MEET IAN GATLEY

NJIT'S NEW PROVOST

These images of the same portion of the Milky Way, acquired some twenty years ago, illustrate the dramatic difference in detail between astronomical observations made at optical and infrared wavelengths. The image at left is in the optical region of the spectrum. The image at right, from Kitt Peak National Observatory, is one of the earliest to be acquired with the pioneering infrared detector array that NJIT Provost Ian Gatley helped to develop.

Ian Gatley joined NJIT in May 2010 as provost, senior vice president for academic affairs and distinguished professor of physics. A prolific scholar well known in astronomy and imaging science, Gatley received a BSc with first-class honors in physics from Imperial College, University of London and a PhD in physics from the California Institute of Technology. He then served as astronomer and project manager with the United Kingdom Infrared Telescope in Hawaii and later led the infrared astronomy program at the U.S. National Optical Astronomy Observatories in Arizona.

As chair of the U.S. National Optical Astronomy Observatories Infrared Steering Committee, Gatley headed a multi-million dollar collaboration funded by the U.S. Naval Observatory and the National Optical Astronomy Observatories to develop the world's most powerful indium antimonide infrared detector array. This detector, code-named "Aladdin," has been adopted by major observatories around the globe, and a large number of state-of-the-art scientific instruments have been designed specifically to take advantage of its superior performance.

In 1997, Gatley became director of the Chester F. Carlson Center for Imaging Science at Rochester Institute of Technology (RIT), where he led the integration of an Aladdin-based camera with a telescope deployed at the South Pole. This and other efforts comprised proof of concept for an approach to data capture and management ultimately utilized for NASA's Stratospheric Observatory for Infrared Astronomy. Building on a growing strength in astronomy, RIT also inaugurated a new PhD program in astrophysical sciences and technology.

While Director of the Carlson Center, Gatley served as associate director of the New York State-supported Center for Electronic Imaging Systems, co-authoring a winning $14 million proposal for a New York State Strategically Targeted Academic Research Center, the IT Collaboratory. This collaboration with the University at *[continued]*

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Buffalo's Institute for Lasers, Photonics and Biophotonics and the NYS College of Ceramics at Alfred University integrates nano-material science, microsystems, photonics, remote sensing systems and information technologies.

Gatley was next appointed dean of the College of Science at RIT, where he took a special interest in promoting a culture that involved all undergraduates in research. Most recently before coming to NJIT, he led the Center for Student Innovation that serves as a hub and clearinghouse of RIT innovation resources.

In the following interview, NJIT's new provost shares some thoughts about his career and the university's future.

What attracted you to physics and astronomy?

As a small boy in northern England, where the Industrial Revolution began, I became fascinated with how stuff worked. This led to a fascination with models that describe the physical world, and I became crazy about physics at an early age, around 12. My mom and a physics teacher I had in the English equivalent of high school were especially encouraging. My teacher even called me by my first name when we talked about physics outside of class. That was a big deal in England in those days.

With my mom's help, I sought out the writings of the Nobel prize-winning physicist Richard Feynman. Feynman would later reemerge in my life when my wife, Cathy, had this brilliant idea that I should go to graduate school in California, where I actually met him. I showed up to study physics but fell in love with astronomy.

Up to that point, I had spent a lot of time in the classroom and was used to solving problems for which the answer was in the back of the book. So my perspectives were rather narrow. When I went to Cal Tech, my life changed in many important ways.

How did your life change in California?

I met people who were inventing a new kind of astrophysics, called infrared astronomy, which I found I could understand very well. There are places in interstellar space that are very, very dusty – where stars are presently being formed, for example. This dust gets in the way of seeing what's going on at optical wavelengths.

But people have known for a long time that if you could only make the observations, infrared light would let you see a lot more, to see through the dust. When I showed up in California at the age of 22, I got the chance to visit the Mount Palomar Observatory, which has a 200-inch reflector and a fabulous amount of technology. At the time, they had hung one little sensitive infrared chip in the focal plane, a camera with only one pixel! Even then, at 22, I looked at it and felt, "Well, that's pretty much a technological disaster – what we need is a real infrared camera."

So I became fixated on the idea of developing the technological capability to make infrared observations, and the people I was able to work with were fabulous, brilliant. By chance, I had showed up at the very beginning of infrared astronomy. It was just barely happening. The difference between no pixels and one pixel was profound because it got us started, and we became a big team of people working for years and years and years, decades actually. But eventually we produced a camera with a million pixels.

It was like being in at the beginning of the Industrial Revolution. Each time we took new infrared technology to the telescope, we made discoveries. How exciting is that? We really pioneered infrared observations. We discovered entire clusters of young stars that were previously unknown, and we made detailed maps of the inner regions of our galaxy, the Milky Way.

Eventually, we were able to obtain images that were quite dramatic and which attracted the attention of publications such as *National Geographic* magazine. One day, as I was giving an interview for *National Geographic* about our work, the person I was talking to selected an image and asked: "If you made the same observation with the technology as it was before your improvements, could you take this picture in an hour? How long would it have taken?"

So we sat down and figured out that it would have required a much longer exposure. In fact, it would have taken something like *400 years*. Helping to make a discovery with that sort of impact, which makes it possible to do things spectacularly more efficiently – it was a really glorious, exciting experience.

Why did you leave the lab in favor of academics and administration?

Although my 25 years as a hands-on researcher after I came to the U.S. were very fulfilling, it was time for a change. I wanted to be more directly involved in education, about which I am passionate. It was time to give back to the next generation.

I joined Rochester Institute of Technology, in Kodak country, to lead its first PhD program, which was in imaging science. The success of this program led RIT to offer PhDs in more fields. So I became a professional educator and eventually dean of science, where my goals of giving back through education were realized in an important way by becoming a good administrator.

For me, the most appealing part of being an educator is doing one's best to share the excitement of learning, of gaining new knowledge about the world around us. In science and technology, or any field, our challenge as educators is to inspire a life-long desire to learn. We need to do this by providing appropriate educational experiences at every level, from the time a child first enters the classroom. We must invest all the imagination, passion and resources necessary to inspire and motivate young people of both genders and all cultures.

It's especially important at the college level, particularly at a school like NJIT, to involve all students in research – in *doing* what they hear about in lectures and read about in textbooks.

Practical experiences that excite students so that they demand to know more are essential. Doing is a vital key.

How do you view the role of provost?

Live the mission. A provost must exude the values of the institution, and efficiently focus enthusiasm for its mission. That requires a great deal of listening and a clear vision of the big picture, to understand what people need to perform to the best of their abilities. People must be able to follow their passions in order to live their dreams and each fulfill his or her own unique potential.

What do you see as NJIT's strengths?

NJIT is a superb institution with an obvious passion for doing the job of teaching really well. In both teaching and research, it's all about the people. I like what NJIT's people do. There is a clear emphasis on developing the tools needed to achieve important ends, among them taking advantage of our location to strengthen our partnerships with government and industry.

What do you feel lies ahead for NJIT as an institution challenged to meet President Obama's vision for advancing education in science and technology?

The United States is still the envy of the world when it comes to higher education. But America must become more competitive, and while it is still too soon to talk about results, I'm glad that President Obama has put education in science and technology on the national agenda.

Education must be available to everyone who is qualified. Words are easy, however. We must make the actual investment needed. I think NJIT's strategic plan makes a strong statement about the university's commitment to working toward this goal. ■

Interviewer: Jean M. Llewellyn is executive director of university communications at NJIT.

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