

## PROJECT SUMMARY

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### Overview:

CRAFT: Culturally Responsive, Affective-Focused Teaching of Science and Mathematics is an Early-Stage Design and Development Study in the Teaching Strand. CRAFT will create a transformative two-year teacher education certificate program for 48 secondary STEM teachers in Alachua County Public Schools (ACPS), the school district with the largest and longest-standing racial achievement gap in STEM in Florida. Our project asserts that science and mathematics instruction—with an explicit focus on students’ affective development through culturally responsive teaching—will broaden the participation of populations historically underrepresented in STEM. Our team is comprised of experts of culturally responsive, antiracist STEM teaching; affective-focused STEM instruction; research design methodology; and district leaders. Using design-based implementation research, CRAFT will accomplish the following aims:

- Transform practices: A cadre of 48 secondary science and mathematics teachers will be equipped with culturally responsive, affective-focused practices and leadership skills to support STEM learning, affect, identities, and career interest for students who identify as Black, indigenous, or people of color (BIPOC).
- Construct tools and resources: Open-access PD materials will be produced for supporting and sustaining culturally responsive, affective-focused teaching of science and mathematics. These materials will be created in Canvas and shared through open-access platforms.
- Develop a theory of change: An evidence-based and adaptable framework will be created that identifies how program experiences improve science and mathematics teachers’ culturally responsive, affective-focused instruction.

### Intellectual Merit:

The CRAFT project extends previous research to improve STEM teacher education in ACPS and broadly. CRAFT is innovative and unique from existing programs in three distinct ways. (i) Most equity coursework in science and mathematics education is relegated to one or two methods classes or is featured as a stand-alone course separate from disciplinary content. Our program integrates content and equity, with a sustained focus on culturally responsive, affective-focused teaching over a two-year, job-embedded and blended learning program. (ii) Equity-focused teacher education programs often miss opportunities to develop core components of culturally responsive teaching in STEM teachers. Through a STEM Enrichment Summer program, action research, and program experiences informed by transformative learning theory, CRAFT will develop teachers’ affirming attitudes toward BIPOC students; their focus on students’ affective development; and their knowledge of culturally responsive instructional design and assessment. (iii) By explicitly targeting students’ affective development, CRAFT will support secondary students’ engagement in science and mathematics, a key factor in their cognitive achievement, their interest in STEM studies and careers, and their development of positive STEM identities. Through iterative program and tool revision cycles, CRAFT will identify effective, feasible structures for transformative learning experiences that will strengthen the skills and abilities of STEM teachers in intentional, well-supported, and sustainable ways.

### Broader Impacts:

CRAFT envisions two Broader Impacts: (i) Improving STEM Educator Development, and (ii) Broadening STEM Participation. First, CRAFT’s innovative, blended-learning and job-embedded program will develop teachers as culturally responsive, affective-focused practitioners and leaders within schools across the ACPS district. Open-access professional development materials for supporting and sustaining culturally responsive, affective-focused teaching of science and mathematics will be shared widely, allowing the program to expand its impact beyond our initial context. Locally, teachers will conduct action research and share findings with colleagues, school administrators, and researchers through a regional CRAFT Teacher Research Symposium and at national science and mathematics education conferences, improving sustainability. Second, CRAFT is designed to transform teacher practices for 48 science and mathematics teachers, with the goal of improving academic outcomes, STEM identities, and interest in STEM careers for approximately 5,300 students in a district with the largest racial achievement gap in STEM in the state.