STUDENT SPOTLIGHT

Drawn to Public Service, He Found a World of Experience at Rutgers

Lessons learned in and out of the classroom

Nicholas Pellitta was in high school when he decided to pursue politics.

The Hunterdon County native participated in the YMCA's Youth and Government program and served in the highest student role, youth governor of New Jersey. He went to Washington, D.C. for a weeklong conference, meeting students from across the nation, interacting with government officials, and getting a taste of what it's like working in public service.

"I totally fell in love with it," says Pellitta, a **School of Arts and Sciences** and Rutgers Honors College senior. "It felt like I was among people who really wanted to make a difference."

At Rutgers, he found the ideal academic program to build on that youthful passion: majors in political science and economics, and minors in Spanish and international and global studies. Earlier this year Pellitta was named a Schwarzman Scholar and will spend a year at a Chinese university earning a master's degree in global affairs.

> "Take the time to find your passion at Rutgers."

Looking back on it all, Pellitta says that some of the most formative experiences as a Rutgers undergraduate were ones that he had never expected when planning his academic career.

There was the trip he took to Northern State Prison as a student in professor Milton Heumann's advanced political science seminar. Pellitta and his classmates toured the facility, met with inmates, and spoke to corrections officers. Afterward, he dug into the history and found that no sitting president had ever visited a prison until Barack Obama did in 2015.

"It hit home to me how certain populations go entirely ignored by the broader political system," Pellitta states. "It's interesting that throughout the '80s and '90s we had government officials talking about cracking down on crime, but none ever visited a prison to see what conditions were like."

Another indelible experience was being among the first cohort of students to attend Rutgers Honors College. Pellitta served as the college's first student advisory board president, a role that required leadership, planning skills, and occasional acts of improvisation.

"It was an experiment to help the deans figure out what works to improve the student experience," he observes. "You try out an event and nobody shows up. What do you do? You learn to be resilient and say, 'Okay, this is not what the community is looking for. Let's go back and try something else.'"

Pellitta will leave in August for Tsinghua University in Beijing, where he will join 146 students from around the world who have been selected as Schwarzman Scholars. When he returns, he plans on going to law school.

One of the enduring qualities of Rutgers, he says, is people—deans, faculty, fellow students—all of whom helped him in ways small and large.

"If you take the time to find your passion and seek out the right resources, so many people at Rutgers are willing to help elevate you whatever your goals might be," he says.

Schwarzman Scholars is an international scholarship program founded by financier Stephen A. Schwarzman to respond to the geopolitical landscape of the 21st century. The program gives top students the opportunity to develop their leadership skills and professional networks through a one-year Master's Degree at Tsinghua University in Beijing.

Senior Nicholas Pellitta

ROUNDUP

Things You May Not Know about the School of Arts and Sciences

23

With 23 Fulbright students in 2018, Rutgers–New Brunswick is a Top Producer for the tenth year in a row

SAS Graduate Brings Research Expertise to Armenia

Christopher Markosian, a 2018 graduate of the **School of Arts and Sciences Honors Program**, is in Armenia this year as one of 16 Arts and Sciences Fulbright recipients teaching and conducting research around the world. At Rutgers, he found every opportunity to do research: he began working with Distinguished Professor Kenneth Irvine in the second semester of his first year, participated in the Aresty Summer Science Program, and received three Aresty Undergraduate Research Fellowships and a Division of Life Sciences Summer Undergraduate Research Fellowship. He received the Rutgers University–New Brunswick Chancellor's Undergraduate Research Excellence Award for his creative approach to understanding the Hippo pathway and earned highest honors in molecular biology and biochemistry and a Henry Rutgers Scholar Award for his undergraduate thesis work, later published in *Journal of Cell Science*. He also founded and served as the editor-in-chief of the *Rutgers Research Review*, an online undergraduate research journal where Rutgers students can publish and share their work. As a research intern at the RCSB Protein Data Bank (PDB), he coauthored "Analysis of impact metrics for the Protein Data Bank," published in *Scientific Data*, with Director Stephen Burley and other members of the RCSB PDB team. Now at Yerevan State Medical University, Christopher teaches English to students, residents, faculty, and staff. He is also conducting research on alternative methods of assessing human exposure to heavy metals at the American University of Armenia's Acopian Center for the Environment, which promotes conservation and restoration through research, education, and community outreach.

State Autism Center Opens at Rutgers

The New Jersey Autism Center of Excellence at Rutgers University–New Brunswick was recently established with funding from the Governor's Council for Medical Research and Treatment of Autism, New Jersey Department of Health, to improve research, treatment, and services for people with autism spectrum disorder (ASD). While autism affects one in 59 children in the U.S., one in 34 New Jersey children has the disorder.

The new center is positioned to become a national model for programs integrating autism research, clinical care, and education, said Elizabeth Torres, professor of psychology in the **School of Arts and Sciences**, who will be leading the center, along with colleagues at Rutgers Robert Wood Johnson Medical School and Children's Specialized Hospital.

"Families of people with autism come to New Jersey from across the globe because of the exceptional services offered here," Torres says. "But like the rest of the nation, we lack a network that allows researchers, clinicians, and families to connect."

The center is forming a collaborative, interdisciplinary network of health care providers, researchers, families, biopharmaceutical companies, universities, corporations, small businesses, and other autism centers. The goal is to establish best practices, share information on successes and challenges to research, educate researchers and clinicians, and locate treatment and employment for people of all ages with ASD.

"Autism is not just a childhood disorder," says Torres. The center seeks to change the public perception of ASD, from an exclusive psychological- or psychiatric-centered description to one that more holistically ascertains the physiological underpinnings of this condition.

"The descriptions of autism as a mental illness, a social deficit, a lack of empathy or a mind that cannot theorize about others' behaviors or actions obscures a person's inherent abilities," Torres said. "We need to change the model to help children with autism become adults who are an integral part of our workforce."

The **School of Arts and Sciences** provides an education of unparalleled breadth and depth, from biological, mathematical, and physical sciences to humanities and social and behavioral sciences. The largest and most comprehensive academic unit of Rutgers University–New Brunswick, with roots that date back to the beginning of higher education in America, the school reflects an educational tradition that began in 1766 with the founding of Queen's College, the institution that would become Rutgers University. Four outstanding undergraduate institutions carried that tradition into the 21st century: Rutgers, Douglass, Livingston, and University colleges. Established in 2007 with the union of these four colleges, the School of Arts and Sciences, with 750 full-time faculty and a vibrant and diverse student body of over 20,000 students, is now a globally engaged teaching and research institution.

Rutgers University–New Brunswick Ranks...

#1 Public University in the Northeast

—*U.S. News & World Report*

 # 3 in the nation, 4-year institutions

—*Military Times*

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School of Arts and Sciences

SPRING/SUMMER 2019

Excellence in the Arts and Sciences

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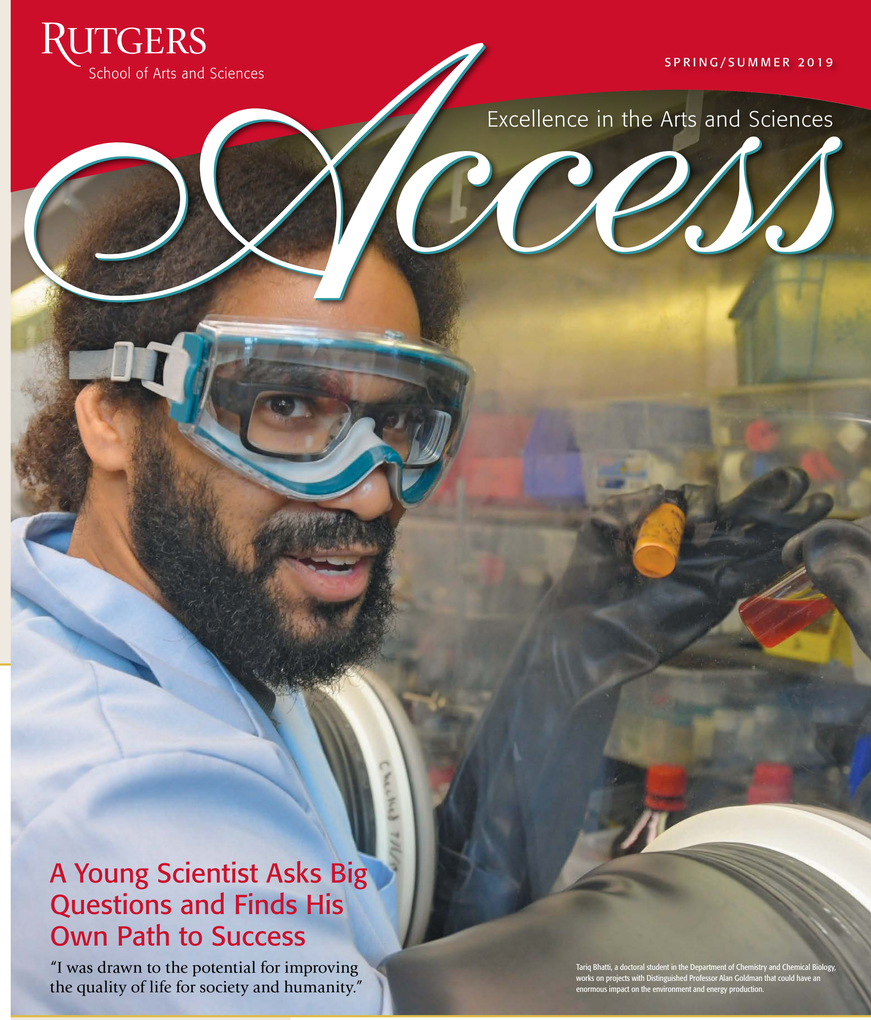

A Young Scientist Asks Big Questions and Finds His Own Path to Success

"I was drawn to the potential for improving the quality of life for society and humanity."

Tariq Bhatti, a doctoral student in the Department of Chemistry and Chemical Biology, works on projects with Distinguished Professor Alan Goldman that could have an enormous impact on the environment and energy production.

Tariq Bhatti's career was finally starting to take off.

After graduating in 2009 with a bachelor's degree in chemistry, he had struggled through the Great Recession, working in retail and at his father's gas station. But he began landing industry jobs, including an analytical chemist position at W.R. Grace, the multi-billion dollar conglomerate.

"My last position at Grace was really great," says Bhatti, a University of Maryland graduate. "They trusted me with important problems while giving me generous support and mentorship."

Yet something was missing during the five years Bhatti spent in industry. He felt restless, though his passion for chemistry was as strong as ever.

"Some of the projects I worked on raised very intriguing questions," Bhatti says. "But those questions were considered tangential because they were unrelated to business."

One of his supervisors got him thinking in a new direction.

"He said that if those are the questions that interested me, then I ought to go to graduate school," he says. "So I did."

(continued inside)

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From Energetic Student to Deputy Secretary of Higher Education

Her Rutgers years paved the way for key role in New Jersey

Diana Gonzalez, raised in the densely-populated town of Weehawken, arrived on Rutgers University Livingston campus for her first year and found the setting downright rural.

"There were deer frolicking outside the dorms," says Gonzalez LC'07. "It was beautiful."

The surroundings were tranquil, but her undergraduate life was fast-paced, all-consuming, and often exhilarating.

Majoring in psychology and minoring in history, she also worked full-time as an RA, held a part-time job off-campus, and played wide receiver and linebacker for the New York Sharks in the Independent Women's Football League.

"I'd be in my car commuting to practice and have my neuropsychology textbook open and reading it while in standstill traffic," Gonzalez says.

She also found time for a six-credit internship at Lucent Technologies where she had to analyze and give critical feedback on cellular technology designs.

Gonzalez savored the expansive scope of experiences available at Rutgers, and always felt like the Livingston community had her back.

"I had fantastic relationships with faculty and deans," she says. "I always knew when office hours were. I found the supports that I needed to be successful."

She may not have known at the time, but the pluck and resourcefulness with which she navigated her undergraduate life pointed the way toward her future calling. In January 2018, just a little more than a decade after getting her undergraduate degree, Gonzalez was named Deputy Secretary of Higher Education in the administration of New Jersey Governor Phil Murphy.

Serving under Higher Education Secretary Zakiya Smith Ellis, Gonzalez works with state leaders to expand educational opportunities across New Jersey. She sees it as more than a job.

> "Education is the key to success."

"Education is the key to success and social mobility, and my goal and my will is for every child, every student, and every adult to have access," she says.

That passion began taking hold at Rutgers. She was one of about a dozen undergraduates admitted to a seminar on higher education taught by then Rutgers President Richard L. McCormick.

"We looked at the fundamental questions: what does higher education mean? Who does it serve? What is its future?" Gonzalez recalls. "It was a critical course that opened my eyes to higher education as a discipline."

After graduating, Gonzalez spent three years teaching kindergarten and preschool in Japan. She also taught English to adults, and found that students would often share their life concerns with her after class.

"That got me thinking about the issues in people's lives that affect their academic success," she said. "When I returned, I was adamant I wanted to focus on higher education."

She enrolled in the Rutgers Graduate School of Education where she earned a master's degree and became absorbed in the study of higher education law, taught by Barbara Lee, Senior Vice President of Academic Affairs. Several years later, she was drawn to Murphy's gubernatorial campaign for its focus on equity in education.

Looking back on it all, the role of Rutgers looms large. But there was an influence even greater: her parents, native Cubans who were persecuted under the Castro regime and fled to the U.S.

"My parents couldn't finish high school," she says. "Yet they put me through college. I owe them everything. In my eyes, they are the true success story. And I hope they realized their dreams through me."

Coincidentally, our alumna and student featured here share a common connection; the gubernatorial campaign of Phil Murphy. Nick Pellitta served as an intern on the campaign, reporting to Diana Gonzalez.

Diana Gonzalez LC'07

ALUMNI PROFILE

Q&A

AFFIRMING THE VALUE OF HUMANITIES IN TODAY'S WORLD

An interview with Michelle Stephens, Dean of Humanities

Since becoming School of Arts and Sciences Dean of Humanities in 2017, Michelle Stephens has been working to keep the strong humanities tradition at Rutgers resilient in a time of new challenges. Her initiatives include Humanities Plus: The 21st Century Learner, a program that provides support for innovative teaching strategies. Another, the Language Engagement Project, is a multi-pronged effort to build a collaborative culture of engagement with world languages across schools and departments at Rutgers–New Brunswick. In the first of a series of interviews with the Arts and Sciences Deans, Stephens talks about the humanities and why they are vital, especially in our current, tech-saturated world.

Q: What is your academic background?

A: Broadly speaking, cultural studies. My Ph.D. was in American studies. Because I am Jamaican, I chose to focus on Caribbean, specifically West Indian, people in the U.S. At the moment I was coming out of graduate school, scholars were identifying and studying something called African diaspora culture—studying blacks across the Americas. This broader notion of cultural studies said, in effect, if you're going to study black people, then you need to approach your questions from a variety of angles: literary, historical, musical, visual, and more. That was my intellectual starting point.

Q: How does that inform your approach to your role as Dean of Humanities?

A: Cultural studies scholars move across the humanities. We don't believe in academic silos. If you are thinking about what it means to be a Jamaican in this contemporary period, you are listening to Bob Marley and you are studying the work of visual artists, and you're reading Jamaican gay writers, and putting all those pieces together. So thinking about the conversations across humanities departments is a perspective I bring from my own approach to the study of culture.

Q: What are your priorities?

A: Humanities scholarship has a value for the public sphere and we have to figure out fresh ways of articulating that value. When I say public sphere, I think about students sitting in class. We need to think more about the ways we teach, and work harder to grab their attention. The subtitle of the Humanities Plus program is The 21st Century Learner. That means both "What's the social world the 21st century learner is living in, and how are the humanities speaking to that world?"

Q: How would you describe the role of the humanities in society?

A: I think of the humanities in terms of communication and meaning—all the forms we use to examine and interpret the human experience and communicate its meaning. In our contemporary moment, ethics is one area that captures these values. Science and technological innovations raise ethical and moral questions once they are brought out of the lab and into the world. Questions of meaning suddenly kick in, and it's the humanities that can provide the forms and frameworks for thinking through those questions.

Q: What do you like best about your job?

A: Rutgers is a premier humanities institution. That's a big draw. If anyone can find new ways of teaching the humanities, we can. I also like the movement between looking at the larger initiatives at the university and figuring out where the humanities fit within them. I keep my ears to the ground to learn what matters to humanities faculty, and then try to link that to the initiatives and larger structures that are in play at the university.

Dean of Humanities Michelle Stephens

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MATHEMATICAL & PHYSICAL SCIENCES

(continued from front)

Scientist Asks Big Questions and Finds His Own Path

Today, Bhatti is a Ph.D. candidate at the Rutgers University School of Graduate Studies, where he works on the research team of Alan Goldman, a professor of chemistry and chemical biology in the **School of Arts and Sciences**. In Goldman's lab, Bhatti is pursuing the questions that fascinate him, and conducting experiments that could have enormous impact on the environment and energy production.

"I was drawn to Dr. Goldman's lab for the potential to improve the quality of life for humanity," Bhatti says.

And with Goldman, a 30-year veteran at Rutgers and a Distinguished Professor, he has found the ideal mentor and collaborator.

"When I walked into Alan's office for the first time, there were papers everywhere and a chalkboard covered with formulas and molecules," Bhatti recalls. "He was explaining something to me and had to take a moment to pause before deciding which ones he should erase."

The Goldman Group, comprised of eight graduate students and a post-doc, specializes in organometallic chemistry—using metal atoms and organic molecules to make chemical transformations. The lab seeks to develop catalysts to produce society's most important chemicals using less energy and with less waste.

Among those chemicals is ammonia, used to grow the world's food supply. Since the early 20th century, ammonia has been produced through the Haber-Bosch process, which combines nitrogen and hydrogen. This monumental breakthrough allows fertilizer to be produced on an industrial scale. But the process, which requires high levels of heat and pressure, burns staggering quantities of natural gas and releases large amounts of carbon into the atmosphere.

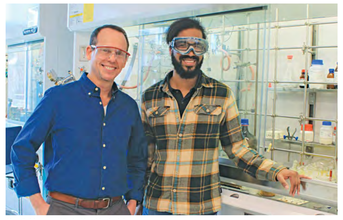
"It's an important process, obviously, because it allows us to eat," Goldman says. "But it would nice to do that without the environmental impact."

Toward that end, Goldman's lab is collaborating with scientists from the University of North Carolina at Chapel Hill and Yale University in a National Science Foundation-funded project to develop new chemistry that would produce ammonia without reliance on fossil fuels, in part by obtaining the hydrogen from water, and using renewable electricity.

Another of the lab's major projects involves the development of a two-step catalytic process to convert simple hydrocarbon molecules in a process that could lead to the production of clean-burning synthetic diesel fuel.

"We are focused on the basic chemistry and where it can take us," says Goldman in describing the overall mission of his lab. "Whether it can take us to sustainable production of ammonia or to synthetic fuel, we look for important applications of the fundamental chemistry."

Bhatti has enjoyed the change from industry to academia. "I have more time to really understand which reaction might work—and how and why it works," he explains. He still has productive working relations with industry, and last year



Alan Goldman and Tariq Bhatti in the lab.

received a one-year fellowship from BASF Corporation.

He's thankful he found his way into organometallic chemistry. He initially thought he might pursue drug development.

"Then I saw a cool paper on turning carbon dioxide into methanol by this triple catalyst system," he says. "That piqued my interest."

Goldman, who received the 2019 American Chemical Society Award in Organometallic Chemistry, had a similar moment of discovery at around the same age. He was a graduate student at Columbia University when scientists discovered the potential for reactions between the type of organometallic complexes he had been working on and simple hydrocarbon molecules, known as alkanes, which are the major constituent of petroleum.

"Alkanes are the simplest and most abundant organic molecules and were regarded as nearly impossible to use for controlled chemical reaction," he explains. "The idea of doing transformations on the simplest molecules, and at the same having an understanding that they are the most important molecules, has always been compelling to me."

Beyond the potential benefits of their work, Bhatti and Goldman say there is an enduring beauty and mystery.

"To Emmanuel Kant, beauty was not just something that looks nice, but something that humbles you," Bhatti says. "In organometallic chemistry, you see things that are so striking; it seems that nature is sharing a secret."

Goldman agrees. "There is a visual beauty in molecules, but it goes deeper. It's the beauty of solving a puzzle where the solution is a deep understanding of how something works."

SOCIAL & BEHAVIORAL SCIENCES

The 2018 Rutgers College Fed Challenge team traveled to Washington, D.C. for the national finals. From left to right: Emmanuel Kanellos, Dan Mio, Samantha Mead, Ashton Welles, and Mihir Trivedi.

HOW THE ECONOMICS DEPARTMENT BUILT A WINNING RUTGERS TEAM

Alumni and faculty step up to support students in the College Fed Challenge

In 2003, Rutgers University–New Brunswick economics professor Jeff Rubin was approached by two undergraduates wanting the school to participate in an intercollegiate academic competition known as the College Fed Challenge. Rubin had never heard of the competition, which had recently expanded from the high school to the college level. But he was game.

"Here are these motivated students knocking at my door," Rubin says. "I was ready to support them."

He had no idea that the team would become a respected Rutgers institution, competing against, and often defeating, some of the most prestigious schools in the country. Rutgers won the nationals in 2016—the only time a public university has finished at the top—and last year finished second to Yale University.

"It's an amazing feeling," says Rubin.

The team's triumph, he emphasizes, is due to the students. Many are economics majors in the **School of Arts and Sciences**; others are business and mathematics majors. They spend the fall semester mastering the intricacies of U.S. economics and monetary policy, and then developing a presentation that's accurate, informed, and eloquent.

But a little-known side to this success story is how alumni who majored in economics—and who went on to high-level careers in government and banking in New York, New Jersey, and Washington, D.C.—have stepped up to support the team.

One of the first things Rubin did was find a macroeconomics whiz to whip the team into shape. He sought out Raymond Stone, who received his doctorate from Rutgers in 1981, and whose career included positions at the Federal Reserve Bank of New York, Merrill Lynch, Fidelity Bank, and decades of running his own company, Stone & McCarthy Research Associates, a global economic and financial market research firm.

The partnership between Stone and Rubin, also a Rutgers alumnus (RC'70), continues to this day. While Rubin handles the oversight of the team, including crafting the presentation, Stone prepares the team for battle, drilling them relentlessly on everything from the labor market to inflation to interest rates.

"I come with an insider's view of the Fed," Stone says. "I have a technical grasp of how the Fed works and I try to bring that understanding to the students."

Rubin likens Stone to a Zen master, quietly commanding the students' attention during twice-weekly practice sessions at New Jersey Hall.

"Ray is the force in the room," Rubin says. "When he starts to talk about policy the students are totally absorbed."

Meanwhile, other Rutgers-trained economists, some of whom didn't have the College Fed Challenge available to them as students, were eager to lend a hand. Doug Simons RC'90, a managing director of UBS Investment Bank and a Wall Street veteran, learned about the team while investigating ways he could give back to his alma mater.

"This immediately caught my interest," Simons states. "I would have liked to have done this activity as a student."

Over the last decade the Simons family has provided financial support for the team. Simons occasionally sits in on practices to add his perspective culled from years of advising major commercial banks. "I spend a lot of time thinking about how changes in monetary policy are going to affect the drivers of my clients' business," he says. "This is the type of background and knowledge I try to bring to the students.

"And for me, I just feel very grateful to be able to give back to Rutgers in a way that's so connected to what I do."

The team's trips to Washington, D.C. for the 2016 and 2018 finals turned up additional support.

An accomplished group of alumni economists who forged careers inside the Beltway came out to meet the team. The group included Robert Arnold RC'83 GSNB'88, Congressional Budget Office; Mark Klee RC'05, U.S. Census Bureau; and Clara Vega RC'95, Board of Governors of the Federal Reserve System. The three took time out from their busy lives to help the students prepare for the competition and chat about careers, graduate education, and life as an economist.

"Being an economics nerd from way back, I was happy to do this," Arnold says. "Both times I was in awe of how smart, bright, and well-informed the students were. As a loyal son of Rutgers, I was really proud."

Klee was also eager to help. A former member of the College Fed team, Klee said the experience training under Rubin and Stone helped him meet the demands of graduate school and entering the academic job market.

"Jeff and Ray had us rehearse again and again and again and got us access to as many questions as they possibly could," Klee recalls. "Those practices showed me what a professional's work ethic and work habits should be."

The gathering, arranged by Rubin, was held at a Dupont Circle restaurant and left both alumni and students feeling inspired and grateful.

"Meeting with the students, I was very proud of my alma mater," notes Vega. "The students I talked with had the perfect mixture of being smart, eloquent, and nice. It made me feel better about the youth who will lead this country in the future."

Paul Robeson: Rutgers Renaissance Man

Paul Robeson is one of Rutgers University's most distinguished alumni and the quintessential 20th century Renaissance man.

In 2019, Rutgers marks the centennial anniversary of Robeson's graduation from Rutgers College in 1919. In recognition, our community honors his achievements as a scholar, athlete, actor, singer, and global activist in a yearlong celebration featuring lectures, performances, art exhibitions, and more.

The son of a runaway slave, Robeson attended Rutgers on an academic scholarship, the university's third black student. He was an extraordinary scholar and athlete. He won 15 varsity letters in football, basketball, baseball, and track and is in the College Football Hall of Fame. Robeson, who spoke more than 20 languages fluently, honed his oratory skills as a member of the Intercollegiate Debating Association and was inducted into Phi Beta Kappa and Rutgers' Cap and Skull Honor Societies. He was valedictorian of his graduating class in 1919.

After earning a law degree from Columbia Law School, Robeson began using his talents to promote African and African-American history and culture. Over nearly four decades, he achieved worldwide acclaim as a vocalist, orator, and actor on stage and screen. A towering figure in the African-American struggle for human dignity and democratic rights, Robeson connected this struggle with people around the world fighting for political rights, cultural recognition, and economic justice.

In June 1919, Paul Robeson stood before the audience assembled for the Rutgers College graduation to deliver his address: "The New Idealism." He opened by thanking recent World War I veterans for forging a "new American spirit," one that he charged his audience to embrace by joining him in this "fight for the great principles for which they contended, until in all sections of this fair land there will be equal opportunities for all, and character shall be the standard of excellence . . . and until black and white shall clasp friendly hands."

Robeson developed these ideas in his senior thesis on "The Fourteenth Amendment, the Sleeping Giant of the American Constitution," calling for its use "to ensure equality before the law (so) the American people shall develop a higher sense of constitutional morality."

Throughout his life, Paul Robeson worked toward the "American Idealism" he espoused in his valedictory speech. The spotlight that shines on Robeson on the centennial of his graduation from Rutgers illuminates the rich legacy he left at the university and the world.

Paul Robeson Plaza Opening Friday, April 12, 3:00pm
Voorhees Mall (behind Ford Hall)

Join us as we unveil the Paul Robeson Plaza, an open space that pays homage to Rutgers University's most acclaimed alumnus who distinguished himself as a scholar, athlete, and artist–but lived most deeply as an activist for civil rights and social justice. Situated by Voorhees Mall on the College Avenue Campus, the plaza serves as a beacon of Robeson's life and legacy. The plaza was envisioned and championed by the Class of 1971 for its 45th anniversary with strong support from the Rutgers African-American Alumni Alliance (RAAA), Inc.

Learn more about Paul Robeson and Rutgers Centennial Year Celebrations: **robeson100.rutgers.edu**

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A STUDENT'S OWN BIRTH STORY LEADS TO GENETICS MAJOR AND FOCUS ON REPRODUCTIVE HEALTH

Rutgers lab explores causes, consequences of infertility

Caroline Kratka knew from an early age that she wanted to study reproductive medicine.

Her father Scott Kratka is a senior embryologist at a New Jersey clinic specializing in such procedures as in-vitro fertilization (IVF), where sperm and egg are combined outside the body to develop a viable embryo.

"When I was little I would come to his lab to watch him work," said Kratka, a **School of Arts and Sciences** and Rutgers Honors College junior. "I was fascinated."

Even as a student at High Technology High School, a Monmouth County school that emphasizes STEM disciplines, Kratka stood out for her commitment to reproductive science. "Everyone else was doing typical science fair stuff and there I was watching embryos hatch on time-lapse videos," she quips.

But Kratka's connection to reproductive health runs deeper than her facility for the science. You might even say that the field is hers by birthright. She and her three siblings were born through assisted reproductive technology (ART) procedures used to treat infertility, including IVF.

"I feel very fortunate that my family had access to these procedures and were successful," she notes. "I hope I can contribute to this field and help others who need these options."

At Rutgers, she found a major to match her passion, and a research opportunity that has her working alongside scientists dedicated to advancing reproductive medicine. Kratka is majoring in genetics and working in the laboratory of Karen Schindler, a genetics professor studying the causes and consequences of infertility in women.

"Our major interest is in understanding how women make eggs and why that process is inherently error-prone in humans," Schindler says. "These errors can cause early miscarriage, infertility, or developmental disorders like Down syndrome."

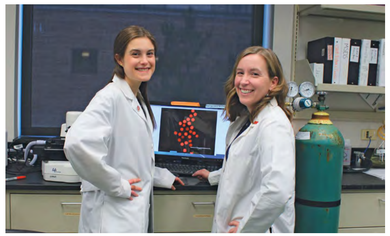
The lab's mission is carried out in two distinct approaches. Using mouse models, Schindler and her team study the mechanics of meiosis–the process of cell division that produces eggs and sperm–and why it can go awry, resulting in eggs with the wrong number of chromosomes.

> "Students are really contributing to the research program."

The lab also analyzes the DNA of women who have undergone IVF treatment, with an eye towards identifying genes and mutations that could result in eggs with the wrong number of chromosomes.

This approach, done in partnership with a New Jersey IVF clinic, could help identify biomarkers, or medical signs, to predict a patient's potential for success in IVF or other procedures, and help design new treatments.

"A patient may have cycle after cycle of IVF treatment, producing really poor embryos that would never implant," Schindler says. "If it was known that she had a genetic variant, then her clinician would see that her potential success rate is not what her age suggests it should be, and she could be counseled in a different direction."



Caroline Kratka (left) and professor of genetics Karen Schindler with a lab computer showing the egg cells of mice. Schindler's lab examines the causes and consequences of infertility.

According to the Centers for Disease Control and Prevention (CDC), about 6 percent of married women ages 15 to 44 in the U.S. are unable to get pregnant after one year of trying, and about 12 percent of women ages 15 to 44 have difficulty becoming pregnant or carrying a pregnancy to term, regardless of marital status.

While the emergence of ART has helped many couples have children, the procedures are expensive, time-consuming, and only partially successful. According to the CDC, the average percentage of non-donor ART cycles that led to a live birth were 31 percent in women younger than 35, dropping to as low as 3 percent in women over 44.

"If we can contribute even a little to improve the field, we can have a huge impact on families in the U.S. and worldwide," Schindler says.

A recent study led by Schindler and published in the journal *Current Biology* found unusual patterns in the way three proteins regulate each other in female mouse eggs, a discovery that may have implications for female fertility and cancer biology.

Schindler says the genetics department is ideal for students like Kratka because the major requires significant research from undergraduates.

"They are in the lab during the school year and full-time during the summer," she says. "Students are really contributing to the research program and that gives them a clearer picture of how research and medicine tie together."

Kratka is leaning towards pursuing an M.D./Ph.D. program that would offer ample opportunity for both research and clinical applications. "I love looking at embryos and oocytes under the microscope," she explains. "That is the science aspect and I get pure joy from doing that."

As for the clinical side, she says her father receives notes from patients with pictures of their babies.

"I've shadowed other fields and have never seen that joy anywhere else."

LIFE SCIENCES

Research Brings Graduate Student to Banks of the Raritan, and the Amazon

Livia Souza encounters indigenous communities as she documents rare, understudied languages

On June 26, 2014, several young men from an isolated Amazonian tribe emerged from the rainforest to make contact with the outside world. They appeared anxious, carrying bows and arrows and speaking a language none of the stunned onlookers understood.

The extraordinary scene—which took place in the shallows of Brazil's Envira River—was captured on video that went viral, triggering international news coverage.

Livia Camargo Souza, a Rutgers University School of Graduate Studies student was intrigued. She noted that their words sounded similar to the Panoan languages she had been studying as a Ph.D. candidate in the Department of Linguistics, **School of Arts and Sciences**.

> "You begin to understand the reality of living a sustainable life in the middle of the jungle, and you marvel at what it must be like to know about every plant and tree, and what fish are in the river."

"I was fascinated," says Souza. "Here is this isolated community attempting to communicate in what sounds like a Panoan language."

Now, Souza is leading the effort to document the language of the tribe, known as the People of the Xinane. The tribe numbers about 35 men, women, and children who may have been fleeing from conflict with armed intruders in Peru when they emerged from the jungle near the Brazilian border.

Souza spent two months with the Xinanes last spring, employing a range of techniques to decode their language.

"They were friendly, they were welcoming, they were amazing," she says.

Souza's work with the Xinanes reflects a calling that began in her native Brazil and later drew her to Rutgers to study with scholars like Mark Baker, chair of the linguistics department.

She found her path after witnessing a ceremony by the Huni Kuin, an indigenous community known for their strong spiritual and cultural traditions and enduring connection to the Amazon rainforest.

"They were dancing and talking about jungle medicine," she said. "This was my first contact with indigenous culture, and it was as if a light bulb went off in my head. It seemed like an amazing world to be explored."

She earned her master's degree in linguistics at the Federal University of Rio de Janeiro, specializing in the endangered Yawanawa language, a Panoan language spoken in northwestern Brazil. Her longtime adviser told her to continue her studies at an American university. She focused on Rutgers.

"I had been reading Mark Baker for a long time and was a big admirer of his work," Souza says. "It was close to what I wanted to do—researching understudied languages, trying to find patterns and generalizations, but within a formal linguistic framework."

Since coming to Rutgers, she has collaborated with Baker on research and done extensive fieldwork in Brazil.

"I have had amazing support from both Mark and Rutgers," she says

For her project with the Xinanes, Souza is working with the National Indian Foundation, or FUNAI, a Brazilian government agency that has helped protect the tribe's territorial rights and provided them with health care. Souza and her collaborator Luana Almeida are producing a Xinane-Portuguese dictionary of currently about 700 words and a digital archive of the language.

The project comes as indigenous people face unprecedented challenges from rapid urbanization. Even though the Xinanes are eligible for territorial rights and health care, their way of life is profoundly challenged by industrialized society, especially if they begin traveling to nearby cities.

"They'll be exposed to sodium- and sugar-rich foods, alcohol, and new diseases, as well as monetary transactions and the trappings of modern society such as television and the education system," Souza says. "We can't predict how all this will affect them, but we know it's critically important to document this historical moment."

The work presents some special challenges. Although the grammar is similar to other Panoan languages, the dialect sounds very different, she said. And the Xinanes know no other language.

"I had to come up with a lot of my own methodology," she says. "First I pointed to things. That's great for objects, but what do you do about verbs? I asked the representative from FUNAI to start jumping around or hiding behind a pole."

She became friends with two of the Xinane women, which also helped.

"Every day we would spend time together and play with the kids," she explains. "Slowly I began to understand more of what they were saying."

Beyond the wealth of research material she gained, Souza says her time spent working with indigenous people is an inspiring, revelatory experience that helps her grow as both a scholar and a person.

"You arrive with huge bags of stuff, and they have nothing," she notes. "You begin to understand the reality of living a sustainable life in the middle of the jungle, and you marvel at what it must be like to know about every plant and tree, and what fish are in the river."

Livia Souza, a doctoral student in the Department of Linguistics, researches rare and understudied languages. Top: Souza works with members of an isolated Amazonian tribe, the Xinanes, to understand and document their language. Right: Souza in the library at the linguistics Seminary Avenue offices. Bottom: A member of the Xinanes, who emerged from isolation in 2014.

HUMANITIES