Persisting in a search for new cancer treatment

Morgan Kelly

At some point this past summer, Kristan Scott wondered if his senior thesis project had a future. Since the spring of his junior year, the Princeton molecular biology major had studied the scientific literature related to a mutant gene linked not only to colorectal cancer but also to the cancer’s ability to resist chemotherapy. He was now hoping to reproduce and observe this resistance in yeast developed in the lab of his thesis adviser Alison Gammie.

But the resistance was not happening. Not that Scott could see, anyway. After a discussion with Gammie earlier this fall, however, he implemented a different approach. He had been tracking cell survival, but that all-or-nothing type of measurement would not detect more subtle interactions between chemotherapy and the mutant cells. Instead, Scott focused on a cell’s growth rate. While not a new strategy generally, he said, it was a clever technique in this case and, most importantly, it worked.

“It was a relief when it started working,” Scott said. “Before then, when I had to struggle to reproduce resistance, it was hard. Because work in biology can take years, I didn’t expect to have a large amount of data for my senior thesis, but I still wanted it to be good. Science can be rough throughout but it’s really satisfying when you finally get interesting data.”

Once Scott figured out how to record chemotherapy resistance, he found the ideal combination of cancer treatments that restored the yeast’s sensitivity to it. This result, which will be part of a paper currently being written in Gammie’s lab, suggests a potential new chemotherapeutic approach for treating certain cancers.

Like any breakthrough, Scott’s was the product of perseverance, a trait that he has shown consistently even in a situation when a young researcher could easily be discouraged, said Gammie, a senior lecturer in Princeton’s Department of Molecular Biology who oversees a lab with Princeton Professor of Molecular Biology Mark Rose.

“Kristan’s project was a little risky in the sense that we weren’t sure he was going to be able to find the right conditions to see the drug resistance,” Gammie said. “But he works really hard. He doesn’t postpone or procrastinate. We talk about something and he does it. That’s often the factor that determines how successful students are with their thesis. That was definitely the factor for him.”

Also exciting for Scott, a Miami native with an interest in medical school, is the clinical relevance of his work. The Gammie lab focuses on the role of mismatch-repair protein mutations in colorectal cancer, and Scott’s work hints at potential new chemotherapeutic approaches for treating this disease.

Molecular biology major Kristan Scott (right) prepares a sample of yeast cells with his thesis adviser, Senior Lecturer Alison Gammie. Scott focused his thesis on a mutant gene linked not only to colorectal cancer but also to the cancer’s ability to resist chemotherapy. Working with special yeast cells created in Gammie’s lab, Scott helped figure out the combination of cancer treatments that restored sensitivity to chemotherapy – a result that suggests a potential new chemotherapeutic approach for treating certain cancers.

The senior thesis: Quintessentially Princeton

John Sullivan

When architect Billie Tsien talks about the design for the new Andlinger Center for Energy and the Environment, you can almost see the shape of the low buildings at dusk, framed by rustling gardens and lit by the quiet beacon of an illuminated tower.

“You are walking through a series of gardens,” said Tsien, one of the principal designers of the new Andlinger Laboratory, which will house the center. “We thought it was important to emphasize the ground plane, the green aspects of a garden, and to bring in light by creating a series of courtyards.”

Andinde, researchers in brightly lit laboratories will search for new energy sources to power societies around the world. Yet the structures themselves are spare and almost prismatic, rooted firmly in the earth.

“These are not just huge machines,” Tsien said. “You sense the human beings. You sense the hand that made things.”

This merger of humanity and technology is the balance the architects of the Andlinger Lab have tried to strike. Pablo Debbenedetti, vice dean of the School of Engineering and Applied Science and chair of the project’s building committee, said the University wants the construction to reflect the goal of science and technology in service to the planet. Instead of a massive stand-alone laboratory building, the committee felt the design should incorporate the research space into the surrounding landscape.

“It is the idea of the center as a place,” he said, “the idea of gardens that take you from one area to another. It will be a place for accomplishment, but also for thinking and contemplation.”

Andlinger Lab design reflects science in service of the planet

Emily Carter, the director of the Andlinger Center for Energy and the Environment, overlooks the site of the Andlinger Laboratory. The laboratory, which will be built over the next three years, will offer state-of-the-art technical facilities for researchers and students seeking solutions to the world’s energy challenges.

Over the next three years, construction crews will build a series of linked structures in an L-shaped plot that extends back from the intersection of Olden Street and Prospect Avenue. From the street, the site will look like three two-story buildings connected by plazas, gardens and pathways. The appearance is deceptive. The Andlinger Lab is actually one building that will break through the surface of the ground like an iceberg emerging from the sea.

Much of the linked structure will rest in the bedrock, which both insulates the structure and dampens vibrations that could interfere with sensitive equipment.

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Princeton offers admission to 7.86 percent of applicants

Martin Mbugua

Princeton has offered admission to 2,095 students, or 7.86 percent of the record 26,664 applicants for the Class of 2016, in what is expected to be the most selective admission process in the University’s history. This compares with Princeton’s final admission rate of a record-low 8.3 percent for the Class of 2015.

The University’s undergraduate admission office mailed letters March 29 to the students in the regular decision applicant pool. Of the 2,095 students admitted, 726 are students who applied through single-choice early action and were offered admission in December. The class size is expected to be 1,300 students for the Class of 2016.

“We have selected students who are extraordinarily bright in every way. They are enormously gifted intellectually and also very well rounded in their interests. Many have made their mark in the arts, in athletics and in their communities as engaged citizens. Their early accomplishments suggest that these students will help fulfill Princeton’s mission to educate the next generation of leaders and public service of all nations,” Dean of Admission Janet Lavin Rapelye said.

“We were impressed with the strength and quality of the applicant pool. The superb talents of so many of the applicants this year made our job as difficult as it ever has been. We reviewed every application carefully and individually, and in the end it was hard to turn away so many highly qualified candidates,” said Lavin Rapelye.

This year’s applicant pool is the second-largest in the University’s history. During the past eight years, the University has seen a 95 percent increase in applications.

Applications to Princeton have increased steadily with enhanced recruiting efforts and growing awareness of the University’s pioneering no-loan financial aid program. Through Princeton’s generous aid program, all students on financial aid are offered grants that do not have to be repaid — giving students an opportunity to graduate debt-free. The University’s admission process is need-blind for both domestic and international students, which means that students are not at any disadvantage if they need financial aid.

Sixty percent of the current student body receives financial aid, compared with 38 percent in the Class of 2001, the last class to enroll before enhancements to Princeton’s aid program. Currently, the average grant is $35,132, and for the coming year it is expected to be in excess of $35,000.

This was the first year since 2006 that the University offered an early action round for prospective students whose first college choice was Princeton. The University’s early action program requires applicants to apply early only to Princeton, and allows them until Jan. 1 to decide whether to accept Princeton’s offer.

The Class of 2016 were from 8,738 high schools and 151 countries. Of the applicants, 10,225 had a 4.0 grade point average, and 15,945 candidates had scores of 700 or higher on each of the three sections of the SAT. Among the students from high schools that rank their students, 97 percent of the admitted applicants are in the top 10 percent of their class.

Students admitted to the Class of 2016 come from all 50 states, plus Washington, D.C., Guam, the Northern Marianas Islands and Puerto Rico, with the largest representation from New Jersey, followed in order by California, New York and Texas. International students represent 12.2 percent of the admitted students and come from 73 countries, including Australia, China, Greece, Madagascar, Jamaica, Singapore, Israel, Venezuela and Zimbabwe.

Of the students offered admission, 50.6 percent are men and 49.4 percent are women. There are 776 students identified as people of color, including biracial or multiracial students. Fifty-eight percent of the admitted students come from public schools, and 12.5 percent will be the first in their families to attend college. Sons or daughters of Princeton alumni account for 9.5 percent of the admitted students.

Beyond the 2,095 students offered admission to the Class of 2016, an additional 1,472 wait-listed students were offered positions on the wait list. As in past years, approximately half of those students are expected to choose to stay on the wait list. Students on the wait list who may be offered a position in the class in May or June will receive the same financial aid.

Continued on page 8

Amy Campbell, who has been an administrator in campus life and athletics at Princeton for a total of 17 years, has been named the associate director of campus services and planning for University Services. Her appointment was effective July 1.

Reporting to Vice President for University Services Chad Klaus, Campbell directs University Services’ transition to a new integrated services model as well as overseeing this approach across university units and University Services. In addition, she manages new University Services initiatives and collaborates with offices across campus to enhance the delivery of a broad spectrum of daily services for faculty, staff and students.

“I am very excited to have Amy join the University Services leadership team. Her exceptional understanding of the Princeton culture coupled with her commitment to serving our campus community made her a clear choice for this important position,” said Klaus.

The executive director of campus service and planning, which is a new position within the University’s executive leadership, is responsible for developing and managing strong relationships across campus with students, faculty, staff, and academic and administrative offices.

Campbell most recently served as executive director of athletics and planning in the Office of the Vice President for Campus Life.

Nicole Shelton, a professor of psychology, has been named master of Butler College, one of Princeton’s six residential colleges. She will begin her four-year term on July 1.

Shelton will succeed Vanjari Kulkarni, a professor of electrical engineering and director of the Keller Center for Innovation in Engineering Education, who has served as the master of Butler College since 2004.

Shelton, who joined the Princeton faculty in 2000, focuses her research and teaching on understanding psychological processes and their application to the target’s perspective. She has received two of the University’s top teaching awards, the Graduate Mentoring Award in 2011 and the President’s Award for Distinguished Teaching in 2008, and has been among Princeton’s numerous campus community activities.

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In general, the copy deadline for each issue is the Friday 10 days in advance of the Monday cover date. The deadline for the next issue, which covers May 14-June 17, is Friday, May 4. A complete publication schedule can be found at www.princeton.edu/bulletin. Call 609-258-3601 with questions.

To submit events for consideration for “Nassau notes,” go to www.princeton.edu/main/news/ share/submitevents.

Memorial set for Dickinson

A memorial gathering for Bradley Dickinson, a professor of electrical engineering, will be held at 6 p.m. Monday, April 23, in the Computer Science Building Auditorium, with a reception immediately after.

The service is open to members of the campus community and Dickinson, 69, who died Jan. 22 at age 63. A full obituary can be found at blogs.princeton.edu/main/news.

Dickinson died Jan. 22 at age 63. A full obituary can be found at blogs.princeton.edu/main/news.

Name: Matthew Armatsted
Position: Lesbian, gay, bisexual, trans-gender (LGBT) program coordinator in the Office of the Dean of Undergraduate Students. Organizing two to three programs per week with the LGBT Center and also with student organizations and departments across campus. Working with students on leadership development, peer education, discussion groups, and informal support and mentoring. Overseeing the LGBT Center’s 10 interns and some administrative items, such as the budget, library and website.

Quote: “One of my favorite things is helping students figure out how to lead other students and to see their own potential. I also really love developing programs that are collaborative. They provide a fantastic opportunity for helping students figure out where they can expand their impact.”

Other interests: Participating in community activism in Philadelphia and training activists. Gardening. Reading. Spending time with his two cats and dog.

www.princeton.edu/bulletin
dedication and service

A lejandro Zaera-Polo, an international renowned architect and scholar, has been selected as the next dean of Princeton’s School of Architecture. Zaera-Polo has been a visiting lecturer in architecture at Princeton since 2008. He was appointed as dean, which requires approval of the University’s Board of Trustees, effective July 1. He will succeed Stanley Allen, the school’s dean since 2002, who will step down at the end of this academic year to return to full-time teaching and architectural design.

“As a world-renowned designer and critic, Alejandro Zaera-Polo embodies a quality that is highly prized by Princeton’s School of Architecture — a commitment to being at the forefront of the ideas that will drive both the theory and practice of architecture in the future,” Princeton President Shirley M. Tilghman said. “I am confident that with our extraordinary faculty and Alejandro as our dean, the school will continue to play its critically important roles of educating the next generation of thought leaders and incubating the next advances in the field.”

Princeton Provost Christopher Eisgruber added, “Alejandro Zaera-Polo is not only one of the world’s foremost architects, but also a respected intellectual and educator who has published on a wide variety of important architectural topics. During our interviews with him, he impressed us by his commitment to sustaining Princeton’s role as a training ground for designers and theorists who will be innovative contributors to the field of architecture. Alejandro’s talents and his breadth of vision make him a worthy successor to Stan Allen. His leadership will undoubtedly add to the luster of a school already blessed with outstanding faculty and students.”

Zaera-Polo said he was honored by his selection, saying, “I am delighted to have been trusted to direct the School of Architecture and to join the Princeton community,” he said. “Princeton has a tradition of intellectual leadership and experimental work across different fields that I hope to cultivate during my tenure at the school. This is the right time to be looking for new possibilities across different disciplines, especially in the field of architecture, design and urbanism. Princeton is the best place to develop this type of approach.”

Zaera-Polo is the founder and principal of Alejandro Zaera-Polo Architecture, an international practice based in London and Barcelona. He was a founding partner of London-based Foreign Office Architects. His award-winning projects include the Yokohama International Cruise Terminal in Japan, which is noted for its use of dramatic form and innovative materials, as well as its interplay of architecture, landscape and nature. Among his other notable projects are a building for the Ravehovn College of Design and Communication in the United Kingdom, the Carabanchel social housing project in Madrid, the Blue Retal complex and multiplex in Istanbul, the Spanish Pavilion at the 2005 International Expo in Aichi, Japan, and the Dulnyouk Publishing headquarters in Paju, South Korea.

Zaera-Polo has received many prestigious honors for his work, including the David Adjaye Prize for Architecture, five RIBA awards from the Royal Institute of British Architects, the Venice Architecture Biennale Award and the Charles Jencks Award for Architecture. While maintaining his international practice, Zaera-Polo has played a significant role in the academic discipline of architecture. In addition to his teaching at Princeton, he has served as dean of the Berlage Institute in Rotterdam, and currently occupies the Berlage Chair at Delft University of Technology in the Netherlands and the Norman R. Foster Visiting Professorship of Architectural Design at Yale University. As a theorist, his writing has appeared in international publications such as El Croquis, Quadrat, A+U, Archves, Volume and Log. Zaera-Polo is a graduate of the Escuela Técnica Superior de Arquitectura de Madrid and holds a master’s degree in architecture from Harvard University.

Employees honored for dedication and service

Zia Bartley

Five Princeton staff members were recognized for their commitment to excellence and exceptional performance during the annual Service Recognition Luncheon on March 29 in Jadwin Gymnasium. In addition, two staff members were honored for their leadership potential.

Those honored as recipients of the President’s Achievement Award were Kristian Kauker of the Office of Information Technology (OIT), Tammy Kinnot of the Office of Finance and Treasury, Joseph Montemurro of the Princeton Institute for the Science and Technology of Materials (PRISM), Cathy Werts of the Department of Electrical Engineering, and Mo Lin Yee of the Department of Anthropology.

The award was established in 1997 to recognize members of the support and administrative staffs with five or more years of service whose dedication, excellent work and special efforts have contributed significantly to the success of their departments and the University. The winners receive a framed certificate and a $2,000 award and have their names inscribed on a plaque that is displayed in the Office of Human Resources.

The award is part of the Staff Recognition Program administered by the Office of Human Resources. Staff members with 10, 15, 20, 25, 30, 35, 40, 45 and 50 years of service were honored during the luncheon; those with 25 or more years of service also received commemorative gifts. A total of 448 University staff members with a collective 7,035 years of service were honored for their dedication this year.

In remarks at the luncheon, President Shirley M. Tilghman commended both the award winners and the long-serving staff members who were recognized at the event, praising their talent, dedication and commitment to excellence in their work at the University.

Kauker joined the Princeton staff in 1999 in the Academic Services unit of OIT. Today, he is an electronic specialist and is responsible for assisting students, faculty and staff members with their media services needs. In her nomination, Betty Leydon, vice president of Institutional Animal Care and Use Committee was launched in response to the allegations, which were based on an anonymous statement. Each allegation was thoroughly investigated based on available records and the committee concluded that there was no clear and convincing evidence of inhuman or nonconsent behavior.

Princeton senior Daniel Gastfriend has been awarded a 2012 Truman Scholarship, which provides up to $30,000 for graduate study. The award recognizes students who are committed to careers in government, the nonprofit or advocacy sectors, education or elsewhere in public service.

A Princeton report reveals that disparities in socioeconomic characteristics can account for 80 percent of the life expectancy divide between black and white men, and for 70 percent of the imbalance between black and white women. The study is one of the first to put a number on how much of the divide can be attributed to racial differences in factors such as income, education and marital status.

A project initiated at Princeton made the first observation of a cosmic effect theorized 40 years ago that could provide astronomers with a more precise tool for understanding the forces behind the universe’s formation and growth, including dark energy and dark matter.

Princeton researchers led by Professor of Mechanical and Aerospace Engineering Edgar Choueiri are embarking, with support from Sony Corp., on a three-year effort designed to advance the possibilities of recording technology and realistic sound reproduction.

A major effort to study a mysterious substance that could enhance understanding of the cosmos and fusion energy has received a critical boost from the U.S. Department of Energy’s Princeton Plasma Physics Laboratory (PPPL). Scientists at PPPL have designed and delivered a crucial component for a device that can heat a spot of foil to 30,000 degrees Centigrade in less than a billionth of a second. The part will complete a linear accelerator that researchers at the E.O. Lawrence Berkeley National Laboratory are using to create a supersized state called “warm dense matter.”

From left, Princeton President Shirley M. Tilghman joins President’s Achievement Award winners Tammy Kinnot, Cathy Werts, Joseph Montemurro and Mo Lin Yee. (Not pictured: Kristian Kauker)
Committee recommends fraternity, sorority rush policies

The University’s Committee on Freshman Rush Policy has issued recommendations for administering and enforcing the prohibition on fresh- men from affiliating with a fraternity or sorority during their freshman year, and on students from soliciting the participation of freshmen from fraternities or sororities. The recommendations have been presented to President Shirley M. Tilghman, who will make a final deci- sion on the recommended policies and practices later this spring.

The committee consulted with students, faculty and staff to help create new policies to ensure compliance with the policy, and to provide ideas for how to best com- municate with students and parents to ensure understanding of the new rules.

The committee was asked to complete its report early enough to allow for a period of comment by students and others before the end of the spring semester.

In a report issued March 25, the committee said its primary goal was to provide clear guidance about what activities should be prohibited, as well as what the consequences may be for a student who knowingly engages in such activi- ties. In particular, the committee said the new policy should be considered as a serious matter.

The committee consulted with students and other campus community members through discussion groups, stakeholder meetings and an online survey to develop recommendations that address a number of issues associated with the policy. The chair and Dean of Undergraduate Stu- dents Kathleen Deignan.

The report includes the following recommendations:

- Freshmen would be prohibited from affiliating with a fraternity or sorority, with affiliation including, but not limited to, such activities as: membership in a, pledge or any other group known as rush; participating in any activity sponsored by a fraternity or sorority; or contributing funds to a fraternity or sorority. This prohibition would extend from the time of arrival on campus through the end of the spring semester of freshman year.
- Students could not solicit the partici- pation of any freshman in a fraternity or sorority, whether or not they are seeking membership or not. They could not, however, invite a freshman to participate in any activity sponsored by a fraternity or sorority; and organizing a sponsored event to which freshmen will be invited.
- Students who solicit the participation of freshmen in Greek organizations or affiliated activities should be suspended.
- Students who join, pledge or rush fraternity or sorority should expect to be suspended.
- Freshmen who attend or participate in any Greek-sponsored events or activities may be subject to a lesser pen- alty for probation.

The committee proposed that indica- tions of “sponsorship” by a fraternity or sorority could include an invitation on behalf of a fraternity or sorority; the use of fraternity or sorority funds to sup- port the activity; the activity being considered an official or other explicit identification of fraternity or sorority sponsorship of an activity. Activities that both promote and support the use of the term “fraternity” or “sorority” on campus would be covered by the policy.

The committee recommended that an activity where members of a fraternity or soror- ity may be present should not, alone, be considered an indication of sponsorship. The committee recommended adding the rules be clear that casual conversa- tions about Greek organizations would be prohibited.

The procedures and penalties that are ultimately adopted will be outlined in the Freshman Rush Policy, Rights, Rules, Responsibilities.

The committee recommended including six undergraduates, half of whom are affiliated with a fraternity or sorority. The committee was one of six groups established last year to review the current rules and to develop recommendations for two recent student, faculty and staff initiatives: the Working Group on Campus Social and Residen- tial Life and the Steering Committee on Undergraduate Women’s Leadership.

The working group is established to implement recommendations to ensure the responsible use of alcohol. The committee’s responsibilities will encompass the following issues: beverage, food and entertainment options; encouraging policies and practices to ensure compliance with state and local laws; and general policies governing campus pub use.

The committee was established to work on developing and implementing policies and procedures consistent with the University’s policy on Greek organizations. The committee will identify renovations needed for Café Vivian, as well as assist in requesting a permit for the campus pub to operate on Saturday. The committee will also be responsible for developing recommendations for administering and enforcing the university policy on Greek organizations. The committee will also be responsible for developing recommendations for administering and enforcing the university policy on Greek organizations. The committee will also be responsible for developing recommendations for administering and enforcing the university policy on Greek organizations. The committee will also be responsible for developing recommendations for administering and enforcing the university policy on Greek organizations. The committee will also be responsible for developing recommendations for administering and enforcing the university policy on Greek organizations. The committee will also be responsible for developing recommendations for administering and enforcing the university policy on Greek organizations.

An online full report is now available at www.princeton.edu/campuslife/freshman-rush-policy.

Griffin Management Award

In addition to the President’s Achieve- ment Award winners, two staff members were honored with the Managing Director of Griffin ‘23 Management Award. They were: Karen Jackson-Weaver, associate director of the University’s Office of Residential Life and the Steering Committee on Undergraduate Women’s Leadership.

The award was established to honor Griffin — a 1923 alumnus who served as the longtime secretary and general secretary of Princeton’s Alumni Council in the 1920s. The award was sponsored by the Office of Human Resources to recognize adminis- trative staff who develop their leadership and management skills. The winners receive a grant of up to $2,500 to participate in professional activities scheduled within the next year to provide new insights and perspectives, renew management skills and enhance skills necessary to their current responsibilities.
T he Communion University celebration, which annually brings the town and University together for a day of performances, food, games and more, is planned for noon to 5 p.m. Saturday, April 28.

Scheduled to take place rain or shine on Nassau and Witherspoon streets and on the campus, the event is sponsored by students at the University and the Arts Council of Princeton. Merchants, nonprofit organizations, musicians, performing and visual artists, food vendors, and many student organizations and performing groups will turn the area into a colorful fairground with events for students and families alike.

The Princeton University Band will kick off the festivities as it marches up Witherspoon Street beginning at 11:30 a.m. Campus Communion activities will feature: performance groups including the Princeton University Rock Ensemble, Triple 8, Symph, Ballet Folklorico, the Divergence, V-Tune, Princeton Tora Taiko and Naacho; student organization booths, demonstrations and activities including a parachute throw for children; sports clinics put on by University athletes on the Firestone Library green; and performances by the University’s student a cappella groups in the East Pyne Hall arch.

The event also will include: a half-hour organ demonstration at the University Chapel at 2 p.m., exhibitions of student work from the Lewis Center for the Arts, and visits from the University’s tiger mascot and cheerleaders.

For more information on Communion weekend, contact the Arts Council at 609-924-8777 or visit www.artscouncilofprinceton.org; for more information about the Communion celebration, also call the University’s Office of Community and Regional Affairs at 609-258-3144 or visit www.princeton.edu/community.

Celebrating a computing pioneer

Eric Schmidt, executive chairman of Google and a 1976 graduate of Princeton, will deliver a public address as part of the Princeton Turing Centennial Celebration, a three-day series of events in honor of the 100th birthday of Princeton graduate alumnus and “father of computer science” Alan Turing. The celebration will take place Thursday through Saturday, May 10-12, at various times and in various locations on campus. For registration details and a schedule of events, visit www.princeton.edu/turing. Turing, whose ideas strongly influenced the development of modern computers, received his Ph.D. from Princeton in 1938.

Fristfest celebration planned

Students, faculty, staff and their families are invited to celebrate the annual FristFest Weekend at the Frist Campus Center Thursday through Saturday, May 3-5. FristFest kicks off at 4 p.m. May 3 with an outdoor fiesta-themed picnic on the South Lawn featuring games, a caricaturist, giveaways and live entertainment. Meal plan holders may obtain four meal tickets for entrées by presenting their University TigerCard.

The event also will include: a parachute throw for children; Naacho; student organization booths, VTone, Princeton Tora Taiko and Princeton UBL; student organization booths, exhibitions; Music Department; Office of Information Technology; Princeton University Band; Princeton Institute for International and Regional Studies; Princeton University Chapel at 2 p.m., exhibitions half-hour organ demonstration at the Pyne Hall arch.

For broader listings of campus public events:

PUBLIC EVENTS CALENDAR
Information on tickets is available at the website below:

UNIVERSITY TICKETING
www.princeton.edu/tickets
609-258-9220

For listings by selected University sponsors:

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www.princetonartmuseum.org
609-258-3789

Athletics
www.princetonathletics.com
609-258-3558

Center for African American Studies
www.princeton.edu/caas/events
609-258-2949

Counsel of the Humanities
humanities.princeton.edu/calendar
609-258-4717

Frist Campus Center
www.princeton.edu/frist
609-258-1700

Lewis Center for the Arts
www.princeton.edu/arts/events/calendar
609-258-1500

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www.princeton.edu/rb/libexhibitions
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McCarter Theatre
www.mccarter.org
609-258-2787

Music Department
www.princeton.edu/music
609-258-4341

Office of Information Technology
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lectures.princeton.edu
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President’s Lecture Series
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Princeton Institute for International and
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609-258-4851

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Devising a ‘silver bullet’ for measuring water use by plants

M ost gardeners can tell by rule of thumb how much water their tomatoes and carrots need, but taking an accurate reading of plants’ actual water use is a very difficult problem. Although the measurement is critical for understanding how ecosystems are affected by drought, development or climate change, there is no easy way for scientists to verify estimates of water use. Right now, scientists have to use expensive, bulky laboratory equipment to analyze samples that allow them to directly track how much water plants are using. But if Ida Posner’s senior thesis project works the way she hopes, that could all change.

Posner, a civil and environmental engineering major at Princeton, has developed a technique to simplify and reduce the cost of water vapor measurements. It is not just a theory: For her thesis project, Posner is building a small, cylindrical device that could lead the way for scientists to quickly and efficiently measure plants’ water use.

“You put your sample in, and within a few seconds it gives you a reading,” she said. Posner is still working on technical details in the hydrology lab in the Engineering Quadrangle and, although she has not obtained final results, she is “pretty confident about it.”

Posner is working with Professor Kelly Caylor’s research team, which is looking for better ways to measure the water use in an ecosystem. Making accurate estimates of how much water is used by plants in a given area is a critical element in governing development in semi-arid regions of the world, such as the area of Africa just below the Sahara Desert.

“There is an urgent need for better guidance regarding the management of water for use in dryland agriculture and the response of rangelands to rainfall variability in semi-arid regions,” said Caylor, assistant professor of civil and environmental engineering and director of the Princeton EcoHydrology Lab. “Any advice or additional insight to these issues depends critically on being able to routinely and accurately characterize the water use of plants.”

Posner, who is from Pittsburgh, is completing a certificate in African studies and spent a semester last year studying at the University of Cape Town in South Africa. She hopes that her research will lead to new work in the area.

“There are so many opportunities for great projects,” she said. To track how plants use water from the environment, the researchers measure isotopes present in water vapor emitted by a plant—a process called transpiration. The proportion of isotopes, which are variants of elements determined by the number of neutrons in an atom, is affected by how the water vapor formed.

“The isotopic signature of water gives it a fingerprint that you can use to trace water throughout the ecosystem,” Posner said. “In the hydrological cycle, you are looking at water being taken up from the soil, converted into transpiration, and then sent back into the atmosphere — is it through evaporation or transpiration?”

Water vapor created by plants through transpiration has a distinct isotope composition, but this measure is often skewed by organic contaminants, including ethanol and methanol, that are emitted by the plants. It’s possible to remove or account for these contaminants, but that requires laboratory equipment not suitable for field use. Posner’s task is to create a cheap and practical filter to remove these chemicals without disturbing the sample.

In testing her device, Posner first extracts water from a basil plant in Caylor’s Princeton laboratory by flushing out a sample and freeze-drying the water. (Another of Caylor’s students, Megan Gammie, is using a special clamp that can directly collect emitted water vapor. Suh, also a civil and environmental engineering major, is developing the device as part of her senior thesis project as well.)

“You put your sample in, and within a few seconds it gives you a reading,” Scott said. “It was a combination of perseverance and technology that allowed him to reproduce the resistance,” Gammie said. “And he’s repeated it enough times that we believe it. Kristan showed scientific maturity in his willingness to repeat his results. He understands that if you don’t reproduce your research, you can’t publish it.”

Scott credits Gammie’s mentorship as crucial to his having to face the challenges of his thesis research, as he was able to discuss ideas, obstacles and new approaches with her as needed.

“The amount of time I have put into this project is more than I’ve ever done before,” Scott said. “Still, there was never a point when I wanted to give up because with Allison there was always something new to try, a different way from what I had been doing.”

For her senior thesis project, civil and environmental engineering major Ida Posner is developing a filter that could allow scientists to quickly measure water use by plants like this basil grown in the Princeton EcoHydrology Lab. Measuring plants’ water use is critical for understanding how ecosystems are affected by drought, development or climate change.

Scott Continued from page 1

the growth of cancer. These proteins act as a kind of biological spell-check, Gammie said, that ensures the DNA of genes is free of errors. While the work in Gammie’s lab is conducted on yeast, her group works with University of Connecticut Professor of Medicine Christopher Heinem to translate the results to human cancer cells. Scott focused his work on MSH2, a gene associated with hereditary non-polyposis colorectal cancer, which accounts for roughly 5 percent of all colorectal cancer cases. Mismatch-repair genes can experience mutations that make the MSH2 gene itself a mutant and can lead to colorectal and other cancers with a strong resistance to conventional chemotherapy.

For his senior thesis, Scott examined how the mutations in MSH2 bestow that strong defense against chemotherapy. In addition, he wanted to better understand how the mutant cells respond to cisplatin chemotherapy treatment by chemotherapy and whether the defective mismatch-repair proteins mean that cancer cells are not receiving the message to die.

The reproduction of resistance was key to tracing where it came from, Scott said. He worked with the chemotherapy drug cisplatin—frequently used to treat colorectal cancer—and a yeast strain developed by Tim Arlow, a doctoral student in Gammie’s lab. The yeast strain was sensitive to a spectrum of drugs, yet had the defective MSH2 gene. Thus, the researchers knew the yeast should respond to the treatment and could then better understand why cells with mutant MSH2 genes were resistant to cisplatin.

After he observed this resistance, Scott helped figure out that a combining of cisplatin and a different treatment called horelazostatin restored the sensitivity of some defective yeast strains to chemotherapy, an important result that expanded on Arlow’s work, Gammie said. This finding will be included in the upcoming paper of which Scott will be a co-author.

Scott’s determination, though, was among the most impressive qualities of his work, Gammie said. Once he identified the best combination of cancer treatments, he reproduced the results.

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Identifying new norms in fertility treatment experiences

Princeton sociology major Lauren Brachman’s senior thesis offers a modern analysis of an age-old question: Where do babies come from? Brachman explored patients and clinicians’ experience with in vitro fertilization (IVF), in which embryos are formed outside the body and then transferred into a woman’s uterus. Brachman, who was conceived through IVF, spent more than 90 days over the last summer and winter break at a California fertility clinic, observing and conducting interviews. In her thesis, she identified new norms that have emerged since the first IVF clinics opened in the 1980s, as access to the practice has expanded and as the culture around it has changed.

“Many people (sociologists) enter clinics, and their projects are to share all the pain and struggles that happen there. I recognized that history, but I was more intrigued by what sociologists would call alterity — the alternative possibilities that exist in a space of deviance” from the normal pathway to pregnancy, Brachman said.

Brachman found her topic during her junior year, when she took the class “Born in the USA: Culture and Reproduction in Modern America” with Associate Professor of Sociology and Public Affairs Elizabeth Mitchell Armstrong. For the first class assignment, students had to talk to their parents about their birth stories.

“When I asked my parents to recount their stories, three years of sociology kicked in. I interviewed them separately and noticed similar themes in the narratives they were telling,” Brachman said. “I thought it would be interesting to enter a clinic and talk to other patients.”

Brachman’s thesis was extraordi- narily ambitious in scope and achievement, from the amount of participant observation to how the background reading informed the conclu- sions, said Armstrong, who became Brachman’s thesis adviser.

“Lauren is a sociologist through and through; one of the reasons this thesis is so ambitious is because Lauren has excelled at every step of the thesis project,” Armstrong said. “She struck gold in her research; she and she has been mining that lucky strike with tremendous skill, devotion and care every step of the way.”

Brachman conducted her fieldwork at the clinic where her parents received care to conceive her older sister. She interviewed 13 clinicians, including physicians, IVF nurse coordinators, procedure room nurses and embryologists. Among the 22 patients she interviewed were intended parents (including straight and lesbian couples), ovum donors, gestational carriers and patients undergoing cryopreservation to preserve their genetic material for future use. In addition, Brachman observed consultations and medical procedures.

Brachman’s trips to California for research and transcriptions of her interview and observation recordings were funded by an Adel Mahmoud Global Health Scholars Program fellowship. In addition to studying sociology, Brach- man is pursuing two certificates, in gender and sexuality studies and global health and health policy.

Her thesis examines four main issues: men’s roles in the clinic; the decision to tell others about undergoing IVF; spirituality and other ways in which people make meaning of the process; and an analysis of the people’s responses to the question, “Where do babies come from?”

Brachman identified multiple roles that men play in the clinic: as general support to their partners; as medical support, conducting research at home; as patients, when the male partner is the partial or whole source of infertility; and as expectant fathers.

“Men nickname their embryos or the actual follicles in an ovary,” Brachman said. “They’re talking about potential birthdays and names and narratives and how they’re going to tell their children about the pregnancy. Brachman said. “A lot of that is facilitated through these new medi- cal technologies, like ultrasounds. For instance, an intended father will buy a home Doppler, because he’s had so much experience with ultrasound in the clinic. That happened with one patient, and his partner told me, ‘Whenever he doesn’t feel connected to the baby, I can tell he’s going to bring it out.’”

Brachman noted that patients she spoke to had a strong drive to share information about their experiences and their specific care, and the topic of IVF was prevalent in the media they consumed and among their friends and co-workers.

Brachman said she was surprised to discover that spirituality played a large role in the health care providers’ per- ception of their work. “When you’re an embryologist and you’re telling me that babies come from God, there’s very interesting cultural work being done,” Brachman said.

She found that IVF patients expressed their spirituality in nuanced ways. “Patients would say babies come from God, but they didn’t feel the same way about embryos pro- duced through IVF” she said. “A lot of things are defined by this potential imagined child or outcome. … When a baby is not in play, things are much more easily dismissed.”

Brachman said she felt compelled to address her personal relationship to the subject in her thesis.

“I’ve had a super-positive experi- ence with IVF — I exist!” she said. “It would be wrong if I didn’t say that I have been influenced by the questions I asked and how I understood people. … That’s one of the things I like about sociology and anthropology. They don’t shy away from the idea that the researcher has perspectives or bias, but that doesn’t say the work is not worthwhile.”

After graduation, Brachman, who is from Westfield, N.J., will be working at a New Jersey fertili- ty clinic — the one at which she was conceived — doing lesbian, gay, bisexual, transgender, queer commu- nity outreach and support, as well as supporting the clinic’s administrative and medical functions. She plans to pursue graduate school in social work or public health, or both, and a career in marriage and family counseling and therapy.
Admitted students, families to arrive for Princeton Preview

More than 2,000 people are expected to visit campus this month for admission events as newly admitted students and their families arrive to sample the University's academic and social offerings. The annual hosting program will be held Thursday through Saturday, April 19-21 and 26-28.

The event will allow prospective members of Princeton's Class of 2016 to sit in on classes, take campus tours and attend panel discussions with students, faculty and deans on topics such as academic and residential life, multiracial and international students. Princeton Panel discussions also will be offered on opportunities available through the University's numerous and award-winning Bridge Year Program, which allows up to 28 entering freshmen to defer their enrollment and spend nine months abroad in service. Participants can attend an activities fair hosted by student organizations and clubs as well as open houses at Career Services, the Center for Jewish Life, the Office of Religious Life, the Field Center for Equal Opportunity and Cultural Understanding, and the Lesbian, Gay, Bisexual, Transgender Center. Admission students will be paired with current students and attend social events in the residential colleges and elsewhere on campus.

Students and their family members will begin arriving as early as 8 a.m. each Thursday, and the program will run through 10:30 a.m. Saturday.

This rendering shows the Andlinger Laboratory main entrance from Olden Street across from Shapiro Walk. A stairway connects the main parts of the lab. Graduate student space at the lower level opens to a garden. An elevated walkway connecting to the Engineering Quadrangle's E-Wing is at the left, above the main entry walk.