

# Project BPC Plan

Ada Lovelace (Activity 1), Jean Bartik (Activity 2), Grace Hopper (Activity 3)

## 1 Activity: Diversity-Focused CS course with Service Learning Outreach (Z State University, Lovelace)

### 1.1 Context & Goals

**Context:** Between 2011 and 2019, just 13% of CS BS graduates at Z State University were female-identified.

**Goal:** Improve retention among women in CS at Z State University.

**Activity Motivation:** -Service-learning has been shown to provide positive academic and attitudinal benefits for students ([Eyler, Giles, & Braxton, 1997](#)), many of which are associated with college persistence.

### 1.2 Intended Population

**Activity Participants:** Primary participants are women already enrolled in college who are studying computer science. A secondary group of participants attending W Academy, a specialized high school for pregnant and parenting teens; the majority of the high school students are women. The primary participants are engaged both through a course and through a service-learning program where the secondary participants are clients.

**Participant Recruitment:** University students currently enrolled in CS are invited to take an experiential service-learning course that counts toward their CS degree. Students in W Academy are asked to participate as clients as part of their regular schoolwork.

### 1.3 Strategy

**Responsibilities of PIs:** PI Lovelace will teach a version of the Stanford University course "[Race and Gender in Silicon Valley](#)" designed by Cynthia Lee, and PI Lovelace will add service-learning to the course.

**Activity Content:** This planned service-learning course explores issues surrounding diversity in technology fields and students in the course lead hands-on activities for the High School students.

**Activity Budget:** \$1000 is requested per year to cover the costs of travel for Z State students to travel to W Academy and complete required background checks.

### 1.4 Preparation

PI Lovelace is a board member for W Academy and was involved in the design of the school. Olschanowsky will build on the course materials developed at Stanford University and will be mentored by Marlyn Wescoff who has experience working with Z State students to do CS outreach at W Academy.

### 1.5 Evaluation

PI Lovelace will measure the impact of this course by comparing the graduation rates of students who complete the course to the graduation rates of those who do not take the course (disaggregated by gender). To iteratively improve the program, feedback will also be collected

from both the teens and the head teacher at the W Academy, as well as from university students enrolled in the course.

## **2 Activity: REUs for 4 female students (University of Q, Bartik)**

### **2.1 Context & Goals**

**Context:** The Department of Computer Science at the University of Q serves approximately 1400 undergrads and 100 graduate students. Even though 53.5% of the students at UQ are female, only 16.7% of the enrolled CS undergraduates are female. The Department of Computer Science at the University of Q has a verified department plan (link not provided in anonymized version).

**Goal:** Over the four years of the proposed project, PI Bartik's goal is to include at least four female undergraduates in undergraduate research activities.

**Activity Motivation:** Participation in undergraduate research opportunities has been shown to help retention with undergraduate students.

### **2.2 Intended Population**

**Activity Participants:** Female undergraduate computer science students.

**Participant Recruitment:** PI Bartik will actively recruit female students by attending multiple WICS club meetings per semester and sending recruitment emails.

### **2.3 Strategy**

**Responsibilities of PIs:** PI Bartik will be responsible for maintaining her relationships with the WICS club in the department, and advising recruited female students in research projects.

**Activity Content:** The research activities with undergraduates will include four times a week 15-minute scrum meetings, collaboration meetings for specific projects, and an open research group meeting once a week where graduate and undergraduate students share research progress. This activity aligns with the third goal in the department's BPC plan (link not provided in anonymized version), which focuses on undergraduate out-of-classroom mentoring.

**Activity Budget:** Primary funding is through NSF's REU program. An additional budget of \$500/year is requested to pay for food at information sessions and other incidentals.

### **2.4 Preparation**

PI Bartik also has 15 years of successfully mentoring undergraduate researchers including multiple, female summer DREU students. Her undergraduate research students have won multiple awards, presented reviewed posters, and published papers. PI Bartik is active in increasing the representation of women and underrepresented minorities in computing. In the recent past PI Bartik was the Women in Information and Computer Science (WICS) club faculty advisor at UQ. During 2016 through 2018, she led the University of Q participation at the Grace Hopper Celebration of Women in Computing with on average 15 students and some faculty attending each year.

### **2.5 Evaluation**

PI Bartik will track the number of times she participates in WICS activities and the number of undergraduate research students and maintain gender demographics. The results will also be included in the yearly NSF reports for the proposed project.

### **3 Activity: Oversee external grant to improve women's success in CS1 and perform outreach (University of X; Hopper)**

#### **3.1 Context & Goals**

The Computing Department's undergraduate population consists of just 13% women and 8% Latinx students, much below the demographics of the university and state. For more details, see the verified Computing Department's BPC Plan (link not provided in anonymized version).

**Goal:** Improve the undergraduate experience through curriculum changes in the undergraduate program, especially targeted at students from groups underrepresented in computing.

**Activity Motivation:** The work is motivated by the discrepancy between the demographics within the School, the university and the state, and the enormous demand for students with computing degrees in the state. State X had one of the fastest-growing tech sectors in the US in YEAR.

#### **3.2 Intended Population:**

The project will focus on prospective women and, indirectly, Latinx undergraduate students.

#### **3.3 Strategy**

**Responsibilities of PIs:** PI Hopper is leading a new external grant with the goal of doubling the percentage of women undergraduates graduating with a computing-related degree.

**Activity Content:** PI Hopper's role will be to oversee the entire project, and as department chair, engage with the faculty to ensure all tasks are completed. The grant requires a revamp of the introductory programming sequence, providing a 2-semester option and separating students with no experience from others, so as to make these courses more inclusive and improve recruiting and retention of women. Additional TA support will provide support for students with no experience. However, all students will benefit from efforts to make the program more inclusive. The project will also include support for a new staff member, a Director of Diversity and Outreach, who will lead a team of student ambassadors in campus outreach.

**Activity Budget:** None, funded externally.

#### **3.4 Preparation:**

PI Hopper, as department chair of the Computing Department, organizes regular training at faculty meetings from on-campus groups focused on inclusivity. The CIC grant provides a consultant to guide the work.

#### **3.5 Evaluation**

The external grant will include extensive data analysis of enrollment patterns and performance patterns within demographic groups, which will be included in the annual NSF report.