





THE VIEW DOWN UNDER

Rapid climate change is evident in Antarctica, where Rutgers researcher Oscar Schofield and a team of scientists have been studying the alterations in its ecosystem—an investigation documented and dramatized by the Rutgers Center for Digital Filmmaking, where director Dena Seidel oversees a program with few peers in the nation.

By Allan Hoffman

Stare at hours and hours of footage of squawking Adelie penguins and blindingly bright glaciers, of scraggly oceanographers and churning seas, and you'll start to feel like you've been transported to a remote scientific outpost in Antarctica. That's just what's happening on the third floor of the Mason Gross School of the Arts in New Brunswick, where a dozen Rutgers undergraduates are reviewing thousands of film clips and interviews from a landscape that's as far removed from New Jersey—from anywhere on the planet,

Rutgers scientist Oscar Schofield, left, is the subject of a film-in-progress called *Antarctica: Beyond the Ice*, a 52-minute television documentary that was filmed on the West Antarctic Peninsula by Dena Seidel, right, the director of the Center for Digital Filmmaking.

PHOTOGRAPHY BY CHRIS LINDER

really—as you can imagine. On one screen, a whale biologist is lifting a cross-bow to harpoon a humpback for a biopsy. Just a few feet away, the first mate of the *Laurence M. Gould*, a 250-foot vessel carrying researchers and their equipment, is warily assessing an iceberg that's a bit too close for comfort. And across the room, Nikolas Long SAS'13 is sorting through interviews with the Rutgers scientist at the center of this film-in-progress, Oscar Schofield, who is inclined to say things like "I've broken almost every bone in my body" (yes, the ocean is a dangerous place) and "I'm a scumologist" (he studies phytoplankton).

The footage is fresh from Antarctica, and it's riveting—packed with moments of adventure, of swashbuckling, seaworthy scientists at work, with fields of sparkling sea ice and frothy, in-your-face ocean spray as the backdrop. The clichés just roll from the tongue as you watch this: breathtaking, stunning, awe inspiring. "I mentioned this project to a friend," Long says, "and he just said, 'Anytime you say a sentence with the words 'Antarctica footage,' it instantly becomes cool.'"

Yes, it's cool. Very. Schofield says as much: "Being a scientist is really cool." Cliché? Not at all. That's because there's nothing typical about what's happening here at the headquarters of the Rutgers Film Bureau—the professional documentary office of the Rutgers Center for Digital Filmmaking. In fact, there's nothing quite like this in American education. These students are working on a documentary, and it's not a student film—though many of these students have already produced their own vérité-style documentary shorts in classes offered by the center. This film-in-progress, *Antarctica: Beyond the Ice*, is being funded, in part, by the National Science Foundation (NSF), and it's envisioned as a 52-minute television documentary about climate change and the morphing ecosystem of the

Antarctic, the oceans, and the planet. Or, as a wildlife ecologist says in the trailer to the film, "Things that are happening down here will start happening in other areas around the world. It's not just a localized issue. It's a world issue."

Something epic is happening here, both on the screen, in the film being made, and in the way these Rutgers undergrads, representing majors of all types (art history, landscape architecture, English), are learning about documentary storytelling, about character and narrative, and about Sony NEX-FS700 cameras and Glidecam stabilizers and all of the other paraphernalia and techniques of the modern documentary filmmaker. What's more, they're most certainly learning about climate change and the challenges of scientific research, especially the rugged

type of science practiced at the NSF's Palmer Long Term Ecological Research project in the West Antarctic Peninsula. It's all part of a new model for filmmaking education programs developed by Dena Seidel, director of the filmmaking center: take leading Rutgers researchers making a global impact, capture the drama and excitement of their work, and have students work on the film to learn about the science—and get hands-on filmmaking experience. The result? Lots of learning—and award-winning films.

"This is learning and making at the same time," says Seidel, founder of the filmmaking center and the director of *Antarctica: Beyond the Ice*. "What's so exciting is how they're all getting turned on by the science. These students are all getting to be in Antarctica right now."



Dena Seidel is fast at work developing a new model for filmmaking education programs: take top Rutgers researchers making a global impact, capture the excitement of their work, and have students help produce the film to learn about the science and filmmaking. The result is lots of learning and, it is hoped, award-winning films.

It's several weeks before Schofield and Seidel are set to leave on their 45-day trip to Antarctica, and a crew of students and staff from the film bureau descend on Rutgers' Coastal Ocean Observation Lab (COOL), part of the Institute of Marine and Coastal Sciences at the School of Environmental and Biological Sciences in New Brunswick. They have come to witness the future of oceanography in the form of the COOL Room, a technology-filled space with wall-sized screens tracking robotic, underwater gliders deployed to study the oceans. "These robots will fundamentally change how we study the global ocean," Schofield is saying as the cameras roll. Working with delicate scientific instruments at the extreme conditions at Palmer Station, or in nearby seas, is fraught with peril. Your equipment breaks? You're thousands of miles from your lab. With robots, you can study the oceans from anywhere; a "glider pilot" controls the robot from this room at Rutgers. "We need to crowd source," says Schofield, one of the founders of the Rutgers coastal lab. "We need more eyes on the problem."

Filmmaking thrives on vivid characters, and it's not hard to see why Seidel has chosen Schofield. He's charismatic, in a self-effacing way, and right out of central casting—a passionate, articulate scientist who's a natural in front of the camera. Schofield studied the Antarctic earlier in his career but then decided to "go coastal" when he had kids. Now he's returning to the Antarctic outpost at Palmer Station as one of the project's principal investigators. "Anyone who goes to the Antarctic gets the bug," he says. "It's the most dramatic, beautiful place you'll find in the world."

And it's one experiencing unprecedented change that's at the heart of *Antarctica: Beyond the Ice*. Glaciers are retreating. Penguins are struggling to



Top, junior Amber Nelson works on assembling a scene for the documentary *Antarctica: Beyond the Ice*. Below and from the left, Theodore Selden MGS'A13 and Kyra Willans and Taban Khan, both seniors at the School of Arts and Sciences, review footage taken by Dena Seidel, the director of the Center for Digital Filmmaking, during her stay in Antarctica.

cope. The winter sea-ice season is 90 days shorter than it was 30 years ago. Schofield hasn't left for Antarctica yet, but he's already talking like he's there. "This place has changed completely," Schofield says. "There are not many places you can go to and see change that rapid. You get to see change as it happens. And the changes down here will affect life in other parts of the planet."

In a typical film program, students do not have the chance to work on a television documentary. They don't travel to Brazil, Spain, and Thailand, or get to fly in a helicopter around Manhattan with a former Black Hawk pilot attending Rutgers, as students have for film center documentaries. And they don't have access to leading scientists, from their own university and others—in the case of *Antarctica:*

Beyond the Ice, from Rutgers, of course, but also from Columbia University, from Woods Hole Oceanographic Institution, and elsewhere—studying one of the central issues facing our planet. But this is not a typical film program. Step into the cramped rooms housing the film bureau, and you can sense the energy of the students, who recognize this as a once-in-a-lifetime opportunity. “This is real job experience that I can apply to jump-start my career,” says Kyra Willans, a senior working on a scene about ornithologists camping out on an island to study the penguins there. “I love film, I’m interested in science and politics, and this brings it all together for me.”

“It’s super hands-on,” says senior Darrel Gordon, who is reviewing footage of Schofield explaining how robotic gliders can be used in tandem with penguins equipped with radio transmitters. “I’m getting credit for it, but it feels like I’m working in a studio on an actual documentary.” Which, in a sense, he is.

The 12 students working on the film (more will be involved later) have been transcribing their footage—an initial step to producing a five- to eight-minute scene, possibly for submission to a Rutgers film festival. Their scenes capture the scientists working out of Palmer Station, and how the connections among them—the whale researchers, the birders, the scientists studying phytoplankton and zooplankton—tell the story of an ecosystem being altered by the effects of climate change. With his robotic gliders and his years of experience in Antarctica, Schofield is able to provide the big-picture view. “All of the pieces, in one way or another, connect back to Oscar and Rutgers,” says Seidel. “He bridges everything.”

He also serves as a one-of-a-kind resource to the students. As part of the project, Schofield is delivering a series of presentations to the students. In worn-out jeans and a hoodie, with a Hawaiian shirt

underneath, Schofield shows up at the film bureau for what’s essentially a crash course in climate change and oceanography spanning everything from terms like “carbon cycling” and “biological pump” to the debate over whether we’re in a new geologic age, the Anthropocene. What’s at stake? Quite a lot. “Whether we have a planet that is good for humans, or not, is the question,” Schofield says. “The earth will continue.”

There is a man on the screen, and he is counting slime. That’s what it looks like, at least. He takes tweezers and picks up one shrimp-like creature, then another, then another. There appears to be no end to this—it’s heartbreakingly arduous, it seems—as he classifies creatures gathered from a special eight-chambered net.

“I get paid to go around the world and have adventures,” Schofield tells the Rutgers students working on this film. But what sort of adventures? Sometimes being a scientist involves tracking a robotic glider from the warm confines of the COOL Room, and sometimes it means counting tiny, slimy, snot-looking creatures, some of them from the vomit of penguins. As the students put together their scenes, they’re getting a rapid-fire lesson in what it means to be a scientist, and not from a textbook or read-an-article perspective. They’re witnessing the reality, all of it—the danger and the drudgery—of scientists at work in the field.

At the film bureau, Willans is sitting down with Seidel to discuss her scene. There’s stunning footage of the scientists on Avian Island, some of it shot with a waterproof GoPro camera attached to one of them as they examine penguins. But it’s one thing to have the footage sorted into folders labeled SEA ICE, SEALS, and PRETTY!, as Willans does, and it’s another to craft a story from raw

(Continued on page 96)

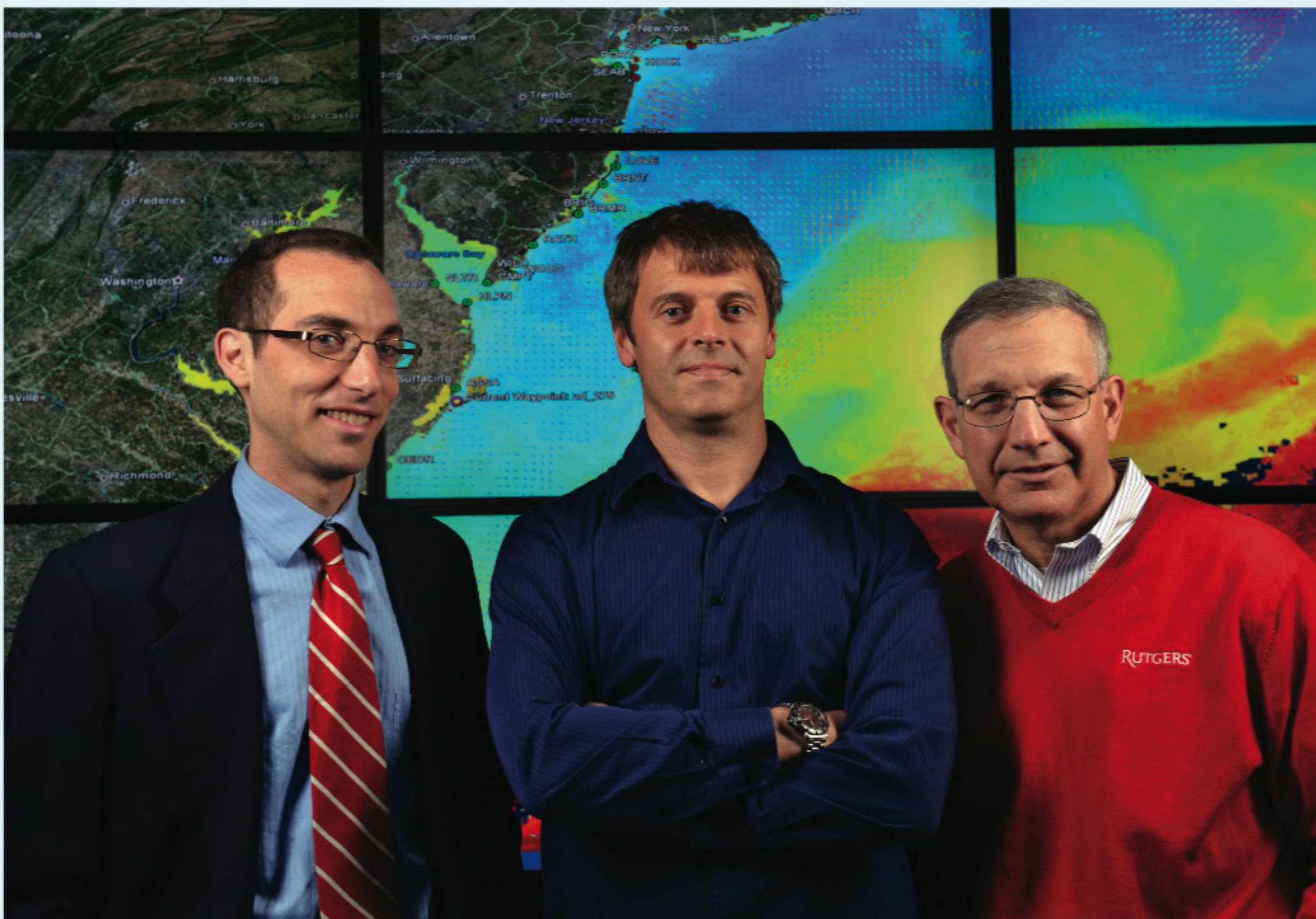
HIGH TIDE

Rutgers has some of the nation’s top experts working to determine whether rising seas will be catastrophic for the region—or amenable to preparations.

● They gaze into the past and they predict the future. Sea levels are rising, their crystal balls tell them, and if we don’t do something about it—and maybe even if we do—there’s trouble ahead for the Jersey Shore. Yet you wouldn’t mistake Rutgers’ sea-level experts for Madam Marie, the fortuneteller made famous by the quintessential Shore song, Bruce Springsteen’s “Fourth of July, Asbury Park (Sandy).” They’re world-class scientists, and their research is telling us, as one of them put it in an op-ed in the *New York Times*, that we’re at risk of turning “our coastal cities into so many Atlantises.” Their work is a mix of geology, history, public policy, environmental science, computer modeling, and even a field known as paleotemperature, and it’s at the forefront of efforts to save the Jersey Shore.

That’s a tall order, yet it’s clearly their mission—or part of it. As members of the Institute of Marine and Coastal Sciences at the School of Environmental and Biological Sciences and experts in geology, Benjamin Horton, Robert Kopp, and Kenneth Miller are notable for approaching sea-level studies from vastly disparate perspectives, chronologically speaking. “Ken looks over cycles of millions of years, Bob looks over cycles of hundreds of thousands of years, and I look over cycles of centuries to thousands of years,” Horton says.

New Jersey is their laboratory, and it’s a particularly conducive one for studying sea-level rise, largely because of the region’s geology and coastal wetlands. By examining the sediment of New Jersey’s coastline and marshes, researchers are gaining a better understanding of how sea levels have varied over millennia. The goal? “It’s all to do with predicting the future,” says Horton. That matters, for obvious reasons. Without more accurate predictions, there’s no way to know whether the inevitable sea-level rise over the next 100 years will be catastrophic for the region, or amenable to preparations.



From the left, Robert Kopp, Benjamin Horton, and Kenneth Miller are members of the Institute of Marine and Coastal Sciences at the School of Environmental and Biological Sciences and experts in geology. Each of them is studying the phenomenon of rising seas from different perspectives of time, looking for historical clues that will help predict the future behavior of the oceans.

The work of Miller, a professor in the Department of Earth and Planetary Sciences at the School of Arts and Sciences, is providing a better understanding of the relationship between sea-level change and Earth's ice sheets, an issue central to the rising seas as Earth is warming. The ice sheets already contain what Miller calls "thermal inertia": the rise in temperature over the past century is setting their melting in motion. "Even if we shut it all off, the thermal inertia in the ice sheets is such that we would be affecting the sea level for hundreds of years," says Miller, the "deep-time guy" among the three.

A study led by Kopp, an assistant professor in earth and planetary sciences, suggests that a warm period 125,000 years ago resulted in global sea

levels that were roughly 20 feet or more higher than they are today. "We don't know how fast sea level will rise," says Kopp, who brings a mix of scientific and policy expertise to his research, having worked on climate policy at the U.S. Department of Energy. "That doesn't mean we should wait to find out."

Horton, who joined Rutgers after having worked at the University of Pennsylvania, is recognized for his groundbreaking work on sea-level records along the Atlantic coast. Horton and colleagues are working on projections of the threat to the coastline from changes in tropical-storm intensity and frequency, coupled with rising seas. As a graduate student, Horton imagined his work would be focused on the past. Now he's at the forefront of research with immense implications for the future

of New Jersey and the surrounding metropolitan region. "I never thought I would do anything of such societal importance," he says.

They're part of a cadre of other leading researchers at Rutgers with expertise in sea-level rise, such as Richard Lathrop, director of the Grant F. Walton Center for Remote Sensing and Spatial Analysis. The center and its partners recently introduced NJ Flood Mapper (at slviewer.rutgers.edu), an online mapping tool to visualize sea-level rise and coastal flooding hazards.

"It's great to have all these people in one place," says Miller. "It's one-stop shopping. You don't have to go to a meeting or fly to Europe to work with somebody on this. They're here."

— Allan Hoffman

Down Under *(Continued from page 50)*

film footage. "I know where I want to go with it," Willans says. "I'm just having an issue with the beginning." Seidel helps her with the storytelling structure. With digital editing equipment, she notes, you can put together a few clips and see if it's working. If not, you try something else.

A few feet away, sophomore Stephanie Wong has assembled a minute-and-a-half scene, or the makings of one, about the Columbia professor Hugh Ducklow, the lead principal investigator at Palmer. The science is complex, having to do with the carbon content of water sampled from the sea, yet Ducklow, with the help of Wong's intuitive storytelling, brings things back to the plight of the penguins around Palmer. "Today there are only a few thousand breeding pairs of Adelle penguins left," he says. "They have declined by about 80 percent since 1975."

It's not a short documentary film—it's not even a full scene—but it's already a riveting piece of filmmaking, and stunningly beautiful, with close-ups of water poured from beakers, sea birds flying in the snow, and the *Laurence M. Gould* making its way through the ice. It's a start, and there's been a lot of learning—about filmmaking, about storytelling, about science—to get there.

Let it be known: this is not the most efficient way to make a documentary. But efficiency isn't the point here. Learning is, for the students and for those who will view the film once it's shaped into a dramatic and educational narrative. "The more voices, the more people you collaborate with, the richer the piece," says Seidel, who will work with the students to include material from their stories into the hour-long film. "Ultimately, we've got to make this all come together, but at this point it's theirs, and whatever scene they complete, that they're happy with, we can show at the film festival." With one semester of work, students will receive an assistant editor credit; two semesters, and they'll get an assistant producer credit. What's more, a new generation of storytellers is being educated in communicating complex scientific material. Gordon knows all about phytoplankton. Willans can explain the threats to the Adelle penguin population. Scientists need help communicating their material, and now they've got these students, who are helping to make their work, in all its complexities, accessible to a worldwide audience. As Schofield tells the students: "You're going to be worshipped by lots of hairy oceanographers." •

To learn more about the film and view the trailer, visit beyondtheice.rutgers.edu.

The Dealmaker *(Continued from page 56)*

Tomorrow, addressed social programs. All of the city's institutional players came on board, along with Democratic power player John A. Lynch Jr., who was mayor of New Brunswick from 1979 to 1991 and continued to pull strings as a state senator until he pleaded guilty to fraud and tax-evasion charges unrelated to Devco's work.

Johnson & Johnson's clout guaranteed the first major redevelopment project: the Hyatt Regency hotel, just across Albany Street from the corporation's sprawling international headquarters. More changes followed, along with criticism from community activists and historic preservationists who thought Devco was a little too quick with the wrecking ball. "For the first 15 years, we were essentially a subsidiary of Johnson & Johnson," Paladino says. "Devco's board leadership was dominated by their executives. They did good work because they were familiar with the city: they lived in the community." By the late 1980s, however, the redevelopment crusade had stalled. When Paladino arrived at Devco in 1994, "Johnson & Johnson," he says, "had evolved into a multinational corporation, and leadership was far more focused on Beijing than George Street."

"When I came on, Devco hadn't had a president in something like 14 months and nothing new had been built for several years," Paladino says. "We had to reinvent ourselves, and we did that by capitalizing on our assets."

Paladino, for his part, notes that Devco has financed the construction of two schools, an example of a public-private project that "requires all kinds of public hearings," he says. "They are actually a lot more transparent than most development projects."

Florio, who keeps in touch with his former student, thinks the critics are off base. "New Brunswick is the supreme example in New Jersey of what urban revitalization should be," the former governor says. "It's an example of the benefits of getting everyone engaged."

Although the Fresh Grocer opened in November 2012, work remained to be done on the upper floors of Wellness Plaza, where Robert Wood Johnson University Hospital is providing clinics and workshops on nutrition, exercise classes, and child care—all with steep membership discounts for New Brunswick residents. In late February, city and county officials gathered on the second floor of Wellness Plaza to mark the grand opening and gave Chris Paladino a round of thanks. On the ground floor, traffic in and out of the Fresh Grocer, on the corner of Kirkpatrick and Paterson streets, was brisk and steady. College-age shoppers crossed paths with retirees, young mothers with strollers walked past academics, a young man was having a conversation with a woman selling flowers in the foyer. The voice of New Brunswick's mayor, James Cahill, boomed overhead. "Chris Paladino is, simply put, the one who made Wellness Plaza happen." Applause filled the air as people bustled outside the store, living their lives in the new city still taking shape around them. •