ADVANCED SCIENCE RESEARCH CENTER

STRUCTURAL BIOLOGY INITIATIVE

asrc.gc.cuny.edu/structbio

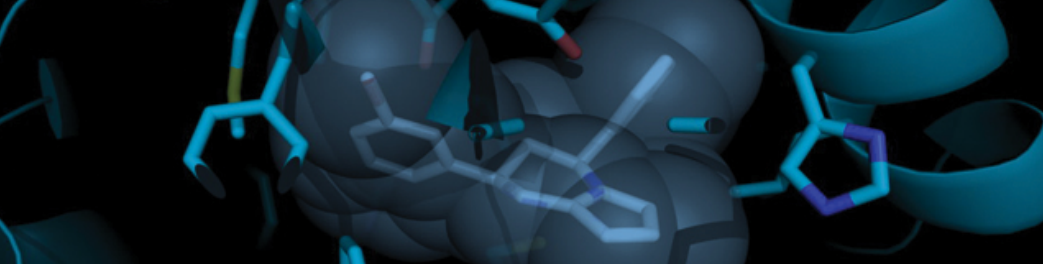
Mission

To provide a first-class structural biology resource for scientists in the CUNY system and beyond, giving researchers inside and outside of the field access and insight to this interdisciplinary field intersecting biology, chemistry, and physics through our work, our facilities, and our expertise.

Initiative Overview

Structural biology brings together biologists, chemists, and physicists to tackle many of life's central questions. How do cells respond to their surroundings? How do they make copies of themselves? What determines the balance between health and disease?

By probing the structures and functions of the molecules in the cell that are involved in these processes, structural biologists advance our understanding of how these work-horses of the cell function normally, how they can be targeted by novel therapeutics, and how they can be adapted to new biotech applications.



Laboratories

Gardner Laboratory

Professor Kevin Gardner and his research team have discovered that a diverse group of proteins uses similar mechanisms of signaling and regulation despite sensing radically different stimuli. Gardner and his team study how these proteins are controlled by diverse triggers—from blue light to nutrients to pollutants—to understand how they are naturally controlled and how disruption of this control leads to disease, all by examining their structures with atomic resolution. From this knowledge, the lab is exploring how these processes can be artificially controlled, leading to the development of novel anticancer drugs currently in clinical trials and tools for biotechnology.

Des Georges Laboratory

Professor Amédée des Georges and fellow researchers use cryo-electron microscopy and other biophysical and biochemical approaches to study the role and regulation of membrane proteins involved in muscle and heart function. Ion channels and receptors work together in a highly regulated process to trigger the contraction of muscles. Failures in these processes, due to genetic mutations, stress, or aging, lead to heart, vascular, and muscular diseases such as arrhythmias, heart failure, and myopathies. A better understanding of these intricate processes at the molecular level could reveal druggable targets to treat these diseases.

Elbaum-Garfinkle Laboratory

Professor Shana Elbaum-Garfinkle and her team conduct research at the forefront of cell biology to reveal the fundamental principles underlying phase separation of biomolecules into liquid materials. Their overarching aim is to identify novel therapeutic targets for treating neurodegenerative diseases and conditions, including Alzheimer's disease, ALS, and traumatic brain injury. Her group is particularly interested in understanding the relationship between protein liquid phases and pathological protein aggregates associated with such neurodegenerative diseases.

Keedy Laboratory

Professor Daniel Keedy and researchers in his laboratory combine computation and experiments to reveal alternative protein conformations and explore how they underlie dynamic functions such as catalysis, ligand binding, and allosteric regulation. Keedy's work reveals new opportunities to modulate the activities of therapeutic targets such as tyrosine phosphatases with small molecules and protein engineering. It also offers insights into more general evolutionary processes that led to functional diversity in the human proteome.