

## Study: Global warming does affect birds, but forecasting its impact will be more difficult

By Roger Segelken

Earlier springs with warmer temperatures over the past 30 years have prompted a ubiquitous North American bird species, tree swallows, to begin laying eggs, on average, a week or more earlier. But whether these harbingers of global warming are being adversely affected by changing weather patterns isn't clear, biologists in New York, Wisconsin and California report in *Proceedings of the National Academy of Science (PNAS)*.

When tree swallows start earlier, they often lay more eggs, say the biologists, referring to data collected by thousands of volunteer citizen-scientists who have watched the birds' nest boxes for 40 years.

"We don't know whether earlier lay dates and larger clutch sizes will be good in the long term for populations of tree swallows," said David W. Winkler, a Cornell professor of ecology and evolutionary biology. "And tree swallows are just one of the many organisms that potentially can be affected by climate change."

After an exhaustive, three-year statistical analysis of bird and weather data, Winkler, Peter O. Dunn of the University of Wisconsin-Milwaukee and Charles E. McCulloch, a biostatistician at the University of California-San Francisco, report the effects of climate change on swallows in the *PNAS* Online Early Edition, week of Sept. 23, 2002. Their article is titled "Predicting the effects of climate change on avian life history traits."

Tree swallows (*Tachycineta bicolor*) are astute weather monitors, Winkler explains, because of three characteristics:

- They are aerial insectivores, hunting the insects they crave "on the wing." (An adult tree swallow can capture as many as 50 insects before returning to the nest and feeding its young.)

- Tree swallows are "income breeders" that rely, more than many other species, on their daily foraging intake – both before and during the spring breeding season. (Tree swallows begin breeding once their source of insect income looks large enough, but the future of their growing family is at the mercy of sometimes-fickle weather.)

- Insects the swallows need do not fly during cool weather, and swallows will not forage on the ground. (A sudden cold snap and a local shortage of insects can kill 5-



Charles Harrington/University Photography

The 'bug sucker,' a vacuum device that samples aerial food supplies for insect-eating birds, is examined at the experimental ponds site in Lansing. From left are Marisa Adler, a junior in the College of Agriculture and Life Sciences; Peter Wrege and David Winkler, senior research associate and professor, respectively, in the Department of Ecology and Evolutionary Biology; and Susan Longest, a senior in CALS.

to 8-day-old nestlings before their developing bodies learn to thermoregulate and grow insulating feathers. When adult tree swallows are forced by cool weather to travel greater distances in search of insects, they may be forced to abandon their chicks.)

Professional ornithologists rely on trained amateurs in volunteer programs, such as the Cornell Lab of Ornithology's Nest Record Card Program, to report on birds throughout a wide geographic area. In 1999, after studying 21,000 nest records from Cornell's database and similar programs in Canada, Dunn and Winkler reported that the lay date of tree swallows shifted an average of nine days earlier between 1959 and 1991.

Since that report, which was among the first to link animal-behavior changes to global warming, Winkler and Dunn have worked with McCulloch and extended the analysis to another key life-history trait – the number of eggs birds lay each year.

"One of the strongest patterns in this data set showed birds that begin earlier in a given season tend to lay larger clutches of eggs," Winkler recalled. "We wanted to see if

earlier average lay dates over the past 30 years have led to larger clutches. However, it is interesting to find that, despite the change in lay dates, there has been no significant increase in clutch size across the years."

To say more with any certainty will require a much better understanding of how birds respond to climate change – and more detailed, hands-on research than even the most dedicated legions of volunteers can conduct. Nevertheless, the *PNAS* authors believe that their statistical analysis of tree swallows' response can be a template for studies by other researchers of how climate change might affect various plant and animal species.

"Tree swallows are doing a fine job of observing seasonal climate conditions and responding in a way that's easy for us to measure," Winkler noted. "Clearly, they're laying eggs earlier on average. Our job as biologists is to learn more about the birds and their food organisms in order to understand the effects of this and other responses to climate change."

The study was sponsored, in part, by the National Science Foundation and Cornell.

## Nobelist Carl Wieman talks at CU about super-cold new form of matter

By Briana Collins '03

It's all about a "superatom" that behaves like an individual atom – only at an incredibly frigid 100 billionths of a degree above absolute zero (minus 459.67 degrees Fahrenheit). The temperature needs to be that incredibly frigid to slow the atoms down enough to get them to "fall" into the superatom.

This superatom – a completely new form of matter – is called Bose-Einstein Condensate (BEC) after Albert Einstein, who in 1924 predicted that when atoms slow down in extreme cold they lose their 'identities' and coalesce into one single atom. He based his prediction on the work of renowned Indian physicist Satyendra Nath Bose.

Last year, Carl E. Wieman, a Distinguished Professor at the University of Colorado in Boulder, won the Nobel Prize in physics for his work with BEC. On Oct. 9 Wieman gave the second of his two Bethe Lectures at Cornell in Schwartz Auditorium of Rockefeller Hall, appropriately titled "Bose-Einstein Condensation: Quantum Weirdness at the Lowest Temperature in



Robert Barker/University Photography  
Nobelist Carl Wieman lectures in Schwartz Auditorium on Oct. 9.

the Universe."

Wieman, with his co-discoverer of BEC, Eric Cornell of the National Institute of Standards and Technology, led a team of scientists in the late 1980s in experiments to achieve the extremely cold temperature – the closest to absolute zero ever recorded.

"The Bose-Einstein Condensate really owes its existence to the idea that people

studying physics decided it *could* exist," said Wieman. "Einstein knew that as you got atoms colder, their quantum waves get so big they start to overlap. Then, instead of them having all different speeds, they all decide to fall down to create a single quantum wave – a superatom."

The team used relatively common, cheap lasers – like the ones used in CD players – and magnetic "traps" to create BEC from rubidium atoms. "We were excited because we could do with our \$100 lasers what others were doing with \$2,000 lasers," noted Wieman. He knew that pushing the atoms with photons – little "chunks of light" from the lasers – could exert a larger, collective force on the atoms, which he likened to the force exerted on a bowling ball from large numbers of ping-pong balls being thrown at it. "We set the light so that it would constantly hit [the atoms]," said Wieman. The constant interference from the photons caused the atoms to slow down, almost to a complete stop.

"It's like running in a hail storm," said the physicist. "It hurts no matter where or

how fast you run, so you stop."

Ironically, Wieman discovered that the very photons that make it possible for the atoms to slow down are also the photons that prevent the temperature from reaching absolute zero. "Photons are a bit like house guests," observed Wieman, "When they first show up, they're nice to have around. But if they hang around too long they start to get unpleasant." In other words, the photons help slow atoms down, but only to a point – they still bounce back and forth between the slowed atoms, jostling them a bit and thus preventing them from getting any colder. "Luckily," he said, "it turns out it's a lot easier to get rid of light than it is house guests."

In order to prevent further movement of the atoms, the laser light is turned off, allowing the atoms to converge. A current is then run through the field as a magnetic trapping device to hold the atoms in position. The most energetic atoms are removed through evaporative cooling, a process Wieman compares with the steam rising from a cup of

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## Myra Hart '62, a Staples founder and trustee, will lecture here Oct 30

Myra M. Hart '62, one of the founders of Staples and a member of the Cornell Board of Trustees, will speak on entrepreneurship and visit with students during a lecture and reception Wednesday, Oct. 30, in the Statler Auditorium.

Hart's lecture, "Taking the Risk Out of Entrepreneurship," will begin at 6 p.m. and will be followed by a pizza reception from 7 to 8 p.m. The event is free and open to the public. Hart's speech is part of the Moses and Loulu Seltzer Speaker Series hosted by Cornell's universitywide



Hart

Entrepreneurship and Personal Enterprise Program (EPE) and the Cornell Entrepreneur Organization (CEO).

Before obtaining her Ph.D. from Harvard University in 1995, Hart was one of four founding officers of Staples, the Office Superstore. She participated in raising the initial venture funding, served as the company's first vice president of operations, then took responsibility for the company's geographic and business expansion as group vice president of growth and development.

Currently the Class of 1961 Professor of Management at Harvard Business School, Hart teaches several courses in its MBA program. In 1998, she and a fellow faculty member received the Apgar Award for Innovation in Teaching for a

new course entitled "Starting New Ventures."

In 1999 Hart was elected to the Cornell Board of Trustees and serves on the Investment Committee and the Committee on Alumni Affairs and Development. She also is an active member of the President's Council of Cornell Women.

Hart is a director of the National Foundation for Women Business Owners and a member of the Boston Club and the MIT Enterprise Council.

The Moses and Loulu Seltzer Speaker Series was established in the mid-1980s by Sam Seltzer '48 to honor his parents for their commitment to education. The series brings outstanding business creators, developers and leaders to campus to interact with students.

# Segway HT inventor Dean Kamen will speak in Hollister Hall, Oct. 30

By Bill Steele

As the main plenary speaker for the 2001 conference of the American Society of Engineering Education (ASEE), inventor and entrepreneur Dean Kamen reportedly gave the higher education community a D-minus for failure to engage the imagination and passion of young people for math, science and engineering.

How he views Cornell's efforts in that direction will be on the agenda when Kamen presents a public lecture Wednesday, Oct. 30, at 4 p.m. in Room B14 of Hollister Hall on campus. His visit is part of the Culture and Diversity Lecture Series, sponsored by Engineering Minority and Women's Programs.

"One reason the engineering profession is not attracting the needed cadre of problem solvers stems from the fact that our nation tends to glamorize and celebrate entertainers



Kamen

such as sports heroes, movie stars and musical performers," Kamen told the ASEE conference. "Is it any wonder then that a young student would dream of being a professional athlete before considering a career as an engineer? Students, at the earliest age, must see engineering, science and technology as opportunities that are fun, rewarding and achievable. They must be inspired to learn."

Kamen has most recently been in the news as the inventor of the Segway Human Transporter (HT), a two-wheeled standup device that, the inventor says, allows people to go farther, move more quickly and carry more while remaining part of a pedestrian community. But it's only the latest in a series of innovative inventions. While still in college, Kamen created the Auto-Syringe, a wearable infusion pump that dispenses drugs. He went on to create several other medical devices, including a home dialysis machine and a transporter for the disabled that can climb stairs, traverse sandy and rocky terrain and raise its user to eye-level with a standing person.

Kamen is the founder and president of DEKA Research

& Development Corp., the CEO of Segway LLC and the founder and driving force behind FIRST (For Inspiration and Recognition of Science and Technology), a nonprofit organization dedicated to motivating the next generation to understand, use and enjoy science and technology. FIRST sponsors the annual FIRST Robotics Competition, which teams professional engineers with high school students from across the country to build robots for regional competitions that culminate at a championship event, and the FIRST Lego League, which offers hands-on experience for 9- to 14-year-olds to explore and invent their own robotic creations.

Kamen recently received the \$500,000 Lemelson-MIT Prize – the world's largest single award for invention – and donated the entire prize to FIRST. He was awarded the National Medal of Technology by President Clinton in 2000 for inventions that have advanced medical care worldwide and for innovative and imaginative leadership in awakening America to the excitement of science and technology. *Smithsonian* magazine has dubbed him "The Pied Piper of Technology."

## 'Ambassador' wolves will visit campus

Rami, Luna, Raven and Magpie, four "ambassador" animals from the Colorado-based Mission: Wolf program, will visit the Cornell campus Oct. 29 at 7 p.m. in Robert Purcell Union for an educational presentation sponsored by Ecology House. The program about the natural history and current status of wild wolves is open to the public, free of charge, and children are particularly welcome.

In their 15th annual fall visit to the Ithaca area, Mission:Wolf wolves and educators also will visit Dryden High School Oct. 28 at 7 p.m., in a visit sponsored by Cornell Cooperative Extension of Tompkins County and the Dryden Youth Commission.

Mission:Wolf is a learning facility and refuge, located at 9,000-foot elevation in the southern Rockies, that takes in pure wolves and wolf-dog hybrids in need of adoption. Rami, a black timberwolf, is making her seventh visit to Cornell and will be accompanied by wolf pups born this spring. After introducing the wolves to the audience, Mission:Wolf educators will discuss volunteer opportunities at the sanctuary. Wolf sweatshirts and other items will be on sale before and after the show.

More information on the Cornell visit is available by calling Ecology House at 255-1094.

## English department sponsors conference on 20th century

By Franklin Crawford

The Cornell Department of English will host a conference, "Some Futures for the Twentieth Century," Oct. 25 and 26 in Goldwin Smith Hall D. All talks, including a post-conference reception and Saturday luncheon buffet, are free and open to the public.

"In the wake of the millennium, scholars of British and U.S. 20th-century literature and culture are exploring innovative ways to think about their period – a period that now has not only a beginning but an ending," said Molly Hite, Cornell professor of English and conference coordinator. "They are basically asking: What exactly was the 20th century?"

Similar to recent English department con-

ferences on Romanticism, the 18th century and Victorianism, this event marks the return of former Cornell graduate students (two Ph.D.s and two MFA/Ph.D.s) who are now faculty involved in some of the most important new approaches to 20th-century studies. Here is the conference schedule:

### Friday, Oct. 25:

4:30 p.m.: Keynote address, Douglas Mao, Cornell, "Arcadian Ithaca: Joyce, Benjamin, and Utopian Sentiment." Reception follows.

### Saturday, Oct. 26:

9:30 a.m. (in 258 Goldwin Smith Hall): Jodie Medd, Carleton University, Ottawa, "Strong Hard Filth: Literary Obscenity and

the Erotics of Modernist Patronage."

11 a.m.: Mark Scroggins, Florida Atlantic University, "New Modernisms, New Biographies."

Noon: Luncheon buffet, public invited.

1:30 p.m.: Timothy Melley, Miami University, Ohio, "Postmodern Amnesia."

3 p.m.: Panel discussion and question-and-answer session, including conference speakers and Cornell faculty addressing other new directions in 20th-century studies.

4:30 p.m.: Reception.

For more information, contact conference coordinator Molly Hite at <mph7@cornell.edu>, or Marianne R. Marsh, Cornell English department administrative manager, at <mrm4@cornell.edu> or 255-6799.

## 'Queen of deadheading' to give Plantations' lecture Oct. 30

By Roger Segelken

"The Well-Tended Perennial Garden" will be the topic for Tracy DiSabato-Aust, author of a best-selling book of the same name, when she delivers the 20th annual Cornell Plantations William J. Hamilton Jr. Lecture Wednesday, Oct. 30.

DiSabato-Aust's 7:30 p.m. presentation in the James Law Auditorium, Schurman Hall, at the College of Veterinary Medicine, is free and open to the public. Following the lecture, the nationally recognized garden



DiSabato-Aust

writer and photographer will attend a reception and book signing.

"This presentation will be especially interesting to gardeners who recognize the need to provide ongoing care for their perennials, but may not be familiar with the latest techniques," said Donald A. Rakow, the Elizabeth Newman Wilds Director of Cornell Plantations.

DiSabato-Aust, a garden consultant with more than 25 years of horticultural experience, has studied, worked and taught in the United States, Canada and Europe. She owns Horticultural Classics and Consultations, a garden design/installation/maintenance business. She also is a frequent guest on the cable channel

Home and Garden Television and on national radio gardening programs. Her magazine articles appear in *Fine Gardening* and *Garden Design*. DiSabato-Aust has served on the staff of the Chadwick Arboretum in Ohio and has received numerous plaudits, including the 2002 Perennial Plant Association Honor Award.

*The Well-Tended Perennial Garden*, published in 1998, was the first book to focus on the specific pruning needs of perennials, which explains why DiSabato-Aust is sometimes known as the "queen of deadheading." Her latest book, *The Well-Designed Mixed Garden*, is scheduled for release by Timber Press in January 2003.

## On-site look at NYC *continued from page 3*

Bergland, a historic preservation graduate student.

"One of the most important aspects of our trip was seeing the many work environments planners encounter and the many community and social issues they handle," said Friday. "It really hit home how valuable planners are to the health of our social and physical environment after we heard practicing planners talk about large issues like the World Trade Center disaster rebuilding effort and share their experiences working with community and business development groups and city budget offices."

On the first day's agenda were visits to Sunnyside community gardens in Queens, Greenpoint redevelopment project in Brooklyn and a social history walking tour of Manhattan's Lower East Side, led by Reardon, a former New York City resident. Reardon also arranged to take the group to the city's best low-cost restaurants, including Sylvia's, famous for its down-home cooking, and the Tibetan Kitchen, said to have the hottest chili sauce in town.

On day two, students toured Ground Zero, then met in the office of Amanda Burden, head of the city's planning

department, for a special session on the World Trade Center rebuilding process. Burden and her staff spoke about New York's plans to reconstruct lower Manhattan a year after the terrorist attacks and discussed how the city collected and synthesized ideas from residents.

The inclusiveness of the planning process was especially interesting to Bergland. "One group did over 200 workshops in all of the city's boroughs and got 19,000 ideas, which then were distilled into 49 different themes," she noted.

And while the city's many layers of bureaucracy seemed a substantial challenge to Friday, he was impressed that "the World Trade Center disaster has spurred many different agencies and levels of government to work more closely together in the aftermath."

Day two also included a tour of Harlem with Abyssinian Development Corp. senior project manager Sylvia Augustus, a CRP alumna in historic preservation. She showed the group some of the new businesses that the faith-based community-driven organization had spurred, among them a Marshall's

department store, the only one in Manhattan, and a Pathmark supermarket, a coup for the neighborhood. No grocery chain wanted to open a unit in Harlem until the development group persuaded Pathmark to do so, Bergland said. "Now it's the chain's top grossing store in the entire country."

On the final day, students attended a session on the building of affordable housing at the Office of Management and Budget of the City of New York and visited the city's Downtown Alliance Business Improvement District, where they joined top city officials and leaders of a rent stabilization group in a spirited discussion on the merits of rent control and the challenge of providing affordable housing in Manhattan.

The day ended with talks with officials and staff members at the United Nations on such third-world economic and social development issues as affordable housing and the role women can play in economic growth.

The experience helped the group "face these kinds issues head on and see first-hand the planning world we will enter next year," said Bergland.

## Wieman lecture *continued from page 5*

coffee. The steam that we see, he explained, "are the most energetic coffee molecules leaping out, taking the hottest part of the coffee with them, so what you have left is cooler coffee." In the same way, the left

over, very cold, almost completely immobile atoms are Bose-Einstein Condensation.

Wieman's achievement allows for the exploration of a whole new area of the quantum world. The possibilities for ultra-

sensitive detectors of time, gravity, and rotation might soon be realized, he said. And, he said, BEC has brought one step closer the creation of gravity-measuring lasers that could predict oil reservoirs – or even detect

if terrorists are hiding in subterranean caves. Indeed, as Wieman professed, "making BEC was really just the beginning, and it's even now, more than ever, allowing us to learn new and interesting things about physics."