Spotlight on Keck Biophysics Facility

“Who am I?” long has been one of those unanswerable philosophical questions that people pose to themselves when exploring their identity. But finding out just who we are is more than an examination of ideals, thoughts, and values. We can also discover what makes us tick by examining our very own physical make-up at the molecular and even atomic level. Moreover, understanding the molecular basis of life not only tells us about ourselves, but also about how to understand and effectively treat disease.

The Keck Biophysics Facility on the Evanston campus is home to a variety of state-of-the-art instruments that perform spectroscopy, gel imaging, and analytical experiments to help researchers learn more about the basic fundamentals of life. (See complete listing of the instruments in the sidebar below.)

“Any one instrument typically reports back on one tiny aspect of a molecular property or interaction, but that’s only a small part of the story,” says Jonathan Widom, biochemistry, molecular biology and cell biology, and director of the facility. “You quickly find that you need a set of instruments get a fuller picture.”

So when Northwestern appealed to the W.M. Keck Foundation for a grant to start the facility in 1998, it requested – and received – all 20 instruments that it still has today. The instruments are located in two equipment rooms on the fourth floor of Cook Hall, occupying a total of 2,040 square feet and serving nearly 300 users every year representing approximately 60 to 70 different research groups from Northwestern and other academic and non-academic institutions in and around Chicago.

“The facility is the best in the country,” says Widom. “We have visits and letters from people from many different universities asking how to build something like this and how to make it work.”

While the state-of-the-art instruments certainly set Keck apart from similar facilities at other institutions, facilities manager Arabela Grigorescu adds that it is also important to ensure that it stays affordable and accessible for its users. Grigorescu and her small staff offer individualized, hands-on training as well as sponsor workshops and seminars on new methodologies.

“We want to provide outstanding services in individual training for the equipment, but we also want to provide focused expertise, counseling, and assistance for our users,” says Grigorescu, who works with a small staff to oversee the daily operations.

“Grigorescu says that the biggest challenge is ensuring that the facility stays current and that older instruments stay upgraded. She is currently applying for a gel scanner capable of scanning gels with fluorescent molecules, which she explains is more environmentally conscious than the older instruments that scanned with radioactivity. She plans to submit the application to the National Institutes of Health next month.

“We try to accommodate a variety of projects,” she says. “When people come in, I like to ask what project they’re working on, and I’m always amazed by the interesting things they’re doing.”

“We have an excellent staff to keep the instruments running and teach new users how to use them, so people here are really limited only by imagination,” Widom says.

Instruments at Keck

*Spectroscopy:
Circular Dichroism Spectrometer
Fluorescence Plate Reader
Frequency Domain Fluorescence Spectrometer
Fluorescence Polarization
Steady State Fluorescence Spectrometer
Stopped-flow Spectrometer
UV/VIS DAD Spectrometer
UV/VIS/NIR Spectrophotometer

*Gel Imaging:
Kodak Gel Imaging System
Storm Phosphoimager/Fluorimager

*Analytical:
Differential Scanning Calorimeter
Isothermal Titration Calorimeter
HPLC
Rapid Quench Flow Instrument
Dynamic Light Scattering Instrument
Analytical Ultracentrifuge

*Other:
Isoelectric Focusing Gel Electrophoresis
Fermentor 1.25L, 15L
Real Time PCR
Rotor Type 45Ti