CORNELL'S QUARTERLY MAGAZINE WINTER 2011

EZRA

SÉAMUS DAVIS AND HIS FANTASTIC MACHINE

RESEARCH GIVES EDGE TO FINDING NEXT GENERATION OF FACULTY

14 - 'UNPACKING THE NANO' EXHIBIT 16 - GIFT CREATES ATKINSON CENTER 24 - PILLSBURY INSTITUTE

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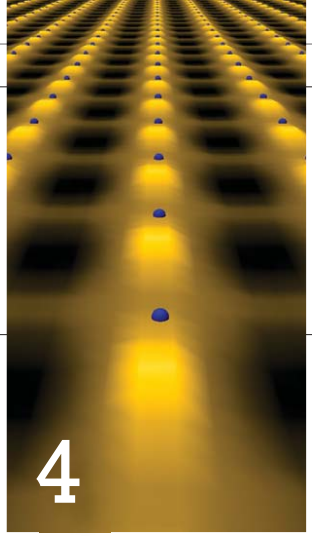
EZRA



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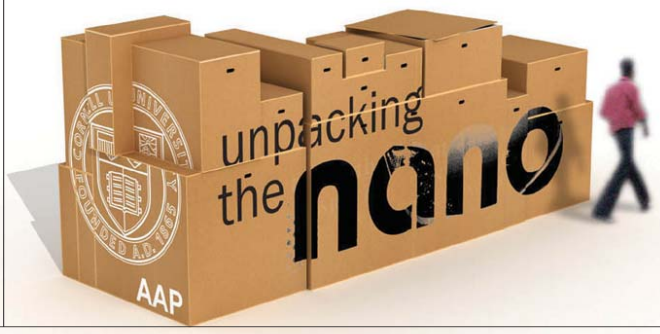

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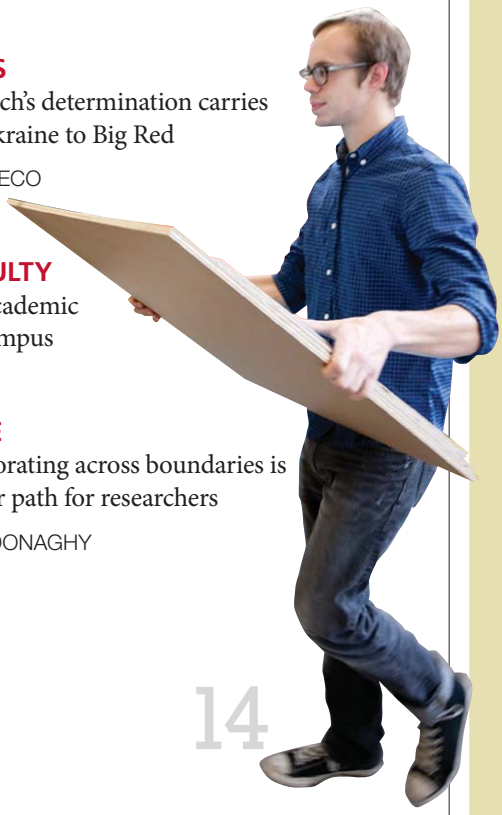

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ON THE COVER

Physicist J.C. Séamus Davis peers out from behind a part of the cryogenic assembly of the scanning tunneling microscope located in a sound- and vibration-insulated room in the basement of Clark Hall.

Cover photo: Photo by Lindsay France/ University Photography; digital post-production by Matthew Fondeur/ University Photography

From the publisher

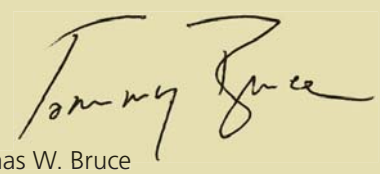
Cornell's Ithaca campus is about to experience a tectonic shift. In the coming decade, as the baby boom generation hit their 60s and 70s, the university will need to hire as many as 1,000 new faculty members, including 100 in the humanities, due to the retirement of more than half of our most distinguished teachers, scholars and scientists.

This and the next three issues of Ezra will focus on this impending renewal of Cornell's faculty – perhaps the most dramatic change in the face of the academic staff in our university's history. Nearly half of our faculty members are over age 55. The College of Arts and Sciences has the oldest faculty in its history, with about 20 percent of faculty members over age 65. "We are hiring our future reputation," G. Peter Lepage, the Harold Tanner Dean of the College of Arts and Sciences, observed recently.

You may have read that Cornell has established a $100 million Cornell Faculty Renewal Fund to begin hiring immediately, following a period of financial downturn that forced us to implement a universitywide hiring pause. In our Viewpoint article, Provost Kent Fuchs discusses the unprecedented rate of hiring that lies before us, and the opportunity it brings "to refocus, reprioritize and create new initiatives that will define Cornell's future."

In coming issues you will read about what makes Cornell such an academic magnet: The vision and dedication brought to the campus by faculty researchers and teachers in the life sciences, arts and humanities, and engineering. In this issue the discipline is the physical sciences, and the enormous energy – and, dare I say it, genius – brought to scientific investigation by one individual, and how this in turn brings the best minds – whether researchers or graduate students – to the Ithaca campus.

We also are planning other stories on how this unprecedented hiring will improve diversity in the faculty as a whole. And central to our stories is the research and teaching by current faculty members that future leadership will want to emulate. Another quote from Dean Lepage that succinctly sums up not only the challenges facing the university but also the themes that Ezra will portray: "It's scary to have your most famous people leave. But it's also a tremendous opportunity."



Thomas W. Bruce

Vice President, University Communications

AROUND CAMPUS

Ezra lived here, too

PROVIDED

An Essentials item in the winter 2010 issue mentioned a new plaque put up at the restored Sigma Phi house on West Campus (1 Forest Park Lane) – a plaque that paid formal tribute to the fact that the house sits on what was a portion of university founder Ezra Cornell's original homestead (in fact, a wall and blocker tie rings in the basement were likely part of Cornell's original barn).

The story indicated that the plaque, along with the Ezra Cornell statue and the crypt at Sage Chapel, are the only obvious places on campus that pay formal tribute to Ezra Cornell.

However, the nearby Delta Tau Delta house at 104 Mary Ann Wood Drive was built in 1965 on the site of Forest Park, Ezra Cornell's farm home, and for many years a plaque in front of that house (see photo) paid tribute to the location.

The plaque stated: "On this site stood Forest Park, the farm home of Ezra Cornell. The university's founder lived here from 1857 to 1869 while the university received its charter and began to build on portions of the farm. Here also lived four generations of the Cornell family as well as generations of students. No other site has more extended or more meaningful links with the early days of Cornell."

Forest Park was torn down in 1965 for construction of Delta Tau Delta house, which was dedicated in November of that year.

The plaque stood on a pedestal in front of the Delta Tau Delta house for many years and was moved to a spot in the sidewalk pavement in front of the house more than a decade ago. According to Young Hur, Delta Tau Delta president, the plaque was removed last semester due to damage from weathering. A replacement plaque has been ordered.


PROVIDED

MILESTONES

Cornell campaign surpasses $3 billion mark

Cornell has reached the $3 billion mark in its university fundraising campaign. Campaign co-chairs Jan Rock Zubrow '77 and Stephen Ashley '62, MBA '64, announced the milestone Nov. 18 at "Cornell on the Charles," an event attended by hundreds of Boston-area Cornellians. The record-breaking amount has been raised by only a handful of other universities.

Celebrating with Zubrow and Ashley (foreground) are, from left, President David Skorton, Cornell Board of Trustees Chairman Peter Meinig '62 and Vice President for Alumni Affairs and Development Charles Phlegar. Bob Appel '53, campaign co-chair for the Weill Cornell campaign, was not present at the event.

Since launching the $4 billion campaign in 2006, Cornell has significantly increased its financial aid program for students as part of its commitment to need-blind admissions, established new professorships, created funds to assist the graduate and professional schools, and raised support for new medical institutes and professorships at Weill Cornell Medical College.


CORNELLCAST/PROVIDED

DOWNLOAD THIS

'CU in the Kitchen'

Check out the debut episode of "CU in the Kitchen" on CornellCast, www.cornell.edu/video?videoID=903, with host Dan Gaibel and Senior Executive Chef Steven Miller, as they showcase preparations for the Fall Harvest Dinner, featuring local, regional and New York state produce, dairy products, beef and more.

With four certified executive chefs and two graduates from the Culinary Institute of America, eating at Cornell means enjoying some of the best campus food in the country. Cornell Dining maintains a commitment to sustainability seen in initiatives such as trayless dining, composting/recycling, and locally sourced food products.

ENTERPRISING ALUMS

Enablers of the app economy

Ben Roberts '10 (below, left) and Alexander Veach '09, M.Eng. '10, (right) are the founders of Terran Exchange, which was the August monthly winner at discoveringstartups.com – and represents that site's most popular startup of all time. Roberts reached out to a network of Cornellians for the competition and credited the Cornell community with amassing the 1,986 votes TerranExchange.com collected.

The site, which launched in early December, gives commercial software developers an open free market system in which to present their products; users can rate, review and purchase limited licenses and, through social media, freelancers and companies can interact with a community of buyers.

Roberts says he wants Terran Exchange to be able to give smaller application software companies the ability to compete with the much larger companies that dominate the market.

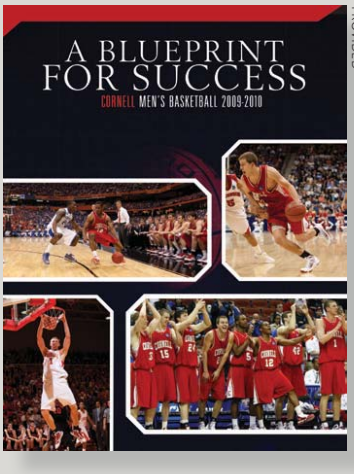
PROVIDED

"We call Terran Exchange 'The Marketplace for Ideas' because the best products rise in a merit-based free market system," Veach says, noting that he and Roberts anticipate tremendous growth in apps and software.

OFF THE PRESS

Two books highlight Cornell's historic 2010 sports year

Two commemorative books on Cornell's historic 2010 year in sports are now available; proceeds from the sale of the books will benefit Cornell athletics.



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"A Blueprint For Success: Cornell Men's Basketball 2009-10," commemorates the year the Cornell men's basketball team won its third straight Ivy League Championship and set a record for most wins in one season by an Ivy League team. It was the first Cornell team to win a game in the NCAA Tournament and to make it to the Sweet 16.

"Making History, March 18-21, 2010: The Greatest Cornell Sports Weekend Ever!" highlights the record-setting performances and game-changing moments for four Cornell winter sports teams – wrestling, men's basketball and men's and women's hockey.

Both books are published by Ithaca-based MomentumMedia and myTEAMBOOK.net, in conjunction with the Cornell Department of Athletics, and are available online and at the Cornell Store.

SHELF LIFE

ALL MOOSEWOOD IMAGES PROVIDED BY THE MOOSEWOOD COLLECTIVE AND CORNELL UNIVERSITY LIBRARY

Growing up Moosewood

The Moosewood Restaurant – which Bon Appetit magazine named one of the 13 most influential eateries of the 20th century – recently donated its earliest menus, cookbook drafts, drawings, ads and other documents to Cornell University Library. Known by Cornellians as an Ithaca favorite since 1973, Moosewood has become an icon of vegetarian cooking and cuisine.

Members of the Moosewood Collective — who called themselves "Moosers" — may have appeared to be veggie-loving free spirits, but underneath the hippie exterior, they were smart and savvy businesspeople. A typewritten mid-'80s policy manual, "The Moosers' Book of Harmonious Functions," shows how organized the collective really was, with serious policies on business matters like corporate officers, ownership percentages and joint responsibility for loans.

In addition to the serious stuff, the manual includes this poem about the dress code:

summer dress vogue

The cooks well-hidden in the kitchen
may wear whatever does bewitch 'em,
but omnis, bussettes and all waitrons
should dress with reverence for our
patrons.

Excessive rear and pit exposure
will often cause a lost composure,
so be aware of shorts and skirts
as well as paints and smells and dirts.
For though no rules we are devising

to stop creative improvising,
we must take part in realizing
a mien that's clean and appetizing.

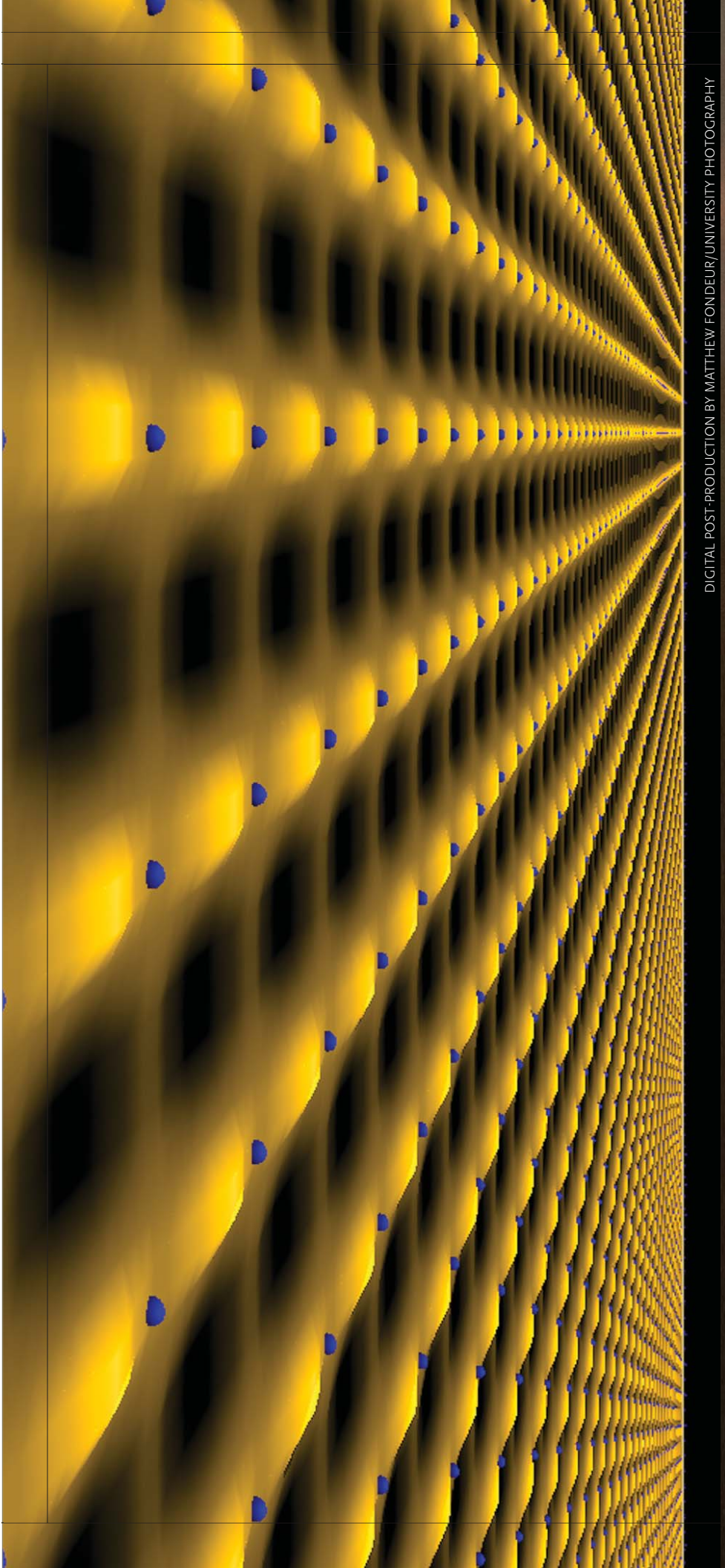
BY BILL STEELE

Séamus Davis builds a fantastic machine

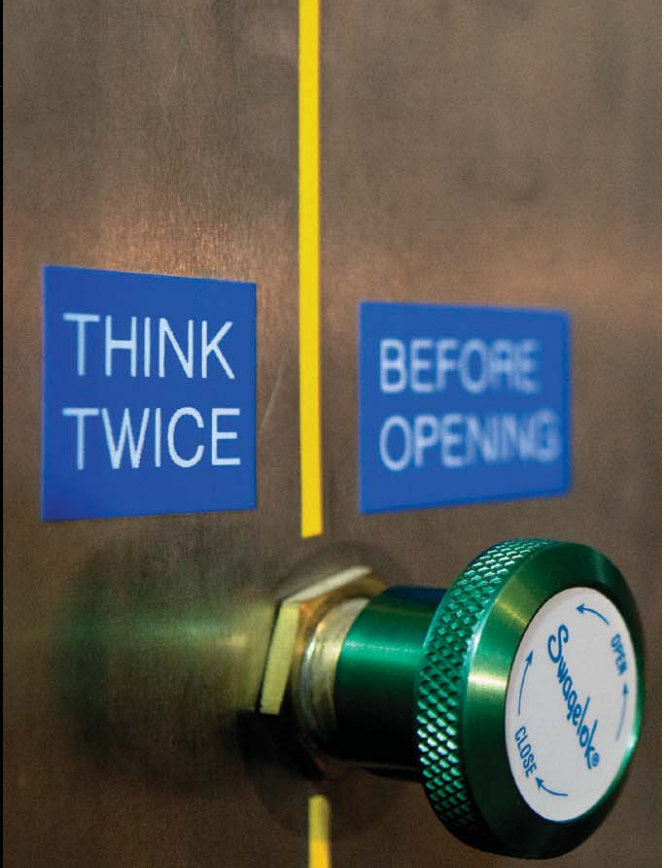
Why his research embodies campus drive to attract next generation of faculty

It took a confluence of factors to bring physicist J.C. Séamus Davis, his family and his potentially world-changing research to Cornell: a welcoming academic environment, a good community for raising kids, generous financial support and a lot of great Irish music.

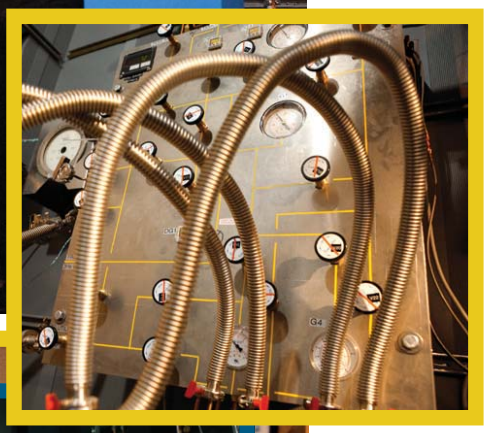
Davis had spent almost two decades at the University of California-Berkeley, working up from graduate student to professor of physics. His wife, Kathy Selby, was a physicist at the University of California-San Francisco. "As young adults living in San Francisco we had a fantastic time," Davis recalls.



DIGITAL POST-PRODUCTION BY MATTHEW FONDEUR/UNIVERSITY PHOTOGRAPHY



Left: This computer graphic simulation of the electron clouds in a layer of copper oxide in a superconductor shows how the density of electrons is different "north" and "east" of the copper atoms (marked by blue dots), a condition discovered using a scanning tunneling microscope in the low-vibration, low-temperature lab of physicist Séamus Davis (on facing page), one of three such microscope labs he has at Cornell (the third is being completed in the new Physical Sciences Building). This discovery may lead to a better understanding of high-temperature superconductors that could revolutionize electric power generation and transmission. Above: One of the controls that form parts of the cooling assembly for the lab.



Until they had two young sons. "My wife and I were both born and bred in the country [he in Ireland, she in England]," Davis explains, "and we had to think about bringing up boys in the city, whether that was the right environment."

"You would think he's a lab rat and doesn't think of anything else," says Selby, "but in a choice between research and family, he'll put family first."

Serendipitously, both fell together. Cornell wanted Davis, who works in low-temperature physics and was already in professional contact with such Cornell researchers as David Lee (now at Texas A&M) and Robert Richardson, the Floyd R. Newman Professor of Physics emeritus, who shared in the Nobel Prize in physics for the discovery of the superfluid state of liquid helium at temperatures approaching absolute zero (-273.15 degrees Celsius, or -459.67 Fahrenheit).

"They hired me as a helium physicist," Davis recalls, and he still does research on superfluid helium as well as on a new state of matter that might turn out to be what's called a "supersolid." But his work on high-temperature superconductivity has drawn the most attention. Superconductivity was first discovered in metals cooled to within a few degrees of absolute zero, through which electricity would move with no resistance. Recently discovered copper oxides called cuprates and some compounds of iron and arsenic become superconductors at temperatures up to 135 degrees above absolute zero. The holy grail is to find materials that will superconduct at or near room temperature, which could revolutionize electric power generation and delivery.

The attention that Davis'

Top image: Physicist Séamus Davis, right, Sourin Mukhopadhyay, visiting scientist from the Tata Institute in Mumbai, India, and undergraduate researcher Neal Harrington, in front, work with a scanning tunneling microscope (STM) in a sound- and vibration-insulated room in the basement of Clark Hall. The STM itself is in the stainless steel vacuum chamber in the center, suspended from an overhead lead table weighing about one ton. The table rests on air spings mounted on three lead-filled pillars, standing on a concrete floor eight feet deep, weighing about 35 tons and in turn resting on more air springs. All this isolation makes it possible to measure distances smaller than the diameter of an atom. During experiments the vacuum chamber is cooled to within a few degrees of absolute zero by liquid helium. Above right and background: Tubes and valves that form parts of the cooling assembly for the STM. Bottom: From left, Davis, graduate student Vikram Gadagkar, Harrington and Mukhopadhyay.

When a faculty hire depends on two jobs, not just one

Kathy Selby and Séamus Davis during a quiet moment together at a local café.

Sometimes the key to enlisting a new faculty member is the offer of a position to a partner. The decision by Séamus Davis to accept a faculty position at Cornell was greatly influenced by a teaching opportunity for his physicist wife, Kathy Selby.

Early in her career Selby decided to have "balance" in her life, combining academics and music. "It runs in my father's family. We like to do a bunch of things," she explains. "A lot of women talk about the glass ceiling. I decided to turn it around and make the life I wanted."

Her mother was a musician, and Selby studied classical violin as a child. Visiting Ireland with Davis she met his uncle – the Séamus for whom he was named – a renowned musician and storyteller. She brought home a book of Irish tunes and started playing them alongside the Vivaldi, and soon found more Celtic music at a San Francisco street fair. To make more time for music, she switched from an adjunct professorship at the University of California-San Francisco to a half-time research position.

Coming into Ithaca's vibrant folk music community, she opted for a similar arrangement, devoting what she calls "50 percent time" to physics, and the rest to teaching fiddle and playing in local bands that play for contra dances (a New England descendant of English country dancing done to traditional fiddle tunes, very popular in academic communities).

Cornell's physics department was already offering a course called The Physics of Musical Sound, and they handed it to Selby – a perfect fit. In alternate semesters she teaches physics for bioscience majors.

"Nowadays it often seems that both people in a couple are looking for a job, so you have to recruit families, not just individuals," says Betsy Hillman, dual career consultant in the Division of Human Resources. The Dual Career Program was created in 2001 by then-Provost Biddy Martin.

Female physicists tend to marry physicists, says newly arrived assistant professor Eun-Ah Kim, because the ratio of men to women among physics grad students is about 25 to one. (Selby had the same experience.) Kim's husband, Michael Lawler, found a job as professor of physics at Binghamton University and has an adjunct professorship at Cornell that allows him to collaborate with Kim and other researchers.

When the partner is an academic, employment arrangements are often made through contacts within or between departments, sometimes coordinated through the provost's office. Candidates also can make use of the Upstate New York Higher Education Recruitment Consortium (UNY HERC), which maintains a database of faculty and staff jobs at member institutions in central New York. For nonacademics Hillman maintains contacts throughout the community. "I urge departments to include information about UNY HERC and the Dual Career Program in their recruitment materials," Hillman says.

The Division of Human Resources also helps make Cornell attractive for arriving faculty families with an on-campus child care center, a program to help defray child care expenses, a lactation time-away-from-work policy and an adoption assistance program. Kim, who gave birth to a baby boy in September, benefits from a Cornell policy that stops the tenure clock for one year for new parents and exempted her from teaching for the fall semester.

Kathy Selby plays the fiddle (with a few fellow musicians) during an English country dance party at her home this fall.

'It's absolutely critical that the funding private universities can get be preserved and amplified, because it plays a critical role in how frontier science works.'

– J.C. Séamus Davis

research is getting has enhanced the reputation of the Cornell physics department and brought in millions in government research funding, talented graduate students and, most notably, a wave of new, young faculty interested in related research. Their numbers, a judicious mix of newly minted Ph.D.s, young professors and established performers, are going to grow in all disciplines across the campus thanks to the university's historic $100 million fund to accelerate the hiring of new faculty over the next five years (see Viewpoint, page 13). Over the next decade they will be taking over from the more than half of current faculty members who are approaching retirement age.

Davis, now the James Gilbert White Distinguished Professor in the Physical Sciences, is a leading example of Cornell's capacity to attract research stars. In recent years some of the nation's leading scientists have been attracted by the campus's commitment to excellence in diverse and collaborative research. There are professors like Serena DeBeer George, an assistant professor of chemistry who is developing new tools to understand biological and chemical catalysts; and Darrell Schlom, a professor of materials science and engineering who is leading collaborative research to create low-power, high-efficiency electronic memory and other new materials for microelectronics. The researchers have come to Ithaca from a diverse number of institutions, including Stanford University, Pennsylvania State University and the Massachusetts Institute of Technology.

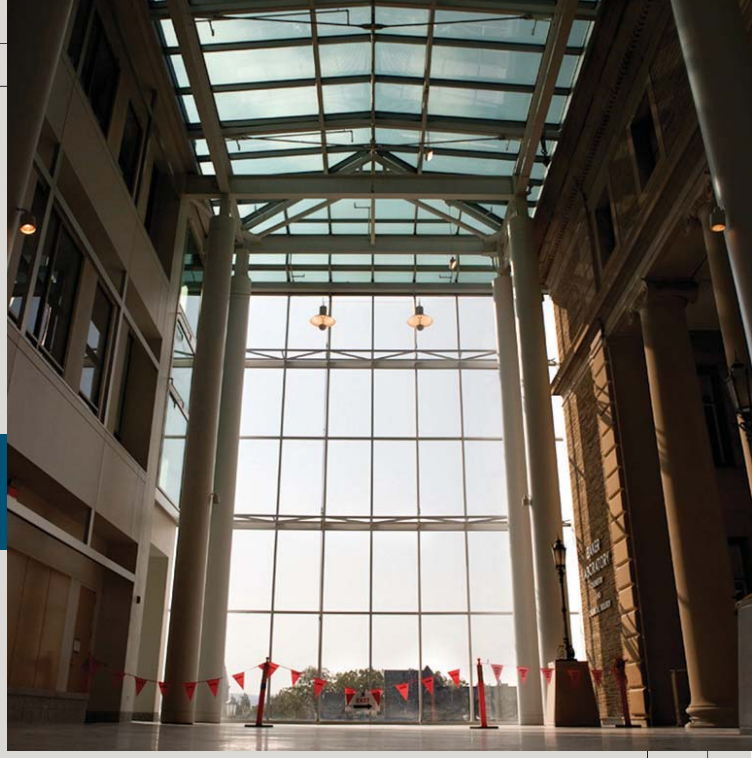
The secret of high-temperature superconductors seems to be the addition of impurities whose atoms distort the normally orderly crystal lattice of copper and iron compounds, rearranging the electrons around atoms in a way that allows some of them to move without resistance. As a young professor at U.C.-Berkeley, Davis had the idea that he could observe the electrons in these materials directly with a scanning tunneling microscope (STM). An STM uses a probe so small that its tip is a single atom, scanning across a surface in steps smaller than the width of an atom. With a voltage applied between tip and surface, electrons jump the gap to create a "tunneling current." By varying the voltage and measuring the tunneling current, Davis found he could determine how much energy it takes to pull an electron loose from an atom, and more importantly, he says, he showed how to visualize the arrangement of electrons around and between atoms. Building a machine that could do this would require cryogenic cooling and serious isolation from the outside world, with massive supports to insulate against vibration. Many scientists thought the idea was unlikely to pay off in proportion to its costs. Berkeley wasn't ready to finance it.

"His work is actually quite different from the

New home for the physical sciences

The new Physical Sciences Building, a joint project of the College of Arts and Sciences and the College of Engineering, was officially completed Nov. 19. While the building will not be fully occupied until the end of January, some of the labs and classrooms were already in use during the fall semester.

The building includes more than 80 research and teaching laboratories, a 120-seat auditorium, and new meeting, dining and gathering spaces. It is designed to enhance interdisciplinary research, and will accommodate 15-20 research groups in the Departments of Physics and of Chemistry and Chemical Biology, and the School of Applied and Engineering Physics.

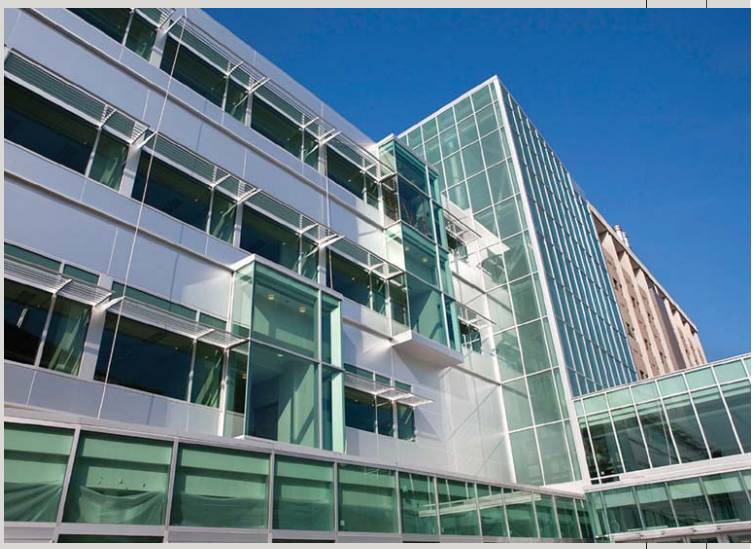


The spacious seven-story, 6,700-square-foot atrium has a skylight and a floor-to-ceiling wall of glass, providing year-round natural lighting.

A 120-seat auditorium offers state-of-the-art videoconferencing, motorized chalkboards and flexibility for scientific demonstrations.

The open architecture of the staircases lends a sense of energy and movement to the building.

Left: One of nine state-of-the-art teaching laboratories on the first floor, windowed so that passers-by can share the excitement of interesting projects. Right: One of the more than 80 laboratories in the building, many engaged in interdisciplinary research in such areas as nanoscale science, X-ray and accelerator physics, chemical biology and biological physics.



The architectural design firm for the building is Boston-based Koetter, Kim & Associates, whose founders are both Cornell alumni.

Glass walls offer writing surfaces for brainstorming, and the open design encourages the kinds of chance encounters that often lead to important new insights and partnerships.

'Because this is kind of a Mecca for this style of research, you get people already prepared – intellectually prepared and morally prepared, because it's very difficult work.'

– Séamus Davis

Assistant professors Eun-Ah Kim, left, and Kyle Shen are typical of the recent faculty hires who have been drawn to Cornell because of the physics work in condensed matter being done by Séamus Davis.

classical physics we do here at Cornell," says Al Sievers, the Edward L. Nichols Professor of Physics, who was then director of the Laboratory of Atomic and Solid State Physics. "He had these ideas for a new kind of measurement, and they couldn't build the kind of facility he needed in Berkeley. We saw the opportunity that we could modify the basement of Clark Hall and put in his instrument."

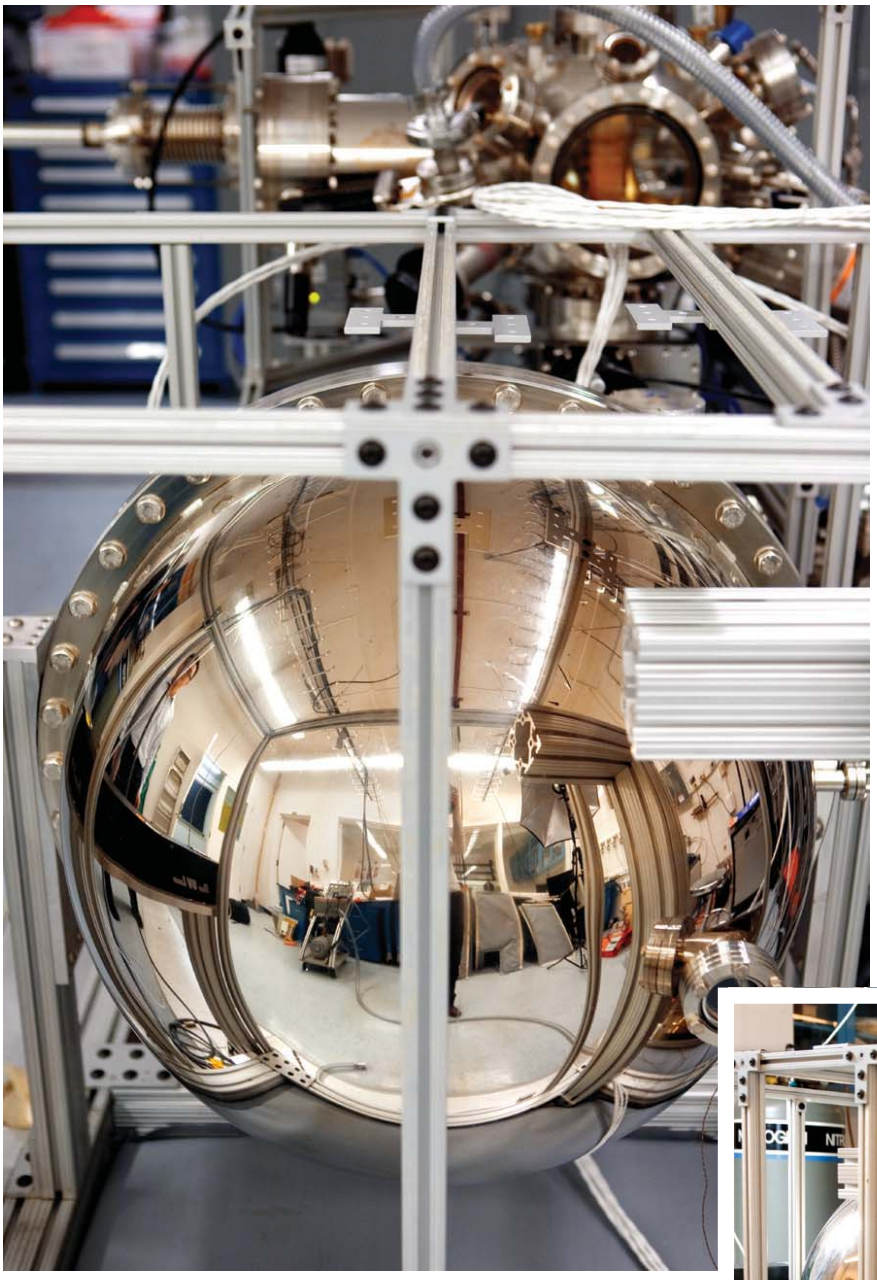
After "informal discussions" with Cornell colleauges, Davis and Selby came to Cornell in 2002 on sabbatical. They liked the small town and its good schools. "I had offers from many of the major physics departments in the country," Davis recalls. "My wife vetoed most of them. [At Cornell] we found a place that was one of the world's leading physics departments and was not in an urban environment." As a bonus, Ithaca also offered a vibrant local community of people playing Celtic music. Selby, a world-class Celtic fiddler, spent some of the initial sabbatical playing gigs and going to jam sessions.

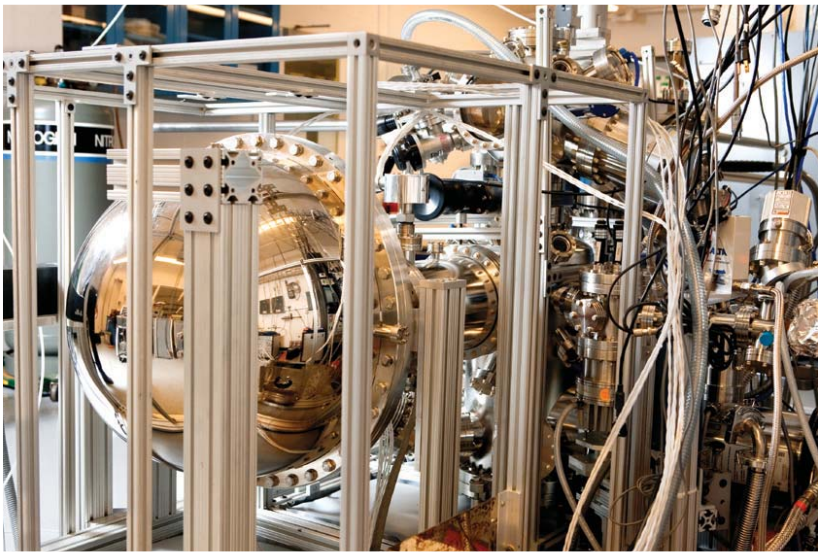
Cornell offered Davis a tenured professorship and a state-of-the-art laboratory. And it offered Selby a permanent, full-time position as lecturer in physics – an important part of the package that cemented the couple's decision to come to Ithaca (see story, page 7).

Setting up a new lab for a brand-new assistant professor in almost any experimental science can run to at least $1 million, Sievers notes. Setting up a tenured professor typically costs at least twice as much, and Davis probably pushed that well beyond the upper limit. But Davis brought with him an armload of federal research funding, and since then has brought in new grants totaling much more than Cornell's initial setup costs.

He has also brought prestige. Since coming to Cornell, Davis has been awarded the Fritz London Memorial Prize, considered the highest award in the field of low-temperature physics, and the Heike Kamerlingh Onnes Prize for Superconductivity Experiments. In the spring of 2010 he was elected as one the youngest physicists in the National Academy of Sciences.

Davis now has two STMs in the basement of Clark Hall, and is building a third in the new Physical Sciences Building that will operate in the highest magnetic field available on any STM in the world. The instruments in Clark Hall were built with "overkill" insulation to protect against vibration from construction of the Physical Sciences Building next door. Now that construction is finished, Davis says, the instruments will be about 10 times more sensitive. He shares some of his time with Brookhaven National Laboratory on Long Island, where he is director of the Center for Emergent Superconductivity, a Department of Energy-supported collaboration among scientists at Brookhaven, Argonne National Laboratory and the University of Illinois at Urbana-Champaign.





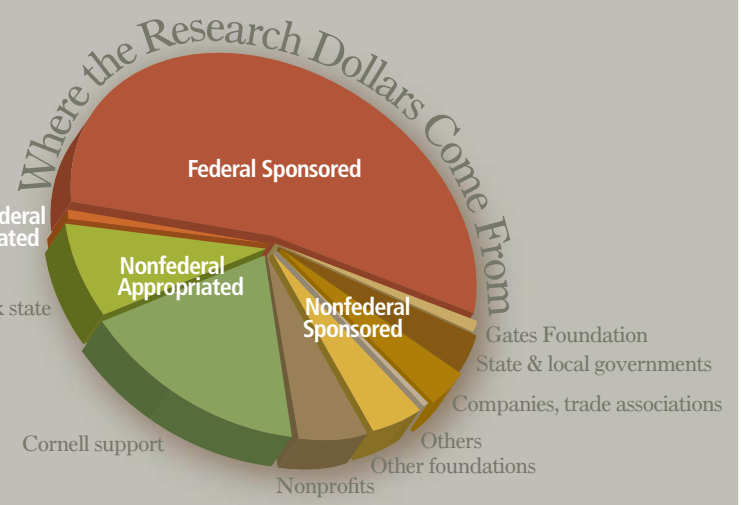
His work has enhanced Cornell's reputation as a center for research in the overall field of "condensed matter" – loosely, anything that isn't a gas, or matter in which atoms have some sort of relationship with one another. And that has attracted young physicists interested in the field, who in turn further enhance the power of the research engine and attract even more new faculty. Cornell's growing reputation in the field also attracts "fabulous graduate students," says Davis. "Because this is kind of a Mecca for this style of research, you get people already prepared – intellectually prepared and morally prepared, because it's very difficult work."

Among recent faculty hires are Kyle Shen, an experimentalist who studies the same complex materials as Davis with advanced X-ray diffraction and photo-emission spectrometry equipment, and Eun-Ah Kim, a theoretical physicist who tries to understand why these materials behave as they do and predict how their properties might be enhanced.

Davis and Shen are collaborating with materials scientist Schlom, who uses a process called molecular beam epitaxy – what he calls "atomic spray painting" – to build materials that never have and perhaps never could exist in nature, atom by atom. Schlom and Shen

Several views of a one-of-a-kind machine designed and built by Kyle Shen, assistant professor of physics (in reflection at left) and Darrell Schlom, professor of materials science and engineering, that combines molecular beam epitaxy, which builds materials by single-atom layers, with photoemission spectrometry to measure how electrons move through the material. To avoid disturbing the measurements, air is removed from the tough, inert stainless steel chamber by a vacuum pump resembling a jet engine until only one of every 100 trillion atoms of gas is left.

Funding Research at Cornell

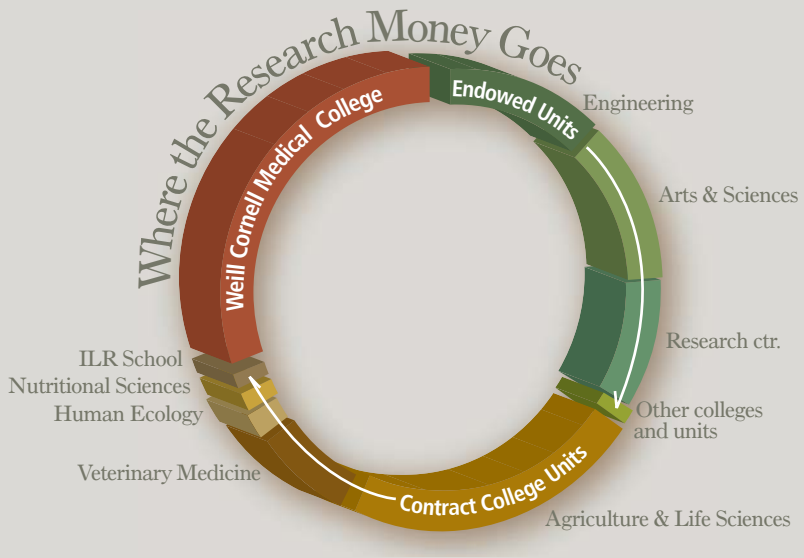


$687.4 million (fiscal year ended June 30, 2009)

***Federal Sources (%)**	
Sponsored Research	54.6
**Appropriated Research	1.2
Nonfederal Sources (%)	
Sponsored Research	6.1 4.6 4.0 3.8 0.7 0.1
Appropriated Research	17.2 7.9

**Federal Funding Sources: Department of Health, Human Services; National Science Foundation; Department of Defense; Department of Agriculture; NASA; Department of Energy; Agency for International Development; others*

***Appropriated by federal agency and not competitive (e.g., USDA Hatch Funds)*



Ithaca (%)	
Contract College Units	0.9 1.4 2.1 7.4 23.8
Endowed Units	0.2 9.6 12.1 12.4
Weill Cornell Medical College (%)	30.2

designed and built a machine that combines molecular beam epitaxy and photo-emission spectrometry to create new materials and study them while they still have an uncontaminated "pristine atomic surface." By bouncing radiation off that surface Shen can see how and where conduction electrons move through the material. "They definitely are the first people in the world to have such a machine," Davis reports.

> [At Cornell] we found a place that was one of the world's leading physics departments and was not in an urban environment.'
>
> – Séamus Davis

Kim was responsible for a recent breakthrough in superconductivity research, discovering a "broken symmetry" in the arrangement of electrons around oxygen atoms in cuprates, which opens another door to the design of better superconductors.

But superconductivity may be only the tip of the iceberg at the frontier of condensed matter physics, Davis says. "There's a false perception that we understand all solids," he explains, "because the ones we use in our engineering are things like silicon and aluminum and gold that have been understood since the 1930s." Now researchers are able to make much more complex materials by combining many elements – but, Davis says, theory and experimental technique haven't kept up. "If we just knew what we were doing, even vaguely, we could probably invent whole families of new materials with useful and dramatically different properties," he says. Shen, for example, is working on materials with unusual magnetic properties that could lead to faster, higher-capacity computer data storage.

Davis collaborates with researchers in several other countries where there is often more government funding for basic research. "The traditional sources of research funding from the [U.S.] federal government for physical sciences have effectively been diminishing for 20 years," he says. "It's absolutely critical that the funding private universities can get be preserved and amplified, because it plays a critical role in how frontier science works."

But his pleasure in being at Cornell is not just the search for practical applications and the advancement of knowledge. "Of course the thing the university really produces is people," he says. "All this investment isn't just going into bricks and mortar; it's going into training these young people and then they go off and pursue their own ambitious careers of discovery and contribution to society." ✦

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