

Departmental BPC Plan
Department of Computer Science
University of Alabama



Effective dates of Plan: 04/15/2022- 04/15/2024

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1. Context

The University of Alabama (UA) is a land-grant institution located in west-central Alabama in Tuscaloosa, Alabama. UA is one of four major public universities in the State of Alabama classified as a Carnegie R1 university. The Department of Computer Science (CS@UA) is housed in the College of Engineering (CoE) and serves approximately 750 undergraduates and 60 graduate students. Twelve percent of the undergraduates at UA identify as Black, while only 8.7% of undergraduates in the CoE identify as Black. In CS@UA, 14.6% of our undergraduates and 15.7% of our PhD students identify as Black.

UA, the CoE (through its <https://students.eng.ua.edu/programs/mep/> Multicultural Engineering Program) and the CS department are all committed to broadening participation in computing across our degree and outreach programs. While CS@UA sponsors multiple activities that have been successful in recruiting Black high school students (e.g., NSF-sponsored LEGACY project), many of our Black students are not retained beyond their first year in CS. The overall DWF rate, which is a grade of D, F, or Withdraw, in our CS1 was at a high of 65% in 2018. To improve our student enrollment and retention, we made some changes to our CS1 course, resulting in a decrease in our DWF rate in CS1 to 46% in Fall 2020. *Unfortunately, the DWF rate for Black students remained at 65%.* To broaden participation in computing at UA, this disparity between our Black students (our focus population) and our remaining CS students needs to be addressed.

2. Goals and Activities

G1: By Spring 2022, design and implement a data plan that will allow us to collect, report, and regularly discuss data with respect to our BPC plan to monitor progress, help identify issues and gain insight as to why we are not retaining our Black students.

A1: Monitor the performance of the students in our intro courses and use midterm grades as an early warning system to intervene as needed. (Yessick/Watson)

E1: Using the midterm and final grades at the end of each semester, compare the DWF rate for target population to the remaining students and share results with the faculty.

A2: Work with the Admissions Office to obtain and understand data about new and transfer applications to CS@UA. (Gong)

E2: Track what data was collected, analyzed, and share with faculty.

A3: Work with the CoE Multicultural Engineering Program Director to identify the climate in our department and explore strategies that will help us tailor departmental metrics. (L. Smith)

E3: Track what data was collected, analyzed, the metrics tailored, and share with faculty.

G2: Within five years (2026), increase the retention of our Black students to the same level as our remaining CS students by (1) increasing curriculum effectiveness and student engagement in CS Freshman courses, (2) enrolling at least 50% of all students who are not Calculus ready for CS1 in a programming course by Fall 2022, (3) providing out-of-classroom mentoring, intentional creation of communities and increasing support opportunities for students.

A4: Refactor our CS Freshman course experience and apply appropriate pedagogical structures (e.g., active learning strategies, project-based learning) to ensure courses are engaging to our

target population, including those who have not had prior deep exposure to CS. (Yessick/Watson)

E4: Identify the examples, projects, and learning strategies that are most meaningful to everyone.

A5: Recommend our Python course and CS Principles course for students who do not have the prerequisites for CS1 to provide them the opportunity to experience programming. Offer these courses routinely in the summer for incoming freshmen. (Graham/West)

E5: Keep track of their enrollment in Python and CS Principles, their course performance, and monitor their retention and success in the CS program.

A6: Create intentional CS learning communities for CS1 students. Start them as tutoring sessions staffed by graduate students with an emphasis on student connections, e.g., working with each other on problems provided. (Yessick/Watson/Gehrke)

E6: Track initial student participation through observation initially, followed by self-reported responses of participation in these communities.

A7: Support students attending such conferences as ACM Richard Tapia, NSBE, and Grace Hopper. (Vrbsky)

E7: Track students and faculty who attend these conferences.

A8a: Near-peer student mentoring will start with upper-class students helping orient freshmen on campus, sharing strategies for success in the first year and helping students identify campus resources (e.g., student organizations such as ACM, ACM-W, NSBE, SWE). (Watson)

A8b: Graduate students will mentor upper-class students. (Carver)

A8c: CS alumni will also provide mentorship to help with career preparation and give encouragement. (R. Smith)

E8: Track student participation in these mentoring opportunities.

G3: By Fall 2022, we will use the data collected in G1 to evaluate the impact of individual BPC activities associated with G2.

A9: Design departmental survey and organize CS student town halls, to create a feedback mechanism to receive the students' opinions, concerns, and perspectives about the departmental BPC activities they believe to be critical to their development and future success. (Vrbsky)

E9: New surveys, their results and townhall feedback will be shared with the faculty.

A10: Participate in the CRA Data Buddies Survey, which will survey students and provide an annual report. (Anderson)

E10: The report will be presented in departmental meetings to increase faculty awareness of the department progression in BPC.

G4: By 2025 we will increase the enrollment of Black students in our program to 18% by focusing more of our outreach efforts on rural Alabama.

A11a: Continue as an NCWIT Aspirations for Women affiliate. Review NCWIT applicants and host Central Alabama NCWIT awardee dinner at UA. (Gray)

A11b: Engage in activities such as high school programming contests, CS camps, field trips, and K-12 teacher workshops to serve students underrepresented in computing. (Gray)

A11c: With the NCWIT Counselors for Computing Program, initiate conversations with high school counselors to advise students about available classes at their school. Note that Alabama requires every high school to offer an authentic CS course. (Gray)

E11: We will evaluate and track our outreach activities to measure the number of events and the number and demographic of students participating.

A12: Work with the Admissions Office to identify the difficulties faced by our newly enrolled students in the pathway to success in CS@UA. (Hong)

E12: Systematically track new enrollment and obtain student feedback to help evaluate the impact and iteratively refine our process for building a recruiting pipeline that improves retention.