

FAB FOUR



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- John Carpinelli, NJIT's campus representative for the Goldwater program

NJIT undergrads continue to earn the nation's top academic honors, the latest being a new university record of four students named Goldwater Scholars this year by the Barry Goldwater Scholarship and Excellence in Education Foundation. The scholarship is recognized among the country's most prestigious for STEM undergraduates pursuing research careers.

This year's NJIT Goldwater Scholar class, doubling last year's total, is the largest from any academic institution in New Jersey and equals second-most across the nation, beating out universities such as Columbia University (3), Harvard University (3), Massachusetts Institute of Technology (2) and Princeton University (2).

Of the more than 5,000 applicants this year, only 396 students from 461 colleges and universities nationwide have been named Goldwater Scholars.

“This was the best NJIT has ever done with this program. ... The reason so many of our students received this prestigious scholarship this year, first and foremost, is due to the strong qualifications of our nominees,” said John Carpinelli, NJIT's campus representative for the Goldwater program who has overseen the scholar nominee selections since 2010. “Undergraduate research has become a part of NJIT's culture, and the wealth of opportunities for interested students to obtain meaningful research experiences has created a much larger pool of strongly qualified candidates to nominate for the Goldwater program.”

NJIT's 2020 Goldwater Scholars will now each earn a prize of up to \$7,500 per year for up to two years to support their education and research. Here they are:



SYDNEY SWEET is a junior majoring in chemical engineering, whose nanoparticle research is aiming to improve health care for Type 2 diabetes patients. During a first-year NJIT Provost Summer Research Fellowship with her professor Xiaoyang Xu, she began a study of hydrogels for the delivery of heart regenerative therapeutics, and contributed on a review paper on nanotechnology-mediated devices to treat obesity published in the journal *Advanced*

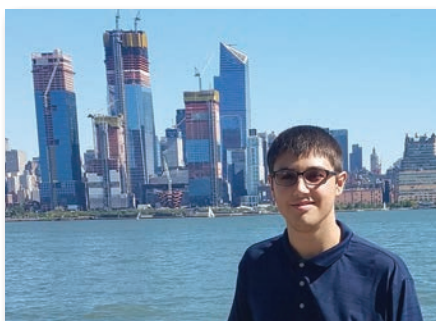
Healthcare Biomaterials. Since then, she's earned a \$3,000 seed grant for research to improve diabetes drug delivery — work she's presented at the 2019 American Institute of Chemical Engineers (AIChE) national conference in Orlando, Fla. “I am developing a novel oral delivery system using nanoparticles that can offer a safer way to deliver drugs than how they are typically administered now via subcutaneous injections,” said Sweet.

Through NJIT programs, she also landed her current co-op at Infineum, and a study-abroad opportunity in Melbourne, Australia, last year, which she says has shaped her future career plans.

On Her Scholarship and Future: “Living in Melbourne for six months greatly expanded my worldview. ... The city's sustainability efforts and wildlife conservation inspired me to pursue

NJIT 2020 Goldwater Scholar Class Among Largest In U.S.

nanomaterials research in the future that could improve alternative energy sources to combat climate change. I am grateful for the opportunities that may arise from being a Goldwater Scholar, but my greatest takeaway is the empowerment that it's already sparked in me to pursue my own research path."



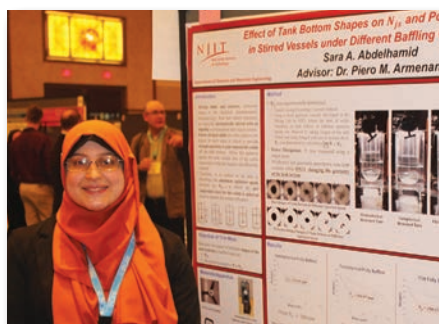
JOSEPH TORSIELLO is a sophomore dual majoring in applied physics and mathematical sciences and involved in research spanning everything from nanotechnology to mosquitoes. As part of his 2019 NJIT Provost Summer Research Fellowship alongside professor Dibakar Datta, he's applied molecular dynamics simulations to study friction properties of 2D materials, which could enhance the engineering of nanotechnologies.

Torsiello sees himself pursuing a Ph.D. in physics. That aspiration has been spurred on by his research using a laser-based technology called lidar (light detection and ranging) to measure backscattered light from spinning blades of nanodrones, as well as the wings of flying mosquitoes. Working with lidars in the lab of physics professor Benjamin Thomas, Torsiello generates numerical simulations that can help monitor mosquito populations more precisely. "This is extremely important for areas where mosquito diseases are prevalent," said Torsiello.

On His Scholarship and Future:

"It's an honor to perform research at NJIT and to be a Goldwater Scholar, as both will

have allowed me to figure out more about my future career interests and myself overall."



SARA ABDELHAMID is a sophomore chemical engineering major researching the impact that different bottom shapes of industrial stirring vessels have on the production quality of everything from the taste of our food to the effectiveness of our drugs. She started her work as a second-year student in the mixing lab of NJIT Distinguished Professor Piero Armenante, and has since been constructing her own customized mixing systems for her research at NJIT's Makerspace. Her work has been recognized nationally, receiving first prize in the 2019 AIChE Conference's Undergraduate Poster Competition. "The findings I soon hope to publish have the potential to make industrial mixing processes much more efficient and cost-effective," said Abdelhamid, who is currently taking part in a co-op in Johnson & Johnson's consumer R&D department.

She'll add her new Goldwater Scholarship to her many other accolades, which include Edward Rogers and Professor Kenneth MacFadyen, Chemical Merit and NJIT Honors scholarships, as well as selection into the McNair Scholars Program.

On Her Scholarship and Future:

"Coming from an Egyptian immigrant family, I have always been curious about the world outside my classroom and community, and about cultures beyond mine. The

Goldwater Scholarship is a key milestone in shaping my career and establishing endless connections with scientists, mathematicians and engineers beyond my field of study. In the future, I plan to pursue a Ph.D. in chemical engineering with a focus on pharmaceuticals."

PHILIP ZALESKI is an 18-year-old junior majoring in applied mathematics who began showing his talents with numbers at an incredibly early age. He started taking AP calculus exams when he was 10, counting toward his college calculus course credits. "My father is a mathematics lecturer at NJIT and my two older brothers were both applied math majors who were all extremely willing to talk to me about their work," recalled Zaleski.

Arriving at NJIT at age 14, Zaleski has since earned numerous distinctions including being inducted into NJIT's chapter of Pi Mu Epsilon National Mathematics Honorary Society and receiving multiple Daljit Singh and Devinder Kaur Ahluwalia Scholarships. Through his recent NJIT research fellowship with mathematics professor Shariar Afkhami, he's published work in the MDPI journal *Fluids* to better model the behavior of electrified droplets, such as those used in inkjet printing or electrospay ionization mass spectrometry.

On His Scholarship and Future:

"I was incredibly happy to receive the scholarship, as all the hard work that the people at NJIT and I had put into my application had finally paid off! I plan on applying to graduate schools for applied math and hopefully following in the footsteps of my father by teaching at the university level and furthering others in the knowledge of mathematics." ■

Author: Jesse Jenkins is an NJIT Magazine contributing writer.