

Supporting Underrepresented Groups and Women in Biomedical Data Science

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In 2015, funded by the NIH, California State University, Monterey Bay (CSUMB) began development of several programs to support undergraduate training in biomedical data science. The programs include new majors, concentrations, and minors relevant to biomedical data science and professional and research training for undergraduate students and faculty at CSUMB. We will present the evaluation of the first four years of the program and discuss plans for the remaining year. We will provide case studies and data on the impact of academic, professional, and personal supports developed specifically for our program to support first-generation and underrepresented groups to pursue graduate studies in biomedical data science. Specifically, we will present program-specific structures that support students “late” in their undergraduate careers who want to pursue graduate education in biomedical data science and our plans to institutionalize the new structures through programs and coursework. The institutionalization of the proposed structures will allow us to recruit more first-generation and underrepresented students into the data science graduate programs and careers.

California State University Monterey Bay

- Four-year public university
- Monterey County, California
- ~7100 students
 - Hispanic Serving Institution (42%)
 - 63% Women, 37% Men
 - 53% First-Generation
 - 36% Low-Income
 - 50% Under-Represented Minorities

BD2K@ CSUMB



Enhancing Diversity in Biomedical Data Science

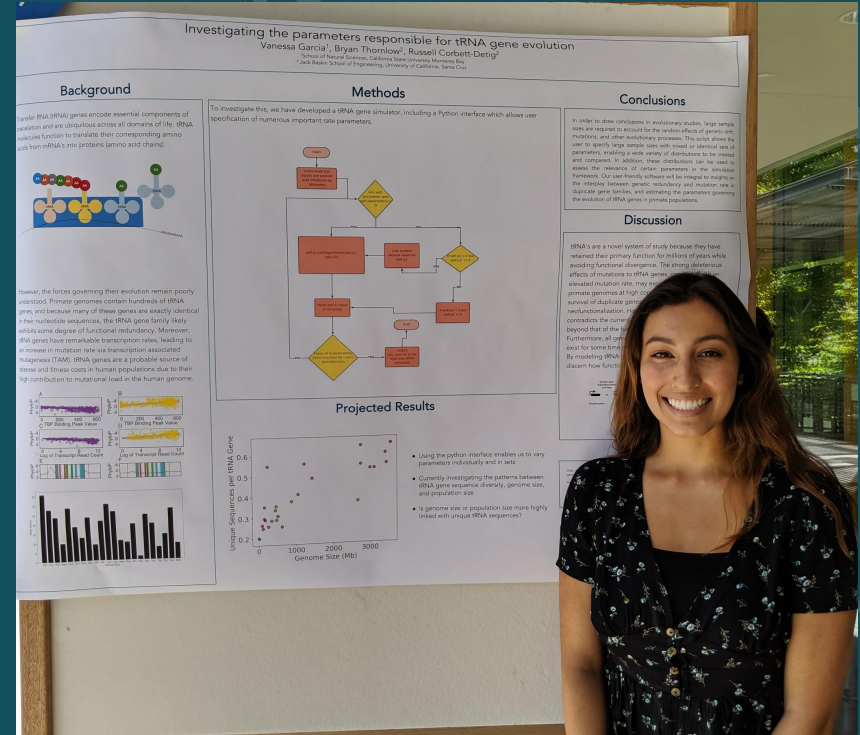
2015 Big Data to Knowledge (BD2K) Grant (dR25)

- Research Program for Undergraduates
- Curriculum Development
- Faculty Development



BD2K Scholars Program Success

- 85% of students are from underrepresented groups in data science (n=27)
 - Ethnic/Racial Minorities (67%)
 - First Generation (70%)
 - Female (40%)
- 60% of graduated students accepted into Master's or PhD Programs (n=19)



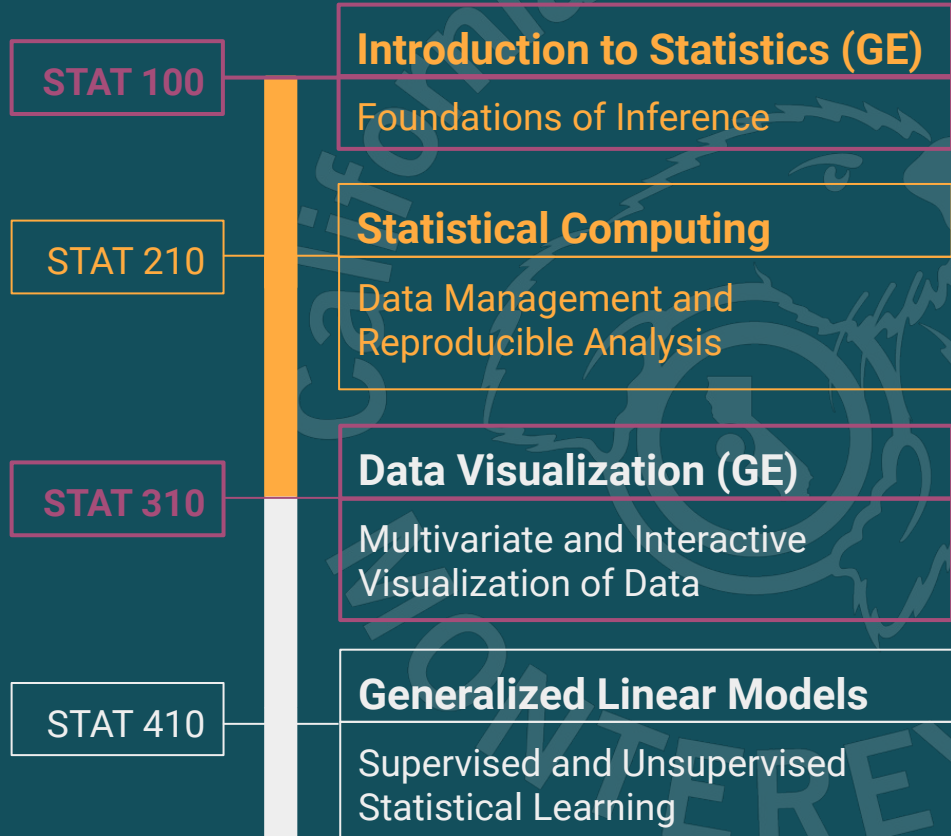
We need a bigger raft...

- Specialized programs have their place
- How do we reach more students?
 - **Expose** students to data science
 - Give them **access** to research experiences
 - **Prepare** students for research and graduate school



Make Curriculum Accessible

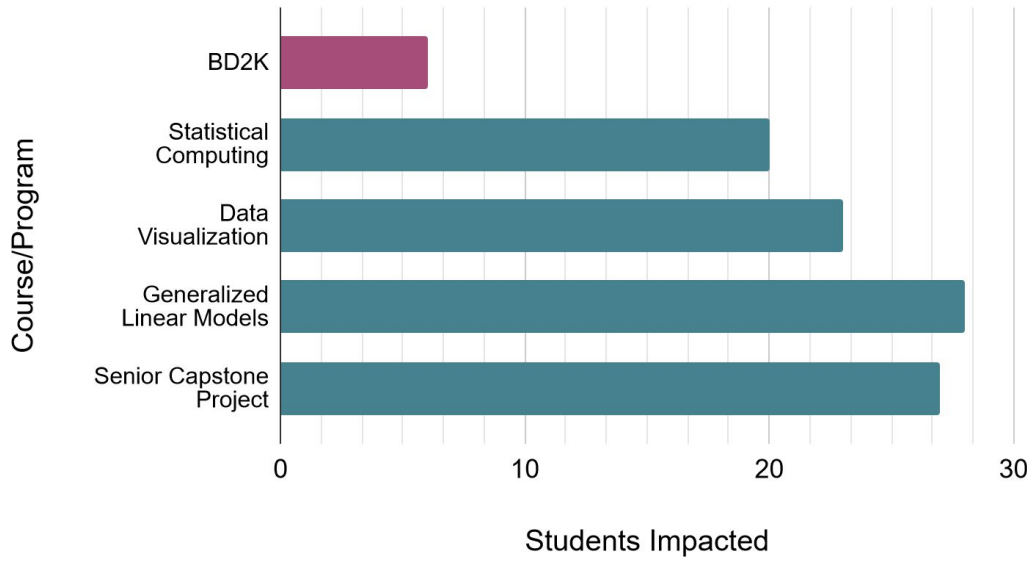
- Develop major agnostic minors and course pathways accessible to transfer students and other majors.
 - Statistics Minor (right)
 - Data Science Minor (in planning)
- Integrate data science into the lower division and general education curriculum



Rethink Research Experiences

Course Based Undergraduate Research Experiences (CUREs)

2019 Original Research Projects in Courses vs. BD2K Program

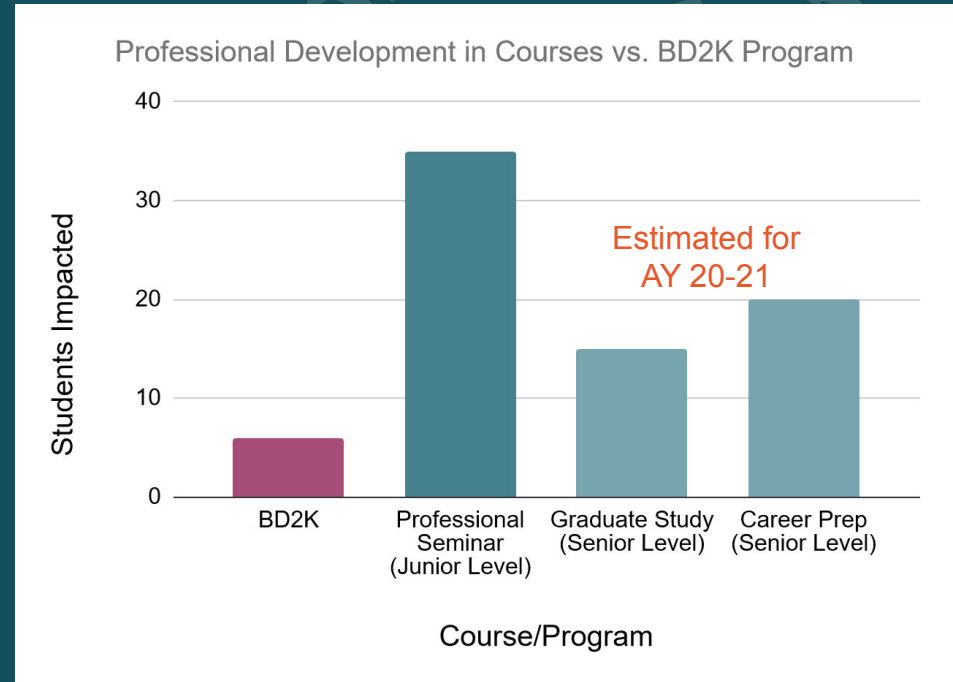


- Evidence-based practice that provides real research experience in the classroom
- Integrated in lower and upper division courses
- Involved **98 students** in original research in 2019



Integrate Professional Development into the Classroom

- 3rd Year Professional Seminar
 - Career Option Exploration
 - Develop Four Semester Plan
 - Develop Communication Skills
- 4th Year Prep for Graduate Study or Career (new AY 20-21)
 - Writing Groups
 - Structured Support for Deadlines
 - Guidance for networking, funding, etc.



Call to Action

- Evaluate the barriers *we create*
- Embed the experiences and supports students need in the curriculum
 - New Courses and Programs
 - Course-based Undergraduate Research
 - Professional Development Courses
- Prepare for change to support the future!

References

Canner, J.E., A.J. McEligot, M.E. Pérez, L. Qian, X. Zhang (2017). Enhancing Diversity in Biomedical Data Science. *Ethnicity and Disease*, 27(2): 107-116.

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