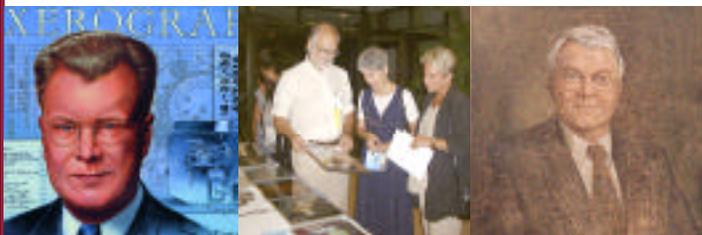
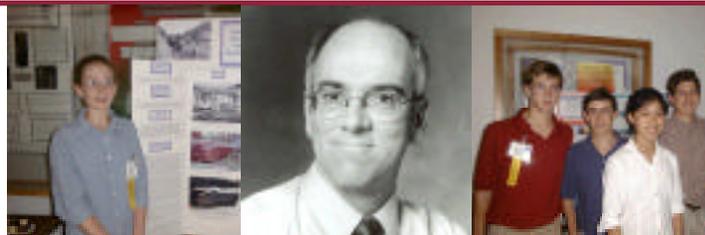


Imaging



Connection

The Newsletter of the Chester F. Carlson Center for Imaging Science

Fall 2000

“Oh Say Can You See...” RIT Scientist Will Help Shine Light on Star Spangled Banner

The flag that inspired Francis Scott Key to patriotic musing in 1812, has captured the imagination of a scientist at Rochester Institute of Technology. The Smithsonian's National Museum of American History (NMAH) recently invited RIT color and imaging scientist Roy S. Berns to join the technical advisory group of the Star-Spangled Banner Preservation Project, a three-year effort that will conclude with an exhibition in late 2002.

Berns, the Richard S. Hunter Professor of color science, appearance, and technology in the Munsell Color Science Laboratory in RIT's Chester F. Carlson Center for Imaging Science, brings to the project his expertise in color perception, instrumental-based color matching, and textile science. As a technical advisor, Berns will work with the project team to develop unique lighting techniques that may enable several viewing experiences. If Berns is successful, any number of unique and interactive exhibition lighting designs are possible.

The faded and damaged condition of the flag, measuring 30-feet by 34-feet, presents a challenge to every aspect of the preservation project. Berns will recommend exhibition lighting that provides “enough light to achieve these goals without inflicting future damage.”

“It's very, very fragile,” Berns

says of the flag. “Everyone associated with the project realizes that preservation is the most important criterion.” Since ultraviolet and visible radiation can further damage the wool and cause additional fading, Berns will devise a scheme in which only low-level lighting with specific spectral characteristics illuminates the flag. He will explore the lighting schemes based on visual experiments



with mock-up flags painted or dyed with modern products to match the spectral properties of the flag.

“Using the same dye doesn't help you because there are nearly 200 years of damage and fading,” Berns says. Conservators at the NMAH are certain that the blue field was dyed using indigo, while the red stripes were derived either from the madder root, a Eurasian plant, or cochineal, a tropical American insect. Berns recently returned from a sabbatical at

the National Gallery of Art, where he developed a new method of colorant identification. “The technique is nondestructive and uses the same theoretical underpinnings as instruments in paint stores that provide automated color matching,” he explains. These instruments are known as spectrophotometers and give a “spectral fingerprint” of color mixtures and colorants.

Berns took spectrophotometric measurements of the flag, artificially aged wool, and wool dyed using a number of natural dyestuffs. He is currently analyzing these data to identify the red dye.

Berns will return to the NMAH in the fall for further study and to attend the technical advisory group's monthly meeting.

The Star-Spangled Banner Preservation Project is made possible by major support from Polo Ralph Lauren. Generous support is also provided by The Pew Charitable Trusts, the United States Congress, and the John S. and James L. Knight Foundation. Special thanks to First Lady Hillary Rodham Clinton and Save America's Treasures at the National Trust for Historic Preservation for their leadership.

For more information about the Smithsonian's Star-Spangled Banner Preservation Project, check out the website: americanhistory.si.edu/ssb.

Collaboration Between RIT and Chiba University

RIT and Chiba University in Japan have entered into a collaborative agreement to work together in color and imaging science. The activities planned include faculty exchange, student exchange, and collaborative research. Four members of the Chiba faculty, Professors Miyake, Haneishi, Kitamura and Yaguchi, spent ten days at RIT last fall. During their visit, our Japanese colleagues became acquainted with RIT people, programs and facilities, and gave a fascinating series of lectures on their research. This summer an RIT group made a reciprocal visit to Chiba.

Dr. Robert Clark, dean of the college of science, Professor Frank Cost, associate dean of the college of imaging arts and sciences, Dr. Ian Gatley, director of the Chester F. Carlson Center for Imaging Science, and Dr. Noboru Ohta, Xerox Professor of Digital Color Imaging Systems, gave a symposium at Chiba describing RIT and its programs. They also met the Chiba faculty, staff and students, listened to presentations, visited laboratories, and promoted collaborative activities between the universities.

Although the RIT visit coincided with the monsoon season, the heavy rains, high temperature, and humidity did not dampen the high level of



From Left to Right: Frank Cost, Ian Gatley, Robert Clark, Yoichi Miyake, Noboru Ohta, and Kazuhiko Takamura in front of Fuji Photo Film Co., Ltd., Japan.

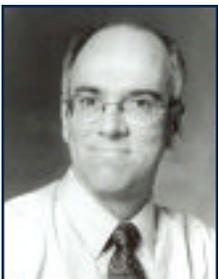
enthusiasm. The warm and generous hospitality of the hosts, the busy schedule of interesting scientific exchange, and the opportunity for a little sightseeing made this a very rewarding visit. "We were fascinated by the Fuji automated camera factory and awed by the feeding frenzy of the colorful fish. We caught a glimpse of nearby Mt. Fuji and visited the remarkable Odawara Castle," says Gatley.

While in Japan, it was a great opportunity to meet with our Industrial Associates. Similarly, Rochester members of the Industrial Associates program look forward to meeting with Professor Miyake and his team when they visit RIT in November, just prior to the Color Imaging Conference in Scottsdale.

Our collaborative efforts have already developed notable results. This September we welcomed, the first of a succession of Visiting Pre-doctoral Fellows, Mr. Jae Chul Sin of Chiba University. We will encourage our students to visit Japan to spend some time studying color and imaging science and work on a project of mutual interest.

This collaboration with Chiba will serve as a model for future academic partnerships around the world. Specifically, Dr. Gatley intends to strengthen the Center's relationship with the University of Derby in England through similar exchanges and visits.

Introducing Associate Director, Joe Pow



The Center for Imaging Science is growing. Joe Pow joined CIS in April as associate director, a new position created to assist Ian Gatley, CIS director, with

day-to-day operations and management responsibilities. Having Pow on board will allow Gatley to concentrate on strategic issues such as curriculum development, and on strengthening relationships with the Center's industrial partners.

While new to CIS, Pow is no stranger to the RIT campus. Before joining the imaging science team, Pow spent three years as head of the Aerospace Studies Department (Air Force ROTC) in the College of Applied Science and Technology (CAST). He is also the former associate director of CAST's Center for Multidisciplinary Studies.

A graduate of the University of Rochester, Pow retired from the Air Force with the rank of lieutenant colonel last summer after 20 years of service. He had worked as a technical program manager on the

development of advanced systems and technologies. His assignments included a tour at the Pentagon on the staff of the Assistant Secretary of the Air Force.

As the associate director of CIS, one of Joe's primary responsibilities will be outreach. He will be working closely with the Center's recruiting committee, RIT admissions, and local school districts to improve recognition of CIS programs and ultimately increase undergraduate enrollment.

You can contact Joe Pow at: 716-475-7323 or e-mail: pow@cis.rit.edu.

Laboratory for Advanced Spectral Sensing (LASS)

RIT's Chester F. Carlson Center for Imaging Science has unveiled a laboratory ready to tap the evolving industry of remote spectral sensing.

The new Laboratory for Advanced Spectral Sensing (LASS) was established as part of the **First-in-Class Initiative** to facilitate partnerships between the university, industry and government. LASS currently has a multimillion dollar partnership with large aerospace companies and federal agencies to model imaging systems, develop electronic image sensors, create analytical software to model electronic imaging systems and devise new ways to measure the properties of materials as seen by electronic imaging systems.

Fueling the growing market are governmental and commercial aerospace companies that collect data from satellite or airborne sensors, such as Landsat and weather satellites; companies that want overhead images for exploration or damage assessment, such as oil and insurance companies; and instrument

manufacturers in need of uniquely skilled employees.

"Government and industry are anxious to hire highly skilled individuals who can meet the demands of building sensors and analyzing image data from the next generation of remote sensing systems," says John Schott, director of LASS and the Digital Imaging and Remote Sensing Group. "To meet that need we have designed a larger research program to educate more students. In the end, the sponsors, the students and the university all benefit."

Robert Kohler, a member of RIT's Board of Trustees and retired executive vice president and general manager of TRW Avionics and Surveillance Group, agrees. "LASS represents RIT's ability to anticipate the need for high-tech talents," he says. "Trained specialists in remote sensing are in demand now, and that demand is going to increase. LASS will position the University and the Chester F. Carlson Center for Imaging Science as an important resource for

"Trained specialists in remote sensing are in demand now, and that demand is going to increase," says Kohler.

industry and government. It's a great example of the Institute's **First-in-Class Initiative**."

LASS will increase the number of trained experts in the field of remote sensing and conduct research on behalf of corporations and government agencies, adds Michael Richardson, CIS distinguished researcher, who helped create the laboratory. Richardson recently joined RIT from Eastman Kodak Corp. where he worked in remote sensing for nearly 20 years.

"The idea is to establish cooperative agreements with companies and conduct cutting-edge research for them," he says.

For further information about remote sensing at RIT, see the website at: cis.rit.edu/research/rs.shtml

Student Scholarships Enhance Recruitment Efforts

There are more opportunities in the field of imaging science than individuals prepared to fill them, which means that enrollment in RIT's imaging science program is a key area for potential growth. The availability of scholarship funds is an important factor in enabling outstanding students to make the decision to enroll in the Chester F. Carlson Center for Imaging Science. Three individuals have chosen to direct their philanthropic support to imaging science student scholarships and it is a pleasure to share the news.

Catherine Carlson notes that "the Carlson family has long standing ties to RIT, and through this gift to the Chester F. Carlson Center for Imaging Science, we hope that this scholarship

fund will draw excellent candidates to RIT. We want to be as strong as other universities in our ability to attract the best students."

Her comments reflect the Carlson family's ongoing support of the imaging science program and underscore the purpose of a recent \$1 million pledge from the Chester and Dorris Carlson Charitable Trust. The funds, to be paid over five years, will be added to the Chester F. Carlson Scholarship in Imaging Science which was established by Dorris and Catherine Carlson in 1994. Annual income from the endowed scholarship fund will help attract more of the brightest students to RIT's imaging science program and will also recognize outstanding

achievement by students who have completed one or more years of the program. The Chester F. Carlson Scholarship in Imaging Science will assist in meeting the goal of enhanced student enrollment by aiding in both the recruitment and retention of the best students.

Jerry Hughes graduated from RIT's program in photographic science in 1964 and his professional life in the field of imaging science was enjoyable and rewarding. To encourage current students in their study of imaging science, he established the Jerry G. Hughes Scholarship which provides academic scholarships annually to a student in the program. At this time, Jerry makes

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Wiedman's Portrait Unveiled in Imaging Science

Friends, family and colleagues of long time Rochester attorney and RIT benefactor Frederick Wiedman, Jr. gathered on September 28 in the lobby of the Chester F. Carlson Center for Imaging Science as a portrait of Mr. Wiedman was unveiled.

Wiedman, a Rochester native who practiced law in the city for 50 years, died April 12, 1999 at the age of 76. His association with RIT began in the early 1960s and continued until his death. Wiedman became a member of RIT's Nathaniel Rochester Society in 1982, and in 1986 he joined RIT's Board of Trustees, a role he filled for more than a dozen years.

Mr. Wiedman established the Frederick and Anna B. Wiedman Professorship in Imaging Science in 1985 in recognition of his parents. Remarking upon the impact of that funding on the imaging science program, Dean Robert Clark noted that "the Frederick and Anna B. Wiedman Professorship has been key in developing the Center's cutting edge program in remote

sensing. In this field of expertise, RIT had already attracted one of the leading experts – Dr. John Schott. As the Wiedman Professor, Dr. Schott has held a position of distinction among his faculty colleagues and built a program of national renown beyond the RIT campus."

Wiedman Professor Schott, head of the Center's remote sensing group, also spoke at the recent ceremony about the impact of Wiedman's generosity on the program. Mr. Wiedman was passionate about the importance of education in the lives of young people and that interest in education was the reason for his support. Current student Stefanie VanGorden assisted in unveiling the portrait.

Those who knew Wiedman well say that RIT appealed to him because he believed RIT contributed to the community. His commitment to the university led Wiedman to name RIT as primary beneficiary of his estate with an estimated \$5 million expected after a number of other bequests are fulfilled. Wiedman's will stipulates that



Dr. Albert J. Simone, RIT President, and Stefanie VanGorden, Imaging Science student, unveil portrait.

funds be used to establish a second professorship in imaging science and then to meet other needs of the university. It is anticipated that the Frederick Wiedman, Jr. Professor will be an expert and lead RIT's work in the general field of imaging materials.

A bronze plaque hung near Wiedman's portrait sums up his many contributions in describing him as "Devoted friend of RIT for more than 35 years."

Imaging Science Teams with MCC and CIPE

The goal is to "Get Kids Hooked on Optics"

This summer, the Chester F. Carlson Center for Imaging Science teamed with Monroe Community College (MCC) and the Center for Image Processing in Education (CIPE) on a winning proposal for a \$500,000 grant from the NSF's Advanced Technological Education program.

MCC is the principal institution, with CIS and CIPE as subcontractors, because the NSF-ATE is directed at improving national educational capabilities in two-year colleges. The collaboration is very natural because the MCC Optical Systems Technology (OST) program

is the largest provider of two-year college transfer student into the imaging science program and because the demand for graduates of both academic programs exceeds the number of matriculated students by a wide margin.

The project will produce imaging and visualization tools for teaching optics in two- and four-year colleges, followed by adaptation for use in secondary schools.

CIS facilitated development of the proposal by bringing together Bob Novak of MCC's OST program and Dr. Steve Moore, director of CIPE. Kathleen Bolton of the MCC Grants Office and Georgia Rothacker

of CIS deserve special recognition for shepherding the proposal through all of the necessary hurdles in a very short time.

NSF sent word this summer that the proposal was successful, and activities are just getting underway. The primary responsibility of CIS is to help create course materials in optics that may be based on existing CIPE resources or on computer tools developed specifically for this project.

All three collaborators expect that this is just the first step in a working relationship that will benefit all three organizations.

The Science of Imaging & The Imaging of Science

The Center for Image Processing in Education (CIPE), in association with the Chester F. Carlson Center for Imaging Science recently hosted the National Imaging Technology Education Conference 2000 (NITEC), "The Science of Imaging and the Imaging of Science" at RIT.

Over 120 educators attended NITEC 2000, an annual forum for educators, scientists, students and industry leaders to share how the science of imaging and the imaging of science support discovery-based learning in the classrooms of today and tomorrow.

The four-day conference, held in July, featured field trips, practical



Dr. Andrew Davidhazy demonstrates high-speed photography to attendees.

demonstrations and industry displays. Presentations were given on a variety of topics such as using image processing in art classes; using a remotely controlled scanning probe electron microscope for classroom education; constructing virtual lab books with digital images; studying oceanography from space; and using Geographical Information System (GIS) and remote sensing to manage a national marine sanctuary.

Among the distinguished speakers at the conference, Ben Waltenberger from the Sustainable Seas Expeditions and Channel Islands National Marine Sanctuary, presented "Marine Sanctuary Uses of Remote Sensing and Visualization



High school students gained valuable exposure to CIS faculty and staff researchers while earning money as NITEC staff members.

Techniques"; Roger Easton and Robert Johnston from RIT and Keith Knox from Xerox Corporation, gave a talk on "Digital Revelations from Ancient Documents"; Julie Skipper, an alumna from Eastman Kodak Company, presented "Challenges in Imaging Systems Design"; Tung Jeong, Lake Forest College, gave the talk "Holography and the Photonic Revolution"; and Eriko Miyahara from RIT presented "Use of Images in Visual Science."

Another highlight of NITEC 2000 was a hands-on demonstration of the Intel Play QX3 Computer Microscope. Herman D'hooge of Intel Corporation, traveled from Portland, Oregon, to demonstrate this inexpensive device. The Intel Play QX3 Computer Microscope empowers children and adults to explore the microscopic world

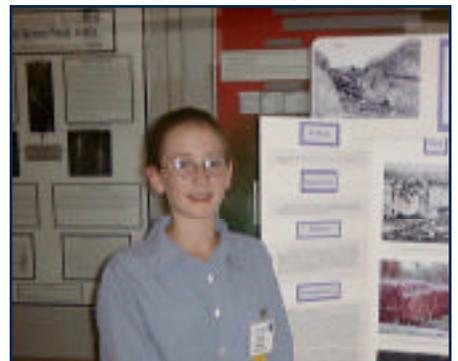


Herman D'hooge of Intel Corp and Dr. Ian Gatley, CIS director with the Intel Play QX3 Computer Microscope.

around them in a way that is easy, fun and engaging. The microscope features three magnification settings and built-in light sources for viewing transparent and opaque specimen. It uses digital video imaging that allows the capture of images, video clips and time-lapse movies.

Following the Intel Play QX3 Computer Microscope demonstration, Intel Corporation sponsored a dessert reception. Conference attendees, many of whom planned on requisitioning the microscope when they returned home, enjoyed the demonstration and reception.

Field trips and campus tours



NITEC student demonstrates an application of image processing through a project entitled, "Using Historical Photographs to Study Lichen Population Change."

added an additional educational component to the conference. Off-campus field trips included tours of the Xerox Corporation Color Studio and the Eastman Kodak Company Imaging Engineering and Simulation Lab and a trip to the Rochester Museum and Science Center.

Tours in the Chester F. Carlson Center for Imaging Science included the Digital Imaging and Remote Sensing Laboratory, and the Silver Halide Laboratory. Attendees were enthralled with Dr. Robert Johnston's "Visit into the World of

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The Science of Imaging *Continued from page 5*



High school students from around the country participated in all aspects of NITEC 2000.

an Archaeologist” and “Imaging and the Dead Sea Scrolls.” Fortunately, the night skies cooperated so Dr. Roger Easton was able to provide nightly astronomical views at RIT’s observatory.

Winners of a student poster session received camera kits donated

by the Eastman Kodak Company and Intel Play QX3 Computer Microscopes donated by Intel Corporation.

The panel of judges included Ian Gatley, director of CIS; Roger Easton and Jon Arney, professors at CIS; Julie Skipper and Robert Parada, Eastman Kodak Company; Don Adams, Vail High School, Arizona; Wesley Hausenfluke, Ronald Reagan High School, Texas; and David Doty, VideoLabs.

NITEC is a strategic part of CIPE’s important work of promoting the use of visualization technologies for innovative educational and other professional applications. CIPE has presented professional development workshops on how to use state-of-the-art image processing technology as a teaching tool to more than 4,500 educators nationwide.



Matthew Wells a Braintree High School in Braintree, MA, winner of the Polaroid/RIT prize at the Massachusetts State Science Fair, stands before his winning NITEC poster entitled, “Digital Color Reproduction.”

To find out more about CIPE, contact Steven Moore, Executive Director at: stevem@cipe.com, call (800) 322-9884, or check out the website at: www.eVisual.org.

Imaging Science Scholarships *Continued from page 3*

annual contributions to fund the scholarship and he has made provisions to endow the scholarship through a gift by will. By doing so, Jerry enjoys the opportunity to meet and talk with current scholars while knowing that the scholarship will continue in the years ahead because he has provided for funding through a planned gift.

“It has been a pleasure to meet Laurie Tuttle, recipient of the Jerry Hughes Scholarship for the past two years, and to follow her work in imaging science at RIT,” Jerry commented. “We had opportunities to meet at the annual Celebration of Scholarship as well as at the Industrial Associates meeting where Laurie presented a poster on her research in imaging science. It has

been a very rewarding experience to establish this scholarship.”

A more recent graduate, Robert A. Scharf ’94 imaging science, recently established an annual scholarship for an incoming student. Named the Elizabeth Ellen Locke Memorial Scholarship in memory of this special person in Robert’s life, the fund provides one academic scholarship annually to a student enrolled in imaging science. The scholarship recipient must demonstrate financial need and the award may be renewed for four years with satisfactory academic progress.

“I was able to complete my studies at RIT with the help of a scholarship established by the Gosnell family. I know how much it meant to me and, since I am in a position to

help another student, I chose to establish this annual scholarship,” Robert explained.

Scholarships are a vital element in the Chester F. Carlson Center for Imaging Science’s ability to attract and retain the best students in the program. Scholarship support may come from individuals or organizations, may be annual or endowed, may be funded with gifts today or with planned gifts that will mature at some time in the future.

Anyone interested in joining the Center in its quest for the best students who will become tomorrow’s best imaging scientists may contact Marianne Virgilio, director of development at (716) 475-7047, to discuss scholarship fund opportunities.

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