First Findings from the INCLUDES Grant
***Best Practices for Undergraduate Programs*[1]**

An NSF INCLUDES grant[2] titled *Women Achieving Through Community Hubs in the United States (WATCH US)* was awarded to a group of mathematicians[3] and social scientists[4] to study strategies to increase the percentage of women entering and succeeding in graduate school in the mathematical sciences. The WATCH US group has recently completed a two-year study with the aim of determining what ideas, both large and small, can be implemented to improve the success and persistence of women, including those from under-represented groups. The study included collecting data and holding discussions with stakeholders as well as past participants in various enrichment programs. This document provides ideas for departments interested in increasing the success of diverse students in their undergraduate programs, and the likelihood of those students to enter and succeed in graduate school.

Key Actions that undergraduate programs can take to help women and others succeed:

1. Create a community among your students and faculty:
   - Build community through shared interests (solving recreational math problems, volunteering at a local school) or social events (afternoon teas, pre-colloquium cookies, "math" lunch, π-day celebrations).
     - Talk about the importance of community and collaboration in your classes.
   - Encourage a collaborative culture rather than a competitive one.
     - Collaborative activities/competitions like the modeling contest, or the DataThon, attract more women and URMs than individual competitions like the Putnam.
   - Celebrate the milestones that every student should achieve.
   - Organize study groups for classes or drop-in tutoring sessions at the department level.
     - Student-organized study groups tend to exclude students who do not share certain traits with the organizers; departmentally-organized study group opportunities or tutoring allow all students to feel welcome to join. Train peer mentors so that they have tools for helping to build collaborative spaces and a sense of community.
2. Create a sense of belonging.
   - Have juniors and seniors talk to first- and second-year students about doubts and concerns they faced and how they overcame them. That helps level the playing field for students.
   - Have positive student role models available to speak to first- and second-year students during registration to answer their questions.
   - Ensure role models, including female faculty and faculty of color. It is difficult for some students to imagine succeeding when they do not see anyone who looks like them who has succeeded.
   - Intentionally give words of encouragement (a note on an assignment or project, an email at the end of the semester) to ALL students, particularly in the first-year classes.

- Have diverse speakers in all seminar and colloquium series. Have speakers talk about their lives and mathematical paths with students; offer the opportunity for social interaction between the speakers and students outside of the talk structure.
    - Allowing students to understand the individuals behind the mathematics will help students to envision themselves as successful mathematicians.
- Use broad criteria for excellence in selecting students for special opportunities and awards.

3. Provide a safe and welcoming environment.
    - Students should not need to sacrifice their safety to succeed in your program. Make sure there is good lighting and that there are secure places for students to work in evenings and on weekends.
    - Students are often unwilling to speak up, and so when they do, you should expect what they are saying to have validity. Make sure women's concerns are heard and taken seriously.
    - Make sure stereotypes are not perpetuated. Do not pigeonhole faculty, staff, or students into certain roles based on gender, race, or ethnicity. Faculty should avoid using microaggressions[5] and should liberally use microaffirmations[6].
    - If events on or off campus might impact students, take the time and make space to talk about those events.
4. Advocate for a Growth Mindset: Mathematicians are made not born.
    - Faculty and speakers should give examples of how they struggled through difficulty.
    - Giving students insight into how successful mathematicians have struggled will allow them to imagine themselves succeeding through their struggles as well.
    - Faculty should believe in the potential of all students, and avoid "deficit" labels.
    - Send a consistent message that the department wants and expects every student to succeed; department should avoid a "weed-out" culture.
    - Work toward multiple pathways through the curriculum, paths can start in different places; "success" is not narrowly defined.
5. Work towards buy-in from all faculty for an inclusive and diverse department
    - Clearly articulate why and how your program sincerely aims for diversity and inclusion.
    - In order to achieve institutional change, a critical mass of the faculty must be committed to these goals.
    - Discuss evidence-based teaching practices amongst the faculty.

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[1] http://WomenDoMath.org

[2] National Science Foundation; OMA-MPS Multidisciplinary Sciences #1649365 (2016-2018).

[3] Mathematical team: Ruth Haas (Smith Postbac Program, President-elect AWM); Deanna Haunsperger (Carlton Summer Math program, President MAA); Ami Radunskaya (EDGE, President AWM); Judy Walker (Nebraska Conference for Undergraduate Women in Mathematics; AMS Board of Trustees)

[4] Hill, P.W., and Whitney, C. (August 2018) NSF INCLUDES WATCH US Qualitative Research Methodology Report and Preliminary Findings: Mathematics Stakeholders Interviews. Prepared for the NSF INCLUDES Design and Development Launch Pilot WATCH US Program. https://www.womendomath.org/watch-us/

[5] Su, F. (October/November 2015) Mathematical Microagressions. MAA Focus. https://bit.ly/math-microaggressions-pdf

[6] Haunsperger, D. (August 2017) President's Message: It's the Micro That Matter. http://digitaleditions.walsworthprintgroup.com/article/President%E2%80%99s+Message/2862238/433409/article.html