

Design and Implementation of Branched DNA-based Signal Amplification in Single-Cell Protein Assays

For this summer research project our goal is to demonstrate the feasibility of a DNA-based signal amplification system for measurement of very low quantities of protein. The mentee will establish a protocol integrating several existing biochemical assays towards this goal, designing and carrying out experiments with my guidance. I will be working on design of the DNA probes to be used in the assay, and towards my larger dissertation goal of the measurement of RNA and protein from the same single cell.



Julea Vlassakis
Ph.D. Candidate, Bioengineering

I received my B.A. in chemistry and physics from Smith College, and am now a third-year Bioengineering Ph.D. student in the Herr Lab. My research focus is in the design of small-scale tools to measure proteins from single cells. Such measurements will allow us to understand small groups of cells that drive processes such as cancer progression and stem cell differentiation. As a mentor in the SMART program, I hope to further my mentoring experience in engineering and teach my mentee valuable research skills which they will be able to apply in their future scientific endeavors.



Sean Purcell
Junior, Chemical Biology

I am an undergraduate student in the College of Chemistry pursuing a B.S. in Chemical Biology. I am excited to begin work in the Herr Lab toward developing a signal amplification strategy that leverages principles of biology, chemistry, and physics to provide information about protein expression that would otherwise be undetectable in single cells. As a SMART program mentee, I look forward to developing new research skills and learning about the engineering process. I hope to continue to explore my interests in the chemical and physical sciences and to become familiar with aspects of engineering and design.

UC Berkeley's Student Mentoring And Research Team (SMART) is a paid professional development program that engages doctoral students in creating mentored research opportunities conducted with selected undergraduate student mentees during a ten-week period over the summer. Both participants receive compensation and training throughout their participation. SMART broadens the professional development of doctoral students and fosters research skills and paths to advanced studies for undergraduates.

Expenses associated with each team total \$10,000 000 (\$5K graduate stipend/ \$3.5K undergrad stipend/\$1.5K research and conference costs). As a donor-supported program of the Graduate Division, the majority of teams are underwritten through a combination of donor funds paired with matching support courtesy of the Graduate Division.

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