Description of the Facility

Mission
The mission of the CUNY X-ray Facility is to perform single-crystal analyses for the structure determination of molecules, which make up a crystal. This technique is called single-crystal X-ray crystallography. It is the ultimate method for definitive determination of molecular structures at the atomic level for both organic and inorganic compounds. Its uses range from simple identification of compounds to various exotic configuration and conformational studies.

Instruments

Bruker-Nonius KappaCCD System
Instrument: Bruker-Nonius KappaCCD, equipped with a CCD detector and a liquid-nitrogen low-temperature device.

Capabilities: The KappaCCD, acquired in 2001, embodies the state-of-the-art technologies for rapid, precise, and accurate data collection. It is especially useful for collecting data from heavy atoms, such as technetium and rhenium, to minimize absorption-correction errors.

Enraf-Nonius CAD4
Nonius CAD4 serial diffractometer, equipped with a scintillation detector and a liquid-nitrogen low-temperature device.

Capabilities: A serial diffractometer collects one diffraction spot at a time. This CAD4 is an excellent instrument for protein crystallography because it can illustrate, display, and apply the principles of crystallography. It requires little maintenance.

Instrument: Nonius CAD4 serial diffractometer, equipped with a scintillation detector, liquid-nitrogen low-temperature device, and a long 2theta-detector arm.

Capabilities: The long 2theta-detector arm allows better resolution of diffraction spots for crystals with long unit-cell axes. The signal-to-noise ratio is higher than for data from a sealed tube; and thus smaller crystals may be used to collect data.

The low-temperature options immensely improve the flexibility of a diffractometer. When a crystal is cooled to low temperatures, the diffraction quality is enhanced. This is because the crystal becomes more rigid and less susceptible to vibrations, thus improving the resolution and intensity of the diffraction spots. When a crystal is cooled, the diffraction quality is enhanced, making the diffractometer more versatile and efficient in collecting high-quality data.