

Hot field is under the microscope

This summer, Diana Wesoloski will take three courses that should help make her more marketable in the career field she hopes to enter — scientifically tracking down criminals. Polarized Light Microscopy, Trace Analysis, and Optical Crystallography Techniques are all part of a new microscopy bachelor's degree program at Concordia University Chicago in River Forest.

Trace Analysis, which deals with microscopic analysis of fibers and hair, will be particularly helpful to the career search of Wesoloski, who hopes someday to work in a crime lab. But microscopy courses can be a springboard to other careers, she says.

"What's nice is you can do various things, like environmental science, forensic science, and pharmaceutical science," says the Concordia University Chicago junior. "You can make it as broad as you want. Classes like Polarized Light Microscopy and Scanning Electron Microscopy teach skills and techniques you can use in many fields."

As the root word of "microscopy" would suggest, this discipline involves use of light microscopes, electron microscopes and infrared and Raman spectroscopy techniques to solve problems and analyze or build materials on a nearly sub-atomic basis.

One of the first

Concordia University Chicago's new applied microscopy Bachelor of Science degree program is enrolling students for fall 2009, but students have been able to take classes associated with the program since the fall of last year, says Michael Whiteside, assistant professor of molecular biology at Concordia University Chicago. The program, offered in partnership with the Westmont-based College of Microscopy, is among the first dedicated Bachelor of Science microscopy programs in the nation, he says.

"Microscopy has been around a long

time, and it's well established in a lot of different fields," Whiteside says. Many community colleges offer two-year associate degree programs in microscopy. But other than Concordia, the only other four-year program is at Central Michigan University in Mt. Pleasant, Mich., he adds.

Concordia's program is unique in that it's the only one combining the resources of a liberal arts university with that of a world leader in microscopy, the College of Microscopy. Founded in 2004, the College of Microscopy is the education division of The McCrone Group of Westmont, an organization known internationally for materials analysis. It trains professionals already working in industry in the use of microscopes, says Charles A. Zona, vice-president and dean of the College of Microscopy.

Microscopists demand

Virtually any industry that relies on small particle identification and analysis has a need for professionals trained in microscopy.

Fields include environmental and ecological sciences, materials engineering, forensic science, homeland security, public health and safety, chemical identification, manufacturing, and art and archaeology.

"It's among the highest-demand degrees out there," says Whiteside. "Regardless of whether you go into industry, academics, pharmaceuticals or even the food industry, microscopy could be required in any one of them. In all of those fields, someone is using microscopes as part of their work."

Microscopists are also needed in academia. Every major college campus has microscopy facilities housing electron microscopes and light microscopes to permit research by graduate students. "For example, University of Illinois Chicago has one," Zona says. "You need someone to manage these facilities, understanding for instance how a scanning electron microscope or transmission electronic microscope works."

Ten-year employment projections by the U.S. Bureau of Labor Statistics (BLS) for the years 2006 through 2016 bear



Photo courtesy of Concordia University/Steve Wolt

Concordia University students check out slides under a microscope. The university is one of the first in the area to offer a bachelor's degree program in microscopy.

out the demand for microscopists. Management, scientific and technical consulting services, all fields in which trained microscopists work, are projected to lead all industries in wage and salary growth, the BLS reports. In addition, forensic science technicians and environmental science and protection technicians are among the projected 30 fastest growing occupations through 2016.

Diverse field

Microscopists work in many diverse settings. For instance, in a pharmaceutical firm, microscopists might be asked to solve a problem in a prescription drug's packaging. The issue would have to be analyzed before the drug under development could go to market, and microscopists would undertake that analysis, Whiteside says.

In the auto industry, defects in coatings may occur as cars move on an assembly line to be painted. The vehicle affected will be pulled off the line, and a microscopist is frequently given the responsibility of determining the source of the paint defect.

"He will try to track it down and find the source," Zona says. "The quicker he can do that, the sooner the production line can start again."

In the art world, microscopy is used to

analyze the authenticity of paintings. "Certain pigments are used today that were not used in the past," Whiteside says. "Polarized light microscopy analyzes the crystalline structure of those pigments to narrow down the age of the painting. If you see pigments not used until after 1900, and the painting is supposedly much older, you know it's a fake or it's been retouched."

It's not just paintings that come under microscopists' scrutiny, Zona adds. Conservators may ask microscopists to examine the makeup of a sculpture, a piece of furniture or even historic documents and flags before they are cleaned, he says.

Forensic science is another industry that relies on microscopists. Those trained in microscopy are needed to examine bullet striations and determine whether bullet fragments came from the same gun, Whiteside says. In rape cases, microscopists using fluorescence microscopy often are required to analyze bodily fluid evidence.

Classroom, lab study

Because the College of Microscopy teaches chemical microscopy, Concordia's bachelor's program in microscopy will be similar to a chemistry degree, Whiteside says. At Concordia, students will take biology, chemistry, calcu-

lus, physics, analytical chemistry, instrumental analysis and forensic science.

This platform will prepare them for their final year, comprised of two semesters with world-class scientists and microscopy educators at the College of Microscopy. Each class at the College of Microscopy will be two weeks in length, with the first week comprised of lectures and the second a practicum, Whiteside says. Students stand to particularly benefit from learning along with people who are actually working in the pharmaceutical industry, crime laboratories and other settings, he adds. In the lab, for instance, they may well be working side by side with a pharmaceutical scientist, a forensic trace evidence analyst, or an individual employed in the automotive industry.

"They can interact with these professionals to understand what's ahead for them, and to take advantage of opportunities for networking," Whiteside says.

Once honed, these skills should be in increasing demand for years to come, Zona says. "As smaller and smaller particles and compounds are studied, you have to go to higher and higher magnification, so you use scanning electron or transmission electron microscopes," he notes. "As disciplines like nanotechnology evolve, the demand for microscopists will only increase." ■

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