

# IEEE Information Theory Society Newsletter



Vol. 63, No. 1, March 2013

Editor: Tara Javidi

ISSN 1059-2362

Editorial committee: Helmut Bölcskei, Giuseppe Caire, Meir Feder, Tracey Ho, Joerg Kliewer, Anand Sarwate, and Andy Singer

## President's Column

*Gerhard Kramer*

The past five years have brought many changes to the governance of the Information Theory Society. You may have read about them in Muriel Médard's December column. We have new events and infrastructure, including an attractive web page, a distinguished lecturer program, many student activities, and prizes. Since most of our members have never had the pleasure of serving on the Board of Governors, this body might seem somewhat mysterious to you. The board oversees several committees, each of which is chaired by someone you might know. The volunteer work this entails keeps our Society functioning smoothly and is an important part of moving research forward by bringing people together. To put it in Steve McLaughlin's (President 2005) words, the board members share "a genuine love of information theory and a strong desire for its dissemination and promotion throughout the world." If you have the same passion, perhaps you will participate in the future?



The main change for 2013 will be a new Editor-in-Chief: Helmut Bölcskei is stepping down after a three-year term. Helmut has poured an enormous amount of time and effort into our Transactions. He introduced and implemented creative ideas: establishing an executive editorial board, fast reviews to bring print issues back on schedule, new rules for reviewers, and training for Associate Editors. I am sure that our Society will benefit greatly over the coming years and we owe Helmut our thanks.

Other things change less quickly. For example, our membership has been holding steady at about 3600 over the past five years. We have a balanced budget and substantial reserves. Less pleasantly, upon browsing past president's columns, one finds recurring issues that we have trouble addressing. Perhaps the issue mentioned most often is the long

sub-to-pub time of the Transactions. We have been unable to budge that despite repeated efforts. I wonder if this goal is attainable with our current format? Many of the papers in our Transactions are over twice as long as the fewer-than-eight pages that other IEEE Societies require (our average paper length is over 14 pages; it was 10 pages in 2000). Some editorial areas seem to attract especially lengthy documents. Should it surprise that reviewers take over twice as long to do a review? Or is the problem solely one of reviewer discipline? Or is it one of author discipline? On the one hand, dissemination is quick and easy via arXiv and this is an excellent way to publicize. But a two-year

journal review process does not help the young members of our Society improve their interview chances. Page limits are a recurring theme but they are never popular. Should we have a separate journal for short high-impact articles? Another idea is to introduce fast-track publication based on ISIT reviews. Perhaps you have some ideas too? Let me know.

Another area where we have been slow to change is our footprint in Asia. Hideki Imai (President 2004) already suggested in 2004 that we should increase cooperation with Asian academic societies. But we currently have only two board members from Asia, which I think is indicative of our weak position there. Two upcoming ISITs (2014 in Hawaii and 2015 in Hong Kong) are good opportunities to get going again. I think we all share the belief that our scientific enterprise should be a global one, and not emphasize North America and Europe only.

On these and other matters that might be of concern, I would be happy to receive feedback, comments, suggestions, and (also) criticisms of the way that we are doing our business. I hope that you can feel that the governance of your Society is something that you can influence!

## From the Editor

Tara Javidi



Dear IT Society members,

The first issue of 2013, naturally, contains Gerhard Kramer's first column as the IT society president. Please join me in welcoming Gerhard and also thanking Muriel for her work last year. Unlike the December issue, this is a rather brief issue. In addition to our popular and regular contribution by our historian Tony Ephremides and our puzzle master Solomon Golomb, we have a short note prepared by Max Costa and the BoG meeting notes prepared by Edmund Yeh. We also congratulate the newly elevated IEEE Fellows from our society.

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 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
June 2013	April 10, 2013
September 2013	July 10, 2013
December 2013	October 10, 2013

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.

## Table of Contents

President's Column .....	1
From the Editor .....	2
Professor Solomon Golomb Receives National Medal of Science .....	3
Professors Abbas El Gamal and Shlomo Shamai (Shitz) were Elected Member and Foreign Associate of the US National Academy of Engineering .....	3
IT Society Members Win Prestigious Awards .....	3
The Historian's Column .....	4
2013 Newly Elevated Fellows .....	6
IEEE Information Theory Society Board of Governors Meeting Minutes .....	7
Distinguished Lectures by Max Costa for the Benelux It Chapter .....	13
Golomb's Puzzle Column <sup>TM</sup> : Using Roots of Unity .....	14
Golomb's Puzzle Column <sup>TM</sup> : Prime Divisors of $n!$ and of $\binom{2n}{n}$ Solutions .....	15
In the Blogosphere... ..	16
Call for Nominations .....	17
Symposiums and Conferences .....	18
Call for Special Issue Papers .....	21
Workshops .....	22
Conference Calendar .....	28

### 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.

© 2013 IEEE. Information contained in this newsletter may be copied without permission provided that the copies are not made or distributed for direct commercial advantage, and the title of the publication and its date appear.

IEEE prohibits discrimination, harassment, and bullying. For more information, visit <http://www.ieee.org/web/aboutus/whatis/policies/pp9-26.html>.

## Professor Solomon Golomb Receives National Medal of Science

As the issue was going to print, we heard that IT society member, and our very own regular puzzle column contributor, Professor

Solomon Golomb received the highest honor bestowed by the United States president for scientific innovation.



## Professors Abbas El Gamal and Shlomo Shamai (Shitz) were Elected Member and Foreign Associate of the US National Academy of Engineering

As the issue was going to print, we also heard that Professor Abbas El Gamal has been elected member of the National Academy of Engineering along with Professor Shlomo Shamai (Shitz) who has been elected as a foreign associate. Professors Shamai and El Gamal are distinguished members of the IT society and gave the Shannon Lectures at ISIT 2011 and 2012, respectively. We were lucky to catch them on the day the news was publicly announced at Stanford.

Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to “engineering research, practice, or education” and to the “pioneering of new and developing fields of technology, making major



advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education.”

## IT Society Members Win Prestigious Awards

**IEEE MEDAL OF HONOR**, for an exceptional contribution or an extraordinary career in IEEE fields of interest, sponsored by the *IEEE Foundation*, to IRWIN MARK JACOBS (LFIEEE)—Director, QUALCOMM, Inc., La Jolla, CA, USA

“For leadership and fundamental contributions to digital communications and wireless technology.”

**IEEE RICHARD W. HAMMING MEDAL**, for exceptional contributions to information sciences, systems, and technology, sponsored by *QUALCOMM, Inc.*, to ARTHUR ROBERT CALDERBANK (FIEEE)—Dean of Natural Sciences, Duke University, Durham, NC, USA

“For fundamental contributions to coding theory that impacted voice-band modems and wireless communication.”

**IEEE W.R. G. BAKER PRIZE PAPER AWARD**, for the most outstanding paper reporting original work published in any IEEE archival publications (such as Transactions, Journals, and Letters), Magazines, or Proceedings, sponsored by IEEE Circuits and Systems, IEEE Communications, IEEE Control Systems, IEEE Information Theory, IEEE Power & Energy, IEEE Signal Processing, and IEEE Vehicular Technology Societies to ERDAL ARIKAN (FIEEE)—Department of Electrical and Electronics Engineering, Bilkent University, Ankara, Turkey

For his paper entitled “Channel Polarization: A Method for Constructing Capacity-Achieving Codes for Symmetric Binary-Input Memoryless Channels,” *IEEE Transactions on Information Theory*, Vol. 5, Issue 7, July 2009, pp. 3051–3073

**IEEE ERIC E. SUMNER AWARD**—recognizes outstanding contributions to communications technology—sponsored by *Bell Labs*—to

**VAHID TAROKH (FIEEE)**—Professor, School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, USA

AND

**HAMID JAFARKHANI (FIEEE)**—Chancellor’s Professor, University of California, Irvine, CA, USA

AND

**SIAVASH ALAMOUTI (MIEEE)**—Group R&D Director, Vodafone, Vodafone House, Newbury, Great Britain

“For contributions to block signaling for multiple antennas.”

## The Historian’s Column

The subject is food (again!). Everyone has to eat, doctors tell us it is very important for our health to choose carefully what to eat, and it has also been said that “you are what you eat”! Thus, what libations constitute our feed deserves a Historian’s attention, as a data point in the historical evolution of ingestible fare.

Most of the members of our profession, and of our Society in particular, lead busy lives that necessitate frequent visits to eating establishments away from home. It is also a (sad) fact that even when we can be at home, where we can have close to full control of what we eat, many of us choose the “easy” way out and visit restaurants, cafeterias, fast food joints (GOD forbid!), and, even, catered functions at the work place, the neighborhood, or other social and professional events. And this is the essence of the sad story of “force-fed” humankind.

Let us start with workshops and conferences, where the tall order of feeding hundreds of people becomes a very profitable proposition. We are all familiar with the prevailing format. Especially at “banquets” (what an ironic evolution of the meaning of the word), we sit down at elaborately set tables with inadequate silverware, glasses of water that are chock-full with blocks of ice, and, typically, a “salad” plate at the seating place of every individual. That plate typically consists of iceberg lettuce with some carrot shavings, a half-decomposed pit-less olive, and, sometimes, some stale nuts. Bowls of dressing adorn the table with colors that range from shades of brown, to stark white, or bright orange and with the flavor of rancid mustard. Rolls of bread are piled up in a basket or two at the center of the table. They are either sponge-like mushy or hard as rock. Oh, there is also butter that must consist of equal parts of salt and milk products or margarine. We typically sustain this assault to the senses by devoting attention to introductions, discussion of current events, and commentary on the weather.

Then the main course arrives, if it is not preceded by a soup bowl of thick gravy-like “cream-of-mushroom” or “cream-of-asparagus” imitation. Sometimes a choice is offered. It used to be that one could choose between fish or meat. Nowadays, the choices tend to be between chicken, fish, and vegetarian. The fish is invariably farm-raised salmon that tastes like chicken, while

Anthony Ephremides



the chicken is a piece of breast with the consistency of rubber and the taste of fish. There is reason for that. It has been revealed in the media (and known for a long time to those who investigate these matters) that most fish farms find it cost-effective to feed the fish (in addition to the color-loaded pellets and hormones that are used for “your safety and pleasure”, oh, and for “your convenience”) a mixture of pulverized chicken by-products like feathers, feet, beaks, organs, skins, and other unspeakable parts of the chicken that are filtered out by the elaborate machine processing the fowl is subjected to. At the same time, chicken farms tend to utilize fish by-products (like, organs, scales, fins, heads, etc). Thus, in a manner analogous to how a fixed-point-theorem works, this iterative process will undoubtedly lead to the convergence of the species, so that the choice will become in the future between “fishken” and vegetarian fare. Which brings us to the vegetarian choice. It is well known that in the Orient and in Southeast Asia the flavors of vegetarian dining can rival those of any animal-based fare. However, at typical banquets in the “Western” world the vegetarian plate consists of over-boiled broccoli, carrots, and potatoes, or, if you are lucky, some lumpy pasta. Confronting a vegetarian plate at the banquet table elevates airline food to levels of glory.

And then comes dessert. If you are really lucky, you might get ice-cream of the “good humor” variety. If not, you get a heavy dose of brownie-textured “forest cake”, after the consumption of which you wish you had skipped the banquet and visited the neighborhood “Denny’s” instead. The “coup-de-grace” is the coffee-or-tea option. Coffee is offered in either “regular” or “decaf” format and the tea is in bags with hot water. I think that banquet wizards and witches have managed to eliminate **all** flavor from these beverages. The feeling of liberation, when this is all over, is tempered by the thought that all this has cost you another \$120 for hosting your spouse to it.

Why do intelligent, educated, talented people like our members accept such indignities without protest? What often comes to

mind after such a banquet is two things. The first is a scene from an advertisement of “Alka Seltzer” on television in the seventies where after a group meal in a penitentiary, the inmates start a rebellion by taking their metal cups (you know, the ones that you receive from the jailhouse upon incarceration) and “banging” them in unison on the wooden long tables. This has been the typical method by which prison rebellions are supposed to start. Except this time, the inmates shout also in unison: “Alka Seltzer, Alka Seltzer”.

The second reaction is again from a scene of a movie from about the same era starring Kirk Douglas and Peter Fonda. Kirk Douglas plays the role of a cunning “model” prisoner who works closely with the authorities to streamline the jail operation while at the same time preparing for a convict rebellion. Peter Fonda plays the role of the jail warden. The scene in question is when the warden, emboldened by the “perfect” behavior of the chief convict, hosts the governor of the state (we are somewhere in the far West of the United States) to a meal of all the prisoners. He sits with the governor at the head table, elevated above the main floor. As the meal progresses, Kirk Douglas rises and asks the warden whether he can make some public comments in the presence of the governor. Peter Fonda proudly whispers to the governor’s ear “This is the prisoner I was telling you about” and tells Douglas “Go right ahead”! At which point, Kirk Douglas starts by reciting a routine speech about how all the prisoners have “wronged” Society and have committed all sorts of crimes and, in return, Society treats them well in this jail. “What we get”, he says as he lifts his half-full plate, “is chicken, and green peas, and gravy”. As he speaks his expression changes and becomes sterner and angry and he finally raises the plate and throws it at the head table, green peas and gravy and all. And following that the rebellion starts.

This is my vision for an “after-banquet” memorable finale!

But banquets are not the only thing. At workshops and conferences we sometimes have buffet breakfasts and coffee-breaks. Leaving aside the fact that these can be priced at up-to \$20 per person per event, let us recall what they consist of. First the breakfast buffet: a basket of so-called breakfast breads, that is to say, lumpy croissants (what happened to that noble roll that has evolved into an oily doe?), muffins that consist of sugary crumbs, “Danish” rolls that are oozing with frosted sugar, etc, plus “fresh fruit (namely flavorless chunks of melon, out-of-season grapes, acidic pineapple, etc) plus coffee, decaf, and tea (see above). Then the ‘coffee’ breaks: sometimes villainous soda cans in lieu of coffee, plus COOKIES! Yes, those soft, buttery, sugary oven outputs which, together with the sodas, are probably responsible for the growth rates of diabetes that is plaguing the “civilized” world.

But of course there is more than meals at conferences. It is amazing how insidiously and progressively our own department at the University of Maryland is transforming itself into an eatery. Every day I see dark shadows of characters that push carts with edibles (covered with cellophane) into our conference rooms where “events” are held. The CC (i.e. Catering Conspiracy) has gradually infiltrated the temples of knowledge and is spreading poison with impunity. In fact, if you care to check the prices of these events, you

will be surprised about how lucrative they are. The component of choice in these events is “cold cuts”. Now don’t get me wrong. There are cold cuts in some Italian salumerias that would make your mouth water. But here we are talking about homogenized, neutralized, marginalized slices, of what was once meat, that have achieved the remarkable goal of indistinguishability. This means that even though they look somewhat different from each other (turkey is beige, chicken is white, pork is pink), they can all be bundled together on a slice of rye without any adverse effect on your palate. Even their texture is the same. And then there is cheese (or, more correctly, cheese slices). This consists of tightly packed shavings of Jack cheese (passing as cheddar), cheese with holes (passing as “Swiss” cheese), and sometimes chunks of brie that has managed to shed all elements of flavor. Some caterers have sensed that their customers are getting disturbed and uninterested and that there is more money to be made if you pretend to move “upscale”, so that they will sometimes offer “premium” packages. These include sushi (do not think of buttery “o toro” tuna slices that ooze over delicious sushi rice; rather, think of California avocado and imitation crab within a rice roll wrapped in a fishy seaweed that will send you quickly to the bathroom), smoked salmon (the farmed variety in which the smoke tries, with some success, to eliminate the chicken taste), and ...arugula (!) salad with spicy dressing that renders any effort to determine whether arugula has a nutty flavor or not completely useless.

And finally, there are the special dinners that are offered to visiting guests who either interview for a job or deliver an invited lecture. These are typically offered in neighborhood restaurants and are considered “luxury” affairs. The watchdogs employed by every Institution that make sure a penny will not be wasted (no matter whose money it is) move suspiciously in their auditing of these events and set up interesting limits. For example, during the current challenging times of public austerity, the limits are set to about \$70 per person (for a typical group of, say, five or six people). This must include any alcoholic beverages and, of course, tax and tips. Of course the alcoholic beverages must be paid from special accounts that somehow have evaded the moralist police that requires that a penny spent for wine is a misdemeanor. If we work backwards from that figure and consider 15% tip and 10% tax (both on the low side in, say, the Washington DC metropolitan area) we obtain approximately \$50–55 left for food and drink per person. This is indeed plenty if we agree to go to McDonald’s and have double cheeseburgers with McSalad, large coke and McCoffee. But if we venture into a middle-of-the-road restaurant and order a bottle of generic California Chablis or “Imported” Pinot Grigio for \$30 (this will provide half a glass to each of the participants), we are left with about \$45–50 per person for food. Typical appetizer prices nowadays around \$15, typical main courses \$25, and desserts \$10. So, it seems that we can squeeze through and have enough for coffee or... “Perrier”! But should we choose two bottles of a decent Malbec at \$40 per bottle, we must decide whether to skip the appetizer, the main course, or the dessert. Of course let us not even talk about more ambitious outings for improved fare.

This being the state of affairs in the “professional” dining scene, it is appropriate to consider an action plan. Before I present my proposals I would like to hear suggestions and opinions from our readers. Do not forget: we are what we eat!

## 2013 Newly Elevated Fellows

**Jeffrey Andrews**

University of Texas at Austin

*for contributions to cellular and ad-hoc wireless communications*

**Andrew Barron**

Yale University

*for contributions to information theory and statistics*

**Gerard Cohen**

Telecom ParisTech (ENST)

*for contributions to combinatorial aspects of coding theory*

**Max Costa**

University of Campinas - Unicamp

*for contributions to multiterminal information theory*

**Suhas Diggavi**

University of California, Los Angeles

*for contributions to wireless networks and systems*

**Yonina Eldar**

Technion - Israel Institute of Technology

*for contributions to compressed sampling, generalized sampling, and convex optimization*

**Anders Host-Madsen**

University of Hawaii

*for contributions to communication theory for wireless networks*

**Kenneth Kreutz-Delgado**

University of California, San Diego

*for contributions to sparse signal recovery algorithms and dictionary learning*

**Tamas Linder**

Queen's University

*for contributions to source coding and quantization*

**Daniel Palomar**

Hong Kong University of Science and Technology (HKUST)

*for contributions to convex optimization-based signal processing for communications*

**Erchin Serpedin**

Texas A&M University

*for contributions to synchronization of communication systems*

**Antonia Tulino**

Alcatel-Lucent Bell Laboratories

*for contributions to the development and application of random matrix methods in information theory*

**Pramod Viswanath**

University of Illinois

*for contributions to the theory and practice of wireless communications*

**Tsachy Weissman**

Stanford University

*for contributions to information theory and its application in signal processing*

**Feng Wu**

Microsoft Research Asia

*for contributions to visual data compression and communication*

# IEEE Information Theory Society Board of Governors Meeting Minutes

Starling Hotel, Lausanne, Switzerland, 09.02.2012, 1–6 pm.

Edmund Yeh

## Present

Matthieu Bloch, Helmut Boelcskei, Martin Bossert, Mike Casey, Michelle Effros, Abbas El Gamal, Elza Erkip, Gerhard Kramer, Frank Kschischang, Nicholas Laneman, Ping Li, Hans-Andrea Loeliger, Muriel Medard, Urbashi Mitra, Alon Orlitsky, Amin Shokrollahi, Paul Siegel, David Tse, Edmund Yeh, Aylin Yener.

The meeting was called to order at 1:45 pm by the Information Theory Society (ITsoc) President, Muriel Medard, who welcomed the Board of Governors (BoG). Everyone introduced themselves, including Mike Casey from NOW Publishers. Mike was at the meeting to present a proposal regarding the production of XML documents. Quorum was verified.

**1. Motion:** The minutes of the BoG Meeting at ISIT 2012 held at Cambridge, MA, were approved.

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

**3. Aylin Presented the Treasurer's Report:** An update on the budget was presented. In June, the BoG approved an increase in the 2012 page budget to 7800, leaving a \$12K projected surplus. By July, this projected surplus was down to \$700. In August, the EiC adjusted the page budget estimate back to 7500. As a result, currently the projected surplus is \$25.2K for 2012.

Aylin reiterated that budget estimates are updated every quarter based on forecasts. The society is being conservative in operations in order to end up with a balanced budget. Committee expenses have been modest and deserving. Due to increasing disk space needs, we now have a new contract of web hosting. Our Distinguished Lectures (DL) program has seen healthy growth. Raymond Yeung, Young Han Kim, and Emre Telatar have been/are being scheduled for visits. Aylin showed the detailed breakdown of the budget leading to the projected surplus. She is hopeful for a balanced budget for 2012. In general, Aylin proposes that the society should aim for a healthy surplus, so that the funds can be used for initiatives.

Continuing on to the 2013 budget, the first pass on the budget was done in May 2012. An increase of the page budget to 8000 was requested and incorporated into the budgeting. No modification in the membership fees, subscription fees, etc, has been requested. Currently in the process of evaluating the second pass of the budget. Aylin will be working with Denise Hurley on the budget (as the previous analyst Carissa Burkhart is taking a leave).

For reimbursements of committee and other relevant expenses (e.g. DL), please submit all receipts with the completed Expense Form to Alyson Rupp (A.Rupp@ieee.org) with a cc to Aylin.

Conference closing is a process that involves IEEE conference services (we have a dedicated conference analyst). Organizers need

to work with the analyst. Closings should be done 3 months after the conference, with a maximum of one year after the conference, beyond which there will be fines.

Aylin will give the next report at ITA 2013.

Frank Kschischang asked about the cost of print subscriptions to the Transactions. Frank asked if there has been an annual increment in the print subscription fee. It's observed that the society currently effectively subsidizes print subscriptions out of the budget. Muriel agreed that this is an important point. Michelle asked whether the issue concerns individual or library subscriptions. Muriel indicated that subsidizing print subscriptions effectively began about 7 years ago. Aylin indicated that the costs may continue to climb. Nick asked for further details on this. Elza asked whether other societies also subsidize print subscriptions. The answer is yes. Nick indicated that the break-even cost of print subscriptions will climb as fewer people subscribe. Michelle indicated that these costs may not climb linearly. Muriel suggests that print subscription costs are high (including paper, mailing) and differ according to where you live. Elza raised the issue of whether people will continue to be society members if print copies become too expensive to obtain. **To Do:** Aylin will propose an increase in price for print subscriptions.

Aylin mentioned that for DL program, the upper limit on reimbursement had been set at \$2000 per trip. She mentioned that there are now requests for more than \$2000 per trip. Gerhard pointed out that the annual budget for the DL program is \$25 K, which can be allocate among talks. Currently, we have had only 2 DL trips so far for 2012, and 1 scheduled for 2013. So there does not seem to be a problem. Aylin mentioned that a \$100 K budget is split among committee expenses, the student committee, and reimbursement for the DL program. Frank mentioned that the DL program was never designed to cover all trip expenses. Chapters are expected to share the cost. \$2000 per trip is guidance to the chapters for budgeting. Nick asked how the surplus from the \$25K DL budget is being spent. Aylin replied that the unspent part of the \$100K budget yields the surplus. However, she said that there are always unexpected budget items which arise.

**4. Muriel Presented the President's Report:** The major items concern publications. The items consist of the report of the ad hoc committee on the growth of the Transactions, the report of the ad hoc committee on the production cost of the Transactions, scope of publications, and new proposed position of vice president of publications. This is followed by the review process update and updates on other activities.

With respect to the review process, input is being gathered and activities coordinated among officers committee members for the review at the TAB meeting in November, which will be very

thorough. We should expect much feedback from that meeting. A document will be sent around to BoG members for comments. Covered areas are purpose of society, strategy and operations, conferences, publications, and education, membership, finance, governance.

In other activities, the ad hoc committee on outreach and education will present its report. A committee on the Tom Cover Dissertation Award has been formed, with Sergio and Giuseppe co-chairing. The award will be formalized and put into the bylaws.

Question from Abbas about the ad hoc committee on chapters and membership. Muriel answered that it has been established. **To Do:** Muriel will check on the level of activity for this committee and report at the next meeting.

**5. Bylaw Changes:** Muriel moved next to present proposed changes in the Bylaws for 2012, prepared by Giuseppe Caire.

**First Item:** Proposed change to Article V: Standing Committees. Article 7 (Publication Committee). **Add:** "The Senior Past President of the Society shall serve as Vice President of Publications."

Muriel recapped the discussion from last BoG on this issue. There is a need for someone independent from the Publications Board to handle appeals above the EiC. Although these appeals occur very seldomly, there is a need to address this issue from a governance point of view. The proposed position of VP of Publications shall handle such appeals. Assigning this to the Senior past president should not constitute a burden, since the incidences of appeals are very few.

Andi Loeliger indicated that this is fine if it works as intended. However, could the role of the VP of Publications be interpreted differently in the future? Frank responded that the executive task list will indicate the role to be played by the VP of Publications, and so the limited scope of the role should be clear. The position is not intended to be the boss of the EiC.

**Motion:** Approve change to Article V, Article 7. Motion was passed.

**Second Item:** Proposed change to Article VII: Awards. Section 3 (The Information Theory Society Paper Award). **Add:** "No paper previously selected for an ITSoc paper award or a Joint ITSoc/ComSoc award shall be eligible for the ITSoc paper award. Normally in a given year one paper will be selected, but in exceptional circumstances up to two may be chosen. The committee may also decline to make any award, if they decide that no suitable paper has been nominated."

There is much discussion on the first sentence. Elza noted that the first sentence is vague. Alon asked why we would disallow a paper which has won the student paper award from winning the ITSoc paper award. Muriel indicated that this is currently possible. David said that as a general rule in the IEEE, winning a lower grade award should not preclude a paper from winning a higher grade award. Gerhard suggested that the first sentence be changed to "No paper previously selected for THE ITSoc paper award or a Joint ITSoc/ComSoc award shall be eligible for the ITSoc paper award." This would remove all ambiguity. Abbas, however, suggested that this would be redundant.

Michelle suggested that the first sentence be changed to "No paper previously selected for THE Joint ITSoc/ComSoc award shall be eligible for the ITSoc paper award." David then raised the issue of what happens if the Joint ITSoc/ComSoc award is being decided at the same time as the ITSoc paper award. In that case, under the proposed change by Michelle, the outcome would be somewhat random. Gerhard suggested that if this happens, then the ITSoc paper award can be decided at an earlier date. Muriel pointed out that since the First VP is ex officio on both award committees, there is actually little room for randomness. She also pointed out that the timing of the ITSoc paper award is well defined in the Bylaws. However, the deadlines for the Joint ITSoc/ComSoc award can be changed. ComSoc does not have the timing in the Bylaws. David suggested that "previously" is vague and should be changed to "in previous years." Muriel suggested that the First VP should be able to manage both awards so that one paper does not get both awards. Abbas suggests that the text should read "No paper shall win both the ITSoc paper award and the Joint ITSoc/ComSoc award." Aylin asked whether one paper can win both the student paper award and the ITSoc paper award. Ubli asked whether a paper can win a pure ComSoc paper award and win the ITSoc paper award. Gerhard responded that no previous winner of a purely ComSoc award (at the same level) can win the Joint ITSoc/ComSoc award. However, winning a lower level ComSoc award does not preclude winning the joint award.

**Motion:** Paul suggested that due to the potential complexities involved, we should table the issue of whether to change Article VII: Awards. Section 3 (The Information Theory Society Paper Award), and let the awards committee chair further the discussion. The award committee chair is asked to return a carefully worded change to the BoG. Motion was passed.

**Third Item:** Proposed change to Article VII. Awards. Section 3 (The Information Theory Society Paper Award). **Add:** "An open call for nominations for this award shall be published in the Newsletter, with a deadline of March 15."

**Motion:** Approve change to Article VII, Section 3. Motion was passed.

**Fourth Item:** Proposed change to Article VII. Awards. Section 3 (The Information Theory Society Paper Award). Amend: "By March 1, the Publications Committee Chair or designee shall forward to the Awards Committee Chair a list of at least five articles, published in the previous two calendar years, for the consideration of the Awards Committee. Each nomination shall be accompanied by a statement outlining the contribution of the paper."

**Motion:** Approve change to Article VII, Section 3. Motion was passed.

**Fifth Item:** Proposed change to Article VII. Awards. Section 7 (ISIT Student Paper Award). **Add:** "This author must be a registered student of an educational institution at the time of paper submission to be eligible for this award."

**Motion:** Approve change to Article VII, Section 7. Motion was passed.

**Sixth Item:** Proposed change to Article VII. Awards. Section 7 (ISIT Student Paper Award). **Replace:** "The ISIT TPC shall select between 8 and 12 eligible papers as finalists and notify the authors accordingly." to "The ISIT TPC, or a committee formed by

the ISIT TPC, shall recommend between 8 and 12 eligible papers as finalists to the Awards Committee Chair. The Awards Committee Chair shall select up to 6 of these papers as finalists and notify the authors accordingly.”

Gerhard pointed out that currently the awards committee must accept the list of 8–12 candidates. 3 can win in the end. Abbas asked whether we can leave it to the committee to decide how many are awarded. Gerhard pointed out that in the two previous years, the committee wanted to award more than 3. Paul suggests that this discussion is beside the point right now. We can revisit the number awarded at a later time.

**Motion:** Gerhard moves to put this proposal back to committee, and then after further deliberation, it will be presented to the BoG. Ubli suggests that the issue of how many to award is separate. Motion is seconded. The motion did not pass.

**Motion:** Approve change to Article VII. Section 7. Motion was passed.

**Seventh Item:** Proposed change to Article VIII. Confidentiality and Conflict of Interest. This is a new article, introduced after the discussion on confidentiality and conflict of interest (CoI) started at the BoG meeting at ITA February 2012. Muriel read the text of the new article to the BoG. The text is provided in the draft Bylaws-2012 document, available on the BoG website.

Summary of the text: it was decided to define confidentiality and CoI general guidelines and definitions, while leaving the various committees and TPCs some latitude in how to manage specific cases. This approach is motivated by the fact that a strict and detailed set of rules may be too restrictive for a relatively small and collegial scientific community like ours.

David asked whether we should give specific examples of relationships which could be construed as CoI. Muriel said that it would be difficult to give examples which covered all cases. Certainly, examples would include same institution, teacher-student relationship, and others. There is a deliberate decision not to make things too precise. Abbas pointed out that each committee member should be aware of his/her potential CoI. Michelle suggested that declaring potential CoI is at first a committee member’s responsibility. This gives others a chance to evaluate potential problems and whether there is apprehension of bias. Muriel pointed out that at the end of the day, these are normative expectations. In general, it is hard to codify everything. This proposed change represents the first step toward codification. It’s a substantive step. Our sister societies in the IEEE are undergoing the same process right now.

Paul asked who drafted the CoI statement. Muriel said it was the junior past president. Gerhard recounted the history: at the Paraty meeting, Frank put together the text. Paul noted that the text is very well written. He asked whether we should seek further validation from the IEEE CoI office. Abbas asked Frank about the process of gathering information. Frank said that a main source is the IEEE Code of Conduct. Frank believes that even minor CoI should be declared. Others can dismiss the concern if they think it’s okay. David was still concerned about the lack of specific examples of CoI. These would be useful as guidance to individuals. Muriel indicated that the IEEE Code of Ethics exists and can serve as a guideline for individuals. We can include an explicit pointer to the IEEE Code of Ethics from our website. Gerhard said that it is

very hard to spell out all possible CoI examples. Abbas added that spelling everything can actually go in the wrong direction in the sense that if a potential issue does not appear on the list of examples, then the person concerned may not feel obliged to mention it, even though it may be a problem. Martin pointed out that CoI is a very important issue. David checked the IEEE Code of Ethics and found no specific examples. Frank mentioned that we could include the NSF guidelines on CoI. But these should be included in the officers’ task list rather than in the Bylaws.

**Motion:** Approve change to Article VIII. Confidentiality and Conflict of Interest. Motion was passed.

**6. Proposal:** Naming and Endowment of the ISIT Student Paper Award.

Paul Siegel gave a presentation on the proposal to rename the ISIT Student Paper Award in honor of Jack and Toby Wolf. The renaming is to be accompanied by a funding campaign to endow the award (with the idea of possibly increasing the amount of the award). The Bylaws would be amended accordingly. Paul noted that Jack Wolf’s profound contributions to information theory and the IT Society have been recognized with some of our most distinguished awards (IT Paper Award, Claude E. Shannon Award, Aaron D. Wyner Distinguished Service Award). He also noted that Jack was passionate about teaching and mentoring of students. This has been recognized by the UCSD Distinguished Teacher Award and the IT Society Padovani Lectureship. Toby Wolf has also been an important member of the community.

Paul noted that Jack was very proactive in creating mechanisms for recognizing and honoring student achievement. Examples of this include endowment of Shannon Graduate Fellowship (UCSD), contribution to Schultz Prize for Excellence in Graduate Student Research at UCSD, establishment of a number of scholarships and fellowships at UPenn, and service on the original board of the Marconi Society Young Scholar Award. Jack and Toby were enthusiastic proponents and supporters of the establishment of the IT Society’s ISIT Student Paper Award. Renaming the ISIT Student Paper Award in honor of Jack and Toby would be a nice way to recognize the counsel, encouragement, and support they provided to generations of information theorists and electrical engineers. Endowment of the award would ensure its funding in perpetuity. A target of 100 K would support 3 lucrative awards or 4–5 awards at current level.

Paul noted that Jack strongly supported the establishment of the student paper prize. There is a good chance of near-term success in fund-raising. For instance, over \$1M was raised in 5 months to support the establishment of the Jack Keil Wolf Endowed Chair in Electrical Engineering at UCSD last year. The fund can be managed by the IEEE Foundation (\$20K minimum). In terms of next steps, the BoG is asked to vote to approve the renaming of the award and the endowment campaign for funding it. It is proposed that an ad hoc committee be formed to address the following issues: the method of informing Toby and others, the timing and venue to publicly announce the naming, the identification of the fund-raising coordinator, and the Bylaw revision.

Following Paul’s presentation, there was discussion. Abbas asked whether the student paper award has the prestige to warrant a name such as Jack Wolf. He would like to see the society add to the number of awards, rather than merely renaming. It is noted

that Alex Vardy emailed in support of the proposal. Michelle Efros voiced her enthusiastic support. David Tse suggested that efforts should be made to make the student paper award more prestigious. The question is how. Ubli Mitra suggested that Jack would have been very enthusiastic about endowing the award. Ubli also mentioned that there won't be a dearth of names for other awards. Gerhard indicated that the BoG should give a charge to the ad hoc committee addressing this issue. Aylin mentioned that the IEEE Foundation is the right venue for managing the fund. They are eager to work with the IT Society on such matters. Alon suggested that the prestige of the student paper award will increase over time, with increased selectivity and monetary award value. Muriel asked how large the ad hoc committee should be. Paul said perhaps three. Abbas agreed that the formation of an ad hoc committee is a good idea.

Frank suggested that the ad hoc committee should be formed first, and then after deliberations, a motion can be made to rename the paper award. Michelle and Andi Loeliger agree. The conclusion is that Muriel will form the ad hoc committee with Paul being the chair. The committee will then consider the proposal presented by Paul. There is therefore no need to vote at present.

**7. Martin Bossert Presented the Conference Committee on Behalf of Bruce Hajek:** The only item for discussion is whether IT Society will support NetCod 2014. Muriel mentioned that Daniel Lucani has sent a message indicating that he will make the proposal for supporting NetCod 2014 at a later BoG meeting. Martin indicated that there are no other issues for discussion at present.

**8. Report of the Ad Hoc Committee on the Future of IT Transactions:** Frank presented the report. The ad hoc committee consisted of the following members: Helmut Bolcskei, Emmanuel Candes, Abbas El Gamal (Chair), David Forney, Bruce Hajek, Frank Kschischang, Madhu Sudan, Alexander Vardy.

The committee charge mentions that "The IT Transactions is the premier publication in the field of information theory and ranks among the top IEEE publications in terms of the number of citations and eigenfactor. However, the size of the Transactions has been steadily growing in recent years, which raises the questions of whether this growth can be managed, and whether it is hurting quality. Furthermore, the Transactions has not been attracting the best papers in closely related fields, such as cryptography, complexity, learning, quantum information, and network science."

Some specific questions that the committee was asked to address are (1) Has this growth indeed hurt quality compared to an absolute standard or top journals in cognate fields (e.g., computer science, statistics, operations research, mathematics, and physics)? (2) How have leading journals in these cognate fields managed size and growth? (3) Has this growth compromised the value of the Transactions to its readership (e.g., in timeliness or browsability)? (4) In general, how is the Transactions viewed by its readership broadly defined? (5) What actions, if any, need to be taken to ensure the future of the Transactions as a leading journal in the information sciences?

The committee conducted over 25 interviews with select group of researchers in IT and cognate fields, collected relevant statistics and policies about leading journals in cognate fields, and held six conference calls and one face-to-face meeting at ISIT 2012 to discuss results and make recommendations.

With respect to question (1), the committee found that T-IT still publishes the best papers in its field, but average quality has slipped, due to inclusion of more average papers in traditional core areas. For question (2), it is found that measures include page limits, spin-off of new journals, more fast-rejects, use of on-line supplements, and all-electronic publication. For (3), it is found that browsability is not an issue because journals are nowadays searched, not browsed. Few comments were made about timeliness. For (4), it is found that T-IT is best journal in its field, more prestigious than any other IEEE journal. T-IT is the most mathematical of the IEEE journals (except possibly T-AC). It is more concerned with technical virtuosity than with impact. The quality of papers ranges widely, and therefore it does not give the quality stamp that other journals and conferences (e.g., FOCS, STOC) do. For (5), it is found that there is little or no sentiment for splitting the Transactions, spinning off new journals, or narrowing the scope. Some actions are under way: raise minimum acceptance threshold, reject incremental papers, avoid special issues. Some discussion items: IT does not have mechanism for pointing out the papers that everyone should read, either in T-IT or ISIT. Other fields have highly selective journals or conferences. Perhaps we should start a magazine along the lines of the Signal Processing Magazine.

Summarizing journal policy, it is noted that no other journal in our survey is contending with the growth that we are. Other IEEE journals have had success with instituting Senior Editors. *Physical Review Letters* (PRL) is an interesting model of a highly selective journal. It features short papers announcing major results from all branches of physics. It is widely read and one of most prestigious journals in any scientific discipline. The *Journal of Machine Learning Research* (JMLR) provides an interesting model for an online, open access journal. It was formed in 2000 by Kluwers Machine Learning Journal editorial board. It has a large staff of associate editors, and separate large editorial and advisory boards, with many top people. The journal makes commitment to rigorous yet rapid reviewing, with final versions of papers published electronically immediately upon receipt. JMLR also maintains an archive of open-source software for machine learning.

It was observed that growth up till 2011 followed 2006 ad hoc committee prediction of 11% per year (8000 pages in 2011). Growth beyond 2012 is difficult to predict, but exponential growth is expected to continue. The committee recommends that we (1) maintain current fast reject rate of about 30%, (2) reject incremental papers (EiC is already implementing this), (3) AEs should take more active role in ensuring that papers are not too long relative to their content, and (4) curb special issues.

Preliminary recommendations on improving operations include (1) move toward hierarchical editorial board with senior editors (similar to other IEEE Transactions); (2) blind AE fast reject should be left to the discretion of EiC; (3) implement some forms of reviewer rewards and penalties. The committee endorses publishing a list of good reviewers every year. Whether to implement or not is left to the EiC; (4) The current editing performed by IEEE Publishing is too costly and of marginal quality. We should explore alternatives. (5) T-IT evolution to all-electronic publication should follow IEEE lead; (6) The committee endorses the arXiv-based approach to open access and recommends continued monitoring of developments in this area; (7) EiC should submit his/her best estimate of page budget for the current and following year to the ITS officers every three months.

Preliminary recommendations on improving visibility include (1) monthly Table of Contents should be sent in a push email to all IT society members and anyone else who requests it (IEEE can do this, for \$600/month!); (2) BoG should set up a committee to study conversion of IT Newsletter to on-line, and potentially its evolution to on-line magazine; (3) publication of review and discussion papers in the T-IT; (4) a more active T-IT website, perhaps including discussions of current papers.

On highlighting quality, some interviewees pointed out that IT has no highly selective venue (e.g., STOC/FOCS, Science/Nature/Physical Review Letters). The following ideas are proposed for the BoG to explore. (1) Highlighting EditorsChoice papers. (2) Comments on current papers. The idea would be to solicit paper reviews, which would appear in some ephemeral but timely medium, e.g., IT Newsletter, IT website, or an IT blog. (3) Announce IT Prize Paper Finalists. This would be a formal responsibility of the Awards Committee. (4) Divide the T-IT into Part A (top) and Part B (archival) papers. No consensus on how to do this could be reached. (5) New, highly selective, interdisciplinary journal in the information sciences. The committee enthusiastically recommends IT Society support of the committee that has been created to explore the feasibility of such journal.

A working group consisting of E. Candes, G. D. Forney, Jr., M. Sudan, and M. Vetterli was formed to further discuss the possible creation of new journal of information sciences. It is noted that other fields have journals (Science, Nature, PRL) where the very best work is highlighted. We don't. Within the information sciences, there is much interest in understanding developments in related fields. We lack good means of doing so. Preliminary suggestions include (1) core scope should include mathematically-grounded information sciences areas (theoretical CS, IT, statistics, signal processing, etc). (2) Title of the journal would probably include the word information. (3) The sponsor would preferably be new nonprofit organization. (4) Modest funding from government, industry, and universities. (5) Endorsement (probably without financial support) of societies, e.g., ACM, ITS, SPS, SIAM, IMS, AMS, INFORMS, with no dominant community. (6) Online, open-access model along the lines of JMLR is attractive. (7) If online journal were successful, it shouldn't be hard to find publisher for subscriber-supported print version (a la Nature/Science). (8) Journal includes both original research and survey articles. As a minimum, articles understandable by readers in related fields. (9) Science, Nature, and PRL require articles to be short (perhaps with supplementary on-line material). Is this the right policy for this journal? Do we expect authors of original research papers to publish full versions elsewhere?

Following Frank's presentation, there was much discussion. Gerhard asked whether junior faculty were interviewed for the committee study. Frank reiterated that the growth of special issues may have led to decreased quality. He mentioned that some associate editors (AEs) are only channeling papers, and are not reducing paper lengths when it's necessary. Helmut pointed out that the growth in page counts has exceeded the growth in number of submissions, meaning that paper lengths are indeed increasing. Paul suggested that carefully conceived special issues are of value. David mentioned that AEs are currently not anonymous, whereas reviewers are. Should AEs also be anonymous? Frank asked whether fast rejections should be done blindly. Abbas suggested that authors should be told to remove preliminary background in their papers, thereby reducing paper lengths. Helmut mentioned

that he will be instituting a policy whereby derelict reviewers will have the printing of their publications delayed.

Abbas asked how we should move forward on the presented committee recommendations. He suggested that the pushing of the Table of Contents (ToC) could be a motion. Aylin asked whether the IT website can handle the table of contents. Abbas felt that this is not sufficient. Nick mentioned that IEEE publishes the contents of journals, and has a RSS feed if you subscribe. Muriel pointed out that whether we want to push the ToC, and how we want to push the ToC, are two separate issues. Gerhard suggested that we give the issue to the online editor for consideration. Frank suggested that we could post on the IT website instructions on how to subscribe to the IEEE RSS feed. Abbas reiterated that we need to push the ToC more actively. Muriel suggests that the online committee should work further on this issue. **To Do:** Matthieu will have the online committee look further into the issue.

The issue of whether to move to a hierarchical structure for the editorial board, with senior editors supervising AEs, was raised. Helmut indicated that he was not in favor of this. It is widely agreed that the newsletter is widely read. Abbas asked whether we should make the newsletter available online in html form. Aylin suggested that perhaps the newsletter should be entirely online, saving printing costs of 25 K per year. Frank suggested that we should list the top downloads of articles in the Transactions on the website.

Muriel raised the issue of whether we should have review and discussion papers in the Transactions. Sergio pointed out that there have been very few review papers over the years. Most of the review papers actually occurred in the special 50th anniversary issue in 1998. Since 2004, the FnT series has served the purpose of hosting review papers. The series promises 5 months from submission to publication. However, Sergio noted that papers are hard to get. It has also traditionally been difficult for IT Transactions to get review papers. Abbas mentioned that discussion papers are different from review papers. Sergio asked for an example of a discussion paper. Abbas mentioned that Annals of Statistics has discussion papers focusing on papers in the same or different issue. Elza asked for clarification. Helmut said that occasionally the Transactions publishes comments on other papers. Muriel asked whether we should put discussion papers in the Transactions. Abbas said not necessarily. Muriel mentioned that the computer science community has many discussion papers. She asked whether the online committee can host discussion papers online. Matthieu said that we can link the paper to comments online. One can build a Wiki around a paper. Nick suggested that this effort can be started off by posting online student review papers and summaries from reading seminars. Muriel suggested that the sentiment is to ask the online committee to look into the issue of discussion papers. **To Do:** Matthieu will look into this issue with the online committee and report back at the next BoG meeting.

On the issue of announcing the finalists of the IT paper prize, Muriel pointed out that the number of finalists differs from year to year. Nick mentioned that the finalists for the student paper award are announced on the IT website. Abbas said that we used to list the finalists of the IT paper prize. Muriel pointed out that we need to have a firm definition of a finalist. Abbas suggested that the award committee take action on this issue. Gerhard pointed out that according to the Bylaws, the award committee forwards the three top choices to the BoG. We could simply list these three top

choices as the finalists. However, one issue is that papers can be considered multiple times for the award.

On the possible creation of new journal of information sciences, Abbas asked for endorsement or feedback from the BoG. Sergio asked whether the working group which discussed this issue was a subcommittee of the Ad Hoc Committee on the Future of IT Transactions. Abbas answered that this was an informal group. Sergio pointed out that starting new journals is a big deal. We don't want to start mediocre journals. Sergio mentioned a new journal *Information and Inference* edited by Rob Calderbank, David Donoho and others, which seems to have coverage similar to that proposed. Abbas indicated that he did not know about this new journal. Muriel suggested that there seems to be overlap, and that we should understand the situation better before proceeding further. Ubli mention that *Information and Inference* provides table of contents alerts, free for the first two years. Sergio suggested that one way to go is to start new journals in specific areas of information theory, for instance data compression. This approach was followed by the ComSoc society. But such a step should not be taken lightly. Ubli indicated that there has indeed been a dilution of importance for IEEE Transactions on Communications since the other ComSoc journals were founded. Gerhard indicated that interdisciplinary efforts are worthy of support, and warrants further investigation. Abbas pointed out that a new journal would not be an initiative from the IT Society alone, but must be supported by multiple communities.

**9. Mike Casey from NOW Publishers Presented a Proposal for a Joint NOW/IT Society Pilot Program for LaTeX to XML conversion:** Mike was introduced by EiC Helmut Boelcskei. Mike expressed his thanks to the IT Society for its support of NOW. Mike explained that the NOW production process is designed to make the authors' life easy and costs down. Production is LaTeX-based and fully electronic. NOW currently does not produce XML, but sticks to PDF. On the other hand, XML gives standardized way of handling journals across different disciplines, makes it easy to switch suppliers and use multiple suppliers, has very competitive typesetting rates. XML also enables output in multiple formats (future proof), makes it easy to publish content piecemeal. But it can be expensive, and cumbersome, particularly for mathematics. Perhaps most importantly, XML is being driven by the growth in hand-held devices.

Mike then explained XML in detail. XML is an extensible mark-up language and successor to SGML. In short, "HTML describes the way Web pages should appear in a browser. XML describes objects that are interchanged for Web services, electronic commerce, distributed computing, and other purposes." XML requires a Document Type Definition (DTD) which defines the entities and rules possible within any given XML file. An XML file can be parsed against a DTD for correctness. MathML has been developed for marking up equations.

Mike then presented a proposal for a joint NOW/IT Society pilot program for LaTeX to XML conversion. The goals are (1) determine how feasible (semi-)automatic conversion is; (2) understand and verify the costs; (3) develop an author-friendly environment; (4) develop a work-flow for typesetting-editing-proofing; (5) deliver Full-text XML files, including figures and print ready PDFs to IEEE. The methodology include (1) use standardized LaTeX; (2) use LaTeXXML a LaTeX-to-XML conversion tool; (3) parallel process a number of articles; (4) include proofing process with authors. The phases of the pilot include (1) detailed scoping and budgeting; (2)

prototype and conversion; (3) define stylefile for LaTeX (Can the IEEE style be used? Does it need adaptations?) (4) prototype workflow; (5) test run conversion and workflow on multiple articles in parallel production; (6) report on findings and proposal for future.

After the presentation, Muriel remarked that pursuing this project requires that authors undertake editing with IEEE in parallel with this project. Authors will therefore have to proofread twice, one for IEEE and one for this project.

**10. Helmut Boelcskei Presented the EiC Report:** Helmut first presented the Aims and Scope statement for the IT Transactions: "The IEEE Transactions on Information Theory publishes papers concerned with the transmission, processing, and utilization of information. While the boundaries of acceptable subject matter are intentionally not sharply delimited, its scope currently includes Shannon theory, coding theory and techniques, data compression, sequences, signal processing, detection and estimation, pattern recognition, learning and inference, communications and communication networks, complexity and cryptography, and quantum information theory and coding. IEEE Transactions on Information Theory papers normally contain a strong conceptual and/or analytical contribution."

Next, Helmut presented further comments from the five-year review. These included (1) Do we want to formalize the appeals procedure and put it in writing? (2) Should authors be given a chance to appeal the EiCs final decision to the IT Society president? or to a VP Pubs? (3) Formalize Transactions reporting structure, how to assess needs of readership, guest editors, duties of EEB members, EiC training, AE training, AE reappointments.

Helmut then discussed the production process for IT Transactions papers. Currently, IEEE converts Latex (and Word) sources we submit first into XML and produces galleys based on the resulting XML. The final XML (after consultation with authors) is then used to produce .pdf and HTML. If we adopted a production process where the editing is not done by IEEE, then one can go directly from Latex to pdf, but it turns out that IEEE still produces XML in parallel and (since the editing would not be done by IEEE), authors do not get to comment on the XML. Thus, the XML produced is not trustworthy. Currently ComSoc produces pdf only using editing outside of IEEE. IEEE currently funds conversion of ComSoc articles to XML, but authors do not get to comment on the XML. By the end of 2013, ComSoc will have to comply with the process currently applied to IT and most other IEEE societies.

Moving on, Helmut discussed the option for "moderate editing" of IT Transactions papers. Thus far, this was not an option for us because the quality of the math editing would not have been acceptable for Trans. IT. Now, however, IEEE is offering a Trans. IT-tailored light editing option that keeps the quality on the math editing. Compared to process so far, the difference is that the main body is not edited for grammar, punctuation, spelling, and style (abstracts and bios are). Going to light editing would save us \$100-110K per year. In terms of editing for grammar, punctuation, spelling, and style, IEEE recommends an out-of-house service costing approximately \$350 per paper. A cheaper option is available through NOW (Mike Casey). If light editing is adopted, AEs would have to decide whether a paper needs editing before it is approved for publication. As a result, the quality of typesetting may reduce, e.g., timid AEs maybe reluctant to force authors to

have their papers edited. AEs may not pay attention to this, and authors may be recalcitrant. We have a need to balance our budget, but the surplus goes to IEEE anyway. Thus, the EiC would advise against switching to light editing.

On the issue of Latex to XML, Helmut mentioned that turning in XML instead of Latex would save us \$2.5 per page. IEEE is working on a Latex to XML compiler. But we are not sure what the process is. Helmut believes that it makes sense for us to explore the development of a Latex-XML compiler. We are likely to come up with a better solution than the IEEE. We would have to clarify with the IEEE first if we could use the results of this project within IEEE. It is also possible that we can get a larger discount than the \$2.5 per page, ITSoc president would have to negotiate this.

Following Helmut's presentation, there was much discussion. Helmut mentioned that IEEE Xplore downloads make us a lot of money. If we went away from IEEE editing, then IEEE may change Xplore download rates. Muriel pointed out that Com-Soc, which is not using IEEE for editing, gets the same download rates as us. There is no negotiation on this. David wanted to verify this. Helmut suggested that in general, going away from IEEE editing is a complex process, a project not to be taken on lightly. Frank suggested that we can split the paper stream into two parts. Most papers don't need heavy editing. A small fraction does. However, it's not clear whether IEEE will allow us to split the paper stream. Andi suggested that we ask. Aylin suggested that light editing would still involve the IEEE, but the resulting savings can be used within the society (we don't have to give it back). For instance, signal processing society has moderate editing with the IEEE. Why not go with that? Helmut answered that we may have to put up with 10 percent of the papers with bad English. Muriel suggested that we hire English editors. Helmut

pointed out that AEs would have to pay attention to which papers require English editing. Muriel suggested that \$100K in savings would mean a large reduction in conference registrations. We should not let most of the nicety subsidize poor English. Helmut suggested that perhaps the EiC, and not the AEs, should decide which papers have bad English. Frank remarked that we should be careful about loading the EiC. Gerhard asked how we can curb growth in costs due to growth in pages. Helmut pointed out that the page explosion is due to a rise in acceptance rates. Muriel asked whether we can hire part-time professional editor. Gerhard said that the publications editor should do this. Muriel said that we should have the publications editor decide which papers need English editing, hire English editors, and adopt the light editing option.

Andi suggested that we approve the project proposed by Mike Casey. It's possible to sponsor such projects by tapping into reserves up to 3 percent. The project will have to be formally proposed. How will it impact our budget next year? Muriel suggested that the XML project is more long term. We can obtain lower costs with light editing now. **To Do:** Helmut agreed to further investigate possibilities for English editors and the IEEE light editing process.

Muriel said that due to time constraints, the report by the outreach committee by Michelle Effros will be tabled until next meeting. Michelle has put up the presentation on the IT website. Perhaps the next meeting can take up this issue first.

Muriel thanked the outgoing BoG members, Martin, Frank, Andi, for their service. She said it has been a honor to serve as President of the IT Society this year.

The meeting was adjourned at 7 PM.

## Distinguished Lectures by Max Costa for the Benelux It Chapter

To recognize the contributions of Edward van der Meulen to Information Theory in the Benelux, the Benelux IT Chapter organizes annually the Van der Meulen Seminar. The Fourth Van der Meulen seminar featured two presentations by Max Costa (University of Campinas, Brazil), who is a Distinguished Lecturer of the Information Theory Society and author of "Writing on Dirty Paper," a celebrated paper in our field.

The seminar was organized by Frans Willems and held at Eindhoven University of Technology on December 4, 2012. Max Costa lectured about "Side Information in Communication Systems – Dual Views of Joint Source and Channel Coding" and "On Gaussian Interference Channels." Other lectures were delivered by Jean-Paul Linnartz ("Writing on Dirty Paper as Inspiration for Electronic Watermarking and Privacy Preserving Biometrics") and Jasper Goseling ("Random Access with Physical-layer Network Coding").

There were 45 participants, mainly from the Benelux (Belgium, the Netherlands, and Luxembourg), but also Germany was very

well represented. The Chapter Board was delighted with the attendance of Edward van der Meulen and his wife Anne-Marie. The picture shows, from left to right, Jasper Goseling, Edward van der Meulen, Max Costa, and Jean-Paul Linnartz.



## GOLOMB'S PUZZLE COLUMN™

## Using Roots of Unity



Solomon W. Golomb

The  $n$  roots of  $z^n - 1 = 0$  in the complex plane are called the " $n$ th roots of unity", and have the values  $e^{2\pi ik/n}$  for  $0 \leq k \leq n - 1$ . They are at the vertices of a regular  $n$ -gon inscribed in the "unit circle" (the circle of radius 1 around the origin) in the complex plane, and sum to 0 (since clearly their sum is unchanged by a rotation of  $(2k\pi/n)$  radians around the origin). If the fraction  $k/n$  is in lowest terms,  $e^{2\pi ik/n}$  is called a *primitive  $n$ th root of unity*, and these are the  $\phi(n)$  roots of the *cyclotomic polynomial*  $\Phi_n(z)$  of "order  $n$ ", where  $\phi(n)$  is Euler's phi-function. If  $k/n$  is not in lowest terms, it equals a fraction  $r/d$  in lowest terms for some divisor  $d$  of  $n$ . Thus,  $z^n - 1 = \prod_{d|n} \Phi_d(z)$ , where the product is taken over all positive divisors  $d$  of  $n$ . By "Möbius Inversion,"  $\Phi_n(z) = \prod_{d|n} (z^d - 1)^{\mu(n/d)}$ , where  $\mu(n)$  is the Möbius mu-function; and the sum of the  $\phi(n)$  primitive  $n$ th roots of unity is  $\mu(n)$ . The cyclotomic polynomial  $\Phi_n(z)$  is known to be irreducible over the field of rational numbers for all positive integers  $n$ .

The following four theorems, listed in order of difficulty, don't mention complex numbers, but their most elegant proofs make use of the  $n$ th roots of unity. See which ones you can prove.

- 1) A point  $P$  is chosen inside a regular  $n$ -gon of radius 1, at a distance  $d$  from the center to one of the vertices of the  $n$ -gon. (The *radius* of a regular  $n$ -gon is the distance from its center to any vertex.) The distances from point  $P$  to each of the vertices of the  $n$ -gon are measured, and these  $n$  distances are then multiplied together. Prove that this product equals  $1 - d^n$ .
- 2) A rectangular box, with dimensions  $a$  by  $b$  by  $c$ , is to be filled exactly ("tiled") with  $1 \times 1 \times n$  bricks. Clearly this can be done if  $n$  divides at least one of  $a$ ,  $b$ , or  $c$ . (Here  $a$ ,  $b$ ,  $c$ , and  $n$  are positive integers.) Prove that this packing can *only* be achieved if  $n$  divides at least one of  $a$ ,  $b$ , or  $c$ .

- 3) Suppose we have a collection of  $r$  arithmetic progressions,  $P_i = \{a_i k + b_i\}$ ,  $1 \leq i \leq r$ , where  $k$  takes all integer values, and such that every positive integer  $n$  is in one and only one of the progressions  $P_i$ . Prove that the *largest* value of  $a_i$ ,  $\max_{1 \leq i \leq r} \{a_i\}$ , must occur in at least two of the progressions  $P_i$ .

- 4) Every number from 0 to 15 can be found as a direct sum  $s + t$  with  $s \in S = \{0, 1, 2, 3\}$  and  $t \in T = \{0, 4, 8, 12\}$ . This is the basis of representing two-digit numbers in base 4 arithmetic. However, each number from 0 to 15 can also be written as a direct sum  $s + t$  with  $s \in S' = \{0, 1, 4, 5\}$  and  $t \in T' = \{0, 2, 8, 10\}$ . In general, when  $m$  is composite, there is more than one way to find two sets  $S$  and  $T$ , of  $m$  non-negative numbers each, such that every integer from 0 to  $m^2 - 1$  has one and only one representation in the form  $s + t$  with  $s \in S$  and  $t \in T$ . (This was illustrated above for  $m = 4$ .) Find such an example with  $m = 10$ , for numbers from 0 to 99. However, prove that when  $p$  is prime, the only way to represent all numbers from 0 to  $p^2 - 1$  as sums  $s + t$  with  $s \in S$  and  $t \in T$  where  $S$  and  $T$  each contain  $p$  non-negative numbers, is with one of  $S$  and  $T$  equal to  $\{0, 1, 2, \dots, p - 1\}$  and the other equal to  $\{0, p, 2p, \dots, (p - 1)p\}$ .

*Notes.* Problem 1 has been known for a long time. The others, with their proofs using the complex roots of unity, are: Problem 2 is a result by N.G. deBruijn; Problem 3 is the Newman-Mirsky Theorem; and I published the result in Problem 4 in 1972, with a more general result about using  $r$  sets of  $p$  members each to represent all integers from 0 to  $p^r - 1$ , when  $r \geq 2$ .

# Prime Divisors of $n!$ and of $\binom{2n}{n}$ Solutions

Solomon W. Golomb



- 1) Let  $H_p(n)$  be the exponent on  $p$  for the highest power of the prime  $p$  that divides  $n!$ . Then clearly

$$(a) H_p(n) = \left\lfloor \frac{n}{p} \right\rfloor + \left\lfloor \frac{n}{p^2} \right\rfloor + \left\lfloor \frac{n}{p^3} \right\rfloor + \dots + \left\lfloor \frac{n}{p^k} \right\rfloor$$

where  $p^k \leq n < p^{k+1}$  since  $\left\lfloor \frac{n}{p^m} \right\rfloor = 0$  for all  $m > k$ .

$$2) H_5(1000) = \left\lfloor \frac{1000}{5} \right\rfloor + \left\lfloor \frac{1000}{25} \right\rfloor + \left\lfloor \frac{1000}{125} \right\rfloor + \left\lfloor \frac{1000}{625} \right\rfloor \\ = 200 + 40 + 8 + 1 = 249,$$

$$H_2(1000) = \left\lfloor \frac{1000}{2} \right\rfloor + \left\lfloor \frac{1000}{4} \right\rfloor + \left\lfloor \frac{1000}{8} \right\rfloor + \left\lfloor \frac{1000}{16} \right\rfloor \\ + \left\lfloor \frac{1000}{32} \right\rfloor + \left\lfloor \frac{1000}{64} \right\rfloor + \left\lfloor \frac{1000}{128} \right\rfloor + \left\lfloor \frac{1000}{256} \right\rfloor + \left\lfloor \frac{1000}{512} \right\rfloor \\ = 500 + 250 + 125 + 62 + 31 + 15 + 7 + 3 + 1 \\ = 994.$$

Since  $10 = 2 \times 5$ , the number of 0's at the end of 1000! is  $H_5(1000) = 249$ .

- 3) Since  $\frac{1}{p} + \frac{1}{p^2} + \frac{1}{p^3} + \frac{1}{p^4} + \dots = \frac{1}{p-1}$ , by keeping track of what is dropped every time we "round down" in (a), we get

$$(b) H_p(n) = \frac{n - \omega_p(n)}{p-1}$$

where  $\omega_p(n)$  is the "weight" (i.e. sum of the digits) when  $n$  is written as a number in base  $p$ .

For example, 1000 in base 5 is 13,000 from which  $\omega_5(1000) = 1 + 3 = 4$ .  $H_5(1000) = (1000 - 4)/(5 - 1) = 996/4 = 249$  as in Problem 2.

- 4) Since  $\binom{2n}{n} = (2n)!/(n!)^2$ , the exponent on the highest power of the prime  $p$  that divide  $\binom{2n}{n}$  is:

$$(c) H_p(2n) - 2H_p(n) = \frac{2n - \omega_p(2n)}{p-1} - 2 \left( \frac{n - \omega_p(n)}{p-1} \right) \\ = \frac{2\omega_p(n) - \omega_p(2n)}{p-1}.$$

- 5) Since  $\binom{2n}{n} = \frac{2n(2n-1)(2n-2)\dots(n+1)}{n(n-1)(n-2)\dots 2 \cdot 1}$  if  $n$  is odd there are clearly more factors of 2 in the numerator than in the denominator. If  $n$  is even, if  $2^k$  is the highest power of 2 between 1 and  $n$ , then  $2^{k+1}$  is a power of 2 between  $n+1$  and  $2n$ ; so the numerator always contains more factors of 2 than the denominator. (In fact,  $\binom{2n}{n}$  is divisible by  $2^2 = 4$  except when  $n$  itself is a power of 2.)

- 6) For the odd prime  $p$  to fail to divide  $\binom{2n}{n}$ , from expression (c) in the solution to Problem 4, this requires

$2\omega_p(n) = \omega_p(2n)$ . Usually,  $2\omega_p(n) > \omega_p(2n)$ , but equality occurs if and only if all the digits of  $n$  in base  $p$  are  $\leq (p-1)/2$

- 7) For values of  $n$  such that  $\binom{2n}{n}$  is divisible by neither 3 nor 5, we look for  $n$  such that when written in base 3 only the digits 0 and 1 appear, and when written in base 5, only the digits 0, 1 and 2 appear. The first 40 such values of  $n$  are:

1, 10, 12, 27, 30; 31, 36, 37, 252, 255; 256, 280, 282, 756, 757; 760, 810, 811, 3160, 3162; 3186, 3187, 3250, 3252, 3276; 3277, 3280, 6561, 6562, 7536; 7537, 7560, 7561, 7626, 7627; 19686, 19687, 20007, 20010, 20011.

- 8) The values of  $n$  such that  $\binom{2n}{n}$  is divisible by none of 3, 5, or 7 is a subset of the previous list. The first 11 values are 1, 10, 756, 757, 3160, 3186, 3187, 3250, 7560, 7561, 20007.

- 9) The only value of  $n > 1$  such that  $\binom{2n}{n}$  is divisible by none of 3, 5, 7, or 11 up to  $n = 25,000$ , is  $n = 3160$ . A rough probability calculation suggests that there may be only finitely many such values of  $n$ .

Note that for  $n$  with  $1 < n < 756$ , the only  $n$  for which  $\binom{2n}{n}$  is divisible by none of 3, 5, or 7 is at  $n = 10$ . Since  $\binom{2n}{n}$  must be divisible by all primes  $p$  with  $n < p \leq 2n$ , and since  $n = 10$  is not a power of 2,  $\binom{20}{10}$  must be a multiple of 4; so we have  $4 \times 11 \times 13 \times 17 \times 19 = 184,756$  must divide  $\binom{20}{10}$ . In fact,  $\binom{20}{10} = 184,756$ . Never again are the primes between  $n$  and  $2n$  so dense; so that  $\binom{2n}{n}$  must also be divisible by some smaller odd primes; and until  $n = 756$ , there aren't enough "small" primes bigger than 7 to play this role.

## Relevant References

1. "On the Prime Factors of  $\binom{2n}{n}$ ", by P. Erdős, R.L. Graham, I.Z. Ruzsa and E.G. Straus, *Mathematics of Computation*, vol. 29, no. 129, January 1975, pp. 82–92. [They prove that for any two odd primes  $p$  and  $q$ , there are infinitely many integers  $n$  such that  $\binom{2n}{n}$  is divisible by neither  $p$  nor  $q$ .]
2. "An Identity for  $\binom{2n}{n}$ ", S.W. Golomb, *American Mathematical Monthly*, vol 99, no. 8, October, 1992, pp. 746–748.

An "Erdős Prize" of \$1000 awaits the first person who can prove that there are infinitely many integers  $n$  such that  $\binom{2n}{n}$  is divisible by none of 3, 5, or 7.

## In the Blogosphere...

In consultation with various IT society “heavy weights,” I decided to add a column in which I include pointers to some interesting blog items around. The items, for now, are essentially an indication of my personal taste and limited time but I hope folks will send in their own pointers and their suggested blog posts to add

diversity. The first column, fortunately, coincided with the announcement about a new [Information Theory b-log](#) whose “about page” invites “all researchers working on information theory” “to participate by posting items -both original material and pointers to the web- to the blog.”

### Information Theory b-long

Posted on January 3, 2013 by Sergio Verdu

#### Information and Inference (new journal)

The first issue of Information and Inference has just appeared: <http://imaia.oxfordjournals.org/content/current>

It includes the following editorial:

In recent years, a great deal of energy and talent have been devoted to new research problems arising from our era of abundant and varied data/information. These efforts have combined advanced methods drawn from across the spectrum of established academic disciplines: discrete and applied mathematics, computer science, theoretical statistics, physics, engineering, biology and even finance. This new journal is designed to serve as a meeting place for

ideas connecting the theory and application of information and inference from across these disciplines...

To enhance the impact of each manuscript, authors are encouraged to provide software to illustrate their algorithm and where possible replicate the experiments presented in their manuscripts. Manuscripts with accompanying software are marked as “reproducible” and have the software linked on the journal website under supplementary material. It is with pleasure that we welcome the scientific community to this new publication venue.

Robert Calderbank David L. Donoho John Shawe-Taylor Jared Tanner

### An Ergodic Walk

a process whose average over time converges to the true average

Posted by Anand Sarwate under [Uncategorized](#) | Tags: [NIPS 2012](#) | [Leave a Comment](#)

#### NIPS Casinos Flooded

I had a rather dim view of the NIPS conference *venue* last year—the Harrah’s and Harveys casino/hotels in South Lake Tahoe. Nothing is more depressing than people playing the slots at 8 AM,

smoking and drinking away. Via [Erin](#), I learned that [the casinos flooded and are closed](#): “thousands of gallons of water dumped into Harrah’s, causing the elevators to break.” I can only hope that this is somehow an excuse to not hold NIPS there in the future—but I’m not holding my breath (which I did to avoid the smoke).

## Call for Nominations

### IEEE Information Theory Society 2013 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, 2013 to the President of the IEEE Information Theory Society, who in 2013 will be Gerhard Kramer <gerhard.kramer@tum.de>. The nomination form is available at <http://www.itsoc.org/honors/claude-e.-shannon-award>

### IEEE Information Theory Society 2013 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, 2013 to the President of the IEEE Information Theory Society, who in 2013 will be Gerhard Kramer <gerhard.kramer@tum.de>. The nomination form is available at <http://www.itsoc.org/honors/wyner>

### IEEE Information Theory Society 2013 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 (2011–2012). 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, 2013 to the Awards Committee chair, who in 2013 will be Abbas El Gamal <abbas@ee.stanford.edu>. Please include a statement outlining the paper's contributions.

### IEEE Joint ComSoc/ITSoc 2013 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 (2010–2012) is eligible for the 2013 award.

**NOMINATION PROCEDURE:** Nominations and letters of endorsement must be submitted by February 15, 2013 to the Awards Committee chair, who in 2013 will be Abbas El Gamal <abbas@ee.stanford.edu>. Please include a statement outlining the paper's contributions.

### 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 Fellows 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>

# 2013 IEEE International Symposium on Information Theory

Photo: Beril Videt  
http://commons.wikimedia.org/wiki/File:Bosphorus.jpg

## July 7 – 12, 2013, Istanbul, Turkey

The 2013 IEEE International Symposium on Information Theory will be held in Istanbul, Turkey, from Sunday July 7th through Friday July 12th, 2013. Istanbul is the cultural, economic, and financial center of Turkey and a bridge between two continents as well as between cultures and traditions.

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 on novel applications of information theory are especially encouraged to submit original findings. Submitted papers should be of sufficient detail for review by experts in the field. Both submitted and final papers will be limited to 5 pages in standard IEEE conference format. The submission deadline is **January 27, 2013**, at midnight, GMT. Authors should refrain from submitting multiple papers on the same topic. Detailed information on paper submission, technical program, tutorials, travel, and social programs will be announced on the ISIT 2013 web site: <http://www.isit2013.org>

General Co-Chairs    Erdal Arıkan  
                                 Elza Erkip  
TPC Co-Chairs        Amos Lapidoth  
                                 Igal Sason  
                                 Jossy Sayir  
                                 Emre Telatar  
Finance                Melda Yüksel

Local Arrangements    Ali Emre Pusane  
Publications            Stefan M. Moser  
Recent Results         Aylin Yener  
Tutorials                Şennur Ulukuş  
Sponsorships          Elif Uysal Bıyıkoğlu  
Student Travel Grants    Defne Aktaş

## TPC Members

Emmanuel Abbe	Nicolas Macris
Venkat Anantharam	Alfonso Martinez
Francois Baccelli	Ueli Maurer
Alexander Barg	Neri Merhav
Andrew Barron	Olga Milenkovic
Yair Beery	Ralf Müller
Randall Berry	Chandra Nair
Yitzhak Birk	Prakash Narayan
Ian F. Blake	Bobak Nazer
Helmut Bölcskei	Aria Nosratinia
Shraga Bruck	Frédérique Oggier
Jehoshua Bruck	Erik Ordentlich
Joachim Buhmann	Daniel Palomar
David Burshtein	Enrico Paolini
Giuseppe Caire	Haim Permuter
Yuval Cassuto	Henry D. Pfister
Nicolo Cesa-Bianchi	Yury Polyanskiy
Terence Chan	Vince Poor
Asaf Cohen	Sandeep Pradhan
Giacomo Como	Bixio Rimoldi
Max Costa	Ronny Roth
Natasha Devroye	Moshe Schwartz
Alex Dimakis	Shlomo Shamai
Tolga Durman	Paul Siegel
Michelle Effros	Emina Soljanin
Abbas El Gamal	Anelia Somech-Baruch
Tony Ephremides	Yossi Steinberg
Uri Erez	Wojciech Szpankowski
Tuvi Etzion	Leandros Tassiulas
Robert F. H. Fischer	Aslan Tchamkerten
David Forney	Ari Trachtenberg
Christina Fragouli	David Tse
Michael Gastpar	Antonia Tulino
Alex Grant	Ertem Tuncel
A. Guillén i Fàbregas	Daniela Tuninetti
Bruce Hajek	Sennur Ulukus
Stephen Hanly	A. van Wijngaarden
Franz Hlawatsch	Alexander Vardy
Syed Jafar	Sergio Verdú
Nicholas Kalouptsidis	Emanuele Viterbo
Ashish Khisti	Pascal Vontobel
Young-Han Kim	Tadashi Wadayama
Joerg Kliewer	Aaron Wagner
Kingo Kobayashi	Marcelo Weinberger
Ioannis Kontoyannis	Tsachy Weissman
Frank Kschischang	Michèle Wigger
Gitita Kutyniok	Andreas Winter
Ingmar Land	Gregory Wornell
Gottfried Lechner	Roy Yates
Yingbin Liang	Aylin Yener
Simon Litsyn	Raymond Yeung
Angel Lozano	Ram Zamir



[WWW.ISIT2013.ORG](http://WWW.ISIT2013.ORG)



Information Theory Workshop

<http://itw2013.tsc.uc3m.es>



**IEEE**

## September 9-13, 2013 @ Sevilla

ITW 2013 will be held on the campus of the University of Seville. Technical contributions are solicited in all areas of Information Theory with special emphasis on innovative and interdisciplinary research related to:

Bioinformatics	Coding
Communication	Compression
Machine Learning	Networks
Security	Signal Processing
Spectrum Sharing	Statistics

### Dates to remember

Submission:

April 1<sup>st</sup>, 2013

Notification:

June 24<sup>th</sup>, 2013

### Technical Chairs

Albert Guillén i Fàbregas

Michael Honig

Alon Orlitsky

### General Chairs

Pedro Crespo

Juan J. Murillo-Fuentes

Javier Payan

Fernando Perez-Cruz





## 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

CALL FOR PAPERS  
**IEEE Journal on Selected Areas in Communications**  
**Communication Methodologies for the Next-Generation Storage Systems**

Results from information and communication theory have been used with phenomenal success in data storage systems, and have helped computer storage become ubiquitous and cheap. However, currently available solutions have hit a performance wall: existing approaches are designed for simpler channels, and do not match the needs of new storage technologies where the data must be packed as densely as possible on increasingly adverse mediums. Such performance provisioning not only violates fundamental information-theoretic laws but directly increases the cost of a storage system. At the device level, recent advances in emerging data storage technologies, such as non-volatile memories (NVM), bit-patterned media recording (BPMR) and heat-assisted magnetic recording (HAMR) are bound to transform the storage industry. These technologies require the information to be stored and accessed in an asymmetric manner. At the system level, massive distributed storage networks, data centers and cloud storage systems desperately need new coding schemes to improve storage efficiency.

The purpose of this issue is to provide a synthesized source of recent research results and to serve as a springboard for future work in this emerging area. We invite both theoretical and applied papers. The possible topics include, but are not limited to:

- Device-level channel modeling for emerging storage technologies
- Analysis of novel recording paradigms and performance evaluation
- Information theory and fundamental data transmission limits for new storage channels
- Practical coding methods cognizant of underlying physical constraints
- Innovative signal processing algorithms and methods for emerging data memories
- Coding and communication techniques for cloud storage and distributed storage networks
- Architecture and design of large-scale storage subsystems based on new non-volatile memories
- Security and data compression for data centers

Original, previously unpublished research articles will be considered. Authors should follow the IEEE J-SAC Information for Authors: <http://www.jsac.ucsd.edu/Guidelines/info.html>

Prospective authors are requested to submit their manuscripts according to the following timetable (via EDAS or by sending the manuscript to email: [JSAC13storage@gmail.com](mailto:JSAC13storage@gmail.com)).

**Initial paper submission: May 1, 2013**

First/second reviews: Sept. 1/Nov. 1, 2013

Final manuscripts due: Dec. 15, 2013

Publication: Second Quarter 2014

**GUEST EDITORS:**

Lara Dolecek, EE Dept., University of California, Los Angeles, [dolecek@ee.ucla.edu](mailto:dolecek@ee.ucla.edu) (lead)

Mario Blaum, IBM Almaden Research Center and Uni. Comp., Madrid, [mblaum@hotmail.com](mailto:mblaum@hotmail.com)

Jehoshua Bruck, EE and CNS Depts., California Institute of Technology, [bruck@caltech.edu](mailto:bruck@caltech.edu)

Anxiao (Andrew) Jiang, CSE Dept., Texas A & M University, [ajiang@cse.tamu.edu](mailto:ajiang@cse.tamu.edu)

Kannan Ramchandaran, University of California, Berkeley, [kannanr@eecs.berkeley.edu](mailto:kannanr@eecs.berkeley.edu)

## INTERNATIONAL WORKSHOP ON CODING AND CRYPTOGRAPHY

## WCC 2013

April 15-19, 2013, Bergen, Norway  
<http://www.selmer.uib.no/WCC2013/>  
 ANNOUNCEMENT AND CALL FOR PAPERS

**General co-chairs:**

Alexander Kholosha, Øyvind Ytrehus

**Program co-chairs:**

Lilya Budaghyan, Tor Hellesest, Matthew Parker

**Confirmed invited speakers:**

Gregor Leander

**Deadlines:**

- Submission by: December 21, 2012
- Notification by: February 1, 2013
- Early registration: February 18, 2013
- Accommodation booking: February 18, 2013

**Information:**

<http://www.selmer.uib.no/WCC2013/> or e-mail to  
 oyvind@ii.uib.no

This is the eighth in the series of biannual workshops organized by the Selmer Center, University of Bergen (Norway) and INRIA (France).

**Conference Themes:** Our aim is to bring together researchers in all aspects of coding theory, cryptography and related areas, theoretical or applied. Topics include, but are not limited to:

- **Coding theory:** error-correcting codes, decoding algorithms, fountain coding, network coding, space-time coding and collaborative decoding, related combinatorial problems;
- **Cryptology:** block and stream ciphers, hash functions, public key cryptography, cryptanalysis, secret sharing, authentication, intellectual property protection;
- **Discrete mathematics** and algorithmic tools arising from these two areas, such as: Boolean functions, sequences, finite fields, algebraic systems and related polynomial properties.

Those wishing to contribute a talk are invited to submit electronically a paper or an extended abstract of  $\leq 10$  pages before December 21, 2012.

Details of the submission procedure will be published on the WCC 2013 web site.

**Program Committee members:**

Daniel Augot  
 Angela Barbero  
 Andrey Bogdanov  
 Anne Canteaut  
 Claude Carlet  
 Joan Daemen  
 Lars Eirik Danielsen  
 Cunsheng Ding  
 Olav Geil  
 Guang Gong  
 Marcus Greferath  
 Camilla Hollanti  
 Jonathan Jedwab  
 P. Vijay Kumar  
 Gary McGuire  
 Wilfried Meidl  
 Sihem Mesnager  
 Kaisa Nyberg  
 Alexander Pott  
 Bart Preneel  
 Eirik Rosnes  
 Vincent Rijmen  
 Sondre Ronjom  
 Igor Semaev  
 Nicolas Sendrier  
 Xiaohu Tang  
 Arne Winterhof  
 Kyeongcheol Yang  
 Victor Zinoviev  
 Patric Östergård

Call for Papers



# 2013 Iran Workshop on Communication and Information Theory (IWCIT)

8-9 May 2013, Sharif University of Technology, Tehran, Iran



The first Iran Workshop on Communication and Information Theory (IWCIT) will take place at Sharif University of Technology, Tehran, Iran from Wednesday May 8<sup>th</sup> to Thursday May 9<sup>th</sup>, 2013. IWCIT will be held annually in Iran to bring together researchers in communication and information theory for exchanging their research results and latest developments.

Prospective authors are invited to submit high-quality, original, and unpublished contributions to IWCIT 2013. All submitted papers will be subject to peer review. This workshop is included in the IEEE Conference Publications Program (CPP). The scope of the workshop includes the following topics:

- Coding theory
- Cognitive radio systems
- Communication theory
- Complexity theory
- Compressed sensing
- Cooperative communications
- Data compression
- Information theoretic learning
- Information theoretic security
- Information theory and data mining
- Information theory and signal processing
- Information theory and statistics
- Information theory in biology
- Information theory in networks
- Information theory in practice
- Multi-terminal information theory
- Network coding
- Network resource sharing and scheduling
- Quantum information theory
- Shannon theory

#### Important dates:

- Paper Submission: 11 January 2013
- Notification of Acceptance: 15 March 2013
- Camera Ready Submission: 15 April 2013

#### General Chairs

- Aref, M.R. Sharif University of Technology, Iran
- Marvasti, F. Sharif University of Technology, Iran

#### Technical Program Chair

- Salehi, J.A. Sharif University of Technology, Iran

#### Executive Chairs

- Gohari, A.A. Sharif University of Technology, Iran
- Seyfe, B. Shahed University, Iran

Contact: [info@iwcit.org](mailto:info@iwcit.org), [iwcit@sharif.ir](mailto:iwcit@sharif.ir)

Address: Secretariat of IWCIT 2013, Room 501  
Department of Electrical Engineering  
Sharif University of Technology  
Tehran, Iran

Tel: +98 21 66165908

#### Technical Program Committee

Aazhang, B.	Rice University, USA
Aghagolzadeh, A.	Babol Noshirvani University of Technology, Iran
Ahmadian, M.	K.N. Toosi University of Technology, Iran
Akhbari, B.	K.N. Toosi University of Technology, Iran
Alishahi, K.	Sharif University of Technology, Iran
Aref, M.R.	Sharif University of Technology, Iran
Avestimehr, S.	Cornell University, USA
Azmi, P.	Tarbiat Modares University, Iran
Banihashemi, A.H.	Carleton University, Canada
Behroozi, H.	Sharif University of Technology, Iran
Esfahani, S.N.	University of Tehran, Iran
Esmaili, M.	Isfahan University of Technology, Iran
Gohari, A.A.	Sharif University of Technology, Iran
Golestani, S.J.	Sharif University of Technology, Iran
Haddadi, F.	Iran University of Science & Technology, Iran
Hodtani, G.A.	Ferdowsi University of Mashhad, Iran
Jafarkhani, H.	University of California, Irvine, USA
Khandani, A.K.	University of Waterloo, Canada
Lahouti, F.	University of Tehran, Iran
Marvasti, F.	Sharif University of Technology, Iran
Mirmohseni, M.	University of Tehran, Iran
Modarres, M.	Isfahan University of Technology, Iran
Nasiri-Kenari, M.	Sharif University of Technology, Iran
Olfat, A.	University of Tehran, Iran
Sabbaghian, M.	University of Tehran, Iran
Sadeghi, P.	The Australian National University, Australia
Sharafat, A.R.	Tarbiat Modares University, Iran
Shokrollahi, A.	EPFL, Switzerland
Tadaion, A.A.	Yazd University, Iran

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

[www.IWCIT.info](http://www.IWCIT.info)

# BlackSeaCom 2013

Technically Sponsored by  
**IEEE Communications Society**

3-5 July 2013



## First International Black Sea Conference on Communications and Networking Sheraton Hotel, Batumi, Georgia (<http://www.blackseacom.net>)

As the name suggests, the BlackSeaCom series of conferences will be held in the countries surrounding the Black Sea. The goal of BlackSeaCom is to bring together visionaries in academia, research labs and industry from all over the world to the shores of the Black Sea. Here they will address many of the outstanding grand challenges that exist in the areas of communication and networking while having an opportunity to explore this exciting and dynamic region that has a rich history.

The first edition of the conference will take place at the Sheraton Hotel on July 3, 4 and 5, 2013 in Batumi, Georgia--a beautiful major port city on the Eurasian Crossroad. The theme of the conference, **Communication and Networking in the Land of the Golden Fleece**, is fitting for the chosen venue (Georgia) to set the goal of discovery and value in our field paralleling the ancient myth of the "Golden Fleece".

We seek original completed and unpublished work not currently under review by any other journal/magazine/conference. Topics of interest include, but are not limited to:

- Information theoretic analysis of wireless networks
- Communication protocols (transport, routing, link, and physical layers)
- Cross-layer design and optimization
- Theoretical analysis frameworks
- Resource management
- Energy efficiency, resiliency, reliability, and robustness
- Deployment scenarios and experiences
- Infrastructures, Platforms, test beds, and software
- Wireless networks, Ad hoc and mesh networks, Wireless sensor networks
- Cognitive radio networks
- Communication in challenging environments (underwater, underground, tunnels/mines, space, disasters)
- Internet of things
- Nano-scale networks
- Integration of heterogeneous networks

**Submission Guidelines:** Papers should describe original work and should be no more than 8 pages in the IEEE double column proceedings format including tables, figures and references. Note that accepted papers up to 6 pages will be published in the proceedings as well as in **IEEE Xplore** with no additional charge. Exceeding pages will be charged an additional fee.

To submit a paper, please use the instructions at: <http://www.blackseacom.net>

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.

### Important dates:

Paper submission deadline: **15 March 2013**  
 Notification of acceptance: **1 May 2013**  
 Camera-ready papers due: **1 June 2013**

### Honorary Co-Chairs:

**Giuli Alasania**, Vice Rector, International Black Sea University, Tbilisi, Georgia

**Tayfun Acarer**, Chairman, Information and Communication Technologies Authority, Turkey

### General Co-Chairs:

**Ian F. Akyildiz**, Georgia Institute of Technology, USA

**Mehmet Ulema**, Manhattan College, USA

### Technical Program Co-Chairs:

**Anthony Ephremides**, University of Maryland at College Park, USA

**Eylem Ekici**, Ohio State University, USA

### Publicity Co-Chairs:

**Rao of Boutaba**, University of Waterloo, Canada

**Dario Pompili**, Rutgers University, USA

### Publication Chair:

**Tommaso Melodia**, State University of New York- Buffalo, USA

### Local Arrangement Chair:

**Lasha Ephremidze**, University of Tbilisi, Georgia

### Finance Chair:

**M. Can Vuran**, University of Nebraska-Lincoln, USA

### Web Chair:

**Josep M. Jornet**, Georgia Institute of Technology, USA

### Regional Advisors:

**Cabir Erguven**, International Black Sea University, Georgia

**Yevgeni Koucheryavy**, St. Petersburg State University of Telecomm., Russia

**Tuna Tugcu**, Bogazici University, Turkey

**Yuriy Prokopenko**, National Technical University of Ukraine, Ukraine

### Steering Committee:

**Ian F. Akyildiz**, Georgia Institute of Technology, USA

**Anthony Ephremides**, University of Maryland at College Park, USA

**Mehmet Ulema**, Manhattan College, USA

Sponsored by International Black Sea University, Georgia



## 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> )

## 2013 European School of Information Theory (ESIT)

The 2013 European School of Information Theory will be organized at the beautiful lakeside world-heritage town of Ohrid, Republic of Macedonia, from 22-26<sup>th</sup> of April 2013. The school is intended to provide an inspiring venue for doctoral and postdoctoral students from all over Europe (and beyond) to learn from leading experts in information theory through short courses/lectures, make friendships and connections with other school participants and present their own research. We especially encourage graduate students from the Balkan Countries to use this opportunity for learning and networking. The school is organized by institutions from Denmark, the Republic of Macedonia, and Serbia, and is supported by the IEEE Information Theory Society.

For this year's European School of Information Theory, we are pleased to announce our distinguished lecturer:

- James Massey

Confirmed course lecturers are:

- Suhas Diggavi (Approximation approach to network information theory)
- Stark Draper (Non-asymptotic information theory, feedback)
- Christina Fragouli (Network coding)
- Angel Lozano (Lost in the assumptions)
- Osvaldo Simeone (Source coding with side information)
- Bane Vasic (Error control coding, iterative decoding)

Mornings will be devoted to lectures and afternoons will be reserved for student poster presentations, discussions and problem solving sessions.

The school will be held at the Hotel Metropol in Ohrid <http://www.metropol-ohrid.com.mk/>. An excursion and sightseeing activities will be included. Transfer between the Skopje International Airport and Ohrid will be organized for school participants.

## Organizing Committee

Petar Popovski  
Aalborg University, Denmark

Zoran Utkovski  
Uni Goce Delcev, R. of Macedonia

Liljana Gavrilovska, University Ss.  
Cyril and Methodius, R. of Macedonia

Venceslav Kafedziski, University Ss.  
Cyril and Methodius, R. of Macedonia

Dejan Vukobratovic  
Uni Novi Sad, Serbia

## Advisory Committee

Gerhard Kramer, TUM, Germany

Deniz Gunduz, Imperial College, UK

## Dates

22-26<sup>th</sup> April 2013

## Application/Abstract Deadline

See the web address below

## Web

[www.itsoc.org/european-school](http://www.itsoc.org/european-school)

## Contact

Prof. Petar Popovski  
Department of Electronic Systems  
Aalborg University, Denmark  
Tel. +45 99 40 98 97  
Email: [petarp@es.aau.dk](mailto:petarp@es.aau.dk)





## 2013 IEEE North American School of Information Theory

Dates: June 4-7, 2013

Location: Purdue University (West Lafayette, Indiana, USA)

The 2013 School of Information Theory is organized by **Center for Science of Information** (<http://soihub.org>), a National Science Foundation science and technology center, and is sponsored by the IEEE Information Theory Society. Hosted at Purdue University from Tuesday, June 4 to Friday, June 7, 2013, 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 will introduce several interdisciplinary topics in the emerging field of science of information. Students will present their own research via a poster during the school. Although the focus is on information theory, interdisciplinary topics are welcome, e.g., topics related to mathematics, physics, biology, control, networking, etc.

### Important Dates:

Applications: April 1, 2013

Acceptance Decisions: April 15, 2013

Registration: May 1, 2013

### Program Overview:

Mornings: Lectures by invited speakers, TBA

Afternoons: Presentations and posters by students

Evening: Special events/activities

### Organizing Committee:

- General Chair: Wojciech Szpankowski (Purdue University)
- Andrea Goldsmith (Stanford University)
- Sergio Verdu (Princeton University)
- Deepak Kumar (Bryn Mawr College)
- Olgica Milenkovic (University of Illinois)
- Todd P. Coleman (UC San Diego)
- Mark D. Ward (Purdue University)
- Brent Ladd (Purdue University)
- Barbara Gibson (Purdue University)
- Bob Brown (Purdue University)

### Advisor:

- Gerhard Kramer (Technical University of Munich)

For updates, application, and further details: <http://www.itsoc.org/north-american-school-2013/>

## Conference Calendar

DATE	CONFERENCE	LOCATION	WEB PAGE	DUE DATE
March 20–22, 2013	<b>47th Annual Conference on Information Sciences and Systems (CISS 2013)</b>	Baltimore, MD, USA	<a href="http://ciss.jhu.edu/">http://ciss.jhu.edu/</a>	Passed
April 14–19, 2013	<b>32nd IEEE International Conference on Computer Communications (INFOCOM 2013)</b>	Turin, Italy	<a href="http://infocom.di.unimi.it/">http://infocom.di.unimi.it/</a>	Passed
April 15–19, 2013	<b>International Workshop on Coding and Cryptography (WCC 2013)</b>	Bergen, Norway	<a href="http://www.selmer.uib.no/WCC2013/">http://www.selmer.uib.no/WCC2013/</a>	Passed
April 22–26, 2013	<b>2013 IEEE European School on Information Theory (ESIT 2013)</b>	Ohrid, Republic of Macedonia	<a href="http://www.itsoc.org/european-school-2013">http://www.itsoc.org/european-school-2013</a>	TBD
May 8–9, 2013	<b>2013 Iran Workshop on Communication and Information Theory (IWCIT)</b>	Tehran, Iran	<a href="http://www.IWCIT.org">www.IWCIT.org</a>	Passed
May 13–17, 2013	<b>WiOpt 2013</b>	Tsukuba Science City, Japan	<a href="http://www.wi-opt.org/">http://www.wi-opt.org/</a>	Passed
June 2–5, 2013	<b>2013 77th Vehicular Technology Conference (VTC2013-Spring)</b>	Dresden, Germany	<a href="http://www.ieeevtc.org/vtc2013spring/">http://www.ieeevtc.org/vtc2013spring/</a>	Passed
June 4–7, 2013	<b>2013 IEEE North American School of Information Theory</b>	West Lafayette, Indiana, USA	<a href="http://www.itsoc.org/north-american-school-2013/">http://www.itsoc.org/north-american-school-2013/</a>	April 1, 2013
June 9–13, 2013	<b>IEEE International Conference on Communications (ICC 2013)</b>	Budapest, Hungary	<a href="http://www.ieee-icc.org/">http://www.ieee-icc.org/</a>	Passed
June 23–26, 2013	<b>2013 IEEE Communication Theory Workshop (CTW 2013)</b>	Phuket, Thailand	<a href="http://www.ieee-ctw.org/">http://www.ieee-ctw.org/</a>	April 1, 2013
July 3–5, 2013	<b>1st International Black Sea Conference on Communications and Networking (BlackSeaCom 2013)</b>	Batumi, Georgia	<a href="http://www.blackseacom.net/">http://www.blackseacom.net/</a>	March 15, 2013
July 7–12, 2013	<b>2013 IEEE International Symposium on Information Theory (ISIT 2013)</b>	Istanbul, Turkey	<a href="http://www.isit2013.org/">http://www.isit2013.org/</a>	January 27, 2013
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>	April 1, 2013
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>	July 9, 2013

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