Two months after he won a coveted $300,000 research grant and shook President Barack Obama’s hand, oceanographer Matthew Oliver (B.S., Ecology and Systematic Biology, ’99; M.S., Biology, ’01) decided it was time to pack up and get to work. It would be a very long commute. The 35-year-old University of Delaware assistant professor traveled more than 7,000 miles to settle down in his new office – a laboratory at a National Science Foundation weather station on Antarctica’s west coast.

With his trusty laptop computer and a couple of digital cameras, the former Mustangs football standout launched a three-year oceanographic project through the NASA Biodiversity research program.

His mission: Chase a crew of hungry penguins back and forth across the Antarctic waters and analyze the ecological implications of their movements with the help of environmental data from half a dozen orbiting U.S. satellites.

“By comparing the data stream from the satellites with information from the ‘tagged’ birds and also our fleet of Underwater Gliders (motorized micro-sub equipped with sensors), we can begin to better understand how all these complex relationships are at work in the penguin ecosystem,” Oliver said from Antarctica’s Palmer station weather outpost.

“Breaking new ground”

Headquartered at the NSF-operated Palmer Station on Anvers Island, Oliver’s five-year project is also breaking new ground in the study of how climate change can affect marine ecosystems.

“The signs of climate change’s impact can be seen everywhere in West Antarctica, as glaciers retreat and the loss of massive amounts of sea ice becomes increasingly evident,” Oliver said. “One of the most exciting things about this project is that it seems likely to help give us a better understanding of how climate change actually affects these Antarctic ecosystems. That could prove to be very important, scientifically, because it could help us to better prepare for the impact of climate change on all the oceans.”

The work presents a challenge, but one right in line with the passion that brought Oliver to Cal Poly in the first place: marine science.

“The challenge we face in studying these seascapes is that they aren’t landscapes, and so they’re always moving on you,” said the Southern California native, who earned an oceanography doctorate at Rutgers University in 2006 after leaving Cal Poly. “To understand what that means, imagine trying to study a forest that drifts for miles each day, so that every time you look at it, the ecological dynamics have changed completely.” That means Oliver must carefully track the vast data streams that flood continuously from the satellites and underwater gliders into his computers.
A group of the Adélie penguins Oliver and his group studied in Antarctica. (Photo courtesy Matthew Oliver)

Poly. Under the guidance of “inspiring mentors” Tom Richards and Mark Moline (A 2001 PECEAS winner now studying the Antarctic penguins with Oliver – see sidebar) Oliver said he was “hugely motivated” by a Cal Poly research voyage he took across the Pacific.

“Dr. Richards got me hooked up with the ‘Golden Bear’ training ship (now part of the Cal Poly at sea program). We sailed from San Francisco to Hawaii and Australia and Japan,” Oliver said. “I remember approaching Alaska on the way home, and our ship was getting crushed by these monster waves. I looked at them and thought: ‘Man, I love this stuff! This is where I want to spend my career.”

After nailing down his doctorate, Oliver launched a series of studies on ocean currents along the East Coast. Last fall, his highly regarded research landed him a visit to the White House – where Barack Obama shook his hand and urged him to use the PECES award (the highest honor bestowed by the U.S. government on young professionals in the early stages of their independent research careers) to help improve the U.S. fishing industry, among other scientific goals.

“Because of all these variables, understanding the ecological factors at work is extremely challenging. As a result, almost every time we run an analysis of the data, we find something new,” he said. “I don’t think there’s any doubt that these kinds of three-dimensional studies are going to help change the way we think about the worlds oceans.”

Oliver grew up in the Los Angeles area and then headed for San Luis Obispo to pursue his passion in marine science at Cal Poly.

Collaborating with Oliver is a group of four students and a professor. “We are collaborating, though with different agencies,” Oliver said of his former professor, Tom Richards and Mark Moline (a 2001 PeCASE winner now studying the environment, with water temperatures averaging 34 degrees). Moline said, “The NSF grant was one of two Moline received last year. The other, a four-year, $500,000 grant will support a collaborative effort with UC Santa Barbara to examine wind and water flows off California’s Central Coast. That project also will use robotic submarines developed at Cal Poly.”

Moline’s work, like Oliver’s, is addressing the impact of global warming and how it affects the penguins’ foraging environment.

The species’ sleeping because of the increasing water temperature, which has warmed up by one to two degrees in the last 15 years,” Moline said. “As a result, the ice is melting and their food sources are changing.”

Moline and a few other researchers traveled to Antarctica in January with an Autonomous Underwater Vehicle (AUV) they used to conduct surveys of the penguins’ foraging locations. The penguins were tagged, allowing the AUV to track them via satellite and transmit data to create a 3-D image of their foraging environment.

What’s remarkable about the team’s collaborative model of AUV – about 2 meters in length – is that it matches the penguins’ abilities for diving and duration. This research will help demonstrate the feasibility of robotic vehicles in a cold water environment with water temperatures averaging 34 degrees,” Moline said.

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ALUMNI IN THE NEWS

> THE ICENMAN CALLS IT QUITS AFTER 12 YEARS IN UFC

CHUCK LIDDELL (B.S., Business Administration, 1995) has retired after a long and successful Ultimate Fighting Championship career that included a nearly two-year reign as light heavyweight champ. The 41-year-old Halleck, nicknamed “The Iceman,” will remain involved with UFC as the company’s executive vice president for business development.

> AG BUSINESS GRAD SUCCESSFULLY GROWING EXOTIC CROP IN CALIFORNIA

COFFEE HAS PROVEN all but impossible to grow commercially in California. But don’t tell Jay Ruskay (B.S., Agricultural Business, 1997), who’s pulling off a feat in Goleta. While coffee growers and experts from around the world visit his operation to see how he’s doing, Ruskay is selling his locally grown coffee at farmers market in Santa Barbara.

> FORMER FOOTBALLER SCORES ON “GLEE”

JON HALL (B.A., Music, 2010) appeared on Fox’s hit TV show “Glee,” playing a member of a team singing in a show choir competition. Hall, who ran for 1,300 yards and scored 11 touchdowns during his college football career, also sang back-up during the national anthem on national television during Major League Baseball’s All-Star Game.

> ALUMNAPPOINTEDSANJOAQUINCOUNTY SUPERIOR COURT JUDGE

BRETT MORGAN (B.S., Social Sciences, 1985) has been appointed to the San Joaquin County Superior Court bench by Gov. Arnold Schwarzenegger. Morgan has worked as chief of staff for the California Department of Corrections and Rehabilitation, as well as chief deputy for the Office of the Inspector General, a government agency charged with watchdogging California prisons for waste, fraud and abuse.

> SPACESHIP DESIGNER RUTAN TO RETIRE IN 2011

BURT RUTAN (B.S., Aerospace Engineering, 1965) founder and chief technical officer of Scaled Composites in Mojave, Calif., plans to retire in April. The EAA plans to celebrate the 25th anniversary of Rutan’s Voyager aircraft around-the-world flight while hosting a “Salute to Burt Rutan” at its AirVenture Oshkosh 2011 event.

> TWINS TAKE THE CAL POLY APPROACH

NICK DAVIS (B.S., Wine & Viticulture, 2008) and Brian Davis (Agribusiness and Wine & Viticulture, 2008) built their business, Twin Pomegranates, on Cal Poly’s learn by doing philosophy. The brothers serve as their own distributors and operate without a traditional tasting room.

> GRAD NAMED CHIEF FINANCIAL OFFICER FOR AMN HEALTHCARE SERVICES

BRIAN M. SCOTT (B.S., Business Administration, 1993) has been named chief financial officer for AMN Healthcare Services. Scott joined AMN in 2003 and has been senior vice president of operations finance and business development.