The Women and Mathematics Program at IAS was founded in 1994 by Chuu-Lian Terng and Karen Uhlenbeck. The program in its early years benefited tremendously from the financial and administrative support of Philip Griffiths, who was then the director of IAS. It was truly a program ahead of its time. The program aims to address the issue of the “leaky pipeline” of female mathematicians. According to the 2013 AMS annual survey, the percentage of women earning undergraduate degree, earning a doctorate, in postdoc position, and with tenure/tenure track are respectively 41%, 31%, 21%, and 15%. Currently, the proportion of female faculty of Asst, Assoc, and full professor ranks are respectively 25%, 23%, 9.1% at Public Large universities, and 22%, 18%, 9.7% at Private Large universities. There has been definite progress in the last 20 years, since the founding of the program, due to government and institutional policies. For example, AMS data shows that the percentage of female doctorates has increased from 21% in 1994 to 31% in 2013. But the attrition rate, particularly at the two critical junctures at the end of undergrad and graduate stages requires continued attention and action. One way to counter the imbalance in the numbers of men and women in mathematics, as well as the higher attrition rate of female mathematicians compared to their male counterparts at the transition points highlighted above, is to encourage female mathematicians to form collaborative relationships and to be part of a large network that provides support and reduces the sense of isolation experienced by many women in mathematics.

The Women and Math program is currently sponsored by the IAS, the Princeton University math department, and the NSF. The program’s main mission is to recruit and retain more women in mathematics. In particular, the program seeks to inspire talented women at the undergraduate level to pursue and complete their educational goals at the highest academic levels, as well as to address the challenges encountered by female graduate students and postdoctoral researchers. While there are a number of women’s programs targeted solely at undergraduate or graduate students, WAM is perhaps unique in the depth and breadth of its reach that comes from including undergraduate students, graduate students, and researchers from a broad spectrum of US institutions in a community of scholars.

WAM is a two-week program that takes place each May prior to the Memorial Day weekend. Each program is organized around a mathematical topic. Within the topic, there are two 4-hour lecture series each week. The lecture series are distinct from standard curriculum and are pitched at different levels: the ‘beginners course’ is aimed at advanced undergraduates and beginning graduate students, the ‘advanced course’ at advanced graduate students who typically are well under way on a PhD thesis in the area. Each lecture is accompanied by a 90-minute problem session and daily homework problems led by teaching assistants. In addition, a 50-minute research seminar by mostly postdoctoral participants is scheduled on most days. The program
also includes two or three colloquia by prominent mathematicians, mostly women, in the field of the year's theme topic. Some of the colloquium speakers in recent years include: Nalini Anantharaman, Jennifer Chayes, Fan Chung Graham, Melissa Liu; as well as Maryam Fazel (Compressive Sensing), Claudia Perlich (Display Advertising), Tadashi Tokieda (Toy Models). The academic component of the program is designed to offer top quality instruction and research experience. The lecturers are chosen for their mathematical prestige as well as their ability to make sophisticated mathematical content accessible. Some recent lecturers include: Lucia Caporaso, Maria Chudnovsky, Moon Duchin, Alice Guionnet, Nancy Hingston, Wei Ho, Elizabeth Meckes, Liz Beazley Milicevic, Ioana Dumitriu, Claire Voisin, Lauren Williams.

Another crucial component of WAM is the Women-in-Science Seminar (WiS) which takes place just before dinner. It brings together all participants, regardless of their age or rank, for a one-hour discussion of various issues of concern to women in mathematics. The activities in this hour break down possible barriers between the participants, and facilitate, through their very informal atmosphere, the building of mentoring relationships and long-lasting friendships which are one of the main goals of WAM. Over the years, WiS has addressed topics on applying to and surviving in graduate school, securing a postdoc position, becoming an academic mathematician, mathematical careers outside academia, chat with a senior mathematician, bringing diversity to mathematics, work-life balance, NSF funding opportunities, etc.

Participants are usually housed in shared apartments on the IAS campus. The grounds, dining and library facilities, and staff support offered by the IAS make the two-week mathematical experience particularly enjoyable and memorable for participants. Over daily teas, lunches, and dinners, participants are able to mingle, both seek and offer advice and support. Participants often plan further social activities themselves, such as soccer or frisbee games, trips to New York (MoMATH), canoe/kayak trips, or a walk in the IAS woods.

The program has grown from about 30 participants at the beginning to 60 participants in recent years. Roughly, the participants divide into 20 undergraduates, 30 graduate students, and 10 postdoctoral fellows. Together with lecturers, organizers, colloquium speakers, as well as local mathematicians mostly from Princeton University, The College of New Jersey, and Rutgers University, and visiting panelists, the number of WAM participants can be between 70 and 80 on any given day.

The program has enjoyed tremendous support from senior women mathematicians of all levels. 4 out of the 5 women mathematicians from the National Academy of Science (Chang, Daubechies McDuff, Uhlenbeck) have played leading roles in the planning and organization of the program. Since 1994, WAM has hosted 1047 individuals. This number includes undergraduate, graduate, and postdoctoral participants, as well as lecturers, colloquium speakers, panelists, and organizers. A WAM alumnae database is established to track alumnae career progress and offer network support to women mathematicians. Of the 1047 WAM alumnae, 330 were undergraduate participants,
80 (24%) have received PhDs, 172 (52%) are in Academia, 35 in Industry/IT, 13 in Finance, 11 in Education, 2 in Government, 6 in Institute/Lab…

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• What works?
  • Undergraduate participants come from a very wide range of institutions and backgrounds. The applicant pool consists of very few female mathematics majors at the most elite universities and many motivated students from formerly group II, III, or IV universities. It is worth noting that the percentage of female math majors at top universities are quite low, and some of these women may also eschew women only programs to avoid a perceived stigma of being a woman mathematician. Both word of mouth and the program flyers help advertise the program to far corners of the country and beyond. We tend to admit strong students from the top universities, and the top students from small liberal arts colleges or public universities.
  • Many alumnae have returned to the program in different capacities, for example as graduate participant, TAs and even lecturers.
  • Recently, we have started to organize informal mentoring partnerships for participants interested in having a mentor who is further along in their career. The mentor serves as a sounding board, a friend, a counselor, a cheerleader and a promoter. Some participants identify their mentors while participating in the program. Using our extensive alumnae database, we are also able to find for some of our participants older alumnae mentors who share similar experiences, particularly those from smaller universities and liberal arts colleges.

• What needs to be available to your undergraduates?
  • Knowledge that everyone, even the most successful mathematicians, encounters setbacks.
  • Perseverance is key.
  • Who/where to turn to for support.
  • Ways to attract students:
    • Local faculty encouragement.
    • Alumnae advertising by word of mouth.
  • What students get out of participating?
    • Our exit survey indicates that participants greatly appreciate the opportunity to meet, mentor, and being advised by, female mathematicians of all ranks and career stages in a friendly and supportive atmosphere. A common refrain from participants is that they feel more connected to the mathematical community and more motivated and confident after attending the program. The younger students particularly like the open and friendly environment where they interact with potential role models mathematically and socially. They feel rejuvenated and encouraged to continue their mathematical studies.
    • It is worth noting that many undergraduate women, even those from large state universities, feel very alone in math departments at their home institutions. Meeting others who share the same mathematical interests was an a rewarding experience.
• Are there policy issues? Are more resources needed in order to reach more students?
• Key is to make sure they are supported in the long term by providing mentorship through graduate school and postdoc years.
• Has the value of this type of program been formally studied? Is a study needed?
• Our database tracks the participants’ career progress.
• WAM alum achieves many distinctions in the last twenty years: NSF graduate fellowships (47), NDSEG fellowships (14), NSF postdocs (26), Sloan fellowships (20). However, participants are self-selected and targeted, this confounds the causal impact on their careers.