# HARBOR TRANSCRIPT

1890 125 2015

Cold Spring Harbor Laboratory

# 125 YEARS

## DISCOVERIES THAT MAKE A DIFFERENCE

**Past ◂ Present ▸ Future**

VOLUME 35 · SPECIAL ISSUE · 2015

Cold Spring Harbor Laboratory

## PRESIDENT'S MESSAGE

I invite you to join the celebration of Cold Spring Harbor Laboratory's quasquicentennial! Founded in 1890, the Lab has been at the forefront of biology and genetics research and education ever since. Over its 125 years, CSHL has been an institution of real consequence, whose impacts can be measured globally.

Discoveries made here have changed the world. Molecular genetics was incubated and has thrived here. Courses on new technologies and methods offered on this campus have launched several generations of investigators on new paths. Our famous Meetings and Banbury programs have provided venues for researchers to exchange results and freely discuss science's impact on society. Diverse publications of the CSHL Press advance and spread scientific knowledge. Our innovative DNA Learning Center has prepared hundreds of thousands of local young people for life in the genome age, and millions more worldwide via its Internet reach.

As we celebrate these successes and look to the future, I want to thank the thousands of CSHL faculty, employees and students who over these many years have made the institution unique.

Science doesn't just happen. People make the discoveries. People develop the enabling technologies. It is people who teach and train. Indeed, it is people who define institutions. CSHL's culture—an unbending commitment to excellence in a non-hierarchical, informal setting—has been a priceless intangible asset. In this special anniversary edition of the *Harbor Transcript*, we invite you to learn more about our history, our culture and our future.

Strong foundations have been laid over our first 125 years that augur continued strength and success. We do not rest on our laurels. In this anniversary year, I challenge everyone in our community to think about the future and what we must do to ensure that CSHL continues to thrive.

I issue the challenge not just to our faculty, employees and students but also to our larger community of supporters. CSHL would not have had the success it has enjoyed without your participation. Let us further nurture the spirit of collaboration, partnership and friendship that will guide science productively forward.

Bruce Stillman

**Harbor Transcript**

**Volume 35, Special Issue, 2015**

*Harbor Transcript* is published by the Department of Public Affairs of Cold Spring Harbor Laboratory.

**Public Affairs**
One Bungtown Road
Cold Spring Harbor, NY 11724

516.367.8455
publicaffairs@cshl.edu

**www.cshl.edu**

**V.P. Communications:**
Dagnia Zeidlickis
**Managing Editor:**
Phil Renna
**Science Writers:**
Jaclyn Jansen
Peter Tarr
**Design & Layout:**
Margot Bennett
**Photography:**
Gina Motisi:
front cover, 15;
Charles Camarda:
inside front cover;
Constance Brukin:
1, 2–3, 4, 17;
Courtesy CSHL Archives:
8–9, 10–13;
Peter Tarr: 1
Philip Renna: 5, 14;
Courtesy CSHL Press: 7;
Margot Bennett: 13;
Courtesy Josh Huang: 15;
Michael Englert: 16
**Illustration:**
Jaclyn Jansen: 5, 6;
Blue State Digital:
back cover

# HARBOR TRANSCRIPT

Volume 35 · Special Issue · 2015

FEATURES




The scientific staff gathers at periodic "in-house" scientific meetings, one example of the Lab's culture of sharing and collaboration.

Visit www.cshl.edu to sign up for our monthly email newsletter.



**On the cover and on the web:**
To celebrate CSHL's 125th Anniversary, join us online and in person for experiences that travel the past, present and future of one of the world's leading private, not-for-profit biological research and education institutions. The front and back covers of this magazine highlight one of these experiences—an interactive digital timeline about the impact of CSHL basic research discoveries on society. Using multimedia, the stories on the pages of this magazine come to life on your digital devices. Visit the campus throughout the year for special events and engage with on Facebook and Twitter! **www.cshl.edu/125** **#CSHL125**

# A Lab like no other

"We are willing to take risks on young scientists"
Chief Operating Officer

"Every person and every discovery matters"
Nobel laureate

"I help make discoveries"
Senior Mechanic, Facilities

"All are family here"
Blackford Bar Barista

On any summer afternoon, you can expect to find Blackford lawn teeming with people. The familiar sight offers a glimpse into the soul of an institution that has stood at the center of Biology for 125 years. Laboratory grounds crew and facilities staff intermingle with graduate students and Nobel prize-winning scientists from around the globe. Snippets of conversations can be heard as you walk across the grass, but to a visitor, it would be hard to know if the speaker is president of the Lab or an editor at the CSHL Press. The Lab has a unique culture of equality that pervades every facet of campus life. It is characterized by youthfulness and energy, and infused with a deep sense of history and purpose.

The Lab stands "at the crossroads of Biology," a place for researchers from around the world to meet and discuss their latest results and share excitement about developments in their fields. Over the decades, casual interactions—over coffee or a beer, or on the volleyball courts, or at a picnic on the beach—have led to unexpected and

Informality not only spurs scientific collaboration, it also breeds fun. At any moment, there are usually a half-dozen employee bands regularly playing gigs on campus or at local pubs.

even historic scientific collaborations. It is a culture that has emerged not accidentally but as a result of shared values placed on passion, excellence, competitiveness and equality.

## "A buzz"

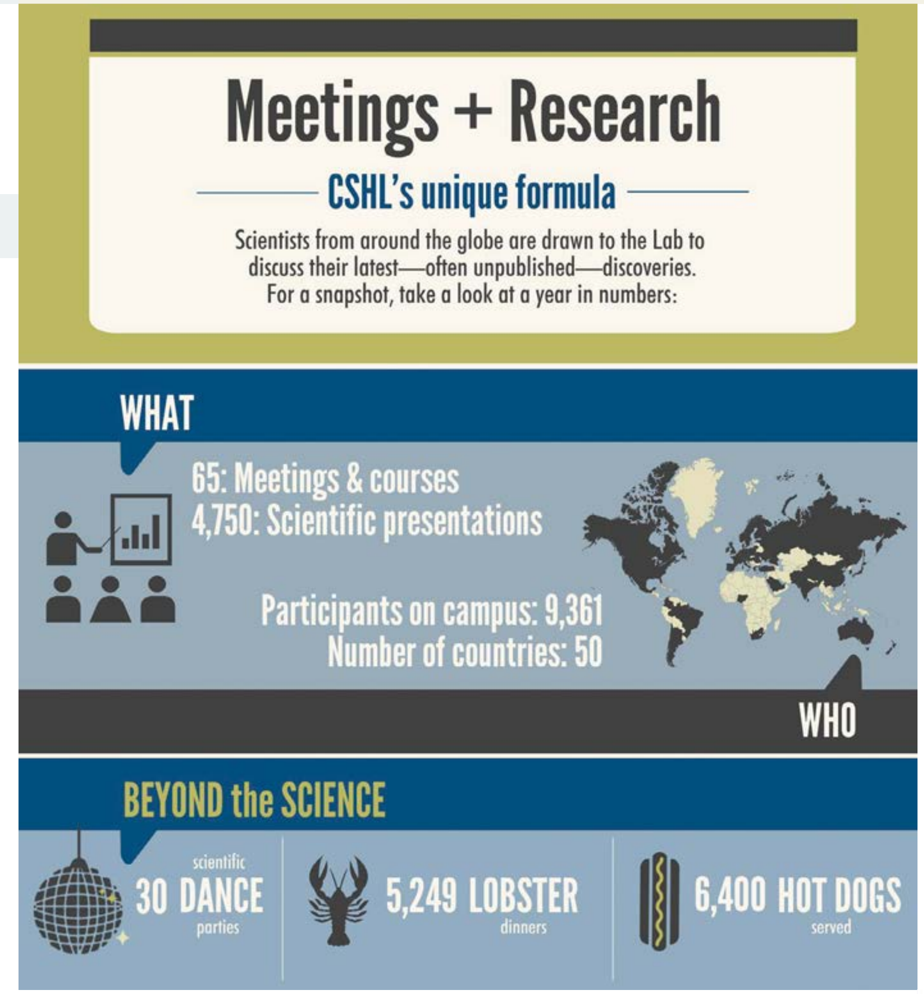
For longtime CSHL Director Jim Watson (now Chancellor Emeritus), two keys to success in science are open discussion and collaboration. So he kept the Lab free of the formal departments that divide up the efforts of scientists at nearly all other academic institutions. The absence of departmental silos has paid dividends in fostering interaction.

"There is an energy here, a buzz, that I've never felt anywhere else. The Lab is one of the most interactive places in the world," says CSHL Director of Research David L. Spector. It affects the way people do science. It brings researchers together from different areas: neuroscientists and plant scientists sharing equipment, geneticists and quantitative biologists collaborating on projects that might never have existed but for a chance conversation. "We have some of the most unexpected scientific pairings, which provide an opening for transformative science," says Spector.

Chris Hammell, an assistant professor, studies developmental timing in the model organism *C. elegans*. One might wonder what this tiny roundworm has to offer those who study human neuropsychiatric disorders. Yet Hammell has recently entered into a productive collaboration with Professor Dick McCombie to identify some of the genes involved in schizophrenia.

"We were sitting at dinner and Dick was talking about how his genomic studies have generated a long list of candidate genes that may be responsible for mental disorders like schizophrenia," Hammell recalls. But testing each gene to see if it affected neuronal function was a hurdle. "It was suddenly obvious—Dick and I realized we could use worms to screen these gene candidates to see if they affect neural function in the worm." For McCombie, the advantages are clear. "To test each gene in mice would take years and the cost would be tremendous. We can do this in worms in about two weeks at the cost of less than $10 per gene."

Cooperation extends not only laterally, across specialties, but vertically, among researchers just starting out and more experienced colleagues. When Carol Greider (now on the faculty at Johns Hopkins) came to Cold Spring Harbor Laboratory in 1988, she was professionally young—"little" in her own words. She came here as a Fellow, a kind of junior faculty position that bypasses the traditional postdoctoral training period. No one knew that in 21 years Greider would win a Nobel Prize. And yet, "everybody at the Lab wanted to help me out. We were all equals, working toward the same goal: making discoveries that would change the face of science."




## "We are all Cold Spring Harbor Laboratory"

The highly interactive and collaborative nature of the Lab stems from a deep sense of community, which is shared as much by support personnel as scientists. "We are all a team," says Glen DiMaria, Senior HVAC Mechanic in CSHL Facilities. "I am a part of it all. I help make discoveries happen." These thoughts resonate throughout the Lab. As CSHL President and CEO Bruce Stillman points out, "We are all here for the same reason. We are *all* Cold Spring Harbor Laboratory."

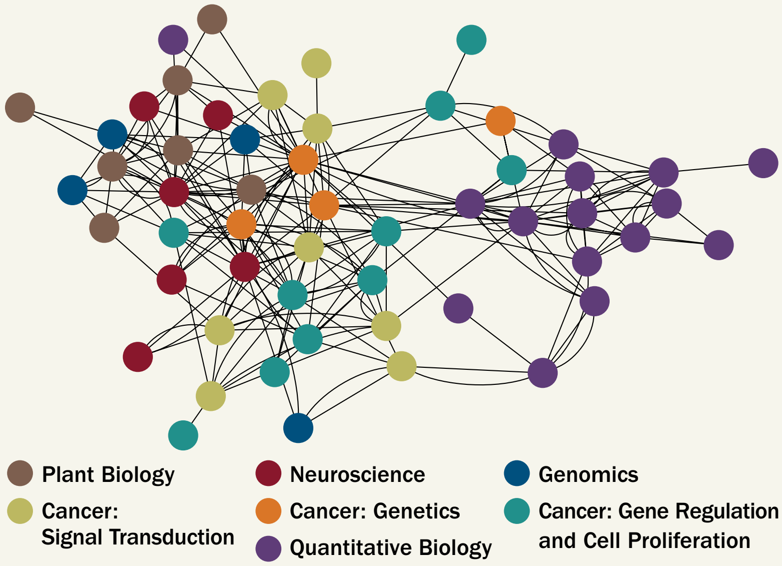
It is a feeling that affects the way people work. Postdocs and graduate students in labs everywhere will routinely spend the evening at lab benches. Less common is something seen often at CSHL: the willingness of technicians and other staff to stay and work alongside them. "My day at CSHL doesn't end at 5 o'clock," DiMaria says, speaking for many others. The camaraderie that has developed takes tangible form in the many musical bands organized spontaneously over the years. DiMaria's current band consists of a professor, a graduate student, a lab technician, and a member of the grounds crew.

The annual volleyball tournament is another example of how shared work brings together people from every part of the Lab. Here, competition is expressed in a "sporting"

Teams competing in the annual volleyball leagues mix and match over 100 people from all corners of the Lab. The team in action here includes Professor Adrian Krainer, Karen Orzel from Development and Jessica Toner from Human Resources.

## Connecting the dots

Collaboration within and across fields is a hallmark of CSHL scientific culture. Inspired by neuroscientists working to build a "connectome" of the brain, we came up with a map showing the connections between CSHL faculty. Each dot represents a principal investigator, and each line between them an active project. We see a complex web of interrelationships—and how frequently scientists from different disciplines work together.




passion to crush one's opponents and be crowned victors for the year. These are bragging rights that Carol Greider says she and her team, the Beta Blockers, still remember more than 20 years after their victory.

The Lab's central hub of activity is undoubtedly Blackford Hall. Beneath the dining hall you can find the Blackford Bar, a coffee shop and lunch destination by day and a pub by night. Look around the room and you will see a microcosm of the CSHL world. Postdocs mingle with the Development team, while members of one of the campus bands discuss their latest set. Professors talk about upcoming collaborations and graduate students fret about their career paths.

### At the center

The bar isn't just for CSHL employees. It is also a gathering place for the Lab's many scientific visitors. Each year more than 10,000 scientists from around the world converge on CSHL to participate in the Meetings & Courses Program. "The Lab is unique for its singular focus on Biology, from all perspectives," says David Stewart, Executive Director of Meetings & Courses. "Nowhere else in the world do you find first-rate research alongside meetings, education, and publishing. This multifaceted approach keeps CSHL in the hearts and minds of scientists around the world."

The constant multinational, multiethnic influx and exchange of people infuses the Lab with a vibrant and infectious energy. When someone arrives for a course, they often work harder than they do "back home," committed to learning a sophisticated new technology in a compressed period of a few days or weeks. Nine CSHL Course students have gone on to win Nobel Prizes. In 1995 Rod MacKinnon, then a Harvard professor, came for the X-ray crystallography course. Three years later, he solved his Nobel Prize-winning structure using the techniques he learned.

Like everything else at CSHL, scientific meetings have a distinctly informal atmosphere. Young biologists come not just to learn, but also to meet and socialize with others in their field. Their elders attend because of the strong sense of community built around the Meetings. "It is a sense of responsibility, a desire to support the next generation of science—simply by listening to talks and engaging at poster sessions," says John Inglis, Executive Director of the CSHL Press.

### Delbrück's example

CSHL is a self-consciously historic place. Both junior and veteran faculty appreciate the community they have joined. "This is a place where 'good' has never been good enough," says Inglis. "We know that we are all inheritors of a grand tradition, one that we wish to carry on."

Where did this unique culture come from? Many say it originated with Jim Watson, but he is always quick to defer. "Everything came from Max Delbrück," he insists. "Stuffiness or protocol had no place in his life. He never was 'Professor Delbrück' or 'Dr. Delbrück.' We wanted a culture of equality. Informality gave us all the chance to do our best, and to dream that later we might find out the ultimate of answers."

To Watson, it was simple: "You didn't have to be a faculty member to have a great idea." Thus the Laboratory has never had a tenure system for faculty, has had little hierarchy, and very little bureaucracy. Says veteran CSHL Board Member Ed Travaglianti, "Here at the Lab, brilliant people have had a chance to do their work in an unfettered way. The administration is willing to take risks, to support new ideas. This is how great science gets done."

**Jaclyn Jansen**

# How we became who we are

"History," says Julian Barnes' narrator in *The Sense of An Ending*, "is the certainty produced at the point where the imperfections of memory meet the inadequacies of documentation." We can smile at the acid comment but where institutional histories are concerned, it's too often appropriate. So when a book-length history of Cold Spring Harbor Laboratory was first proposed, the question we asked at CSHL Press was "Can it be done well?"

You can judge for yourself when you read *Prevail Through Knowledge: A History of Cold Spring Harbor Laboratory*. Written by historian Jan Witkowski, Executive Director of the Laboratory's Banbury Center, it's a compact, accessible book that will appeal to friends and neighbors of the Laboratory and anyone interested in the development of biomedical science and biotechnology.

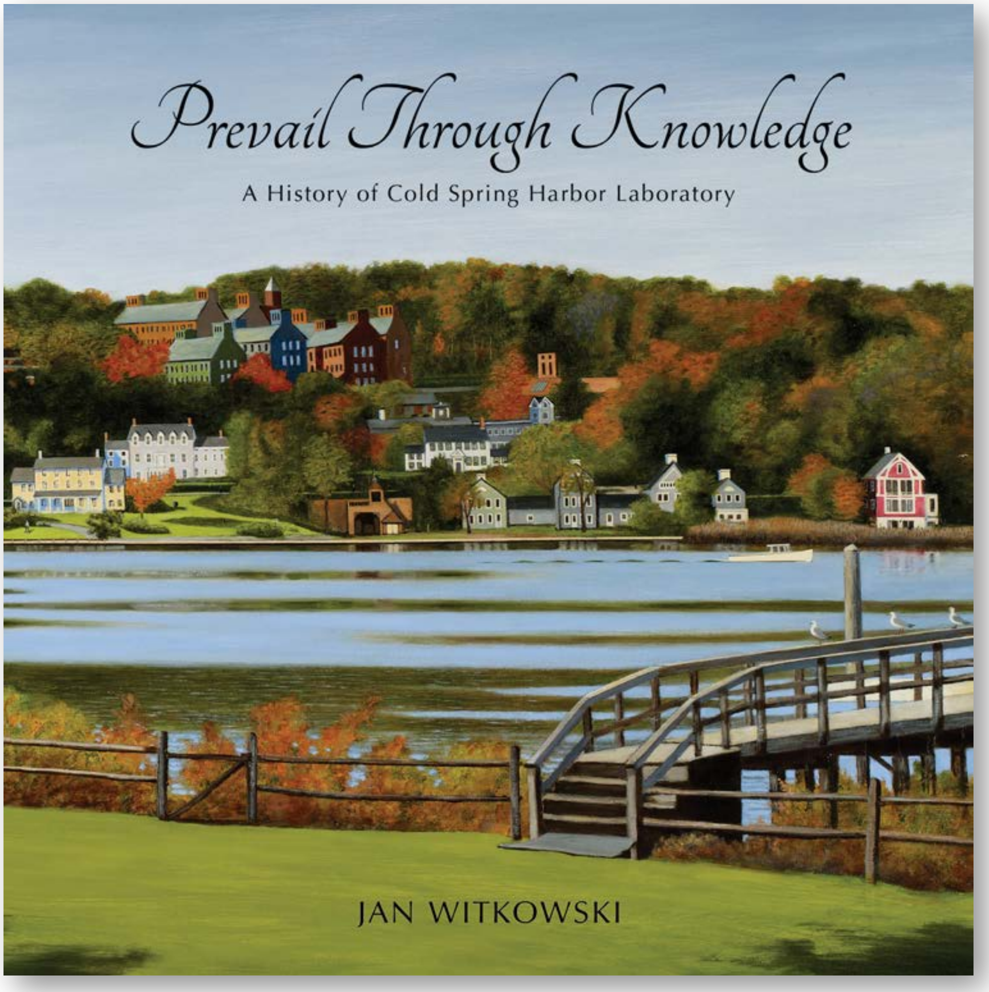
At Cold Spring Harbor, two interdependent research centers born in the light of Darwin's ideas grew into a single institution that would cradle another revolution, the new science of molecular biology, and go on to world renown in research and professional education. The path was neither simple nor assured. For the first half-century, there were changes in name, leadership, governance, and financial fortune. And scientific missteps, most notoriously in eugenics, triumphed by innovative work in genetics, human metabolism, and cancer.

Appointed Director in 1968, James Watson would inspire, cajole, and goad the Lab into new research directions and initiatives in conferences, courses, publishing, and education. Bruce Stillman's leadership has expanded that scope still more. The Laboratory is unique among research institutions worldwide—envied, imitated, but not reproduced.

*Prevail Through Knowledge* is a story of remarkable people, outstanding achievements, and occasionally dramatic events, illuminated by vignettes of individual scientists and material from the CSHL Archives. It draws on an unpublished manuscript by distinguished scientist and educator Bentley Glass, a long-time Trustee. His memoir is of research and symposia through the '60s but also the personal, the idyllic summers in which visiting scientists debated ideas while their inquisitive children roamed the grounds and once turned off the entire institution's water supply.

Jan Witkowski's knowledge of his subject is wide, his affection for it deep, and his perspective is enriched by a decades-long career on the staff. Anyone who has walked on the Laboratory's gorgeous campus—or browsed its website—and wondered how it became what it is today will find answers in the entertaining pages of *Prevail Through Knowledge*.

**John Inglis**




Price $20. ISBN: 978-1-621821-08-3. Published April 2015 in print and online at cshlhistory.org

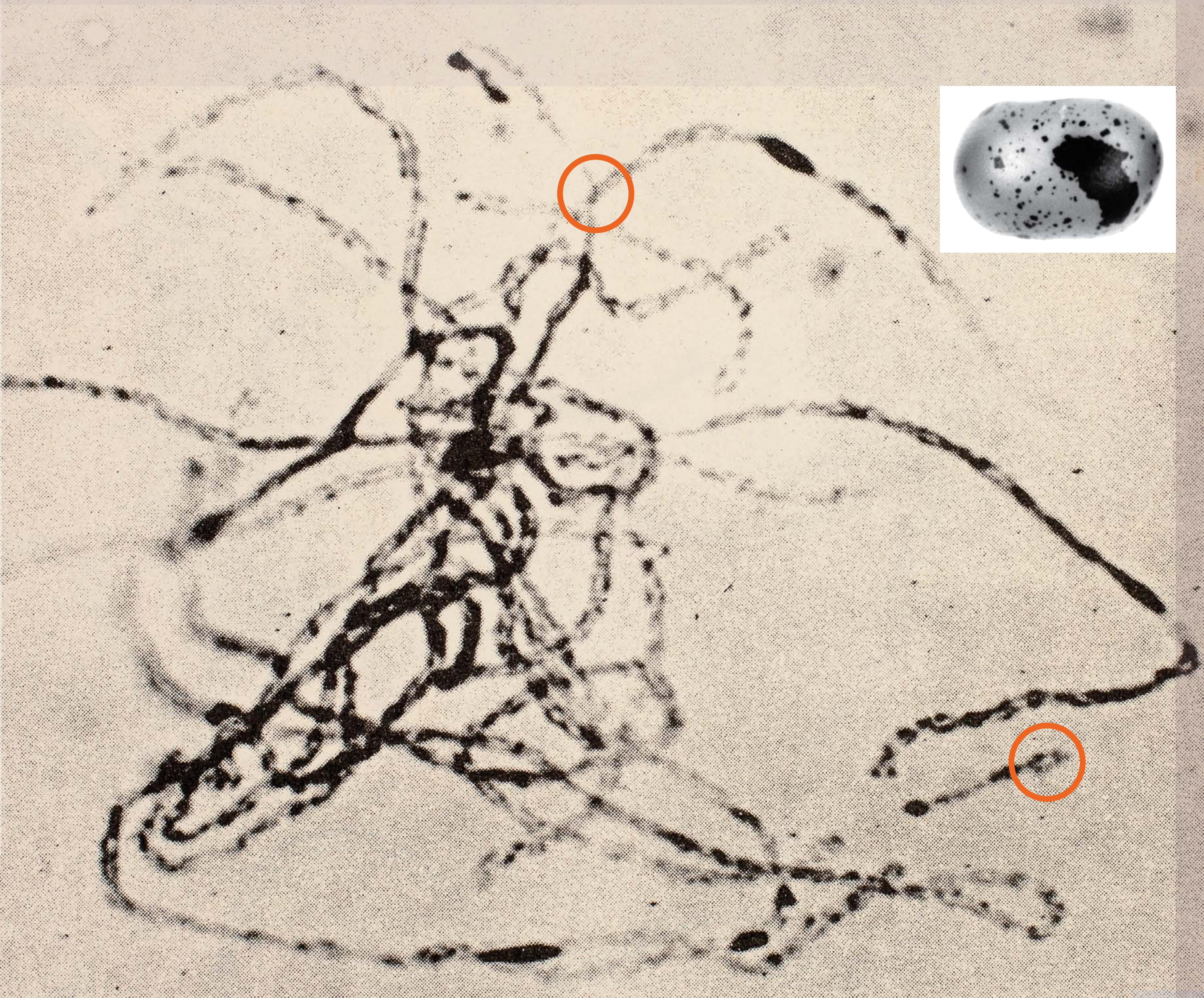
# One experiment

One of the first things Milislav Demerec did in 1941, after being appointed Director of the Department of Genetics at Cold Spring Harbor, was to hire a young geneticist named Barbara McClintock. It was an inspired choice. She spent the rest of her long career at the Laboratory and won a Nobel Prize in 1983—for work she had published decades before.

This image is one of an historic series made by McClintock. Published in 1951, it represents over a decade of research focused on broken chromosomes. The circles (○) indicate places where these chromosomes of a maize plant are broken—areas of damage that McClintock linked to two phenomena with which her name will forever be associated. She showed that chromosomes can break as cells divide to form eggs and sperm. These breaks allow genetic material to "cross over" from one chromosome copy (chromatid) to another, creating variation in offspring. Later she showed that chromosomal breakage sometimes signals the transposition of genetic material within and across chromosomes. Scientists call these transposable genetic bits "transposons," in popular culture, they've been dubbed "jumping genes."

Prior to McClintock, the dogma was that chromosomes—and genes—were fixed in place. By closely observing the results of genetic crosses in corn plants, McClintock was able to prove that bits of chromosomes could hop around, sometimes landing in places where they rendered genes inoperative—for example, in genes that gave corn kernels their color. In the inset (upper right) we see an oddly spotted corn kernel, the result of a "color" gene being interrupted by an invading transposon. McClintock earned her Nobel by pointing out that transposition of genetic material is an instrument of evolution. Mutations caused by jumping genes can confer a survival advantage—or wreak havoc, capable of giving rise to cancer and other serious illnesses.

**Peter Tarr**

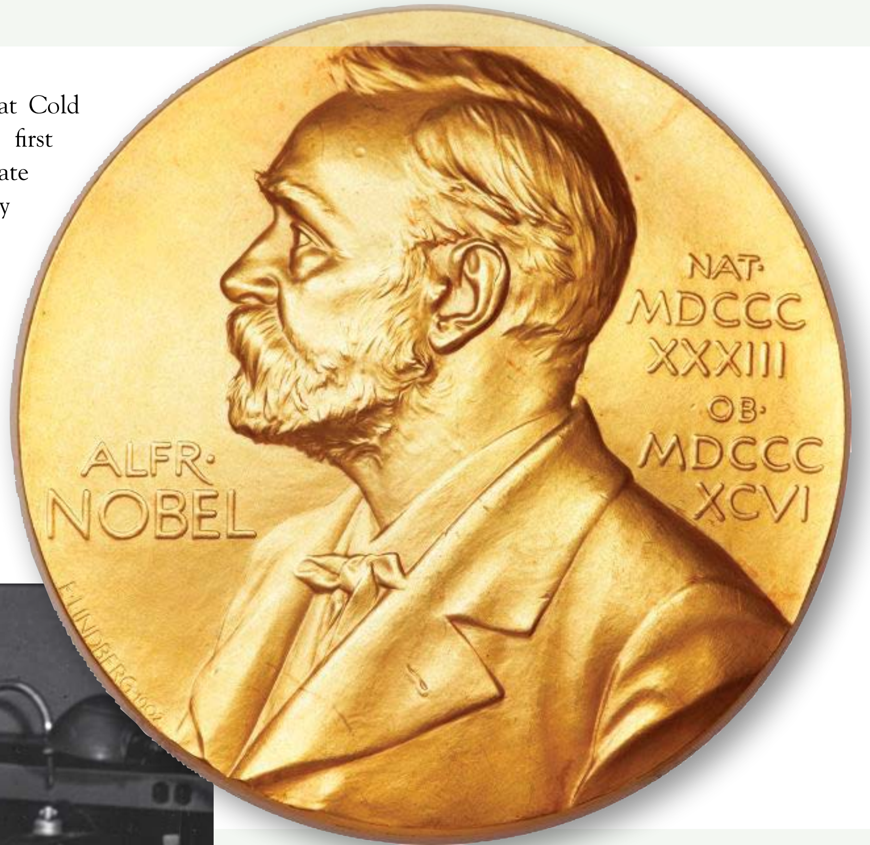


# Jewels in the crown

## CSHL's 8 Nobel laureates

Eight scientists who have worked at Cold Spring Harbor Laboratory over its first 125 years have earned the ultimate honor, the Nobel Prize for Physiology or Medicine. Some have been full-time faculty members; others came to the Lab to do summer research or a postdoctoral fellowship. Two, who performed experiments at the Lab as part of the historic Phage Group, later served as Directors.

**Peter Tarr**

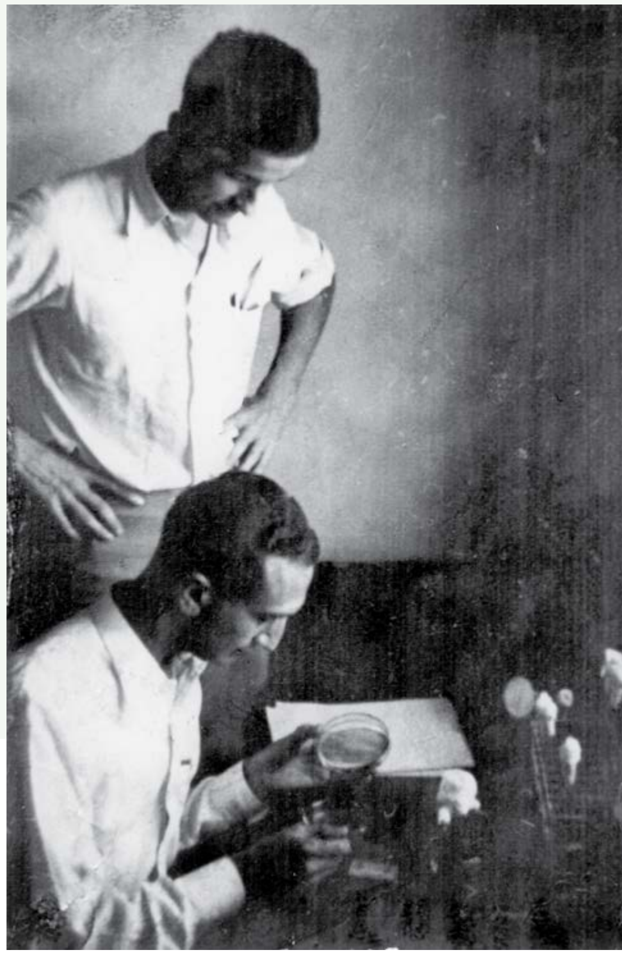



### Barbara McClintock

Today we know that "jumping genes"—transposable elements (TEs)—are littered everywhere, like so much wreckage, in the chromosomes of every organism. These bits of DNA, which occupy more than half the human genome, have the potential to jump around, wreaking havoc on our genetic information. Despite their importance, most scientists were highly skeptical of their existence—even after Barbara McClintock first found them in the maize genome during the 1940s. It wasn't until TEs were seen in bacteria in the 1960s and in other living things that the community became convinced. In 1983 McClintock, one of modern science's great loners, received the Nobel Prize she so richly deserved. The world finally had caught up with her insights, recognition she appreciated but had never craved. McClintock was an active member of the CSHL community for the rest of her life.

### Max Delbrück and Salvador Luria

Beginning in 1941, two scientists, both refugees of European fascism, began spending their summers doing research at Cold Spring Harbor. In this idyllic setting, the pair—who had full-time appointments elsewhere—explored the deep mystery of genetics by exploiting the simplicity of tiny viruses called bacteriophages, or phages, which infect bacteria. Max Delbrück and Salvador Luria, original protagonists in what came to be called the Phage Group, were at the center of a movement whose members made seminal discoveries that launched the revolutionary field of molecular genetics. Their distinctive math- and physics-oriented approach to biology, partly a reflection of Delbrück's physics training, was propagated far and wide via the famous Phage Course that Delbrück first taught in 1945. The famous Luria-Delbrück experiment of 1943 showed that genetic mutations occur randomly in bacteria, not necessarily in response to selection. The pair also showed that resistance was a heritable trait in the tiny organisms. Delbrück and Luria, along with Alfred Hershey, were awarded a Nobel Prize in 1969 "for their discoveries concerning the replication mechanism and the genetic structure of viruses."



### Alfred Hershey

Alfred Hershey first came to Cold Spring Harbor to participate in Phage Group experiments in 1943, and set down permanent roots in 1950, rising to the position of Director of the Genetics Research Unit in 1962. Hershey's early experiments were historic. Working with Martha Chase, he began a study of the components of phage particles and their contributions to the process by which phage propagate. The famous Hershey-Chase experiment—also known as "the Waring blender experiment"—used that humble kitchen appliance to shear phage proteins from the surface of infected bacterial cells. Phage DNA remained associated with the bacteria—it had been 'injected' by the virus into the interior of the cells, where it programmed the development of phage progeny. DNA, not protein, was the stuff of heredity. Hershey, the taciturn but thoughtful "scientist's scientist," was remembered by colleagues to make an outsized impression on those relatively infrequent occasions when he chose to speak, his words working like "a searchlight being trained on a dark landscape." Hershey shared the 1969 Nobel Prize with Phage Group co-founders Delbrück and Luria for their combined contributions to viral genetics.

## James Watson

It was love at first sight for 20-year-old James Watson, a Chicagoan making his first trip to Cold Spring Harbor Laboratory in 1948. He had come on the advice of his mentor at Indiana University, Salvador Luria. The latter had discovered the summer charms of the North Shore at the start of the decade, and now he wanted Watson to take part in the Phage Group that he had co-founded. The ensuing history has been oft told, but one part bears repeating: Watson, at the ripe age of 25, returned to the campus for the 1953 Cold Spring Harbor Symposium. At Delbrück's insistence, he made the final presentation, reporting a discovery that he and Francis Crick had made in Cambridge, England, only three months before. It was the public's first look at a shape that would become an icon of global culture, the gorgeous paired helices that carry our hereditary information. As Francis Crick boasted on the day of discovery in 1953, "We have found the secret of life!" It was a fact commemorated by the Nobel Prize awarded to Watson and Crick in 1962. Watson's "second act" commenced in 1968, when, following publication of *The Double Helix*, he became Director at CSHL and set about transforming the fortunes of an institutional gem then suffering from a lack of funding.

## Richard Roberts and Phillip Sharp

In 1972, James Watson invited Richard Roberts, a young biochemist, to Cold Spring Harbor for an interview. Roberts found himself a new member of the Laboratory after a chat that lasted all of 10 minutes, and during which he remembers having said little. After setting up his lab, Roberts became interested in a so-called restriction enzyme, Endonuclease R, that could cleave DNA at specific sites. Before long, Roberts and his team had discovered or characterized three-fourths of the world's first restriction enzymes, which did much to advance both basic research and the nascent biotechnology industry. Next, Roberts turned his attention to the genetic material of a cold virus, Adenovirus-2, which he sought to map.

Here, Roberts' story intertwines with that of Phillip Sharp, who was also interested in the DNA of this simple virus. After completing postdoctoral research at Cal Tech, Sharp was invited by James Watson to continue his work at CSHL. Sharp hoped to use restriction enzymes to fragment the adenovirus genome into tractable units. He and Roberts were on parallel tracks that led to the same discovery—of "split genes," in 1977, for which they shared a Nobel Prize in 1993. Independently, these two scientists upended the long-held view that individual genes were continuous segments of DNA. Roberts at CSHL, and Sharp, at the time of his discovery at MIT, demonstrated that single genes along the adenovirus DNA molecule were discontinuous, separated by DNA segments that were not involved in encoding protein. This discovery led to the prediction that genes are edited after they are transcribed from DNA. It also led to the insight that errors in the editing process can give rise to faulty proteins, which in turn can cause serious diseases.


## Carol Greider

In 1987, a small audience that included James Watson and Bruce Stillman gathered in James Library to hear Carol Greider give a talk. Soon after she was hired as the first CSHL Fellow. Three years before, Greider and her mentor at UC Berkeley, Elizabeth Blackburn, had discovered an important enzyme called telomerase that had a role in protecting the ends of chromosomes. At CSHL, Greider continued her work on the enzyme and soon had a major success. "I was excited and told my friends in the building... [but] I was very surprised to hear later at lunch in Blackford Hall that many other people knew of the result. A few hours later Bruce Stillman stopped me... to say he heard I got a great result. News traveled fast at CSH and people really cared about what other people were doing." Stillman encouraged Greider to propose a mechanism to explain how the repeated DNA segments that "cap" chromosomes—called telomeres—are made. The paper she produced, "drawn crudely on a Macintosh SE, has stood the test of time," she has recalled. It's part of the body of work for which she, Blackburn and Jack Szostak were recognized in the 2009 Nobel Prize. Their work demonstrated how telomerase provides the repeated DNA sequence that caps copied chromosomes, explaining why chromosomes don't get shorter every time they are copied. This has implications in aging and cancer, and also, potentially, in a host of other human illnesses.

# Charting a course for the future


President Stillman and COO Ayres with scientific staff at the 2014 In-House meeting.

*With a strong 125-year tailwind, Cold Spring Harbor Laboratory looks to the future. What does that future look like? CSHL President & CEO Dr. Bruce Stillman and Chief Operating Officer W. Dillaway Ayres have a view of the Lab's research and education mission that is simple, consistent, and clear.*

## Basic research at the core

"One of the things I'm proudest about," says President Stillman, "is that over its 125-year history the Laboratory has been at the forefront of *basic* science." His view is echoed by all who are steeped in the Laboratory's history of achievement. The focal point of their pride, in Stillman's words, is that the "understanding of fundamental biology" produced by the Lab "has had a broad and highly beneficial impact." Excellence in basic research consistently has paid off, in marvelous and unpredictable ways. [See box, "Where our research is headed…"]

It is true, Stillman acknowledges, that "increasingly, public funding is being devoted to what is called translational, or applied, science." And, he is quick to add, "we are increasingly applying some of the basic discoveries we have made, for instance in cancer research, to the world of the clinic and the patient." This is also true in plant science, where CSHL discoveries in genetics are increasing the yield and range of vital food crops, while also pointing to novel means of generating future plant-based biofuels.

Basic research in neuroscience is just beginning to guide us to ideas for practical application. The Lab's deep investment in probing the neural basis of cognition will help explain the causes of devastating cognitive dysfunction in neurodevelopmental and neurodegenerative illnesses, from schizophrenia to autism to Alzheimer's. This new knowledge will inevitably bring to light novel targets for urgently needed new treatments.

That's the way basic science has worked from the Lab's earliest days. These are vital contributions, which Stillman wants to accentuate in the years ahead. Yet, even as greater attention is paid to clinical outreach and applications of basic research to medicines, agricultural products, and new forms of energy, the Laboratory's central mission is not translational and will not be in the future, Stillman stresses. "At the core, we must keep focusing on basic science, for that is where the big discoveries are going to come from." What Stillman, Ayres, and the CSHL Board of Trustees most highly value is "investigator-initiated science, where we give very capable scientists the resources to do what they want to do," Stillman says.

## More aggressive public education

Since its founding, CSHL has been chartered as an educational institution. "We take our education mission very seriously," declares Stillman. CSHL's education programs span from middle and high school up to teaching the world's scientists the latest technologies. CSHL has a very innovative graduate program that is now a model for the world, and its scientific conference program is a magnet for biologists near and wide.

Expanding the Laboratory's global educational reach is a priority for Stillman. He explains that "we would like to propagate the Cold Spring Harbor Laboratory culture and model of education throughout the world." This is happening through the DNA Learning Center. In partnerships with universities, high schools and governmental education agencies, we are teaching hands-on biology and genetics to children across the globe. Another example is the expansion of CSHL's scientific meetings program to Suzhou, China, where we are enabling a culture of young investigators to talk about their science in the way we have been doing it for so many years on our Cold Spring Harbor campus. By adapting continually to changes in communication and publishing technologies, meanwhile, the CSHL Press continues to enrich the global scientific community with books, lab manuals and highly rated journals that are the lifeblood of science education.

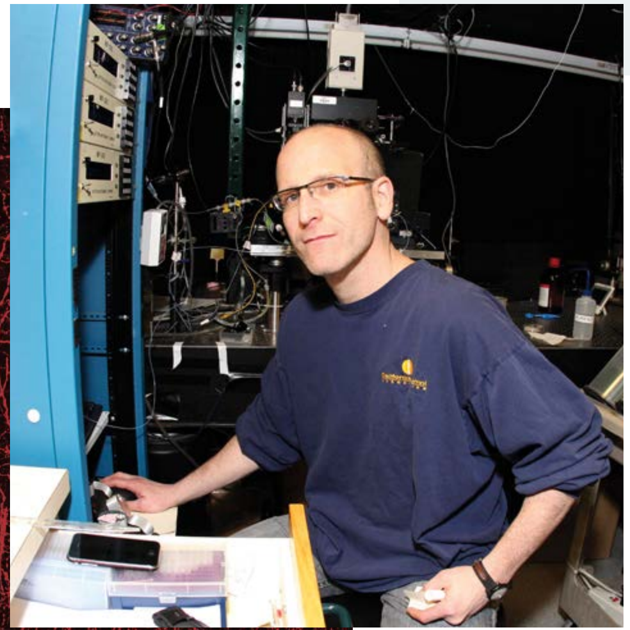
"As we translate our basic science into the clinic and into areas like food production, we're going to have to be much more aggressive about educating the general public so that they can make what I would call rational decisions about how to use the science," says Stillman. This is going to be especially important in topics such as the use of genetically modified plants for food production and to ensure that people understand the genetics of disease so that they can make informed decisions, with their doctors, about their own health. According to Stillman, "this requires sophisticated public education, and CSHL is at the forefront for the next century."

### "Where our research is headed…"

**"I'm very excited about something we're doing that was inconceivable just a few years ago. My lab is developing new technologies to figure out the wiring diagram of an entire mouse brain, quickly and cheaply. We're converting the problem of neural connectivity into a problem of DNA sequencing. I'm optimistic this will provide a foundation for really understanding what is going on in the brain when an animal is thinking…."**

**Anthony Zador**

***See more from Zador and other CSHL faculty in our multimedia feature at www.cshl125/futurevision***



## Operational strength from culture

The lab has more than doubled in size since COO Ayres came to CSHL 17 years ago, yet he has focused on making the Lab not just bigger but better. The future, for him, depends on preserving a laboratory culture that affords maximum latitude to principal investigators in pursuit of basic-research goals.

"I've always felt that our productivity is directly connected to our culture," he explains. "It's something that Jim Watson understood in 1968 when he left Harvard to lead the Lab. He deliberately established an environment conducive to doing great science." [See "A Lab like no other," p. 2]

## Expanding the educational mission

"Hands-on science is the way to go," says President Stillman. "I myself was not a great science student in high school, until I had the opportunity to do hands-on experiments. Then science became a natural thing for me. And I think we need to make that available to as many children and their parents as we can across the country. We will be doing that in New York City. We've had a great collaboration with the New York City Department of Education, which will be expanding. From a new DNALC facility in Manhattan, we will be teaching many more children in the City school system the DNALC way of doing science."

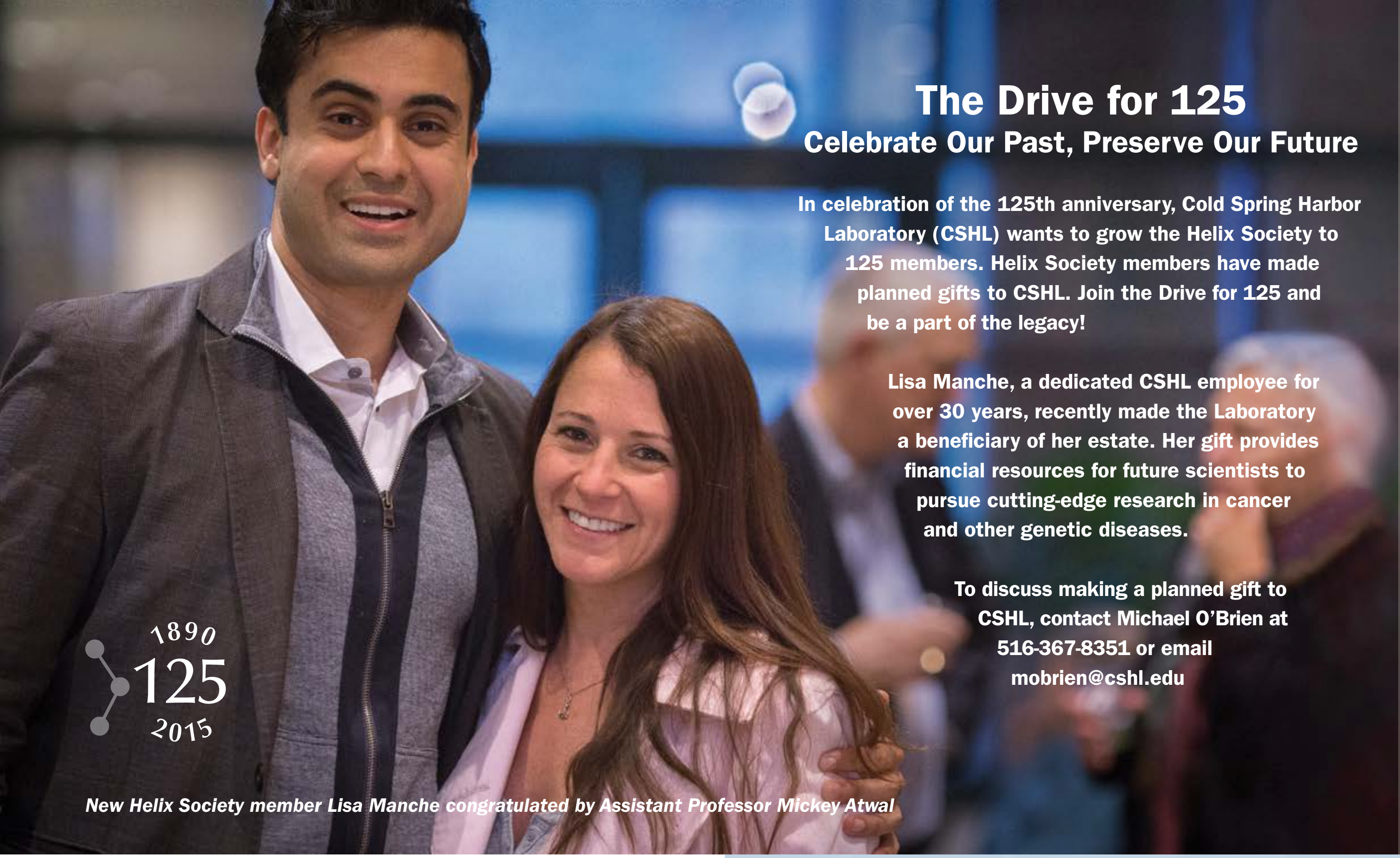
The Lab is distinctive and attractive, in Ayres' view, because of the value placed on intellectual rigor, collaboration and informality. He is therefore pleased that "the new, young class of investigators at CSHL are not only the best and brightest, but seem intuitively to 'get' the culture. They fit in, and this bodes well for our future."

The chief challenge for Ayres, Stillman and the Board, in Ayres' words, is how to sustain core values in a very difficult financial environment. "We are an independent research institute," he observes. "Many of our peer institutions are struggling financially, looking at mergers with major universities or hospital systems. What is important to us is that CSHL maintain its independence, maintain its excellence, and continue to be able to do what it has done well."

Looking to the future, Ayres dreams big. "When I go to bed at night I think about how I will sleep much better when our endowment, which is now about $430 million, reaches $1 billion." The Laboratory will have to depend increasingly on private funding. Not many years ago, over half the operating budget was funded by Federal grants. "The mix has shifted substantially. We are more and more dependent upon private philanthropy, and it is really what is going to make the difference. And not only at Cold Spring Harbor Laboratory. If America is going to continue to lead in the biological sciences and in basic research, it's going to require increased private support. That's inevitable."

Stillman agrees. "Institutions like CSHL, to remain at the forefront, need the resources and the endowment to support a substantial part of our science. This is a goal for the future. I think it is the future of our success—and, indeed, our survival."

**Peter Tarr**



# The Drive for 125

## Celebrate Our Past, Preserve Our Future

**In celebration of the 125th anniversary, Cold Spring Harbor Laboratory (CSHL) wants to grow the Helix Society to 125 members. Helix Society members have made planned gifts to CSHL. Join the Drive for 125 and be a part of the legacy!**

**Lisa Manche, a dedicated CSHL employee for over 30 years, recently made the Laboratory a beneficiary of her estate. Her gift provides financial resources for future scientists to pursue cutting-edge research in cancer and other genetic diseases.**

**To discuss making a planned gift to CSHL, contact Michael O'Brien at 516-367-8351 or email mobrien@cshl.edu**

1890 125 2015

***New Helix Society member Lisa Manche congratulated by Assistant Professor Mickey Atwal***



### CSHL Association

CSHL Association comprises some 1000 neighbors and friends of the Laboratory who contribute to the Annual Fund, an essential source of unrestricted support for outstanding young scientists. Association members get to know CSHL scientists at lectures, concerts, dinners and other social events that support the Laboratory. Membership levels start at $100 per year. For more information please contact Karen Orzel, Director, Annual Giving and Donor Relations, at 516.367.6886 or orzel@cshl.edu.

CSH Cold Spring Harbor Laboratory
Cold Spring Harbor, NY 11724

@ www.cshl.edu/125

# Explore. Participate. Connect. Support.


## Travel through time with CSHL!