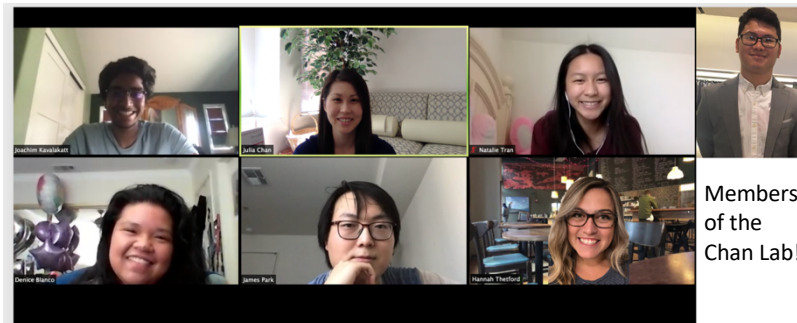


Dr. Julia Chan is an Assistant Professor in the Department of Chemistry and Biochemistry. Her research foci include the development, implementation, and evaluation of growth mindset and study strategies interventions in gateway



Members of the Chan Lab!

chemistry courses and the effect of affective characteristics on achievement in general chemistry classes.

General chemistry is a course that all STEM students are required to take at CSUF. This course functions as a gateway course because it is a prerequisite for many STEM majors. Since Fall 2015 until Spring 2021, approximately 2260 have taken CHEM 120B and the number of repeatable grades was 24 percent for all students. Additionally, there is a large racial achievement gap between underrepresented (URM) and non-underrepresented (non-URM) students' repeatable grades across the past twelve semesters (28 vs. 17 percent, respectively).

Recent Chan Lab Research

The Chan Lab focuses on developing interventions to retain first-year STEM students by helping them respond effectively to academic challenges faced in general chemistry. In Spring 2020, two novel growth mindset intervention workshops were developed and subsequently implemented in two different courses: CNSM 101 in Fall 2020 (N = 346) and Fall 2021 (current semester) and CHEM 120B in Fall 2021 (current semester). The growth mindset workshops focused on teaching students about neuroplasticity, factors that affect neuroplasticity, characteristics that differentiate between growth vs. fixed mindset, and how to practice cultivating and embracing a growth mindset during challenges and failures through the use of YouTube videos, a TED talk, personal anecdotes and stories from students and professors from the Department of Chemistry and Biochemistry at CSUF and written self-reflection assignments

Recently, a novel study strategies workshop was developed and implemented in CHEM 120B (Fall 2021). To evaluate the effectiveness of the workshops, quantitative and qualitative approaches were used to understand students' beliefs of intelligence, types of study strategies used, and perception of the workshops through online surveys. Preliminary data show most students value the content presented within the workshops, particularly the ability to engage in written reflection tasks and learning about evidence-based studying strategies from the workshops.

The development of growth-mindset and study strategies interventions in the Department of Chemistry and Biochemistry will serve as a pilot that can be shared across other departments within the College of Natural Science and Mathematics (CNSM) and other CSU campuses. It will add to the knowledge base about evidence-based strategies and best educational practices to support and foster retention in STEM majors and generate knowledge about factors that affect students' academic success, particularly among URM students.