First Vice-President Report

Muriel Medard
BoG meeting July 2011
Saint Petersburg
Awards Committee

- IT Paper Award:
  - Running of the committee – best practices and lessons learned
  - Discussion of the detailed report (password protected, posted on the web site and shared with the BoG)
- IT/Comsoc Paper Award:
  - Procedure
  - Recommendation
- Baker Prize
  - Procedure
  - Recommendation
- ISIT Student Paper Award
  - Procedure
- Awards and Medals – discussion of Kyoto prize
Committee Members

- Ian Blake
- Max Costa
- Elza Erkip
- Ping Li
- Gerhard Kramer
- Amin Shokrollahi
- Emina Soljanin
- David Tse
- Greg Wornell
- Hirosuke Yamamoto had to decline because of force majeure
IT Paper Award

• 10 papers were considered, mostly from external nominations, one self-nomination, very few from publications committee
• See posted report for details
• The procedure was the following:
  • All papers were posted on a website (recommended)
  • Papers were assigned, according to interest of members of the committee
  • Each paper (except one, which I personally handled), received two full written reports by members of the committee, which were posted on the website (recommended)
  • The papers were then, after conference call discussion, winnowed to four papers and a fifth paper that was added by the committee for consideration
  • The five semi-finalist papers were considered by the entire committee both through conference calls and through extensive online discussions.
IT/Comsoc Paper Award

- We had 6 papers under consideration, 5 from IT Transactions, 1 from Transactions on Communications, proposed by the Communications Society editorial board
- I chaired the joint committee, which this year was led by the IT Society according to the alternance rules
- Members of the committee:
  - Elza Erkip
  - Debasis Mitra
  - Vince Poor
  - Sirin Tekinay (had to excuse herself)
IT/Comsoc Paper Award

- Procedure:
  - Website with papers created (recommended in the future)
  - Papers were assigned to committee members for written reports according to interests and needs (2 per paper)
  - Conference calls and e-mail discussions
  - Decision through discussions was for two papers (see report on next page)
  - Coordination with the ComSoc Awards Committee, led by Vince Poor
The committee recommended for the 2011 joint Information Theory and Communications Society Paper Award the two following papers:


The first paper is in the area of Information theoretic security, which has recently been revived and attracted significant interest in the research community. There have been many works in the general area and fundamental results presented in other papers. However, the committee commended the paper by Bloch et al. for the fact that it provided an excellent bridge between information theory and communications by presenting a protocol which, rather than using the channel to directly communicate in a secret fashion (as done in Wyner’s wiretap work for example), uses the channel to generate a secret key, and then uses this key for secure communication. While this may fall short of the secrecy capacity (as the authors also argue) it allows the authors to provide codes for key generation (in particular reconciliation) and exploit the instances in which the eavesdropper channel quality is better than that of the legitimate receiver. It also allows the generated key to be either used in an information theoretically secure way (using one time pad) or in conjunction with cryptographic methods. The paper thus constructs a very effective opportunistic key agreement protocol. The paper's contribution in building ties between information theoretic security and the traditional cryptographic security is considered worthy of the joint Information Theory and Communications Society Paper Award.
"Multiuser MIMO Achievable Rates With Downlink Training and Channel State Feedback” by Giuseppe Caire, Nihar Jindal, Mari Kobayashi, Niranjay Ravindran published in IEEE TRANSACTIONS ON INFORMATION THEORY, VOL. 56, NO. 6, JUNE 2010

The second paper presents a novel and useful treatment of the use of feedback for MIMO systems and paper makes a significant contribution to understanding the role of feedback in the context of channel measurement, particularly when the cost of the feedback must be taken into account. In so doing, the paper shows the benefit of using digitized feedback, based on information-theoretic principles. The paper explicitly takes into account the fact that the feedback channel is itself noisy and that the system must therefore be considered in terms of distortion. The paper presents a scheme of shared and dedicated training which is novel and quite non-trivially extends the existing schemes. One of the novel approaches of the paper is that goes beyond considering the error in channel estimation as a SNR penalty at the receiver. The gains shown are quite large in terms of degrees of freedom. The paper's use of information theory in designing new approaches for feedback in MIMO systems is considered worthy of the joint Information Theory and Communications Society Paper Award.
IT/Comsoc Paper Award Lessons

- The nominations were mostly from the IT Society
- Difference of dates (March 1 from our bylaws), normally February 15 for Comsoc, this year extended to March 1
- The ComSoc publications committee nomination was very brief, the outside nominations detailed and very helpful
- Since the committee is small, it is sometimes difficult to have enough expertise for reports without overburdening some members
- Some proposals:
  - Revise dates in our bylaws to harmonize with ComSoc so that we do not have different deadlines on alternating years
  - Consider expanding membership to have wider thematic coverage
  - Encourage nominations from the IT editorial board
Baker Award

- This year was our first time proposing a paper for the Baker Award
- The IEEE W.R.G. Baker Award was established in 1956 and is presented by the IEEE Board of Directors for the most outstanding paper reporting original work published in any IEEE archival publications (such as Transactions, Journals and Letters), Magazines, or Proceedings.

  The paper must have been published during a three to five year window prior to the presentation year of the award on the fundamentals of electrical engineering, electronics, computing, and related arts and sciences as represented by IEEE. No more than one award may be given in any year. The award was originally established through a donation of the Institute of Radio Engineers, one of the predecessor organizations of IEEE, by Dr. Walter R. G. Baker (1892-1960), who was a pioneer in the field of radio and television broadcast engineering. This award is administered through the IEEE Prize Papers/Scholarship Awards Committee of the IEEE Awards Board.

- Sponsor: IEEE Circuits and Systems, IEEE Communications, IEEE Control Systems, IEEE Information Theory, IEEE Power & Energy, IEEE Signal Processing and IEEE Vehicular Technology Societies. Scope: For the most outstanding paper reporting original work in any of the IEEE Transactions, Journals, Magazines, or Proceedings. Presented annually to a single author, or multiple co-authors, with no restriction on the number of co-authors. The author(s) of the paper need not be members of IEEE or of any IEEE Society, nor are they restricted in any manner. The award may be received only once by a single author or the same group of authors for work in the same area.

  Prize: The award consists of a certificate and honorarium.

  Nomination deadline: 1 July
Baker Award

- Subcommittee:
  - Max Costa
  - Andrea Goldsmith (not member of awards committee, but involved in reinstating the Baker Award)
  - Gerhard Kramer
  - Amin Shokrollahi
  - Greg Wornell

- We considered the four premiated papers in the time range and also discussed several other non-premiated papers with significant impact

- The four premiated papers were:
Baker Award

- The premiated papers were posted on a website (recommended)
- Discussions via e-mail and conference calls
- See posted full report for details
- The paper that was recommended is:
- A strong contender, which we recommend remain in consideration in the future is:
ISIT Student Paper

- We received a list of finalists from the TPC chairs in a timely fashion
- We have posted the papers on a website along with the reviews (recommended)
- Attendance to the sessions by committee members
- Meeting on Thursday to decide (if possible) the winner(s)

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<thead>
<tr>
<th>Finalists for ISIT 2011 Student Paper Award</th>
<th>student author</th>
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<tbody>
<tr>
<td>paper</td>
<td>Yuval Lomnitz</td>
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<tr>
<td>Prediction of Priors for Communication over Arbitrarily Varying Channels</td>
<td>Himanshu Asnani</td>
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<td>To Feed or Not to Feed Back</td>
<td>Arva Mazumdar</td>
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<tr>
<td>Channels with Intermittent Errors</td>
<td>I-Hsiang Wang</td>
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<tr>
<td>Communicating Remote Gaussian Sources over Gaussian Multiple Access Channels</td>
<td>Ye Wang</td>
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<tr>
<td>On Unconditionally Secure Multi-Party Sampling from Scratch</td>
<td>Ilan Shomorony</td>
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<tr>
<td>Sum Degrees-of-Freedom of Two-Unicast Wireless Networks</td>
<td>Andreas Malär</td>
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<tr>
<td>Covering Point Patterns</td>
<td>Davide Schipani</td>
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<tr>
<td>On the Decoding Complexity of Cyclic Codes Up to the BCH Bound</td>
<td>Yihong Wu</td>
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<td>Degrees of Freedom of the Interference Channel: a General Formula</td>
<td>Amir Ingber</td>
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<tr>
<td>The Dispersion of Infinite Constellations</td>
<td>Lei Zhang</td>
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<tr>
<td>Capacity of Gaussian Channels with Duty Cycle and Power Constraints</td>
<td>Suvarup Saha</td>
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<tr>
<td>A Potential Function View of Information Theoretic Interference Games</td>
<td>Eitan Yaakobi</td>
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<td>On Codes that Correct Asymmetric Errors with Graded Magnitude Distribution</td>
<td>Adel Javanmard</td>
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<td>Localization from Incomplete Noisy Distance Measurements</td>
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Promoting Awards for Members

- Discussion of the Kyoto Prize in Advanced Technology
  - This year the field is “information science”
  - Deadline is September 16 – possibility of a candidate from IT Society
- Nominations have been generated for the medals such as Hamming
- More ideas welcome.