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MESSAGE FROM THE MING HSIEH INSTITUTE DIRECTOR

On behalf of the Ming Hsieh Institute (MHI), my co-directors, Hossein Hashemi, Bhaskar Krishnamachari and I are pleased to welcome you to review our Annual Report for the fiscal year July 1, 2010 - June 30, 2011. It highlights the Institute’s activities and accomplishments during its first year with a vision toward continued success and growth in the future.

The Ming Hsieh Institute in the Ming Hsieh Department of Electrical Engineering was launched in July 2010, after a generous endowment gift of $35 million dollars from Mr. Ming Hsieh, an alumnus of the department. One of the main goals of the institute is to position the Electrical Engineering Department at the forefront in thought leadership in the world in the area of electrical engineering, and specifically in the development of intelligent technologies to empower mankind.

In addition, the Ming Hsieh Institute is dedicated to defining the future of Electrical Engineering in general through positive impact, creativity and invention. MHI is focusing on creating a vibrant intellectual environment at USC while bringing student and faculty researchers together to engage in the development of new ideas. In its first year, MHI brought students and faculty together through two major events, which we plan to host annually, a Department Retreat and a EE Research Festival. Along with these events MHI also sponsors other activities including cross-cutting and thematic ground breaking research activities and a MHI Scholars Program targeting the most outstanding doctoral students.

Specific MHI sponsored activities included seminar series, conferences, a visitor program and mini-grants, all which were requested for funding through proposals submitted by Electrical Engineering faculty members. These activities are aligned with the institute’s goal to position Electrical Engineering in the forefront in thought leadership and offer additional opportunities to showcase Electrical Engineering at USC to the outside world. Further details of the institute’s activities are provided in the next several pages.

To learn more about the Ming Hsieh Institute and its future events, please visit us at http://mhi.usc.edu.

We thank you for reviewing our first annual report and hope for your continued engagement and participation in the institute’s activities. Your support is the cornerstone for the continuing success of the Ming Hsieh Institute.

Sincerely,

Shrikanth S. (Shri) Narayanan
Andrew Viterbi Professor of Engineering; Professor of Electrical Engineering, Computer Science, Linguistics and Psychology

Mr. Ming Hsieh (BSEE ’83, MSEE ’84) whose vision and support made the Ming Hsieh Institute possible.
Ming Hsieh Institute Leadership Team

Director:

Shrikanth S. (Shri) Narayanan
Andrew Viterbi Professor of Engineering; Professor of Electrical Engineering, Computer Science, Linguistics and Psychology; Ph.D., UCLA, 1995. Signals and systems modeling with an interdisciplinary emphasis on speech, audio, language, multimodal and biomedical signal and information processing and applications. EEB 430, (213) 740-6432
shri@sipi.usc.edu  http://sail.usc.edu/shri.php

Co-Directors:

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Associate Professor; Ming Hsieh Faculty Fellow in Electrical Engineering; Ph.D., Caltech, 2003. High-speed and RF integrated circuits. PHE 616, (213) 740-3596
hosseinh@usc.edu
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Bhaskar Krishnamachari
Associate Professor, Ming Hsieh Faculty Fellow in Electrical Engineering; Ph.D., Cornell University, 2002. Design and analysis of next-generation wireless networks. RTH 410, (213) 821-2528
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Danielle Hamra
Ming Hsieh Institute Business Officer
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Faculty Advisory Council:

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Assistant Professor Ph.D., University of Michigan, 2001. Computer architecture, 3D stacking, mobiquitous computing. EEB 232, (213) 740-3299 annavara@usc.edu

P. Daniel (Dan) Dapkus
W. M. Keck Professor of Engineering; Ph.D., U. of Illinois, Urbana-Champaign, 1970. Photonics, MOCVD & III-V materials vertical cavity surface emitting lasers, novel photonic devices. VHE 314, (213) 740-4414 dapkus@usc.edu

Martin A. Gundersen
Professor of Electrical Engineering, Physics and Astronomy; Ph.D., USC, 1972. Quantum electronics; pulsed power; applied plasma science. SSC 421, (213) 740-4396 mag@usc.edu

Richard M. Leahy
Professor; Ph.D., University of Newcastle, 1984. Biomedical signal and image processing methods for anatomical and functional imaging with applications in neuroimaging, oncology, and gene expression. EEB 400C, (213) 740-4659 leahy@sipi.usc.edu

Urbashi Mitra
Professor; Ph.D., Princeton University, 1994. Multi-user spread-spectrum systems, spacetime coding, communication theory, wireless resource allocation, ultra wideband communications, sensor networks. EEB 540, (213) 740-4667 ubli@usc.edu

Michelle Povinelli
Assistant Professor, WiSE Jr. Gabilan Chair; Ph.D., Massachusetts Institute of Technology, 2004. Nanophotonics, photonic crystals, metamaterials, nano-optomechanics. PHE 614, (213) 740-8682 povinell@usc.edu http://www.usc.edu/nanophotonics

Viktor K. Prasanna
Charles Lee Powell Chair in Engineering, Professor; Ph.D., Penn State, 1983. Parallel and distributed systems, embedded systems, configurable architectures, high performance computing. EEB 200, (213) 740-4483 prasanna@usc.edu http://pgroup.usc.edu
EXECUTIVE SUMMARY
The Ming Hsieh Institute's (MHI) first Annual Report provides information on the Institute’s events, sponsored activities and accomplishments during the past fiscal year July 1, 2010 - June 30, 2011. One of the key goals of the Ming Hsieh Institute in its first year was to bring together the entire, large and richly diverse, Electrical Engineering (EE) department family. MHI achieved this by developing and hosting events that had significant student, faculty and alumni participation by sponsoring a variety of programs that align with the Institute’s goal to position Electrical Engineering in the forefront in thought leadership.

Key activities sponsored by the Ming Hsieh Institute include ground-breaking, cross-cutting and thematic proposals that were submitted by faculty members to launch research and other academic endeavors that enhance the department in significant ways. Thematic proposals targeted providing venture funding to facilitate activities under well-defined themes to initiate research and academic programs that are strikingly innovative and forward-looking. Cross-cutting proposals aimed to support programmatic activities that broadly benefit EE faculty and students and build an energetic academic environment to increase the department's impact and visibility. The proposals were evaluated by the Faculty Advisory Council and/or the MHI leadership. The Ming Hsieh Institute provided sponsorship for 12 of the 15 submitted cross-cutting proposals that included several innovative seminar series, support of major conferences organized by EE faculty, a visitor program and several mini-grants. A total of five thematic proposals were submitted by faculty and the Ming Hsieh Institute provided sponsorship for one of these proposals titled “Large-Scale Software-Radio Testbed.” Detailed information about each funded proposal is in the following pages.

Another flagship program that MHI was proud to initiate and sponsor is the MHI Ph.D. Scholar Program for recognizing and nurturing promising future academic and research leaders. Faculty advisors were asked to nominate outstanding Ph.D. students and a total of 13 nominees were submitted. Out of the 13 excellent nominees, 5 Ph.D. students from the EE department were named "2010-2011 Ming Hsieh Institute Ph.D. Scholars." This set of students was chosen carefully by a faculty committee on the basis of their research accomplishments, promise and desire for an academic career beyond the Ph.D. and to facilitate their career development and mentorship from department faculty. Our 2010-2011 Ph.D. Scholars served as leaders in Electrical Engineering and traveled to other universities and top laboratories to give talks and represent the department. We are very happy to showcase the talents of these outstanding students and are excited to continue this program in 2012 and in the long-term.

In addition to sponsored activities, MHI developed and sponsored the First Electrical Engineering Department Retreat and the EE Research Festival, which are planned to be hosted annually. The First EE Department Retreat was held on Saturday, March 26 – Sunday, March 27 at the Lake Arrowhead Resort and Spa with a total of 158 guests in attendance including 60 Ph.D. students and 36 faculty members (many with their families), 8 of which have been with USC for over 35 years. The objective of the retreat was to bring faculty and Ph.D. students together in a social environment both to receive updates regarding the department's research accomplishments across the board and to discuss and collaborate on defining the future of Electrical Engineering, at USC and beyond. We received positive feedback from students and faculty that signifies the success of the retreat and we plan to continue hosting it in future years and implement suggestions to improve the program and participation.

Another successful event was the First EE Research Festival, held on campus with 175 in attendance. The Research Festival was a day-long event that showcased Ph.D. student research through posters and oral presentations. 25 graduating Ph.D. students gave 10 minute long oral presentations and 85 Ph.D.
students gave poster presentations. Faculty judges deliberated and selected two presentation winners and four best posters that were announced at an awards ceremony where students were acknowledged and some awarded for their outstanding work. Attendees included members of the USC Viterbi Community including Dean Yannis Yortsos, local alumni and industry representatives. A reception was held prior to the awards ceremony, which gave students, faculty, alumni, and industry representatives an opportunity to network in a social setting. The Research Festival was concluded with a panel session titled the Birth of Aerospace in Southern California: a conversation about Engineering, History & Art. The main focus of the Research Festival was to showcase the outstanding research conducted by our Ph.D. students, which possibly will lead to future opportunities and relationships with fellow Electrical Engineering members. MHI plans to continue hosting a Research Festival annually in the spring semester, and our goal for next year is to increase alumni and industry participation to give students more future opportunities.

Additionally, the Ming Hsieh Institute has been gathering historical department content and using the data for numerous projects. Some of these projects include the construction of faculty history timeline and an alumni database with profile details. With the help of Electrical Engineering faculty members, MHI compiled information on all past and present EE faculty members and their Ph.D. student’s academic career information. Using faculty data, MHI created an EE Faculty History Timeline that included tenured and tenure-track faculty with “primary” EE appointment who have been with the department for over three years. This design includes faculty photos with a data graph showing the timeframe they were appointed in EE, years faculty members served as department chairs, and facts about the department. The Faculty Timeline was showcased at the Retreat and Research Festival, which helped influence faculty members to respond and provide valuable historical information which was also documented. Using alumni information provided by faculty, MHI created an alumni database and used this information to document details of tenured and tenure-track Faculty who currently hold a faculty position at a university. Both projects not only offered an opportunity to engage the EE department but also to help showcase their outstanding and enduring accomplishments.

These efforts demonstrate how the Ming Hsieh Institute has begun to realize its commitment by advancing its goals and plans in supporting and enhancing the Viterbi School of Engineering’s Ming Hsieh Department of Electrical Engineering. Activities for the 2011-2012 fiscal year are underway. We hope this annual report encourages faculty members to initiate innovative and important projects and events, and all our key stakeholders to continue their strong engagement with, and support of, the USC Ming Hsieh Department of Electrical Engineering. We request you to continue to visit our website mhi.usc.edu for upcoming events and sponsored activities.

**FINANCIAL SUMMARY (2010-11)**

- Thematic Proposals: 37%
- Cross-cutting Proposals: 25%
- Supplies, payroll etc: 17%
- Retreat: 12%
- Research Festival: 9%
1. CROSS-CUTTING ACTIVITIES

In September 2010, the Ming Hsieh Institute requested cross-cutting proposals to be submitted from faculty within the USC Ming Hsieh Department of Electrical Engineering for a number of activities and programs that seek to enhance the intellectual and social life of the department. All tenured and tenure-track faculty with primary appointment in the Ming Hsieh Department of Electrical Engineering at USC were eligible to submit applications for the below activities. Each faculty member was eligible to participate in multiple proposals. There was no limit on the number of Principal Investigators (PI) per proposal. USC faculty members outside of the EE Department were able to serve as Co-PIs, but not submit the proposal. A total of 15 cross-cutting proposals were submitted by faculty in 2010-2011. The Ming Hsieh Institute provided sponsorship for 12, not including the MHI Scholars Program. These activities (listed below) were sponsored to benefit faculty and students in the Ming Hsieh Department of Electrical Engineering, with the objective to attract and retain the best talents, build an energetic academic environment, and increase visibility. Below are the approved sponsored cross-cutting activities and further details of each activity is provided on the pages to follow.

Workshop and Event Organization – MHI provided support for events such as workshops, seminars, meetings, and panel sessions. Sponsored activities include:

- Seminar Series:
  1. Beyond 2020 – Developing a USC Vision
  2. Electrical Engineering Communication, Networks and Systems Research Seminar
  3. Integrated Systems Seminar Series
  4. Photonic Devices and Systems Seminar

- Conferences/Workshops/Other:
  5. Third Annual School of Information Theory
  6. Second International Conference on Quantum Error Correction
  7. EE-S Holiday & End of the Year Reception
  8. EE-EP Holiday Party
  9. SIPI 40th Anniversary Symposium

Visitors Program - The Ming Hsieh Institute provided funds for faculty to host top researchers and practitioners from both academia and industry to visit USC for a few days or weeks. Travel funding was also available under this program for USC researchers to visit other academic and industry institutions but none were granted this year. Sponsored activities include:

10. Dr. Zhijian Tang of Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (TNO), Rijswijk, Netherlands hosted by Professor Urbashi Mitra

Mini-Grants - Support for miscellaneous events, projects, causes that will aid our faculty and students in ways that cannot be ordinarily supported through other sources. Sponsored activities include:

11. Experimental mini-cluster to support VLSI and architecture classes
12. The Smartphone In Your Pocket Refreshing the Hardware of EE579
1.1 BEYOND 2020 – DEVELOPING A USC VISION SEMINAR SERIES
Organizer: Sandeep Gupta
Proposal received: 11/15/2010
Proposal approved: 1/3/2011
Duration of funding: 1/1/2011-12/31/2011 (1 year)

Summary:
During summer, Dean Yortsos initiated a discussion to take stock of on-going research activities in EE Department relevant to the era beyond the “End of Moore’s Law”. This started several conversations and meetings, including one called by the Dean. Discussions before, during, and after that meeting have given rise to the following three-step plan to develop a complete inventory of on-going research in this area, and to develop and disseminate a clear and impactful USC vision for future research. As mentioned below, the process is structured in a manner that will improve interactions between faculty members across multiple departments as well as with doctoral students. The three-step process will also help formation of USClead teams to pursue large research initiatives and will strategically inform hiring decisions in many areas of EE. Finally, this process will initiate a substantial overhaul of a large part of our curriculum.

A Faculty Seminar Series
Gupta plans to invite members of Viterbi and College faculty who are interested in materials, devices, circuits, systems, and applications to a seminar series to share their vision of the landscape of their field beyond 2020. Each week, one or two faculty members will share their vision (each talking for 15-20 minutes). This will be followed by a discussion (approximately 30-40 minutes) that will end with an update of a working draft of key aspects of the collective USC vision for beyond 2020.

With the goal of developing a holistic vision, the seminar series will span materials and devices, circuits and design, system architectures, and applications. Research ideas that fall into any one of the above areas or cut across multiple areas will be covered. Other areas will be included as they emerge during the discussions. The seminar series will also include discussions of curriculum overhaul required to train students for careers in the era beyond 2020. Each speaker will describe specific challenges and opportunities expected to emerge in the next decade, such as those posed by slowdown of CMOS physical scaling, that motivate his/her research, share key thoughts and ideas, and outline anticipated impact by identifying the domain of impact and estimates of the level of impact. To expose doctoral students to the academic culture, we will invite them to these seminars and encourage them to participate in the discussions. To facilitate distillation and to enable updates at the end of each week’s discussion, the working draft of collective USC vision for beyond 2020 will be maintained in the form of bullet points. At the end of the first phase of this seminar series, these bullets will be expanded into a full-length report. MHI funding was requested to provide lunch for the Faculty Seminar Series attendees.
1.2 ELECTRICAL ENGINEERING COMMUNICATION, NETWORKS AND SYSTEMS RESEARCH SEMINAR

Organizer(s): Alex Dimakis and Rahul Jain
Proposal received: 12/4/10
Proposal approved: 1/4/11
Duration of funding: 1/11 – 5/11  2011 Spring Semester

Summary: The Communications, Networks and Systems seminar has been running since Spring 2010. It has been sponsored by the Ming Hsieh Institute since Spring 2011. It is a weekly seminar that takes place every Wednesday, 2-3pm in EEB-248, and brings together faculty and students in communications, networks and controls (and sometimes signal processing and electro-physics as well) with common interests.

One of the goals has been to expose students in various areas to work in other areas, e.g., communications Ph.D. students know very little about research in controls, and vice-versa. Many faculty found this a very worthy goal, and encouraged us to make this into a research seminar course, in which Ph.D. students (particularly when in their first year) and some MS students, can enroll. The registered students are asked to submit seminar summaries. The seminars, though are open to all. They have usually been very well-attended over the course of the last one year. This seminar series ensure that first year Ph.D. students and the enrolled MS students get a good exposure to research, including research in other areas as well.

The funding from the Ming Hsieh Institute has enabled CommNetS to sustain this as a weekly seminar course with a fixed schedule. Earlier, it had been relying on visitors who happen to be in the LA area, or who can take care of their travel expenses themselves, to come give talks, in addition to local and internal speakers. However, the funds have now given flexibility of inviting and hosting high quality speakers from outside the LA area as well.

CommNetS seminars are very well attended and have targeted some very high quality speakers, that ordinarily would not be able to have in the seminar series since there are only four annual department colloquium talks, in addition to the Viterbi and Munushian keynote lectures.

To reiterate, the goal for this seminar series has been (i) to bring together faculty, postdocs and students in different areas/divisions but with common interests together, (ii) expose students to research in diverse areas, as well as to accomplished speakers, and (iii) to establish the CommNetS seminar series to be well known outside as well, like long running Net-DSP-Comm seminars at Berkeley, LIDS seminars at MIT, CSL seminars at Illinois and CSPL seminars at Michigan. We intend to continue running this seminar series, and hope to make it a permanent seminar series in the department.

Website: http://csi.usc.edu/~dimakis/CommNetS/
| Date       | Title                                                                 | Speaker                              | Host                  |
|------------|----------------------------------------------------------------------|                                     |                      |
| Jan. 12, 2:00pm. EEB 248 | Utility Optimal Scheduling in Networks - Small Delay and No Underflow | Longbo Huang (USC)                  | Rahul Jain           |
| Jan. 19, 2:00pm. EEB 248 | Role of Feedback in Interference Networks                           | Changho Suh (UC Berkeley)           | Alex Dimakis         |
| Jan. 26, 2:00pm. EEB 248 | Bringing network coding closer to practice                          | Christina Fragouli (EPFL)           | Alex Dimakis         |
| Jan. 27, 4:30pm. SAL 101 | Sparse Approximations - Algorithms and Analysis                    | Anna Gilbert (Michigan)             | Alex Dimakis         |
| Feb. 2, 2:00pm. EEB 248  | Recent results on discrete memoryless broadcast channels            | Chandra Nair (CUHK)                 | Giuseppe Caire       |
| Feb. 9, 2:00pm. EEB 248  | Title                                                                 | ITA                                  | N/A                  |
| Feb. 16, 2:00pm. EEB 248 | Delay and power-optimal control in multi-class queueing systems      | Chih-ping Li (USC)                  | Rahul Jain           |
| Feb. 23, 2:00pm. EEB 248 | Channel coding, non asymptotic fundamental limits with and without feedback | Yury Polyanskiy (Princeton/MIT)    | Urbashi Mitra        |
| Mar. 2, 2:00pm. EEB 248  | A Clean Slate Design of Wireless Ad Hoc Networks Using On Off Division Duplex | Dongning Guo (Northwestern)         | Alex Dimakis         |
| Mar. 9, 2:00pm. EEB 248  | Robustness in High Dimensions -- Principal Component Analysis        | Constantine Caramanis (UT Austin)   | Alex Dimakis         |
| Mar. 23, 2:00pm. EEB 248 | Cooperative Information Exchange over Networks                       | Tom Courtade (UCLA)                 | Rahul Jain           |
| Mar. 30, 2:00pm. EEB 248 | Wavelets on Graphs - Theory and Applications                        | Antonio Ortega (USC)                | Rahul Jain           |
| Apr. 6, 2:00pm. EEB 248  | A New Approach to Robustness and Flexibility in High-dimensions      | Sujay Sanghavi (UT Austin)           | Rahul Jain           |
| Apr. 13, 2:00pm. EEB 248 | Wireless Open-Access Research Program                               | Ashutosh Sabharwal (Rice)           | Rahul Jain           |
| Apr. 20, 2:00pm. EEB 248 | Rethinking wireless networks with network coding - Overhead and stability challenges | Yalin Sagduyu (Intelligent Automation, Inc.) | Alex Dimakis |
| Apr. 27, 2:00pm. EEB 248 | Content-Aware Caching and Traffic Management in Content Distribution Networks | Srinivas Shakkottai (Texas A&M)     | Rahul Jain           |
| Apr. 11, 2:00pm. EEB 248 | Network Modulation -- Simultaneous Optimality in Multi-User Communication | Yuval Kochman (UC San Diego)         | Giuseppe Caire       |
| Apr. 25, 2:00pm. EEB 248 | MDS Array Codes with Optimal Rebuilding                             | Zhiying Wang                         | Alex Dimakis         |
| Apr. 26, 2:00pm. TBD     | Efficient Code Constructions for Reliable Distributed Storage        | P Vijay Kumar (IISc Bangalore)      | Alex Dimakis         |
| Apr. 8, 2:00pm. EEB 248  | Multi-Channel Multi-Stage Spectrum Sensing - Link Layer Performance and Energy Consumption | Przemyslaw Pawelczak (UCLA)         | Bhaskar Krishnamachari |
1.3 INTEGRATED SYSTEMS SEMINAR SERIES

Organizer: Hossein Hashemi
Proposal received: 12/15/2010
Proposal approved: 1/3/11
Duration of funding: 1/11 – 5/11 2011 Spring Semester

Summary: Integrated Systems Seminar Series covers integrated systems, circuits, and devices with wide range of applications including communication, computation, networking, sensing, and imaging. Invited speakers, all prominent researchers in academia or industry, meet with faculty, Ph.D. students, post-doctoral scholars, and research associates within the Ming Hsieh Department of Electrical Engineering during their visit at USC. For spring 2011, Firooz Aflatouni, a 5th year Ph.D. student and one of the Ming Hsieh Scholars, served as the organizer and host of the integrated systems seminar series.

Schedule:

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<tr>
<td>Jan. 28, 2:00pm. EEB 248</td>
<td>Ultra-Wideband Radio Frequency Signal Analysis using Spatial-Spectral Holography</td>
<td>Dr. Kris Merkel, S2 Corporation</td>
<td>Hossein Hashemi</td>
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<td>Feb. 4, 2:00pm. EEB 248</td>
<td>CMOS ICs in Biotechnology</td>
<td>Prof. Arjang Hassibi, University of Texas – Austin</td>
<td>Hossein Hashemi</td>
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<tr>
<td>Feb. 11, 2:00pm. EEB 248</td>
<td>CMOS: Challenges and Opportunities</td>
<td>Dr. Alireza Shirvani, MediaTek</td>
<td>Hossein Hashemi</td>
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<td>Mar. 25, 2:00pm. EEB 248</td>
<td>ADC-based Multi-GHz Wireline Transceivers</td>
<td>Dr. Afshin Momtaz, Broadcom Corporation</td>
<td>Hossein Hashemi</td>
</tr>
<tr>
<td>Apr. 1, 2:00pm. EEB 248</td>
<td>Digital Radio Concepts for SoC</td>
<td>Dr. Yorgos Palaskas, Intel</td>
<td>Hossein Hashemi</td>
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<td>Apr. 8, 2:00pm. EEB 248</td>
<td>Analog Front End ICs for Electrochemical and Biomedical Sensors</td>
<td>Prof. Bertan Bakkaloglu, Arizona State University</td>
<td>Hossein Hashemi</td>
</tr>
<tr>
<td>Apr. 15, 2:00pm. EEB 248</td>
<td>Exploring the Limits of Power and Miniaturization in Chip Design for Wireless Sensors</td>
<td>Prof. Brian Otis, University of Washington</td>
<td>Hossein Hashemi</td>
</tr>
<tr>
<td>Apr. 22, 2:00pm. EEB 248</td>
<td>The Next Wave of Mixed-Signal Interface Electronics</td>
<td>Prof. Boris Murmann, Stanford University</td>
<td>Hossein Hashemi</td>
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1.4 PHOTONIC DEVICES AND SYSTEMS SEMINAR

Organizer: Michelle Povinelli
Proposal received: 12/8/2010
Proposal approved: 1/3/2011
Duration of funding: 1/1/2011-12/31/2011 (1 year)

Summary:
The purposes of the seminar are to 1) expose our Ph.D. students to cutting-edge research from outside USC, 2) encourage interaction between USC faculty, staff, and students working in photonics, and 3) boost the visibility of the USC photonics effort on the national level, as visiting speakers have the chance to meet our faculty and tour our labs. In accordance with the goals of the Ming Hsieh Institute, the speakers are selected to encourage dialogue between researchers interested in devices and systems issues in photonics research. A fourth goal is to expose Ph.D. students to photonics-related career options in academia and industry.

For spring 2011, two local, university-based speakers were hosted. The target is to host approximately four university and two industry speakers per year. Due to the large number of faculty candidate talks in the spring semester, the majority of the seminars will be scheduled for the fall semester. This fall’s speakers will be chosen according to their ability to place their research within a broader perspective and discuss future directions in the field. Ming Hsieh funding will be used to bring in high-profile speakers from outside the local area.

Schedule:

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<th>Title</th>
<th>Speaker</th>
<th>Host</th>
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<tr>
<td>Feb. 10, 1:00pm. EEB 248</td>
<td>Photothermal Excitation for Ultrafast Micro and Nanofluid Systems and Biomedical Applications</td>
<td>Prof. Eric P. Y. Chiou, UCLA</td>
<td>Michelle Povinelli</td>
</tr>
<tr>
<td>Feb. 24, 1:00pm. SSL 150</td>
<td>Integrated optical sensors for portable biomedical sensing and imaging</td>
<td>Prof. Ofer Levi, University of Toronto</td>
<td>Michelle Povinelli</td>
</tr>
</tbody>
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1.5 THIRD ANNUAL SCHOOL OF INFORMATION THEORY
Organizer(s): Aylin Yener and Gerhard Kramer
Proposal received: 7/2010
Proposal approved: 8/2/2010
Duration of funding: 8/5/2010 – 8/8/2010

Summary:
The 2010 North American School of Information Theory was held Thursday, August 5, to Sunday, August 8, 2010, at USC in Los Angeles. The school offered graduate students and postdoctoral researchers the opportunity to learn from leading experts in information theory through short courses and talks as well as the chance to present their own work. Lecturers included Emmanuel Candès, Andrea Goldsmith, Alon Orlitsky, Rüdiger Urbanke, Sergio Verdú, and Jack Wolf. Jack Wolf was the second Padovani Lecturer of the IEEE Information Theory Society and gave his lecture at the School. The Padovani Lecture is sponsored by a generous gift of Roberto Padovani. Thanks to the generous support from our sponsors including the USC Ming Hsieh Institute, we were able to accommodate a record number of 178 students.

Website: http://www.itsoc.org/school2010

<table>
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<tr>
<th>Thursday Aug. 5</th>
<th>Friday Aug. 6</th>
<th>Saturday Aug. 7</th>
<th>Sunday Aug. 8</th>
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<tr>
<td>8:30am</td>
<td>Breakfast &amp; Registration</td>
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| 9:00am          | **Padovani Lecture**  
Jack Wolf  
Can an Information Theorist Be Happy in a Center for Information Storage? | Emmanuel Candès  
Information Theory of Data Matrices: Recovery from Incomplete and Corrupted Entries | Sergio Verdú  
Reading Shannon | Rüdiger Urbanke  
Approaching Shannon |
| 10:45am         | **Padovani Lecture**  
Jack Wolf  
Can an Information Theorist Be Happy in a Center for Information Storage? | Emmanuel Candès  
Information Theory of Data Matrices: Recovery from Incomplete and Corrupted Entries | Sergio Verdú  
Reading Shannon | Rüdiger Urbanke  
Approaching Shannon |
| 11:45am         | Lunch          | Lunch          | Lunch         |
| 1:00pm          | Andrea Goldsmith  
Seeking Shannon Capacity of Wireless Channels and Networks | Alon Orlitsky  
Probability Estimation over Large Alphabets | Student Poster Presentations 3 (1:30-3:30) | Student Poster Presentations 5 (until 3:00) |
| 2:30pm          | Andrea Goldsmith  
Seeking Shannon Capacity of Wireless Channels and Networks | Alon Orlitsky  
Probability Estimation over Large Alphabets |               |               |
| 4:00pm          | Student Poster Presentations 1 | Student Poster Presentations 2 | Student Poster 4 |
| 6:45pm          | Picnic          | Dinner, Speaker & Organizer Dinner | Dinner         |
1.6 SECOND INTERNATIONAL CONFERENCE ON QUANTUM ERROR CORRECTION

Organizer(s): Daniel Lidar and Todd Brun
Proposal received: 11/9/2010
Proposal approved: 12/2/2010
Duration of funding: 12/5/11 - 12/9/11

Summary:
Quantum error correction of decoherence and faulty control operations forms the backbone of all of quantum information processing. In spite of remarkable progress on this front ever since the discovery of quantum error correcting codes more than a decade ago, there remain important open problems in both theory and applications to real physical systems. In short, a theory of quantum error correction that is at the same time comprehensive and realistically applicable has not yet been discovered. Therefore the subject remains a very active area of research with a continuing stream of progress and breakthroughs.

The Second International Conference on Quantum Error Correction, hosted by the USC Center for Quantum Information Science & Technology (CQIST), will bring together a wide group of experts to discuss all aspects of decoherence control and fault tolerance. The subject is at this point in time of a mostly theoretical nature, but the conference will include talks surveying the latest experimental progress, and will seek to promote an interaction between theoreticians and experimentalists. Topics of interest include, in random order: fault tolerance and thresholds, pulse control methods (dynamical decoupling), hybrid methods, applications to cryptography, decoherence-free subspaces and noiseless subsystems, operator quantum error correction, advanced codes (convolutional codes, catalytic, entanglement assisted, ...), topological codes, fault tolerance in the cluster model, fault tolerance in linear optics QC, fault tolerance in condensed matter systems, unification of error correction paradigms, self-correcting systems, error correction/avoidance via energy gaps, error correction in adiabatic QC, composite pulses, continuous-time QEC, error correction for specific errors (e.g., spontaneous emission), etc.

MHI support will be used to subsidize the participation of students and to cover the expenses of invited speakers.

Website: http://qserver.usc.edu/qec11/
1.7 EE SYSTEMS HOLIDAY AND END OF THE YEAR RECEPTION

Organizer: Alexander Sawchuk
Proposal received: 11/2010
Proposal approved: 12/1/2010
Duration of funding: 1 day event

Summary:
The EE Systems reception helped foster interaction among the faculty and staff of EE Systems and personnel from other administrative units within VSoE in an informal setting. The event was a large success with over 75 attendees. We thank the Ming Hsieh Institute for funding the refreshments and beverages.

On 12/14/2010, thanks to the MHI support, EE Systems held its first holiday celebration event in EEB 248 at 3pm.

1.8 EE ELECTROPHYSICS HOLIDAY PARTY

Organizer: Hossein Hashemi
Proposal received: 11/2010
Proposal approved: 12/1/2010
Duration of funding: 1 day event

Summary:
The Ming Hsieh Department of Electrical Engineering Electro-Physics (EEEP) consists of 15 tenured or tenure-track (TTT) faculty members, about 10 staff members, several research and teaching faculty members, and a large number of Ph.D. students, research associates, and post-doctoral fellows. The EEEP faculty spans vastly different research topics including electronics, optics, nano-science and nano-technology, micro-electromechanical systems, electromagnetic, plasma, energy sciences, quantum engineering, power engineering, and bio-inspired and biomedical systems. EEEP faculty, graduate students, research associates, and various laboratories are spread over several buildings including PHE, SSC, VHE, RTH, BHE, and KAP. As such, regular interaction between EEEP family is limited.

On 12/15/2010, thanks to the MHI support, the EEEP family held its first holiday celebration event at the University Club. The event was attended by the majority of faculty, staff, and graduate students. Several mini-games helped the EEEP family to interact and get to know each other on a personal level. The feedback after the event was overwhelmingly positive, encouraging the department to continue holding this event on a regular basis.
1.9 SIPI 40TH ANNIVERSARY SYMPOSIUM

Organizer: C.-C. Jay Kuo
Proposal received: 5/10/2011
Proposal approved: 5/16/11
Duration of funding: 12/3/2012-12/6/2012

Summary:
The Signal and Image Processing Institute (SIPI) will celebrate its 40th anniversary in 2012. We plan to organize a one-day symposium on Dec. 2 (Sunday) as the main highlight of a sequence of celebration events. The guests of the symposium will include SIPI Founding Directors, Dr. William K. Pratt and Dr. Harry C. Andrews, former and current faculty, alumni and current Ph.D. students and friends to participate in this event. We expect the number of participants to be around 200.

There are three main objectives of this symposium.
1) Visibility: we would like to promote SIPI’s outstanding research accomplishments over the last 40 years to the outside world and enhance SIPI’s visibility.

2) Networking: we would like to build a network among past and current SIPI members, including faculty, alumni and current Ph.D. students.

3) Planning: we would like to use this opportunity as a technology forum for strategic planning and obtain inputs for the future growth of SIPI.

The symposium will consist of three parts:
- historical review
- current status
- future outlook

The symposium will be videotaped and some short clips will be uploaded to Youtube for sharing.

Description of how MHI support will be used in the symposium: The event will take place in the JW Marriot hotel in downtown LA. We need some deposit for room/facility reservation. The MHI support will be used for this purpose. Furthermore, the MHI support will be used to cover the travel and lodging expenses of a few key guests. The symposium will charge participating members a registration fee to cover the cost of the lunch and/or the dinner banquet.
1.10 VISITOR PROGRAM
Organizer: Urbashi Mitra
Proposal received: 1/5/11
Proposal approved: 1/28/11
Duration of funding: 10/1/2011-11/30/2011

Summary:
Dr. Zijian Tang, Research scientist of TNO Defence, Security and Safety, Rijswijk, the Netherlands has been approved to come to USC as a visiting professor for two months beginning on October 1, 2011.

The goals of the visit are the design of sea trial signals, to be followed by algorithm design, as part of a European project in which the University of Technology, Delft and the Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (Netherlands Organisation for Applied Scientific Research) aka TNO are involved. In summer 2011, we designed preliminary signals based on multi-scale Gabor transforms for transmission in a successful sea trial. We are waiting for the declassification of the mobile data and have begun preliminary analysis on the stationary data (stationary transmitter and receivers). The major challenge at the moment is designing high performance channel estimation which will enable us to test the efficacy of some of our newly proposed multi-scale, multi-lag channel equalizers. Dr. Tang and I are working with a visiting graduate student from the University of Padova (Nicolo Michelusi) on adapting his newly developed channel estimation methods for hybrid channels (with a diffuse and sparse component) to the underwater channels. Mr. Michelusi’s Ph.D. advisor is Michele Zorzi and he is also part of the aforementioned European project. Based on a recent collaboration visit, Dr. Tang, Prof. Geert Leus of TUD and I have determined that carrier frequency offset (CFO) estimation will be critical for this project. This is a new and exciting research avenue that will likely draw upon CFO work that has previously been undertaken for MIMO systems, but for completely different channel models. We anticipate that both joint research proposals, conference papers and seminars will result from the visit.
1.11 EXPERIMENTAL MINI-CLUSTER TO SUPPORT VLSI AND ARCHITECTURE CLASSES

Organizer: Sandeep Gupta, Collaborators: Woojoo Lee, Doochul Shin
Proposal received: 11/15/2010
Proposal approved: 12/1/2010
Duration of funding: 1 time funding for year-long experiment

Summary:
Background: We had proposed to acquire, configure, and manage a mini-cluster, on an experimental basis. The objectives of our proposed experiments were: (i) to demonstrate that it is beneficial – in terms of providing students with upgraded tool versions, libraries, and technologies, and (ii) to study the feasibility of installation, troubleshooting, and upkeep of our own cluster using a combination of available resources, namely an external vendor for installation and occasional major repairs, a fraction of a departmental IT staff member’s effort, and a designated TA for tools used in our classes.

Developments to date: Using approximately $7,500 of the MHI funds, we have acquired an eight-node cluster. This cluster was successfully installed by an outside vendor under the guidance of Murali Annavaram and with significant help from two of his senior doctoral students. The cluster became available somewhere in the middle of Spring 2011. (Our new machine has been named Dhaulgiri.) Within a couple of weeks our Tools TA, Woojoo Lee, who is funded by the department, was able to successfully install all Cadence tools that we use in our VLSI Design classes, especially EE 577a. He was also able to install the associated utilities, libraries, and technology files. Since it was late in the semester, we did not make this cluster and tools available to the students enrolled in EE 577a. Instead, since ITS’s Student Computing Facility (SCF) cluster (which now has only two main machines, aludra and nunki) had become extremely slow to the point where we were forced to assign to students in our 577a class a design assignment that was eight times smaller than what we had assigned in Spring 2009, we carried out extensive benchmarking on SCF and our new CEng mini-cluster. The benchmarking clearly demonstrated that the SCF machines are inadequate since our tasks take nine-times longer to complete on SCF compared to our $7,500 CEng mini-cluster. We presented this data at Viterbi IT Advisory Council and shared the information with ITS staff and administrators who are in-charge of SCF. (The slides presented at the Viterbi IT Advisory Council are enclosed. Recall that the CEng mini-cluster is referred to as Dhaulgiri.) After over a year of discussions with ITS, which had produced no concrete results, the results of above mentioned benchmarking effort finally convinced ITS that they need to make serious changes to SCF. The series of meetings that will plan these changes should occur over the next few weeks. We are hopeful that the new and improved SCF will be in place by the end of September, by the time the new students in VLSI classes will get their first design assignments.

Our ongoing plans for this cluster: First, we will continue to use the CEng mini-cluster for VLSI classes to keep ITS on its toes with respect to SCF upgrades. In Fall 2011, we will provide a randomly selected subset of students in participating classes access to this cluster and tools. (They will retain their access to SCF machine like their other classmates but encouraged to use this cluster.) We will then continually survey all students enrolled in participating classes to assess the relative benefits of the mini cluster. We will also evaluate our ability to maintain this cluster. Second, we will use this cluster to install and try new versions of software and design libraries to ensure that they work and are stable before requesting ITS to install the new versions on SCF. This will minimize unpleasant surprises while allowing us to provide the latest versions of the tools to our students. Third, in August 2011, we will encourage all CEng faculty to use this mini-cluster for their classes for which it might be useful. This will also help us continue to evaluate our ability to maintain this cluster.
1.12 THE SMARTPHONE IN YOUR POCKET – REFRESHING THE HARDWARE OF EE579

Organizer: Murali Annavaram
Proposal received: 11/24/2010
Proposal approved: 12/1/2010
Duration of funding: 1 time funding

Summary:
The goal of this MHI grant was to provide greater platform selection to the students of EE 579 (Wireless and Mobile Networks Design and Laboratory). Prior to receiving the grant, the students had access to ten Nokia N95 smart phones. By including iPhone and Android alternatives students would be able to select a platform that best met their application goal or matched their target user demographic. The MHI grant supported the purchase of seven Android Nexus One phones and eight iPhone 3GS phones. Students embraced these purchases enthusiastically; seven groups used Andorid Nexus One phones for applications varying from weLobby (a social networking application for lobbying congress) to a dating service. Five groups selected the iPhone alternative for their final project, creating applications such as Hungry Pig (a 2-d tile based game in which a pig tries to eat falling food, pig movement being controlled by tilting the phone) to an augmented reality application that used the camera to overlay directions to a destination.
2. THEMATIC RESEARCH ACTIVITIES

In September 2011, The Ming Hsieh Institute also requested thematic proposals to be submitted from EE faculty. Thematic proposals should facilitate research and scholarly activities under well-defined, finite-duration themes that are strikingly innovative and forward-looking within the general theme of empowering humankind with intelligent technologies. These will initiate research and scholarly directions that are strikingly innovative and forward-looking within the theme of empowering humankind with intelligent technologies. The Institute’s activities will be coordinated with academic and research activities of the Ming Hsieh Department engaging as many of its faculty as possible. A total of five thematic proposals were submitted by faculty in 2010-2011. The Ming Hsieh Institute provided sponsorship for one of these proposals titled “Large-Scale Software-Radio Testbed”.

2.1 LARGE-SCALE SOFTWARE-RADIO TESTBED

Organizer(s): K. Psounis, G. Caire, A. Molisch, M. Chen

Proposal received: 4/24/2011
Proposal approved: 5/11/2011
Duration of funding: 5/15/2011 – 5/15/2012 (after report of year 1 is submitted MHI will consider funding year 2)

Summary:
Large-Scale Software-Radio Testbed aims to build the best software radio testbed in the world at USC. Two natural questions arise. First, why should one build the best software radio testbed today? The answer is that there is a tremendous demand in the world to increase wireless throughput, and the best way to achieve this is by bringing together people with diverse expertise, such as networking, communications, information theory and hardware design, into a software radio testbed where people can design, implement, and test fundamentally new wireless communication systems. Second, why should one build this at USC? The answer is that the Electrical Engineering department at USC has a particularly strong presence in all related research areas, but somehow it lacks a world-class facility where faculty can experiment, implement and showcase the innovative results of their research. Given that a large number of faculty have shown strong willingness to collaborate around this testbed, this is a great opportunity for the department as a whole. The testbed will be located at the UltRa Lab space at USC, and will consist of ten top of the line, fully programmable WARP software radios, coupled with another ten USRP software radios. Faculty from the EE department have already come up with four multidisciplinary projects that they plan to begin as soon as the testbed is funded and have committed to use Ph.D. students funded from other sources to perform the work. Two of those projects, namely, creating a distributed multiuser MIMO system from distinct base stations and demonstrating a massive multi-user MIMO system, are expected to yield important results within a year and the PIs plan to hold a live demonstration of those results on next year’s MHI research festival. There are detailed timelines for all projects, specific milestones for the two projects that are expected to yield immediate results, information about the faculty and students that will be involved in each project, as well as specific plans to make the testbed self sustainable by seeking funding from external sources. While trained Ph.D. students are expected to manage the lab initially, the PIs will seek a very experienced post-doc to act as a lab manager. Finally, the PIs would like to stress that many more projects, not described in this document, are expected to start within a year or two after the testbed is operational, involving all PIs and all collaborators.
3. MHI ORGANIZED ACTIVITIES & PROJECTS

3.1 MHI Scholars Program – 5 top Ph.D. students from the EE department were named "2010-2011 Ming Hsieh Institute Scholars." This set of students were chosen carefully by a faculty committee on the basis of their research accomplishments, promise and desire for an academic career beyond the Ph.D. and to help them in their career development and mentorship from department faculty. They were awarded an annual stipend of $2000, as well as funds for travel to other institutions to help expand their horizons and enable them to gain visibility and receive feedback on their work. MHI scholars showcased leadership in Electrical Engineering by traveling to other Universities to give talks and represent the department. Some of the MHI Ph.D. Scholars were offered faculty positions at other universities after visiting to give talks and networking with faculty members. They have also gained valuable experience by organizing and taking on leadership roles at Ming Hsieh Institute sponsored events such as the EE Research Festival and the Department Retreat.

For 2010-2011, nominations for the MHI Scholars Program were due on November 15 and were required to be submitted by the student’s thesis advisor with a cover letter, CV of student, and two letters of reference. Of the 13 nominees received by the deadline, 5 top Ph.D. students from the EE department were named "2010-2011 Ming Hsieh Institute Scholars." We are very happy to showcase the talents of these outstanding students and are excited to continue this program in the future.

2010-2011 Ming Hsieh Institute Ph.D. Scholars:

Firooz Aflatouni  
Research Interest: RF inspired photonics and low power integrated RF and millimeter-wave systems in silicon-based processes. PHE 416, (213) 740-3058 aflatoun@usc.edu

Prasanta Kumar Ghosh  
Research Interest: Understanding human speech communication with application to machine recognition of speech especially inspired by the speech production and perception link. EEB405, (213) 821-2433 prasantg@usc.edu

Samir Sharma  
Research Interests: signal processing with a focus in inverse ill-posed imaging problem; currently exploring the application of compressed sensing and parallel imaging for accelerated water-fat MRI.  
EEB 414, (213) 740-4650 sdsharma@usc.edu

Chuan Wang  
Research Interests: Carbon nanotube nanoelectronics and macroelectronics.  
RTH B118, (213) 821-4208 chuanwan@usc.edu

Omer Faruk Yilmaz  
Research interests: Advanced optical signal processing for reconfigurable fiber optical networks with emphasis on coherent detection.  
EEB 533, (213) 740-0024 oyilmaz@usc.edu
3.2 DEPARTMENT RETREAT

On Saturday, March 26 – Sunday, March 27 MHI hosted the First Electrical Engineering Retreat at the Lake Arrowhead Resort and Spa. All faculty, Ph.D. students, post-doctoral scholars, and research associates in the Ming Hsieh Department of Electrical Engineering were invited with their families to attend the two day retreat. MHI heavily subsidized the cost for the participation of all department members but charged a small fee for attendees and their families.

- Faculty at USC for 35+ years – complimentary
- Faculty - $50
- Ph.D. students - $20
- Family (includes above fee)- $200

There were a total of 158 guests in attendance including 60 Ph.D. students and 36 faculty members, 8 of which have been with USC for over 35 years. Event organizer and MHI co-director Hossein Hashemi lead all the panel sessions and was the moderator for the weekend. The retreat pamphlet is provided on the next page which includes the following event itinerary:

- Structured Brainstorming Session on “Current and Future Roles of Electrical Engineering in Human Health and Wellbeing” moderated by Prof. Leahy. Organizing Faculty: Profs. Molisch, Narayanan, Povinelli


- Structured Brainstorming Session on “Creating an Intelligent Networked World” moderated by Prof. Caire. Organizing Faculty: Profs. Brun, Dimakis, Jain, Krishnamachari, Mitra, Psounis, Scholtz, Willner

- Social networking & family time

- Banquet Dinner featuring the Keynote Talk by Dr. Robert Lucky

*The Joys and Disappointments of Engineering*
The objective of the retreat was to bring faculty and Ph.D. students together to receive an annual update regarding research accomplishments across the board. The retreat was planned in a social environment so attendees were able to interact and build relationships that resulted in bringing the department as a whole closer, interlinking students and faculty. As well as discussing technical research topics, some attendees showcased their impressive talents during a musical ensemble at the banquet dinner. Photographs and a video were constructed at the retreat, which can be viewed by visiting this link: http://www.youtube.com/watch?v=aQNI59Gw_uA

The Institute conducted a confidential survey after the retreat and received positive feedback from attendees with some suggestions on how to improve it in future years, which we plan to incorporate.
3.3 RESEARCH FESTIVAL

As one of the MHI goals to enhance the research visibility of the Electrical Engineering department, the Ming Hsieh Institute hosted The First Annual Ming Hsieh Department of Electrical Engineering Research Festival on Friday, April 29 at USC Park Campus. MHI plans to host this event annually and continue to increase participation and expand the Electrical Engineering Department externally. The Research Festival was a day-long event that showcased Ph.D. student research through posters and oral presentations. The entire USC Viterbi Community was invited to the event as well as local EE alumni, and select academic representatives in Electrical Engineering. Industry representatives were also invited so they could see the outstanding research conducted by our Ph.D. students and provide possible future opportunities.

The event began with a keynote talk by John Brooks Slaughter titled Celebrating Research, followed by a welcome by MHI director Shri Narayanan and an overview of the day by event organizer and MHI co-director, Bhaskar Krishnamachari.

Poster Sessions and Graduating Ph.D. Presentations were going on simultaneously, one session scheduled in the morning and one in the afternoon by research category. 25 graduating Ph.D. students gave 10 minute long oral presentations and 85 Ph.D. students gave poster presentations. Faculty judges deliberated and selected two presentation winners and four best posters that were announced at the Awards Ceremony, which followed the Reception.

MHI compiled a Research Book including Ph.D. student and Post Doctoral Scholar research summaries and distributed it to all event attendees. Extra Research Books were given to the department chairs and our External Relations Department to give to external Electrical Engineering contacts to enhance the visibility of our Ph.D. student research and the EE faculty and department.

The Research Festival concluded with a panel session on the Birth of Aerospace in Southern California: a conversation about Engineering, History & Art organized by: Bill Deverell, Huntington-USC Institute on California and the West and Urbashi Mitra, Ming Hsieh Department of Electrical Engineering. This panel session was a perfect ending to the Research Festival because some alumni that were confirmed to attend the panel also got a chance to see some student work, and students in turn stayed for the panel session and learned valuable information.
Ming Hsieh Institute 2010-2011 Annual Report

Event Program

Welcome Community & Keynote talk by John Brooks Slaughter - Celebrating Research 9:30am - 10:00am - Gerontology Auditorium

John Brooks Slaughter, Ph.D., P.E.
Professor of Education and Engineering, University of Southern California

A former director of the National Science Foundation, chancellor of the University of Maryland, College Park, and president of Occidental College, Dr. Slaughter has served for many years as a leader in the education, engineering, and scientific communities. He is well known for his commitment to increasing diversity in higher education with a special focus on the STEM disciplines.

Graduating Ph.D. Presentations
10:00am - 11:30am - Gerontology Auditorium

Signal Processing

10:00am
Matthew P. Black
You made me do it: Classification of Barans in Musical Couples' Interactions - A Case Study in Behavioral Signal Processing

10:15am
Sanghyun Chang
Human and Environment Sensing via UAV Radar

10:30am
Yo-Tong Chang
Multi-Sensor Feature Extraction: Statistical Null Models and Applications

10:45am
Sanjoy Das
Block-Based Image Segmentation: Algorithm and Performance Evaluation

11:00am
Zheng Tan
Interactive Visualization of Large Datasets, Tensor Field, Tiled and Compressed

11:15am
Pratap Panda
A computational framework for exploring the role of speech production in speech recognition

11:30am
Athanasios A. Kotsialos
Multiscale Machine Learning for Behavioral Signal Processing

11:45am
Woo-Jin Kim
3-D Video Coding with Enhanced Randomized View Quality

12:00pm
Sam Eunpark
Transferring Image Graph Signal Processing (IGSP) Methods

12:15pm
Chun-Hao Rich
Rich Multi-Person Tracking by On-Line Learned Environnmental Appearance Models

12:30pm
Emily Keefe
Mirror Emotions in Engineering: Methods for the Incorporation of Ambiguous Emotional Content

12:45pm
Michael Jan Fodor
An MRI Study of Human Brainwiring

References

1. Michael A. Newton
Behavioral Multi-Adaptive Regrowth (BRAT) System

22. Gary Belchick
Optimizing video streaming experience for a user in a cellular network

32. Hao Tang
Diversity Background Algorithms with Mutual Information ACQUISITION

42. Yi-Di Lin
Online Learning Algorithms for Network Optimization with Unknown Variables

52. Hanchuan Peng
The TensorCUBE

62. Deepak Srivastav
Incentive Mechanisms for Spectrum Sharing - Contracts for Cooperation

72. Sheng Li
A Memory-Efficient and Modular Approach for Enhance-Based String Matching on FPQs

82. Shengming Feng
Machine Learning Based Automatic Patent Monitoring and Prioritizing by Body Sensor Network Systems

92. Malekmanesh
Distributed Storage Codes Reduce Latency in Vehicular Networks

102. Huan Cao
Towards Green Cellular Networks

112. Wai-kai Ling
Network Games Theory

122. Yicong Zhao
Markov-optimal sensing policy for user state estimation in mobile devices

132. Wai-Keong Young
High performance 3Dlook up on FPGA with Combined Length-info and Pixelized Search

Presentations

1. Thanh Le
Incorporation of High Semiconductors Whispering Gallery Mode Resonators for Beam Forming Applications

2. Yu-Sung Lin
Hybrid MEMS-MEMS Ring-Resonator-Like Dodecagon Resonators for Active Phased Arrays

3. Yu-Lai Chen
Rovel-Coupled Malleable Design Using Ring Resonator-Based Light-Sheet Structure

42. Chenni Lin
Optimal Modelling of Silicon Nanowire Arrays for Photovoltaic Applications

52. Jing Ma
Applications of Optical Fibres in Learning, Microscopy and Devices

62. Naoko Shigetomi
Spatially-Selective Microscopy Using Fabricated Microlens Arrays

72. Zhanjuan Yang
Using Non-diagonal 3D-Wave Mixing in TCP/IP

82. Omar Firoozfar
Tunable Optical Tapped Delay Lines using Wavelength Conversion and Chromatic Dispersion-based Driven

Visualization

82. Vivekanand Basu
Generating content for a novel silicon delay subsystem

92. Jonathan K. Phillips
Modeling Biological Neural Connectivity Using Custom Silicon Circuits

102. Mohammad Akram
Redundancy and Partitioning for Physical Synthesis of Fine-Grained Built-in Self-Test Circuits

112. Ming Hsieh Institute
2010 - 2011 Annual Report

122. Ming Hsieh Institute
2010 - 2011 Annual Report
Panel Session Flyer

The Birth of Aerospace in Southern California: A Conversation about Engineering, History & Art

GERONTOLOGY AUDITORIUM - 3715 MCCLINTOCK AVENUE
FRIDAY, APRIL 29 4:30PM

Panelists:
Ron Blackwelder, Aerospace & Mechanical Engineering, USC
Robert McEliece, Allen E. Puckett Professor, Electrical Engineering, Caltech
Ken Richardson, former President & COO, Hughes Aircraft Company
Laif Swanson, Jet Propulsion Laboratory
Jason Weems, History of Art, UC Riverside
Peter Westwick, History, USC

Organized by:
Bill Deverell, Huntington-USC Institute on California and the West and
Urbashi Mitra, Ming Hsieh Department of Electrical Engineering. For questions please contact Professor Mitra at ubli@usc.edu

Parking Information
Please enter through Gate 6 located at W 36th Place & Vermont Avenue off the Santa Monica Freeway.
Parking - $8
For complete driving directions visit: http://ee.usc.edu/about/maps.htm

Sponsored by the USC Center for Excellence in Research, the Ming Hsieh Institute and the Viterbi School of Engineering
Research Festival Award Winners

Honorable Mention Paper Award Winners

- Prasanta Ghosh: Processing speech signal using auditory-like filterbank provides least uncertainty about articulatory gestures
- Rahul Urgaonka: Optimal Power Cost Management Using Stored Energy in Data Centers

Best Paper Award Winners

- Matthew Black: Automatic Prediction of Children’s Reading Ability for High-level Literacy Assessment
- Chuan Wang: Wafer-Scale Fabrication of Separated Carbon Nanotube Thin-Film Transistors for Display Applications

Best Poster Award Winners - Session One

- Behnam Analui: 0-6GHz Software-Defined Receiver
- Jialu Zhang: Air-Stable n-Type Separated Carbon Nanotube Thin-Film Transistors and Its Application in CMOS Logic Circuits

Best Poster Award Winners - Session Two

- Yicong Zheng: Geometric Manipulation of Ensembles of Atoms on Atom Chip for Quantum Computation
- Samir Sharma: Accelerated Water-Fat MRI

Honorable Mention Best TA

- Satsuki Takahashi
- Kartik Audhkhasi
- Waleed Dweik
- Chih-Chieh Hsu
- Aaron Friesz
- Brandon Franzke
- Jesse Theiss
- Jonathan Joshi
- Benjamin Raskob

Best TA

- Sean McPherson
- Arash Saifhashemi

2nd Place Best Presentation

Emily Mower: Emotions in Engineering: Methods for the Interpretation of Ambiguous Emotional Content

Grand Prize-Best Presentation

Firooz Aflatouni: FR Assisted Phase Control of Semiconductor Lasers
3.4 FACULTY TIMELINE

MHI compiled information on all past and present faculty members. This information includes year of appointment at USC and year of departure. Faculty and staff also provided further information on past faculty members, for instance where they are now, etc. – all this information is documented. Using this information, MHI created an EE Faculty History Timeline including the tenured and tenure-track faculty with “primary” appointment in EE-S or EE-EP who have been with the department for over three years. The design includes faculty photos with a data graph showing the timeframe they were appointed in EE, year’s faculty members served as department chairs, and facts about the department. MHI plans to update this data as accurate information is provided. The Faculty Timeline was showcased at the Retreat and Research Festival, which helped influence faculty members to respond and provide valuable historical information which was also documented.

To view and print full size image please visit: http://mhi.usc.edu/assets/001/75733.pdf
3.5 EE ALUMNI DATABASE

With the help of EE Faculty members, MHI created a database with all successful USC EE alumni who have decided to pursue a career in academia. All information provided by the advisors of student alumni is documented in this database. MHI also created the below Alumni Profile Design including information from the database, which was showcased at the Research Festival. At this point, we are focusing on USC EE Ph.D. alumni (i.e., received their Ph.D. in USC EE) who have chosen the academic path and gone to become faculty members (including those who went somewhere else at first and then became faculty). To view and print full size image please visit: http://mhi.usc.edu/assets/001/75186.pdf