

IEEE Information Theory Society Newsletter



Vol. 65, No. 1, March 2015

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ISSN 1059-2362

Editorial committee: Frank Kschischang, Giuseppe Caire, Meir Feder, Tracey Ho, Joerg Kliewer, Anand Sarwate, Andy Singer, and Sergio Verdú

President's Column

Michelle Effros

It is an honor and a privilege to take on the role of 2015 President of the Information Theory Society. This community has been an intellectual home to me throughout my career, and I am grateful for the opportunity to serve.

To me, the Information Theory Society is characterized by the beauty of its questions and answers, the brilliance of its participants, the intellectual rigor and honesty of its technical activities, and the warmth of its community. The society stands on solid footing today because of the leaders who came before me. We are fiscally sound. Our Transactions remain a model of excellence.

Our membership is showing early signs of new growth. Programs for supporting students, encouraging broad participation of our membership, and mentoring colleagues at all levels of their career are solidly in place. Our symposia, workshops, and schools are exceptionally good.

As a Society, we owe a debt of gratitude to all of the many volunteers who have made and continue to make this society what it is. Thanks go to Abbas El Gamal, Aylin Yener, Tara Javidi, Matthieu Bloch, and Muriel Medard, whose respective terms as President, Treasurer, Newsletter Editor, Online Committee Chair, and Senior Past President end with the start of the new year. Many thanks as well to all of the new and continuing volunteers who make this community strong. They are too numerous to detail here, but their roles are enumerated in full on our society website. I am privileged to work with such a talented and dedicated team.

April 30, 2016 will be the 100th anniversary of Shannon's birth. As the date approaches, I am struck by one area where we as a community have not done as well. I believe that we need to spend more time talking about what we do with people outside of our own community. Whether this means



reaching out to other research communities, working with the popular press, or developing materials for children and their teachers, I believe that we should spend more time sharing the questions and results that inspire us with people who are not already similarly inspired. Every school child learns the name of Albert Einstein; his most famous equation has somehow entered the realm of popular culture. Why is it that so few people know the name or have heard about the contributions of Claude Elwood Shannon? Clearly the respective fame of these two men is not a measure of the direct impact that each man's results have had on the substance of those school children's lives. If we won't be the ones to tell

them, it is hard for me to imagine who will.

With the new year, the Society has begun the hard work of addressing this concern. Under the leadership of our Conference Committee Chair, Elza Erkip, a sub-committee of the Conference Committee is examining the question of whether joint workshops with other communities would enrich our Society's activities, and, if so, to begin the process of seeding such activities. The incoming editor of our newsletter, Michael Langberg, is considering curating a series of newsletter contributions from authors outside our community who might introduce our readership to interesting new areas for mutual exploration. I am in the process of forming an ad hoc committee tasked with the job of thinking broadly about outreach beyond our community's borders. Options under discussion include everything from teaming up with television, radio, and web programs that focus on science to writing pieces for the popular press to preparing materials to enable Shannon lessons in schools and information theory celebrations around the globe.

The Shannon Centennial offers a perfect opportunity to begin what I hope will become an ongoing effort in our community

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From the Editor

Tara Javidi



Dear IT Society members,

This is my last issue as the editor of the newsletter. I would like to thank all of you who have helped me not completely mess up a great tradition. I would like to especially thank our editorial board who have been a great resource as well as the amazing group of folks who have contributed. I also would like to wish the incoming editor, Michael Langberg, best of luck.

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 jointly at 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 our incoming editor, Michael Langberg, with a subject line that includes the words “IT newsletter.”

The next few deadlines are:

Issue	Deadline
June 2015	April 10, 2015
September 2015	July 10, 2015
December 2015	October 10, 2015

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

IEEE Information Theory Society Newsletter (USPS 360-350) is published quarterly by the Information Theory Society of the Institute of Electrical and Electronics Engineers, Inc.

Headquarters: 3 Park Avenue, 17th Floor,
New York, NY 10016-5997.

Cost is \$1.00 per member per year (included in Society fee) for each member of the Information Theory Society. Printed in the U.S.A. Periodicals postage paid at New York, NY and at additional mailing offices.

Postmaster: Send address changes to IEEE Information Theory Society Newsletter, IEEE, 445 Hoes Lane, Piscataway, NJ 08854.

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Professor Thomas Kailath was One of the Recipients of the 2012 National Medals of Science

Professor Thomas Kailath of Stanford University was one of the recipients of the 2012 National Medals of Science, presented by President Obama at the White House on Nov 20, 2014. The medal is the country's highest honor for achievement and leadership in advancing the fields of science. Tom was recognized for "transformative contributions to information and system science, for distinctive and sustained mentoring of young scholars, and for translation of scientific ideas into entrepreneurial ventures that have had a significant impact on industry."

A link to the ceremony is available on white house page: <http://www.whitehouse.gov/photos-and-video/video/2014/11/20/presidentawards-national-medals-science-and-nationalmedals-tech>

During the award ceremony, Tom was mentioned by the President as having come "to this country from India at the age of 22, with a research assistantship that took him to MIT, and then to Stanford, where he made critical contributions in information theory and statistics, and mentored more than 100 scholars along the way." The President also got a lot of applause for his quoting Tom directly (minute 8:39): "As Thomas Kailath, one of our honorees today, says, 'Scientists are intrinsically hopeful and believe in grand answers, and that if we work hard enough we can find some of them in our lifetime.' And that's a good phrase- intrinsically hopeful."

I'm intrinsically hopeful (*laughter*). I am. That's who I am (*laughter and applause*). That's who we are as a people, as Americans, as a nation."

Tom joins two earlier IT Society National Medal of Science awardees: Andy Viterbi and Sol Golomb. Irwin Jacobs received a National Medal of Technology and Innovation.



White House

Professor Norm Beaulieu Wins the 2014 IEEE Communication Society Communication Theory Technical Committee Technical (CTTC) Achievement Award

Honored for his fundamental work on the analysis of fading channels and diversity systems

Norm Beaulieu, past President of the Canadian Society of Information Theory, and who is currently a visiting professor in the School of Information and Communication Engineering, and the School of Electronic Science and Technology, Beijing University of Posts and Telecommunications (BUPT), is the 2014 winner of the IEEE Communication Society Communication Theory Technical Committee Technical (CTTC) Achievement Award. Announcement of the award took place at GLOBECOM 2014 in Austin, Texas in December. The award citation reads, "for fundamental work on the analysis of fading channels and diversity systems". The Basis for Judging from the CTTC website reads, "The award will recognize members of the Communication Theory Technical Committee (CTTC) of the IEEE Communications Society who have been involved with CTTC, have done outstanding work in communication theory, and have achieved a high degree of visibility in the field."



IT Society Welcomes New Transactions Editor-in-chief

As you all know, Professor Frank Kshischang has agreed to serve as the new Editor-in-Chief for our Transactions. We are sure many readers wonder what it takes for some brave souls to serve despite knowing how heavy the workload is. We are happy to report that we have uncovered that it might have something to do with sweets, chocolate, and cake during a small ceremony in his University of Toronto office in January, Professor Frank Kschischang accepts the Society's annual payment of a cake for his services as IEEE Transactions on Information Theory Editor-in-Chief. Photo courtesy of Dr. Christian Senger.



The Historian's Column

The History of our field includes some amazing events that connect with World History and, often, with dramatic events that show how Science is not immune to political and societal matters. A case in point is today's commentary that is based on material provided by our esteemed colleague, Dr. Joachim Hagenauer, professor emeritus at the Technical University of Munich and member of the Bavarian Academy of Science. He is hereby awarded the coveted title of "honorary historian of the IT Society".

The story involves three professors of Communication Engineering before, during, and after Hitler's "Third Reich". They were all of the same age, had been volunteers during World War I, shared similar conservative backgrounds, and even sometimes worked and published together. The interesting difference amongst them is the completely different ways they reacted to the Nazi regime. They were Hans Piloty, Hans Ferdinand Mayer, and Karl Kuepfmueller.

Piloty (1895–1969) was actually Joachim's predecessor who held the Chair occupied later by Joachim, then by the late Ralf Koetter, and, now by our colleague Gerhard Kramer. He opposed Hitler's regime but he did so quietly. Nonetheless, he almost got fired from his position by the regime. After the war he became Rector of the "Technische Hochschule Muenchens" and is credited with building one of the first German electronic computers.

Mayer (1895–1980) was head of research in Siemens. He was a strong and determined opponent of Hitler's regime who actively opposed it and even revealed secrets in radio technology to the British through the so-called "Oslo report". This fact was revealed to the public only in the late eighties. During the war he was spreading BBC news in his neighborhood, saved the life of a Jewish girl, and ended up in several concentration camps after 1943. He barely survived and was subsequently employed by the US Army through an operation codenamed "Paperclip" and eventually joined the faculty at Cornell University. He was recalled by Siemens in the fifties to become a member of its Board until his retirement in 1962.

Anthony Ephremides



Kuepfmueller (1897–1977) joined the Nazi Party early in his life and rose to a high rank in the SS. He had been a tenured professor early in his life in Danzig and Berlin and during the war he directed communications research for Siemens and for the German Navy. Because of his SS rank he was jailed by the allies after the war from 1945 to 1947 but was later acquitted and became Professor at the University of Darmstadt. He was the most brilliant of these three scientists and Joachim attests to the fact that he was an excellent teacher having met him during his studies and having had direct contact with him. His past involvement with the Nazis was not revealed or discussed in his later years.

Having looked at the pictures of these three men that Joachim provided it is interesting to note how appearances can be deceiving. Piloty had a rather neutral demeanor and is shown slightly balding, with spectacles and cigar in hand, that is, a perfect image of a conservative professor. Mayer, the active opponent of the Nazis had a sinister look and a scarred face that fitted more the conventional image of what an SS officer would be like. And, finally, Kuepfmueller, the SS officer and Nazi sympathizer had the most gentle expression of a distinguished intellectual.

In terms of their scientific accomplishments, Kuepfmueller is credited with being the first to identify the uncertainty relation between time and frequency in 1924 (before Heisenberg disclosed his Uncertainty Principle), he preceded Nyquist in identifying the stabilizing effect of feedback in 1928, he characterized the ideal low-pass filter (also in 1928), showed together with his student Raabe the first application of the sampling theorem in 1939, and calculated the entropy of German text in 1954.

Piloty dealt with long-range energy transmission in 1925, developed the theory of four-pole filters since 1931, and built the first German computer with his co-workers in 1950.

Mayer developed filter theory in 1925, showed the equivalence between current and voltage sources, identified transients in cable-based long-range transmission (working WITH Kuepfmueller), and worked on long-range TV transmission, again with Kuepfmueller, in 1938. Finally, he developed the principles of Pulse Coded Modulation in 1954, and established the Sun as an object of Radio Astronomy in 1955.

All three are certainly not your average resumes. Yet, how different the reactions of these three men were to the emergence of the catastrophic movement! It is not easy to pass judgment on any individual but in this case it is even harder. Three brilliant minds caught in the turmoil of sweeping world events in the confusing circumstances of their environment reacted to it in vastly different ways. If we simplify a little we would say that Piloty chose a “middle-of-the road” stance, while Mayer joined the resistance and Kuepfmueller sided with the rulers. Who knows

what their intimate thoughts and beliefs were? And who knows, as actually Joachim asks, how we would have behaved had we been in their shoes?

This fascinating story of three members of the community of our own discipline suggests that there are probably numerous instances of our own colleagues who are caught in similar circumstances around the world. There are surely examples of similar dilemmas in the ex-Soviet Union and other countries of authoritarian regimes. The ethical issues involved dwarf perhaps the scientific aspects of these dilemmas. But when major accomplishments accompany the issues that scientists face, it is surely immensely difficult to pass final judgment. People are not single-faceted. Their actions and careers often hide significant internal turmoil that can span the full gamut of human experiences. Let us just reflect on this and similar matters as we navigate our lives through this complex world we live in.

2015 Elevated Fellows

Jean Armstrong

Monash University

for contributions to the theory and application of orthogonal frequency division multiplexing in wireless and optical communications

Kristine Bell

Metron, Inc.

for contributions to statistical signal processing with radar and sonar applications

Daniel Bliss

Arizona State University

for contributions to adaptive sensor systems in radar and communications

Christian Cachin

IBM Research Laboratory

for contributions to steganography and secure distributed systems

Ning Cai

Xidian University

for contributions to network coding theory and arbitrarily varying channels

Biao Chen

Syracuse University

for contributions to decentralized signal processing in sensor networks and interference management of wireless networks

Mérouane Debbah

Ecole Supérieure d'électricité (SUPLEC)

for contributions to the theory and application of signal processing in wireless networks

Pingzhi Fan

Southwest Jiaotong University

for contributions to signal design for wireless communications

Nihar Jindal

Broadcom Corporation

for contributions to multiuser multi-antenna communications

Young-Han Kim

University of California, San Diego

for contributions to feedback communication and network information theory

Daniel Lidar

University of Southern California

for contributions to quantum information processing

David Love

Purdue University

for contributions to feedback-adaptive wireless communication systems

Gianluca Mazzini

University of Ferrara

for contributions to chaos-based electronic and telecommunication systems design

Krishna Narayanan

Texas A&M University

for contributions to coding for wireless communications and data storage

Radha Poovendran

University of Washington

for contributions to security in cyber-physical systems

Aylin Yener

Pennsylvania State University

for contributions to wireless communication theory and wireless information security

Wei Zhang

University of New South Wales

for contributions to cognitive radio communications

2015 IT Society's Newly Elected IEEE Fellows

Ning Cai, Xidian University

Cai Ning received the M.S. degree in mathematics from Academia Sinica, Beijing, China, in 1982, and the Dr. degree in mathematics from the University of Bielefeld, Bielefeld, Germany, in 1988 respectively. He is a professor in Xidian University since 2006. He is one of the founders of network coding and a recipient of the 2005 IEEE Information Theory Society Paper Award (with R. S.-Y. Li and R. W. Yeung). His research interests include Information Theory (Shannon Theory), Network Coding, Quantum Information, Combinatorics and its applications in Computer Science.

Young-Han Kim, University of California, San Diego

Young-Han Kim received his B.S. degree with honors in Electrical Engineering from Seoul National University, in 1996, where he was a recipient of the General Electric Foundation Scholarship. After a three-and-half-year stint as a software architect at Tong Yang Systems, Seoul, Korea, working on several industry projects such as developing the communication infrastructure for then newly opening Incheon International Airport, he resumed his graduate studies at Stanford University, and received his Ph.D. degree in Electrical Engineering (M.S. degrees in Statistics and in Electrical Engineering) in 2006.

Since then, he has been with the Department of Electrical and Computer Engineering at the University of California, San Diego, where he is currently Associate Professor.

Professor Kim's research interests are in the broad areas of statistical signal processing and information theory, with applications in communication, control, computation, networking, data compression, and learning. He is coauthor of the textbook "Network Information Theory." Professor Kim served as a Distinguished Lecturer for the IEEE Information Theory Society (2012–2013)

and an Associate Editor for the IEEE Transactions on Information Theory (2012–2014). He is a recipient of the 2008 NSF Faculty Early Career Development (CAREER) Award, the 2009 US-Israel Binational Science Foundation Bergmann Memorial Award, and the 2012 IEEE Information Theory Paper Award.

Daniel Lidar, University of Southern California

Daniel Lidar is a Professor of Electrical engineering, Chemistry, and Physics at the University of Southern California, where he is the Director of the USC Center for Quantum Information Science and Technology, and the Scientific Director of the USC-Lockheed Martin Center for Quantum Computing. He received his Ph.D. in Theoretical Physics in 1997 from the Hebrew University of Jerusalem, and did his postdoctoral work in Theoretical Chemistry at UC Berkeley. Prior to joining USC in 2005 he was a faculty member at the University of Toronto for five years.

Professor Lidar has made numerous contributions to quantum computing and quantum control, and is the coeditor and coauthor of the book "Quantum Error Correction" (Cambridge University Press, 2013). His main research interest is quantum information processing, where he works on quantum control, quantum error correction, the theory of open quantum systems, quantum algorithms, and theoretical as well as experimental adiabatic quantum computation. His past interests include scattering theory and fractals. He currently holds four U.S. patents in the area of quantum computing.

He served as Chair of the APS Topical Group on Quantum Information. He is an editorial board member of Springer's book series on Quantum Information Science and Technology and an editorial board member of the journal Quantum Information Processing. Professor Lidar is a recipient of a Sloan Research Fellowship and is also a Fellow of the American Association for the Advancement of Science (AAAS) and a Fellow of the American Physical Society (APS).

IEEE Information Theory Society Board of Governors Meeting Minutes

*Edmund Yeh,
Hawaii Convention Center, Honolulu, HI, 06.29.2014, 1:10-6:20 PM*

Present: Abbas El Gamal, Sergio Verdu, Vijay Kumar, Nick Lane-man, Alex Vardy, Matthieu Bloch, Joerg Kliever, Alon Orlitsky, Rudiger Urbanke, Aylin Yener, Emina Soljanin, Michelle Effros, Urbashi Mitra, Emanuele Viterbo, Ram Zamir, Patrick Mitran, Andrew Barron, Muriel Medard, Gerhard Kramer, Frank Kschischang, Elza Erkip, Jossy Sayir, Vitaly Skachek, Edmund Yeh, Stephan ten Brink (via Skype).

The meeting was called to order at 1:10 PM by Information Theory Society (ITSoc) President, Abbas El Gamal, who welcomed the Board of Governors (BoG).

- 1) Abbas presented the President's Report. Abbas congratulated IT members who recently received major awards: Dan Costello (2015 IEEE Leon Kirchmayer graduate teaching award), Sanjoy Mitter (2015 IEEE Sumner Award), Sergio Verdu (National Academy of Science), Bin Yu (National Academy of Science), Vince Poor (Foreign Member, Royal Society), Joachim Hagenauer (2014 Science Prize of the German Information Technology Society).

Abbas congratulated the IT Society itself for winning the the 2014 IEEE Educational Activities Board Society/

Council Professional Development Award with the citation: “for leadership in educating and mentoring the future generation of the information theory community.” This award was established by the IEEE EAB to recognize IEEE Societies or Councils for major contributions to the professional development of its members through the provision of outstanding products, services and support in the areas of lifelong learning, continuing education, and professional development. Abbas thanked Alon, Muriel, Aylin, Andrea, Gerhard, Joerg, Alex for writing the nomination.

Abbas offered thanks to committee chairs (Michelle, Alon, Frank, Elza, Muriel, Bruce, Joerg, Matthieu, Deniz, Helmut, Osvaldo, Rob, Jeff) for their service, to Michelle for attending the June TAB meeting, and to Karin Sligar for offering administrative support to the Society.

Abbas then reviewed the main work items for the BoG for 2014. The final report for the committee on new directions led by Jeff Andrews will be presented by Muriel Medard. To manage the increasing size of the Transactions, the BoG has passed a motion to allow for peer-reviewed online-only supplementary material to be posted together on Xplore with each IT Transactions paper. An ad hoc committee chaired by Frank has been formed to determine the implementation details. With regards to declining Society membership, the BoG has already approved differentiated fees for conferences, workshops, and schools (in favor of Society members). Alon will present additional steps we are taking to address the membership decline.

Efforts have been undertaken to improve visibility into IEEE finances. A major concern is that the formula for distributing funds to the Society from IEEE has an undisclosed parameter. At the June 2014 meeting of the IEEE Technical Activities Board, a motion was approved which requests that the IEEE Executive Director provide within 90 days a “pro-forma” Society/Council financial report for each of their product lines. The pro-forma reports should be produced for every Society and Council, using 2014 budget data, and showing how current financial accounts are mapped.

Abbas then addressed the issue of administrative support for the Society. Currently, the Society officers (especially the President) undertake too many menial tasks, have a steep learning curve with respect to IEEE, and lack the time to think about important issues. It is proposed that the Society hire a part-time administrator who would serve a role similar to that of the current administrator for the EiC, and who could provide administrative continuity.

A discussion followed on the topic of administrative support. It was noted that the location of the administrator is not too important. The hiring process would consist of placing an ad in an appropriate venue, and then informing IEEE. It was noted that since the nature of the work associated with the position is bursty, perhaps the position can be combined with that of the assistant to the EiC. It was pointed out that the person hired should be able to read financial statements properly. One question raised is whether the hired person should be an IEEE person or an outside contractor.

- 2) Aylin Yener presented the Treasurer’s Report. Aylin began by discussing the 2013 initiatives. She recalled that given the very large surplus from 2012, we had \$70k–\$100k that we could spend on initiatives in 2013 with the 50% rule. Initiatives requiring less than \$50k do not require IEEE approval. Three initiatives (Student Committee, WITHITS, and Online Committee) were approved for 2013 and were implemented successfully.

The Student Committee and WITHITS initiatives ended up being in line with what we budgeted. A \$2k additional invoice for the WITHITS initiative is charged to the 2014 budget since the invoice is sent in 2014. The Online initiative went through “extensive” reviews at the IEEE, in spite of being under \$50k (albeit being quite close to the limit). Due to this, the company (Six Feet Up) did not get paid in 2013. By the time IEEE “approved” the expense, it was February, and we were told the books were closed for 2013, and that this \$50k would have to be put on the 2014 budget. After some negotiations with IEEE, the Society agreed to put this expense on the reserves. In May 2014, the TAB Fincom passed the resolution, “TAB FinCom agrees the Information Theory society can overspend its 2014 budget to cover the unpaid Six Feet Up invoices and agrees the society should not be penalized and placed on the Watch List.”

Aylin concluded from this experience that there is no reason not to have initiatives if the money is there. In fact this appears to be the only way to meaningfully spend the surplus we make as a society. Furthermore, the reserves are not easy to tap into.

Aylin moved on to initiatives for 2014. For 2014, we have \$45k by the 50 percent rule. Aylin suggests that we pose the new schools as initiatives. If there is any new initiative idea, we must act quickly on it.

For 2014, support for various outreach activities total \$98k. The Student Subcommittee is budgeted for \$10k, Outreach and WITHITS \$3k each. Schools are given \$85k (NASIT, ESIT \$20k each, Australian \$15k, and India \$10k).

Aylin concluded that the Society finances are in good shape for 2014. We have \$60k surplus and “permission” to go in the red. We can afford some additional expenses such as the new administrative assistant and should encourage outreach as well as volunteer efforts and the Distinguished Lecturer program. Aylin mentioned that we need to encourage people to nominate Distinguished Lecturers.

For 2015, the budget looks reasonable. Membership and print fees will stay the same. Looking forward, IEEE financial transparency is being requested by the TAB (see President’s report).

Finally, Frank mentioned that due to lower editorial costs made possible by moderate editing, we have \$65k less in Transactions costs.

- 3) Muriel Medard presented the Nominations and Appointments (N&A) Committee report. Muriel presented the slate of candidates for the BoG members election. The list

includes Matthieu Bloch, Helmut Bolcskei, Merouane Debbah, Albert Guillen i Fabregas, Dongning Guo, Stephen Hanly, Amir K. Khandani, Urbashi Mitra, Ralf Muller, H. Vincent Poor, Aylin Yener, and Wei Yu. BoG members will vote over email to approve (all or a subset of the candidates), not approve the slate of candidates, or to abstain.

Muriel proceeded to First and Second Vice President and President nominations. Ubli Mitra and Rudiger Urbanke were nominated for Second VP. An email vote will be taken where BoG members approve one of the two candidates for 2nd VP or abstain. Alon Orlitsky was nominated for First VP. Michelle Effros was nominated for President. An email vote will be taken where BoG members approve or disapprove these candidates or abstain.

- 4) Michelle Effros presented the Awards Committee Report, which was previously emailed to BoG members. The Awards Committee members for the IT Society Paper Award are: Giuseppe Caire, Michelle Effros (ex-officio, chair), Tracey Ho, Mike Honig, Navin Kashyap, Young-Han Kim, Vijay Kumar, Alon Orlitsky (ex-officio), Stephan ten Brink, Andreas Winter.

Eight papers were nominated for the 2014 IT Society Paper Award. After four rounds of review, two finalists were selected. The Committee recommends the following paper for the IT Society Paper Award:

Dalai, M., "Lower Bounds on the Probability of Error for Classical and Classical-Quantum Channels," *IEEE Transactions on Information Theory*, Volume 59, Issue 12, Dec. 2013. pp. 8027–8056.

Michelle also summarized recent activity for the 2014 ComSoc-ITSoc Joint Paper Award. The committee consisted of: Michelle Effros (chair), Giuseppe Caire, Costas Georgiadis, Vincent Lau, Aria Nosratinia, and Alon Orlitsky. The award was given to:

Gopalan, P., Huang, C., Simitci, H., Yekhanin, S., "On the Locality of Codeword Symbols," *IEEE Transactions on Information Theory*, Volume 58, No.11, pp. 6925–6934, November 2012.

Next, Michelle summarized activity for the 2014 Thomas M. Cover Dissertation Award. Sixteen nominations were received. The award was given to Hassani, H., "Polarization and Spatial Coupling: Two Techniques to Boost Performance," Ph.D. Thesis, EPFL, Lausanne, Switzerland, Sep. 2013

For the 2014 Jack Keil Wolf ISIT Student Paper Award, ten nominations were received and five finalists have been chosen. The committee will select the winners at Thursday lunch (ISIT week), based on both the paper and ISIT presentation.

Motion: Vote to approve the Awards Committee Report. Motion was passed.

Motion: Vote to approve the awarding of the 2014 IT Society Paper Award to the recommended paper by M. Dalai. Motion was passed.

Discussion ensued on the number of recommended papers for the IT Society Paper Award that the Awards Committee should forward to the BoG. The current bylaws specify that the committee can forward up to three selected nominations to the BoG. It was noted that the BoG may in some instances lack the time needed for deciding among multiple nominations. On the other hand, it was also noted that the BoG should also not decline to make substantive decisions. In cases where the Awards Committee has difficulty deciding between multiple papers, outside expertise may be sought, as happened in this case.

- 5) Ram Zamir presented the Fellows Selection Committee report on behalf of Rob Calderbank. The committee members are Rob Calderbank (Chair), Helmut Boelcskei, Andrea Goldsmith, Tom Richardson, Emre Telatar, Raymond Yeung, Ram Zamir. The Committee provided IEEE with a rank ordering of the 8 candidates before the June 7 deadline. Rami described the procedures used by the Committee to arrive at the set of candidates. It was noted that only 4 of the 18 IT Society members elected to Fellow this year were nominated through the IT Society itself. A number of BoG members noted that perhaps the bar set for Fellow nomination in the IT Society is too high. Many accomplished researchers are not named Fellow until quite late in their careers. Members may feel that their chances are better with other societies. Rami noted that Rob is actively trying to improve the process.

- 6) Elza Erkip presented the Conference Committee Report. Elza presented a quick update on ISIT 2014. For ISIT 2015 in Hong Kong, Elza noted that the venue is expensive. We are expecting a 25% discount on the venue, which may lead to lower registration fees. The budget has three versions, the most likely of which leads to a 10% surplus.

In the discussion which ensued, it was pointed out that ISITs now have high registration fees. Given that IT Society has a mix of member backgrounds and support levels, the Society should try to keep conference fees in check. It was suggested that ITA provides a good model for conferences with low registration fees. It was also suggested that conferences should be held at universities if possible, with access to reasonably priced dorm accommodations. On the other hand, it was pointed out that conference fees are determined by the proposals which the Conference Committee receives, and recently the proposals have come from expensive locations.

Motion: To approve the budget for ISIT 2015 in Hong Kong. Motion was passed.

Elza moved on to ISIT 2016 to be held in Barcelona. The venue will be a university. The registration fee will be 600 euros. Around 900 people are expected. The budget surplus is expected to be greater than 10%.

Motion: To approve the budget for ISIT 2016 in Barcelona. Motion was passed.

Jossy Sayir presented a proposal to host ITW 2016 at Cambridge University, UK. Jossy pointed out that many UK universities have recently hired faculty in the information theory area, and it seems

appropriate to bring ITW to the UK. The proposed venue for ITW 2016 is Robinson College, Cambridge University, which will also provide accommodations.

Motion: To approve Cambridge, UK, as the location for ITW 2016. Motion was passed. Elza next moved to technical co-sponsorship for ITA 2015.

Motion: To approve technical co-sponsorship for ITA 2015. Motion was passed.

Elza discussed prospects for future ISITs (2018 and beyond). There is a potential proposal for ISIT 2018 from New York (Emina Soljanin, Alexei Ashikhmin). A third co-chair is needed. Other possible locations include Paris (Pablo Piantanida), Stockholm (Lars Rasmussen), and Melbourne (Emanuele Viterbo).

- 7) Alon Orlitsky presented the Membership Committee report. Alon first summarized the Student Sub-committee activities at ISIT 2013 (Meet the Shannon Awardee, Video competition results, discussion w. Ubli Mitra), ITA 2014 (Land your dream job), CISS 2014 (Roundtable research discussion), ISIT 2014 (Meet the Shannon Awardee), as well as the WITHITS activities (WITHITS lunches, videos).

Alon moved on to the Distinguished Lecturers (DL) program. There were two requests for Distinguished Lectures this year, similar to the past. We need more requests. Suggestions include making the DL program more noticeable on the IT Society website, request and advertise yearly travel schedule, and mail to chapter chairs.

Alon next discussed the Padovani Lecture. This year, the lectureship was awarded to Professor En-Hui Yang, a distinguished member of the IT Society who straddles academia and industry. Prof. Yang is FRSC, FCAE, Tier 1 Canada Chair. Based in Toronto, he has successfully started and sold two companies.

Alon next noted that the Chapter of the Year award has been given to the Israel Chapter. Discussion ensued on how the Society can create new IT chapters. We should try to enhance the role of chapters in the life of members. It was noted that in the past, certain chapters hosted talks every month where local industry was involved. It is suggested that the Society create incentives for the creation of new chapters. Currently, new chapters receive \$1000 from the Society to jump start activities. The Chapter of the Year further receives \$1000. It is suggested that chapter activities be funded at higher levels. It is also suggested that the DL program be coordinated with chapter activities.

Alon next mentioned that the IT Society has been nominated for the IEEE Professional Development Award. Although the Society is not the largest in IEEE, it has pioneered many innovative professional development activities such as IT Schools, the mentoring program, the Student Committee and WITHITS.

Alon moved on to discussing IT membership numbers, which have been declining recently. The wide availability of

Xplore has decreased Society benefits and excitement level in the area is also down. Incentives such as differential registration charges and the mentoring program may help reverse membership decline. Other societies are trying new approaches such as webinars and courses. Alon gave figures for IT Society members who participated in the North American School and at ISIT. One suggested way to increase membership is to encourage students to join. Alon mentioned an effort to email other IEEE societies to encourage membership in the IT society. Next, Alon discussed IT society chapters. While there are some star chapters, a number of chapters are inactive, outdated, and not widely known. Matthieu is in the process of updating the website to highlight the chapters. New chapter formation is encouraged. Alon mentioned efforts around the world to boost chapter activity. Additional chapters at various locations are discussed. Success at building chapters involves online lectures, tutorials, mailing lists, requesting distinguished lecturers, country best paper awards, membership society coordination, and strong commitment for a few years.

- 8) Matthieu presented the Online Committee report. Matthieu first presented a brief report on financial aspects of the web initiative. In December 2013, the IEEE Project Request Procedure for our web initiative was stopped by the CIO of IEEE, effectively preventing us from paying Six Feet Up. IEEE has been very reluctant to provide explanations beyond what was included in the Online Committee report at ITA. All the invoices due to Six Feet Up have now been paid, and the IEEE Financial Committee that was held in May passed the motion described above in the Treasurer's report. The impact of the motion is not completely clear though, since overspending our 2014 budget could strictly speaking prevent us from creating new initiatives for 2015.

In a related discussion, questions were raised as to whether the web initiative is in line with IEEE objectives. It was suggested that since the initiative was developed in open source, it could be given to the IEEE.

Matthieu moved on to new features of the website which have been added. The website has been upgraded from Plone 3 to Plone 4. Every item on the website can now easily be shared on Facebook/Twitter/Google+, etc. One can now upload videos into the website or embed videos hosted elsewhere. Looking ahead, the Online Committee will work on linking and advertising all the media resources using the new media features.

Matthieu continued on the topic of domain names and archiving of future ISITs. Presently, creating a website and managing the domain name (isitxxx.org) is the responsibility of conference organizers. While this does provide them with flexibility in terms of website design, interfacing with submission sites, etc., it makes it difficult to ensure archival over the years. The Online Committee recommends the following: moving from isitxxx.org to isitxxx.itsoc.org as the standard address for ISIT, and encouraging conference organizers to create a subwebsite within Plone for their conference.

Finally, Matthieu mentioned that Pareja is about to be discontinued. A complete backup has been performed and will be archived on DVDs.

9) Joerg Kliever presented the Outreach Subcommittee report. The committee is chaired by Joerg, and has Elza Erkip, Bobak Nazer, and Daniela Tuninetti as members. At ITA 2014, the Outreach Subcommittee organized a panel discussion “Landing Your Dream Job” with the Student Committee. The panel featured Bert Hochwald, Muriel Medard, Giuseppe Caire, and Joseph Soriaga. 75 students and post-docs attended. The Outreach Subcommittee will organize a panel discussion at ISIT 2014 on Tuesday evening titled “How to Survive Tenure-Track.” The panelists are Salman Avestimehr, Rober Calderbank, Natasha Devroye, and Pulkit Grover. This will be followed by the traditional ISIT mentoring get-together reception.

Joerg pointed out that the mentoring program is stable and doing well. Contacts are being established between the ITsoc mentoring program and the IEEE mentoring program (MentorCentre). Joerg presented recent experiences of mentors and mentees in the program.

10) Aylin Yener presented the School Subcommittee Report. The members of the School Subcommittee are Alex Dimakis, Stark Draper, Michael Gastpar, Gerhard Kramer, Young-Han Kim, and Aylin Yener (Chair). Aylin first previewed reports on past 2014 schools.

Patrick Mitran reviewed the North American School which took place June 18–21, 2014, in Toronto, Canada. Speakers included Robert Calderbank, Brendan Frey, Andrea Goldsmith, Alon Orlitsky, Henry Pfister, and En-hui Yang. Poster sessions were a highlight of the School. The School had 95 registered attendees, 6 lecturers, 3 industrial panelists, 5 organizing committee members, and 13 other faculty attendees. The School received \$20k from the IT Society, \$16k from the Fields Institute, and \$20k from the NSF. The School ended with a 17% budget surplus. New items at the School this year include inviting outside faculty (13) to increase social opportunities for networking and interaction, an academic/industrial panel, and a workshop on leadership and engineering.

Vitaly Skachek reviewed the European School which took place April 14–18, 2014, in Tallinn, Estonia. Speakers included Venkatesan Guruswami, Camilla Hollanti, Yuval Ishai, Yingbin Liang, Bobak Nazer, and Ruediger Urbanke. There were 70 participants from 16 countries, including 54 students and early stage researchers. Vitaly then summarized the School budget and expenses. The School received a \$20k grant from IT Society.

Navin Kashyap reviewed the The JTG / IEEE IT Society Summer School which took place June 16–19, 2014 at IIT Madras. Speakers included Pascal Vontobel and Sitabhra Sinha. The School took place over four days and featured two topics. There were 95 registered participants at the School. The School received a \$10k grant from IT Society. For 2015, the School is planned to be held at IISc Bangalore in June/July 2015. The tentative speakers are Yihong Wu and Gerhard Kramer. Navin also presented an estimated Budget for the 2015 Indian School.

Gerhard Kramer presented the report on the 2015 European School of Information Theory, to be held in April 2015 in the

Netherlands. The organizing committee consists of Jasper Goseling, Tanya Ignatenko, Jos Weber, and Frans Willems. The school location will be near the Amsterdam airport. The estimated budget is 45,000 euros for 60 student participants. The School seeks IT Society support of \$20k.

Motion: To approve funding at \$20k for the 2015 European School of Information Theory. Motion was passed.

Alon Orlitsky presented the report on the 2015 North American School of Information Theory, to be held at Warren College on the UCSD campus in late summer 2015. The organizing committee consists of Massimo Franceschetti, Tara Javidi, Young-Han Kim, Alon Orlitsky, Paul Siegel, and Alex Vardy. The School will take place over 3–3.5 days, with 5–6 speakers, 3 poster sessions, a possible panel discussion and about 100 student and 20 faculty/industry participants. One topic of focus will be 5G wireless. The estimated budget is \$50k. The School seeks IT Society support of \$20k.

Motion: To approve funding at \$20k for the 2015 North American School of Information Theory. Motion was passed.

11) Frank Kschischang presented the EiC report. Frank first thanked the outgoing Executive Editorial Board (EEB), consisting of G. David Forney, Jr., Prakash Narayan, H. Vincent Poor, and Shlomo Shamai (Shitz). Frank then welcomed the new EEB (as of July 1, 2014), consisting of Hans-Andrea Loeliger, David N. C. Tse, Alexander Vardy, and Gregory W. Wornell. Frank thanked the AEs who have retired since July 2013, and presented the current editorial board, which consists of 44 AEs. Some further expansion of the Editorial Board (to about 50) is planned. A listing of all past editors has been posted at <http://www.comm.utoronto.ca/trans-it>.

Frank presented data on the number of papers submitted to IT Transactions and the page count, both of which are projected to decrease slightly. The page budget is currently 8500 pages. The overall acceptance rate stands at 44.3%. The area with the highest rejection rate is cryptography (93% rejected). The rate of fast decision (submission to decision of fewer than 30 days) is 18.5%. The median time to first decision is 190 days, although some papers take more than 2 years to the first decision. With respect to AE discipline, the outliers are of concern, and more aggressive action (e.g. reassignment of papers) will be taken in some cases.

Frank mentioned that he plans to invite survey/tutorial papers. These papers will be written in an accessible yet rigorous style, with the aim of being a possible “first entry” for research in the area. Two invitations have already been made. Frank invites suggestions for suitable topics and/or authors.

In the discussion which ensued, it was noted that the perceived long turnaround time for IT Transactions appears to be a myth, given the median time of 190 days to first decision. Nevertheless, many have still expressed their experience of long review periods. It is suggested that deadlines be given for revisions.

12) Frank presented the report of the ad hoc Committee on Implementation of Transactions Supplements. The committee

members are Helmut Bolcskei, Gerhard Kramer, Frank Kschischang, Alon Orlitsky, Alexander Vardy, Sergio Verdú. By an email vote conducted in mid-February, 2014, the Board of Governors passed the motion: “to allow for peer-reviewed online-only supplementary material to be posted together on Xplore with each IT Transactions paper.” An ad-hoc committee was formed in March to work out the details, including recommended page limit on papers, possible page charges above some page limit, as well as all implementation details.

Frank noted that IEEE does currently support posting of supplementary material. The present interface appears aimed at supporting the posting of supplementary multimedia files. The supplementary material associated with a paper is available from the same IEEE Xplore page from which the paper can be downloaded. Current IEEE practice is to label supplementary material as “Multimedia;” we would need to work with IEEE to allow for a more general label such as “E-supplement.”

The supplement can be referred to in the paper in several ways: in the first-page footnote, as a footnote in the main body, or as a reference within a paragraph. It is also possible to include a hyperlink (to a digital object identifier or DOI, which then maps to a URL) directly in the text. IEEE will post the supplement on IEEE Xplore for free. Normally, authors take full responsibility for supplying the digital file; i.e., by default no processing by IEEE is performed on the supplementary material. In particular, this means that IEEE takes no responsibility for compatibility of posted material with future standards (e.g., updated versions of PDF). It is possible to have IEEE format the supplementary material. However, the production cost would be the same as to produce a paper.

The committee inquired with IEEE about cost savings achievable by going “all electronic,” eliminating printed copies. According to IEEE, If we were to eliminate print altogether, we would save about \$140K per year.

The committee considered the possibility of imposing overlength page charges in conjunction with the posting of electronic supplements. For example, imposing page charges when a paper exceeds 20, 18, or 16 pages might produce annual savings of about \$30K, \$50K, and \$75K, respectively, but would affect between 1/5 and 1/3 of all papers. The committee consensus is: imposing overlength page charges is, for many reasons, undesirable; imposing such charges is not justified by the potential cost-savings.

The committee recommends allowing for peer-reviewed online-only supplementary material to be posted on Xplore together with each IT Transactions paper, entirely at the authors’ discretion.

The committee further recommends that Transactions authors be made aware that electronic publication of peer-reviewed supplementary material is now possible by posting the following in the *Information for Authors*: “Posting, in electronic form on IEEE Xplore, of supplementary material (e.g., detailed mathematical proofs, additional tables, figures, data, multimedia, computer code, etc.) associated with an accepted

paper is now possible. Such posting of electronic supplements will be considered solely at the request of the author(s), provided that all supplementary material is submitted for review simultaneously with the manuscript. Electronic supplements will undergo review along with the submitted paper. All supplementary material must be referred to in the paper. Authors bear full responsibility for formatting and production of the supplementary material in a suitable file format. Authors should note that electronic supplements may have a non-archival status. That is, the IEEE does not warrant that such files will remain compatible with future read-back software in perpetuity. All materials must follow copyright guidelines and may not include material previously copyrighted by another author, organization, or company.”

Frank reiterated that posting of supplementary material will be done solely at the request of the author(s). There is no intent that posting of supplementary material be made mandatory at the request of, say, a reviewer or an Associate Editor. The Editor-in-Chief will work the Transactions Editorial Board so that AEs are made aware that the option to post supplementary material exists, but also to provide clarity so that the purpose of this option is not misconstrued.

In the ensuing discussion, it was asked why anyone would use the supplementary material option. It was suggested that long proofs and source code may be good reasons. It was pointed out that proofs should be treated differently from tables and figures. The nature of information theory research gives proofs a different status, and proofs should be included with the main text.

Motion: To accept the recommendations of the Committee on Implementation of Transactions Supplements, with a friendly amendment that the supplementary material shall exclude mathematical proofs. Motion was passed.

13) Muriel Medard presented the report of the Committee on New Directions. The committee members are Jeff Andrews (Chair), Alex Dimakis, Lara Dolecek, Michelle Effros, Olgica Milenkovic, Muriel Medard, Andrea Montanari, Sriram Vishwanath, Edmund Yeh. External contributors to the report include Saul Kato, Jon Sorenson, Soheil Feizi, Manolis Kellis, Ken Duffy, Stuart Licht, Haris Vikalo, Lav Varshney, Randall Berry.

After revisiting the definition of information theory, the report explores new potential directions for the development of information theory in terms of its interactions with other fields including communications, networks and networked systems, control theory, neuroscience, signal processing, statistics and machine learning, genomics and molecular biology, theoretical computer science, physics, economics and finance.

The committee suggests that a new journal could be a great venue for exploring the new directions outlined in the report.

It was asked whether the report can be published in the Transactions or in the Newsletter. It was suggested that further discussions on the committee report be held at the next BoG meeting.

14) Gerhard Kramer presented the proposal for creating the James L. Massey Teaching and Research Award for Young Scholars. The annual award is to recognize outstanding achievement in research and teaching in information theory by a young scholar who exemplifies the special quality of James L. Massey to integrate outstanding research with excellence in teaching. The award consists of a plaque and a \$1000 honorarium. The award is funded by the IEEE Information Theory Society. The nominee must be 40 years old or younger and a member of the Information Theory Society on January 1st of the year nominated.

The selection subcommittee is to be chaired by the Senior Past President and consisting of two other Society members selected by the Nominations and Appointments Committee, at least one of whom is a member of the Society Board of Governors. The judging will be based on the research and teaching contributions of the nominee. Contributions to research will be judged by the perceived impact of the nominee on the field of Information theory as evidenced by

publications, patents, product development, research awards, and other tangible items. Contributions to teaching will be judged by evidence of new and innovative teaching methods, curriculum development with inclusion of current research, teaching/learning tools made available to students and faculty worldwide, textbook authorship, university teaching awards, and innovative short courses and tutorials in fields of interest to the Information Theory Society. The nominator should submit a nomination package that includes a description (maximum three pages) of the nominees contributions, accomplishments, and impact on research and teaching in the field of Information Theory, a brief biography of the nominee, and a maximum of three letters of recommendation. In evaluating nominees, equal weight will be given to research and teaching accomplishments. The award will be given annually at the awards luncheon of the IEEE International Symposium on Information Theory.

Gerhard also presented the suggested bylaws text. The meeting was adjourned at 6:20 PM.

Report on a Munich Workshop on Information Theory of Optical Fiber (Munich, December 10–11, 2014)

Gerhard Kramer

A two-day Workshop on Information Theory of Optical Fiber took place at the Technische Universität München (TUM), Germany, from December 10–11, 2014. The workshop brought together leading scientists working on the topic, with the aim of exploring new ideas and advancing understanding.



Participants of the 2014 Munich Workshop on Information Theory of Optical Fiber.

The participants came from across the world, including Bell Labs Crawford Hill, Bell Labs Stuttgart, Aston University, Chalmers University, Technical University of Denmark, Tel Aviv University, University of Athens, Universität der Bundeswehr München, University College London, University of L'Aquila, University of Stuttgart, and University of Toronto.

The speakers on the first day were Mansoor Yousefi (Kolmogorov-Zakharov model for optical fiber communication), Sergei Turitsyn (Nonlinear communication techniques for fiber-optic channels), René-Jean Essiambre (Overview of the nonlinear Shannon capacity limit in fibers), Cristian Antonelli and Antonio Mecozzi (Space division multiplexing for the future transport networks), Luca Barletta (Information-theoretic results for phase noise channels), Georg Böcherer and Tobias Fehenberger (LDPC coded modulation with probabilistic shaping for optical fiber systems), and Ronen Dar (Modeling the nonlinear fiber-optic channel). The second day featured Laurent Schmalen (Code design for channels affected by phase slips), Alex Alvarado (On soft FEC for optical channels: is the "FEC limit" a good predictor of post-FEC BER?), Aris Moustakas (Nonlinear Fourier transform for fiber-optic communication), and Metodi Yankov (Increasing the reach of the fiber-optic channels by probabilistic shaping of QAM constellations).

The social program included dinner at a traditional Bavarian restaurant. Funding was provided by the TUM Institute for Advanced Study (IAS) and the TUM Institute for Communications Engineering (LNT).

More information on the workshop can be found here: <http://www.lnt.ei.tum.de/en/events/munich-workshop-on-information-theory-of-optical-fiber/>

GOLOMB'S PUZZLE COLUMN™

Fallacious Proofs

We present six false statements, each with a fallacious “proof”. Your task is to identify the specific mistake in each proof, and to exhibit a counter-example to the statement.

1. The infinite sum $1 + 2 + 4 + 8 + \dots = \sum_{n=0}^{\infty} 2^n = -1$.

“Proof:” Let $1 + 2 + 3 + 4 + \dots = s$. Then $s - 1 = 2 + 4 + 6 + 8 + \dots = 2s$.

From $s - 1 = 2s$, we get $-1 = s$. □

2. The product of two $n \times n$ symmetric matrices is an $n \times n$ symmetric matrix.

“Proof:” If M is an $n \times n$ matrix, we denote the *transpose* of M by M^T . If A and B are $n \times n$ symmetric matrices, then (by definition) $A^T = A$ and $B^T = B$. Let $AB = C$, again $n \times n$. Then $C^T = (AB)^T = A^T B^T = AB = C$, so the product C is again symmetric. □

3. If an angle θ is trisectible, then θ is constructible.

(The terms *trisectible* and *constructible* refer to what can be done geometrically, with the strict rules of Greek geometry.)

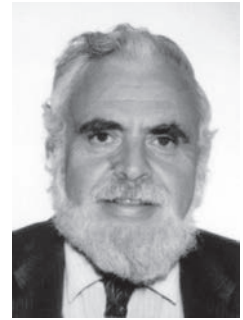
“Proof:” If θ is trisectible, this means we can obtain the angle $\frac{1}{3}\theta$. But given any two angles α and β , the angle $\alpha + \beta$ can be constructed (using only straight edge and compass). So from $\frac{1}{3}\theta$, we can construct $\frac{1}{3}\theta + \frac{1}{3}\theta = \frac{2}{3}\theta$, and then we can construct $\frac{2}{3}\theta + \frac{1}{3}\theta = \theta$. So θ is then constructible. □

4. (A “binary relation” $R(a, b)$ on a set S is a statement that is either *true* or *false* for every ordered pair (a, b) in $S \times S$. The binary relation $R(a, b)$ on S is called an *equivalence relation* on S iff $R(a, b)$ satisfies these three requirements:

1. Reflective (r): $R(a, a)$ is true, for all $a \in S$.
2. Symmetric (s): If $R(a, b)$ is true, then $R(b, a)$ is true.
3. Transitive (t): If $R(a, b)$ and $R(b, c)$ are both true, then $R(a, c)$ is true.

Statement: If a binary relation $R(a, b)$ on a set S is both symmetric(s) and transitive (t), then it is also reflexive (r), and hence it is an equivalence relation.

Solomon W. Golomb



“Proof:” From $R(a, b)$ is true, we have $R(b, a)$ is true by the symmetric property. Then, from both $R(a, b)$ and $R(b, a)$ true, we have $R(a, a)$ is true, by the transitive property, and therefore the reflexive property holds. □

5. All crayons are the same color.

“Proof:” We will prove the statement: In any set of n crayons, they are all of one color, for all $n \geq 1$, by Mathematical Induction.

Case $n = 1$. One crayon is clearly of only one color.

Inductive Assumption: In any set of k crayons ($k \geq 1$), they are all of one color. We then consider the case of $k + 1$ crayons. To a set of k crayons (all the same color by the inductive assumption) we adjoin a $(k + 1)^{st}$ crayon, but remove one of the original k crayons. We then, again, have a set of k crayons, all of a single color by the inductive assumption, so the “new” crayon must match the others, and all $k + 1$ are of a single color. □

6. If we have n lines in the plane, no two of which are parallel, for $n \geq 1$, there is (at least) one point that all n lines have in common.

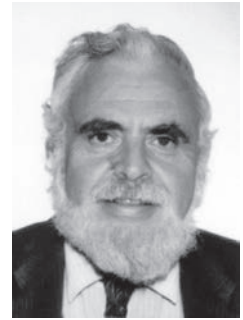
“Proof:” by Mathematized Induction. When $n = 1$, any point on one line is a point that this line has in common with itself. If we prefer to start at $n = 2$, given 2 non-parallel lines in the plane, they will intersect at a point. *Inductive Assumption:* In any set of k lines in the plane, no two of which are parallel, there will be a point, P , that they all have in common.

Now consider the case $k + 1$. To a set of k lines in the plane, no two of which are parallel, they have a common point P by the Inductive Assumption. We now introduce a $(k + 1)^{st}$ line, parallel to none of the previous k lines, and we remove one of the original k lines. We now have a new set of k lines, which by the inductive assumption must have a point in common, but clearly this must be the same point P , so all $k + 1$ lines have this point P in common. □

GOLOMB'S PUZZLE COLUMN™

Poker Hand Odds Solutions

Solomon W. Golomb



CATEGORY	ON 5-CARD HANDS			BEST 5 OF 7 CARDS	
	NO. OF HANDS		% of $\binom{52}{5}$	NO. OF HANDS	% of $\binom{52}{7}$
Straight Flush	4×10	= 40	0.001539	41,584	0.031083
4-of-a-kind	13×48	= 624	0.024010	244,848	0.183017
Full house	$\binom{13}{1} \binom{4}{3} \binom{12}{1} \binom{4}{2}$	= 3,744	0.144058	3,473,184	2.596102
Flush (only)	$\binom{4}{1} \binom{13}{5} - 40$	= 5,108	0.196540	4,047,644	3.025494
Straight (only)	$10 \cdot 4^5 - 40$	= 10,200	0.392465	6,180,020	4.619382
3-of-a-kind	$\binom{13}{1} \binom{4}{3} \binom{12}{2} 4^2$	= 54,912	2.112845	6,461,620	4.829870
2 Pair	$\binom{13}{2} \binom{4}{2}^2 \binom{44}{1}$	= 123,592	4.755411	31,433,400	23.495536
1 Pair	$\binom{13}{1} \binom{4}{2} \binom{12}{3} 4^3$	= 1,098,240	42.256903	58,627,800	43.822546
"High Card" only	$\binom{13}{5} 4^5 - 15,348$	= 1,302,540	50.117739	23,294,460	17.411920
TOTALS:	$\binom{52}{5}$	= 2,598,960	100.00%	$\binom{52}{7} = 133,784,560$	100.00%

Acknowledgment: Help with some calculations was provided by Richard A. Epstein, author of the book "The Theory of Gambling and Statistical Logic"

President's Column continued from page 1

to reach beyond our borders. I look forward to sharing details of the Society's coordinated efforts in this domain as they unfold. In the mean time, I would like to enlist the help of the community at large. What will your institution do to celebrate Shannon's Centennial? What materials might you create that would help teachers learn and teach about Shannon's life or ideas or impact? How might you interest your local newspaper or your favorite technology blog in writing about information theory—past, present, or future?

I have great faith in the intelligence, creativity, and ingenuity of the Information Theory Society. I hope that you will share your thoughts, ideas, and plans with me. Our combined activities may not only expand the view that others have of our field; perhaps they will also expand the view that we have of ourselves.

I look forward to hearing from you. Please send me your thoughts at effros@caltech.edu.

Call for Nominations

IEEE Information Theory Society 2015 Claude E. Shannon Award

The IEEE Information Theory Society Claude E. Shannon Award is given annually to honor consistent and profound contributions to the field of information theory.

NOMINATION PROCEDURE: Nominations and letters of endorsement must be submitted by March 1, 2015 to the President of the IEEE Information Theory Society, who in 2015 will be Michelle Effros <effros@caltech.edu>. The nomination form is available at <http://www.itsoc.org/honors/claude-e.-shannon-award>.

IEEE Information Theory Society 2015 Aaron D. Wyner Distinguished Service Award

The IT Society Aaron D. Wyner Service Award honors individuals who have shown outstanding leadership in, and provided long standing exceptional service to, the Information Theory community.

NOMINATION PROCEDURE: Nominations and letters of endorsement must be submitted by March 1, 2015 to the President of the IEEE Information Theory Society, who in 2015 will be Michelle Effros <effros@caltech.edu>. The nomination form is available at <http://www.itsoc.org/honors/wyner>.

IEEE Information Theory Society 2015 Paper Award

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 (2013–2014). The purpose of this Award is to recognize exceptional publications in the field and to stimulate interest in and encourage contributions to fields of interest of the Society.

NOMINATION PROCEDURE: Nominations and letters of endorsement must be submitted by March 15, 2015 to the Awards Committee chair, who in 2015 will be Alon Orlitsky <aorlitsky@ucsd.edu>. Please include a statement outlining the paper's contributions.

IEEE Joint ComSoc/ITSoc 2015 Paper Award

The Communications Society/Information Theory Society Joint Paper Award recognizes outstanding papers that lie at the intersection of communications and information theory. Any paper appearing in a ComSoc or ITSoc publication during the preceding three calendar years (2012–2014) is eligible for the 2015 award.

NOMINATION PROCEDURE: Nominations and letters of endorsement must be submitted by February 15, 2015 to the Awards Committee chair, who in 2015 will be Alon Orlitsky <aorlitsky@ucsd.edu>. Please include a statement outlining the paper's contributions.

Thomas M. Cover Dissertation Award

The IEEE Information Theory Society Thomas M. Cover Dissertation Award, established in 2013, is awarded annually to the author of an outstanding doctoral dissertation.

NOMINATION PROCEDURE: Nominations should be submitted electronically to Michelle Effros (effros@caltech.edu) and Edmund Yeh (eyeh@ece.neu.edu) by January 15, 2015. The nomination form is available at <http://www.itsoc.org/news-events/recent-news/call-for-nominations-thomas-m.-cover-dissertation-award>

IEEE Fellow Program

Do you have a colleague who is a senior member of IEEE and is deserving of election to IEEE Fellow status? If so, please submit a nomination on his or her behalf to the IEEE Fellow Committee. The deadline for nominations is March 1. IEEE Fellow status is granted to a person with an extraordinary record of accomplishments. The honor is conferred by the IEEE Board of Directors, and the total number of Fellow recommendations in any one year is limited to 0.1% of the IEEE voting membership. For further details on the nomination process please consult: <http://www.ieee.org/web/membership/fellows/index.html>

IEEE Awards

The IEEE Awards program pays tribute to technical professionals whose exceptional achievements and outstanding contributions have made a lasting impact on technology, society and the engineering profession. For information on the Awards program, and for nomination procedures, please refer to <http://www.ieee.org/portal/pages/about/awards/index.html>

Call for Papers

ITW2015

2015 IEEE Information Theory Workshop

October 11~15, 2015 / Lotte City Hotel Jeju, Jeju Island, Korea

<http://www.itw2015.org>

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Giuseppe Caire (TU Berlin, Germany)

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Pramod Viswanath (UIUC, USA)

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Jun Heo (Korea Univ., Korea)

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Do-Hyun Kim (Jeju National Univ., Korea)
Sun Yong Kim (Konkuk Univ., Korea)

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Dong-Joon Shin (Hanyang Univ., Korea)
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Won-Yong Shin (Dankook Univ., Korea)
Joon Ho Cho (POSTECH, Korea)
Jin Young Kim (Kwangwoon Univ., Korea)

International Liaison Chairs

Young-Han Kim (UCSD, USA)
Kyeongcheol Yang (POSTECH, Korea)
Jong-Seon No (Seoul National Univ., Korea)

The 2015 IEEE Information Theory Workshop will take place in Jeju Island, Korea, from October 11 to October 15, 2015. Jeju Island is the largest island in Korea and is located in the Pacific Ocean just off the south-western tip of the Korean peninsula. Jeju Island is a volcanic island with a mountainous terrain, a dramatic rugged coastline and spectacular watershed courses. The Island has a unique culture as well as natural beauty. It is a living folk village, with approximately 540,000 people. As a result of its isolated location and romantic tropical image, Jeju Island has become a favorite retreat with honeymooners and tourists. The tour programs of the conference will also provide participants with the opportunity to feel and enjoy some of the island's fascinating attractions.

Topics

Interested authors are encouraged to submit previously unpublished contributions in all areas of information theory with special emphasis on the following:

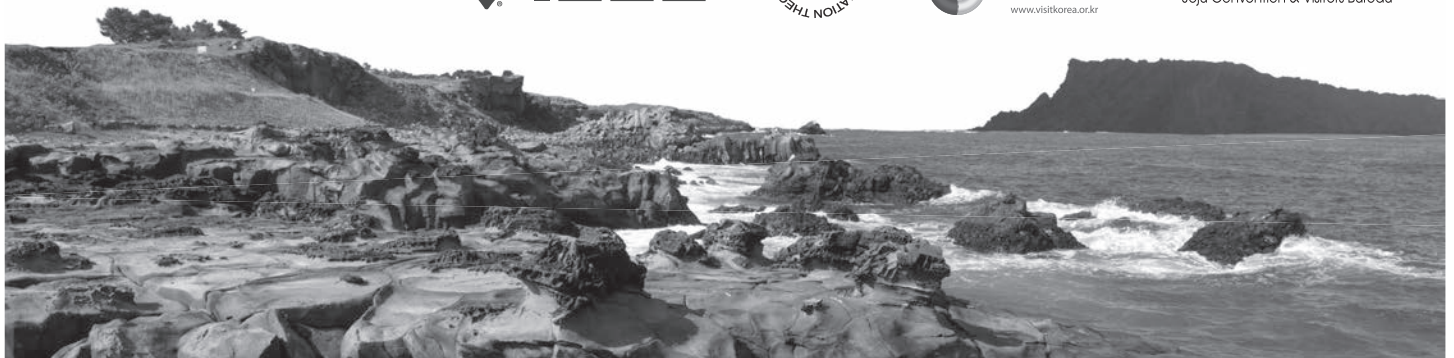
- Big data
- Coding theory
- Communication theory
- Computational biology
- Interactive communication
- Machine learning
- Network information theory
- Privacy and security
- Signal processing

Paper Submission

Papers for the contributed sessions should be submitted according to the directions which will appear on the conference website: <http://www.itw2015.org>

Important Dates

Paper submission deadline: **April 12, 2015**
Acceptance notification: **June 26, 2015**
Final paper submission: **July 26, 2015**
Author registration: **July 26, 2015**



Call for Papers

2016 International Zurich Seminar on Communications

March 2 – 4, 2016



The 2016 International Zurich Seminar on Communications will be held at the Hotel Zürichberg in Zurich, Switzerland, from Wednesday, March 2, through Friday, March 4, 2016.

High-quality original contributions of both applied and theoretical nature are solicited in the areas of:

Wireless Communications	Optical Communications
Information Theory	Fundamental Hardware Issues
Coding Theory and its Applications	Network Algorithms and Protocols
Detection and Estimation	Network Information Theory and Coding
MIMO Communications	Cryptography and Data Security

Invited speakers will account for roughly half the talks. In order to afford the opportunity to learn from and communicate with leading experts in areas beyond one's own specialty, no parallel sessions are anticipated. All papers should be presented with a wide audience in mind.

Papers will be reviewed on the basis of a manuscript (A4, not exceeding 5 pages) of sufficient detail to permit reasonable evaluation. Authors of accepted papers will be asked to produce a manuscript not exceeding 5 pages in A4 double column format that will be published in the Proceedings. Authors will be allowed twenty minutes for presentation.

The deadline for submission is **September 27, 2015**.

Additional information will be posted at

<http://www.izs.ethz.ch/>

We look forward to seeing you at IZS.

Amos Lapidoth and Stefan M. Moser, Co-Chairs.



2015 European School of Information Theory

April 20-24, 2015, Zandvoort, The Netherlands

The European School of Information Theory (ESIT) is an annual educational event, organized by the IEEE Information Theory Society, for graduate students from institutes throughout Europe and beyond. The objective of the school is to provide the students with the opportunity (i) to learn from distinguished lecturers by attending long-format (3 hour) tutorials, (ii) to present their own work to obtain feedback and to start up collaborations, (iii) to hear about applications in industry, and (iv) to participate in a stimulating and inviting forum of scientists.

The program will span the foundations, implementations in practice, and new application areas of information theory. In particular, network information theory, quantum information theory, coding theory, security, genomics, machine learning and big data are among the topics to be discussed at ESIT 2015. The following renowned scientists have confirmed to give a tutorial lecture:

- Stephan ten Brink
- Imre Csiszár
- Richard Durbin
- Young-Han Kim
- Michael Langberg
- Stephanie Wehner

Furthermore, representatives from successful start-ups rooted in information theory will give inspiring talks. The program also includes poster sessions where every participating student is expected to present a poster on his/her research.

The venue for the school is hotel NH Zandvoort, located at the beach front. The venue is conveniently situated close to Amsterdam and Schiphol airport.

The organizing committee represents the three technical universities in the Netherlands and consists of Jasper Goseling (University of Twente, chair), Tanya Ignatenko (Eindhoven University of Technology), Jos Weber (Delft University of Technology), and Frans Willems (Eindhoven University of Technology). Moreover, the school advisory committee consists of Vitaly Skachek and Gerhard Kramer.

Registration is expected to start in December 2014. A registration fee will be handled, which includes accommodation, social program and meals. A number of grants will be available to cover the registration fee for students that would not be able to attend otherwise. In addition, some travel grants will be made available.

Further information appears on <http://www.itsoc.org/european-school-2015>.

Contact

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Eighth Annual North American School of Information Theory

Monday–Thursday, August 10–13, 2015
UC San Diego, La Jolla, California

The School of Information Theory will bring together over 100 graduate students, postdoctoral scholars, and leading researchers for four action-packed days of learning, stimulating discussions, professional networking and fun activities, all on the beautiful campus of the University of California, San Diego (UCSD) and in the nearby beach town of La Jolla.

Program overview

- Tutorials by some of the best known researchers in information theory and related fields
- Poster presentations by student participants with feedback and discussion
- Panel discussion on “IT: Academia vs. Industry Perspectives”
- Social events and fun activities

Confirmed speakers

- Stephen Boyd, Stanford
- Venkatesan Guruswami, CMU
- Syed Jafar, UC Irvine
- Urbashi Mitra, USC

Organizing committee

- Massimo Franceschetti, UCSD
- Tara Javidi, UCSD
- Young-Han Kim, UCSD
- Victoria Kostina, Caltech
- Alon Orlitsky, UCSD
- Paul Siegel, UCSD
- Alexander Vardy, UCSD

Advisors

- Gerhard Kramer, TU Munich
- Ramesh Rao, UCSD
- Aylin Yener, Penn State University

Registration: \$100 (covers shared room, full board, and lectures for all four days)

Application deadline: Monday, May 11, 2015 (<http://ita.ucsd.edu/nasit2015>)



Conference Calendar

DATE	CONFERENCE	LOCATION	WEB PAGE	DUE DATE
March 18–20, 2015	49th Annual Conference on Information Systems and Sciences (CISS 2015)	Baltimore, MD, USA	http://ciss.jhu.edu/	January 2, 2015
April 20–24, 2015	2015 European School of Information Theory (ESIT 2015)	Zandvoort, The Netherlands	http://www.itsoc.org/european-school-2015	TBD
April 26–May 1, 2015	2015 Information Theory Workshop (ITW 2015)	Jerusalem, Israel	http://itw2015.eew.technion.ac.il/	Passed
April 26–May 1, 2015	34th IEEE International Conference on Computer Communications (INFOCOM 2015)	Hong Kong	http://infocom2015.ieee-infocom.org/	Passed
May 6–7, 2015	3rd Iran Workshop on Communication and Information Theory (IWCIT 2015)	Tehran, Iran	http://www.iwcit.org/	Passed
May 10–13, 2015	2015 IEEE Communication Theory Workshop (CTW 2015)	Dana Point, CA, USA	http://www.ieee-ctw.org/2015/index.html	Passed
May 11–14, 2015	2015 IEEE 81st Vehicular Technology Conference (VTC2015-Spring)	Glasgow, Scotland	http://www.ieeevtc.org/vtc2015spring/	Passed
May 18–21, 2015	3rd International Black Sea Conference on Communications and Networking (IEEE BlackSeaCom 2015)	Constanta, Romania	http://www.ieee-blackseacom.org/2015/index.html	Passed
May 25–27, 2015	WiOpt 2015	Mumbai, India	http://www.wi-opt.org/	Passed
June 8–12, 2015	IEEE International Conference on Communications (ICC 2015)	London, United Kingdom	http://icc2015.ieee-icc.org/	September 15, 2014
June 14–19, 2015	2015 IEEE International Symposium on Information Theory (ISIT 2015)	Hong Kong	http://www.isit2015.org/	TBA
June 28–July 1, 2015	The 16th IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)	Stockholm, Sweden	http://www.spawc2015.org/	March 2, 2015

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