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← LIBERAL ARTS

# BRIDGING

SCIENCE AND THE  
LIBERAL ARTS  
CONVERGE AT NJIT



Five centuries ago, Leonardo DaVinci assumed it natural to view the world as both a scientist and artist. Fifty years ago, the physicist and novelist C. P. Snow decried the “gulf of mutual incomprehension” between the “two cultures” of science and art that had broadened since the Renaissance. Today, as dean of the College of Science and Liberal Arts (CSLA), Fadi P. Deek is focused on the educational and social benefits of bridging that gulf.

How is CSLA spanning the divide between science and disciplines such as history and philosophy, music and other arts? *NJIT Magazine* recently asked CSLA Dean Deek and several faculty members for their views. Following are highlights of the discussion.

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SCIENCE →

# THE GULF



Assistant Professor of Physics  
Camelia Prodan

Assistant Professor of Biological  
Sciences Daniel Bunker



## YEW TREES OR PEOPLE?

Deek's vision for promoting deeper understanding of the intersection between science and society is manifest in the contexts of bioethics, the environment, and social values. Assistant Professor of Physics Camelia Prodan, Assistant Professor of Biological Sciences Daniel Bunker, and Assistant Professor of Philosophy Michael Brownstein center their research in these contexts.

A major aspect of Prodan's research has been investigating how chemotherapy agents interact with cellular components, specifically microtubules. In the 1970s, a drug derived from old-growth yew trees showed significant promise for treating cancer. A number of trees were required to obtain enough of the drug to treat one person. "Eventually, this drug was produced synthetically, eliminating the need for large-scale harvesting of yew trees," Prodan explained. But she added that significant questions raised at the time went beyond the science involved.

What if the drug could not be manufactured synthetically, or if the trees that are its source could not be farmed due to economic constraints or other limits? Would we be justified in removing an entire species from the ecosystem to treat people suffering from cancer, especially with a therapeutic agent that might

be available only until the last tree was cut down? And who should have access to such a drug as the supply dwindles? Just those able to pay an escalating price?

At some point, this could very well be more than a hypothetical exercise. It could be an urgent, real-world debate with grave implications for science, economics, the environment, and the lives of individuals.

## A GLOBAL PERSPECTIVE

Bunker – who researches the response of plant species and plant communities to global climate change – pointed to yet another complexity. It's the potential for conflict between developed and less-developed countries over natural resources. Suppose only an advanced nation has the technology to develop some natural resource in a less-developed region for export and economic gain. What local obligations, if any, does the technically superior nation have? Is there an ethical imperative regarding the degree to which economic benefits should be shared?

Expanding on the points made by Bunker, Brownstein said, "The conflict may not arise from different levels of technical ability, but whether something is perceived locally as having any value at all." What do people who realize the exportable worth of a resource owe


those who do not value that resource in the same way – perhaps an indigenous people whose forest environment has a plant that can yield a valuable drug?

## NEW CONNECTIONS

In discussing the "two cultures," Snow advocated the interplay between the liberal arts and sciences with a greater awareness of aesthetics. This focus on the nature of beauty is the creative basis of research by Professor of Philosophy David Rothenberg. His widely publicized studies of bird song and whale song illustrate the complex, complementary relationship between music and the scientific investigation of nature. Rothenberg is currently working on a book that assesses the connection between evolution and aesthetics, including the power of the aesthetic aspects of Darwin's concept of natural selection.

Brownstein too investigates new connections. One of his interests relates to questions long raised by philosophers and the work of social psychologists. This research includes examining the social significance of reflective thinking and the unreflective mode of thought often referred to as a "gut reaction" or instinctive "know-how."

Philosophers have traditionally spoken of this dichotomy as the difference between acting



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← SCIENCE

*"EVERY CLASS I'VE TAUGHT HERE,  
WHETHER IT'S MUSIC OR PHILOSOPHY, IS  
CONNECTED TO SOMETHING SCIENTIFIC  
OR TECHNOLOGICAL. I THINK WE DO THIS  
TO A UNIQUE DEGREE COMPARED TO  
OTHER UNIVERSITIES." — DAVID ROTHENBERG*

*LIBERAL ARTS* —————>



Assistant Professor of Philosophy  
Michael Brownstein

Professor of Philosophy  
David Rothenberg



PHOTOS (ABOVE): JASON GOMES

intentionally and unintentionally. “Today, there’s considerable work being done in social psychology on what this means with respect to making many kinds of decisions,” Brownstein said. Reflecting on the gulf between social psychology and philosophy, he noted that his goal was “to help bring these two disciplines together in new and creative ways.”

In addition, he is interested in the relationship between unreflective behavior and the wildly popular social media supported by new communications technologies and the Internet. He believes that many aspects of our digital interaction appear to have emerged spontaneously, energized by unreflective behavior. The social scientist and the philosopher are thus challenged to address much the same questions regarding the manner in which we relate to each other as individuals and to society as a whole.

Brownstein also brings the perspective of philosophy to research he’s conducting with Associate Professor of Humanities Robert Friedman, director of the CSLA bachelor’s program in science, technology and society. They are developing a new model for online academic publishing. While information technology is basic to their effort, their study also addresses ethical implications of making research globally accessible in digital form.

### HARMONIZING DIFFERENCES

A productive relationship between the liberal arts and the sciences requires mutual understanding of key differences as well as recognition of common objectives, Deek commented. The sciences demand empirical data and hypotheses that can be experimentally tested with reliable results. The liberal arts, conversely, examine the world in terms of the individual, human case – often purely on the strength of case-centered argument and humanistic impulse. Yet these two ways of thinking about the world can be complementary.

Citing the field of experimental philosophy as an example, Rothenberg said that there are several philosophers now working with neuroscientists and psychologists to help design experiments. “Philosophy has a long history of incisive critical thought,” he commented. “The idea is to integrate this analytical tradition with that of empirical science to enhance the collection of valid, concrete data.”

Fostering awareness of the many links between science and the liberal arts is what makes being part of CSLA especially appealing to Rothenberg. “Every class I’ve taught here, whether it’s music or philosophy, is connected to something scientific or technological,” he said. “I think we do this to a unique degree compared to other universities.

Whatever people are studying, they see that the sciences and the arts and humanities are intrinsically intertwined.”

### BUILDING COMPLEMENTARY PROGRAMS STRATEGICALLY

“CSLA today enrolls nearly ten percent of the students at NJIT, up from less than five percent a few years ago,” Deek said. “I think this is a good indicator of the interest there is in the breadth of the educational experience we offer at CSLA. Our goal over the next five years is to raise the visibility of all our programs, and in doing so continue to build essential complementary relationships between the sciences and the liberal arts.”

Specific initiatives to accomplish these goals include the multidisciplinary student research projects outlined in CSLA’s recently adopted strategic plan. Collaborative work will engage students in disciplines as diverse as biology, chemistry, environmental science, mathematics, and physics – as well as the study of history, philosophy, and science, technology and society.

In CSLA, the Renaissance has just begun. ■

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College of Science and Liberal Arts: <http://csla.njit.edu>