Undergraduate Research HIP
at
Columbia State Community College

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CSCC student populations

- Has 5 campuses: 9 counties in southern Middle Tennessee
- Two campuses – Columbia and Williamson serve more than 77% of students
- The number of students: 6,130
HIP Course-Based Research Experience (CRE) in Biology

- HIP CRE in Biology was implemented in 2017
- Introduced as a 1-credit elective Introduction to Biology Research course
- Offered a choice of research projects at two campuses
- Secured funding
HIP Biology Research - inclusive education in STEM

- Equity and inclusion: an inclusive research education

- The diverse population of CoSCC students includes:
  - 17.8% of a racial/ethnic minority
  - 28.9% low-income (based on PELL - eligibility)

- The project-based course does not require prior skills
Participation from Underrepresented Students

Combined Diversity Indices of Students Engaged in CRE

- Minorities: 33%
- Low-Income: 26%
- Geographic: 10%
- None: 31%
Student participation in HIP Biology Research by Major

- Biology
- Pre-Health professions
- Psychology
- Pre-Physical therapy
- Computer science
- Engineering
- Physics
- Music
Cumulative GPA of CRE Students During 2020-2021

The average cumulative GPA for CRE student participants was 3.6
HIP Biology Research Learning
Outcomes in Brief

1st Semester: Phage Isolation
- General Biology
- electron microscopy
- Microbiology
- culture bacteria and phages
- Molecular biology
- DNA isolation, restriction, and analyses
- Math
- calculating titers and concentrations
- graphing
- Critical Thinking
- Writing and Presentation skills

2nd Semester: Bioinformatics
- Microbial Genomics
- large datasets and databases
- gene function prediction
- comparative genomics
- Computer literacy
HIP Research transferable skills, applicable outside of the classroom

- **Critical Thinking skills:**
  - experimental design, data analysis, and the reading and analysis of primary scientific literature

- **Professional Presentations and Publications:**
  - scientific writing (e.g. conference abstracts, papers)
  - presentations (oral and posters) at conferences internally and outside their institution (TAS, NCUR, ASM)
  - publications: peer-reviewed scientific articles; genome announcements (submitted to the NCBI)
Research-based activities are HIP

❖ Provides scientific content (teaching/learning tool).
❖ Fosters creativity, critical thinking and project ownership.
❖ Fosters personal responsibility & independence
❖ Develops scientific thinking
❖ Contributes to student success and satisfaction.
❖ Fosters peer collaboration
❖ Helps make career choices (PhD, MD)
Presentations at Conferences

- Institutional Research Forum/Poster Day
- Tennessee Academy of Science Annual Conference
- National Conferences on Undergraduate Research (NCUR)
- American Society for Microbiology KY-TN
Persistence in the sciences is related to psychological measures.

CRE:
- research, collaboration, disciplinary significance.

Project ownership:
- content and emotion

- Self-Efficacy
- Science identity
- Scientific community values
- Networking

Intent to stay in the sciences
Persistence in the Sciences (PITS) survey (6 psychological measures)
Publications to explore

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