UPFRONT

LAURA VALENTINO '10

FROM ART STUDENT TO ASTRONOMER

Keys to the History of Galaxies

KAFKA AND K. HONEYCUTT, INDIANA UNIVERSITY/WIYN/NOAO/NSF

C. HOWK (JHU), B. SAVAGE (U. WISCONSIN), N.A.SHARP (NOAO)/WIYN/NOAO/NSF

Rhode's survey of galaxies for globular cluster systems included this spiral one, NGC4013.

Katherine Rhode was an art student at Sonoma State University north of San Francisco when she took an introductory astronomy course to fulfill a general education requirement. As her artistic vision made the leap to appreciating the beauty of the night sky and its workings, she became the one student in the class who caught fire.

Now, with a master's in astronomy from Wesleyan ('97) and a doctorate from Yale, this Wesleyan research associate has been hunting for some of the oldest collections of stars in the universe. Known as globular clusters, these massive assemblages of thousands and even millions of stars provide an astronomer's version of a fossil record in the formation of galaxies.

To imagine the strangeness of globular clusters, consider that our own sun has fewer than a dozen neighbors within nine light years. A star located in the middle of a globular cluster could have hundreds of thousands of neighboring stars within that distance. The night sky would be ablaze with light.

The density of stars in the clusters has led astronomers to consider them as likely sites for black holes that could be formed by spectacular collisions. The resulting bodies would be so massive, according to theory, that intense gravitational forces would collapse them into black holes from which no light escapes.

The theory had only one problem: astronomers had not found unequivocal evidence for a black hole in any globular cluster anywhere.

Rhode and her colleagues changed that, but she had not set out to locate a black hole. Her goal instead was to survey nine galaxies within a distance of 60 million light years for globular clusters in pursuit of her fascination with galaxy formation.

"When I was a student in the Wesleyan master's program, I learned that astronomers did not understand how galaxies form," she says. "We have a basic understanding of how stars form, although there are a lot of outstanding questions, but at the time we didn't have a clue about how galaxies form. That seemed so fundamental to me."

The model of galaxy formation prevalent then envisioned giant gas clouds that collapsed under their own gravity, in the process forming the thousands and millions of stars that make up individual galaxies. Students taking introductory astronomy courses read about this process, which many astronomers now believe is completely wrong.

An accumulation of observational and theoretical work has shown that galaxies began their formation in the early universe. After the Big Bang, matter was not distributed evenly—think lumpy soup. Small fluctuations in density led to matter coalescing through gravitational attraction. Galaxies began to form from the ground up through collisions of smaller fragments of collapsed matter. Globular clusters likely formed when these fragments collided and merged together.

The process is dynamic, continuing to this day. The Andromeda Galaxy, our nearest large spiral neighbor, is approaching us and will in some far distant time merge with the Milky Way. Meanwhile, the Milky Way is gobbling up a dwarf galaxy known as Sagittarius.

These collisions take place on a vast timescale and do not produce star-on-star smashes because interstellar distances are so great. But they can lead to the formation of new globular clusters, which serve as markers for major galactic events.

In pursuit of globular clusters, Rhode has used 3.5-meter and 4-meter telescopes at Kitt Peak National Observatory, orbiting X-ray telescopes (Chandra Observatory and XMM-Newton), and a 10-meter telescope on Mauna Kea in Hawaii.

Her survey revealed spiral galaxies with as few as 80 globular clusters as well as a giant elliptical galaxy with 1,500 identified clusters; she estimates it contains 5,000.

In the course of work with the XMM-Newton telescope, she and her colleagues determined that a globular cluster that she had previously identified was a potent source of X-rays with the telltale signature of a black hole. She expects that more will be found.

More speculatively, Rhode points out that globular clusters may illuminate one of the most important unsolved problems in cosmology: the role of dark matter in the formation and structure of galaxies. Dark matter is believed to be far more prevalent in the universe than the ordinary matter with which we are familiar, but its existence can only be inferred through gravitational effects. Globular clusters, she explains, serve as point-like "tracer particles" revealing the gravitational pull of their host galaxies and, most important, could reveal the amount and distribution of dark matter in the galaxies. **UPFRONT**

NORM DANIELS AT 100

Sporting Life

More than 100 people, including alumni athletes from the 1930s through the '70s, gathered in the upper lobby of the Freeman Athletic Center in early April to celebrate the 100th birthday of Norm Daniels and his contribution to Wesleyan intercollegiate athletics. Arriving on the Middletown campus in 1934, Daniels, the three-sport athlete from the University of Michigan, served as head coach of football, baseball, basketball, wrestling, and squash during his 39-year tenure at Wesleyan. His football teams of 1947–49 still hold a Wesleyan record for the longest string of undefeated seasons.

Highlights from the noon program included Mayor Sebastian Giuliano's proclamation of "Norman Daniels Day," underscoring the coach's contributions to local recreational sports and fostering town-gown relations. Vice President for University Relations Barbara-Jan Wilson and Athletic Director John Biddiscombe announced that the site of the gathering was to be dedicated as "Coach Norm Daniels Lobby," recognizing his contributions as teacher, coach, colleague, mentor, and friend.

While some participants had traveled many miles for the event—even as far away as South Carolina—none found the lessons "Coach" or "Danny" taught ever far from their mind. Many who are now, themselves, educators and coaches, said that it was Daniels who serves as their model in their own interactions with young athletes whose characters they hope to shape, even as theirs was shaped so many years ago at Wesleyan.

OLIVIA BARTLETT

FICKLE MEMORIES

Soda Machine Betrothal

Did you propose marriage to a Pepsi machine two weeks ago, or did you just imagine it?

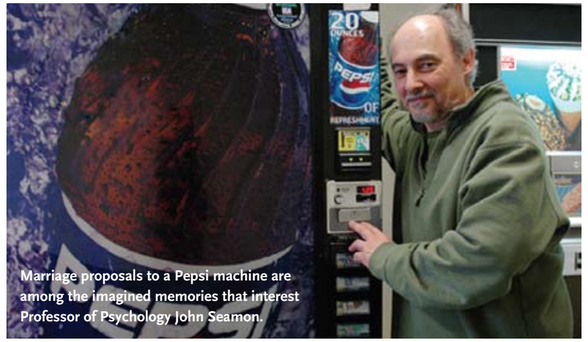
That's one of the questions John Seamon, professor and chair of psychology, asked participants in a study designed to determine if memories, and, in particular, bizarre false memories, could be implanted.

"Given that all of us sometimes mix up the source of our memories, we wondered whether people would misremember bizarre actions as well as familiar actions," says Seamon, who worked with co-authors Morgan Philbin '04 and Liza Harrison '04, both undergraduates when the study was initiated.

The study, aptly titled, "Do you remember proposing marriage to the Pepsi machine? False recollections from a campus walk," appeared in a recent issue of *Psychonomic Bulletin & Review*.

Which brings us to people on bended knee asking for lifetime commitments from Pepsi machines—or not, but imagining it—depending on instructions.

Those instructions came during a series of walks around the Wesleyan campus. During the walks, 40 participants were asked to stop at a total of 48 separate locations. At each location the experimenter read an action statement; participants were asked to perform the action, watch the experimenter perform it, vividly imagine themselves performing it for 10 seconds, or spend 10 seconds vividly imagining the experimenter performing it.



Marriage proposals to a Pepsi machine are among the imagined memories that interest Professor of Psychology John Seamon.

OLIVIA BARTLETT

Some of the activities were normal, such as, "Check the Pepsi machine for change." But others were more bizarre, including, "Recite the balcony scene lines from *Romeo and Juliet*," "Pat this dictionary and ask it how it's doing," as well as, "Get down on one knee and propose marriage to that Pepsi machine."

One day later, the same participants went to 36 locations along the previous route. This time around, the participants only imagined each action, and they rated their images for vividness.

At no time during either walking session was any mention made of a memory test.

Two weeks later, participants were asked questions about the two campus walks. Roughly 12 percent of the merely imagined actions were "remembered" as performed. The results may surprise some, but not Seamon.

"This is consistent with similar studies that have been done in the laboratory. We moved it into the real world. Even when presented with bizarre actions such as the proposal to a soda machine, after a couple of weeks, some participants had false memories inspired by their imaginations."

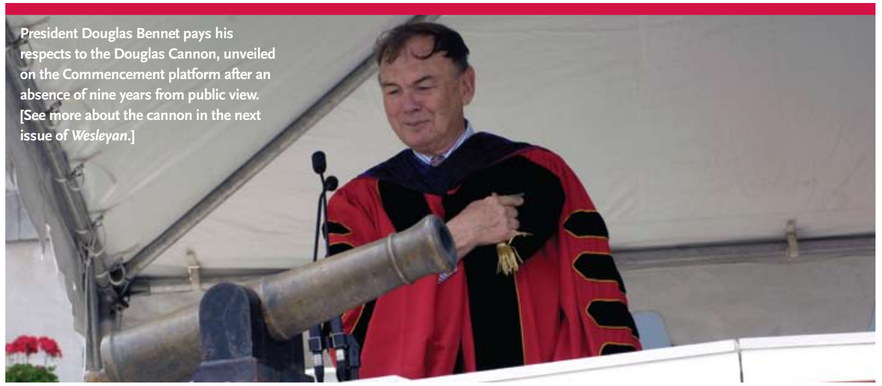
Seamon adds that these studies point to the danger of using techniques such as guided imagery in the course of psychotherapy to recover lost memories. People can be confident about their recollections and accurate, and they can be confident and wrong.

"Without some corroboration, we just can't tell the difference," Seamon says. "Clearly, when accuracy is critical, we should always seek some verifiable evidence that supports our recollections. Our memories are usually, but not always, a pretty faithful guide to our past. Otherwise, we'd be in real trouble as a species."

—*David Pesci*

Do you have an opinion about our UPFRONT section? Please write us at letters@wesleyan.edu.

Commencement 2007



President Douglas Bennet pays his respects to the Douglas Cannon, unveiled on the Commencement platform after an absence of nine years from public view. [See more about the cannon in the next issue of *Wesleyan*.]

Service and Civility

Excerpts from Jim Lehrer's Commencement Address

I would urge each of you graduates of the class of 2007 to find ways to also serve. I don't mean necessarily joining the Marines, to fight in Iraq or in the next war or two. I mean, no matter what you decide to do with your life, also serve....

I happen to personally favor some form of mandatory national service. Not a draft, but a system for creating the shared experience of service for everyone, for us all. Service that could include civilian service—the Peace Corps, teacher corps, police corps, and all kinds of corps besides the Marine corps.

But that suggestion isn't going anywhere at the moment politically. Service is a voluntary act, so be it. You are graduating at a time when there are enormous opportunities to do great things, voluntarily. But also to do terrible things. The possibilities for good and evil have seldom been so limitless. We have, at the personal and political levels in our society, wrenching conflicts right now over race, health care, poverty, violence, as well as how we employ our military and diplomatic muscle.

Yes, those conflicts and others like it have always been there. But the difference now is that we—you and me and our respective peers—have a chance to solve them. If we are willing to simply accept that as a given and get on with it.

One way to serve, of course, is by staying informed, by forming and expressing opinions, by questioning the opinions of others, particularly those other people who hold public office or who otherwise exercise public power—including those who write and edit the newspapers and magazines and blogs you read; report on and produce the radio and television programs you listen to and watch. Complain about the things you do not like, praise those you do....

But as you do it, please, please be civil, be fair. One of the most serious losses we, as a society, have suffered in recent years in my opinion, is that of civil discourse. There is a meanness of communication alive in the land right now. I see it in the mail and the e-mail we get at our program. I hear it on television and the radio, read it in the newspapers and magazines and on the blogs and elsewhere on the Internet.

The controversies involving Iraq and the 2008 presidential election have and will continue to definitely heighten the passion of the rhetoric and the discourse at the moment. But there will always be differences because there must always be differences in a free and open democratic society. We are civilized people; we should disagree in a civilized manner. We should acknowledge the right of others to disagree with us. We should acknowledge the possibility that sometimes, some very rare times, we might be wrong. And strange as it may seem, we might learn more from listening than from talking, and more from talking than from shouting.

Winners of this year's Binswanger Prize for Excellence in Teaching are Richard Slotkin, Olin Professor of American Studies and English; Joyce Jacobsen, Andrews Professor of Economics; and T. David Westmoreland, Associate Professor of Chemistry.

Retiring Faculty

W. Wistar Comfort (1967–2006)
Edward Burr Van Vleck
Professor of Mathematics

Martha Crenshaw (1974–2007)
Colin and Nancy Campbell Professor in Global Issues and Democratic Thought

C. Stewart Gillmor (1967–2007)
Professor of History and Science

Anthony Wood Hager (1968–2007)
Professor of Mathematics

Helen Mensah (1998–2007)
Artist-in-Residence, Dance

Ellen B. Widmer (1984–2007)
Kenan Professor of Humanities

Honorary Degrees

At the 175th Commencement ceremony, Wesleyan awarded honorary degrees to

JEWEL PLUMMER COBB P'79, renowned as a teacher, a research biologist, and an advocate for the participation of women and members of minority groups in the sciences. She is president emerita at California State University at Fullerton.

ALAN M. DACHS '70, P'98, president and CEO of the Fremont Group and a director of the Bechtel Group and the S. D. Bechtel, Jr. Foundation, served 14 years as a member of the Wesleyan University Board of Trustees and eight years as Board chair. He currently serves on the board of the Brookings Institution and The Conference Board and on the Corporation Visiting Committee for the Engineering Systems Division of MIT, the Advisory Board of the Freeman Spogli Institute for International Studies at Stanford, and he chairs the university's Development Committee.

ROSA DELAURO, elected to Congress from Connecticut's Third District in 1990 and currently serving her ninth term. A frequent visitor to Wesleyan's campus and to Middletown, DeLauro has strongly supported Wesleyan's efforts to establish and fund the Green Street Arts Center.

JIM LEHRER P'85, who has anchored The NewsHour with Jim Lehrer on the Public Broadcasting Service (PBS) since 1995. In the last five presidential elections, he moderated 10 televised candidate debates.

NOBUTAKA MACHIMURA, former Japanese Minister for Foreign Affairs, currently serving as a member of the Japanese House of Representatives. He attended Wesleyan for one year as an exchange student.

THOMAS F. MALONE, an environmentalist and expert on sustainability, is University Distinguished Scholar Emeritus at North Carolina State University.

IN ADDITION:
ROBERT G. MCKELVEY '59 received the Raymond E. Baldwin Medal, the highest award of the Alumni Association. McKelvey has a long history of dedicated service to Wesleyan, including numerous positions on the Board of Trustees and leadership of Alpha Delta Phi.

For more, see www.wesleyan.edu/magazine.

ENGAGED WITH THE WORLD

Rousing Welcome for Rev. Dr. Martin Luther King Jr. at Wesleyan

Dr. King visited Wesleyan in 1963, the same year he delivered his "I Have a Dream" speech in Washington, D.C. He used passages of that speech when he delivered the 1964 Commencement address at Wesleyan.

As he did during all four of Martin Luther King's visits to Wesleyan, Professor John Maguire opened his house at 44 Home Avenue for people to meet the Reverend. Between phone calls, the Reverend Dr. King sat and talked with students, faculty and community activists, offering advice and encouragement.

King's connection to Wesleyan was through Maguire, professor of religion. As an 18-year-old student at Washington and Lee in Virginia, Maguire had by chance met and become a close friend of the 21-year-old Martin Luther King Jr. King had already graduated from Morehouse College and was studying at Crozer Theological Seminary in Upland, Pa. In May 1961, John Maguire and his department chair, David Swift, joined the Freedom Rides and were jailed briefly in Montgomery, Ala. When they were released, Maguire and Swift met with King.

On Sunday, Jan. 14, 1962, King arrived for his first visit to Wesleyan and preached to a packed chapel. He spent the night at the university guesthouse on High Street and was available the next day to the College of Social Studies' students and faculty. Maguire arranged the visit to coincide with King's 33rd birthday, which was celebrated that Monday at lunch.

In February of 1963, King preached at Yale's Battell Chapel in the morning and then Maguire drove him to his house before he preached again that evening in the Wesleyan chapel. After the services, students crowded into a car to drive King to the airport.

The following year President Butterfield asked Maguire to see if King would be Wesleyan's 1964 baccalaureate preacher and receive the university's honorary doctorate. On the Monday before he was to arrive for the weekend ceremonies, King went to jail challenging segregation in St. Augustine, Fla. John Maguire called his friend and King's chief aide, Andrew Young, and together they persuaded him to post bail and fly north. King arrived early Sunday morning and said he felt justified leaving jail because Mrs. Peabody, mother of the Massachusetts Governor Chubb Peabody, had gone to jail in St. Augustine, taking his place, as it were.

In 1966, two years before his death, King paid his last visit to Wesleyan, again to preach. The service, moved to McConaughy Hall to accommodate a larger audience, spilled out of the hall. Three students—many more had offered—met King at 5 a.m. to drive him to the airport. Throughout the day, those students were giddy about their conversation during the ride.

King was killed on Thursday, April 4, 1968, as Wesleyan's Board was preparing to meet over the weekend. President Etherington subsequently asked that the meeting adjourn and move to the Chapel, where Maguire provided an informal eulogy. **UPFRONT**

—Elan Barnehama (Special thanks to John Maguire for his assistance)

LETTER HOME FROM HIRUT M'CLEOD '00

Results in 100 Days

As I start to write this letter, I'm sitting in a small room in the town of Rashad in Sudan, which lies west of the Nuba Mountains and borders the region of Darfur. I'm wearing a headscarf over my dusty hair and I'm covered from head to toe. The running line I have with a teammate is, "Did you ever think that it would come to this, you in a small village in Sudan?" Each time things get tough I joke about how amazing and ridiculous it is that our paths have lead us here.

Wesleyan alumni who were in the CSS with me know about my struggle to get into the development field—where those of us who are idealistic and crazy enough can put our theories and wills to the test. As it turns out, my journey has led me to two other Wesleyan alumni. I work for a new nonprofit organization, The Rapid Results Institute, which is a spinoff of the management consulting firm Robert H. Schaffer and Associates, where Ron Ashkenas '72 and Matthew McCreight '81 are managing partners. They and their colleagues developed and support the work of the institute.

Our goal is to help people and organizations manage change in order to accelerate the achievement of results while developing leadership capacity. By results, we mean tangible, bottom-line results, usually in 100 days or less—not recommendations to senior management as to how they *might* get results. Of course, in the development sector everyone wants results, but that's not always what happens. In the struggle to craft viable solutions, people often lose sight of the objective.

I started in June of 2006 as an intern in Sierra Leone, helping local councils strengthen their development and implementation skills. I also did research in Madagascar, where our institute is working on problems related to taxation, health, and reforestation. My job is to train local "coaches" and their "teams." I work with them both on site and remotely from our office in Stamford, Conn., to make sure that they develop enough capacity to support their projects.

In Rashad, I work with four teams focused on education projects. The community of Rashad is recovering from a recent conflict during which education became a low priority. Boys and girls drop out of school at very high rates. Leaders and community members alike agree that a shift in attitudes is necessary to improve education. Building schools is not enough. The four teams were set up to make sure the construction projects have a long-term impact on their communities.

M'cleod (third from left) works with a collective in Madagascar, using modern farming techniques to grow the trees that are home to silkworms.

We've put a lot of pressure on coaches to succeed in a short time. At one point our lead coach lost interest in working with her teams. When I asked her why, she said that if the teams did not understand the management skills we were trying to explain, they were never going to articulate clear ambitious goals, let alone achieve results. I was so frustrated. I wondered, "Is this what happens when development fails? Do people just give up and go for second best?"

Thankfully, the local coaches and their teams redoubled their efforts and were able to climb the learning curve. The four teams created specific goals and detailed work plans for the next 100 days. In the village of Tarouba, for example, they planned to increase the number of newly enrolled students from 24 (last year's number) to 50 by May 2007. Highlights of their plan include traditional dramas at school, lectures in the mosque, and spiritual support through chants and singing to engage students.

At the end of my week in Sudan, the teams presented their work to local leaders and received inspirational words and support. I vividly recall the words of one community leader, who said that what the teams had learned would move their communities from relief towards development. Their achievements would give them an appetite for more success and that, in time, would liberate them to strive for more.

I was moved because he was talking to a room full of people who had been disillusioned by ineffectual interactions with international donors and aid agencies. These people—young and old, mothers and fathers—didn't have PhDs or MBAs, but by working with us, they had become leaders in their communities. **UPFRONT**

For further information see www.rapidresults.org.

POSTSCRIPT

IT'S 57 DAYS in and I'm feeling more comfortable in Sudan. I've gotten henna on both hands and just finished the mid-point review. The teams are living up to their initial promise. Tarouba and Mabsout have already reached their goals and will surpass them. Tarouba will now provide adult literacy and kindergarten classes. Khor el Deleib will add adult courses for women that focus on small-scale processing of agricultural goods. Dar es Salam and another team are partnering with an NGO to provide school lunches and latrines. Three of the teams will now try to target the nomads in their communities whose children use the schools.

At the presentations of their mid-point review sessions, one community member echoed something I wrote months ago. He said when he saw team members get up to present he thought to himself, "I know these people; who let them get up to talk?" He was afraid of what the team members would say in front of everyone. But, when he heard them talk, he realized that he was in the presence of leaders, new budding leaders in his own community.

A CONVERSATION WITH GARY YOHE

Managing the Risks of Climate Change

Gary Yohe, Woodhouse/Sysco Professor of Economics, a co-lead author of the United Nations' Intergovernmental Panel on Climate Change Report (IPCC) views global warming with an economist's eye.

By David Pesci

DAVID PESCI: For any skeptics reading this, let's start with the facts. Is global warming real and are human beings affecting it?

GARY YOHE: Yes, and yes. The third IPCC Assessment Report stated that climate change is real and we were already observing its impacts. The fourth IPCC Assessment Report concluded that human activity is causing the climate to change.

DP: What is an economist doing at the center of the climate change debate?

GY: I am trying to figure out what the risks are and how people adapt and respond to the manifestations of climate change. The climate is getting warmer, but so what? Well, the "so what" is that there are risks involved short term and long term that could have significant economic impacts. For me it's a very natural progression from, "We are experiencing climate change" to, "How will this affect us economically?"

DP: Your interest in global warming began back in the early 1980s. As I recall, that was a time when scientists universally were predicting a global cooldown.

GY: There had been a concern in the late 1970s that the earth was cooling and another ice age could be on the way. But the scientific community looked more closely at that possibility and determined that the mini-ice age theories didn't stand up. Meanwhile, the Keeling data from Mauna Loa showed increasing levels of atmospheric carbon dioxide in Hawaii—a location with no concentrated industrial base. Those data indicated an increased probability of a worldwide warming trend caused by the consumption of fossil fuel. The National Academy of Sciences began to investigate the question by commissioning a panel in the early 1980s to look at the drivers of carbon dioxide emissions over a 100-year time frame. William Nordhaus, a professor of mine during graduate school at Yale, was on the panel. He knew of my research on uncertainty and modeling economic decisions and asked me to become involved in the Academy report. That was in 1981 and I've been involved ever since.

DP: How did the scientific community respond to an economic viewpoint of what they considered their domain?

GY: With some degree of skepticism at first. But part of the beauty of that small committee was that there were three economists on it with some really hard-nosed scientists. We got to know each other's vocabulary and each other's needs, and from that a conversation began. After five or six years, many in the scientific community started to see some value in what we were trying to do. These issues are very complex, of course, and the conversations took an enormous amount of time. As I became involved with the U.N., the conversations became much longer, and participants came from all over the world.

DP: In the early '90s the correlations between CO_2 emissions and rising global temperatures started to attract more attention.

GY: Yes, and my work started to shift to assessing the economic costs of major impacts, including considering how humans would adapt to climate change, either autonomously or through planned policy decisions. I did a lot of work with sea level rise risk assessments. For example, some of the extremists said that continued sea level rise could put Kennedy Airport underwater. But Kennedy Airport would not be allowed to go underwater simply because somebody would build a wall around it. That would involve significant economic costs, to be sure, but not the billions that would be sacrificed if the airport were abandoned.

THERE IS NO SILVER BULLET TO THE CLIMATE PROBLEM, AND IF THERE WERE, IT WOULD NOT BE NUCLEAR POWER.

We can't rely on adaptation to eliminate all the risks that climate change could bring, though. In fact, the report we just released in Brussels said that there are a lot of possible climate scenarios along which our capacity to adapt would simply be overwhelmed over the next 50 to 100 years.

DP: What does the future look like for the United States?

GY: The near-to-middle-term future is less troubling for the United States than it is for many parts of the world. We are looking at an increase of 2–3° C over the next 70 to 80 years; and a period of modest warming and no decline in precipitation could be experienced through, say, 2030 or so. Agriculture could actually become more productive because higher levels of CO_2 help plants to grow faster. Eventually, though, even these benefits will begin to abate. Moreover, even if we are not severely impacted through direct climate change, what will be happening in the rest of the world could make us uncomfortable at home.

DP: You've testified before the U.S. Senate on multiple occasions. Have you seen a change in the perspectives of American policy makers toward climate change?

GY: Resistance to climate policy has, up until recently, dominated discussions "inside the beltway." In some cases, politicians have looked at climate policy as a ploy for a redistribution of wealth by the U.N. Many politicians have also been concerned that climate policies could seriously damage the American economy. Many of these concerns have begun to melt away. Climate is no longer a Democratic or Republican issue. In fact, I don't think there will be a successful presidential candidate in 2008 who doesn't have a climate action plan. Our politicians on both sides of the aisle are recognizing that climate risks are real, and to delay action is to increase the costs of doing something in the future. This recognition need not translate into slamming on the brakes and grinding the economy to a halt in the short term. It *does* mean "getting the train moving out of the station." To make this happen in a realistic and effective way we need to set up a climate policy that cannot be manipulated politically, and I support imposing a carbon tax.

PHOTO ILLUSTRATION BY BILL BURKHART

Gary Yohe says a climate policy is essential for safeguarding the future of our planet.

DP: This may be a good time to talk about the pink elephant in the room—China—which is notorious for ignoring environmental measures. How does the U.N. get the Chinese to try to pay attention to any of this?

GY: That's not only the pink elephant, it's the $64 billion question. I think if the United States commits itself to a comprehensive climate policy, then carbon will get more and more expensive year in and year out and it will become clear to countries such as China and India that ignoring climate policy in their development plans is unsustainable. They won't change their behavior in the next 5 or 10 years, but they'll figure it out.

DP: You said earlier that much of the world will pay attention if we create a climate policy that "cannot be manipulated politically," but there are few if any policies ever created in this nation that aren't subject to some form of political manipulation.

GY: Except for monetary policy. The Federal Reserve System is set up specifically to avoid, or at least minimize, political manipulation. Climate policy should be at the same level, not just in the United States but globally.

DP: So then does that mean that energy policy, water distribution policy, and other policies affected by climate would become driven by climate policy?

GY: No, but energy and water and other resource management decisions would have to take climate change and climate policy into account. This is why I favor taxes rather than a cap and trade mechanism for restricting emissions. Cap and trade means allocating permits across thousands of points of consumption; it would be an administrative nightmare, and the signal of higher carbon prices would be obscured by volatility in the permit market. Taxing the carbon as it enters the energy system is simple, and it sets up all of the right incentives. People make adjustments to clear signals across all markets.

DP: What is the IPCC process like?

GY: I'm glad you asked that question. The perception of the IPCC is that it's this big monolith with one view of the world. It would be really instructive if people could attend one of the meetings and listen to us argue with each other. There is no single view. Ultimately we come out with an assessment of the literature. We report what we find convincing and what we don't. We highlight strengths and weaknesses. We identify where the next round of research should be focused. And we argue with each other every step of the way. We're all professional skeptics by training, and it can become quite intense. It is, though, extremely gratifying and always a real education. Some of my best work has come from collaborations that were born at IPCC authors' meetings.

DP: France and England have become much more reliant on nuclear power. For the first time in years, conversations in the United States have come back to perhaps building more nuclear power plants. Does this figure into the equation?

GY: The other pink elephant in the room. There is no silver bullet to the climate problem, and if there were, it would not be nuclear power. To reduce emissions to any effective level we need a whole portfolio of approaches, including energy conservation, investments in energy efficient production processes and buildings, increased mileage, carbon sequestration, more use of natural gas and less carbon-intensive energy sources, and so on. Nuclear is certainly a low carbon source of energy. But nuclear carries a lot of other baggage: plant safety, waste disposal, global proliferation, etc. These are policy issues that complicate any scenario that envisions increased reliance on conventional nuclear energy.

DP: That this is all being done, and that recommendations are being issued under the auspices of the U.N. has caused skepticism in more than a few places. In fact, the prime minister of Australia and his environmental minister recently claimed that IPCC was "the newest version of the Spanish Inquisition." How do you answer such charges?

GY: The IPCC is a scientific assessment body, so it is precluded from being policy prescriptive. We're not allowed to tell anybody what to do. We're trying to provide information to inform decision-makers about the risks and the consequences if they fail to act. The chapter for which I am the coordinating lead author is about sustainability, and its subtext essentially offers a road map for countries to get climate policy out of the environment ministries and into the finance ministries. The risk management approach that frames our assessment allows us to say to anyone who is listening, "This is the kind of approach you are already using for all your other important issues." The facts speak for themselves. We don't need to suggest policy.

DP: Your work has been affecting policy directly here and across the world. That must be very gratifying.

GY: It is, although for so long it felt like we were just batting our heads against the wall, especially in the United States. But I'm finding a lot more former disbelievers who are beginning to see that the old way of framing the question isn't right. They are coming to understand that you get totally different answers to questions about what should be done if you frame the debate about climate change around risks. In a risk management context, uncertainty suddenly becomes a reason to take action. To argue the contrary, skeptics now have to guarantee the public that climate change is not happening. They have to be able to assure everyone that no impacts have been felt, and none are on the way. They simply cannot do that.

To read the IPCC report co-authored by Yohe, go to: www.ipcc-wg2.org.