NJIT LAUNCHES POTENT RESEARCH HUB: INSTITUTE FOR SPACE WEATHER SCIENCES

Both on land and in space, Earth's technology-centered civilization is increasingly vulnerable to the powerful bursts of electromagnetic radiation, energetic charged particles and magnetized plasma known as space weather. As the complexity of engineered systems increases, as new technologies are invented and deployed, and as humans venture ever further beyond Earth's surface, both human-built systems and humans themselves become more susceptible to the effects of the planet's space environment.

It is with these vulnerabilities in mind – and in response to urgent calls from government agencies, insurers, electrical grid operators and others for more sophisticated research, forecasting and mitigation strategies – that NJIT is forming the multidisciplinary Institute for Space Weather Sciences to advance both theoretical and applied research on our civilization's interface with these cosmic forces.

Led by Haimin Wang, distinguished professor of physics and chief scientist at NJIT's Big Bear Solar Observatory (BBSO), the Institute will combine the strengths of the university's groundbreaking solar scientists with powerful computing and mathematical capabilities. Its mission will be to safeguard national security, the global economy and human safety.

At the institute's launch at NJIT's annual Research Centers and Laboratories Showcase and President's Forum, Wang recalled knowing "nothing" about space weather while he was a graduate student, because the instruments to study it in-depth and with precision did not yet exist. "But as technology advances, we understand more and more about its impact," he noted.

Mona Kessel, Ph.D., the NASA program and research scientist who delivered the keynote address at the 2018 showcase, pointed to GPS as an example of a space-based "highly utilized commodity we're quite dependent on" that is at risk of major disruption from space weather. She added, "There are things we can do on Earth to prepare."

At the institute's core is the Center for Solar-Terrestrial Research (CSTR). With its array of unique instruments on land and in space – the world's largest operating solar telescope, a newly expanded radio array with 15 antennas, instruments aboard NASA's Van Allen Probes spacecraft and devices deployed across Antarctica, to name a few – the Center is uniquely poised to advance understanding of the genesis, acceleration and impact of solar storms, as well as provide a comprehensive view of solar activity over months and years.

Joining the CSTR are modeling and big data analytics experts at the Center for Computational Heliophysics, who partner with NASA's Advanced Supercomputing division at the NASA Ames Research Center, and researchers at the Center for Big Data. The latter's mission will be to synergize expertise in various disciplines across the NJIT campus and to build a unified platform that embodies a rich set of big data-enabling technologies and services with optimized performance.

Indeed, the specter of a geomagnetic solar storm with the ferocity to disrupt communications satellites, knock out GPS systems, shut down air travel and quench lights, computers and telephones in millions of homes for days, months or even years is a low-probability, but high-impact risk that space scientists, global insurance corporations and federal agencies from the U.S. Department of Homeland Security, to NASA, to the U.S. Department of Defense take seriously.

While the recent solar cycle has been relatively inactive, Kessel noted, there have been periods in which storms have been more sustained and ferocious. "But it wasn't so important back then. We didn't rely on space the way we do now. It's important to gather knowledge that we pass down."

The future of space-based research will also depend on the scientific community's ability to create materials and systems able to withstand powerful cosmic radiation on long space trips. "We'd like to (send humans) to Mars, but we can't yet," she added.

In addition to applied research, Wang says the institute will focus in particular on several fundamental questions: how energy builds toward a solar eruption; the mechanisms that trigger solar eruptions; the reason that some eruptions reach Earth, while others do not; and the effects of eruptions on Earth, such as high-energy particles and geomagnetic storms.

But these questions do not preoccupy researchers alone. As NJIT President Joel S. Bloom noted at the launch, "As I travel, talking to leaders in the Air Force, China and Egypt, space is increasingly a topic of conversation."

As he watched NASA's Mars InSight successfully land on the surface of the planet, Vincent DeCaprio '72, co-vice chair of the NJIT Board of Trustees and a supporter, with his family, of the annual President's Forum, noted the power of scientific discovery to bring researchers and peoples together. The point of the forum, he added, is to explore "the effect of science on society and on our lives." ■

Louis Berger Fellowship Supports Real-World Practice

James Stamatis '85

"Of course, NJIT will always have a special place in my heart as the institution that provided the foundation that continues to inspire me today," noted James Stamatis '85, chief executive officer of Louis Berger, a full-service engineering, architecture, planning, environmental, program and construction management and economic development firm based in Morristown, N.J. The company, he pointed out, "has had a long and successful partnership with NJIT, dating from my years as a student [there] to the present, with the university the source of many of our finest employees."

This relationship, he added, "has been a model partnership between private industry and a leading institution of higher learning."

Indeed, Louis Berger has become a valued Recruitment Partner through NJIT's Career Development Services. The company employs upward of 20 alumni, including Stamatis, who earned a bachelor's degree in civil engineering. Recent student-to-staffer conversions include Hardik Patel '16 '17, an environmental engineer, and Takudzwa Mugabe '18, a structural engineer.

Many NJIT students, like Patel and Mugabe, have found their way to Louis Berger through its Graduate Internship and Fellowship Program, launched in 2014 as a cooperative endeavor by NJIT and the Louis Berger Group. The program, which focuses on environmental services, transit, highways and bridges, aviation and energy, as well as economics, policy and management activities, "provides financial support to two NJIT engineering or architecture students annually, in addition to a full-time summer internship at one of the company's U.S. or international offices," explained Stamatis.

Last year, master's students Catherine Brito '19, studying architecture and infrastructure planning, and Abhishek Banyal '19, pursuing civil engineering with a construction management track, were named 2018 Louis Berger Fellows. And just as their predecessors have done, they spent a summer immersed in real-world experiences, honing their know-how in their respective fields. ■

PRESIDENT BLOOM VISITS 50+ ALUMNI AT STRYKER CORPORATION

More than 50 NJIT alumni hosted President Bloom at Stryker headquarters on Sept. 11, 2018, in Mahwah, N.J. The event marked the fifth time Stryker engaged with NJIT last year. Previous events included a Stryker campus tour and basketball game, a lecture at Stryker headquarters by Biomedical Engineering Professor Treena Arinzeh, and visits from students in the Pre-College Program and Biomedical Engineering Club.

At the invitation of Stryker Joint Replacement's chief technology officer and NJIT Trustee Robert Cohen '83, '84, '87, Bloom toured Stryker's new Additive Manufacturing Lab, 3D printing facility, and several other areas of the Stryker campus.

Club co-chairs Joe Racanelli '83, '90 and Ken Trimmer '92, '99 hosted a lunch with dozens of NJIT Stryker alumni, followed by a presentation to the club from Bloom, who highlighted new campus construction, new faculty research, increasing connections with Newark, and NJIT's ranking in *U.S. News & World Report*, which placed the university 106th among all national research universities.

Cohen encouraged the group to stay connected with NJIT. "You all know that we're not here because we have to be," he said, "We're here because we care about the work we do, and because we care about our alma mater."

Following Cohen's remarks, Racanelli and Trimmer conducted a Q&A with Kenneth Alexo, Jr., vice president of development and alumni relations; Vincent Lombardo, executive director of development; and Michael Smullen, executive director of alumni relations. Topics included: creating mentorship opportunities with students and other alumni, increasing the number of Stryker employees on volunteer boards at NJIT, and establishing consistent, meaningful touchpoints between Stryker and NJIT.

The next Stryker alumni event took place Dec. 4 on NJIT's campus, where alumni toured several lab facilities, including the new Makerspace. ■

LEFT: From left: John Seazholtz '59, chair of the university's Board of Overseers; Dale Gary, distinguished professor of physics in NJIT's Center for Solar-Terrestrial Research; and NJIT President Joel S. Bloom.

BELOW: From left: John Seazholtz '59, chair of the university's Board of Overseers; Edward Dreizin, distinguished professor of chemical engineering; and NJIT President Joel S. Bloom.

A NEUROBIOLOGIST, A SOLAR PHYSICIST AND A CHEMICAL ENGINEER RECEIVE EXCELLENCE IN RESEARCH AWARDS

Faced with a formidable list of nominees for the annual Excellence in Research Prize and Medal, the Board of Overseers opted for its own brand of novelty and innovation: the prize committee picked three. The sector-spanning winners, all at the forefront of their fields, included a solar physicist, a chemical engineer and a neurobiologist.

Dale Gary, distinguished professor of physics in NJIT's Center for Solar-Terrestrial Research, was recognized for his groundbreaking research on solar flares and for the creation of a radio telescope, composed of 15 antennas spread out over two kilometers, that is able to peer into their genesis.

Edward Dreizin, distinguished professor of chemical engineering, was tapped for his research into novel energetic compounds for use in advanced propellants, explosives and pyrotechnics. In his Reactive and Energetic Materials Laboratory, Dreizin creates many of these compounds by milling together distinct metal-based materials into tinier and tinier particles, generating nanocomposites with unique properties that combine high-density energy with extremely high reactivity exceeding that of existing fuels.

Farzan Nadim, professor of neurobiology and a founding director of NJIT's Institute of Brain and Neuroscience Research, was honored for his fundamental insights into the mechanisms by which synaptic dynamics contribute to the generation and control of oscillatory neuronal activity. He has helped identify new mechanisms, for example, through which a fast and a slow oscillatory network coordinate their activities; widespread synchronization of rhythmic activity among networks of neurons that normally produce distinct behaviors can lead to disorders such as generalized epilepsy and Parkinson's disease.

NJIT President Joel S. Bloom, who bestowed the medals along with John Seazholtz '59, chair of the university's Board of Overseers, lauded the three researchers for their hard work, prodigious talent and deep commitment to working across disciplines and industries. Seazholtz, who described each year on the board as a thrilling revelation of the "new knowledge" NJIT researchers were uncovering, said he was also touched as an alumnus by how their groundbreaking work had moved the university "into the research arena." ■

NJIT Basketball Alumnus Shining in Luxembourg

Former NJIT basketball star Tim Coleman '17 is representing the Highlanders program with flying colors. In November, he was named Interperformances Player of the Week in the Total League for his performance with Etzella in Luxembourg.

The Union, N.J., native notched 32 points and 10 rebounds in an 88-68 win over Sparta.

In fact, Coleman is leading the league at 29.3 ppg. In the process, the 24-year-old product of St. Anthony's High School has guided Etzella to a 6-1 record and a second-place standing in the early stages of the season.

Coleman finished his NCAA with 1,439 career points, which ranks fourth all-time at NJIT, and 762 rebounds, which ranked 41st among active Division-I leaders upon the completion of his senior season. He became the sixth member of NJIT's D-I 1,000-point club vs. Army on March 16, 2016.

He is also the only player in NJIT history to average better than 1.0 block and 1.0 steal per game for a season — a feat he accomplished three times (2013-14, 2014-15, 2016-17). ■

ALLY NICK NAMED ASUN COACH OF THE YEAR; FIONA WRIGHT SELECTED ASUN FRESHMAN OF THE YEAR

Three NJIT women's soccer players were selected to the 2018 ASUN All-Conference team, headed by Freshman of the Year Fiona Wright, and NJIT's Ally Nick was named Coach of the Year. In addition to Wright, senior midfielder Arianna Gerber was selected to the 11-person first-team. Sophomore defender Nicole Loehle was named to the second-team while Wright was selected to the All-Freshman team.

In her third season at the helm of the Highlanders, Nick recorded a program-record 11 victories and nine shutouts, and placed second in the regular season, earning the No. 2 seed in the program's first postseason appearance in the ASUN since joining the league in 2015-16.

NJIT, which started off the season with a 1-0 loss at five-time defending MAAC champions Monmouth, went 4-0-1 over the next five contests. NJIT closed out the regular season with a 5-1-1 mark, which included wins over both Florida Gulf Coast and Kennesaw State in the regular season. Wright, from Ajax, Ontario, Canada, registered 11 goals this season, more than any first-year player for the Highlanders and just one off the overall mark in program history as a Division I team. Wright added to her 2018 accolades, earning Eastern Collegiate Athletic Conference (ECAC) Division I Women's Soccer Rookie of the Year. In addition, she became the first female Highlander to be recognized on an All-Region team since the Highlanders began competing at the Division I level.

The midfielder was one of three freshmen named to the second-team at the end of November.

Her 11 career goals rank one-shy of the NJIT Division I record (12) held by Kori Washington (2007-10) and two-shy of the NJIT all-time single-season record (13) held by Cathy Wasko '01.

Gerber was recognized on the 2018 ASUN Conference Fall Winners for Life team and selected to the 2018 United Soccer Coaches NCAA Division I Women's Scholar All-East Region Team. Gerber owns a 3.81 cumulative GPA working towards her bachelor's degree in biology and on schedule to graduate in May with magna cum laude honors. Her leadership and play were instrumental in leading NJIT to its best-ever season with 11 victories in 2018. Gerber, an ASUN first-team all-Conference honoree, finished her playing career tied for most assists (18) in NJIT program history. Gerber appeared in all 18 matches, recording one goal and six assists. The lone goal on the season for Gerber was a game-winner, coming in the 89th minute against Temple, in the Highlanders' 1-0 victory.

Nicole Loehle, the Highlander sophomore on the backline, started 17 matches, notching two goals and four points. Loehle scored the game-winning penalty kick in NJIT's 1-0 victory at North Florida and scored the lone goal in the Highlanders' 1-0 victory over FGCU for the first all-time win over the Eagles. ■