3394
J. Brakensiek, V. Guruswami, and S. Zbarsky	Efficient Low-Redundancy Codes for Correcting Multiple Deletions	3403
Y. Hashemi and A. H. Banihashemi	Characterization of Elementary Trapping Sets in Irregular LDPC Codes and the Corresponding Efficient Exhaustive Search Algorithms	3411
V. Aref, N. Rengaswamy, and L. Schmalen	Finite-Length Analysis of Spatially-Coupled Regular LDPC Ensembles on Burst-Erasure Channels	3431
Y. Gu and Y. Miao	Bounds on Traceability Schemes	3450
A. Tripathy and A. Ramamoorthy	Sum-Networks From Incidence Structures: Construction and Capacity Analysis	3461
A. Agarwal, A. Barg, S. Hu, A. Mazumdar, and I. Tamo	Combinatorial Alphabet-Dependent Bounds for Locally Recoverable Codes	3481
I. Ahmad and C.-C. Wang	Locally Repairable Regenerating Codes: Node Unavailability and the Insufficiency of Stationary Local Repair	3493
W. Song, K. Cai, C. Yuen, K. Cai, and G. Han	On Sequential Locally Repairable Codes	3513
C. Qureshi, S. I. R. Costa, C. B. Rodrigues, and M. Firer	On Equivalence of Binary Asymmetric Channels Regarding the Maximum Likelihood Decoding	3528

Foundations and Trends in Networking

Volume 12, Issue 3
Age of Information: A New Concept, Metric, and Tool
By Antzela Kosta, Nikolaos Pappas and Vangelis Angelakis.

Foundations and Trends in Signal Processing

Volume 11, Issue 34
Massive MIMO Networks: Spectral, Energy, and Hardware Efficiency
Emil Björnson, Jakob Hoydis, and Luca Sanguinetti.

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ISITA2018

October 28–31, 2018
Singapore

The **International Symposium on Information Theory and Its Applications (ISITA)** is a leading conference on information theory. Since its inception in 1990, ISITA has been an exciting forum for interdisciplinary interaction, gathering leading researchers to discuss topics of common interest in the field of information theory. In 2018, the biennial ISITA will be held October 28–31 in Singapore at the Grand Copthorne Waterfront.

Call for Papers

Interested authors are invited to submit papers describing novel and previously unpublished results on topics in information theory and its applications, including, but not limited to:

- Error Control Coding
- Coded Modulation
- Communication Systems
- Detection and Estimation
- Signal Processing
- Rate-Distortion Theory
- Stochastic Processes
- Network Coding
- Shannon Theory
- Coding Theory and Practice
- Data Compression and Source Coding
- Data Storage
- Mobile Communications
- Pattern Recognition and Learning
- Multi-Terminal Information Theory
- Cryptography and Data Security
- Applications of Information Theory
- Quantum Information Theory

Paper Submission

Authors should submit papers according to the guidelines which will later appear on the conference website:

http://www.isita2018.org/

This link points to the permanent site http://www.isita.ieice.org/2018/. Accepted papers will appear in the symposium proceedings. To be published in IEEE *Xplore*, an author of an accepted paper must register and present the paper. IEEE does not guarantee inclusion in IEEE *Xplore*.

Schedule

Paper submission deadline	**April 6, 2018**
Acceptance notification	**June 30, 2018**

Further information on the technical program, plenary talks, social events and registration will be posted on the symposium web site as it becomes available.

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Photo: Flickr/Kojach

Welcome to ITW 2018 in Guangzhou! ITW 2018 solicits and welcomes original contributions on the frontiers of information theory, coding theory and their applications, as well as the frontiers with other fields such as data science, biology and signal processing. The conference structure consists of a daily plenary seminar followed by two parallel sessions throughout the day. Guangzhou is the third largest city in mainland China with a history of over 2,000 years. The conference will take place at the **Sun Yat-sen Kaifeng Hotel**, located within the university campus where the attendees can explore many historic architectures and artifacts, including the famous Swacey Hall, Xing Pavilion, Scholar Archway and many others. The conference also provides ample social events for better interactions among the participants. With appreciation and anticipation, we look forward to welcoming you in Guangzhou.

Scope of Submission

Original papers on **Information and Coding Theory** are encouraged for submission. The scope of submissions includes, but is not limited to

- Information Theory and its Applications
- Frontiers of Coding Theory and Practice
- Boundaries between Information Theory and Data Science, Biology and Signal Processing
- Network Information Theory
- Network Coding and Distributed Storage
- Information Theoretic Security

Important Dates

Paper submission : **May 18, 2018**
Acceptance notification : **August 13, 2018**
Final paper submission : **September 13, 2018**
Tutorial proposal submission: **March 1, 2018**
Tutorial acceptance notification: **March 15, 2018**

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Call For Papers

Call for Papers: Due July 9, 2018

Manuscripts can be submitted from June 15-July 9, 2018 with the submission deadline of July 9th being firm. Please follow the instructions at **allerton.csl.illinois.edu**.

CONFERENCE CO-CHAIRS | **Negar Kiyavash & Daniel Liberzon**

INFORMATION FOR AUTHORS | Regular papers suitable for presentation in 20 minutes are solicited. Regular papers will be published in full (subject to a maximum length of eight 8.5" x 11" pages, in two column format) in the Conference Proceedings. Only papers that are actually presented at the conference and uploaded as final manuscripts can be included in the proceedings, which will be available after the conference on IEEE Xplore. For reviewing purposes of papers, a title and a five to ten page extended abstract, including references and sufficient detail to permit careful reviewing, are required.

IMPORTANT DATES | 2018

JULY 9 — Submission Deadline

AUGUST 6 — Acceptance Date Authors will be notified of acceptance via email by August 6, 2018, at which time they will also be sent detailed instructions for the preparation of their papers for the Conference Proceedings.

AFTER AUGUST 6 — Registration Opens

OCTOBER 2-5 — Conference Dates

October 2 — Opening Tutorial Lectures at the Coordinated Science Lab, University of Illinois at Urbana-Champaign: **Paulo Tabuada,** *UCLA*; and **Joao Hespanha,** *UCSB*.

October 3-5 — Conference Sessions at the University of Illinois Allerton Park & Retreat Center. The Allerton House is located 26 miles southwest of the Urbana-Champaign campus of the University of Illinois in a wooded area on the Sangamon River. It is part of the 1,500 acre Robert Allerton Park, a complex of natural and man-made beauty designated as a National natural landmark. Allerton Park has 20 miles of well-maintained trails and a living gallery of formal gardens, studded with sculptures collected from around the world.

PLENARY SPEAKER — A. Stephen Morse, *Dudley Professor of Electrical Engineering at Yale University*

OCTOBER 7 — Final Paper Deadline Final versions of papers that are presented at the conference must be submitted electronically in order to appear in the Conference Proceedings and IEEE Xplore.

PAPERS PRESENTING ORIGINAL RESEARCH ARE SOLICITED IN THE AREAS OF:

- Communication systems
- Communication and computer networks
- Detection and estimation theory
- Information theory
- Error control coding
- Source coding and data compression
- Network algorithms
- Control systems
- Robust and nonlinear control
- Adaptive control
- Optimization
- Dynamic games
- Multi-agent systems
- Large-scale systems
- Robotics and automation
- Manufacturing systems
- Discrete event systems
- Multivariable control
- Computer vision-based control
- Learning theory
- Cyber-physical systems
- Security and resilience in networks
- VLSI architectures for communications and signal processing
- Intelligent transportation systems

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Conference Calendar

DATE	CONFERENCE	LOCATION	WEB PAGE	DUE DATE
June 04–05, 2018	**Conference on Channels, Statistics, Information, Secrecy, Zero-error, and Randomness (CSISZÁR)**	Budapest, Hungary	https://www.renyi.hu/conferences/csiszar80/	Passed
July 22–27, 2018	**Latin American Week on Coding and Information (LAWCI)**	Campinas, Brazil	http://www.dev.ime.unicamp.br/lawci/	Passed
August 16–18, 2018	**IEEE/CIC International Conference on Communications in China**	Beijing, China	http://iccc2018.ieee-iccc.org	Passed
October 2–5, 2018	**56th Annual Allerton Conference on Communication, Control, and Computing**	Allerton, University of Illinois at Urbana-Champaign, USA	http://allerton.csl.illinois.edu/	July 10
October 7–9, 2018	**59th Annual IEEE Symposium on Foundations of Computer Science (FOCS) 2018**	Paris, France	https://www.irif.fr/~focs2018/	Passed
October 28–31, 2018	**The International Symposium on Information Theory and Its Applications (ISITA) 2018**	Singapore	http://www.isita2018.org/	Passed
December 3–7, 2018	**10th International Symposium on Turbo Codes & Iterative Information Processing (ISTC)**	Hong Kong, China	http://www.istc2018.org/	June 15, 2018
December 9–13, 2018	**IEEE Global Communications Conference (GLOBECOM) 2018**	Abu Dhabi, UAE	http://globecom2018.ieee-globecom.org/	Passed

Major COMSOC conferences: http://www.comsoc.org/confs/index.html