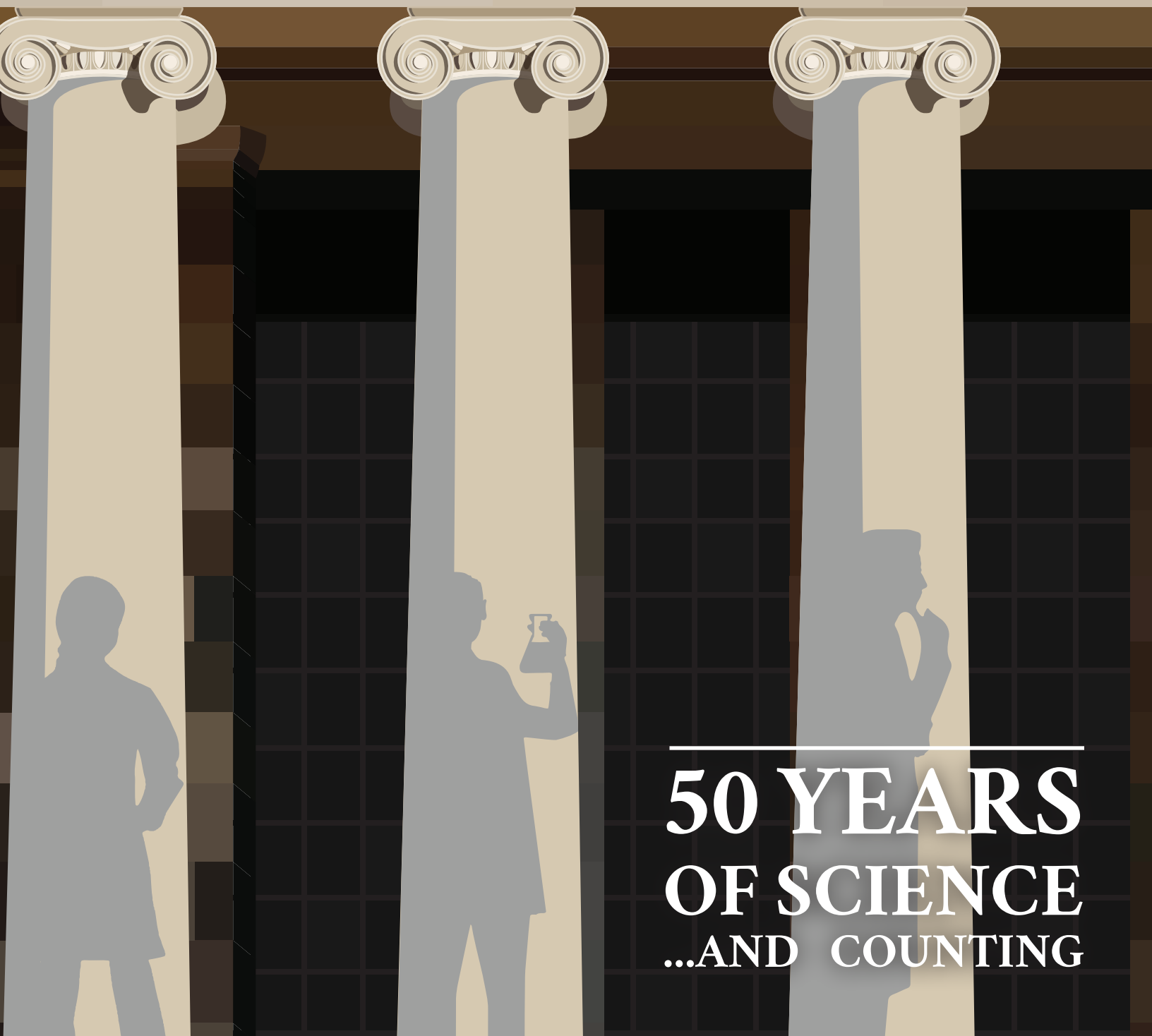
Mellon College of Science | Carnegie Mellon University

SCIENCE CONNECTION

Volume 10 | 2018

MELLON INSTITUTE



50 YEARS OF SCIENCE ...AND COUNTING

CONTENTS

SCIENCE CONNECTION

Mellon College of Science
Volume 10 | July 2018

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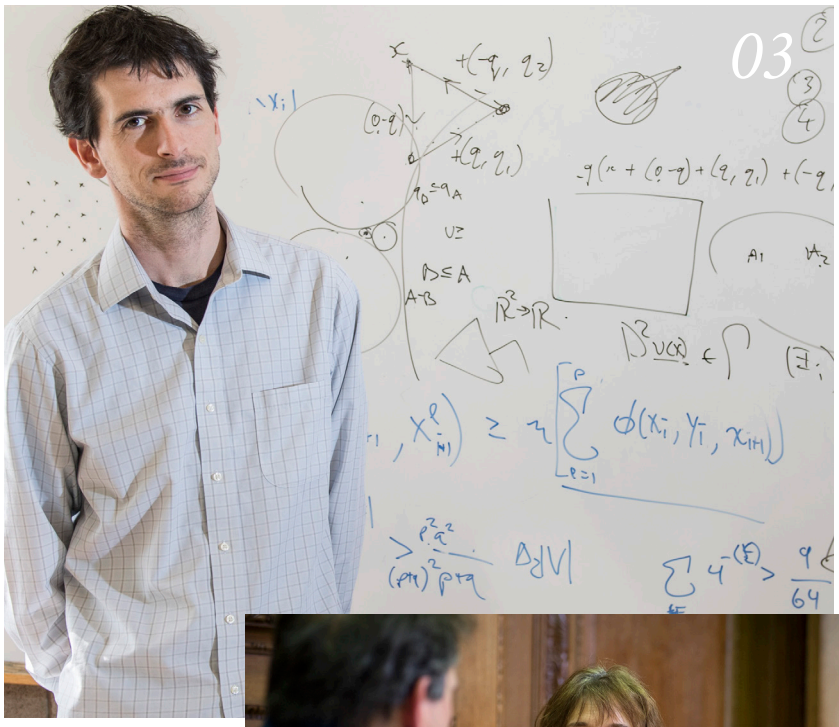


FROM THE DEAN

The 2017-2018 academic year was a year full of celebration for Carnegie Mellon University and the Mellon College of Science.

As a university, we celebrated the 50th anniversary of the merger between the Mellon Institute of Industrial Research and Carnegie Tech that formed Carnegie Mellon University. Throughout the year, we looked back on the past, but also looked at how far we've come as a university and at the exciting places we're going in the future (pages 12-14).

As a college, we started the year off with an amazing party to watch the solar eclipse. Organized by the student Astronomy Club, students, faculty, staff and members of the community flooded the Cut to celebrate this awe-inspiring event (pages 10-11). At the beginning of the spring semester, we celebrated one of our distinguished alumni, Glen de Vries, who generously endowed the MCS deanship with a visionary gift that will propel the college and the future of science at CMU forward (page 28). At commencement, we welcomed two of the world's most preeminent scientists back to campus to receive honorary degrees: mathematical sciences alumna and Turing Award winner Shafi Goldwasser and former post-doc and Nobel Laureate Ada Yonath (pages 24-25). This year, we also welcomed distinguished new faculty to campus, including Scott Dodelson, who heads our physics department (pages 18-20) and Barbara Shinn-Cunningham (page 16), who will lead the university's neuroscience institute.

These celebrations, much like the university's celebration of the 50th anniversary, are not an end point. In fact, they're just the beginning. They show that MCS's momentum is strong and fast. And while we will always maintain ties to our traditions, the future is our priority. In the last year, we have accomplished so much and have set up the infrastructure to accomplish so much more.

Each of you — alumni, students, faculty, staff and friends — play a critical role in the success of the college. I want to thank you for your support of the Mellon College of Science and hope that you will continue to support the college and contribute to our exciting future.

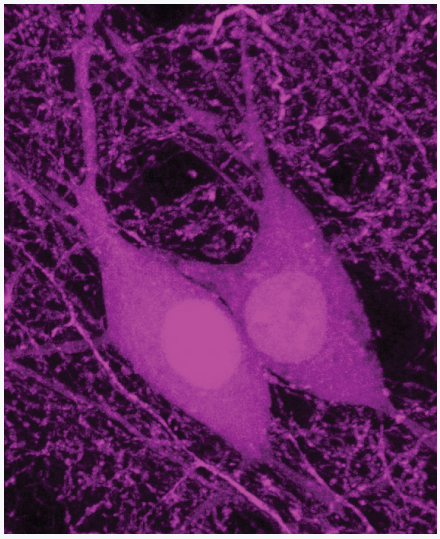
Rebecca W. Doerge

Glen de Vries Dean, Mellon College of Science
Professor of Statistics and Data Science, Professor of Biological Sciences

UNDER THE SCOPE

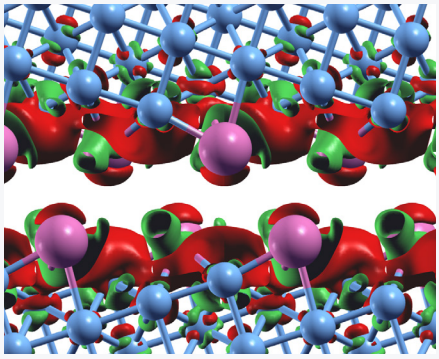
‘SUPERHUMAN' POKER AI BEATS THE WORLD'S BEST HUMAN PLAYERS

Computers have been famously beating humans at their own games for decades. Unlike chess or checkers, Texas Hold'em poker is a game of imperfect information, meaning each player doesn't know all of the variables of the game — namely what cards another player is holding. An artificial intelligence called Libratus, developed by Carnegie Mellon University computer scientists and run on the Pittsburgh Supercomputing Center’s Bridges, beat four of the world's best poker players in a high-stakes match over three weeks and 120,000 hands. It was reported in Science that the AI was able to win by monitoring and improving its play while keeping tabs on the shifting strategies and betting of its opponents to check for bluffing.



ACETYLCHOLINE WAKES SILENT NEURAL NETWORK

In the brain’s cerebral cortex, there is a dense web of pyramidal and somatostatin neurons that are strangely silent. Neuroscientists led by Biological Sciences Professor Alison Barth were able to wake up and functionally rewire this matrix of neurons using acetylcholine. They found that both pharmaceutical and endogenous acetylcholine can turn on the network by binding to the same receptors targeted by nicotine. Acetylcholine plays a role in many of the same brain states as nicotine, including memory, cognition and attention. The researchers hope to further investigate the role it plays in plasticity, sensory processing and cognition.



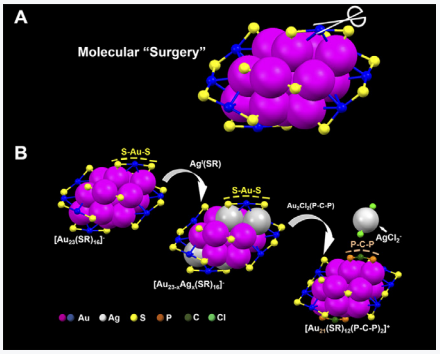
WHY SOME METALS WON'T MIX

At the microscopic level, solid objects are made up of a mosaic of crystals, called grains. Gaps between these grains can cause a material to become less durable. Alloys of nickel and bismuth are known to be brittle, a problem as nickel is used to manufacture things like airplane wings and bismuth is often used in solder. Physics Professor Mike Widom and his collaborators found that, at the grain boundaries, nickel and bismuth realigned to form superstructures resulting in weakly connected bonds between the two elements, causing the material to be weak. Widom and graduate student Qin Gao calculated the energies at the grain boundaries. This information, which was published in the journal Science, could help inform the development of stronger materials.

DSF GIVES MCS $4M FOR FOUNDATIONAL RESEARCH BLOCK GRANT PROGRAM

The DSF Charitable Foundation has given $4 million to the Mellon College of Science to support an innovative block grant program that encourages researchers to address fundamental scientific questions through the lenses of diverse disciplines. The projects funded by the program will lead to new avenues of scientific research and groundbreaking discoveries in the life sciences and biomedicine.

The centerpiece of the program is a $1 million moonshot grant that will bring together scientists from different fields to collaborate on high-risk, high-reward activities. Other grants fund early-career and individual investigator research and transdisciplinary workshops. The first six grants were awarded this spring.



CHEMIST LEADS PIONEERING NANOSURGERY EFFORTS

Carnegie Mellon University chemist Rongchao Jin led a team that performed the first site-specific surgery on nanoparticles. The pioneering technique developed by graduate student Qi Li will help nanochemists create precisely tailored nanoparticles with enhanced functional properties. Using a gold nanoparticle composed of 23 atoms, Jin's team was able to remove ligands from its surface in a procedure that increased the nanoparticle photoluminescence by roughly tenfold. The work, done in collaboration with researchers at the University of Pittsburgh, was published in May 2017 in the journal Science Advances.

MATH v. GERRYMANDERING

Until recently, the lines drawn on the congressional map of Pennsylvania looked irregular. So irregular, in fact, that the outline of the seventh district looked like a drawing of cartoon characters and was often referred to as “Goofy Kicking Donald Duck.”

These wildly drawn maps are likely the result of gerrymandering, the more than 200-year-old practice of redrawing congressional and legislative lines to benefit a particular political party. Mathematicians, including Mathematical Sciences Associate Professor Wesley Pegden, have been enlisted in the fight against gerrymandering.

In early 2017, Pegden, with University Professor of Mathematical Sciences Alan Frieze and the University of Pittsburgh’s Maria Chikina, published a paper in the Proceedings of the National Academy of Sciences that used Markov Chains to redraw Pennsylvania’s congressional maps step by step and show that there was little chance that the existing districts had been drawn at random or without bias.

"Our analysis of Pennsylvania's map, which is based on a general theorem we proved about detecting outliers using small random changes, demonstrated rigorously that the Congressional map of Pennsylvania exhibited more carefully crafted partisan bias than more than 99.99 percent of possible congressional districtings of the state," said Pegden.

The paper was named one of the top 100 science stories of 2017 by Discover Magazine, and it caught the eye of lawyers who were challenging the Pennsylvania congressional map in front of the state Supreme Court. Pegden was asked to testify in the case. The court found the maps to be unconstitutional and called for the maps to be redrawn before the state’s May primary elections.

For Pegden, identifying gerrymandering is only the first step. He is also looking at solutions for drawing district maps and has found it might be as easy as the “I cut, you choose” method people use when splitting a piece of cake.

Pegden and Associate Professor of Computer Science Ariel Procaccia proposed a system where one party would divide the map of a state into the required number of districts. Then the second party would "freeze" one district, ensuring no changes can be made to it and redivide the rest of the map. The first party then would choose a district to freeze and redivide the map again. The two parties would take turns until every district has been frozen and a final map is produced.

"In the real world, you still might expect the results to be less than perfect," Pegden said. "But this would be much, much, much more fair and balanced than having one party do essentially whatever it wants."

■ *Jocelyn Duffy*

JOSEPH BRIGGS RECEIVES GRADUATE STUDENT TEACHING AWARD

Mathematical Sciences Ph.D. candidate Joseph Briggs was honored with the 2018 Hugh Young Graduate Student Teaching Award. He received the prize at the Mellon College of Science Graduate Town Hall in April.

"Joe Briggs embodies everything one could possibly want in a [teaching assistant]," Associate Teaching Professor Deborah Brandon wrote in a letter nominating Briggs for the award. "He is a gifted expositor. He is extremely reliable and very helpful, and he really cares about his students. In addition, he has that rare ability to make the learning experience memorable (in a good way)."

A dozen of Briggs' former students wrote in to confirm his teaching abilities.

"He just loves math and gets so excited about math concepts and teaching others," junior Makayla Filiere wrote. "He would solve the problem and be jumping all around, pumped up at how it is that we just solved this problem! To see a TA so passionate about math naturally makes you more excited about it as well."

MUKUND BAPNA RECEIVES GRADUATE STUDENT RESEARCH AWARD

Physics' Mukund Bapna won the 2018 Guy C. Berry Graduate Student Research Award. He was presented with the prize at the Mellon College of Science Graduate Student Town Hall in April.

"Mukund is a quiet person who does not draw attention to himself, but those who interact with him quickly recognize his abilities," Bapna's lab director, Physics Professor Sara Majetich, wrote in nominating him for the prize.

In Majetich's lab, Bapna's research has looked at magnetic tunnel junction nanopillars, nanostructures that could be used for more energy efficient computing and data storage. With his "golden hands," Majetich said Bapna has fabricated devices as small as 15 nanometers in diameter using electron beam lithography and ion milling.

Bapna received his Ph.D. in May and is now heading off to Portland, Oregon, to work for the research and development team at Intel. There he will be developing smart interconnects for nodes under 20 nanometers in size for next generation processors.

FINDING **HER** WAY

Through her own health struggles and those of others, one Carnegie Mellon student has been inspired to explore the hospital, the lab bench and the world.

Victoria Van Benschoten is in many ways a typical Carnegie Mellon University student — extremely busy, but that's the way she prefers it. She's a chemistry major and Science and Humanities Scholar with dreams of becoming a doctor. She's a sister of Delta Delta Delta, Greek Sing chair, vice president of the Panhellenic executive board, a resident assistant, a dancer with Infra Dance Company and a buggy driver.

But there's also something different about her. Something you wouldn't know by looking at her. She has Celiac disease, an autoimmune disorder that prevents her from eating gluten. Her own health experiences have been a major catalyst toward her interest in becoming a doctor.

Van Benschoten has spent her undergraduate career immersed in her two main passions — health care and research. Now a junior, soon she'll decide which path to go down. But the decision hasn't been easy. Even as she moves forward in one area, her foot is still firmly planted in the other.

In the summer after her first year, Van Benschoten interned in the emergency room at Grant Medical Center in Columbus, Ohio. "It's the level I trauma center for Columbus, so we got anything from car crashes to gun shot wounds. You stepped in and didn't know what was going to happen that day," she said. Van Benschoten worked in the waiting room, keeping patients and families up-to-date on medical care and information from doctors.

That same summer, Van Benschoten worked for Get Covered America, a nonprofit organization in Ohio that helps people sign up for health insurance under the Affordable Care Act. She connected with many in the community, setting up outreach in soup kitchens, community centers and places of worship.

These complementary experiences further ignited Van Benschoten's desire to dive headfirst into the field of health care. In the ER, she helped those in immediate need of medical attention and learned how to comfort patients as well as their families in their most vulnerable moments. "It was a very humbling experience," Van Benschoten said.

WORKING AT THE GROUND LEVEL IN THE COMMUNITY WAS EQUALLY AS VALUABLE; HEARING PEOPLE'S STORIES ABOUT THEIR LIVES AND THEIR HEALTH CARE STRUGGLES HAD A GREAT IMPACT.

"I had parents cry in my office because they would finally be able to take their children to the doctor," Van Benschoten said. "It showed me another side of health care that I hadn't really thought much about and opened my eyes to the fact that health insurance is a big barrier in people's lives and that having it has the power to truly change lives."

When she returned to CMU for her sophomore year, Van Benschoten started working in Chemistry Professor Stefan Bernhard's laboratory. She makes iridium complexes that are used in photochemistry experiments to explore stronger electron and energy storing solutions.

But Van Benschoten wasn't sure research was something she could do as a full-time career — until she came across disease model research.

In June 2017, Van Benschoten spent two months in Ireland, conducting research at University College, Dublin, in the laboratory of Niamh O'Sullivan. O'Sullivan is a lecturer in the Conway Institute of Biomolecular & Biomedical Research; her work focuses on hereditary spastic paraplegia, a neurodegenerative disease that affects the motor neurons in your legs. The interesting thing about hereditary spastic paraplegia is that the motor neurons don't die, they just don't work. O'Sullivan uses this knowledge to see if the effect can be reversed, which could lead to therapies for other neurodegenerative diseases.

Previous experiments have shown that the shape and number of mitochondria in diseased animal models is drastically different from healthy animal models. If the mitochondria weren't dividing correctly, O'Sullivan believes it could lead to clues about how to restore neuron function in the disease model.

To test this out, Van Benschoten worked with populations of adult fruit flies and larvae to cross different genetic strains so that some populations would present the gene for hereditary spastic paraplegia. She then treated a sample of the diseased population with a genetic treatment that, in later tests, was shown to restore neurological function.

As a chemistry major, Van Benschoten said she enjoyed delving into more biologically focused research, particularly doing genetic experiments for the first time, which has helped her in her biological chemistry track courses at Carnegie Mellon.

"Dr. O'Sullivan really pushed me in my research and my understanding of genetics. I don't have a big genetics background, but she took the time to work with me and give me the background in biology, and I really feel like I understand what was happening," Van Benschoten said. "She also gave me the opportunity to travel if I needed the day off to go somewhere because I was in Europe for the summer."

Van Benschoten caught the travel bug, stopping off for day and weekend trips in Germany, London, France and Amsterdam. She also checked an item off her bucket list by seeing the famed Mariinsky Ballet perform in London.

Van Benschoten said her experience in Ireland was something of an "a-ha" moment. As much as she loves organic synthesis, she couldn't see pursuing that field of research for the rest of her life. But disease model research was different; she saw how it could have the potential to change lives. She realized it was something that she could see herself doing.

"I'm always debating between going into research or a health care field," Van Benschoten said. "I'll always be interested in research, but having Celiac disease really was the tipping point — knowing that people deal with health problems every day whether you can tell or not," she said.

Van Benschoten plans to enter medical school after graduating next spring. "Fingers crossed I did well on my MCATs," she said with a laugh. But until then, there are more pressing matters to focus on—like preparing for her final buggy races at Carnvial.

■ *Emily Payne*

Photo courtesy of Victoria Van Benschoten

JOSH BRAKENSIEK RECOGNIZED BY NATIONAL SCIENCE FOUNDATION AND COMPUTING RESEARCH ASSOCIATION

Mathematical Sciences graduate Joshua Brakensiek received a Graduate Research Fellowship from the National Science Foundation that will help fund his graduate studies at Stanford University as he pursues his Ph.D. in theoretical computer science.

Earlier this year, Brakensiek also won an Outstanding Undergraduate Researcher Award from the Computing Research Association along with a $1,500 award to attend a research conference of his choice.

Brakensiek came to Carnegie Mellon University as part of its Knaster-McWilliams Scholars program, which is one of only a few scholarship-supported programs in the United States that pairs an honors program with increased access to faculty and early research opportunities.

His undergraduate research in coding theory, computational complexity theory and approximation algorithms has resulted in several publications, manuscripts and presentations at major mathematics and computer science conferences and symposia.

He is also a Goldwater Scholar, a two-time Gold Medalist in the International Olympiad in Informatics, and a Putnam Fellow and member of the Carnegie Mellon Putnam Team that placed first in 2016.

APRIL LI RECEIVES FUGASSI MONTEVERDE AWARD

April Li received this year's Dr. J. Paul Fugassi and Linda E. Monteverde Award from the Mellon College of Science. The award recognizes the graduating female senior with the greatest academic achievement and professional promise.

Li is part of the Department of Mathematical Sciences' Computational Finance program. She is a dedicated student leader who has enriched her fellow students' experiences through her passion for computational finance. In 2016, Li co-founded the Quant Club, which has been an invaluable resource for students interested in quantitative finance.

As a club leader, she helped organize mock interviews and conducted resume workshops for students, where she used her own experience in finding internships to help students prepare for recruiting season.

During her junior year, Li accepted an internship with Goldman Sachs as a sales and trading analyst in their securities division. Following her internship, Li was offered a full-time position with the company in their interest rates products division upon graduating in May 2018.

CHRISTINA CABANA AWARDED GATES CAMBRIDGE SCHOLARSHIP TO STUDY IN UNITED KINGDOM

Chemistry graduate and Science and Humanities Scholar Christina Cabana was awarded a Gates Cambridge scholarship to pursue a one-year master's degree of philosophy in chemistry at the University of Cambridge starting this fall.

At Cambridge, she will work in Professor Sir Shankar Balasubramanian's laboratories, based in the university's Department of Chemistry and in the Cancer Research UK Cambridge Institute. "Creating more widely effective cancer immunotherapy is the big problem that I want to solve," Cabana said. Cabana is excited to build upon her skills in researching the epigenetic processes that contribute to cancer.

In 2017, Cabana was awarded a Barry M. Goldwater Scholarship, which supports students interested in pursuing research careers in the fields of science, engineering and math.

Following her master's program, Cabana plans to pursue a Ph.D. in chemical or molecular biology and aspires to lead a research group in cancer pharmacology and teach at the university level.

JUNIOR ANDREW KWON RECOGNIZED AS GOLDWATER SCHOLAR

Mathematical Sciences honors student Andrew Kwon received a 2018 Barry Goldwater Scholarship, which supports undergraduates interested in pursuing research careers in STEM fields. Kwon plans to pursue a career in academic research in number theory and algebraic geometry.

Last summer, Kwon was part of the NSF's Research Experience for Undergraduates program. He examined a mathematical paper that showed the existence of minimal additive complements in special cases and developed a conjecture that provides insight into what distinguishes complementable sets and sets that are not complementable. If justified, his conjecture could explain all observed phenomena in this area of study.

Mentoring students is another passion of Kwon's. As a first-year student, he co-founded the Carnegie Mellon University Informatics and Mathematics Competition for high school students. This year, 400 high schoolers came to campus to compete.

"[Former participants] have told me 'your competition made CMU really stand out to me and it's why I'm here now,'" Kwon said. "And I think that's really incredible to be able to have that kind of impact."

■ *Emily Payne*

SOLAR

CAMPUS COMES TOGETHER FOR SOLAR ECLIPSE

During the 2017 solar eclipse, the CMU Astronomy Club hosted a viewing party for the Pittsburgh campus and community. Hundreds of people flooded the Cut to view the phenomenon through the club's telescopes, eclipse glasses and pinhole cameras.

Photo courtesy of Gary Ropski (S 1972)

ECLIPSE

STUDENT HONORS AND AWARDS

Physics postdoc **Sergio de la Barrera** won a Springer Thesis Award.

Recent physics doctoral graduate **Alexander Gurrich** received a National Science Foundation Graduate Research Fellowship.

Recent chemistry graduate **Kathryn Hanson** won the College Chemistry Award from the Society for Analytical Chemists of Pittsburgh.

Physics undergraduate student **Ian Harris** will conduct research in Switzerland this summer though a ThinkSwiss Scholarship.

Math graduate student **Jenny Iglesias** coached U.S. teams that competed in the China Girls Mathematical Olympiad and European Girls Mathematical Olympiad, where they placed first.

Chemistry graduate student **Qi Li** won an International Precious Metals Institute Student Award.

Mathematical Sciences undergraduate student **Anne Silbaugh** won the 2017 Mulach Scholarship that supports women in STEM.

Chemistry graduate student **Thomas Ribelli** won a Best Poster Award at the American Chemical Society's national meeting.

Biological Sciences undergraduate **Siyao Wang** received an International Summer Undergraduate Research Fellowship.

Chemistry graduate student **Zoe Wright** won a Best Presentation Award at the American Chemical Society's national meeting.

Recent chemistry graduate **Chenjie Zeng** won the IUPAC-Solvay International Award for Young Chemists.

Mathematical Sciences graduate student **Andrew Zucker** received a National Science Foundation Postdoctoral Fellowship.

The Carnegie Mellon team placed 6th in the 2017 Putnam Competition, with 55 students ranking among the top 500.

50 YEARS OF SCIENCE
...AND COUNTING

A half century ago, two Pittsburgh institutions came together in an unlikely, and initially uneasy, partnership. The merger of the Carnegie Institute of Technology and the Mellon Institute of Industrial Research in 1967 birthed Carnegie Mellon University and its Mellon College of Science (MCS). In the 50 years since then, MCS has continued to grow and evolve.

"I started well before there was a CMU," University Professor Emeritus Guy C. Berry jokes about his tenure at MCS. When Berry first walked up the Mellon Institue's steps on Fifth Avenue in 1960, it was an independent institution conducting research on behalf of private companies. Berry had just obtained a Ph.D. in chemical engineering and landed a fellowship at the Mellon Institute to study the rheology of polymers.

By the time Berry climbed those steps, the Mellon Institute had existed for nearly 50 years in various locations and forms. It first took shape in 1913, inspired by the ideas of University of Kansas professor Robert Kennedy Duncan. In his travels in Europe, Duncan had seen a level of cooperation between the industrial and scientific communities that was virtually nonexistent in the United States, and he wanted to bring it to America.

This idea caught the ears of two Pittsburgh-based titans of early 20th century America: Andrew and Richard Mellon. The brothers had made their fortune financing many major industrial companies, and they understood keenly the manufacturing problems that Duncan had brought to their attention. They provided funds for Duncan to establish the Mellon Institute of Industrial Research and School of Specific Industries as an arm of the University of Pittsburgh. Fellows were hired to conduct research sponsored by industry to help improve their products and processes.

Even though Duncan died a year later, his institute continued on, and one of its fellows hit success soon after its founding. Seeking an alternate way to produce the gas acetylene, which was often used for illumination, a young chemist stumbled upon a chemical process that produced the compound ethylene glycol as a byproduct. The substance, which later became the common ingredient in automobile antifreeze, was also a good base for making many other organic compounds.

Major breakthroughs continued at the institute as research there led to the development of the first gas mask, which helped protect American soldiers in World War I against deadly new chemical weapons such as mustard gas.

Eventually, the institute separated from the university to become an independent organization devoted fully to industrial research. This independence also came with a large new building designed to inspire — 62 40-foot-tall limestone columns ringed its 85-foot-tall facade.

Despite its new and impressive architecture, the Mellon Institute's coming years were difficult. The industrial companies that the institute catered to began to establish their own laboratories, thus reducing their need to fund independent researchers in Pittsburgh. Still, nearly 5,000 scientific papers, 2,000 patents and some notable inventions came out of the work of the Mellon Institute before its end.

By the time Berry joined the Mellon Institute, the federal government had become the largest funder of independent research with the Cold War and the Space Race in high gear, leading the Institute to adopt a hybrid model of sponsored and grant-supported research. "The two sides didn't quite fit together in some ways," Berry recalled. "That all began to change with the merger."

The Merger

The 1967 merger of the Mellon Institute and the Carnegie Institute of Technology that formed Carnegie Mellon University came as a shock to many working in both organizations.

"I had decided I didn't want to be in academia, and then I found myself in academia," Berry said. The staff of the former Mellon Institute who only did research and the faculty of Carnegie Tech who concerned themselves mainly with teaching now found themselves in positions where they were expected to do both.

Luckily, "... that tense early interaction between the organizations doesn't play a role in the college today," Berry said.

Tougher to overcome was the similar conflict that existed with the Mellon Institute building itself. To facilitate industrial research for numerous and sometimes competing companies, the building was designed with smaller labs, separated by closed doors and long hallways. This set-up is the antithesis of the type of open, flexible space that is needed for modern academic research. And the building's architects could have never anticipated the changes in science and technology that would occur in the coming decades.

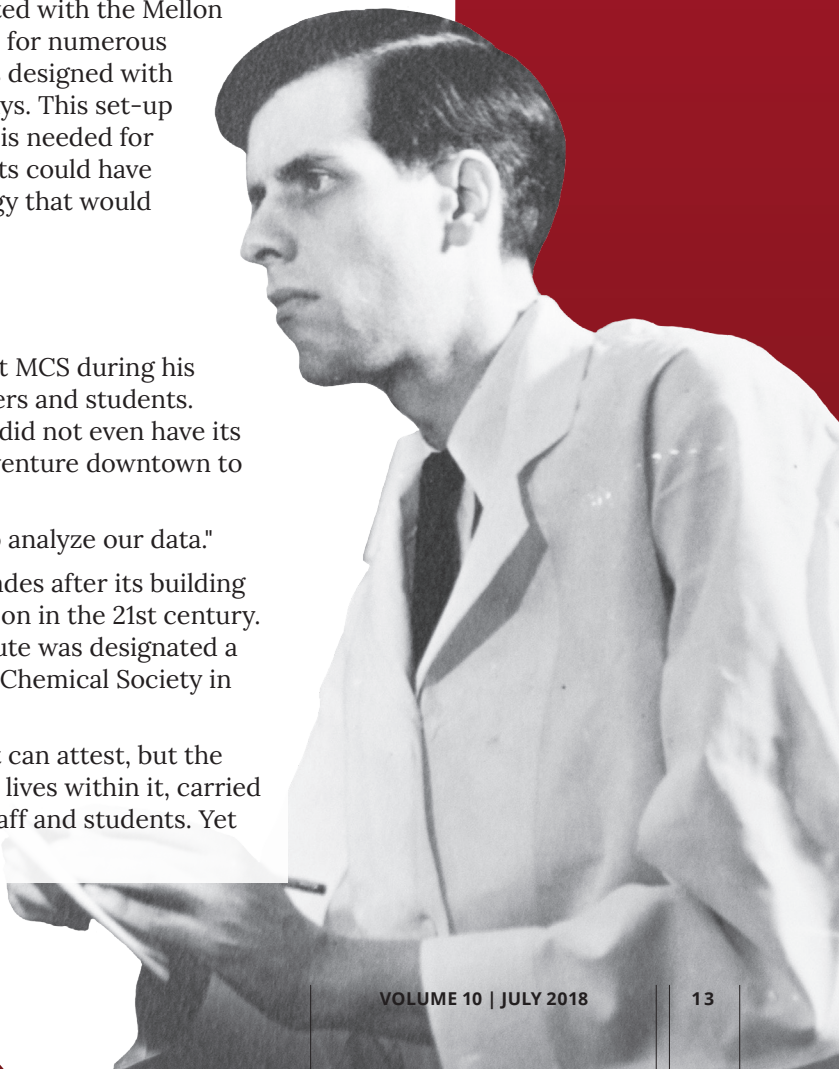
Then Vs. Now

To a chemist like Berry, the biggest change in science at MCS during his tenure has been the technology used by both researchers and students. When he first came to Pittsburgh, the Mellon Institute did not even have its own computer; Berry had to type up punch cards and venture downtown to feed them into a massive machine.

"When we got a computer, it no longer took a month to analyze our data."

Now, more than a century after its founding, eight decades after its building and 50 years after its rebirth, the Mellon Institute lives on in the 21st century. Thanks largely to the efforts of Berry, the Mellon Institute was designated a National Historic Chemical Landmark by the American Chemical Society in 2013 in recognition of its significance to science.

The building may be old, as anyone who's been inside it can attest, but the same creative spirit that drove its early inhabitants still lives within it, carried on by a large and ever more diverse group of faculty, staff and students. Yet the mysteries and miracles of science persist.



HOW HAS **SCIENCE** CHANGED OVER THE PAST 50 YEARS?

> "You never know what's going to happen when you start an experiment. *That's something that hasn't changed over the years.*"
>
> *- Guy Berry*

Guy Berry, *university professor emeritus, joined the Mellon Institute as a fellow in 1960*

One of the things that's changed in my time here is the development of instrumentation. The rheology I discovered then was entirely unknown, and the equipment I used was pretty crude: I used two flat plates to compress objects and then measured them by hand. The instrumentation that's available to everyone now makes their work so much more creative and effective.

David Hackney, *professor of biological sciences, joined Carnegie Mellon University in 1978*

There's much more of an emphasis on collaborative things today. I haven't been involved in most of the major changes in instrumentation, such as high-throughput DNA sequencing, too much because most of the kinds of work I do doesn't need a lot of that stuff. But when I do need other equipment or techniques, now someone in my position would collaborate.

James Russ, *professor of physics, joined Carnegie Mellon University in 1967*

You always have to be prepared to evolve because technology will not stand still. Initially I spent my time writing punch cards; later we got the first commercially available unit of the VAX-11/780 computer. However, there was something interesting going on at the time called ARPANET, which is what ultimately became the internet. The ability to have a nice-sized computing unit for my own use suddenly became unimportant.

Robert Sekerka, *university professor emeritus, joined Carnegie Mellon University in 1969, dean from 1982–1991*

I would say the culture in MCS [today] is highly interdisciplinary — it's fairly easy to cooperate across departments. This allows students to branch out and get into positions where there may be more funding and opportunities for growth. One kind of sad thing though is that we have chemistry and biology in the Mellon Institute building, and physics and math are in Wean Hall, so it's not like you're tripping over your neighboring departments.

■ *Ben Panko*

STEPHEN GAROFF AND HAEL COLLINS WIN MELLON COLLEGE OF SCIENCE AWARDS FOR EDUCATION

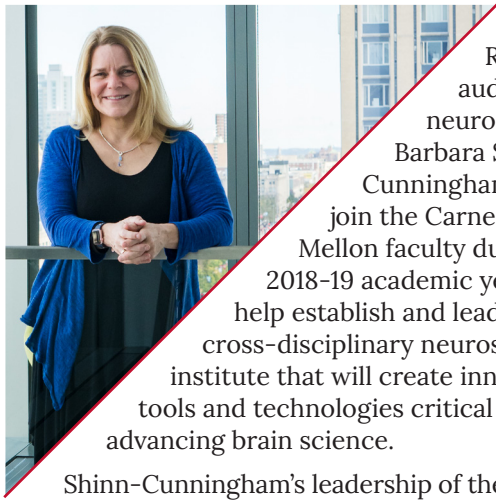
THE RICHARD MOORE AWARD: STEPHEN GAROFF

Physics Professor Stephen Garoff was awarded the 2018 Richard Moore Award for his significant educational contributions over his more than three decades with the college. Throughout his career, Garoff has helped to implement valuable interdisciplinary courses such as Physics I for Engineering Students, Physics II for Biological Sciences and Chemistry Majors, and the Modern Physics Laboratory, which has become a highlight of the undergraduate curriculum. He also developed and instituted the Department of Physics' graduate student orientation program and graduate student visitation weekend, one of the first of its kind among physics departments across the country.

JULIUS ASHKIN TEACHING AWARD: HAEL COLLINS

Physics Special Faculty Lecturer Hael Collins won the 2018 Julius Ashkin Teaching Award for his devotion and effectiveness in teaching. Collins has taught an impressive 13 different courses in the past seven years. Students profess their appreciation for both his teaching style and the rigorous content of his classes. He balances difficult coursework with subtle humor, genuine care and a significant amount of extra time and effort to prepare additional study materials. Through his dedication and care, Collins has crafted the ideal environment to encourage and inspire his students to learn, to push themselves and to succeed.

SHINN-CUNNINGHAM SELECTED TO LEAD NEW NEUROSCIENCE INSTITUTE AT CMU

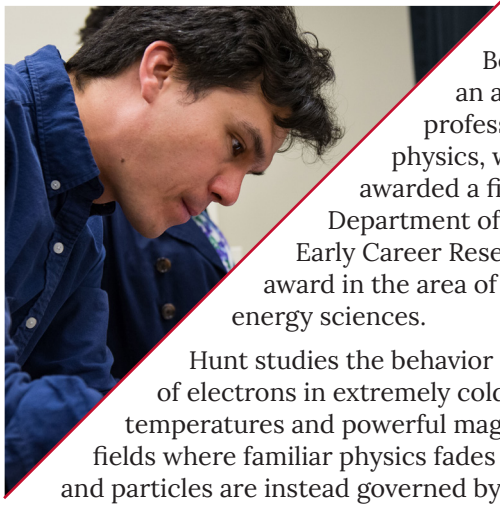


Renowned auditory neuroscientist Barbara Shinn-Cunningham will join the Carnegie Mellon faculty during the 2018-19 academic year to help establish and lead a new, cross-disciplinary neuroscience institute that will create innovative tools and technologies critical to advancing brain science.

Shinn-Cunningham's leadership of the new institute will coalesce Carnegie Mellon's existing resources in neuroscience to expand collaborative research across the biological sciences, cognitive neuroscience and psychology, as well as to deepen connections to Carnegie Mellon's core strengths in other disciplines.

Shinn-Cunningham comes to Carnegie Mellon from Boston University where she is the director of the Center for Research in Sensory Communication and Neural Technology. Trained as an electrical engineer, Shinn-Cunningham has built her research career around applying math and engineering approaches to perception, specifically hearing and speech. She is best known for her spatial hearing work on the "cocktail party problem," which looks at how the brain blocks out certain sounds and pays attention to others.

HUNT EARNS DEPARTMENT OF ENERGY EARLY CAREER RESEARCH AWARD



Ben Hunt, an assistant professor of physics, was awarded a five-year Department of Energy Early Career Research award in the area of basic energy sciences.

Hunt studies the behavior of electrons in extremely cold temperatures and powerful magnetic fields where familiar physics fades away and particles are instead governed by a weirder set of laws. There, he hopes to discover new materials that could be building blocks for the quantum computers of the future.

Hunt wants to find a material that could form the substrate for the next generation of computers. Hunt's DOE project aims to layer graphene with other flat materials at a small fraction of a degree above absolute zero to form what's called a "topological insulator." In this new form of matter, electrons can move along the edge of the material with no loss of energy. That property makes these materials a strong candidate for underlying the ultra-powerful quantum computers of the future, in the same way that silicon underlies the computers of today.

FACULTY HONORS AND AWARDS

Associate Teaching Professor of Chemistry and Director of the Science and Humanities Scholars Program **William Alba** was named associate dean for diversity.

Chemistry Professors **Terrence J. Collins, Ronchao Jin** and **Krzysztof Matyjaszewski,** and Physics Associate Professor **Di Xiao** were named among the world's most highly cited researchers in their fields by Clarivate Analytics.

Mathematical Sciences Professor **Giovanni Leoni** published the second edition of his book "A First Course in Sobolev Spaces."

Physics Professor **Sara Majetich** co-chaired the 2018 Intermag Conference in Singapore.

Associate Professor of Physics **Rachel Mandelbaum** was named the Analysis Coordinator for the Large Synoptic Survey Telescope Dark Energy Science Collaboration.

Physics Professor **Curtis Meyer** was re-elected spokesperson for the Glue-X collaboration. Meyer was also named associate dean for research.

Physics Assistant Research Professor **Diana Parno** chaired the organizing committee for the KATRIN Collaboration Meeting.

Physics Professor **Manfred Paulini** was named a fellow of the American Physical Society. Paulini was also named associate dean for faculty and graduate affairs.

Physics Professor **Reinhard Schumacher** chaired the local organizing committee for the 2017 American Physical Society Division of Nuclear Physics annual meeting held in Pittsburgh.

Chemistry Assistant Professor **Stefanie Sydlik** received the American Chemical Society Division of Polymeric Materials: Science and Engineering Young Investigators Award.

FONSECA NAMED KAVČIĆ-MOURA PROFESSOR OF MATHEMATICS

University Professor Irene Fonseca was named the recipient of Carnegie Mellon's first Kavčić-Moura Professorship in Mathematics. The professorships were established to provide sustained, long-term support for scholars across the university whose breakthroughs and discoveries have the potential to impact the world where human life and technology meet. The professorship in mathematics was one of four Kavčić-Moura Professorships to be awarded this year.

Named in honor of inventors José M. F. Moura and Aleksandar Kavčić, the professorships are funded through the university's proceeds from the 2016 settlement of the patent infringement lawsuit against Marvell Technology Group Ltd. and Marvell Semiconductor Inc.

A member of the MCS faculty since 1987, Fonseca directs the university's renowned Center for Nonlinear Analysis. She is one of the world's leading researchers in applied mathematics and has received numerous recognitions for her work as a researcher and teacher. Most recently, she was named to the Abel Committee by the Norwegian Academy of Science and Letters, where she will help to select the winner of the prestigious Abel Prize, the top prize recognizing lifetime contributions to mathematics.

As new department heads, Scott Dodelson and Linda Peteanu sat down for a Q&A to get to know each other a little better. Scott came to MCS in 2017 from the University of Chicago to head the Department of Physics. Previously serving as acting head since January 2016, Linda was officially named head of the Department of Chemistry last August. Linda began by asking about Scott's first job, and from there, the conversation flowed from one topic to the next, while turning the traditional Q&A style on its head. Back and forth, the pair touched on everything from the importance of science communication to the appeal of the Big Bang Theory, their experience as department heads and their visions for where the physics and chemistry departments will be in the coming years.

ON THEIR FIRST JOB...

SCOTT: My first job was cutting echocardiograms and dipping dipsticks in urine and putting blood in centrifuges in my father's office. He was a doctor.

LINDA: I don't have to ask why you became a physicist then!

SCOTT: And not a doctor. How about you?

LINDA: I was a candy striper for a hospital. I thought I wanted to be a doctor so I was a candy striper. I think the most memorable candy striper job I had was in Bellevue Mental Hospital (in New York). I was like the occupational therapist. I was supposed to come up with activities for the very significantly mentally ill. Back then, they were a little bit faster and looser with what young people could do, so they put me in a lockdown ward.

Tête-à-Tête

A Q&A WITH NEW DEPARTMENT HEADS LINDA PETEANU AND SCOTT DODELSON

SCOTT: How old were you?

LINDA: I was in my teens. It was before there were a lot of medications and so forth for mental illness. It was a little disappointing to think that these people are so ill and there's not a lot that could be done. And the revolutions that have happened since then, it is a completely different world.

SCOTT: Did you grow up in the New York area?

LINDA: Yeah, I grew up on the Upper West Side of Manhattan. You carry the accent. Where did you grow up?

SCOTT: I have an accent? I once met this guy from Australia who said to me "You have the worst New York accent that I've ever heard." I didn't even realize I had one. I grew up in New Jersey, actually.

ON SCIENCE COMMUNICATION, THE BIG BANG THEORY AND EINSTEIN...

LINDA: The way science is communicated is tricky. At a science and communication discussion with Dietrich College, I discussed that the idea of the general public understanding what uncertainty actually means is probably the most important idea we can convey. A scientist says caffeine is good for you, another says caffeine is bad for you. And that's all the headlines say, and then we lose credibility as a field. Obviously, climate change is another victim of this kind of thinking. I think that's often the case with fields that people feel touch them in their everyday experience. I mean, physics has the notion of being remote and beautiful and so forth. Whereas with chemistry and biology, people feel it's their daily experience. I think it plays to physics' strengths. Do you watch the Big Bang Theory?

SCOTT: I've seen it.

LINDA: I love that show. I have family members who haven't been to college and they love it and relate to it. There's something about physics that has this charm to it, I think, that other fields don't quite possess.

SCOTT: You don't think that could have been a show about chemistry?

LINDA: I don't think so. They've got some biologists in it, but I think ultimately physics has a certain persona in the popular mind that other sciences don't quite share. How many pictures do you see of Einstein riding a bicycle and all this sort of stuff?

SCOTT: I used to think Einstein was overrated. It turns out there's this myth that he was against quantum mechanics. But he actually understood it before anyone else. If life were fair, he probably would have won about seven Nobel prizes. Quantum mechanics inherently is probabilistic theory. There's a probability this will happen, a probability that we're having this conversation in a different room. Everything is possible, and there's this misinterpreted quote from Einstein saying "God doesn't play dice," which seems to speak against that idea of probability. Quantum mechanics, we know, is the underpinning of most of chemistry now. So, it survived. However, I learned that in the early 1900s, Einstein was the person who understood quantum mechanics before anyone else. I once read a famous paper he wrote with Pudulski and Rosen about the basic paradox of quantum mechanics, which only he was able to articulate, and it was the only paper I read from 100 years ago that you could understand. He was a very clear thinker and writer. He was smart. I guess that's not a bold statement to say that Einstein was smart.

ON BEING DEPARTMENT HEAD...

LINDA: It's been a change. I'm not teaching a class and that made it a bit of a change in my routine. Strangely so far, I like it. I got so many emails of sympathy from inside and outside [when I became head]. All academics think administration is "Oh, you poor thing, who hates you?" For me, it's been kind of fun because I like to solve problems. And novelty really drives me. Off-the-wall things are constantly happening, and there are always problems for me to solve.

SCOTT: I had an experience about four years ago, which kind of formed the way I think about leadership. In high energy physics, the budget each year is roughly a billion dollars nationally. There are panels of 20 people once every five to 10 years that decide how to spend that money. As I said, there are one or two big questions in physics, and they try to figure out what those questions are and allocate this $10 billion over the course of the decade. I was on one of those panels, and we took not a single vote. The notion of reaching consensus by talking through things was a very powerful idea that we've tried to do in physics, and I think it would be great if we could do that nationally — if people who disagree politically come together and reach consensus by talking things out. I hold out hope that that is possible because I saw it happen and $10 billion was at stake. People's livelihoods were at stake. Everyone around the table talked things out and managed to come to a consensus, and that was tremendously informative.

ON THEIR VISION FOR THEIR DEPARTMENT...

SCOTT: In terms of the vision for what physics will look like in 10 to 20 years, I think we all are beginning to appreciate that we're headed to a future which has enormous possibilities with neuroscience, artificial intelligence, quantum computing and so on. The world in 30 years is not going to look like it does today, and it will be limited by laws of physics. Physics departments in 20 years are not going to look the same. We have to gradually get to where we can contribute to the way the world is inevitably going to be changing over the next decade.

LINDA: My vision for the department is that we grow our strengths, our interdisciplinary strengths. And we keep making progress towards what we consider to be our big questions, which is how we can use chemistry to improve people's daily lives both in the area of their environment and their health and in the products that are available to them.

■ *Emily Payne*

NEW FACULTY

SCOTT DODELSON
Professor and Head, Physics

Specialty: Cosmology

Education: Ph.D., Physics, Columbia University; postdocs, Fermi National Accelerator Laboratory (Fermilab) and Harvard University

Prior appointment: Professor, Astronomy and Astrophysics, The University of Chicago, and Distinguished Scientist Fermilab

YU GU
Assistant Professor, Mathematical Sciences

Specialty: Probability and mathematical finance

Education: Ph.D., Applied Mathematics, Columbia University

Prior appointment: Szegö Assistant Professor, Stanford University

JASON HOWELL
Associate Teaching Professor and Director of Undergraduate Studies, Mathematical Sciences

Specialty: Mathematics education, computational mathematics

Education: Ph.D., Mathematical Sciences, Clemson University; postdoc, Carnegie Mellon University Center for Nonlinear Analysis

Prior appointment: Assistant Professor, College of Charleston

JOHANNES MUHLE-KARBE
Associate Professor, Mathematical Sciences

Specialty: Probability and mathematical finance

Education: Ph.D., Mathematics, Technical University of Munich; postdoc, University of Vienna

Prior appointment: Associate Professor, University of Michigan

TOMASZ TKOCZ
Assistant Professor, Mathematical Sciences

Specialty: Probability and mathematical finance

Education: Ph.D., University of Warwick; postdoc, Princeton University

STEPHANIE WONG-NOONAN
Assistant Teaching Professor, Biological Sciences

Specialty: Biological sciences education

Education: Ph.D., Biomedical Engineering, Carnegie Mellon University; postdoc, Allegheny Health Network

ERIC YTTRI
Assistant Professor, Biological Sciences

Specialty: Neuroscience

Education: Ph.D., Neuroscience, Washington University in St. Louis; postdoc, Howard Hughes Medical Institute, Janelia Research Campus

YONXIN (LEON) ZHAO
Assistant Professor, Biological Sciences

Specialty: Cell biology

Education: Ph.D., University of Alberta; postdoc, Massachusetts Institute of Technology Media Lab, Synthetic Neurobiology Group

RETIRING FACULTY

DAVID HACKNEY:

The professor of biological sciences has been a member of the Mellon College of Science Faculty since 1978. Hackney has made significant contributions to the understanding of the mechanisms, regulation and structure of enzymes, specifically the relationships between enzyme structure and function. He has completed influential work elucidating the structure and function of kinesin molecular motors, proteins that move important cargo around the cell.

CHIEN HO:

The Alumni Professor of Biological Sciences has been a member of the Mellon College of Science faculty since 1979 when he came to Carnegie Mellon as head of the Department of Biological Sciences. In 1985, he founded the multidisciplinary Pittsburgh NMR Center for Biomedical Research, a joint program between Carnegie Mellon and the University of Pittsburgh. Ho is a pioneer in the field of magnetic resonance imaging (MRI) cell tracking and is researching ways to improve the delivery of chemotherapy nanodrugs.

GARY PATTERSON:

The professor of chemistry joined the MCS faculty in 1984. His research uses light scattering and statistical mechanics to study the structure and dynamics of macromolecular systems. For his work, he won the National Academy of Sciences Award for Initiatives in Research in 1981. Patterson is also known for his work as a historian, having published numerous books and articles on the history of chemistry.

JAMES RUSS:

The professor of physics joined the Carnegie Mellon faculty in 1967 shortly after graduating with his doctorate from Princeton University. Russ' career has focused on accelerator-based, high energy physics experiments, including the Collider Detector at Fermilab and the Compact Muon Solenoid at the Large Hadron Collider. He served as the spokesperson for the Segmented Large X Baryon Spectrometer (SELEX) project that studied charmed baryon production and decay at Fermilab.

ROBERT SUTER:

The professor of physics has been a member of the physics faculty since 1981. His early research focused on taking X-ray and other measurements of thin films, and his most recent work uses High Energy X-ray Diffraction Microscopy (HEDM) to study the microstructures in bulk crystalline and polycrystalline materials. He invented a technique that uses high energy X-rays and high-performance computing to create 3D maps of the microstructure of hard materials that can be used to develop stronger materials.

HELMUT VOGEL:

The professor of physics joined the Carnegie Mellon faculty in 1983. Vogel conducted high energy physics at particle accelerator laboratories including CERN, the Cornell Laboratory for Elementary-Particle Physics, the Stanford Linear Accelerator and DESY, searching for new quarks and leptons beyond those already found. In addition to his research, Vogel was well respected as an educator, having received MCS's Julius Ashkin Award, Richard Moore Award and the university's William H. and Frances S. Ryan Award for Meritorious Teaching.

MICHAEL LEVINE AND RALPH ROSKIES LEAVE LEGACY IN SUPERCOMPUTING

ALAN WAGGONER:

The Maxwell and Gloria C. Connan Professor of Life Sciences joined the Carnegie Mellon faculty in 1982. In 1992, he became vice chairman of Biological Detection Systems, a spin-off company based on his research. He returned to Carnegie Mellon in 1999 to become the director of the Molecular Biosensor Imaging Center. Considered one of the top scientists in the field of fluorescent probes, Waggoner invented CyDyes, cyanine dyes that have furthered the understanding of how genes and cellular functions are regulated.

After 30 years at the helm of the Pittsburgh Supercomputing Center (PSC), co-founders Michael Levine and Ralph Roskies stepped down from their positions as co-directors of the center. Levine, who is a professor in the Department of Physics, also has retired from the Carnegie Mellon physics faculty.

Levine and Roskies, along with Westinghouse's Jim Kasdorf, established the PSC in response to the growing need for bigger and better computers to support the research being done at Carnegie Mellon, the University of Pittsburgh and other centers across the country.

"What Mike and Ralph created in the PSC has stood the test of time, providing lasting value to the national science community," said Nick Nystrom, PSC's interim director. "Their vision led to a wealth of discoveries that expanded human knowledge and improved the way we live and work."

Under their direction, the PSC has built 19 highly advanced and productive high-performance computing systems, often designing and deploying the first generation of many machines and developing custom instruments. Today's systems at the PSC combine high-performance computing, artificial intelligence and big data to help researchers in the hard sciences as well as biology, social science and the digital humanities—disciplines that have recently become in need of computing power that can deal with large datasets.

Starting with the delivery of the center's first supercomputer in 1986, the PSC's founders created an environment for innovation at each stage, from winning the first grant from the National Science Foundation that established the center to hiring key people with unique skills and then empowering them to make innovative contributions. They fostered a community of scientific and computing researchers that enable scientific discovery by re-thinking the architecture and software of the systems they make available.

In honor of their accomplishments, Feb. 16 was proclaimed Michael Levine and Ralph Roskies Day in Pittsburgh and Allegheny County.

TURING AWARD WINNER AND NOBEL LAUREATE WITH TIES TO MCS RECEIVE HONORARY DEGREES

At Carnegie Mellon's 121st Commencement, Dean Rebecca Doerge stood on the stage and presented the MCS students set to graduate "from the best college of science in the cosmos." Among those cheering were the more than 300 recipients of bachelor's, master's and doctoral degrees from MCS and its affiliated programs and some very notable guests.

Seated nearby Doerge on the stage were two women with close ties to the Mellon College of Science — Turing Award winner Shafi Goldwasser and Nobel Laureate Ada Yonath. Earlier in the ceremony the two women received honorary Doctor of Science and Technology degrees from the university.

Goldwasser earned her bachelor's degree in applied mathematics from MCS in 1979. Coming back to the university meant coming back to the place where she first stepped out on her own and was exposed to many things that would lead her to her esteemed career in computer science.

After graduating from Carnegie Mellon, Goldwasser completed her doctorate at the University of California, Berkeley, where she is now the director of the Simons Institute for the Theory of Computing and professor of computer science.

Goldwasser won the Association for Computing Machinery's Turing Award in 2012, the highest honor in computer science given to an individual. She is the co-inventor of probabilistic encryption, the gold standard for security for data encryption, and the co-inventor of zero-knowledge proofs, a key tool in the design of cryptographic protocols. She has also made significant contributions in the fields of complexity and number theory.

"Being a math major is the best preparation for computer science," Goldwasser said later in the day at the Department of Mathematical Sciences diploma ceremony.

Yonath was a postdoctoral fellow at the Mellon Institute just prior to the merger between Mellon Institute and Carnegie Tech that created Carnegie Mellon University. She came to the Mellon Institute after completing her Ph.D. at the Weizmann Institute of Science. Later in her career she returned to the Weizmann Institute, where she now directs the Helen and Milton A. Kimmelman Center for Biomolecular Structure and Assembly and is the Martin S. and Helen Kimmel Professor of Structural Biology.

Yonath won the 2009 Nobel Prize in Chemistry for her pioneering studies of the structure and function of the ribosome. In her research, she mapped the position of each and every one of the quarter of a million atoms in the ribosome, uncovering how it functions at the atomic level.

Speaking at the Department of Chemistry's diploma ceremony, Yonath had one piece of advice to give to the graduating students.

"Don't look for advice. Do what you feel is good for you. [Something] that you can contribute, that you can find yourself, that you can love."

■ *Jocelyn Duffy*

Ada Yonath

Shafi Goldwasser

2018 **ALUMNI AWARD** WINNERS

Three MCS alumni were recognized with 2018 Alumni Awards for their professional achievements and service to the university. They were honored at a reception on May 18 during Commencement Weekend.

■ *Joyce DiFrancesco and Deb Taylor*

NJEMA FRAZIER, ALUMNI ACHIEVEMENT AWARD

Njema Frazier, who graduated with her bachelor's degree in physics in 1992, has a history of being first. She was the first African-American woman to graduate with a physics degree from MCS and the first to graduate with a Ph.D. in nuclear physics from Michigan State. She is now the acting director of the Inertial Confinement Fusion Program in the Department of Energy's National Nuclear Security Administration (DOE's NNSA); she is the first woman and first black scientist to head the office.

Within NNSA, Frazier manages scientific and technical projects that ensure a safe, secure and effective nuclear weapons stockpile without nuclear explosive testing. She has led efforts in nuclear weapons modeling and simulation, weapons physics experiments and international collaborations.

Frazier is an advocate for women and minorities in STEM. She was a leadership ambassador for the OneDOE Campaign and a champion of the Department's Minorities in Energy Initiative under the Obama administration and is a co-founder of the POWER (Professional Opportunities for Women at Energy Realized) Employee Resource Group at DOE. She holds positions on the National Advisory Board of the National Society of Black Engineers, in the Algebra by 7th Grade Initiative, and in Diversity Science LLC an expert-based network of scientists and engineers dedicated to broadening STEM participation.

MARK GELFAND, ALUMNI ACHIEVEMENT AWARD

Mark Gelfand has long been interested in industry and technical education. Since earning a B.S. in physics in 1973, he has been a factory worker, computer programmer, engineer, businessman, investor and philanthropist. Forty years ago, he founded Boston-area company Intex Solutions Inc which developed the standard calculator for the international structured finance markets.

For the past 10 years, Gelfand's physics and electronics background has served as the foundation for many STEM enrichment projects for deserving youth in the United States, Israel, Ethiopia, South Sudan, Kenya, Burundi and Rwanda. To date, in Africa, the philanthropic projects established by Gelfand's non-governmental organization, STEM Synergy, include 18 hands-on science and engineering centers, 31 university STEM outreach programs, 75 municipal schools' virtual computing labs, and many other hands-on STEM enrichment programs.

Gelfand also is the founder and active manager of TodayTomorrow Ventures, an "impact investment" portfolio of self-sustaining industrial and agro-tech companies in Ethiopia.

ASHLEY KILP GODISART, OUTSTANDING RECENT ALUMNI AWARD

Being a volunteer is a way of life for Ashley Kilp Godisart, and she maintains her passion for service to others regardless of her life's demands.

While at Carnegie Mellon, she excelled as a chemistry major and Science and Humanities Scholar, was a resident assistant at Mudge House and a volunteer at Children's Hospital in Pittsburgh. As a leader of the Global Impact Corps for Unite for Sight, Godisart spent two weeks in India and almost three months in Ghana.

After graduating in 2010, she attended the University of Pennsylvania for medical school and returned to Pittsburgh in 2014 for an emergency medicine residency at the University of Pittsburgh, where she served as chief resident. During that time, she re-engaged with Carnegie Mellon. She has served on the advisory board for CMU's chapter of Camp Kesem, is a member of the Carnegie Mellon Admission Council (CMAC), speaks frequently to chemistry majors and students interested in health professions and meets with Science and Humanities Scholars during Spring Carnival each year. Last year, she joined The Task Force for the CMU Experience to reform campus culture to promote wellness and compassion.

ALUMNUS **GLEN DE VRIES ANSWERS** MCS'S CALL

As an undergraduate student studying molecular biology and genetics, Glen de Vries volunteered for the university's telefund, calling alumni to solicit donations. As an alumnus, de Vries has answered the call to serve his alma mater many times over.

In December 2017, the university announced that de Vries, the president and co-founder of Medidata Solutions, gave the Mellon College of Science a transformational gift that will help the college to advance science at the university now and into the future. His $10 million endowment of the dean's chair at the Mellon College of Science will allow current dean Rebecca W. Doerge and her successors to invest in fundamental science, interdisciplinary initiatives and in faculty and students.

"This gift is about giving the Mellon College of Science the freedom to be visionary. We will build on all of our collective strengths to elevate science at this university. We will do this by doing foundational research and developing technologies that will lead to tomorrow's greatest discoveries. We will train leaders who look outside their disciplines to solve problems, and we will prepare those leaders to make a great impact, just like Glen continues to do," said Doerge at an April 24 reception celebrating de Vries, his gift and Doerge.

De Vries' path to success can be traced back to his time at Carnegie Mellon. He took classes in his biological sciences major as well as in computer science. And while working at the telefund, he connected with MCS alumnus Aaron Katz, which led to a job at Columbia University working on a clinical trial. In the course of this work, de Vries found that there was no software available to manage clinical trials. Data management and data sharing between labs was inefficient, if not close to impossible. He took his skills in biology and computer science and, with his partners, developed an answer that would become Medidata Solutions. The company is now the leading global provider of cloud-based technology for clinical research.

"I think Carnegie Mellon made me me," said de Vries. "The work here has an incredibly outsized effect on the world. I am really excited about what we can do around science at CMU."

De Vries has long been a supporter of MCS and Carnegie Mellon. He established a Presidential Fellowship in Biological Sciences and often returns to talk with students.

"I remember during a visit to CMU in 2015, it was a pleasure to see what a kick Glen got out of talking to 'his student' about the research he was supporting. He also gave a talk on entrepreneurship during that visit where he gave hard-won and heart-felt advice that wowed faculty and students alike," said Fred Gilman, the Buhl Professor of Theoretical Physics and former dean of MCS.

De Vries will continue to be a familiar face around Carnegie Mellon. Recently, he was named a university trustee.

■ *Jocelyn Duffy*

Carnegie Mellon University
Office of Gift Planning

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Over the last 50 years, the Mellon College of Science's legacy can be seen through the innovations that have come from our faculty, students and alumni.

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