Meg Lowman wants to take people on scientific journeys inside the four-story "Daily Planet" behind her.

PHOTOGRAPH BY ROGER WINSTEAD '87

Meg's Wild and Wonderful World of Science

by Bill Krueger

NC State's Meg Lowman wants to use the new Nature Research Center to get others excited about scientific discovery.

Meg Lowman plans to take thousands of schoolchildren into the Amazon to study the rain forest. She wants to take them to Ethiopia, where she works to preserve what remains of the rain forest there. She also wants them to work side-by-side with other scientists doing a wide variety of research projects. Grown-ups are welcome, too, be they parents or grandparents, politicians or business leaders.

Don't believe it? Then you haven't met Meg Lowman, and you probably aren't familiar with her latest project.

That project is the new Nature Research Center at the N.C. Museum of Natural Sciences in downtown Raleigh. Lowman, a research professor of natural sciences at NC State, is director of the new center. And that's where she will take anyone who is interested on a scientific journey. Many of those treks will be taken virtually, inside a multi-media silver globe that looms over the street, while others will happen alongside scientists from NC State and elsewhere who will be conducting their research at labs inside the center.

Lowman's goal is to help everyone have a greater appreciation and better understanding of science. Like other scientists, she is bothered by the low level of scientific literacy among the general population and how that sometimes translates into public policy. She fears that time is running out for rain forests and the countless species—roughly half of all living creatures on earth—that make their home there. But she holds out hope that scientists can do a better job of getting others excited about science. "I remain optimistic," she says, "because my real hope is that some of this younger generation will come up with these amazing technologies that we so desperately need—clean energy, solutions that allow us to travel in a virtual way instead of using gasoline, opportunities that reduce the numbers of pieces of paper that we need in our everyday life."

There's nothing simple, though, about the challenge Lowman faces. She has to convince scientists to do a better job of explaining what they do and how it relates to everyday life. And everyone else has to do their part, even if it's as simple as kicking off their shoes and wading through a stream or taking the time to take a close look at a leaf, open to whatever surprises await. Lowman knows that bridging that gap is no easy task.

"How do we cross this divide?" Lowman asks. "Scientists have to give a lot. I mean, they have to take it seriously, that the art of communication is critical in their field. And then the public has to experience some 'eureka' moments where scientists demystify it for them, when they find out that science is really important to their everyday life."

While the challenge may be daunting, Lowman (sounds like HOW-man) has an impressive track record of overcoming obstacles and transmitting her passion for science and scientific discovery to others. Yes, she is a university professor and the director of a gleaming new research center, but she's also "Canopy Meg," an intrepid tree climber who is a pioneer in the research of the rain forests' towering canopies. She is a conservationist who fights to save rain forests around the world. She is an author, a teacher, a newspaper columnist, a diplomat, an explorer and a mentor. And, as she will tell you with a twinkle in her eye, the owner of a treasured collection of blow guns (each acquired through barter with tribes she has met in her travels) and a cook who has been known to enjoy a chocolate cricket (yes, cricket) torte.

"She wants to engage you," says Betsy Bennett, who, as director of the N.C. Museum of Natural Sciences, is one of Lowman's supervisors. "She's just got that knack. She understands the subject so well, and can communicate it to a five-year-old or a 95-year-old or a senior scientist. She wants to have a conversation. She wants you to be a citizen-scientist."

Lowman, 58, recently spoke to a gathering of science writers, describing the mission of the Nature Research Center, scheduled to open in April within walking distance of the state Capitol and the Legislative Building. Unlike most science museums, which display the results of scientific discoveries, the Nature Research Center will enable visitors to see scientific research as it is happening and talk with the researchers who are working in labs in the center. The College of Veterinary Medicine will have a space where visitors will be able to watch surgery performed on small animals or bring a strand

Lowman enlisted the help of a spelunking club in Australia to learn how to use ropes to research the tops of trees.

of hair from their pet dog to analyze its DNA. The insides of the globe (known as the "Daily Planet") will project images of Lowman and other scientists at work—an ongoing virtual tour that may also be beamed into classrooms across North Carolina and elsewhere. Visitors will even be able to grab a burger and a beer in a "science bar" that mimics sports bars except the big-screen televisions will be broadcasting science stories and reports.

"Most museums are collections of what we know," Lowman says. "They're kind of dusty collections that people go in and see. They're probably not as dynamic to the current generation of kids. We hope in the new museum to take what we know, and focus on how we know it."

Although she insists she had no grand career plan, Lowman appears to have spent her life preparing for this opportunity to spark the public's interest in science. Lowman grew up in Elmira, N.Y., without the video games and smart phones that are everywhere today. Lowman was smart, but shy, and found comfort exploring the world outside her house. Lowman and a friend walked behind as her dad mowed the lawn, scooping up the worms that were cut in half in a futile attempt to patch them back together. She catalogued wildflowers, brought home abandoned birds' nests to study and memorized the songs of countless birds. (During a recent walk through the Museum of Natural Sciences, Lowman noted that the sound piped into the butterfly room included the call of a red-shouldered hawk that would never be found in such a tropical locale. She promised a museum employee to get a more authentic recording.)

"Nature is a good friend if you're not a real talker in class or one of those people who's always making friends with everybody," Lowman says. "Something about nature is very peaceful and meaningful to that kind of person. I loved finding a new wildflower. I loved seeing a new bird."

While she may have felt at home outdoors, science was not an obvious career path for Lowman. Her parents were not scientists, and she says there were no role models to be found at school. A summer nature camp in West Virginia was the one place where she met other kids—and adults—who shared her fascination with all that could be found outdoors. It was enough to launch Lowman into a college career that led her to Massachusetts, Scotland and finally Australia to work on her PhD. It was, at times, a lonely journey. She initially planned to study geology, only to be told by a department head, "We don't want you here. We don't want women majors." She was one of two female doctoral students studying biology at Sydney University and was typically the lone woman on research expeditions into the field.

"When I was a student, all of my mentors were men—who could hardly advise me about balancing pregnancy with fieldwork or offer helpful hints about living in the jungle with male colleagues," Lowman wrote in *Life in the Treetops*, which chronicled her early days exploring the forest

PHOTOGRAPH COURTESY OF MEG LOWMAN

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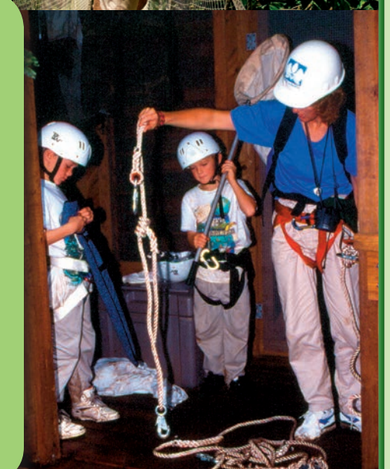
—Betsy Bennett, director of the N.C. Museum of Natural Sciences



Lowman has used ropes, dirigibles (top center) and elevated walkway (top right) to study the forest canopy. She works with other scientists, students and priests in Ethiopia (bottom) in her efforts to save rain forests.

"Scientists recognize they have to communicate, but there's still a whole lot of them that don't get trained. They're scared to communicate because no one ever told them what it's like to talk to a seventh grader. So rather than embrace it and say, 'Wow, I really want to learn,' they just turn their back on it."

—Meg Lowman

Lowman shares her passion for science with children from Raleigh (at the N.C. Museum of Natural Sciences) to Ethiopia. She even took Daniel Solomon (upper right), dean of the College of Physical and Mathematical Sciences, with her on an expedition to the Amazon.

PHOTOGRAPHS BY ROGER WINSTEAD '87; LOWMAN/SOLOMON PHOTOGRAPHY COURTESY OF DANIEL SOLOMON; LOMAN IN ETHIOPIA COURTESY OF MEG LOWMAN

canopy and the challenges she faced as she tried to balance being a wife and mother to two young boys with her professional aspirations. Her husband, an Australian rancher, owned 5,000 acres that Lowman found as beautiful as they were remote. But Lowman faced pressure from her husband's family to stay close to the ranch to take care of the boys and the house, and she took seriously her responsibilities to what she called her "housewifery."

"I became adept at 'boiling the billy' (making a cup of tea) and learned at least a hundred ways (or so it seemed) to cook lamb," she wrote. But Lowman was unable

Lowman has a child-like ability to find the fun in science.

PHOTOGRAPH BY ROGER WINSTEAD '87; MEG LOWMAN WITH NET PHOTOGRAPH BY CARLTON WARD JR.

to make it work. "After a year of married life in the bush . . . it became increasingly obvious to me that my devotion to science was an obvious deterrent from domestic duties," Lowman wrote. Lowman eventually divorced her husband after returning to the United States with her sons, and has since remarried.

Lowman was faced with another obstacle while in Australia as she began her research in the rain forest. Most of the research at the time was done from the ground, with scientists relying on binoculars to look up into the trees or shotguns to bring branches to the ground for closer observation. So, in 1979, Lowman enlisted a local spelunking club to help her figure out how to use ropes to pull herself up into a 30-meter tall coachwood tree in Royal National Park just north of Sydney. "From then on, I never looked back . . . or down!" Lowman wrote in *Life in the Treetops*.

What Lowman found in the treetops continues to amaze her—an incredibly diverse and unexplored ecosystem. She concentrated her studies on leaves, finding that insects eat about 25 percent of the canopy every year. "It gives me a huge appreciation for trees, that they are so absolutely resistant to being eaten," she says. "It would be like if you could regenerate half of your fingers every year. It would be a pretty cool medical feat."

Her favorite tree is known as a giant stinging tree, which she studied in Australia despite the fact that it is covered with hairs that produce a chemical sting. "When you think about it, animals can run away from their enemies," she says. "Plants cannot. So plants have to create ways to protect themselves, and I think the giant stinging tree wins first prize. It's so darn nasty, but I'm so impressed."

Methods of researching the canopy have since expanded to include permanent walkways (many of which Lowman has helped build), construction cranes and dirigibles that carry a large raft-like structure (with the scientists on it) onto the top of the canopy. Lowman and a colleague wrote the first textbook on canopy biology.

"She was driven by an intense curiosity about nature," says Hal Heatwole, a professor of reptile and amphibian ecology at NC State who worked with Lowman in Australia. "She was also ambitious. She wanted to succeed and she wanted to make a difference. One of the driving forces in her life was the concern for the environment."

Lowman spent countless hours observing, counting and cataloguing leaves and the insects that ate them. But she worried that her findings would be lost to some scientific journal, unread by the general public and the politicians and others who make decisions that impact the rain forest. She feared that before she could finish her research, important parts of the rain forest would be lost. "I look at all my colleagues who are investing their heart and soul into

Muttonbirds and Nutmeg Beetles

In her first book, *Life in the Treetops*, Meg Lowman wrote about an encounter she had with a group of howler monkeys in Panama and said they made one of the strangest sounds she had ever heard. We asked about a few of her other adventures.

Other strange and extraordinary sounds: "Oh, muttonbirds on the Great Barrier Reef. They sound a little bit like awful bird sex, if there is such a thing. . . . Being in the Amazon, sleeping in an open-air hut, or somewhere on the ground; in the canopy is best of all. Just having surround-sound insects at night, with the occasional howling animal and the occasional bird call."

Strangest foods she's eaten: "I ate quite a few things in Africa that I'm not sure what they were. But if I had to pick one that I knew what I was eating, it would probably be what's called suri, or grubs that live in decaying palm trunks in the Amazon. It's a lovely delicacy for the locals, to serve them raw. You nip the head off, and they're really fat and greasy. Then you put the body in your mouth and swallow it like sushi. They're awful! But it's more or less a politeness. You respect the culture."

Toughest injury: "This last trip (to Ethiopia) I had a thousand and one chigger bites. I think it's because I sat with some priests in some places. I had to sit quietly and respectfully. And I just don't think they'd ever done things like clean their rugs."

Favorite insect: "The most fun one is the nutmeg beetle, which was found in the canopies of the Amazon eating air plants, the bromeliads. As far as gorgeousness, there are some gorgeous, gorgeous katydids that camouflage to look like a leaf. To me, that's utterly stunning. Some of them even have little areas that are nicked to look like a hole in the leaf surface."

collecting data about leaves or bugs, and they're publishing it in a journal that you are never going to read," she says. "There are enormous amounts of money going into that research. But I can assure you, it hasn't done squat to save one percent of the forest."

Then, in 1999, *Life in the Treetops* got a front-page review in *The New York Times* book section. The positive response was overwhelming. It was also eye-opening for Lowman, who was in awe of the reach of a few hundred words in a daily newspaper. It marked the beginning of the final stage of Lowman's transformation from field researcher to impassioned conservationist and then to science educator and communicator. What sets Lowman apart is her ability to tap into each phase of her career in pursuit of her latest mission.

Lowman and Claire Hopkins of Raleigh get a closer look at some bess beetles at the N.C. Museum of Natural Sciences.

"Some people are very good at research, but couldn't explain it to their next-door neighbor if their life depended on it," says Heatwole. "Then there are some people who are caught up in nature so much without really understanding the biology of it. But the mixture is where the two combine, and Meg does that admirably. She's capable of both, and both come very natural to her."

Daniel Solomon, dean of the College of Physical and Mathematical Sciences, was on the search committee that hired Lowman from New College of Florida in Sarasota, where she had also run a public botanical garden. Solomon says Lowman has the scientific background to make her credible with other scientists and an ability to connect with non-scientists. "She's very compelling, very engaging," he says. "She not only satisfied what we were looking for as a scientist and a science communicator, she is focused on diversity in the science community."

Solomon is referring to Lowman's determination that the next generation of girls, as well as minorities, won't struggle to find familiar role models. Many of the scientists who will work in the Nature Research Center will be women and minorities who are eager to share their passion for science with young visitors to the center.

Not surprisingly, much of the talk about the Nature Research Center is about the potential impact it will have on visitors, young and old, as they get the chance to encounter science in new and exciting ways. But an important part of Lowman's mission is to help scientists get out of their research labs and help others understand the work they are doing. She recently led a seminar on the subject for other scientists at NC State.

"Scientists recognize they have to communicate, but there's still a whole lot of them that don't get trained," Lowman says. "They're scared to communicate because no one ever told them what it's like to talk to a seventh grader. So rather than embrace it and say, 'Wow, I really want to learn,' they just turn their back on it."

Lowman says they don't have that luxury anymore, not if they want to continue to get funding for research in a time of tightening budgets at the state and federal levels. Not if they want the findings of their science to be understood by the power brokers in Washington and elsewhere who make decisions that have an impact on issues like climate change. Not if they want the public to understand what it is they do and why it matters. "I hope I can change the landscape of science in the long term by inspiring other young scientists to seek science communication as part of their formula," she says.

Solomon, the dean of PAMS, says other scientists need to get on board with what Lowman is trying to do. He hopes that the Nature Research Center will become a place where graduate students learn how to communicate what they are doing to the public. "We can't, as a science community, complain that the public doesn't understand climate change or evolution or vaccines or whatever it is if we're not out there talking to the public," he says. "We can't complain that there's not enough federal funding for science if we're not out there talking to the decision-makers."

Lowman, the girl who was so shy as a child that she didn't even look out the window at school for fear of calling attention to herself, is now comfortable with scientists, children, employees, Rotary clubs and legislators. She is as likely to toss out a "my gosh" or a "geez" when talking about science as some scientific term that will be lost on her audience. In her world travels, Lowman engages tribal shaman in the Amazon and works with Coptic priests in Ethiopia to get their help in preserving the forests there.

"There are a lot of really good academics around who never had the same impact that someone like Meg has," says Patrice Morrow, a retired professor of ecology and evolution who worked with Lowman in Australia. "She has this personality, this outgoingness, without being pushy. You can't help but get drawn in."

When Lowman encounters two young children visiting the museum, she gets down on her knees to extend her hand and introduce herself. When she meets an NC State student working at the museum, he gushes that he had hoped to meet her since he hopes to get a job at the Nature Research Center when he graduates in May. "And I've been hoping to meet you!" she tells him. He beams as she suggests he come by to see her some time so they can talk about their mutual interest in forest conservation.

But when she is asked about how she will measure success in the Nature Research Center, she doesn't talk about seeing a child watching in awe as images from Ethiopia are projected on the screen in the Daily Planet. She doesn't mention someone coming back every week to check on the progress of the research one of the scientists is conducting. She doesn't even talk about big crowds or impressive reviews for the center.

"One is if the North Carolina legislators come across to our science cafe for drinks after work and think that watching live science on TV screens is almost as cool as a sports event," she says. "That would be fantastic.

"And secondly, if teens can come and hang out and enjoy the virtual activities, talking to the real scientists, want to have their cokes and pizzas at the NRC on Friday night and do a gaming session in the Daily Planet, then I think we will have really changed the landscape of how people are viewing science and, hopefully, how they are absorbing science in their everyday life."

On the web: canopymeg.com/naturalsciences.org/nature-research-center

PHOTOGRAPH BY ROGER WINSTEAD '87

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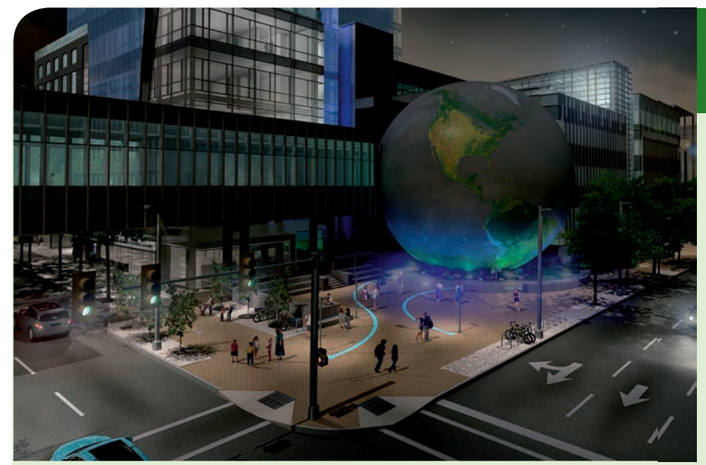

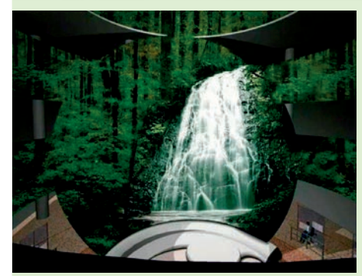

A Quick Glance at the Nature Research Center

The Nature Research Center is a new wing of the N.C. Museum of Natural Sciences in downtown Raleigh. Meg Lowman, a research professor of natural sciences at NC State, is the director.

When does it open? The NRC will have a 24-hour grand opening on April 20–21.

How much will it cost to get in? The center will be free and open to the public year-round.

What will I find there? The center will have 80,000 square feet of space dedicated to exhibits, labs, classrooms as well as what is being called the Daily Planet. The Daily Planet is a four-story earth-shaped structure that houses a round multimedia theater featuring live and taped video of Lowman and other scientists on scientific research expeditions around the world.

What is the Science Café? A restaurant along the lines of a sports bar, except that all the television screens will feature scientific research happening around the world.

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Take a look at some of Meg Lowman's favorite bug recipes, and try one yourself the next time you have guests over.

KEYWORDS: Meg Lowman