

HSI ITP: Cal Poly Pomona Intentional Venture Engaging STEM Students (CPP INVESTS)

Project Summary: California State Polytechnic University, Pomona (CPP) is one of 23 campuses in the California State University (CSU) system located in Los Angeles County, CA and is widely recognized for its polytechnic mission and learn-by-doing philosophy. CPP enrolled its largest number of students in fall 2020 at 29,704, 94% undergraduates, 59% first-generation college students, and 44% Pell recipients. CPP is designated by the U.S. Department of Education as a Hispanic-Serving Institution (HSI); Hispanic students constitute 49% of the student body and 82% identifies as non-white. CPP's STEM programs play an important role in the local, state, and national economy and currently, 1 out of 14 engineers in California were trained at CPP. CPP is the highest-ranking polytechnic university in the nation on the "2020 Social Mobility Index" for propelling low-income students to financial success by graduating them into well-paid careers. Of the 39% CPP STEM students 22% were enrolled in Engineering, 13% in Science, and 4% in Agriculture.

The vision of INVESTS is to expand student pathways to continued STEM education and integration into the STEM workforce through interventions during three critical transitions in the STEM student life cycle: secondary to post-secondary education, lower division to upper division STEM courses, and graduation to the STEM workforce. INVESTS has three inter-related goals:

GOAL 1 Embed high impact practices at critical transition stages. **a) First-Year Experience (FYE)** – i) increase the number of FYE courses in the College of Science from the current two to seven; ii) embed course-based undergraduate research experiences (CUREs) into new and existing FYE STEM courses; iii) embed peer learning assistants (PLA) into FYE courses to support CUREs. **b) Second year CUREs** – Embed CUREs in second year gateway STEM courses. **c) Upper-division micro-internships and CUREs** – Embed six-week "micro" internships in junior gateway and senior capstone STEM courses, and CUREs into capstone and upper-division GE courses.

GOAL 2 Implement four alternative learning records (ALRs) to enhance the transition of STEM students into the STEM workforce: **a) Leadership career development pathway** – teamwork and communication ALRs. **b) Research career development pathway** – information literacy and problem solving ALRs.

GOAL 3 Provide STEM faculty professional development opportunities anchored in diversity, equity, and inclusion through: **a) Identifying and coaching STEM department champions** to support efforts in adopting culturally relevant pedagogies and developing more effective equity work initiatives. **b) Offering STEM Faculty Institutes** to coach faculty in developing culturally relevant pedagogy, developing FYE courses, embedding CUREs and micro-internships in their courses, and implementing ALRs in their courses and programs.

The intellectual merit of INVESTS will include contributing to HSI STEM education research by addressing: 1) the impact of peer mentoring experience of first time first year STEM students on their sense of belonging and academic self-efficacy utilizing self-efficacy theory; and 2) the contribution of ALRs and micro-internships to the professional identity of STEM students over and above their STEM identity. Academic research on two innovative components of the proposal is in the nascent stage. INVESTS will make important contributions to STEM education research by examining the impact of ALRs and course-embedded micro-internships on STEM student success.

The broader impacts of INVESTS will include: 1) 11,750 (39% of student population) STEM students by focusing interventions in the three STEM colleges of Engineering, Science, and Agriculture; 2) students from underrepresented communities, first-generation, and low income; 3) 200+ STEM faculty through faculty development opportunities and learning communities; 4) industry and community partners through the development of mutually beneficial micro-internships; and 5) the CSU system, serving the greatest number of Hispanics and underserved STEM students in the nation, and other institutions that serve large populations of students from URMs and low-income communities through broad dissemination via publications, presentations at CSU-wide conferences, annual conferences focused on STEM education, and an INVESTS website hosted by CPP.