Women's Workshop on Communications and Signal Processing

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1 Background

Women are underrepresented in Electrical Engineering at all levels. This fact has been documented in several places including [1, 2]. In particular, women are underrepresened at the tenured and full professor level in engineering [3]. This is also true for the subfields of Communications and Signal Processing where women make up slightly less than 7.5 % of the total membership. However, of the few women who are in these fields many are very successful.

While there is no single way to increase the percentage of women in these research areas; we believe targeted mentoring and networking can help retain and increase the number of women in leadership positions. The IEEE Signal Processing and Communications societies have long recognized the need to integrate junior members of these societies into society leadership. A common strategy employed to achieve this goal is the modestly sized workshop where junior researchers can interact and learn from more senior researchers. Such workshops foster the mentoring and networking that can make a difference in a career. Our ultimate goal is to create a more diverse and vibrant research community in signal processing and communications.

2 Overview of the Workshop

There have been many workshops devoted to women in engineering, but they have mainly focused on the mechanics of being a woman in engineering. For example, they concentrate on gender differences, how women can advance, work-life balance, children, etc.

The organization Networking Networking Women (N2Women) [4] has several workshops targeting women in communications networks. They also have a workshop that is technical in nature and co-located with an existing IEEE/ACM conference, InfoCom. Our goal was also a technical workshop but one where women could bond outside the technical discussions. As such, we envisioned a stand-alone workshop.

2.1 Structure of the Workshop

As one of the goals of the workshop was to promote networking among junior women researchers and with more senior women researchers, we wanted to ensure that we had a close, friendly environment. We also

Figure 1: Group photo from the Women's Workshop

wanted to focus on the technical rather than the social issues involved with women in communications and signal processing. Technical talks were a key part of the workshop for several reasons:

- The participants are technical people, not sociologists.

- We wanted to emphasize that women can be successful technical contributors.

- We wanted a forum where women, both junior and senior, can find new avenues for research and collaboration.

2.2 Funding

To make this first workshop attractive and affordable we solicited and received travel funds from the United States Office of Naval Research, IEEE Communications Society and IEEE Signal Processing Society.

2.3 Recruitment

We had two categories of participants: women with more established careers who would be the speakers and women just beginning their academic careers. For the more established women speakers, we asked several prominent researchers to participate. The selected speakers provided a comprehensive range of topics on communications and signal processing. For the more junior participants, we advertised via flyers at conferences, mailings to targeted research groups and advertisements on society websites and social media sites. We requested from each applicant a two-page abstract of their poster, a curriculum vita and the names of two references. We received 29 applications and accepted 24 applicants. Five of the accepted applicants could not attend due to visa or other issues yielding 19 untenured women participants in the fields of communications and signal processing. They ranged in experience from near the completion of their Ph.D. program to a few years into a position as an assistant professor.

This group's makeup was international. We had one participant each from India, the United Kingdom, Spain, Tunisia and Colombia. In addition, we had two from Canada and the rest from the United States. A group photo is shown in Figure 1.

2.4   Social aspect

Fostering networking involves making good personal as well as technical connections. The workshop had the following social networking aspects.

Friday evening we held an informal session in the Corbett Hall residence lounge. The focus of the session was open-ended and the participants, both junior and senior researchers, were sitting in a round table format. Discussions included:

- The challenges of having and raising children at different stages of one's career.

- Choosing an academic versus an industrial career.

- Methods and issues associated with moving from a career as a Ph.D. in industry to an academic career.

- How a Ph.D. can both broaden and limit career choices.

A workshop registration fee was charged to each participant of 150 U.S. Dollars. This helped offset the cost of meals at the Banff Center as well as a banquet dinner Saturday night.

We also planned a group hike Saturday afternoon which was well-attended.

On Sunday afternoon, the participants met in the TransCanada Pipeline Pavilion to discuss the workshop and what we should plan for the future.

2.5   Technical Activities

The workshop began with a morning poster session; the remainder of the workshop comprised 35 minute presentations from the more senior participants.

The poster session had 17 presenters. The topics covered ranged from video compression to using communications system to model Parkinson's disease. Before the poster session, each presenter gave a one-minute 'elevator' pitch about their work. The goal was for each presenter to crystalize what the work was about, why it was important and why we should go see the work.

A listing of the posters is presented in Appendix A and the workshop talks in Appendix B.

3   Outcomes of the Meeting and Lessons Learned

One of the initial goals of the meeting was to introduce younger pre-tenured women to post-tenured women to initiate mentoring and networking. An additional benefit of the all-women workshop, was that participants felt more relaxed presenting their results than they would in a mixed environment. The perception was perhaps that they did not have to prove themselves in the same way they would in front of a more predominantly-male workshop.

We found also that the meeting stimulated new research avenues for both the senior and junior attendees and created new research networks among all the participants. Several of the participants have identified paths for future joint research.

At the wrap-up discussion, one of the participants said that she came to the workshop to meet more established women researchers and to learn from them; but she realized that an equally important network was the younger women she met at the workshop.

Because the talks and posters were of a technical nature, many of the participants came away with new research ideas. Three of the more senior researchers discussed a future research project focusing on signal processing and whale sounds. Comments about the workshop included:

- "[My postdoc] was extremely happy about [the workshop], and came back with a lot of very interesting ideas for research and collaborations. So, at least from her perspective (and mine!), it was a great success."

- "This indeed was a unique event in that we are such a small group and yet we managed to cover such a wide range of topics. Being a small all-women group also allowed to create an informal atmosphere which made it very easy to approach professors and talk with them. To me it was truly inspiring to meet all these successful women. "

- "It's such a great pleasure attending the first Women's workshop in Banff, and I certainly gained a lot experience in working in academic field as a female!"

- "My participation in the BIRS workshop allowed me to make important contacts with people from my research area, as well as to be able to get significant insights of their current areas of research which provides me new interesting ideas for my job. Also the contacts I made during the workshop may help me through my career with postdoc opportunities or joint projects."

The general consensus from the group is that they would like to have another women's workshop on communications and signal processing in two years. Every year would be too often, but a workshop held every two years would be soon enough to provide some continuity.

For future workshops, the following suggestions were made:

- Rather than have a single time slot for a poster session, have two poster sessions with half the presenters at each. This allows more freedom for people to see the work of other presenters.

- Continue to have the workshop in a nature-oriented location like Banff where participants stay focused on the workshop without the distractions of a larger venue.

- Extend the workshop an additional day.

- Have break-out sessions where participants can brainstorm possible collaborations.

- Have presentations that are more tutorial in nature rather than new results.

- Advertise in more venues and earlier to increase recruitment.

A   Posters

- **Zahra Ahmadian** (University of British Columbia)
  Pre-Rake DS-UWB System Design - an Overview

- **Nasim Arianpoo** (University of British Columbia)
  Network Coding in Wireless Mesh Networks

- **Yue Chen** (Queen Mary University of London)
  Cooperative User Relay Assisted Load Balancing in LTE Networks

- **Arsenia Chorti** (Princeton University)
  Physical Layer Security in Wireless Networks with Active Eavesdroppers

- **Raja Ghozi** (ENIT, Tunis)
  Elderly Altered Auditory Perception in Urban Spaces

- **Cristina Gomez Santamaria** (Universita Pontifica Bolivariana-Colombia)
  Combining Eigenbeamforming and OSTBC in a MU Macrocell scenario with Partial CSITx

- **Sumana Gupta** (IIT Kanpur)
  A Novel Technique for Color Video Compression

- **Julie Jackson** (AFIT)
  Exploitation of OFDM Communications for Passive Radar Imaging

- **Victoria Kostina** (Princeton University)
  Lossy joint source-channel coding in the finite blocklength regime

- **Abbie Kressner** (George Tech)
  Causal Locally Competitive Algorithm for the sparse decomposition of audio signals

- **Yao Li** (Rutgers University)
  Enhancing Throughput-Complexity Tradeoff in Coded Content Distribution

- **Sandra Roger** (Technical University of Valencia)
  Rapid Prototyping of MIMO Detectors Using Graphic Processing Units

- **Neveen Shlayaan** (University of Nevada, Las Vegas)
  The Ill-posed Inverse Radon Problem in Neutron Tomography

- **Samantha Summerson** (Rice University)
  Parkinsons Disease: Interference in the Neural Communications Channel

- **Vanessa Testoni** (University of California, San Diego)
  The Hierarchical Signal Depedent Transform: A Framework for Creating Orthonormal Basis Matching the Local Signal Characteristics

- **Preetha Thulasiraman** (US Naval Postgraduate School)
  Interference Aware Resource Allocation Using Multiobjective Optimization for Mobile Wireless Networks

- **Laura Toni** (University of California, San Diego)
  Channel Coding Optimization Based on Slice Visibility for Transmission of Compressed Video over OFDM Channels

- **Hongmie Xie** (Lehigh University)
  Distributed Storage Codes Based on Evaluation of Linearized Polynomials

B   Workshop Talks

- S. Aissa, (University of Quebec) *Is cooperation a Must in Future Cognitive radio networks?*

- P. Cosman, (University of California, San Diego) *Subcarrier Mapping Based on Slice Visibility for Video Transmission over OFDM Channels*

- M. Effros (California Institute of Technology) *Reduction as a Route to a Computational Information Theory*

- S. Kishore, (Lehigh University) *Smart Electricity Systems and the Role of Communications Engineering*

- M. Ostendorf, (University of Washington) *Human Language: a Signal Processing Perspective*

- M. Stojanovic, (Northeastern University) *OFDM over Rapidly Varying Channels Partial FFT Demodulation and its Application to Underwater Acoustic Channels*

- S.K. Wilson, (Santa Clara University) *Blinded by the Light: OFDM and Optical Wireless Communications*

- S. Wood, (Santa Clara University)*Computational Imaging Challenges*

References

[1] B.L Yoder, Engineering by the Numbers, *Profiles of Engineering and Engineering Technology Colleges*, American Society of Engineering Education (ASEE), June 2012

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www.asee.org/papers-and-publications/publications/college-profiles/2011-profile-e
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[2] E. Guizzo, The EE Gender Gap is Widening, In *IEEE Spectrum*, December 2008

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http://spectrum.ieee.org/computing/software/the-ee-gender-gap-is-widening
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[3] Committee on Gender Differences in Careers of Science, Engineering and Mathematics Faculty, In *Gender Differences at Critical Transitions in the Careers of Science, Engineering and Mathematics Faculty*, National Academies Press, 2010.

[4] `http://cms.comsoc.org/eprise/main/SiteGen/n2women/Content/Home.html`