

Juan de Pareja (ca. 1608–1670), the apprentice and manservant of Spanish painter Diego Velázquez, is immortalized in the famous portrait painted by Velázquez now displayed in New York’s Metropolitan Museum of Art. Pareja, the trusted and able assistant (manumitted in 1654) went on to a career as a painter in his own right. He is, of course, the namesake of *Pa eja*, the Information Theory Soci-

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President's Column *continued from page 1*

annual Communications Theory Workshop has for many years had a strong information-theoretic flavor.

At the February meeting of the IT Society Board of Governors, in recognition of an increasing affinity between our Society and the IEEE Signal Processing Society (SPS), the Board decided to create the position of SPS Liaison. I am delighted to report that this position has been filled by Urbashi Mitra and, furthermore, that SPS has appointed a reciprocal liaison in the person of Nikos

Sidiropoulos. My hope is that Ubli and Nikos will be able to find much common ground for a closer cooperation between the two societies (perhaps in the form of shared Workshops or Special Transactions Issues). I look forward to seeing the outcome of their discussions.

As always, if you would like to get more involved in the activities of the Society or share your comments, please contact me at frank@comm.utoronto.ca.

IT Society Members Honored

Professor Arogyaswami Paulraj, Stanford University has been awarded the prestigious Padma Bhushan award by the Govt. of India in the category of science and engineering. The Padma group of awards is primarily awarded to citizens of India to recognize distinguished service of a high order to the nation in different fields. Padma Bhushan stands at the middle in a three tiered system. Paulraj joins three other IEEE members who have received this award earlier – Professor Emeritus Thomas Kailath, Stanford University, Professor Raj Reddy, CMU and Dr. Arun Netravali, Former President, Bell Laboratories.

Professor Paulraj received the award from the President of India in New Delhi in March 2010.

The 2009 BBVA Foundation Frontiers of Knowledge Award in the Information and Communication Technologies category has been awarded to engineer and mathematician, Thomas Kailath, for creating knowledge with transformative impact on the information and communication technologies that permeate everyday life. These pioneering developments laid the mathematical foundations enabling solutions to some of the challenging problems in this area and have also served to break through the barrier of chip miniaturization.

Kailath, the Hitachi America Professor in the School of Engineering, Emeritus, was cited as, “that rare combination: a scientist with the ability to solve profound mathematical problems and translate them into practical applications, generating new technologies and transferring them to industry.”

The BBVA Foundation is the corporate social responsibility arm of the BBVA Group, a multinational financial services corporation based in Spain. BBVA collaborated with the Spanish National Research Council in the awards process.

Professor Kailath is a member of National Academy of Engineering, National Academy of Sciences, and American Academy of Arts and Sciences. He is a Foreign Member of the Royal Society of London, England and Indian Academy of Engineering. He also received the third highest civilian honor of the Government of India, the Padma Bhushan Award. He has received honorary doctorates from universities in France, Spain, Sweden, Scotland and India.

The prize, which carries a purse of 400,000 Euros, will be awarded at ceremonies in Madrid in June 2010.

Recent Activities of the IT Student Committee

Salim El Rouayheb, Bobak Nazer, and Aylin Yener

We are happy to report that the Student Committee has had another productive year. We had the opportunity to continue several successful traditions and have also tried to create some new ones.

At ISIT 2009, the Student Committee organized a panel called "When does Conversation become Collaboration?" We are grateful to Michelle Effros (CalTech), Nihar Jindal (Minnesota), Gerhard Kramer (USC), Daniela Tuninetti (UIC), and Jack Wolf (UCSD) for sharing their insights with attendees. At the end of the panel, as is now tradition, free IT Student Committee t-shirts were distributed to the attendees. A second panel was held at Allerton 2009 on "Navigating the Academic Job Market." Thanks to Matthieu Bloch (GeorgiaTech), Todd Coleman (UIUC), and Pierre Moulin (UIUC) for speaking about their experiences with the job search and answering student questions. An audio recording of this panel is available at www.itsoc.org/people/committees/student/events-1/job-market-panel.

Another well-attended roundtable research discussion was held at ISIT 2009. Participating students had the opportunity to chat with other students interested in one of several research topics. We would like to thank the following students for leading a discussion:

- Secrecy – Ersen Tuncel
- Network Coding – Salim El Rouayheb
- Fidelity Efficacy – [unreadable]

- Sparse Graph Codes – Satish Babu Korada
- Experimental Information Theory – Lav Varshney
- Coding Strategies for Relay Networks – Leila Ghabeli

Also during ISIT, the Student Paper Award – first proposed by the Student Committee and presented for the third time in Seoul – was awarded to three students. The awardees were:

- 1) **Ali Nazari** (University of Michigan) for his paper “*Network Coding for Multiple Access Channels*” (co-authored with S. Pradhan, and A. Anastasopoulos),
- 2) **Changho Suh** (UC Berkeley) for his paper “*Secure Network Coding for Multiple Access Channels*” (co-authored with D. Tse), and
- 3) **Satish Babu Korada** and **Eren Sasoglu** (EPFL) for their paper “*Network Coding for Multiple Access Channels, Broadcast, and Constrained*” (co-authored with R. Urbanke).

Congratulations!

At CISS 2010, the Student Committee hosted, for the first time, a pizza lunch and networking event aimed at fostering discussion between students, faculty, and industry professionals on how to find postdoctoral positions. There were over 100 attendees. We hope to continue to organize and support such events in the future.

We are currently preparing for the upcoming ISIT, as always we will have lunch time events for students. Please see the ISIT web page for details: we look forward to the participation from all student and postdoc attendees.

Preparations are currently underway for the third annual School of Information Theory, hosted this year by USC. For more details on the school please see the article in this issue.

Finally, we would like to call volunteers to action. The student committee events are organized with the help of the student volunteers: This is your committee and we need your help! Please consider being involved in the committee as a volunteer and as a student leader. Contact us by E-mail Salim salim@eecs.berkeley.edu, or Bobak bobak@ece.wisc.edu and we will get you involved in this rewarding service to our society.

Can Workshops Serve Us Better?

Bruce Hajek

I write, on behalf of the Society's Board of Governors and Conference Committee (which I currently chair) to you, members of the Information Theory community, about how you might organize a much greater variety of workshops that could serve us all better. By and large, the Information Theory Workshops of the last five years have been very similar in format and scope to the annual ISITs. While the meetings have been in appealing places, it has been expensive for many members to travel to the workshop locations and to pay the registration fees. Many think one workshop of that sort per year is fine to promote global outreach. But the Conference Committee and the Board of Governors would welcome proposals for workshops that do not conform to the recent norm. We would like to challenge you to be creative in organizing workshops which complement, rather than mimic, ISITs. In particular, there are substantial opportunities to:

- a) Run workshops with focused, cutting-edge technical agendas, in a variety of sizes and creative formats. Workshops can be run jointly with other technical organizations, with half the program committee coming from each organization, to form an agenda at the intersection. Workshops can have panel discussions. Poster sessions can play a significant role in some workshops, and be absent in others. Workshops can include working sessions which seek to foster new collaborations. Workshops can be as short as one or two days long. Workshops do not need to have contributed papers and twenty minute talks with papers reviewed by TPCs very similar to ISITs. A workshop can be highly productive with as few as twenty to forty participants. For

example, the 1993 IT Workshop on coding, system theory and symbolic dynamics, introduced three communities to each other. Each participant had a color-coded badge indicating which "languages" s/he spoke, and the organizers produced a "multilingual dictionary." At the insistence of the mathematicians, costs were held very low.

- b) Make workshops more accessible. Due to their large size, ISITs are mostly held at hotels and a certain level of expense is unavoidable. But workshops can be organized on university campuses or other venues which can be significantly more affordable than ISITs. Creative or no-frills venues in locations near major transportation nodes can lead to meetings roughly half as expensive as an ISIT or high-end workshop, for each participant. In addition, participants often appreciate seeing and using actual teaching and research facilities in other countries, rather than getting a generic hotel experience.

A mitigating factor is that there are already many varied workshops being organized by members of the Information Theory Community. Organizers don't think of asking for IT Society sponsorship, because their meeting doesn't look like a miniature ISIT. But the Society would welcome the chance to support such meetings. The process for gaining technical co-sponsorship for a workshop is simple, and is d i w m i d i d t (a) h i n g r k 19 (o p o n s

Infinite Sequences with Bounded Overlap

Solomon W. Golomb

It is well-known that the family F of all infinite subsequences of the positive integers is uncountably infinite.

- 1) Can there be an uncountably infinite subfamily G of F such that, for each pair of sequences S_1 and S_2 in G , the intersection $S_1 \cap S_2$ is finite? (If *yes*, give an explicit description of such a subfamily G . If *no*, prove that such a subfamily cannot exist.)

For any sequence $A = \{a_1, a_2, a_3, \dots\}$ with $0 < a_1 < a_2 < a_3 < \dots$ in F , define $\bar{A} = \{a_1, a_2, a_3, \dots\}$ to be the infinite binary sequence where $a_j = 1$ if $j \in A$ for any $a \in A$, $a_j = 0$ otherwise. (For example, if $A = \{2, 4, 6, 8, 10, 12, \dots\}$ is the sequence of positive even integers, then $\bar{A} = \{0, 1, 0, 1, 0, 1, 0, 1, 0, 1, \dots\}$. We may also write $\bar{A} = \{0101010101\dots\}$ for simplicity.) We further extend the definition of \bar{A} by the rule $a_j = 0$ for all $j \neq 0$, so that a_j is now defined for all integers $j \in \mathbb{Z}$ (i.e. for j positive, negative, and zero).

- 2) Can you find two sequences, $A = \{a_j\}$ with $\bar{A} = \{a_j\}$, and $B = \{b_j\}$ with $\bar{B} = \{b_j\}$, such that the infinite unnormalized crosscorrelation

$$C_{AB}(t) = \sum_{j \in \mathbb{Z}} a_j b_{j+t}$$

is finite for all $t \in \mathbb{Z}$, $t \neq 0$?

- 3) Can you further find such sequences A and B such that $C_{AB}(t) \neq 1$ for all

GOLOMB'S PUZZLE COLUMN™

Calendar Puzzles Solutions

Solomon W. Golomb



1) If the day of the week were statistically independent of calendar date in the Gregorian calendar, the period would be $7 \times 400 \times 52800$ years. But in fact the Gregorian calendar, G, repeats identically every 400 years.

2) This statistical dependence arises in G as follows. A "normal" year of 365 days consists of 52 weeks plus one day. A leap year, of 366 days, has one more day than a normal year. In 400 years, G has 97 leap years (because years with numbers ending in 00 are *no* leap years unless the year is a multiple of 400). Thus, in 400 years, G has 400×52 weeks, 1400 days, 197 days, or 20,800 weeks plus 497 days. But $497 \div 7 = 71$, and 497 days is *exactly* 71 weeks. So in 400 years, G has *exactly* 20,871 weeks, and year 2001 (for example) looks exactly like year 1601. Since everything repeats every 400 years, and 400 is *no* a multiple of 7, no calendar date falls on a given day of the week *exactly* every 72430 days (approximately 201 years).

The 100th Anniversary of Professor L.M. Fink's birth

One of the Informal Leaders of the Russian Information Theory School

Prof. Valery Korzhik, and Dr. Yuri Okunev

Biographic Sketch

Lev Matveevich Fink was born on February 11, 1910 in Kiev. Initially he was a humanistic-oriented young man and studied music composition at St.Petersburg (Leningrad) conservatory in the beginning of the 1930-s. But at the same time he was very interested in radio amateur activity and successfully worked in the electronics industry. Such a rare combination of musical and engineering talents brought an unusual result – the young man published simultaneously his first symphony and his first scientific paper.

In 1933 Fink was called up for military service as a signal-corps soldier, where he showed himself as a highly professional telecommunication specialist. As a result, he was soon directed for further education at the Military Communication Academy (MCA) in Leningrad. After graduation from the radio engineering faculty of MCA in 1940, L.M. Fink was assigned to a R&D laboratory of the Research Military Communication Institute in Moscow. Just after the beginning of the Great Patriotic War in 1941, this laboratory developed a special system for intervening into broadcasting of Hitler's radio stations. In a very short time period this system was fully developed and implemented – it allowed Soviet commentators to comment on propaganda statements of fascist leaders within pauses of their speeches. In spite of the strict order of Nazi propaganda minister Goebbels, fascist engineers were unable to remove such interventions. The idea of this intervention was based on the use of so called Gorky-Luxemburg effect, when radio waves radiated by a very powerful transmitter result in strong ionizing the ionosphere, and then even a very low-power transmitter is able to broadcast, on the same frequency, in pauses of the main speakers. The development of this system was very effective in anti-Hitler propaganda in Germany and L.M. Fink, as an inventor of this method, was awarded the first degree Stalin prize.

After the end of the war L.M. Fink was approved as a lecturer to the Military Communication Academy in Leningrad, where he worked till 1970. In 1953 and in 1959 he successfully defended his PhD and Doctoral theses, respectively. (It should be noted that in the USSR and presently in Russia there is a two-stage system of scientific degrees different than in the West.) In period of 1953–1970 L.M. Fink worked very intensively as a Professor and as a researcher in MCA.

In 1970 L.M. Fink left the MCA and was approved as a Professor of Leningrad Electro-engineering Institute named after Prof. M.A. Bonch-Bruevich. But in 1979 he was removed from the Professor's position because his adult daughter emigrated to the USA. (This was a terrible, but common practice of political repressions in the Soviet Union). From 1979 till his death on December 8, 1988, L.M. Fink worked as a chief scientist in

L.M. Fink was one of the first scientists who proved that the conventional modulation gain for the analog modulation sometimes gives incorrect results and proposed so called generalized modulation gain [7]. Having considered a number of linear error correction codes, he found that the most of them, defined earlier as the optimal ones by D. Slepian, are in reality ineffective in terms of energy consumption, and he introduced a new criterion of error correcting codes – efficiency-equivalent error probability [3].

A significant contribution of Professor Fink in coding theory was his invention of convolutional codes with their application to correction of burst errors. Lev Matveevich told his pupils that the idea of convolutional codes appeared as he was playing piano. This invention was published practically at the same time as the corresponding paper by D. Hagelbarger, therefore it is completely justified that these codes can be called Fink-Hagelberger codes.

L.M. Fink was one of the first scientists in the world who paid his attention to algorithms of soft decoding, combining the main elements of communication systems – modems and codecs – in such a way as to provide maximization of the coding gain at a given reliability [3, 5]. He proposed (jointly with his pupils) several algorithms of soft decoding, for example, the Kagan-Fink algorithm [3].

The last research work of Professor Fink at the end of the 1980s was development of the first European digital audio broadcasting system.

In total L.M. Fink published more than 100 scientific papers. Unfortunately, Fink worked in the period of strong political restrictions on cooperation of soviet scientists with foreign colleagues. Because of this he was unable to visit international conferences (although he had many invitations) or to publish his papers in western journals. Some of his papers became known to western scientists only through English translation of some

approaches can be used to decode such codes more effectively than currently done. (Note that because of their structure, Reed-Solomon codes are most naturally described by high-density graphical models.)

Besides the main focus on channel coding related problems, the workshop tried to also attract and bring together people working in adjacent fields. This was in the strong belief that, more often than not, results from other fields have proven beneficial for channel coding theory, and vice-versa, insights from channel coding theory have proven useful for adjacent fields. In this respect, there were presentations on linear programming and message-passing approaches to applications in communications, compressed sensing, and artificial intelligence.

The workshop also included an evening excursion to Jaffa and a day-long excursion to Jerusalem.

Overall there were 92 registered participants: 38 from Tel Aviv University, 34 from Israel (outside Tel Aviv University), 10 from Eurocipients:

Positions Available

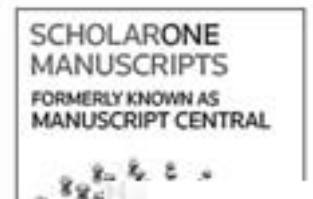
Positions of Postdoctoral Fellows and Research Associates are open at the Institute of Network Coding (INC) of The Chinese University of Hong Kong (CUHK). Initial appointments are typically for two years, and the commencing date is flexible.

Applicants should have a strong research record in network coding related areas, including theory, applications, or implementation.

For further information please visit the INC home page at <http://www.inc.cuhk.edu.hk/> or contact Raymond Yeung at why-eung@ie.cuhk.edu.hk

Paper Submissions Moving to ScholarOne Manuscripts

The IT society is moving its paper submission and reviewing activities to ScholarOne Manuscripts. ScholarOne Manuscripts (formerly known as Manuscript Central) is a web-based submission and peer review workflow solution which will replace Pareja. Existing papers will continue to be processed through the Pareja system. Further information will be available on the "Information for Authors and Reviewers" page of the website and upcoming announcements.



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DATE	CONFERENCE	LOCATION	WEB PAGE	DUE DATE
June 01–04, 2010	First African Winter School on Information Theory and Communications	Kruger National Park, South Africa	http://www.awsitc.info/	Passed
June 12–18, 2010	2010 IEEE International Symposium on Information Theory (ISIT 2010)	Austin, Texas, USA	http://www.isit2010.info	Passed
August 30– September 3, 2010	2010 IEEE Information Theory Workshop (ITW 2010)	Dublin, Ireland	http://www.shannoninstitute.ie/itw2010/	Passed
September 06–10, 2010	6th International Symposium on Turbo Codes & Iterative Information Processing	Brest, France	http://conferences.telecom-bretagne.eu/turbocodes/	Passed
September 13–14, 2010	3rd International Workshop on Multiple Access Communications	Barcelona, Spain	http://www.csit-spb.ru/macom2010.html	Passed
September 29– October 01, 2010	48th Annual Allerton Conference on Communications, Control, and Computing	Monticello, Illinois, USA	http://cslgreenhouse.csl.illinois.edu/allerton/	June 16, 2010
October 17–20, 2010	2010 International Symposium on Information Theory and its Applications and the 2010 International Symposium on Spread Spectrum Techniques and Applications (ISITA 2010 and ISSSTA 2010)	Taichung, Taiwan	http://isita2010.cm.nctu.edu.tw/	Passed
November 7–10, 2010	The Asilomar Conference on Signals, Systems, and Computers (Asilomar 2010)	Pacific Grove, CA, USA	http://www.asilomarssc.org/	June 1, 2010
December 6–10, 2010	2010 IEEE Global Communications Conference (GLOBECOM 2010)	Miami, Florida, USA	http://www.ieee-globecom.org/	Passed
July 31– August 05, 2011	2011 IEEE International Symposium on Information Theory (ISIT 2011)	St Petersburg, Russia	http://www.isit2011.info	

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