



WHAT'S IT LIKE WHEN THE STAKES OF YOUR JOB ARE NOTHING LESS THAN SAVING THE WORLD? MEET 15 EXTRAORDINARY WOMEN OF GRIT, HEART AND HOPE WHO ARE DOING JUST THAT. PLUS, REAL INFORMATION ON HOW YOU CAN HELP

**THE
CLIMATE
AVENGERS**

INTRODUCTION BY MICHELLE NIJHUIS
INTERVIEWS BY CLAUDIA DREIFUS
PHOTOGRAPHED BY DAVID BENJAMIN SHERRY



A DECADE AGO, I was living in Colorado and working as a reporter for *High Country News*, a scrappy, bighearted magazine that covers the landscapes and people of the American West. One gray December afternoon, my coworkers and I crammed into a tiny mountain cabin to talk and argue about future stories. “Someone’s got to start writing about climate change,” my editor said. He turned to me. “How about you?”

I was, I’ll admit, daunted. I like science—I majored in biology in college—and I like scientists. I knew climate change was important. But the issue seemed abstract, complicated and depressing. And as far as I knew, it wasn’t yet affecting the places that I wrote about. It wasn’t yet a story.

How wrong I was. I learned that scientists in the Rockies were watching as rising temperatures encouraged insect outbreaks in

mountain forests, killing millions of acres of trees. In the Pacific Northwest, warmer winters were shrinking mountain snowpacks—and spring and summer water supplies. In the Southwest, wildfires were getting bigger and more destructive. Climate change had already arrived in the American West, and it was already changing lives.

In the years since, as a writer for *National Geographic* and other magazines, I’ve followed the effects of climate change from Alaska to China to Vietnam to coastal Louisiana. These stories are fascinating, but they’re never easy to tell, and I know they’re not easy to read. They’re about change and uncertainty on a very grand scale, and too often they’re also about suffering and fear. My job has given me moments of doubt. I’ve stood on crumbling shorelines and sat in lonely hotel rooms, wondering if what I do—or what anyone does—will

make a difference to future generations. But I’ve always been recharged by the people I meet—people who are devoting their careers, their passion and their smarts to the problem of climate change. I may not always agree with them, and they certainly don’t always agree with one another. But their deep and genuine concern for the future keeps me going.

On the following pages, you’ll meet some of the scientists, historians, journalists, businesswomen and activists who have committed themselves to a better, safer future. They know that climate change is real and well underway. We have already missed our chance to avoid its effects. But with innovation, dedication and courage, we can reduce its damage and help people and nature adapt to its impacts. These women are part of that historic effort. You can be, too.

—MICHELLE NARJIS @mijnarjis

(TOP) PHOTO COURTESY OF SPANISH MOUNTAIN SHEPHERD AND SHELBY DE MEYER/ONYX; (MIDDLE) PHOTO COURTESY OF JACQUI C. PATTERSON; (BOTTOM) PHOTO COURTESY OF MARY CHRISTINA WOOD

THE CLIMATE AVENGERS

THE ICE STORMER

ROBIN E. BELL
Monitoring the poles

ROBIN E. BELL, 57, of Columbia University’s Lamont-Doherty Earth Observatory, goes to the farthest reaches of the planet to track nature’s response to increasing global temperatures. She has traveled to Greenland four times and Antarctica seven. “When the climate changes, it changes more at the polar regions,” Bell explains. “It’s the place where we can see things happening first.” And what she sees is scary: “Along the edge of the huge ice sheets, the top of the ice is dropping, and the ice is flowing faster into the ocean. In other words, there is less ice than there used to be and more water. Which means the way humans have warmed the atmosphere and the oceans is making the ice change now.”

HER BIGGEST WORRY: “Will we figure out how to change our behavior fast enough to help the changing planet?”

HER BIGGEST HOPE: “That more smart women will become scientists and engineers, because we need more smart people to address changing climate. I’ve had a great life doing this. I go to new places and landscapes. And I got to discover a river that flows uphill. You never know what you’re going to find.”



FROM TOP: ROBIN E. BELL, JACQUI C. PATTERSON, MARY CHRISTINA WOOD

THE STRATEGIST

MARY CHRISTINA WOOD
Arguing that a clean environment is a civil right

THE DEVASTATION of Hurricane Katrina horrified University of Oregon law professor Mary Christina Wood. Having already concluded that environmental regulation was in a state of dysfunction, she realized the laws would never address the climate urgency in time: “They were written 40 years ago, and they aren’t adequately enforced. We need to do something to get the judiciary to act, because the other branches of government haven’t.” Wood, 52, resurrected a legal principle that stretches back to ancient Rome: the public trust doctrine, which holds that every generation has an obligation to protect natural resources for the next. If lawyers could get courts to rule that the air was held in the public trust, she reasoned, the government would have a constitutional duty to protect it.

For the next few years, Wood wrote and spoke within the legal community about

this approach; in 2010, after attending one of Wood’s lectures, a litigator named Julia Olson, 43, founded Our Children’s Trust, an NGO that brings together lawyers, climate scientists and young people to initiate lawsuits rooted in Wood’s theory. Currently six active Children’s Trust cases (to lower CO₂ pollution) are being argued in courts around the country; the group will go as high as it takes to “secure the legal right to a healthy atmosphere and stable climate for all generations,” says Olson.

WHY SHE IS OPTIMISTIC: “There are more than 50 law professors who supported this litigation with an amicus brief. People are recognizing the importance of this principle. They are giving it credibility.”

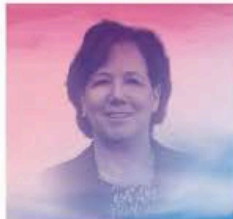
THE LOCAL HERO

JACQUI C. PATTERSON
Focusing climate-change activism on communities of color

IN 2009 social worker Jacqui C. Patterson, a longtime climate-justice activist, was hired as the first-ever director of environmental and climate justice at the NAACP. “Of the traditional issues the NAACP advocates, climate change impacts all of them,” Patterson, 46, says. “Changes such as extreme heat really impact communities of color, where people often don’t have air conditioning. Shifts in agriculture because of climate change are



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FROM TOP: RHEA SUH, SALLY AITKEN, MINDY LUBBER

THE ADVOCATE

RHEA SUH

Lobbying for change as president of the Natural Resources Defense Council

RHEA SUH grew up in Colorado, loving both nature and politics. As the newly installed president of the Natural Resources Defense Council, the 1.4 million-member environmental-advocacy organization, she will have ample opportunity to exercise both of her passions. "We advocate for smart environmental and health policy in statehouses and on Capitol Hill," she says. "We sue big polluters; and we research the latest science

on how to best solve our environmental problems." Suh, 45, cut her political teeth in the 1990s as a staffer for Colorado's Senator Ben Nighthorse Campbell. More recently, she served as President Obama's assistant secretary of policy, management and budget for the Department of the Interior. But in 2013, when she was selected for a new position overseeing fish, wildlife and parks, Suh's nomination was stalled by senatorial supporters of the energy industry. "I was characterized as this 'radical' because of statements I'd once made about the impact of natural gas on the environment," she recalls. "This was amazing when you consider I'd once worked for a Republican senator!" Suh says her move to the "other side," where she can say what she thinks, has been "liberating."

WHAT SHE BELIEVES: "The opposition has focused on creating a narrative that says we can't afford to do anything about climate change. I dispute that. The U.S. has some of the best environmental laws in the world, and corporate profits have increased. Our environmental regulations have supported a thriving economy and citizenry."

THE TREE TRANSFORMER

SALLY AITKEN

Swelling the charge against climate change

THERE are people who can't see the forest for the trees. Sally Aitken, 53, a professor in the department of forest and conservation sciences at the University of British Columbia, in Canada, actually sees both—and uses evolutionary biology to help them survive in an increasingly warm world. "We're already seeing some of the effects," she says. "In Europe there have been massive increases in tree deaths caused by droughts and heat stress." Many tree species grow over huge areas, "and there are genetic differences depending on where they have evolved and how they have adapted," she explains. "If we can find the trees that have adapted to hotter, drier conditions and find out which genes

are involved, then we may have an insurance policy for the future. We grow and bank the seeds of natural specimens that have best adapted to the new conditions."

WHAT GIVES HER HOPE: "In 2006 the chief forester of a large company came up to me and said, 'You don't really believe in climate change, do you?' Two years later, he said, 'We really need to deal with climate change—it's a big issue for us.' That exchange gives me hope that people can change their minds."

THE GREEN-INVESTMENT GURU

MINDY LUBBER

Convincing corporations that climate sense makes business sense

AT ITS core, "climate change is an economic issue," says Mindy Lubber, 61, CEO of Ceres, a Boston-based nonprofit devoted to convincing companies that being green will make them more competitive and boost their bottom line. "It isn't about red states versus blue states—it's about, for example, the Midwest, where we've lost billions in agricultural dollars to climate change," Ceres brings together an unusual coalition of investors, businesses, trade unions, pension funds and charities leveraging their collective power for the environment. Among Ceres's programs is one that sets worldwide standards for sustainability practices and helps businesses measure their own compliance with them. Ceres's 100 members—which include Pepsi, Coca-Cola, Citi and Disney—pledge themselves to those greener procedures. There's also an investment arm that steers dollars to sustainable businesses. "There are now 6,000 businesses worldwide making regular sustainability reports, which are similar to financial reports," Lubber notes.

HER BIG WIN: "We petitioned the Securities and Exchange Commission on behalf of 18 large institutional investors and state treasurers representing \$1.5 trillion in assets to force publicly traded companies to disclose their climate risks; without that, investors don't have enough information. They listened." And the disclosure is now required.

PHOTO: REPRODUCED FROM TOP: ROYAL MAIL/ALAMY; MINDY LUBBER: COURTESY OF CERES

PHOTO: REPRODUCED FROM TOP: COURTESY OF SHELL UNIVERSITY; PHOTO: KATHARINE HAYHOE; CATHERINE HAYHOE: COURTESY OF SHELL UNIVERSITY

THE WATER WATCHER

WENHONG LI

Studying how climate change has created weather extremes

EIGHT years ago, climatologist Wenhong Li, then a postdoctoral researcher at Georgia Tech, was studying the potential degradation of the Amazon rain forest due to climate change and found herself in an Atlanta parched by drought. "Crops and grass had dried up all over the Southeast," recalls Li, now an assistant professor in her forties at the Nicholas School of the Environment at Duke University. "But the next summer, Six Flags Over Georgia was under water. You wondered what was going on!" Li decided to find out. By 2009 she'd moved on to Duke, where she and her team discovered that the abnormal patterns were becoming more frequent and that this change was due to something unusual happening in the North Atlantic subtropical high-pressure system.

WHAT THIS MEANS TO YOU: "During the 2007 drought in the Southeast, the government had to institute water rationing. This could happen no matter where you live. The American Meteorological Society concludes that nine of 2013's most extreme weather events, including the drought in California and the flooding in the Midwest, were made at least somewhat more intense by climate change."

THE CLIMATE EVANGELIST

KATHARINE HAYHOE

Having faith in the future

WHEN Katharine Hayhoe, associate professor in the political science department at Texas Tech University in Lubbock and director of the school's Climate Science Center, speaks to community groups, she often opens with a statement of faith. This 42-year-old atmospheric scientist is deeply religious and married to an evangelical Christian pastor. But she also begins that way because she

finds it helps her connect to her audiences. "People will listen to you if they see you as someone who shares their values," she notes. "I try to illustrate how if you are a person of faith, you should also care about climate change. It's not always an easy argument to make. People think you're asking them to join the Church of Al Gore. I try to show how this is about caring for others and protecting our families, communities—our way of life." Hayhoe's consulting work involves helping municipalities plan for climate change. After record heat waves in Chicago, for instance, her report to city officials prompted them to initiate a green-roof program, which saves money and alleviates the urban heat-island effect.

WHY SHE DOES IT: "I feel climate scientists are similar to physicians. We've determined the climate is running a fever. We know if nothing is done, there will be serious consequences. For me, my faith takes me further. This affects God's creation, which is people and the earth, which we are commanded to love."

THE FIRE STARTER

NAOMI ORESKES

Sounding the alarm—and taking the heat

IN 2003, Naomi Oreskes began a project that would change her life. Then a professor of history and science studies at the University of California, San Diego, she analyzed nearly 1,000 published research papers and discovered a consensus in the scientific community that climate change was real and caused by human activities. "This astonished me," Oreskes, 56, recalls. "I'm as scientifically educated as a person can be, and even I had the impression that the jury was still out." Oreskes published the results of her study in the journal *Science* and ignited a firestorm. Al Gore cited Oreskes's findings in his film *An Inconvenient Truth*, while U.S. Senator James Inhofe, a Republican from Oklahoma, denounced her by name. "When I said there was a consensus about warm-



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FROM TOP: WENHONG LI, KATHARINE HAYHOE, NAOMI ORESKES

ing, I hit a nerve," says Oreskes, now a tenured professor at Harvard. "The deniers want people to think the science is unsettled. Rather than argue the facts, they attack. Complaints were filed against me at the university. I was accused of academic fraud, threatened with lawsuits." Oreskes's grandmother used to say, "When people try to shut you up, it means you're saying something important," so this once-quiet academic began speaking out. A 2010 book she coauthored on the tactics of climate denial, *Merchants of Doubt*, has been printed in six languages. A documentary film based on the book was released in March. CONTINUED ON PAGE 125

TURN PAGE FOR PRACTICAL WAYS YOU CAN HELP >>

THE
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HANDY CLIMATE CALCULATORS

Are you a green genie, or are you big (carbon) footing your way around the planet? Find out here:

The wedding zinger

Discover how much carbon dioxide you could spare the air. This eye opener tabulates the CO₂ produced by trains, planes, automobiles, home-energy use and even weddings: carbonfund.org/individuals

Good foodie

This food-waste quiz will tell you whether your eating and food-shopping habits make the sustainability grade: valueoffood.com/quiz.php

The forest and the trees

Here's a personal CO₂ calculator that estimates the number of trees needed to offset emissions produced by your driving, your household waste and even how much meat you eat: carbonify.com/carbon-calculator.htm

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I CAN see from the geological record that during periods in the deep past when the climate was slightly warmer than it is today, the West Antarctic ice sheet collapsed, raising sea level by over five meters—about 15 feet. Right now about five million people in Florida, Texas and along the East Coast live within four feet of sea level. At the current rate of climate change, all those people very likely will be under water by the end of this century, with storm surges coming through the front door.

”

MAUREEN RAYMO
Director of Columbia University's Lamont-Doherty Core Repository

How to be a climate avenger at work

IF YOU'RE

A MANAGER

DO GREEN MEETINGS If you must travel, search top travel sites or EcoRooms.com for eco-friendly hotels and use a hybrid car (most major rental services have them, as does the car-sharing site GetAround.com). For events, pick a host city that's close to as many of the delegates as possible and use a hotel and venue near the airport and/or within walking distance of each other.

RECYCLE YOUR WASTE An online exchange, such as RecycleMatch, can sell, trade or donate your company's old equipment and scrap materials.

USE SUSTAINABLE SUPPLIERS Tell caterers, equipment vendors, etc., that you want to save energy and cut waste.

A C-SUITER

CUT COMMUTER POLLUTION Let employees work at home a few days a week. Provide electric-car-charging stations, transit subsidies and bike parking.

CUT WASTE—AND COSTS Get ideas from the Environmental Protection Agency's "Business Guide for Reducing Solid Waste" (epa.gov). The Energy Star Low Carbon IT Campaign (energystar.gov) is filled with tips on energy efficiency; GlaxoSmithKline, for example, saved nearly \$1 million a year using a free Windows sleep feature. **BE AN INSTITUTIONAL DIVESTER** Remove shares of "dirty" fossil-fuel companies from your company's portfolio. Opt in to green ones that support sustainability. (See greenamerica.org and ceres.org).

AN ENTREPRENEUR

USE A BIKE COURIER for local deliveries. **REUSE PACKAGING**, and stamp shipments with "Excuse My Appearance, I'm Reused." **BUY CARBON OFFSETS** (see nrdc.org/globalwarming/offsets.asp), then add how much energy you've saved to your website and email signature.

“

I WORK with Magellanic penguins, which breed in Punta Tombo in Argentina. Storms and rain fall there over the past 30 years have significantly increased, which reduces breeding success. Penguins are marine sentinels telling us what is happening to our oceans. More than half the penguin species is now on the International Union for Conservation of Nature's threatened 'red list.' Which should give us all pause.

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DEE BOERSMA
Wadsworth Endowed Chair in conservation science at the University of Washington and head of the school's Center for Penguins as Ocean Sentinels

OUR BIG-ASS PLASTIC-BAG FOOTPRINT

These bags are light enough to be lifted by a breeze—but their impact adds up fast

THE AVERAGE PERSON
throws away about



Almost all the bags end up in oceans and landfills, where they will stay for **500 to 1,000** years before beginning to break down.

REUSE THEM, DON'T LOSE THEM!

1 PERSON reusing 313 BAGS = 4 POUNDS less in landfills	100 PEOPLE reusing 313 BAGS = 400 POUNDS less in landfills	NEW YORK reusing 313 BAGS = 34 MILLION POUNDS less
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REDUCING OUR CARBON FOOTPRINT

If everyone in, say, New York City used just **ONE LESS PLASTIC BAG EACH YEAR**, waste would be reduced by **85 TONS**, and **200 TONS** of carbon dioxide would be eliminated.

SOURCES: GREENWAVE PRODUCTIONS; CALIFORNIA APPOINTMENT WORK; SOLUTIONS; COOKTOP FOR THE FUTURE; COFFEE FOR CLIMATE; THE GREEN; OUR COMMON FUTURE; WASTE; ENVIRONMENTAL PROTECTION AGENCY; REUSEAMERICA.ORG



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FIVE HUNDRED MILLION households, roughly half the world's population, cook over an open fire. That means there's a lot of smoke coming from those stoves. Smoke that releases carbon dioxide and soot, warming the atmosphere and shortening the lives of millions. We are working to create a market for clean cooking solutions, stoves that reduce emissions by 30 to 50 percent. The world is programmed to think we need massive interventions to make a significant difference, when in fact a relatively small investment in changing the way women cook will have a transformational impact globally.

”

RAJSHA MUTHIAH
Chief executive officer of the Global Alliance for Clean Cookstoves

Facts we can't ignore

2014

The **HOTTEST YEAR** since modern record keeping began, in 1880, says NASA. **TEN OF THE 11 HOTTEST YEARS** have occurred in the 21st century.

97%

Percentage of climate scientists who believe that **HUMANS VERY LIKELY CAUSED GLOBAL WARMING**, according to a NASA report.

8 INCHES

Approximate **SEA LEVEL RISE** around the world since 1880, according to the Environmental Protection Agency.

\$100 BILLION +

Amount that **CLIMATE- and WEATHER-RELATED EVENTS** cost the U.S. in 2012, according to the National Oceanic and Atmospheric Administration. That's **MORE THAN TRIPLE** the cost in 1980.

YES, CLIMATE CHANGE IS PERSONAL, and you can help stop it! **FIND OUT HOW** at more.com/saveetheclimate and [@moremagclimate](http://moremagclimate).

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CONTINUED FROM PAGE 105 "I didn't seek to become a spokesperson," Oreskes asserts. "But when it happened, I didn't run from it."

WHAT KEEPS HER GOING: "For every nasty letter, I get 10 fan letters," Oreskes says. "I definitely feel that the work I'm doing is inspiring young people to pick up the baton. That's a really good feeling. That and the fact that my mother feels that I'm saving the world."

WHY SHE WANTS YOU TO ACT: "If we don't do something, we are looking at trillions spent on adaptations and repair after catastrophic events. And that's money we won't have for universities and hospitals... I've been to plenty of parties where some man says, 'There's no conclusive evidence on climate change' and the women silently roll their eyes. It's time for women to speak up."

THE BRAIN CHANGER

ELKE WEBER

Exploring how we think about—and react to—a changing climate

"PEOPLE DON'T like making sacrifices for something that is far off in the future," notes psychologist and risk-management expert Elke Weber, 58, codirector of Columbia University's Center for Research on Environmental Decisions. "To fight climate change, you are being asked to make sacrifices for yourself and for the sake of other generations later on. That's too diffuse for many to accept." To help overcome this barrier, Weber's center has published *The Psychology of Climate Change Communication*, a research-based guide that suggests, among other things, reframing the message in terms of local values and goals. For example, when U.S. Navy officials wondered why their officers delivering supplies to Afghanistan were avoiding the new energy-saving technologies available to them, Weber helped the Pentagon make the message more immediate and relevant. "I showed them how using green technology could save money and soldiers' lives," she says. "Going green wasn't something airy in the future. It was about being 'effective in the field and 'succeeding in the mission.'"

TAILORED TALKING POINTS: Show the benefit of changing old habits, and "don't overwhelm people with gloom and doom without also providing feasible, effective solutions."

THE COMMUNICATOR

HEIDI CULLEN

Making sure the media tell the climate-change story

CLIMATOLOGIST Heidi Cullen, 44, made history—and sparked controversy—when she became the Weather Channel's first climate-change beat reporter. "I didn't fit the traditional sunny personality" that viewers expected from their weather reporters, she says. "I didn't realize how personal it could become. One of the meanest emails I got was, 'Listen, Weathergirl, just shut up and give me the weather!' There was a lot to unpack in that." In early 2008, Cullen left to help start Climate Central, a think tank and news agency that provides climate-science content to more than 200 local television stations and serves as a resource for policy makers. Cullen is the organization's chief scientist.

PAINTING A PICTURE: "Around Climate Week 2014 we worked with meteorologists to produce weather forecasts from the year 2050, such as this one from Japanese television: 'It was 40.8 C [105 degrees F] in Tokyo on the hottest day in August. The heat wave has lasted for 50 straight days.' "@

CLAUDIA DREIFUS does the "A conversation with" feature in the Tuesday Science Times section of the *New York Times*. @Claudiadreifus

SURVEY RULES NO PURCHASE OR SURVEY PARTICIPATION IS NECESSARY TO ENTER OR WIN. Subject to Official Rules at www.surveymonkey.com/s2/989068/Sweepstakes-Rules. The \$10,000 Reader Survey Sweepstakes begins at 12:00 AM ET on October 1, 2014, and ends at 11:59 PM ET on September 30, 2015. Open to legal residents of the 50 United States and the District of Columbia, 21 years or older. Sweepstakes is offered by Meredith Corporation and may be promoted by many of its publications in various creative executions online and in print. Limit one (1) entry per person and per email address, per survey. Void where prohibited. Sponsor: Meredith Corporation.