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10 YEARS OF NETWORKING NETWORKING WOMEN

Networking Networking Women (N²Women) celebrated its 10-year anniversary at the fifth N²Women Workshop co-located with MobiCom 2016. Founded in 2006 by Tracy Camp and Wendi Heinzelman, N²Women is a discipline-specific community for researchers in the communications and networking field. The main goal of N²Women is to foster connections among the under-represented women in computer networking and related research fields. N²Women allows women to connect with other women who share the same research interests, who attend the same conferences, who face the same career hurdles, and who share common career objectives.

N²Women has grown from just over 40 members in 2006 to more than 1,000 members in 2016. The first N²Women meeting was held during the MobiHoc conference in 2006, in Florence, Italy. Over the past 10 years, over 110 N²Women events have been held at most of the top networking conferences including MobiCom, MobiSys, SIGCOMM, and INFOCOM. Events range from small, informal gatherings over breakfast or lunch to panels that attract dozens of attendees and day-long workshops. In all cases, a fundamental goal of the meeting is to facilitate connections among the female conference attendees. N²Women has been generously supported by many organizations, including ACM SIGMOBILE, ACM SIGCOMM, IEEE Communications

Society, IEEE Computer Society (CS) Technical Committee on Computer Communications (TCCC), NSF Division of Computer and Network Systems, CRA-W, Microsoft Research, HP Labs, and Google Research.

Since 2010, the growth of N²Women has been sustained by the creation of a board of volunteers who manage existing programs and create new ones to foster additional activities. Currently, the board is composed of 26 members, each member committing to a two-year term. Over the past six years, 65 women have served in leadership positions on the board. Thanks to their commitment and creativity, several valuable new programs have been established in recent years.

N²WOMEN PROGRAMS

N²Women has expanded over the past ten years to support several programs. In this section, we discuss the different N²Women programs and the impact that these programs have had on women in the communications and networking field.

Fellowships: The N²Women Young Researcher Fellowship program awards up to 18 annual travel fellowships to enable junior researchers to attend conferences where an N²Women event will be held.

Unlike more traditional travel fellowships, the N²Women Young Researcher Fellowship requires the recipient to serve as the organizer of the N²Women meeting at the event. The fellow must work directly

IDEAS WORK
 POWER CONCEPT
 LEADERSHIP THINK
 STRATEGY TARGET
 MARKETING GOAL INNOVATION
 TEAM ONLINE MOTIVATION BRAIN
LEADERSHIP



DEVELOPMENT CUSTOMER BUDGET MONEY
TACTICS
 PROMOTION SERVICE PRICING
 SE GOAL PRODUCT FUTURE PROFIT SAFE
 INSPIRATION IDEAS ANALYSIS
 RISK PROGRESS GROWTH
BUSINESS SOLUTION
 GOAL BRAINSTORM
 COMMUNICATION TEAM
PROCESS
 TALK MEDIA
 SKILL SELL
 TEAMWORK
 RESEARCH
 CREATIVE
 POSSIBLE

with the conference organizing committee to plan the event. She is also assigned a senior mentor who helps her make decisions about speakers or panelists to invite, timing of the event, and other logistics. This model provides significant value beyond just travel funds; for example, the fellow has the opportunity to meet and work directly with senior researchers in the field. In addition, previous survey results have shown there are significant benefits for the women who attend an organized N²Women meeting, e.g., positive impact from meeting other females (“I’m not alone!”) and increased professional development skills.

Awards: The N²Women awards committee works to ensure that women in our field are recognized for their accomplishments and apply for senior member and fellow levels in the ACM and IEEE professional communities. N²Women regularly monitors its list of members and encourages women who are eligible to apply for elevation in ACM and IEEE. Additionally, beginning in 2015, N²Women started two annual lists: 10 Women in Networking and Communications That You Should Know and 10 Women in Networking and Communications That You Should Watch. More than 150 people around the world submitted nominations for the 2015 list of women you should know, resulting in an impressive list of approximately 140 distinct names of accomplished women in the field. Similarly, more than 100 people nominated top junior researchers, making it difficult to choose just 10 women for each list.

Advocacy: The role of the N²Women advocacy committee is to ensure that the broader networking community remains welcoming to everyone. First, the advocate chairs review the websites of the major ACM and IEEE conferences in our field to ensure prominent posting of the ACM and IEEE’s anti-harassment policy, along with contact names, should anyone experience (or witness) cases of harassment at the conference. If a conference has not posted the policy, the chairs reach out to the organizing committee to request that the website be updated. Their efforts have



FIGURE 1. N²Women meeting at Infocom 2012, Orlando, FL, USA.



FIGURE 2. The 4th N²Women workshop, August 17, 2014, at ACM SIGCOMM, Chicago, IL, USA.

resulted in almost all of the conferences that we monitor posting the policy and providing appropriate contact names. We hope that this sends a clear message to all conference attendees that any type of harassment is not acceptable and will be reported and acted upon, ensuring that our conferences are welcoming venues for all attendees.

The advocacy committee also works to

increase the number of women who serve in prominent roles at the top ACM and IEEE conferences over the past several years, and have generated a list of female keynote speakers and invited panelists at these events. The numbers are, sadly, woefully low. We have, therefore, shared this data with ACM SIGMOBILE and IEEE ComSoc leaders in the hope that the number of females in these key (and



FIGURE 3. N²Women membership from 2006 to 2016.

N²Women members all over the world

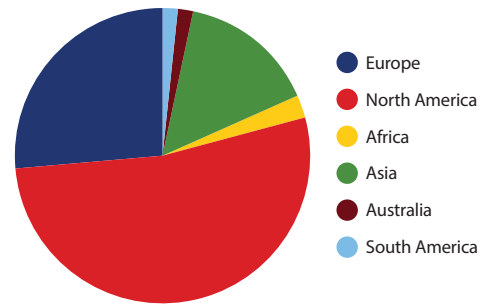


FIGURE 4. N²Women 2016 membership demographics.

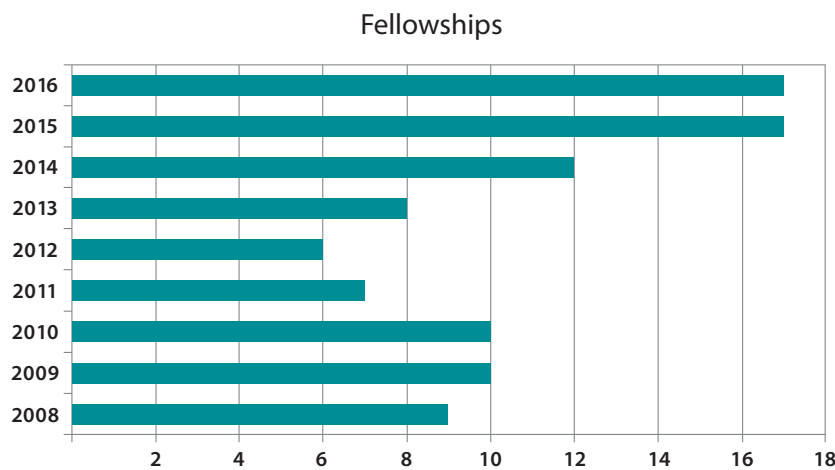


FIGURE 5. The number of fellowships awarded from 2008 to present.

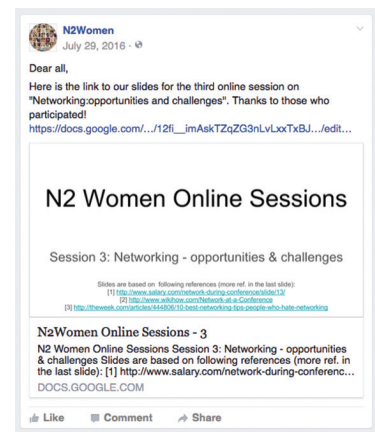


FIGURE 6. Facebook post: N²Women Online Sessions.

quite visible) speaking roles will increase. We have a large number of very successful women in our community, and we advocate that conferences recognize their efforts and showcase their accomplishments by inviting them to be keynote speakers and invited panelists at prominent conferences. Research indicates that making our successful female role models visible is extremely important in order to recruit and retain the next generation of women in our field.

Social Media: The role of the social media chairs has expanded in recent years to include groups on LinkedIn and Twitter, as well as a page and a closed group on

Facebook. In addition to advertising and discussion of events organized by N²Women, these forums serve as a place for sharing job and other professional opportunities. They are also a place to share articles on topics of interest to women in networking as well as accomplishments of women in our community. Recently, the social media chairs have begun hosting N²Women online sessions. The goal of the sessions is to facilitate an online discussion using videoconferencing, where members can share their experience and get advice from an experienced researcher. Two sessions were organized in 2016 and have received positive feedback from attendees.

Mentoring: In 2015, N²Women started a pilot mentoring program that pairs junior researchers with more experienced women in the field. We are currently working on Phase 2 of the pilot program and plan to extend it in the upcoming year.

Workshops: N²Women holds a biennial day-long mentoring and professional development workshop. Since 2010, the workshop has been co-located with MobiCom/MobiHoc (2010), MobiCom (2016), INFOCOM (2012 and 2013), and SIGCOMM (2014). Most events have featured two prominent keynote speakers, one or two panels, several small-group

mentoring sessions, and a technical poster session with a Student Best Poster Award. Some of the most prominent men and women in the field have participated as speakers. The sessions are a mix of technical content and professional development advice, providing an excellent opportunity for students to learn about hot topics in computer networking, open research problems, and possible career options after graduation. Feedback in post-workshop surveys has been overwhelmingly positive. For example, all participants of the 2016 event rated the workshop as a whole as Good (20%) and Excellent (80%). For example, comments from prior workshops include the following:

“Wonderful experience!! I really enjoyed the workshop.”

“The discussions were really relevant and I believe I learned a lot from it and the workshop in general.”

“(Favorite part was) networking and speaking with successful women in my field.”

“It was incredibly helpful to get to know people, in particular other women, before SIGCOMM.”

Thanks to generous support from a variety of sources, all N²Women workshops have been held without charge to the participants and have supported a significant number of travel scholarships for students to attend both the workshop and the main conference. In 2014, for example, a total of 77 people registered for the workshop and 56 junior researchers stayed for the main SIGCOMM conference. This not only provides significant benefit to the workshop attendees, but offers a larger and more diverse body of attendees at the main conference as well.

GET INVOLVED!

As N²Women continues to grow and offer additional programming, there are many ways to get involved with the organization. Visit the N²Women website for further details: <http://n2women.comsoc.org/>

Apply for a fellowship: If you are a junior researcher attending an N²Women-supported conference, consider applying for an N²Women fellowship. If you are a senior researcher, consider encouraging your students or junior colleagues to apply. Not only does the fellowship cover part or all of the cost of attending a prominent networking conference, it provides the opportunity to work directly with the main conference organizers who are leaders in the field of computer networking.

Organize an event: Organizing an N²Women event, for example a panel or a lunch meeting at a networking conference, is relatively easy. The N²Women website provides a guide that discusses the benefits of organizing an event and provides step-by-step instructions for planning the event and handling the logistics.

Volunteer for the board: With a board comprised of 26 people and growing each year, we call for new volunteers to help support the community. Why might you want to assist N²Women? First, in most cases, the time commitment is very small. Second, being on the N²Women Board is a résumé and CV builder. This is especially useful for students and junior researchers. Third, activities that show a commitment to promoting women in CS are valued by several organizations. Finally, you just may sleep better at night, knowing that you are involved in activities to broaden the participation of women in computing! ■

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Sami Rollins is a Professor of Computer Science at the University of San Francisco. Her research focuses on mobile computing, sensor systems, and Computer Science education. She is on the editorial board of Get Mobile magazine and is co-chair of the board of N²Women.

Tracy Camp is the Division Director of Computer Science at the Colorado School of Mines. Her research interests are in the credibility of ad hoc network simulation studies and the use of WSNs in geosystems. She is an ACM Fellow, an IEEE Fellow, and an ACM Distinguished Lecturer. She is a member of N²Women, CRA-W, and NCWIT.

Wendi Heinzelman is a professor in the Department of Electrical and Computer Engineering at the University of Rochester, and she is currently serving as Dean of the Edmund A. Hajim School of Engineering and Applied Sciences at Rochester. Dr. Heinzelman's research interests lie in the areas of wireless communications and networking, mobile computing, and multimedia communication. She is a member of N²Women and SWE, a Distinguished Scientist of ACM, and a Fellow of the IEEE.

N²WOMEN ALLOWS WOMEN TO CONNECT WITH OTHER WOMEN WHO SHARE THE SAME RESEARCH INTERESTS, WHO ATTEND THE SAME CONFERENCES, WHO FACE THE SAME CAREER HURDLES, AND WHO SHARE COMMON CAREER OBJECTIVES