

Why Broadening Participation Matters

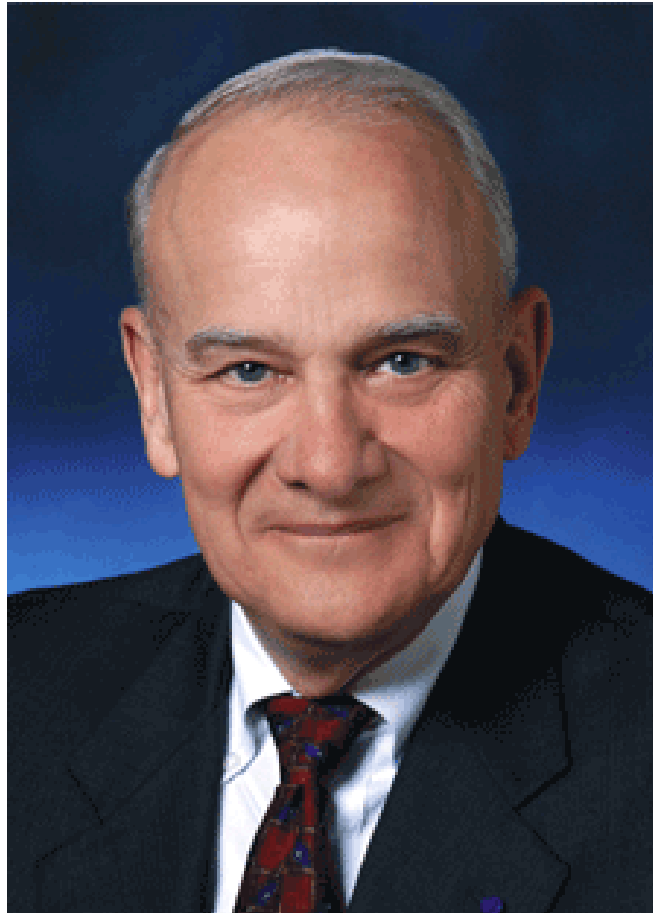
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SIGCSE
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Channeling Bill Wulf



For reasons of workforce?





For reasons of social equity?





For reasons of greed!



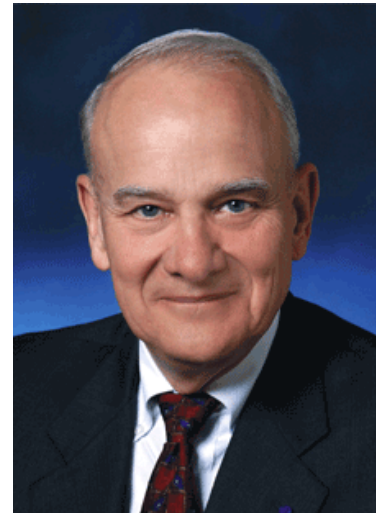








“Every time we approach an engineering problem with a pale, male design team, we may not find the best solution. We may not understand the design options or know how to evaluate the constraints. We may not even understand the full dimension of the problem.”



What can each of us do?

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Computer Science & Engineering

UNIVERSITY of WASHINGTON

News & Events | People | Education | Research | Current Students | Prospective Students | Faculty Candidates | Alumni | Industry Affiliates | Support CSE

DawgBytes: A taste of CSE

UW CSE's K-12 outreach program, DawgBytes, aims to introduce both students and teachers to the exciting world of computer science & engineering. Whether you are a K-12 student, a UW CSE student, a parent or an educator, we have opportunities for you! If you are interested in scheduling a building tour, a classroom visit or becoming a DawgBytes volunteer, please e-mail outreach@cs.washington.edu.

Find lots of pictures and our event calendar on [the DawgBytes Facebook page](#).

Read our 2011-2012 [activity report](#).

For K-12 students

Programming Competitions

We host programming competitions organized by [PSCGTA](#). These allow high school students to show off their programming chops. [Learn more](#).

Summer Camps

Our summer camps introduce middle and high school students to computer science through programming projects, magic tricks and faculty presentations. [Learn more](#).

Computing Open House

Several computing departments on campus as well as local tech companies present hands-on activities illustrating the breadth of computing. [Learn more](#).

NCWIT Award

The NCWIT award for aspirations in computing recognizes high school girls passionate about computing. We participate in the VIA affiliate competition. [Learn more](#).

STEM Out!

STEM Out, organized with [PSCGTA](#) and Amazon.com, is a day just for girls to hear stories from women in STEM and participate in hands-on activities. [Learn more](#).

Deaf & Hard of Hearing

UW's Advancing Deaf & Hard of Hearing in Computing project has many activities, including a 9-week residential Summer Academy for students from across the nation. [Learn more](#).

CSE Videos

We have created several videos to showcase applications of CSE, overcome CSE stereotypes and share why our students and faculty have chosen the field. [Learn more](#).

For K-12 Teachers

CS4HS

Every summer, about 50 middle and high school math and science teachers come to UW CSE to learn how to teach computing concepts to their students. [Learn more](#).

Puget Sound CSTA

We host and participate in monthly meetings of the Puget Sound chapter of the Computer Science Teachers Association. [Learn more](#).

Inspirational Teachers

Each year, we ask our students to nominate their favorite high school or community college instructor and invite them to join us for a banquet in their honor. [Learn more](#).

National Involvement

CSE faculty members publish and present to conferences including [SIGCSE](#) and [CSEI](#). Principal lecturer [Shard Rogers](#) is currently University Faculty Representative for [CSTA](#).

<http://www.cs.washington.edu/dawgbytes/>

Programs for K-12 students



- Weeklong summer day camps for girls
- Annual open house in connection with CS Ed Week
- Multiple annual programming competitions with Puget Sound CSTA
- Annual NCWIT Award for Aspirations in Computing
- Summer Academy for Advancing Deaf & Hard of Hearing in Computing
- Videos describing the nature of the field
 - "Power to Change the World"

Programs for K-12 teachers



- Annual CS4HS summer workshop
- Broad support for Puget Sound CSTA
- Annual Inspirational Teacher Dinner
- Instructional support

Our introductory course sequence: One size fits all

- CS1: 2,000 students/year (up 65% since the bust)
- CS2: 1,300 students/year (up 100% since the bust)
- Female enrollment: Up 120% and 180% respectively
 - Instilling confidence
 - Building community
 - Illustrating the breadth of the field



Stuart Reges



Marty Stepp



Hélène Martin



Allison Obourn

Our Introductory Course Instructors



60 undergraduate TAs, 45% women

Broadening Participation: The Why and the How

Crystal Eney, Ed Lazowska, Hélène Martin, and Stuart Reges, *University of Washington*

There are many reasons for striving to increase the representation of women in the computing field, but the most compelling one is the enhanced quality of the solutions diverse contributors can achieve.

We are honored to have been invited to address the “how” of broadening participation in computing by describing our experiences at a large, research-intensive public university.

We begin, though, by addressing the “why,” because having the right motivation is of critical importance. As eminent computer scientist Bill Wulf stated nearly 15 years ago, when he was president of the National Academy of Engineering:¹

A lot of people argue for diversity in terms of fairness. We Americans are very sensitive to issues of fairness, but that's not my argument. Others argue in terms of simple numerics: Male caucasians will be the minority in the 21st century, and so to meet the need for engineers we will have to attract women and underrepresented minorities. That's true too, but that's not my argument, either.

I believe there is a far deeper reason why we require a diverse work force. Let me give you the argument in a nutshell, and then I'll try to draw it out more carefully.

First, engineering is a very creative profession. That is not the way it is usually described, but down to my toes I believe that engineering is profoundly creative. Second, as in any creative profession, what comes out is a function of the life experiences of the people who do it. Finally, sans diversity, we limit the set of life experiences that are applied, and as a result, we pay an opportunity cost—a cost in products not built, in designs not considered, in constraints not understood, in processes not invented ...

Every time we approach an engineering problem with a pale, male design team, we may not find the best solution. We may not understand the design options or know how to evaluate the constraints. We may not even understand the full dimension of the problem.

In other words, while there are many reasons for striving to increase the representation of women in our field, the selfish reason is the most compelling one: the quality of the solutions we achieve is enhanced by the diversity of the individuals contributing to these solutions.

Having nailed the incentive angle with Wulf's help, we can now focus on ideas that are broadly applicable and less obvious—describing what we're doing at the University of Washington.

UW is a large research-intensive public university located in the heart of one of the nation's most vibrant software industries. UW's 28,000 undergraduate students have a range of interests and abilities, and they can choose from a broad array of technology-related majors. This differs significantly from the environment at smaller,

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"There's no silver bullet. Sometimes, it's one woman at a time - a student who has made a connection with an advisor, an instructor, or an undergraduate TA, or who gets hooked because of an honors section, the women's seminar, a cool assignment, or a great exploration session. Progress comes from a multiplicity of efforts, and every little bit helps."



Our undergraduate advisors:
← Crystal Eney
Raven Alexander
Elise deGoede Dorough
Jenifer Pesicka
Megan Reardon



