

STANFORD

NOVEMBER/DECEMBER 2000

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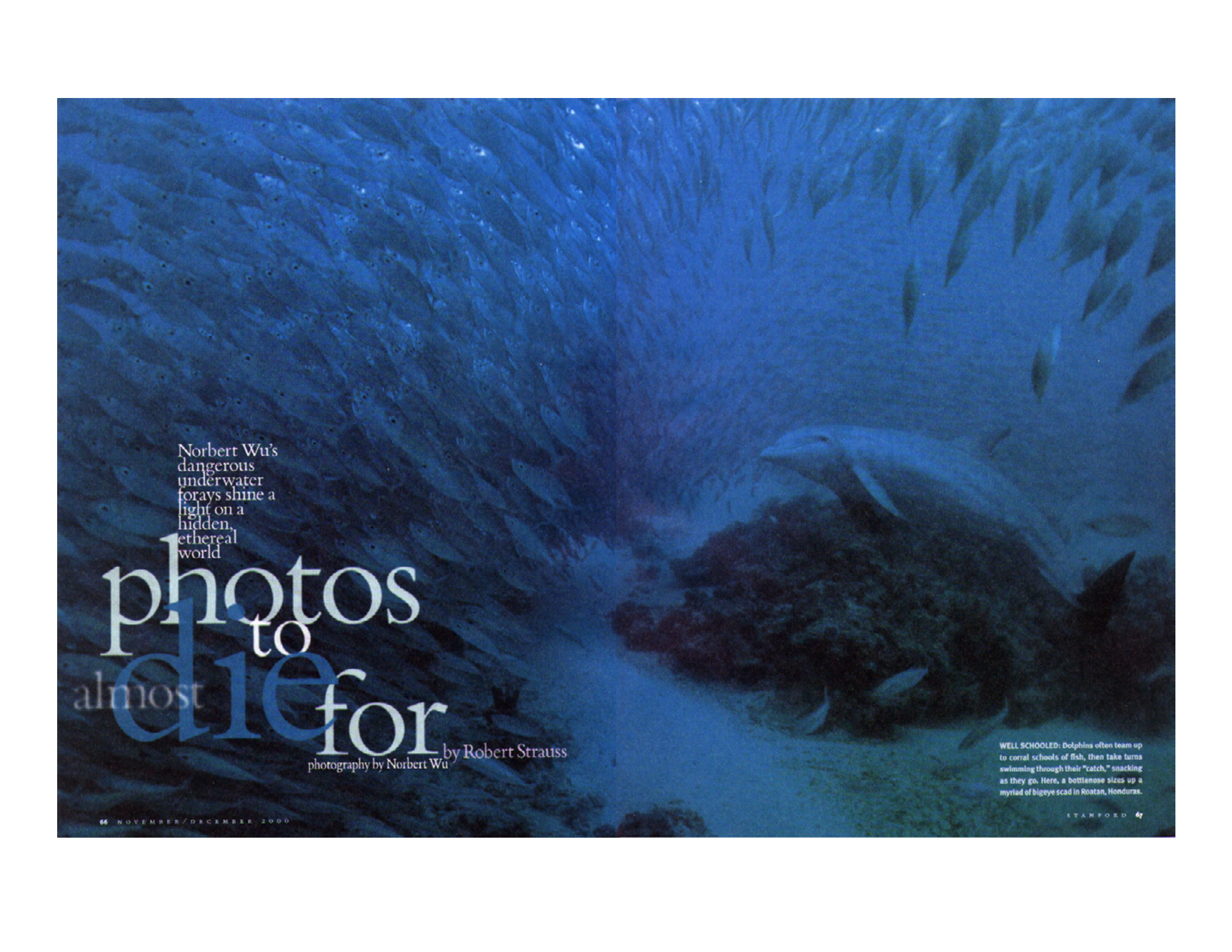
The Egg Donor Debate • Home-Schooled Students • Remembering Ivor Winters

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Photographer
Norbert Wu
goes to
breathtaking
lengths to
capture a
secret
universe
**UNEARTHLY
REVELATIONS**





Norbert Wu's
dangerous
underwater
forays shine a
light on a
hidden,
ethereal
world

photos
to
almost
die for

by Robert Strauss
photography by Norbert Wu

WELL SCHOOLED: Dolphins often team up to corral schools of fish, then take turns swimming through their "catch," snacking as they go. Here, a bottlenose sizes up a myriad of bigeye scad in Roatan, Honduras.

Norbert Wu's wife doesn't like hearing about what can go wrong when her husband goes off to work.

Like the time he ran out of air 100 feet underwater in the Galapagos while trying to photograph a red-lipped batfish. Or last year, when a critical hose became detached from his dry suit and frigid Antarctic water began spilling in against his skin. Or that time in Borneo when, trying to photograph inside a lightless cave known as Turtle Tomb, he stayed so long that he failed to realize just how low he was on air. Then his flashlight batteries began to give out.

For Norb Wu, 83, MS '85, surviving situations like these has become almost commonplace. He is one of the world's foremost underwater photographers, whose images have appeared on the covers of *Time*, *Geo*, *Science World*, *Natural History* and many others. Next fall, *Under Antarctic Ice*, a documentary Wu has been developing since 1997, will air on the PBS program *Nature*. It is the first underwater film ever shot in Antarctica with a high-definition digital video camera.

Despite his many achievements, Wu recognizes that no one will ever confuse him with the heroic, buffed, underwater type that Hollywood might imagine. Rather than standing fast at the helm as the chop splashes past him, Wu, 39, gets seasick and says he hates boats. He wears a hearing aid to counter the deafness brought on by years of diving, and he'd need Coke-bottle glasses except for the powerful contacts he uses. Plus, at 5 feet 6 inches and 195 pounds, he is seriously pudgy.

Producer David Meyer, who hired him to be the director of underwater photography for the National Geographic television program *Deep Flight*, likens Wu to an amphibian. "I thought he was like a frog—more comfortable as soon as he fell over the side

than he was on the boat," Meyers says. Wu would probably agree that the less-than-flattering comparison is apt. "Every time I go to the water, I experience something new," he says. "At 60 feet, you've got a little bit of nitrogen narcosis. You're weightless. You're feeling great. There's nothing I like better."

Wu has been fascinated by marine life ever since he saw his first Jacques Cousteau television special in second grade. He regularly went exploring in the creeks behind his family's home in suburban Atlanta. As a high school sophomore, he signed up for an honors class in marine biology; when it was canceled, he and a buddy went ahead and earned dive cards on their own. Wu made one of his first dives in Georgia's Lake Lanier, where he recalls seeing "nothing but a muddy bottom, a catfish and some golf balls."

He wanted a career somehow involved with marine life but detoured into electrical engineering as a safer choice, while studying several quarters at Hopkins Marine Station. Bachelor's and master's degrees completed, he was named an Our World Underwater Scholar in 1986. The program helps promising students tour the country and meet prominent people of the underwater world. Midway through, he accepted a job as the still photographer aboard Cousteau's *Calypso* during a four-month expedition off New Zealand. Wu couldn't turn down the chance to work with his idol, but his decision to leave the prestigious fellowship irked more than a few in the oceanographic establishment.

After *Calypso*, Wu settled in San Diego, where he began a PhD

MOUTHING OFF: Under the ice in Antarctica, a Weddell seal greets Wu aggressively. The photographer has worked three years on a PBS documentary about Antarctica's marine life.



HOMEBODIES: Despite its name, the wolf eel (left) has one mate for life and stays close to home, but its teeth are strong enough to crush clamshells. Above, a purple oceanic jellyfish harbors a juvenile crab. A large jellyfish may shelter hundreds of young crabs until they drop off in shallow water to develop into larger, armored adults. Wu met these denizens off Monterey, Calif.

program in applied ocean sciences at UC's Scripps Institution of Oceanography. He spent hundreds of hours photographing unusual specimens in the institute's vast collection and became something of an expert on deepwater life. In 1991, nowhere near his doctorate, he left Scripps, determined to make it as a professional photographer.

"When I met Norb in 1988, he probably had no talent as a photographer," says film director Howard Hall, the six-time Emmy-winner whose credits include *Into the Deep*, the first movie filmed underwater for large-screen IMAX 3-D. "But the difference between being a professional photographer and an amateur is whether you sell your pictures, and Norbert excelled at that. He was selling his images before they were any good. Now he sells them a lot easier, because he's one of the most prominent underwater photographers in the world."



Wu disdains the notion that accomplished photographers are "born" with talent, with "an eye." "I hear that over and over," he says. "It's all baloney. Anyone can do it. You can train the eye. I just happen to work full time at it."

As an illustrations editor at *National Geographic World*, Susan McElhinney sees thousands of underwater images every year. She recognizes that years of experience and study have separated Wu from the pack. "Most under-

water photographers are good divers who happen to have figured out how to use an underwater camera and strobe," she says. "What I enjoy about Norbert is that his background makes him considerably more valuable. There are a zillion and one underwater photographers, especially in California, but very few have his knowledge, his hidden insight."

Unlike most divers, who simply back-flip off a boat, Wu must go to extraordinary lengths just to get in the water. Consider the logistics of filming beneath the ice in Antarctica as Wu did in 1997, 1999 and again this year. First, there's the 24-hour trip from his home in Pacific Grove, Calif., to Christchurch, New Zealand. (Wu doesn't like flying, either.) In Christchurch, he and his team members may have to wait as long as a week before getting space on the next flight to Antarctica, rising daily at 3 a.m. in case seats open up. Then it's a five-hour, knee-to-knee flight on a

crammed C-130 down to "the ice" and the McMurdo Research Station.

After completing the mandatory survival training course ("Don't put anything cold near your mouth!"), Wu and his assistants begin scouting locations and arranging for food, helicopter flights and housing in the field. He is the first underwater photographer selected for the National Science Foundation's Antarctic Artists and Writers Program, but the NSF only helps with logistics after the needs of its scientific teams have been met.

Finally, if the weather permits, Wu gets to go out to the ice. His party will travel to the dive site either by helicopter or tracked vehicle. A drilling team will have bored a hole through the 6-foot-thick shelf ice, into which Wu will descend.

Diving around the world, Wu has had any number of experiences that could unnerve the most seasoned divers. One of those came last year beneath the Antarctic ice. The water temperature was 28.6°F. Salt water typically freezes at 28.5°.

Wu wanted to film the frozen underwater slope of a glacier. After stirring up, a process that can take 30 to 45 minutes and requires several helpers, an assistant handed him the bulky housing containing a Sony high-definition digital video camera. Then Wu lowered himself through the borehole into the crystalline water beneath the ice. There was, however, a small potential problem.

The access hole had been drilled several hundred yards from the glacier face, meaning that by the time the team swam to the location, as much as half their air might be used up. "We all knew that, but it was a really cool wall [slope]," Wu says. And he wanted the footage. "It's like another dimension. Like clear glass. A sheer wall of ice that goes down from 80 feet."

One of the attractions of diving in Antarctica is the preternatural clarity of the water. After a winter of near-total darkness, the water is almost entirely free of plankton. Experienced divers rave about underwater visibility of 150 or 200 feet in the tropics. Yet visibility beneath Antarctica can be five times as great—an astonishing 1,000 feet of visibility.

"The filming was going well," Wu recalls of his foray to the glacier slope. "But you get caught up in it. I got low on air." At 110 feet beneath the ice, slipping, sliding and struggling with the 100-pound camera housing, he inadvertently knocked the inflator hose off his dry suit.

Unlike a wet suit, in which a thin layer of water warmed by the body keeps the diver comfortable, a dry suit is supposed to be just that, dry. Depending on the water temperature, a diver might put on thermal underwear, or a heavy-duty snow-mobiling outfit, or both. But the deeper one dives, the more the water pressure constricts the loose-fitting suit, until movement becomes all but impossible. Divers counteract this straitjacket effect by releasing compressed air into the suit as they descend.

"I hit the button to reinflate the suit, and it didn't feel right," Wu remembers. Rather than the compressed air he expected, a stream of freezing water flowed in. "This is a dangerous

STARSTRUCK. Beneath the breathing holes of a Weddell seal colony, Scripps Institution marine ecologist Dale Stokes encounters sea stars blanketing the floor of an ice cave. The starfish feed on seal feces.



situation, because you can barely swim as it is," he explains. "Your clothes get sodden, and that adds weight." Hundreds of yards from the borehole and low on air, Wu realized he was beginning to sink. He felt the first twinge of panic.

Peter Bruggeman, who dived with Wu in Antarctica in 1997 and 1999, knows that panic is what often kills divers—no matter how experienced they may be. He oversees one of the world's largest marine collections as library director at the Scripps Institution and is himself an accomplished diver and photographer.

"I've had situations where I was unnerved," Bruggeman says. "I didn't think I was going to die, but then the bad movie starts playing in your head. You've seen *Jaws*. You start worrying about sharks that aren't there. Diving is all about being in control of your thoughts and responding accordingly."

Wu, recalling his own narrow escape from Turtle Tomb in Borneo where he nearly exhausted his air, says, "I could feel panic coming over me. It could easily overwhelm you. You're going, 'Oh s***, what a stupid way to die. Oh s***, I can't believe I'm going to die.' And you start breathing faster," using up what little air may be left.

Beneath the ice in Antarctica, Wu slashed his finger across his throat, the universal signal for "low on air." He tossed the camera in the direction of Dale Stokes, one of his team members, and made for the hole. Fortunately, Stokes, a Scripps project scientist, caught the \$750,000 camera package before it sank out of reach. And Wu, now marginally buoyant but getting increasingly soggy, made it to the hole just as his oxygen ran out.

Director Howard Hall has seen some of the footage Wu intends to use in *Under Antarctic Ice*. The clarity of the water, the unique sealife, Wu's aesthetics and the incredible resolution of the camera make Hall believe that the film will be nominated for one, if not both, of the prestigious awards given to natural history filmmakers each year at festivals in Jackson Hole, Wyo., and Bristol, England.

Of the hundreds of thousands of dollars Norbert Wu has invested in his business, camera buffs might be most impressed by his high-definition camera, the absolute latest in digital filmmaking. But for most people, no piece of equipment is more impressive—and more emblematic of the risks Wu takes—than his "shark suit."

Wu wears the \$10,000 custom-made chain-mail suit, fabricated from countless tiny stainless-steel ringlets, only when he knows he'll be photographing in the company of sharks. The problem is, the suit weighs 20 pounds and Wu must wear it under his BC, or buoyancy compensator, the inflatable vest that helps control his depth underwater. Should a shark happen to bite through the BC, Wu and his suit would head straight for the bottom. And against large sharks, the tigers and great whites, the suit offers no protection at all. The great ocean predators are "the size of a minivan," Wu says, and would "simply grab you and swim away." Suit or no suit.

Although he claims it's another myth that all natural history photographers are real-world Indiana Joneses, Wu has a larger-than-life reputation. Like many highly regarded photographers, he is known not only for his underwater images but also for his topside personality.

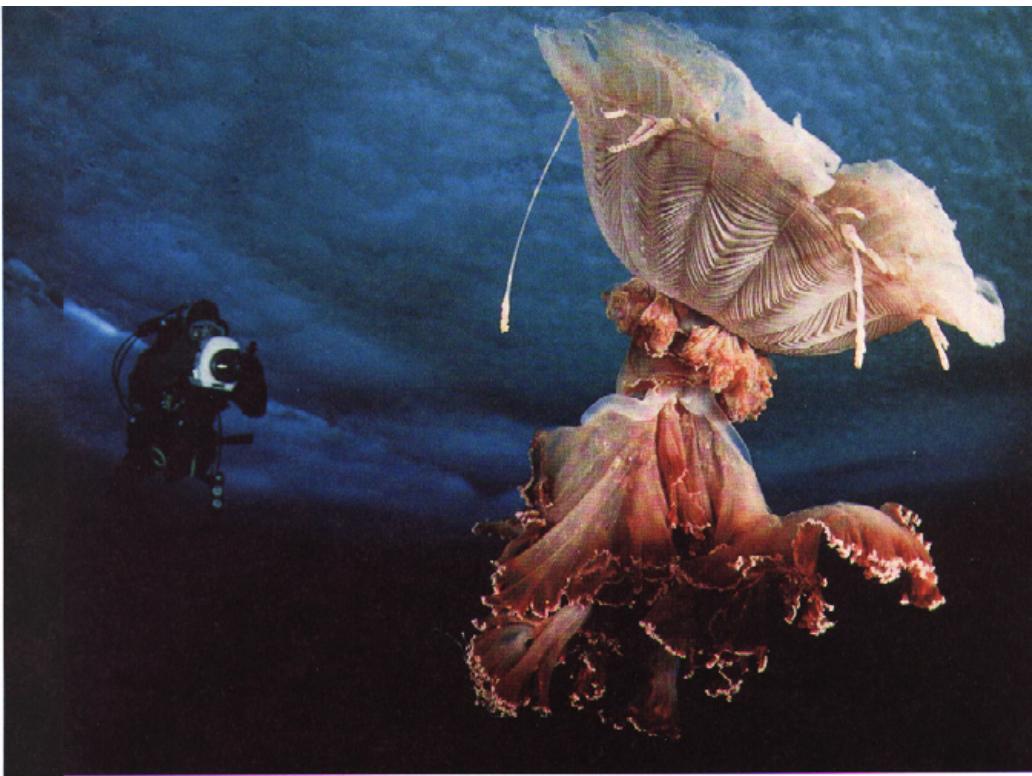
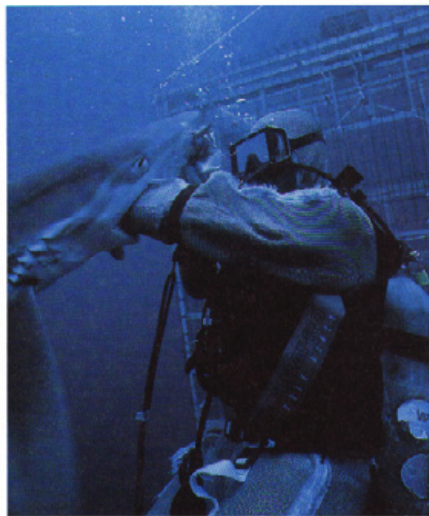
"One thing that characterizes a lot of photographers is inflated egos," says *National Geographic World's* McElhinney. "Norbert is not deficient in that category." Underwater photographer Marty Snyderman has a different view of his friend—although he admits that Wu was "a brash, cocky little #*!@% at one time." Says Snyderman: "You ask Norb what he's doing, and he says, 'Not much.' So you ask him what he's done lately, and your jaw drops." And according to Hall, "he's one of the most self-deprecating individuals I know. He likes to make fun of himself, and that's part of what's charming about him."

Sometimes it seems the only thing people who have worked with him agree upon is that Wu is the James Brown of his profession—the hardest working man in underwater photography. "The main thing that everybody comments on is that he's a worker," Guy Guthridge says. As the manager of Antarctic information for the Office of Polar Programs, Guthridge has been overseeing Wu's work. "This guy's in the water two and three times a day. In water as cold as it gets in this world, he's just down there, being there, seeing things."

"He's doing this in a fabulous way," Guthridge adds. "He's not only got the pictures, he's got the website (www.scilib.ucsd.edu/sio/msf/). He's got the high-definition film. There are scenes there I've never seen before. Our scientists are delighted. He's doing things they cannot do. We're getting a lot out of it, and I think the nation is getting a lot out of it. We're going to see the underwater life of McMurdo Sound in a way we've never seen."

Part of Wu's success comes from his endurance. "He has an ability to stay in the frigid waters far longer than we normal humans find comfortable," says Rob Robbins, scientific diving coordinator for the U.S. Antarctic

JAWBREAKER: Chain-mail suits made of thousands of steel ringlets protect divers from smaller species such as this blue shark. Wu spent \$20,000 on his 20-pound custom armor.



GLACIAL GRACE: The huge Antarctic jellyfish, *Desmonema glaciale*, has a few cordlike tentacles and a "bell" that can reach more than a meter in diameter. Dale Stokes films one swimming near the surface.

Despite being away from home as much as six months each year, Wu sometimes intentionally projects a persona of studied diffidence bordering on laziness. In a Christmas letter to friends, he claims to have spent most of 1998 eating junk food, watching television and telling himself he could have done what his fellow underwater photographers were doing—if only he could get someone to hire him. He named his production company Mo Yung—that's Chinese for "worthless." Wife Deanna, 83, quips that her husband's prolonged absences—during which she stays busy as a dentist—are "the secret to our marriage."

Project. "It impresses me that Norb and Dr. Dale Stokes will make multiple 90-minute-plus dives in shallow water around a Weddell seal colony to get that perfect shot. Many people want out in 30 minutes. Most are exceptionally whiny after an hour in the water. I've seen Norb injure his neck due to exposure to subfreezing water. I'm too old to keep up with him."

At some point, everyone who has worked with Wu has probably experienced his unusual sense of humor or witnessed his temper, frequently characterized as volcanic. Leighton Taylor, a former deputy director of the California Academy of Science, traveled with Wu to Antarctica in 1997. While planning a dive, Wu became profanely furious with Taylor, potentially jeopardizing a collaboration that has produced seven books, with three more in the works. People who know Wu well say his occasional fury comes from the incredibly high expectations he sets for himself and everybody else. "It works," Taylor says of Wu's outbursts. "The guy does it once, and you're watching your behavior after that."

Being on the receiving end of Wu's sharp tongue hasn't diminished Taylor's regard for Wu's work. "Norbert's stock library is wonderfully complete," he says. "His documentary and aesthetic qualities are wonderful. The value of what Norbert does is worth enough to me that if someone said that the only way he can get these pictures is for me to go again, I'd go again."

Wu admits that his temper "is probably one of my biggest faults," though he claims, and Deanna concurs, that it erupts less



frequently and with less force these days.

To get some of his astounding footage, like the video of brittle stars moving across the ocean floor with the anemones of the enchanted bioluminescence in *Fantasia*, Wu deploys techniques rarely used before. In addition to the electric cables and lights required in low-light situations, he has placed cameras on underwater tripods and utilized time exposures that allow wide-angle shots in the relative darkness beneath the ice. For his still photography, he and his assistants sometimes go below with as many as seven cameras. (Reloading or changing focal lengths underwater is not a simple matter of popping in another roll of film or snapping on a different lens. Multiple cameras help avoid trips back to the surface.)

Wu doesn't know exactly how many pictures he's taken in his career. He estimates that his library includes more than 150,000 images. He attributes a good part of his success to his ability to build and maintain huge databases of all his shots, contacts and sales. The two-bedroom house he and Deanna once called home has been given over entirely to his production company. (The couple and their two atlantic dogs live in another neat-as-a-pin home on a half-acre lot a few blocks away.) With his new hi-def camera, Wu hopes to build an equally impressive library of video footage.

Perhaps more incredible than the size of his stock library is the fact that it represents only those photos he thought worthy of keeping. Of the 36,000 or so images he shoots every year, Wu expects to sell only 1 percent. On a trip to the Great Barrier Reef in 1998, he shot more than 100 rolls of film but added just 20 images to his portfolio.

Last year, Wu was named a Pew Fellow in Marine Conservation, the first underwater photographer so honored since the

program's inception in 1996. He plans to use the \$150,000, three-year award to document marine conservation efforts around the world, from coral reefs to fisheries to hot spots like the Galapagos, where "we've got this treasure that's under siege from fishermen coming from the mainland."

In the nearly 25 years Wu has been diving, he's personally witnessed a degree of degradation of populations and habitats that once might have been thought impossible. Years ago he was able to photograph dozens of 10- to 12-foot blue sharks swimming together off San Diego. Now, he says, he's lucky to find a couple: the booming economy has put shark's fin soup within reach of more people than ever before. A first-generation Chinese-American, Wu won't touch the stuff. "I've never liked the taste, or the waste, that results from the demand for shark's fin soup."

Nor will he eat Chilean sea bass or swordfish, knowing that today's fishing techniques endanger their populations. "Fishermen are going deeper and deeper. The technology is so advanced that when they hit a fishery, it's just not going to come back. The white abalone may [soon] be classified as extinct," Wu says. "Think about the vastness of the ocean. It's incredible." Part of his biggest challenge as a Pew fellow is to find a way to effectively document marine systems that no longer exist as they once did.

Wu's outspokenness on conservation issues can cause unwelcome ripple effects within the oceanographic community. Recently, he's been disturbed by what he considers unreasonable and unscientific efforts that have stopped the establishment of new marine conservation areas in Monterey Bay. On the other side of what has been a very heated, occasionally nasty debate, the Monterey Bay Aquarium says there's no scientific evidence that the proposed areas are in distress—or at least not any more so than the entire California coastline, the protection of which is currently under review by the state. Wu and others contend that the aquarium is only looking out for its ability to gather



ON THE WING: Though flightless, emperor penguins (left) shoot through McMurdo Sound like torpedoes and are the champions among diving birds, able to hold their breath for 22 minutes and reach depths of 1,800 feet. Above, Adelle penguins at Cape Bird take to the water like dominoes.

Steven Webster, the aquarium's senior marine biologist, says, "If you're going to educate the next generation of marine biologists, you're going to need some critters for them to study." Webster, '61, MA '65, PhD '72, asserts that the bay's sea otter population

the specimens that have helped attract 26 million visitors to Monterey since the facility opened.

on. An anemone has caught a jellyfish and is slowly consuming it. Without disturbing the sealife on the wall, Wu somehow stabilizes himself against the ocean surge that rises and falls every few seconds. Looking through his contacts, through his mask, through the underwater housing, through the Nikon's viewfinder, he carefully adjusts his lights and shoots. During two 45-minute dives, he fires off 72 frames. He hopes to get one he can use. □

alone consumes many times more specimens than the scientific community will ever collect. Rather than piecemeal protection of cherished marine locations, the aquarium supports a coherent statewide plan. The debate and the frayed emotions continue.

'Is it really necessary?' Wu wants to know when asked to bring a camera along on a dive in Monterey Bay. He'd rather not spend the two hours it takes to prep—and later break down—his workhorse Nikon F90. Watching him shoot will be boring, he says. There will be nothing to see. It'll be cold. Finally, he reopens and begins greasing the seals on the housing that will keep his camera dry.

A shawl of fog has draped itself across Point Lobos State Reserve, just south of Monterey. Under an otherwise clear morning sky, the point itself begins to glow as though illuminated from within. From his vantage in an inflatable dive boat, Wu knows it's a shot Edward Weston or Ansel Adams could have made a classic. But having brought along only a macro lens that can focus no farther than a few feet away, he can only curse as the boat bobs up and down in an unusual 6-foot summer swell.

The swell has carried thousands of "egg-yolk" jellyfish into Monterey Bay from the deep Pacific. In a cul-de-sac 80 feet beneath the surface, perhaps 50 or 100 have settled into their final resting place. Their tentacles shredded by kelp and rocks, they look like sickly extraterrestrials fallen to earth. Or the makings of a giant omelet only partially stirred.

Along one underwater wall, Wu finds something he can focus his lens on. An anemone has caught a jellyfish and is slowly consuming it. Without disturbing the sealife on the wall, Wu somehow stabilizes himself against the ocean surge that rises and falls every few seconds. Looking through his contacts, through his mask, through the underwater housing, through the Nikon's viewfinder, he carefully adjusts his lights and shoots. During two 45-minute dives, he fires off 72 frames. He hopes to get one he can use. □

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