

# IEEE Information Theory Society Newsletter



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## Annual Awards Announced

The main annual awards of the IEEE Information Theory Society were announced at the 2013 ISIT in Istanbul this summer.

- The 2014 Claude E. Shannon Award goes to János Körner. He will give the Shannon Lecture at the 2014 ISIT in Hawaii.
- The 2013 Claude E. Shannon Award was given to Katalin Marton in Istanbul. Katalin presented her Shannon Lecture on the Wednesday of the Symposium. If you wish to see her slides again or were unable to attend, a copy of the slides have been posted on our Society website.
- The 2013 Aaron D. Wyner Distinguished Service Award goes to Daniel J. Costello.
- The 2013 IT Society Paper Award was given to Shrinivas Kudekar, Tom Richardson, and Rüdiger Urbanke for their paper "Threshold Saturation via Spatial Coupling: Why Convolutional LDPC Ensembles Perform So Well over the BEC", IEEE Transactions on Information Theory, Feb. 2011
- The 2013 IEEE Communications Society and Information Theory Society Joint Paper Award goes to two papers:
  - 1) B. Nazer, M. Gastpar, "Compute-and-Forward: Harnessing Interference Through Structured Codes", IEEE Trans. Inform. Theory, Oct. 2011
  - 2) S. Avestimehr, S. Diggavi, D. Tse, "Wireless Network Information Flow: A Deterministic Approach", IEEE Transactions on Information Theory, Apr. 2011
- The 2013 Chapter of the Year Award goes to the Sweden Chapter.



**János Körner**



**Daniel Costello**

- 2013 IEEE Jack Keil Wolf ISIT Student Paper Awards were selected and announced at the banquet of the Istanbul Symposium. The winners were the following:

- 1) Mohammad H. Yassaee, for the paper "A Technique for Deriving One-Shot Achievability Results in Network Information Theory", co-authored with Mohammad R. Aref and Amin A. Gohari

- 2) Mansoor I. Yousefi, for the paper "Integrable Communication Channels and the Nonlinear Fourier Transform", co-authored with Frank R. Kschischang

- Several members of our community became IEEE Fellows or received IEEE Medals, please see our website for more information: [www.itsoc.org/honors](http://www.itsoc.org/honors)

The Claude E. Shannon Award honors "consistent and profound contributions to the field of information theory" and it is the most prestigious honor of our Society. János Körner is the recipient of the award. János Körner has been a Professor in Computer Science at "Sapienza" University of Rome since 1993. He obtained his Degree in Mathematics from Loránd Eötvös University, Budapest in 1970. From 1970 to 1992 he worked at the Mathematical Institute of the Hungarian Academy of Sciences. During these years he had two periods of leave: from 1981 to 1983 working at Bell Laboratories, Murray Hill, NJ, and for the academic year 1987-88 working at ENST, Paris, France. He is an Associate Editor of IEEE Trans. Information Theory and a member of the Hungarian Academy of Sciences. He is the coauthor of by now a classic textbook on information theory and is a winner of many awards and recognition.

*continued on page 5*

## From the Editor

Tara Javidi



Dear IT Society members,

As usual we start the September issue with a report on various awards announced at ISIT 2013 in Istanbul. The September issue of 2013 contains a very nice interview with Robert Fano conducted by Sergio Verdú. I believe you will all enjoy reading this as much as I did. In this issue, we congratulate Imre Csiszár, Tamer Başar, John M. Cioffi, and Balaji Prabhakar on their recognitions and awards as well as Bin Yu on her election to the American Academy of Arts and Sciences. I would like to thank Edmund Yeh, for preparing and submitting the BoG meeting minutes, in addition to our popular and regular contributors Tony Ephremides and Solomon Golomb. Finally we end this issue with reports from the 2013 European and North American IT schools, kindly prepared by Petar Popovsky and Brent Ladd, respectively.

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 via the IT Society website <http://www.itsoc.org/>, using the quick links “Share News” and “Announce an Event.” Articles and columns also can be e-mailed to me at [ITSocietynewsletter@ece.ucsd.edu](mailto:ITSocietynewsletter@ece.ucsd.edu) with a subject line that includes the words “IT newsletter.” The next few deadlines are:

Issue	Deadline
December 2013	October 10, 2013
March 2014	January 10, 2014
June 2014	April 10, 2014

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. I look forward to hear your suggestions (especially regarding the new column) and contributions.

### IEEE Information Theory Society Newsletter

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## President's Column

*Gerhard Kramer*

The president's third column of the year is often written shortly after ISIT, and this one is no exception. The annual Symposium is our society's main event and in early June there was concern about how the protests in Istanbul would develop. Fortunately, they did not escalate and the Symposium ran smoothly. The latter outcome can be attributed to the excellent organization by ISIT co-chairs Erdal Arikan and Elza Erkip, and their team.

Some of the many highlights of ISIT were the beautiful and historic city of Istanbul, the Shannon lecture by Katalin Marton, and the four plenary lectures. As usual, there were numerous award presentations and announcements. IEEE President Peter Staecker presented Erdal Arikan with the IEEE W.R.G. Baker Award, for the most outstanding paper published in any IEEE archival publications during a three to five year window prior to 2013. Then there were the surprise announcements of the winners of the 2013 IT Paper Award and the 2013 IEEE Jack Keil Wolf ISIT Student Paper Awards. Next, just before ISIT we learned that Imre Csiszár was selected as the recipient of the 2013 Dobrushin International Award. Please see this newsletter and our website for more information. Finally, and most important for next year, the 2014 Shannon Award winner was announced to be János Körner from Sapienza Università di Roma. It was clearly a great year for our members from Hungary who are associated with the Alfréd Rényi Institute of Mathematics in Budapest in one way or another.

The Monday evening of ISIT marked a sad occasion: a memorial event was held for James L. Massey who died on June 16. Jim's passing is a great loss for our Society, for the other scientific communities in which he was active, and for everyone who was fortunate enough to know him. The funeral was held in Copenhagen on June 22 and many of his former doctoral students attended. Please refer to our website for more information about Jim's life, career, and influence.

For example, Jim was one of our society's most international figures. This was in part because of his career path, but even more so because of his personality, his interest in and care for people irrespective of where they came from, and because of his gift for making information theory accessible to the uninitiated. In this context, I will point out that this year there were several new information theory events worldwide. For example, in February the first European Training School in Network Coding was held in Barcelona; in April the first Workshop on Entropy and Information Inequalities was held in Hong Kong; in May the first Iran Workshop on Communication and Information Theory was held in Tehran; and in July the



first International Black Sea Conference on Communications and Networking was held in Batumi. I was fortunate to be able to attend the Iran Workshop at Sharif University and was impressed by the quality of the students and faculty. I especially appreciated their generosity and kindness during my visit. I was also able to attend the Black Sea conference in Georgia, unfortunately only briefly. All these events serve their communities by motivating the current and next generation of engineers, mathematicians, and scientists to consider studying and applying tools of information theory. The desire to develop international contacts is, naturally, especially strong in countries that are isolated geographically or politically.

As in previous columns, I will close by drawing attention to outstanding volunteer work by our members. First, the Publications Committee is now chaired by Editor-in-Chief Yiannis Kontoyiannis. Yiannis deserves great appreciation for taking on this demanding task, and I am grateful for his commitment to our society.

Second, the Student Committee has been mentioned often in past columns, and this time I would like to highlight the work of the committee chairs. Aylin Yener was chair from 2007 until 2011, and she put much energy and enthusiasm into her work. Elza Erkip and Sriram Vishwanath became committee chairs in 2012. Earlier this year, Deniz Gunduz replaced Elza who now chairs the Conference Committee. The Student Committee continues to be very active under the leadership of Sriram and Deniz. For example, during ISIT Daniela Tuninetti and Deniz organized a "Meet the Shannon Awardee" lunch event with Katalin Marton. The meeting was a great success and is planned for future ISITs. I encourage you to attend in 2014; the event is a valuable opportunity to get to know the most recent Shannon Award winner a little better.

Third, the Outreach Committee organizes a mentoring program and outreach events at ISITs and workshops. The current chair is Joerg Kliewer. I invite you to browse our society webpage to learn about the programs this committee offers. For example, the Women in Information Theory (WITHITS) program was headed by Christina Fragouli until the end of 2012. The program is now run by Negar Kiyavash who is actively planning a video initiative that I expect you will hear about soon.

Finally, the 2013 Information Theory Workshop will be held in Seville, Spain, in September. This newsletter will likely reach you only after the workshop is completed. I hope that you were able to attend and enjoy ISIT, and that you had a good summer.

## The Historian's Column

It is the mark of time and the destiny of humankind. One by one, the people we know and love or loathe are passing away until our own time comes. Throughout human history, philosophers, artists, scientists, and plain folk have ruminated about death only to be left with unanswered questions. Religions have tried to "explain" the passing and soothe the living. But no matter how we come to terms with our fate, when death strikes the feeling of loss is heavy and rekindles all the questions and anxieties about it that we harbor. Especially when the deceased is a special person, someone we love, respect, or admire.

In the last few years, our Community has lost some of its most luminary members. The ink is still fresh from the eulogies we delivered for our giants colleagues Jack Wolf and Tom Cover. And of course, if we look further back we will remember the untimely passing of Aaron Wyner and the loss of Peter Elias and many others. Before we could recover, we had to confront the news of Jim Massey's death. One cannot make comparisons in the ever after, but Jim was truly special. In addition to being one of the brilliant scientists who solidified Information Theory as the foundation of our Information era and who can be counted in the fingers of a single hand, Jim had some other qualities as a human being that are simply truly rare. His smiling face was a staple for all our gatherings. His generous disposition was a kindling of good will for all. His wit was a source of delight. His company and fellowship during relaxing after-work gatherings was irreplaceable. His presentations were standing-room only events. His crisscrossing of the world as an apostle of Information Theory cannot be duplicated. Beloved by all his colleagues, students, co-workers, friends, and family, he was one of those rare human beings whom one can confidently elevate to the pedestal of the ultimate "role-model".

In the last ISIT in Istanbul a hastily organized memorial service (barely a week or so after his funeral) drew hundreds among those who knew him or simply had heard about him to hear words of celebration of his life and contributions to science and the human spirit. The outpouring of warm remembrances lasted well into the night. Cataloguing Jim's virtues brought his spirit back amongst us.

Jim was one of the dwindling set of colleagues who had the privilege of knowing Claude Shannon and working with him.



Photo courtesy of Sergio Verdú

Anthony Ephremides



Inspired by his example, Jim led a life that was true to the mission he set out for himself; namely, to spread the allure of Information Theory to the world. After he moved to Europe in the early eighties, Jim engaged in a whirlwind tour of the world energizing every corner of intellectual activity at Universities and Institutions and making converts every day. He was truly Information Theory's ambassador to the world. Perhaps not with the zeal of Aaron Wyner but with a similar commitment and dexterity he created a global following for our field that has grown beyond the level of a critical mass. He earned the first Aaron Wyner Award for exceptional Leadership and Service to our Society as a fitting complement to his legion awards for his scientific accomplishments.

Jim was a very generous man. He had only praise for everyone. He could pick the best that everyone carried within and put it up front. I never heard him say an ill word for anyone (including many who deserved it). He was helpful, kind, considerate, civilized, broadly educated, knowledgeable in many fields outside his profession, and a superb conversationalist. His Irish background elicited in him joviality and eagerness to sing, celebrate, and sip a fine whiskey. He adored his miniature dogs and made light of all their misdeeds. His sense of humor was a sheer delight. Who doesn't remember his "quip" during his Shannon Lecture in Kobe, when he playfully introduced the "concept" of the "Minimum Likelihood" Receiver? When the audience burst into laughter, he went on with "why are you laughing? I will patent this concept and start a new company called "Sink-a-bit", with the marketing slogan of "Sink a Buck in Sink-a-bit", clearly making an unparalleled metaphor for Linkabit and the slogan "link a Buck to Linkabit".

On another occasion when the discussion was raging on the need for a proof to be rigorous he quipped "rigor is great, provided it does not become rigor mortis". And the ultimate example to me of his unique wit was the occasion when I told him my unhappy experience of buying a leg of prosciutto from the Rome airport on my way back to New York. Upon arrival, the customs officer confiscated my purchase arguing that it was not permitted into the country. He proceeded to place it in a drawer. When I asked him what he would do with it, he responded that he would destroy it. As I told this to Jim, I added that I had the suspicion that he probably took it home for consumption instead of destroying it. Upon which, Jim said "if he took it home, it would be ordinary human corruption; if he destroyed it, it would be uncivilized behavior"!

Jim has simply left an indelible memory to our collective conscience. It will live in us and will guide us. For everyone who knew him, Jim will not be forgotten. How could he? To me at least he epitomized the idea of a "Role Model". May you rest in peace, Jim! You shaped our thinking, you shaped our Field, and you shaped our lives. Farewell.



## IT Society Members Honored

**Bin Yu**, Chancellor's Professor, Departments of Statistics and EECS, University of California at Berkeley, has been elected to the American Academy of Arts and Sciences in the Mathematics, Applied Mathematics and Statistics section.

Election to the academy honors individual accomplishment and calls upon members to serve the public good, said academy president Leslie C. Berlowitz. "We look forward to drawing on the knowledge and expertise of these distinguished men and women to advance solutions to the pressing policy challenges of the day."

**Imre Csiszár**, Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences, has been awarded the 2013 Dobrushin International Award.

Dobrushin International Award was established in 2008 and is handed in on July 20, the birthday of Dobrushin. The prize is awarded to outstanding researchers for the totality of their work in the domains of Dobrushin's research interests, including probability theory, mathematical and computer linguistics, information theory and statistical physics.

## IT Society Members Received 2014 IEEE Technical Field Awards

### Tamer Basar

University of Illinois at Urbana-Champaign  
2014 IEEE Control Systems Award

*"For seminal contributions to dynamic games, stochastic and risk-sensitive control, control of networks, and hierarchical decision making."*

### John M. Cioffi

Stanford University  
2014 IEEE Leon K. Kirchmayer Graduate Teaching Award

*"For educating a stellar array of graduate students in digital communications and for inspiring them to make a difference."*

### Balaji Prabhakar

Stanford University  
2014 IEEE Innovation in Societal Infrastructure Award

*"For his demonstration of the innovative use of information technology and distributed computing systems to solve long-standing societal problems, in areas ranging from transportation to healthcare and recycling."*

## Annual Awards Announced *continued from page 1*

The Aaron D. Wyner Distinguished Service Award honors "individuals who have shown outstanding leadership in, and provided long-standing exceptional service to, the Information Theory Community". Daniel Costello has been selected as the recipient of this award for 2013. He has been a reliable supporter of the IEEE Information Theory Society for over four decades, serving as its President in 1986, three times as ISIT co-chair, three times as board member; chair of many committees including the Conferences, Fellows, and Hamming medal committees as well as Associate Editor for the IEEE Information Theory and Communications Transactions. Dan is the co-author of a popular textbook on coding and winner of several IEEE paper prizes. We are lucky to have such distinguished and dedicated members as leaders of our Society.

The Information Theory Society Paper Award is given annually "for an outstanding publication in the fields of interest to the Society appearing anywhere during the preceding two calendar years". The Awards Committee must receive at least 5 nominations for the Best Paper Award from the Publications Committee. Nominations received in previous years for papers that remain eligible are also considered. Of these, the Awards Committee submits up to three to the Board of Governors. The BoG voted before ISIT in Istanbul to recommend the paper by S. Kudekar, T. J. Richardson, and R. L. Urbanke, "Threshold Saturation via Spatial Coupling: Why Convolutional LDPC Ensembles Perform So Well over the BEC," IEEE Transactions on Information Theory, Vol. 57, Issue 2, pp. 803-834, Feb. 2011. If you are curious to find out more about the selection procedure, please refer to the IT Society Bylaws at <http://www.itsoc.org/people/organization>

The IEEE Communications Society and Information Theory Society Joint Paper Award recognizes outstanding papers "appearing in any publication of the IEEE Communications Society or the IEEE Information Theory Society in the previous three calendar years". For this award, each Society has an internal process to choose among nominated papers to forward to the joint committee. This year, each Society put forward 3 nominations and the joint committee selected the winners. The 2013 Award went to two 2011 papers in network information theory: one on the deterministic approach to wireless channels by Salman Avestimehr, Suhas Diggavi, and David Tse and the other on compute-and-forward via structured codes by Bobak Nazer and Michael Gastpar. Congratulations to all the winners!

The 2012 Chapter of the Year Award was presented to the Sweden Chapter at ISIT in Cambridge. The Membership and Chapters Committee selected the winner based on chapter-related activities during 2012 and 2013, including scientific events, student events, web presence, and recruiting efforts.

The IEEE Jack Keil Wolf ISIT Student Paper Award is a relatively new award of our Society that is intended to encourage and recognize student work. The Award is "given annually for up to three outstanding papers at the ISIT for which the student is the principal author and presenter". This year the ISIT Technical Program Committee assigned the Awards Committee 12 papers from which the Awards Committee chooses up to 6 as finalists for presentations to judge. Our Bylaws specifies that the Awards Committee should announce the winner(s) at the ISIT banquet. The two winners were Mohammad H. Yassaee and Mansoor I. Yousefi. Congratulations to both winners!

## A conversation with Robert Fano

*Sergio Verdú*

I met with Robert Fano on June 14, 2013 in his residence in Concord, Massachusetts. What follows is an edited and condensed transcript of our conversation.

**SV:** Bob, at 95 you seem to be in great shape.

**RF:** I lost the vision in one eye a few years ago and I have some dizziness in the morning but, otherwise, I cannot complain.

**SV:** You were born a year after Claude Shannon.

**RF:** Yes, in Torino. Italy. I grew up in an academic environment. My father, Gino, was a Professor of Mathematics at the University of Torino. He had worked with Felix Klein. He died in 1952. My older brother, Ugo, became a theoretical physicist and worked with Fermi and Heisenberg. He became a professor at the University of Chicago and died in 2001; My cousin Giulio Racah, was also a theoretical physicist. He eventually became rector of the Hebrew University of Jerusalem.

**SV:** What are your memories of Torino?

**RF:** I have very happy memories of my life in Torino. I did mountain climbing on skis in winter and early spring and, rock climbing with ropes and pitons in the Dolomites during the summer. My happy life ended abruptly in 1938 when I turned 21 and Mussolini decided to join Hitler in a campaign against Jews, in spite of the fact that there was no sentiment against Jews in the country. Suddenly, a committee of "experts" decided that there was an identifiable Italian race of which Jews were not part. That was the beginning of the racial laws. These laws had become serious enough by fall that my family decided that we should leave Italy. My parents went to Switzerland; my father would not go to any country that might be at war with Italy. My brother decided to come to the US. He was already in Paris and arrived in the US in the Summer of 1939 after picking up his wife in Argentina where she had gone earlier with her family. I decided to complete my fourth year of engineering in Torino, but not the fifth one, before emigrating.

**SV:** So you decided to come to the US because your brother was here...

**RF:** No, I too wanted to come to the US. I had visited the US with my parents in the summer 1932 and I had a great memory of it. I took the exams of the 4th year of Engineering and joined my parents in July 1939 with the intent of getting the visa to the US in Switzerland.

**SV:** Was that electrical engineering?

**RF:** In Italy, Engineering was a very broad program with the specialization occurring in the last year. For reasons I don't remember I was always interested in electrical engineering.

**RF:** Back to the visa to the US. I had to make several trips to the US consulate in Zurich. On August 31 I was told that my visa was just waiting for the quota number from Washington. Upon leaving the

consulate, I saw in the newspaper that Germany and Russia had signed a non-aggression treaty, which meant that the war was going to start the next day. And in fact it did. Now my problem was to get to the US. I could not leave from Italy because Mussolini did not approve emigration to the US. I had to leave through France, which was already at war and required that all visas be approved in Paris. Fortunately, I was traveling with a cousin from Rome who had family diplomatic connections leading to the French ambassador. I got through him the visa to get aboard the Manhattan in Bordeaux. I arrived in New York in late October 1939. My brother Ugo was there to greet me.

**SV:** How was your English?

**RF:** I had learned English in Italy but I had trouble with local accents, particularly in Washington where I spent my first two months. My first task was to complete my undergraduate engineering degree. Initially, I did not apply to MIT because I thought I had no chance of being admitted to such a famous school. But my sister-in-law, who had a sharp tongue, insisted that not applying was a sure way of not being admitted! So I did apply, and MIT was not only the first school to admit me but also the one that gave me the most credits for my studies in Italy, including for the humanities that I had taken in high school. It turned out that MIT was very friendly to foreign students. I started at MIT in February 1940 and, by attending the summer term, I completed the requirements for the SB degree by February 1941. I received top grades in all subjects except for the first laboratory. I mention this because I was well aware that my personal standing would not cross the Atlantic with me and I would have to rebuild it in the US.

**SV:** You worked extra hard.

**RF:** I did. My thesis was on the feedback control of the speed of an electric motor. The executive officer of the EE department asked me if I would be interested in a teaching assistantship. I said no, because at that time I wanted to go to work in industry. Unfortunately, the electrical industry was already on a war footing and the jobs that I was offered turned out to require a military clearance that I could not get because I was not a US citizen. The only job that did not require a clearance was in a General Motors stamping and welding plant in Grand Rapids, Michigan. Unfortunately, the job turned out to be very different from what I had expected and rather unpleasant. I informed MIT that I had changed my mind. The offer of a teaching assistantship arrived at the beginning of the fall term and two days later I was on my way back to MIT.

Teaching assistants were expected to devote half of their time to the tasks assigned to them and the other half to their graduate studies so that they could qualify for an SM degree by the end of the second year. My first year went according to this plan, but by the beginning of the second year, September 1942, the US was at war and several members of the faculty had left for war duties and teaching assistants had to take over their classes. I had the opportunity to attend the classes of a subject that I had to teach

the next term. Otherwise I had to learn the material just ahead of my students. That kind of teaching became a major part of my graduate education. Apparently my performance was good enough to merit my promotion to the rank of instructor. In addition I was put in charge of a pair of graduate subjects on microwaves and antennas that, of course, I had never taken. This time I was really two weeks ahead of my students and they were aware of it. We learned together. I was encouraged to accept that tasks by my mentor, Ernst Guillemin, the “guru” of network theory who told me that he had started out by being asked to teach a subject on filters about which he knew nothing. Did you know about Guillemin?

**SV:** Sure I did. As an undergraduate in Barcelona we had a full course on network synthesis. We learned all about Guillemin, Cauer, and Hurwitz polynomials.

**RF:** By the way, what does Verdú mean?

**SV:** Nothing. It is the name of a town in Catalonia.

**RF:** Fano is the name of a town on the Adriatic coast. Some Pope had decreed that Jews had to adopt the name of their town of origin.

**SV:** Yes, also in Spain.

**RF:** Back to MIT. By the summer of 1944, Italy was out of the war and I was cleared to join the Radiation Lab since I was no longer a citizen of an enemy nation. I became a “microwave plumber” and designed a variety of components for radar systems. I also became a coauthor of two chapters on microwave filters in volume 9 of the Radiation Laboratory series. I completed the manuscript of those chapters in April 1946 just when the leftover of the Radiation Laboratory became the beginning of the Research Laboratory of Electronics. I became a Research Associate in the Electrical Engineering Department, resumed my teaching, and turned my attention to completing my doctorate.

The doctoral thesis was the major task confronting me. Most of my time at the Radiation Laboratory was spent “broadbanding” some microwave component and I often wondered whether there was a fundamental limit to how broad a band could be achieved. I decided to tackle that problem in the simpler case of a two-terminal network of LCR components, with antennas being special cases. The problem had been solved by Hendrik Bode for simple RL and RC impedances. I didn’t get anywhere until Christmas. I was walking to the train station to go to Washington when I saw the light. The rest was just a lot of mathematics in the complex plane. The thesis titled “Theoretical Limitations on the Broadband Matching of Arbitrary Impedances” was completed in time for my receiving my ScD in June 1947. The graduation ceremony that took place (for the last time) in Boston’s Symphony Hall was attended by my parents. My appointment to Assistant Professor started shortly thereafter on July 1, 1947.

My interest turned at that point to the field of communication in which there was considerable activity in RLE, mostly centered on the book by Norbert Wiener entitled “Extrapolation, Interpolation, and Smoothing of Stationary Time Series”.

**SV:** Had you already met Claude Shannon?

**RF:** I had heard of him from Jerry Wiesner who was an undergraduate with him at the University of Michigan and because Shannon’s Masters thesis was famous at MIT. Jerry had told me that Shannon was developing some sort of theory of communications. I had no idea what it was. Norbert Wiener had the habit of wandering into friends’ MIT offices, making some statement and then leaving without waiting for an answer. One morning he came into my office with his cigar and said “You know: Information is Entropy” and walked out without any further comment. I never found out where he had gotten that idea but it excited my curiosity and I kept thinking about it. Again, while walking to the train station to attend the IRE meeting in New York, it occurred to me that that relation might have to do with the representation of messages with binary digits. By the time I arrived to New York I had defined the entropy of a set of messages and proved the coding theorem for noiseless channels.

**SV:** In fact, Shannon describes your idea in his paper.

**RF:** Wait a minute. At the IRE meeting the next day I buttonholed Shannon after the presentation of his paper, and asked him permission to visit him in his office the next day. Obviously, he didn’t like the idea but he was nice to me and he agreed to see me. The next morning, I went to Murray Hill and he received me in his office with the same bored face. But when I started telling him what I had done on the train his face lit up: I had duplicated the initial part of his work. Shannon was kind enough to make reference to my work in his famous BSTJ paper that appeared in the fall 1948. I was very embarrassed when Shannon asked me for a reference to my work. I had not yet put it on paper. I gave him the first unused number in the series of reports of the Research Laboratory of Electronics and got busy writing the report.

**SV:** When you first saw Shannon’s paper, were you already familiar with the language of probability, random processes? It was not yet common in the toolbox of engineers.

**RF:** I was generally familiar with it, but there was still a lot to learn. The basic and most important notion in Shannon’s work is that information is transmitted in the form of selections from finite sets of messages. This was very different from the previous goal of accurate transmission of waveforms. I accepted Shannon’s statement that it was possible to transmit information at any rate smaller than channel capacity with a vanishing small probability of error. However I was not satisfied with Shannon’s original proof. I challenged a physics student looking for a thesis topic to provide a solid proof. He did it in a very short time but I had a very hard time getting him to write a thesis acceptable by the physics department. He had the mind of a mathematician and not that of a physicist.

**SV:** Was this Feinstein?

**RF:** Yes. He was a very bright fellow but there was something strange about him. I don’t know what happened to him.

**SV:** He wrote a book and translated Pinsker’s book into English. He is one of the people in information theory I always felt was most underrated. Wolfowitz, Ahlswede, that mathematical branch of information theory, was very much influenced by Feinstein’s work.

**RF:** He disappeared. The last time I saw him was at an information theory meeting at Lake Como.

**SV:** Did you keep in touch with Claude Shannon? What was he like?

**RF:** Oh Yes! He was a wonderful and interesting person. He had the strangest ideas. He built an aerial tramway in his backyard to the lake. He bought a school bus and transformed it into a travel home. He learned how to ride a monocycle...etc. He came to MIT as a visiting professor and then accepted a permanent chair. However he never acted as a regular professor. He lectured for a while; he was a wonderful speaker. Then slowly faded away. When I became director of Project MAC I put a time-sharing terminal in his home hoping that he would do something interesting, but only Betty used it. Claude was very photogenic; I was given a portrait of Claude around 1965, and it is still adorning my office.

**SV:** So true. Also Shannon had the fortune to be photographed by some of the giants of XXth century photography: Henri Cartier-Bresson, Alfred Eisenstaedt.

**SV:** Your course on information theory must have been the first course on the subject anywhere.

**RF:** Yes, I believe so. The first time I offered the subject in 1950 I presented in class all I knew about the subject, just a little more than the content of Shannon's paper. I could not think of problems for the students to solve so I asked them to write term papers on some pertinent subjects. Dave Huffman, who was in my class, invented the procedure for constructing the most efficient codes.

**SV:** He was your PhD student?

**RF:** No, I believe his thesis was on switching networks.

**SV:** Going back to Wiener, did you ever talk with him?

**RF:** Yes, but always about what interested him.

**SV:** Did he know you were teaching "Information Theory"?

**RF:** Possibly. However I doubt he knew what I meant by information theory. Wiener was a bit professionally self-centered; also he was getting old and had vision problems. I doubt that he ever read Shannon's 1948 paper.

**SV:** Peter Elias. He also became interested in Information Theory.

**RF:** I gave a talk at Harvard and he came to speak with me. I thought he was very smart and I invited him to come to MIT as an assistant professor. He did some very good work in information theory and eventually became Department Head. He died very suddenly in 2001.

**SV:** You came up with the name "mutual information".

**RF:** Yeah. It's not generally known that I did. I am surprised you know that.

**SV:** How did Fano's inequality come about? Did you notice there was a gap in the converse in Shannon's paper?

**RF:** No. I felt that entropy measures did not provide a physical understanding of the process of communication in the presence

of noise. Noise causes errors and the probability of error is what counts. So I thought it would be nice to relate the entropy loss caused by noise to the probability of error.

**SV:** You never published it.

**RF:** By that time I didn't worry about publishing. My information theory output was primarily in my class notes and my textbook.

**SV:** Let's talk about your next phase: computers. At some point you decided you had enough of information theory.

**RF:** My textbook "Transmission of Information" evolved in the form of class notes over a decade and appeared in print in 1961. I was developing at the same time class notes for an undergraduate subject on electromagnetism which led to the textbook "Electromagnetic Fields, Energy, and Forces" that appeared in print at about the same time. I decided to take a vacation from teaching in the form of a sabbatical leave at the MIT Lincoln Laboratory over the academic year 1961-62. My intention was to look around for something else to do but my mind kept going back to information theory and I ended up inventing the sequential decoding algorithm that I described at the end of my invited paper "A Heuristic Discussion of Probabilistic Decoding". It was a good idea, but it could not be used in practice at that time. A few years later, however, Irwin Jacobs mentioned my algorithm while introducing me at an IEEE meeting, pulled a chip out of his pocket and said "here it is"! Indeed, chip technology made a big impact on the evolution of information theory.

**SV:** By the way, you gave one of the first Shannon lectures.

**RF:** Yes, the third: Shannon, Slepian and me. By that time I had been away from information theory for several years and I must have talked about on-line computation and time-sharing systems. I got involved with computers and became the founding director of Project MAC, a laboratory that has evolved into the present "Computer Science and Artificial Intelligence Laboratory".

Project MAC originated from work done at the MIT Computation Center toward the two goals that eventually led to the present Internet: providing personal access to computers and providing it to the population at large in the form of a computer utility. In the fall 1962, a branch of the Advanced Research Projects Agency of the Department of Defense directed by J.C.R. Licklider was offering large financial support for work toward these goals. MIT was in an excellent position to obtain it because of the work already in progress at the Computation Center. What was missing was an individual willing to pull together the MIT resources, write a proposal and, if accepted, lead the research effort. I felt very strongly that MIT should not miss this opportunity particularly because I believed that Computer Science was going to become an important new discipline. Unfortunately the right person was not available. I had no management experience, and I was not, by nature, a multitasker. In the end, I closed my eyes and jumped in. Fortunately I had the full support of the MIT administration and the wholehearted participation of the Computation Center. Project MAC started on July 1, 1963 and I was its Director until the Fall of 1968.

**SV:** That must have been quite a job managing the logistics of such a large scale project. A lot of headaches.

**RF:** Yes. I had a lot of those.



**SV:** How long did the project last?

**RF:** Still exists. Just changed its name. At the beginning I didn't want to call it a Laboratory because I needed the participation of people from the whole of MIT. Later on it became the Laboratory for Computer Science.

**SV:** Tell me a bit about your family.

**RF:** I met my wife at a dance on Valentine's Day 1948. We got married in the Spring break in 1949. Our first girl was born in 1950, the second girl in 1955. Our boy was born in 1960. He recently decided to change sex so now I have three daughters. I have five grand children. They are all doing fine. I lost my wife in August 1998 to ovarian cancer.

**SV:** Well, Bob it has been a pleasure meeting with you and listening to so many fascinating stories.



Photo courtesy of Sergio Verdú

**RF:** Let me just add that I formally retired in 1984, but I still have an office in CSAIL, which I share with my colleague J.F. Corbató. I still drive to MIT periodically.

**SV:** Bob, you are so fortunate that your mind is so sharp. Stay healthy! One more thing: Would you mind if I take your picture?

**RF:** Oh sure.

## IEEE Information Theory Society Board of Governors Meeting Minutes

Catamaran Resort, San Diego, CA, 02.10.2013, 1-6 pm

Edmund Yeh

### Present

Jeff Andrews, Matthieu Bloch, Giuseppe Caire, Michelle Effros, Abbas El Gamal, Elza Erkip, Michael Honig, Tara Javidi, Negar Kiyavash, Joerg Kliewer, P. Vijay Kumar, Urbashi Mitra, Alon Orlitsky, Petar Popovski, Paul Siegel, Emina Soljanin, David Tse, Rudiger Urbanke, Sergio Verdu, Alex Vardy, Emanuele Viterbo, Edmund Yeh, Aylin Yener.

The meeting was called to order at 1:10 pm by the Information Theory Society (ITSoc) President, Gerhard Kramer, who welcomed the Board of Governors (BoG).

**1. Motion:** The minutes of the BoG Meeting at ITW 2012 held at Lausanne, Switzerland, were approved.

**2. Motion:** The agenda was approved.

**3. Gerhard Presented the President's Report:** Gerhard welcomed the new members of the BoG: Jeff Andrews, Michael Honig, P. Vijay Kumar, Emina Soljanin, Rudiger Urbanke, and Ram Zamir.

Major honors for IT Society members were celebrated: Sol Golomb (recipient of U.S. National Medal of Science), Abbas El Gamal (elected Member of the U.S. National Academy of Engineering), Shlomo Shamai (Shitz) (elected Foreign Associate of the U.S. National Academy of Engineering), Irwin Jacobs (recipient of the IEEE Medal of Honor), Robert Calderbank (recipient of the Hamming Medal), Erdal Arkan (recipient of the W.R.G. Baker Prize Paper Award), Vahid Tarokh, Hamid Jafarkhani, Siavash Alamouti (recipients of the Eric E. Sumner Award).

Congratulations to the new IEEE Fellows from IT Society: Jeff Andrews, Andrew Barron, Gerard Cohen, Max Costa, Suhas Diggavi,

Anders Host-Madsen, Kenneth Kreutz-Delgado, Tamas Linder, Daniel Palomar, Erchin Serpedin, Antonia Tulino, Pramod Viswanath, Tsachy Weissman, Feng Wu.

Gerhard noted that the IEEE Technical Activities Board (TAB) meeting will take place February 15-16. The IT Society Review will take place on Thursday, Feb. 14. He expressed thanks to Muriel for organizing the society review, and to the following contributors for providing text: Bruce, Helmut, Abbas, Sriram, Elza, Joerg, Negar, Prakash, Frank, Tara, Matthieu, Aylin.

**4. Aylin Presented the Treasurer's Report:** Aylin first summarized some recent conference closings. The 2011 North American IT School held in Austin, Texas, ended with no surplus (and with \$25,008 society support). The 2011 ISIT ended with a surplus of \$118,074. The 2012 North American IT School, Cornell, ended with a surplus of \$6,939. Conferences which have not started the closing process include the 2012 European IT School, Turkey, April 2012, and the 2012 ISIT, MIT, July 2012.

With regards to conference closings, Aylin held up ITW 2012 as a great example. The conference generated a surplus of \$8,453. It was held September 2012 in Lausanne. As of February 7, 2013, it was ready to close within a week. The overall process took only five months from the conclusion of the conference (inclusive of the audit).

Aylin continued onto the 2013 budget. The budget was prepared in May 2012, approved in July 2012, and finalized in November 2012. The initial projected surplus for 2013 was \$131k (approved by Aylin). The surplus was then decreased to \$2k due to an increase in the page budget of IT Transactions pages to 8000. Then, in September, the budget was updated to have a surplus of \$179.4k. The explanation given by the IEEE is that this was due

to additional income for 2012 from “ASPP India (AICTE) agreement.” As a result of this, Aylin requested an immediate increase from \$100k to \$120k for committee budgets. This was approved by TAB. The final projected surplus for 2013 is \$159.4k.

Aylin continued onto the 2012 budget. The forecast for the 2012 budget at the preparation stage was a surplus of \$84.7k (finalized in 2011). As of May 2012, the end-of-year surplus was forecasted to be \$119k. During the summer, the forecast went down significantly (to as low as \$0.7k). By late October, thanks to revenues and reducing the original increase in the Transactions page budget, the surplus was back up to \$66k. As of October 22, the surplus remained at \$66k and the situation was regarded as “unfavorable” by IEEE. However, the surplus has now climbed to \$219k. The additional \$153k seems to have come again from “ASPP India (AICTE) agreement.” Aylin commented that forecasts appear to be less than informative, and that we should try to plan the budget as best as we can (at least the parts we can control) and then go about spending it to benefit the Society.

Aylin emphasized that the time to plan the 2014 budget is now. The major components of the budget are 1) committee allocations (Schools, Online, M&C [Distinguished lecturers], Student, Outreach), 2) Transactions page budget (EiC) and 3) Print subscription fees. Current proposed committee allocations are: Schools: \$40k, Student: \$10k, Outreach: proposed increase from \$1.5k to \$3k. WITHITS: proposed increase from \$1.5k to \$3k. Budgets for the Online and DL committees are yet to be determined.

Gerhard noted that there is no need to vote on small committee budget allocation increases. The Treasurer is authorized to implement the increases.

**Motion:** Increase the print subscription fee for IT Transactions to \$100 for IT Society members.

The current cost of print transactions is \$147 per subscription. We currently charge \$65. Other societies have already crossed the \$100 mark (Example: SP was \$69 and increased to \$104).

Discussions on the motion followed. Some BoG members noted that many members receive print versions of the Transactions, and since the Society currently has a surplus, there is no need to increase print subscription fees significantly. Others contended that the Society should not subsidize wasteful paper copies.

**Motion:** Friendly Amendment: increase the print subscription fee for IT Transactions to \$80 for IT Society members. Motion was passed.

Aylin ended with a note regarding reimbursement of expenses.

**5. Giuseppe Caire Presented the Nominations & Appointments (N&A) Committee Report:** The 2013 N&A has the following members: Giuseppe Caire (SPP, ex-officio Chair), Muriel Medard (JPP, ex-officio), G. David Forney, Jr., David Neuhoff, and Shlomo Shamai.

As of Fall 2012, Elza Erkip was nominated (by the N&A Committee) to be Chair of the Conference Committee. Sriram Vishwanath and Elza Erkip have co-chaired the Student Committee in 2011-2012. Given Elza’s new appointment, the N&A Committee decided to nominate Sriram as the sole chair of the Students Committee.

**Motion:** Vote to approve Elza as Chair of the Conference committee. Motion was passed.

The 2013 Awards Committee consists of Abbas El Gamal (ex officio, Chair), Michelle Effros (ex officio), continuing members Michael Gastpar, Alex Grant, Igal Sason, Emanuele Viterbo, Aaron Wagner, Randall Berry, Ubli Mitra, new members Merouane Debah, Andreas Winter, Vijay Kumar, Pascal Vontobel, Young-Han Kim, and outgoing members [SPECIAL THANKS] include Ian Blake, Emina Soljanin, David Tse, Greg Wornell.

The 2013 External Nominations Committee consists of Gerhard Kramer, with continuing members Alon Orlitsky, Han Vinck, new members Helmut Bolcskei, Dick Blahut, and outgoing members [SPECIAL THANKS]: Prakash Narayan, Max Costa. The chair is to be elected by the committee itself, Gerhard Kramer will lead the process.

The 2013 Wyner Service Award Committee consists of Gerhard Kramer (Chair, ex officio), Muriel Medard (ex officio), continuing members Rolf Johannesson, H. Vincent Poor, new member Ian Blake, and outgoing member [SPECIAL THANKS] Anthony Ephremides.

The 2013 Shannon Award Committee consists of Gerhard Kramer (Chair, ex officio), Abbas El Gamal (ex officio), Michelle Effros (ex officio) continuing members Sergio Verdu, Raymond Yeung, new members Sol Golomb, Imre Csiszar, and outgoing members [SPECIAL THANKS]: Dick Blahut and Jacob Ziv.

In Fall 2012, the N&A Committee chaired by Frank Kschischang selected Yannis Kontoyiannis to be the next Editor in Chief of the IEEE Transactions on Information Theory, succeeding to Helmut Bolcskei. Yannis was contacted by the committee and agreed.

**Motion:** To approve Yannis Kontoyiannis as the next EiC of the Transactions. Motion was passed.

**6. Matthieu Bloch Presented the Online Committee Report:** Matthieu noted that the Society website had been running smoothly and consistently until February 5th, when it experienced significant slowdowns and errors (error 504). The problem has been fixed on February 8th, with the website running up again, but the fundamental cause of the problem has not been precisely identified yet. The developers have scheduled additional time to fix the issue next week, and the Online Committee will provide more information then.

Following the discussion during the BoG meeting in Lausanne, the Online Committee has investigated the possibility of using an online version of the newsletter to complement the paper version. Matthieu presented a sample online newsletter based on the December 2012 newsletter. The benefits of having an online newsletter include: a timely dissemination of the articles, the possibility of publishing articles online as they are received – readers can be kept informed of updates by subscribing to a specific rss feed improved visibility of articles (e.g. the articles discussing recently awarded papers, etc.) The Online Committee recommends the porting of the next newsletter online as an experiment. This could be achieved with coordination between the newsletter and the online editor.

Following the suggestion of the BoG, the Online Committee has also investigated the possibility of introducing online Discussion

papers. A feature for posting comments is already available in the website infrastructure and an example of discussion has been set-up online. As suggested by Nick Laneman, a possibility would be to have students post review papers or summaries from seminars. The Online Committee suggests that we identify student volunteers to test the current setup.

A discussion followed on online discussion papers. It was noted that currently, only award papers and fundamental papers are available for online discussion. It was suggested that something similar to the Communications Society Digest can be implemented, whereby a subset of papers are presented for reading and discussion.

Matthieu continued: the Online Committee has also investigated options to more actively push the table of content of the latest issue of the Transactions. Presently, it is already possible to subscribe to a feed on IEEEExplore: [feed://ieeexplore.ieee.org/rss/TOC18.XML](http://ieeexplore.ieee.org/rss/TOC18.XML). Several options are then available to advertise a new issue: 1) Encourage members of the IT community to register to the feed by providing detailed instructions on the subscription process; 2) Create a "mailing list" (through feedburner) to which users can register, which would push the latest table of content to emails; 3) Pull the content of the feed from the IEEEExplore feed and display it on the website; one can imagine complementing this with a news item once the latest TOC is available. Options 1 and 2 can be implemented with minimal effort and without extra development. Option 3 would require some development time (to be estimated).

**ToDo:** The Online Committee will submit a proposal for effective and attractive dissemination of the Society newsletter and IT Transactions Table of Contents.

Finally, Matthieu presented recent analytics on website use and statistics on the Society mailing list.

**7. Reports from Schools:** Petar Popovski presented the report on the European School of Information Theory (ESIT) 2013 in Ohrid, Republic of Macedonia, April 22–26, 2013. Lecturers for ESIT 2013 include Suhas Diggavi, Stark Draper, Bane Vasic, Angel Lozano, Osvaldo Simeone, and Christina Fragouli. The School is located in an accessible location and expects to receive many students from the Balkans. The Society has supported the school with US\$20k. The School registration deadline is Feb 15, 2013.

Sergio Verdu presented the report on the 2013 North American School of Information Theory at Purdue University, West Lafayette, IN, June 4–7, 2013. The School is organized by the Center for Science of Information, a National Science Foundation Science and Technology Center, and is sponsored by the IT Society. This year the school will introduce several interdisciplinary topics in the emerging field of science of information. Although the focus is on information theory, interdisciplinary topics are welcome, e.g., topics related to mathematics, physics, biology, control, networking, etc. Invited speakers include Scott Aaronson, Michelle Effros, Mehmet Koyuturk, P.R. Kumar and Padovani Lecturer Emina Soljanin. Registration deadline is May 15, 2013.

On behalf of Vitaly Skachek, Gerhard Kramer presented the report on European School of Information Theory 2014 in Estonia. The School will be held in a resort/hotel along the northern coast, around 1 hour drive from Tallinn. The School will involve about 80 students/post-docs/researchers, with 4 hours of lectures for five

days, and students talks or posters in the afternoon. The School will take place in May 2014, with registration in January–February 2014. The Institute of Computer Science, the University of Tartu, will provide administrative support. The European School of Information Theory 2014 asks for \$20,000 from the IEEE IT Society. The funds will be used to pay invited speakers, and to cover administrative costs, rented equipment, buses, activities, etc.

**Motion:** Approval of funding for the European School of Information Theory 2014. The motion was passed.

There is an upcoming proposal for the 2014 North American school to take place at Toronto. It will take place at the University of Toronto campus, organized by Stark Draper, tentatively scheduled for mid June 2014. The full proposal will be presented at the ISIT BoG meeting in Istanbul.

A discussion followed on whether there should be IT Schools in China, including Beijing and Hong Kong.

**8. Joerg Kliever Presented the Outreach Committee Report:** The main activity since the last report at ISIT 2013 is an attempt to recruit more mentors for the mentoring program. Other activities for 2013 include an ITA panel discussion "How to navigate the job market," co-organized with Student Committee, and an ISIT 2013 mentoring event. There are plans to address issues for junior faculty: tenure track, research questions, student recruitment, and proposal writing. Activities for 2014 include a panel discussion at ITA and a mentoring event at ISIT 2014. Joerg noted that we may not be able to cover all activities with our current budget of \$1.5k. Joerg ended by presenting an outline application form for the mentoring program.

**9. Negar Kiyavash Presented the WITHITS Committee Report:** Recent events include afternoon tea with Katalin Marton at ITW Lausanne. Upcoming events include informal lunch and discussion at ITA 2013, and luncheon and panel discussion at ISIT 2013. The WITHITS website is being overhauled, with content being moved from the EPFL to the IEEE host, and additional historical notes on women in IT, as well as videos and interviews.

**10. Alon Orlitsky Presented the External Nominations Committee (ENC) Report on Behalf of Prakash Narayan:** The ENC, a new committee formed in February 2012, consisted of Max H. M. Costa, Muriel Medard, Alon Orlitsky, A. J. Han Vinck and Prakash Narayan (Chair) as its members for 2012.

The ENC is described by the Society bylaws as follows: "The External Nominations Committee shall consist of the External Nominations Committee Chair, the Society President and three additional members. The Chair and other members are appointed by the Nominations and Appointments Committee. Typically the members of the Committee will serve for two years, with staggered terms. The Committee will be responsible for the solicitation, processing and submission on behalf of the Society of nominations for appropriate IEEE awards (such as, for example, the IEEE W. R. G. Baker Award) and, as applicable, for awards outside of the IEEE."

The ENC submitted a successful nomination for the 2013 IEEE W. R. G. Baker Award: E. Arikan, Channel Polarization: A Method for Constructing Capacity-Achieving Codes for Symmetric Binary-Input Memoryless Channels, IEEE Transactions on Information Theory, Volume: 55, Issue: 7, Year: 2009, pages: 3051–3073.



The ENC also submitted or coordinated nominations for the IEEE Medal of Honor and the IEEE Hamming Medal for 2013. Also, potential nominees and corresponding nominators have been identified for the IEEE Founders and von Neumann Medals, as also for the Marconi, Kyoto and Okawa Prizes; these nominations are to be considered for submission in 2013. In addition, the ENC helped generate nominations, with deadlines in early 2013, for the following: IEEE Kirchmayer Graduate Teaching Award, IEEE Kobayashi Computers and Communications Award, IEEE Sumner Award, and the Japan Prize (in the field of Electronics, Information and Communication).

**11. Michelle Effros Presented the Report of the Ad Hoc Committee on Outreach and Education:** The committee was formed in 2011, with members Michelle Effros (chair), Gerhard Kramer, Ubli Mitra, Vince Poor, Paul Siegel, and Lizhong Zheng. The committee's charge is to consider a range of outreach goals and activities, and to advise the BoG on possible roles for the Society. Possible outreach goals include raising financial support for the community, influencing funding agencies, and stimulating funding at other agencies. Possible outreach activities include workshops, publications/presentations to general media, and actively encouraging service at the NSF (by setting up a society nominating committee). Current committee priorities include influencing funding agencies, gaining visibility and recognition, and connecting with other communities. As a first experiment, an IT video contest is being run by the Student Committee for the purpose of producing IT-related video aimed at a broad audience.

In a discussion which followed, it was suggested that the Society lobby the U.S. Postal Service for a commemorative stamp for Shannon's centenary.

**12. Elza Erkip Presented the Student Committee Report on Behalf of Sriram Vishwanath:** Elza is the outgoing coordinator (huge thanks). Student coordinators include Galen Reeves, Mustafa El-Halabi, and Alex Dytso. Recent activities include organized Pictionary at Allerton 2012. The committee (jointly with the Outreach committee) will sponsor a jobs/mentorship panel for students and postdocs at ITA 2013. Panelists will include Giuseppe Caire, Elza Erkip, Dongning Guo, Bobak Nazer, and John Smeed (Qualcomm).

The Committee proposes an IT video contest. Applicants would post short (<10 min) videos on Youtube. The theme of the video is to introduce basic information theory concepts (ex: how your phone works, basic coding concepts). A website, which will contain good video examples, will be used to advertise the contest. The contest is timed to conclude during ISIT 2013, with the announcement made on Monday (lunch). Judging criteria will be rating on Youtube. Prizes will include Shannon's collected works, and will be handed out on Thursday (lunch). The committee requests a budget of \$500 for the awards.

In a discussion that followed, it was suggested that the video contest be turned into an initiative, and that the prize amounts be increased.

**13. Michelle Effros Presented the Report of the Ad Hoc Committee on the Role of the Membership and Chapters Committee:** The committee was formed at ISIT 2012, with members Michelle Effros (chair), Abbas El Gamal, Elza Erkip, Michael Gastpar, Negar Kiyavash, Joerg Kliewer, Sriram Vishwanath, and Lizhong Zheng. The committee's charge is to advise the BoG on a proposal to combine

the Membership & Chapters Committee (MCC) with Student and Outreach Committees, as well as to define the charge of the new Membership Committee to reflect the activity of the combined committee. The current bylaws on the Membership & Chapters Committee and the Student Committee were presented. The proposed updated bylaws on the Membership Committee, with the two standing Student and Outreach sub-committees, were presented.

In the discussion which followed, it was suggested that the purposes of the committee versus the subcommittees were not clear enough, and that the proposed bylaw language is not specific enough.

**ToDo:** The Constitution and Bylaws Committee will review the proposed bylaws change, and submit text to the BoG three weeks prior to the ITW 2013 Seville meeting.

**14. Paul Siegel presented the report of the Ad-hoc Committee on New Awards:** The committee members are Abbas El Gamal, Alex Vardy, Andrea Goldsmith, Frank Kschischang, Giuseppe Caire, Sergio Verdu, Paul Siegel, along with Gerhard Kramer, Muriel Medard, and Dave Forney.

Paul described the steps involved in the establishment of a new award, along with possible funding sources. Paul summarized the existing IT awards, and then discussed the Thomas M. Cover Dissertation Award. This new award was approved by the IT Society BoG in July 2012. It is to be funded by the IT Society, with an initial gift from Abbas (other gifts are welcome). The next required steps are to 1) approve the proposed IT Society Bylaw with a dollar amount and to 2) submit a completed form for TABARC/TAB approval. Paul presented the language of the proposed bylaw for the Cover dissertation award, with the dollar amount of the honorarium unspecified. Paul also presented the proposed BoG resolution.

Paul continued with the ISIT Student Paper Award. This award was established in 2010 (TAB approved), and is funded by IT Society. A name change was proposed at ITW 2012. The next required steps are to 1) approve with bylaw change and 2) notify IEEE Technical Activities Operations for approval by TABARC/TAB. Paul presented the language of the proposed bylaw for the Jack Keil Wolf ISIT Student Paper Award. Paul also presented the proposed BoG resolution.

A discussion on the Cover dissertation award followed. At issue is the wording of the proposed bylaw. Some felt that the evaluation committee should consist of people who have advised many theses. Others felt that the workload on the Awards committee (which would be charged with choosing the winners of the award) would be too high. It was noted that there may be overlap between the best dissertation award and the best paper award. It was also noted that such overlaps routinely occur in other fields. After some discussion, Gerhard made an executive decision to postpone the vote for the approval of the Bylaws change for the Cover Dissertation Award.

**ToDo:** The Ad-hoc Committee on New Awards will reconsider the text of the bylaws change for the Cover Dissertation Award in coordination with the Constitution and Bylaws Committee.

**Motion:** Approval of renaming and Bylaws change for the Jack Keil Wolf ISIT Student Paper Award. Motion was passed.

Paul raised the issue of whether to endow IT society awards. An endowment ensures long-term funding (in perpetuity) and



provides a framework and psychological incentive for gifts. The IEEE Foundation, which manages the endowment, requires \$20k minimum corpus. The honorarium comes from interest income on the corpus. Administration fees may apply.

Finally, Paul mentioned that the TABARC form for the Padovani Lectureship should be submitted before March 2013 for TAB approval.

**15. Elza Erkip presented the Conference Committee report:** She thanked outgoing committee members Bruce Hajek (who will stay on for one more year to ease the transition), Joao Barros, and Martin Bossert. The current members are Gerhard Kramer, Abbas El Gamal, Aylin Yener, Paul Siegel, and Lars Rasmussen.

**Motion:** Approve new Conference Committee members Bruce Hajek (one year only), Alon Orlitsky, Rudiger Urbanke. Motion was passed.

Elza gave updates on ISIT 2012, MIT (successfully completed), ITW 2012, Lausanne (very positive response), ISIT 2013, Istanbul (987 submitted papers, all papers forwarded to TPC). Update on ITW 2013, Sevilla: the workshop will take place September 9–13, with a paper deadline of April 1. The budget has been submitted. Currently, the surplus is around 7%, lower than the recommended 10%. This is partly due to plenary speaker expenses and honorarium. Organizers will look for other funds.

**Motion:** Approval of ITW 2013 budget. Motion was passed.

Giuseppe Caire presented the proposal for ITW 2015 in Jeju Island, Korea. The workshop is to take place October 12–15, 2015. General

co-chairs are Hong-Yeop Song and Giuseppe Caire. The program co-chairs are Sae-Young Chung, Rudiger Urbanke, and Pramod Viswanath. Giuseppe presented the background on the conference location, venue, transportation, tentative program, social events, registration fees, and potential sponsors.

**Motion:** Approval of ITW 2015 proposal. Motion was passed.

Elza discussed plans for future ISITs (2017 and beyond). For 2017, Interested groups include Stockholm (contact: Lars Rasmussen), Aachen (contact: Rudolf Mathar), Melbourne (contact: Emanuele Viterbo), New York (contact: Aaron Wagner, Roy Yates). In terms of future ITWs, there is interest from Gurgen Khachatryan for holding an ITW in Armenia.

Finally, Elza raised technical co-sponsorship proposals for NetCod 2014 (ITSoc has provided technical co-sponsorship for NetCod since 2008), and ISITA 2014 (ITSoc has provided technical co-sponsorship for ISITA since 2008).

**Motion:** Approval of technical co-sponsorship for NetCod 2014 and ISITA 2014. Motion was passed.

**16. Standing Items:** Aylin calls for more ideas for initiatives and proposals to spend 50% of the Society surplus.

Tony Ephremides has proposed a competition of a technical nature, in which the winner would gain custody of the notes left by David Middleton. In the discussion that followed, it was suggested that the notes should be made publicly available, perhaps after expert reviewing by an ITSoc member.

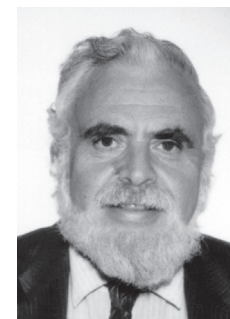
The meeting was adjourned at 5:43 PM.

## GOLOMB'S PUZZLE COLUMN™

# Combinatorial Counting

- 1) When  $(w + 2x + 3y + 4z)^4$  is multiplied out, what is the coefficient of  $wxyz$ ?
- 2) In how many ways can a set  $S$  of 8 distinct elements be partitioned into three non-empty subsets? (Each element of  $S$  must be put in one and only one of the three subsets; and which subset is which does not matter.)
- 3) A sequence  $\{a_n\}$  is defined recursively by  $a_0 = 0$ ,  $a_1 = 1$ , and  $a_{n+1} = 2a_n - a_{n-1}$  for  $n \geq 1$ . What is the value of  $a_{2013}$ ?
- 4) Balls labeled from 1 to 15 are on a billiard table. The rules of a particular game of pool require that the first

*Solomon W. Golomb*

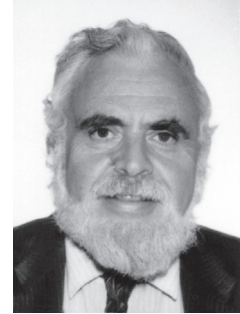


- ball to go off the table can be any of these 15 balls; but thereafter, each new ball to go off the table must have a number consecutive (above or below by one) with a ball already off the table. (The balls labeled 1 and 15 are *not* considered consecutive.) In how many different sequences can all 15 balls go off the table?
- 5) Each of four players, A, B, C, and D, holds ten \$1 chips. Each player in turn (first A, then B, etc.) must contribute at least one chip to a "kitty" which must end up with exactly \$27 in chips. How many different sequences of their four "antes" are possible?

## GOLOMB'S PUZZLE COLUMN™

## Word Puzzles Solutions

Solomon W. Golomb



## A. BIT-WORDS

As a noun, **BIT** has several meanings, ranging from a small amount of anything to the strap in the mouth of a saddled horse. The two technical meanings, distinct but often confused, are either a binary digit, or Shannon's unit of information. As a verb, **BIT** is the past tense of **BITE**. Words may contain the three consecutive letters B-I-T for a variety of reasons, most of which are unrelated to the meanings just listed. Here is a lengthy sample, in alphabetical order.

AMBIT	BITTER	HABIT	PHLEBITIS
AMBITION	BITTERN	HABITABLE	PROBITY
ARBITER	BITTERS	HOBBIT	PROHIBIT
ARBITRAGE	BITUMEN	INDUBITABLY	QUBIT
ARBITRARY	COHABIT	INHABIT	RABBIT
ARBITRATE	CUBIT	INHIBIT	RAREBIT
BITANGENT	DEBIT	ITSY-BITSY	SUBITO
BITCH	EMBITTERED	ITTY-BITTY	TIDBIT
BITE	EXHIBIT	OBITER DICTUM	TITBIT
BITEMPORAL	FLEABITTEN	OBITUARY	TRILOBITE
BITHEISM	FROSTBITE	ORBIT	UNDERBITTEN
BITT	GAMBIT	OVERBITE	WEATHERBITTEN

Proper nouns, with BIT, include brand names (ROBITUSSIN, NESBITT'S, SORBITOL); Biblical designations (CALEBITE, MO-ABITE, TISHBITE); TOBIT, a book of the Apocrypha; and the surname BABBITT and forename TABITHA. Did you notice the "BIT-RATE" in ARBITRATE? (It's also in barBITuRATE.)

## B. HIDDEN NUMBERS

In my preferred format:

1. a. PIONEER	2. a. NETWORK	8. a. FREIGHTER	9. c. ZANINESS
1. b. PHONEME	2. b. BATWOOD	9. a. BONINESS	10. a. ANTENNA
1. c. STONERS	2. c. CUTWORM	9. b. PUNINESS	10. b. EXTENDS

Other uninterrupted:

1. d. ATONEMENT	8. b. WEIGHTED	9. e. CANINES	11. a. TELEVENDING
1. e. THRONES	8. c. HEIGHTS	9. f. CANNINESS	80. a. WEIGHTY
2. d. BATWOMAN	8. d. SLEIGHT	10. c. CONTENDER	1. - 2. BIONETWORK
2. e. CATWOMAN	9. d. ASININE	10. d. INTENTION	

With letters inserted:

0. a. CRUZEIRO	4. a. FOUNDER	5. a. FESTIVE	6. b. ASTERIX
3. a. THREATEN	4. b. FAVOUR	5. b. FICTIVE	7. a. STEVEN
3. b. THREADED	4. c. FERVOUR	5. c. FURTIVE	30. a. THIRSTY
3. c. THRESHER	4. d. FLAVOUR	6. a. SPHINX	100. a. THUNDERED

There are a great many more, notably for **ONE**, **NINE**, and **TEN**. Chemical terms ending in **-NINE** include **ADENINE**, **ALANINE**, **GUANINE**, etc, and there are also the **APPENINE** mountains. For **SEVEN**, there is also the **SEVERN** River. While **BATWOMAN**, **CATWOMAN**, and **ASTERIX** are cartoon characters, a **BATWOMAN** is also a position in the British military. The **CRUZEIRO** is the Brazilian unit of currency. Words 4.b., 4.c., and 4.d are the preferred British spellings. Finally, **TELEVENDING** is my proposed synonym for *telemarketing*. Other number words can be found in short phrases, with the consecutive letters separated only by spaces, e.g. "PAT WENT YONDER" for **TWENTY**.

## Report on the 2013 European School of Information Theory (ESIT)

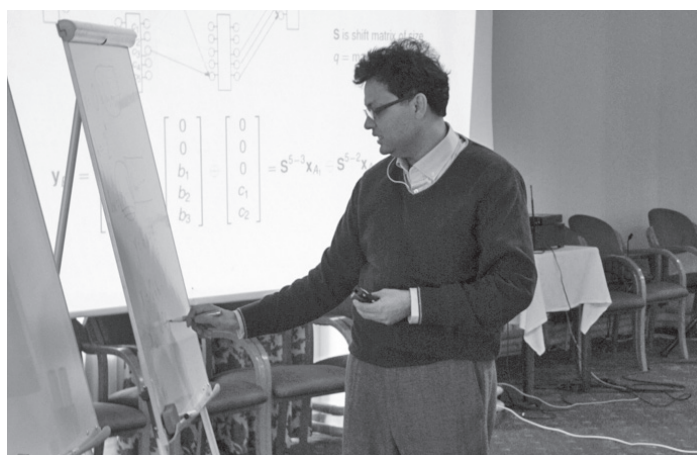
Petar Popovski

The 2013 Edition of the European School of Information Theory (ESIT) took part from April 22–26 in Ohrid, the Republic of Macedonia. The format and the number of participants continued the trend from the past two editions of ESIT in Barcelona, Spain (2011) and Antalya, Turkey (2012). The school featured lectures from very experienced information- and communication theorists, each of them well-known for her or his fundamental contributions to the field. The lecture topics were in the core areas of information theory, including channel coding, source coding, network coding, and wireless communication theory. There were dedicated poster sessions in which the students had the opportunity to present their work and involve in scientific interaction with the lecturers as well as the other senior scientist that attended the school, including the organizers and the guests. The social program of the School targeted to create more opportunities for networking among the participants, as well as a visit of World Heritage sites in the region of Ohrid.

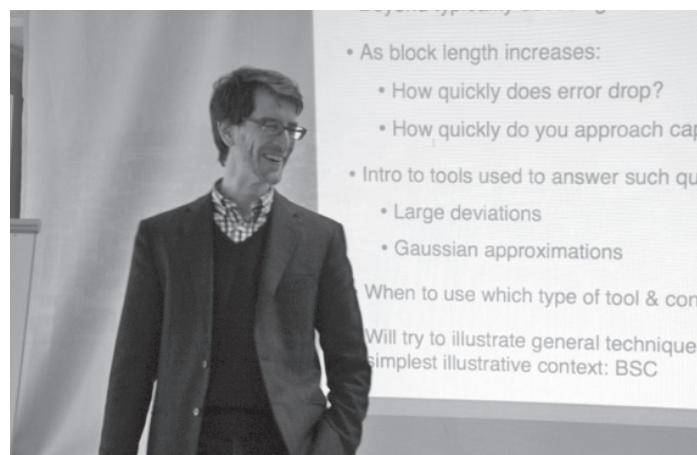
The total number of participants at the school was 63, including lecturers, students, organizers and guests. The original plan was to have six lecturers in the regular program and Jim Massey as a distinguished lecturer, but eventually ESIT had seven (excellent!) lecturers. Jim Massey had initially kindly agreed to participate, but in the last moment he was prevented due to illness, which unfortunately turned out to be a terminating one in June 2013. The participating students were from many different countries in Europe, and there were even Ph.D. students from the USA. The School was very well attended by graduate students from the Balkan countries and their participation was supported by partial travel grants, made possible by the financial support provided by the IEEE Information Theory Society. The school had as a guest Vitaly Skachek, who is organizing ESIT 2014 in Estonia.



The school started on Monday, April 22, by a brief opening speech from Gerhard Kramer, the president of the IT Society. The morning lecture was by Suhas Diggavi in the area of approximation models for wireless network. The Monday afternoon lecture was given by Start Draper in the area of error exponents and non-asymptotic results for channel coding. The second day had one lecture in the morning, in which Bane Vasic spoke about recent advances in the area of codes on graphs and iterative decoding, and two poster sessions in the afternoon. On Wednesday there were two lectures in the morning, while the afternoon was dedicated to the excursion. The first lecture was by Angel Lozano, who gave a talk on the role and limitations of the assumptions and models in wireless communication theory and practice. This lecture was followed by a talk on short message network coding by Gerhard Kramer. Similar to the second day, on Thursday there was a morning lecture and two poster sessions in the afternoon. The Thursday lecture was given by Osvaldo Simeone, titled “Source coding with side information.” The school concluded with a Friday morning

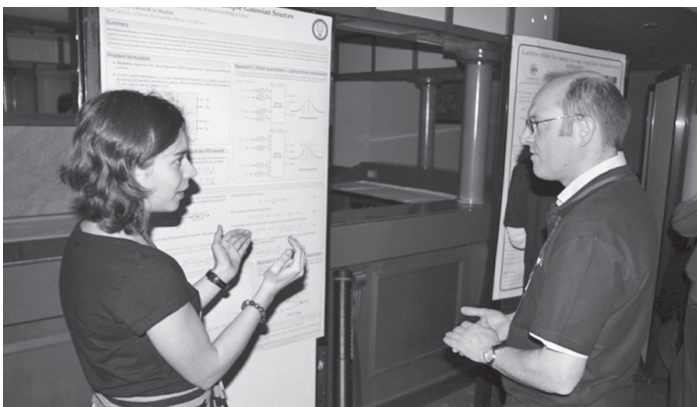


September 2013



IEEE Information Theory Society Newsletter





lecture “Network Coding Theory and Applications” by Christina Fragouli.

The social program had multiple events, starting with a speaker & organizer dinner, excursion and three informal (but organized) evening events. The excursion featured samples of the cultural and natural heritage of Ohrid and the Ohrid lake, boat trip to the

10th century monastery of St. Naum and finished with a joint dinner, where the participants could try the local food and fish.

ESIT 2013 was a success, which certainly owes to a number of people. First the team of organizers who, in addition to the undersigned, consisted of Zoran Utkovski, Liljana Gavrilovska, Vencislav Kafedziski and Dejan Vukobratovic. The school benefited a lot from the advisory board, consisting of Gerhard Kramer and Deniz Gunduz. The poster preparations and sessions were very efficiently handled by Valentin Rakovic and Daniel Denkovski, graduate students from the Doctoral School at the University “Sts. Cyril and Methodius.” Many thanks to all! And special thanks to Vitaly Skachek for making the photos.

ESIT 2013 has confirmed the mission to expose the students in communication engineering to the ideas, tools, and methods of information theory, and thereby attract more talented researchers to work in this fundamental engineering area. Furthermore, the level of participation has removed any doubt whether this should be an (bi)annual event—it will stay as an annual event. The planning for ESIT 2014 in Estonia has already started and we are looking forward to the next successful edition of ESIT.



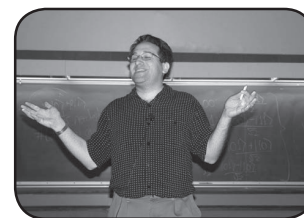
## Report on the Sixth Annual North American School of Information Theory

*Brent T. Ladd, Director of Education, Center for Science of Information*

The sixth annual North American School of Information Theory took place June 4-7, 2013 on the campus of Purdue University. Hosted by the Center for Science of Information (<http://soihub.org>), 140 total students, postdocs, faculty, and professional staff took part in the school this year. A concurrent workshop for faculty and postdocs on teaching science of information courses brought faculty from across the nation who also attended the lectures at the school. The school provides a venue where doctoral and postdoctoral students can meet to learn from distinguished professors in information theory, and form friendships and collaborations. This year the school introduced several interdisciplinary topics in the emerging field of science of information.



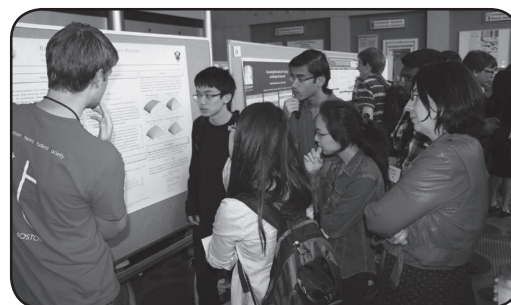
The school format has courses by distinguished scientists followed by student poster presentations. The five featured speakers this year were Michelle Effros (Cal-Tech) who explained “Information Theory for Large Networks”, Scott Aaronson (M.I.T.) gave an enthusiastic tutorial on “Quantum Computing and Information”, P.R. Kumar (Texas A&M) and postdoctoral scholar Jonathan Ponniah co-presented “A Clean Slate Approach to Security of Wireless Networks”, Mehmet Koyuturk, gave a survey on “Complex Diseases and Information Theory”. Emina Soljanin (Bell Labs), gave the Padovani Lecture on “The Secret Lives of Codes: From Theory to Practice and Back”. Videos and slides of the lectures are viewable on the Science of Information Channel via <http://soihub.org/summerschool>, as well as on the IEEE IT Society 2013 School page <http://www.itsoc.org/north-american-school-2013>



Students gave fast-paced overviews of their research during the traditional “one minute madness” series of presentations that was enjoyed by all. Three poster sessions took place during the school. There was a broad scope of topics presented, and many students commented that the interdisciplinary nature of the posters presented provided much insight and helpful discussions.

Many connections were made between the students and several mentioned possible future collaborations. Several students offered to lead open problem discussions in the evenings following dinner, and a

professional development session on biases and diversity in hiring was also offered to the students one evening.



We had the most perfect weather we could have asked for during the week of the school, with blue skies and temperatures in the mid 70's. Built into the schedule were lunches and dinners that allowed ample time for students to network and discuss issues in their respective fields. The social program included a sit-down roundtable dinner on the first evening of the school, with an outdoor BBQ cookout on Wednesday evening (with veggie sandwiches and frisbee games too!).

Many people helped make the 2013 school a success. Wojtek Szpankowski and Brent Ladd put the program together, Mike Atwell took care of the many web and print media duties, Kiya Smith and Erica Wilson assisted with organizing meals, lodging, lecture hall, and t-shirts, Bob Brown served as treasurer and organized key sponsorships, Barbara Gibson organized student diversity components including a session on recognizing biases in hiring. Sergio Verdu presented our school proposal and updates to the IT BoG, and the Center for Science of Information Executive Committee provided overall support. Erin Blakeslee, Mike Atwell, and Bob Brown all took great photographs - a full school album available at <https://www.facebook.com/media/set/?set=a.477580742319450.1073741827.132095200201341&type=3> . Robynne McCormick assisted with financial items, and Andy Thompson tirelessly ran video equipment and edited the final lectures. Deepak Kumar and Mark Ward facilitated a workshop for faculty interested in teaching science of information courses.



A big thank you to all of the sponsors that made the 2013 school possible. In particular, IEEE Information Theory Society, Center for Science of Information, Purdue Computer Science Department, and Vice President for Research, Princeton Electrical Engineering Department, UC Berkeley Departments of Electrical Engineering & Computer Sciences, Statistics, and ERSO, Bryn Mawr College Computer Science Department, and Texas A&M Electrical & Computer Engineering.

We close this brief report with feedback and representative quotes from students and faculty. In addition to gaining experience presenting their research to their peers, students report a 3.7/4 on obtaining useful feedback to their research from talking with other students and faculty, and a 3.4/4 that they were able to start some level of professional connection with their peers for possible collaborations.

*“The poster sessions were a great opportunity to see the variety of information-theoretic research that is going on. They facilitated meaningful conversations. I hope to continue discussing my research with some of these students. The one-minute madness sessions were useful, too.”*

*“Sharing my research and getting to see what the other students’ research was certainly valuable. It is also good to speak to someone in the same stage of career and talk about practical aspects of the PhD life, questions that you would not feel so comfortable to ask to your advisor, in general.”*

*“I think the summer school was a big success. I enjoyed the talks very much. The poster sessions were very interesting. I had several deep discussions with other researchers about my (and their) research which was very helpful for me.”*

*“The best thing about the summer school for me is getting to know students from other universities, learn about their research and share ideas with them. And even talk about future collaborations!”*

*“I will look forward to attending this conference again, especially if the accommodations and food are as decent as they were at Purdue. Thank you.”*

*“Great Summer School!!! Thank you for a really well organized and enriching event!”*

## CALL FOR PAPERS

### *IEEE JSAC Special Issue on Full-duplex Wireless Communications and Networks*

With the recent system-centric demonstrations of full-duplex wireless, where a node can send and receive at the same time in the same frequency band, another avenue has opened up for increasing the capacity of future wireless networks. One of the key challenges in full-duplex wireless is self-interference. Depending on device dimensions, the amount of self-interference and the extent to which it can be cancelled can vary greatly, thereby impacting the performance at different nodes in the network differently. Thus, to translate the promising preliminary results into practical network gains, it is crucial that self-interference be adequately modeled based on the problem context. Towards that end, there is an urgent need for a concerted effort by the research community to address the diverse set of challenges regarding all aspects of full-duplex network design, theory, and development. The following areas are of particular interest for this special issue:

1. **Modeling of hardware and propagation effects** relevant to the design and analysis of full-duplex wireless systems, especially those relating to the issue of self-interference.
2. **Analysis of system performance and of theoretical performance limits**, including channel capacity, network capacity, and latency for a variety of practical full-duplex wireless system topologies (e.g., SISO, MIMO, relay, multi-user, multi-hop).
3. **Design** of modulation schemes, channel codes, signal processing algorithms, and network protocols that facilitate the practical implementation of full-duplex wireless systems. Relevant network design topics include resource management, medium access control, scheduling, and cross-layer design for practical full-duplex systems.
4. **Experimental evaluation** of full-duplex system implementations that quantify the actual gains achievable with modern design techniques.

#### Submission Guidelines

Authors should refer to the submission rules specified in the “Information for Authors” section of the JSAC guidelines ([www.jsac.ucsd.edu/Guidelines/info.html](http://www.jsac.ucsd.edu/Guidelines/info.html)) to prepare their papers. Papers should be submitted through EDAS (<http://www.edas.info>) according to the following schedule:

#### Tentative Schedule

Manuscript Submission: October 1, 2013

First Review Notification: February 1, 2014

Second Review Complete/Notification Letters: April 1, 2014

Final Manuscript Due: June 1, 2014

Publication: 4th quarter, 2014

#### Guest Editors

1. Prof. Ashutosh Sabharwal, Rice University, USA ([ashu@rice.edu](mailto:ashu@rice.edu))
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5. Prof. Risto Wichman, Aalto University, Finland ([risto.wichman@aalto.fi](mailto:risto.wichman@aalto.fi))
6. Dr. Sampath Rangarajan, NEC Labs America ([sampath@nec-labs.com](mailto:sampath@nec-labs.com))



## FIFTY-FIRST ANNUAL ALLERTON CONFERENCE

### ON COMMUNICATION, CONTROL, AND COMPUTING

October 2–4, 2013  
Call for Papers

The Fifty-First Annual Allerton Conference on Communication, Control, and Computing will be held from Wednesday, October 2 through Friday, October 4, 2013, at Allerton House, the conference center of the University of Illinois. Allerton House is located twenty-six miles southwest of the Urbana-Champaign campus of the University in a wooded area on the Sangamon River. It is part of the fifteen-hundred acre Robert Allerton Park, a complex of natural and man-made beauty designated as a National natural landmark. Allerton Park has twenty miles of well-maintained trails and a living gallery of formal gardens, studded with sculptures collected from around the world.

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, and intelligent transportation systems.

**Information for authors:** Regular papers suitable for presentation in twenty 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 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.

Manuscripts must be submitted by **Tuesday, July 9, 2013**, following the instructions at the Conference website: <http://www.csl.uiuc.edu/allerton/>.

Authors will be notified of acceptance via e-mail by August 7, 2013, at which time they will also be sent detailed instructions for the preparation of their papers for the Proceedings.

**Final versions of papers to be presented at the conference will need to be submitted electronically by October 6, 2013.**

Conference Co-Chairs: Tamer Başar and Olgica Milenkovic

Email: [allerton-conf@illinois.edu](mailto:allerton-conf@illinois.edu)

URL: [www.csl.illinois.edu/allerton/](http://www.csl.illinois.edu/allerton/)

COORDINATED SCIENCE LABORATORY AND THE  
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

University of Illinois at Urbana-Champaign





## ICITS 2013

### 7th International Conference on Information Theoretic Security

Singapore, November 28–30, 2013

<http://www.spms.ntu.edu.sg/mas/conference/icits2013/>

### Call for Papers

This is the seventh in a series of conferences that aims to bring together the leading researchers in the areas of information theory, quantum information theory, and cryptology. Papers on all technical aspects of information-theoretic security and quantum information-theoretic security are solicited for submission to ICITS 2013. Areas of interest include, but are not restricted to:

Unconditional security	Lattices and cryptography	Quantum information theory
Quantum cryptography	Secret sharing	Network coding security
Authentication codes	Multiparty Computation	Physical models & assumptions
Wiretap channels	Bounded storage model	Physical layer security
Randomness extraction	Oblivious transfer	
Codes and cryptography	Nonlocality and nonsignaling	

Two types of contributed presentations will take place in ICITS 2013. The *Conference Track* will act as a traditional conference, consisting of original papers with published proceedings in the Lecture Notes in Computer Science series. The *Workshop Track* will operate more like an informal workshop, with papers that have appeared elsewhere or that consist of work in progress.

### Important Dates

<b>Conference Track submissions deadline</b>	<b>Friday, July 5, 2013, 13.00 GMT</b>
Conference Track notification	Friday, August 30, 2013
Proceedings version	Friday, September 20, 2013
<b>Workshop Track submissions Deadline</b>	<b>Friday, August 2, 2013, 13.00 GMT</b>
Workshop Track notification	Thursday, September 19, 2013

### Conference Organization

General Chairs	Frédérique Oggier ( <i>NTU, Singapore</i> ) and Miklos Santha ( <i>CQT, Singapore</i> )
Program Chair	Carles Padró ( <i>NTU, Singapore</i> )



## Call for Papers CISS 2014

48th Annual Conference on  
Information Sciences and Systems

**March 19, 20, & 21, 2014**

Princeton University - Department of Electrical Engineering

*and Technical Co-sponsorship with*



**IEEE Information Theory Society**

Authors are invited to submit previously unpublished papers describing theoretical advances, applications, and ideas in the fields of: information theory, coding theory, communication, networking, signal processing, image processing, systems and control, learning and statistical inference.

**Papers, requiring 20 minutes for presentation, will be reproduced in full (up to six pages) in the conference proceedings.**

Electronic submissions of up to 6 pages (in Adobe PDF format) & 3-4 keywords must be submitted by **January 3, 2014**. Submissions should be of sufficient detail and length to permit careful reviewing. Authors will be notified of acceptance no later than **January 31, 2014**. Final manuscripts of accepted papers are to be submitted in PDF format no later than **February 23, 2014**. These are firm deadlines that will permit the distribution of the Proceedings at the Conference. IEEE reserves the right to exclude a paper from distribution after the conference (e.g., removal from IEEE Xplore) if the paper is not presented at the conference.

**For more information visit us at: <http://ee-ciss.princeton.edu/>**

### CONFERENCE COORDINATOR

**Lisa Lewis**

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### PROGRAM DIRECTORS

**Prof. Sanjeev Kulkarni**

**Prof. Emmanuel Abbe**

Dept. of Electrical Engineering  
Princeton University  
Princeton, NJ 08544

### IMPORTANT DATES

**Submission deadline:**

**January 3, 2014**

**Notification of acceptance:**

**January 31, 2014**

**Final manuscript due:**

**February 23, 2014**

**TPC**

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Vaneet Aggarwal	Michael Lentmaier
Mohamed-Slim Alouini	Simon Litsyn
Anima Anandkumar	Andi Loeliger
Venkat Anantharam	Mohammad Maddah-Ali
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Volker Kühn	Aylin Yener
Gitta Kutyniok	Wei Yu
Vijay Kumar	Ram Zamir

# IEEE International Symposium on Information Theory

June 29 – July 4, 2014  
Hawai`i Convention Center, Honolulu, HI, USA



## Call For Papers

The 2014 IEEE International Symposium on Information Theory will be held in Honolulu, Hawai`i, USA from June 29 through July 4, 2014. Interested authors are encouraged to submit previously unpublished contributions from a broad range of topics related to information theory, including but not limited to the following areas:

Coding theory and practice  
Compression  
Detection and estimation  
Information theory in networks  
Pattern recognition and learning  
Sequences and complexity  
Signal processing

Communication theory  
Cryptography and data security  
Information theory and statistics  
Multi-terminal information theory  
Quantum information theory  
Shannon theory  
Source coding

Researchers working in emerging fields of information theory or on novel applications of information theory are especially encouraged to submit original findings. Submitted papers should be of sufficient depth for review by experts in the field. Both submitted and final papers will be limited to 5 pages in standard IEEE conference format. If full proofs cannot be accommodated due to space limitations, authors are encouraged to post a publicly accessible complete paper elsewhere and to provide a specific reference. Authors should refrain from submitting multiple papers on the same topic.

The paper submission deadline is January 19, 2014, at midnight, Eastern Time (New York, USA). Notification of acceptance by March 30, 2014.

**TPC Chairs**  
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Gerhard Kramer  
Olgica Milenkovic  
Urbashi Mitra

**General Chairs**  
Anders Host-Madsen  
Aleksandar Kavcic  
Venugopal V. Veeravalli



[www.isit2014.org](http://www.isit2014.org)







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**ISITA2014** — the **International Symposium on Information Theory and Its Applications** — will be held in **Melbourne, Australia** from **26 to 29 October 2014**. This biennial event, first held in 1990, is a leading conference in the information theory community. ISITA2014 features world-class speakers, plenary talks and technical sessions on a diverse range of topics within the field of information theory.

### 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
- Spread Spectrum Systems
- 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
- Speech/Image Coding
- 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 on the conference web site:

[www.isita2014.org](http://www.isita2014.org)

This link points to the permanent site <http://www.isita.ieice.org/2014/>. Submissions will be selected on the basis of a full paper, reviewed by subject-matter experts. Accepted papers will appear in the symposium proceedings. To be published in the symposium proceedings and IEEE *Xplore*, an author of an accepted paper must register at a non-student rate and present the paper. IEEE does not guarantee inclusion in IEEE *Xplore*.

### Schedule

<b>Paper submission deadline</b>	<b>6 April 2014</b>
<b>Acceptance notification</b>	<b>22 June 2014</b>
<b>Final paper submission</b>	<b>20 July 2014</b>

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

The IEEE Information Theory Workshop (ITW2014) will be held from 2 to 5 November 2014 in nearby Hobart, Tasmania, Australia.

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image by R. Michalski



# ITW2014



IEEE Information Theory Workshop

Hobart, Tasmania, Australia | 2-5 November



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The 2014 IEEE Information Theory Workshop will take place 2-5 November in Hobart, Tasmania at the Hobart Function And Conference Centre. The Australian island of Tasmania varies geographically from old-growth forests and grasslands to mountains and volcanic lakes, supporting unparalleled biodiversity, with many flora and fauna species unique to the island. Tasmania's rugged wilderness offers ample opportunities for hiking, bushwalking, kayaking, swimming and scuba. Hobart is Australia's second-oldest city, where historic buildings and districts stretch along the Derwent River. A burgeoning art and restaurant scene are complemented by fresh local seafood and established wineries.

## Call for Papers

ITW2014 is a forum for technical exchange among scientists and engineers working on the fundamentals of information theory. The agenda is broad and will cover the diverse topics that information theory presently impacts. There will be both invited and contributed sessions. Papers for the contributed sessions are solicited in, but not limited to, the following areas:

- Source coding
- Distributed source and channel coding
- Joint source and channel coding
- Coding for wireless systems
- Coding for sensor and ad-hoc networks
- Coding and biology
- MIMO and space-time coding
- Graph-based codes and iterative decoding
- Cooperation in wireless systems
- Sequences and coding
- Secure communication and cryptography
- Compressed sensing
- Coding applications: optical communications, smart grid, underwater, etc.
- Information theoretic security

## Paper Submission

Interested authors are invited to submit previously unpublished contributions. Papers for the contributed sessions, not exceeding five pages, should be submitted according to the directions which will appear on the conference website:

[itw2014.jaist.ac.jp](http://itw2014.jaist.ac.jp)

The ITW proceedings will be published by the IEEE and will be available on IEEE *Xplore*.

## Schedule

Paper submission deadline: 4 May 2014

Acceptance notification: 27 July 2014

Final paper submission: 1 September 2014

## Plenary Speakers

Presentations by plenary speakers are planned.

ISITA2014 will be held nearby in Melbourne, Australia on 26-29 October 2014

images: ccdoh1, lyot Boparai





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## Conference Calendar

DATE	CONFERENCE	LOCATION	WEB PAGE	DUE DATE
September 9–13, 2013	<b>2013 IEEE Information Theory Workshop (ITW 2013)</b>	Seville, Spain	<a href="http://itw2013.tsc.uc3m.es/">http://itw2013.tsc.uc3m.es/</a>	Passed
October 2–4, 2013	<b>51st Annual Allerton Conference on Communication, Control, and Computing</b>	Monticello, Illinois, USA	<a href="http://www.csl.illinois.edu/allerton/">http://www.csl.illinois.edu/allerton/</a>	Passed
November 3–6, 2013	<b>Asilomar Conference on Signals, Systems, and Computers (ASILOMAR 2013)</b>	Pacific Grove, CA, USA	<a href="http://www.asilomarssc.org/">http://www.asilomarssc.org/</a>	Passed
November 28–30, 2013	<b>7th International Conference on Information Theoretic Security (ICITS 2013)</b>	Singapore	<a href="http://www.spms.ntu.edu.sg/mas/conference/icits2013/">http://www.spms.ntu.edu.sg/mas/conference/icits2013/</a>	Passed
December 9–13, 2013	<b>2013 IEEE Global Communications Conference (GLOBECOM 2013)</b>	Atlanta, GA, USA	<a href="http://www.ieee-globecom.org/">http://www.ieee-globecom.org/</a>	Passed
December 16–17, 2013	<b>6th International Workshop on Multiple Access Communications (MACOM 2013)</b>	Vilnius, Lithuania	<a href="http://www.macom.ws/">http://www.macom.ws/</a>	September 5, 2013
April 27–May 4, 2014	<b>33rd IEEE International Conference on Computer Communications (INFOCOM 2014)</b>	Toronto, Canada	<a href="http://www.ieee-infocom.org/2014/">http://www.ieee-infocom.org/2014/</a>	Passed
May 18–21, 2014	<b>2014 79th Vehicular Technology Conference (VTC2014-Spring)</b>	Seoul, Korea	<a href="http://www.ieeevtc.org/vtc2013spring/">http://www.ieeevtc.org/vtc2013spring/</a>	September 16, 2013
June 10–14, 2014	<b>IEEE International Conference on Communications (ICC 2014)</b>	Sydney, Australia	<a href="http://www.ieee-icc.org/">http://www.ieee-icc.org/</a>	September 15, 2013
June 29–July 4, 2014	<b>2014 IEEE International Symposium on Information Theory (ISIT 2014)</b>	Honolulu, Hawaii, USA	<a href="http://www.isit2014.org/">http://www.isit2014.org/</a>	January 19, 2014
October 26–29, 2014	<b>2014 International Symposium on Information Theory and its Applications (ISITA 2014)</b>	Melbourne, Australia	<a href="http://www.isita.ieice.org/2014/">http://www.isita.ieice.org/2014/</a>	April 6, 2014

Major COMSOC conferences: <http://www.comsoc.org/conf/index.html>