Scientists, including Montclair State Physics Professor Marc Favata, made history this past February when they recorded, for the first time, gravitational waves from two black holes colliding to form one in a distant universe — confirming Albert Einstein’s 1915 theory of relativity.

The recording was made by the Laser Interferometer Gravitational-Wave Observatory (LIGO) Scientific Collaboration and is one of the most important physics discoveries of the past half-century, says Favata.

“The main significance is that we now have a new tool — gravitational waves — that will let us observe the universe in a completely different way,” he explains. “It’s analogous to observing the world with only sight, and only later being able to hear. Gravitational-wave astronomy will provide us with the ‘missing soundtrack’ to the universe.”

Long a leader in graduate education in New Jersey, Montclair State was designated earlier this year as a Research Doctoral University in the widely recognized national Carnegie Classification of Institutions of Higher Education.

With the new classification, Montclair State moves from a master’s to a doctoral research institution, reaching a major academic milestone.

Provost and Vice President for Academic Affairs Willard Gingerich notes that of the 4,664 institutions reviewed, only 335 were classified as research doctoral universities and only 38 were reclassified from master’s to doctoral institutions.

“This highlights the significance of this classification in higher education, as well as the significance of the change in designation,” he explains. “It affirms the important contributions that our faculty and student researchers are making to their respective scholarly and academic communities.”

The new designation recognizes the University’s increased number of doctoral students in research fields, as well as its growing ability to attract significant funding from federal agencies such as the National Science Foundation, the National Institutes of Health, NASA and the U.S. Department of Education.

Recently funded projects include efforts to combat bioterrorism; research on the collapse of Antarctic ice shelves; a study of the sociodemographic factors contributing to racial and ethnic disparities in cancer prevention; and research on fostering science and mathematics achievement for all learners.
Exploring Bioenergy Sustainability

Earth and Environmental Studies Professor Pankaj Lal has received a five-year, $450,000 National Science Foundation Faculty Early Career Development grant to explore sustainable bioenergy solutions in the Midwestern and Southern United States. The highly competitive award supports the research and education initiatives of faculty such as Lal who are in the early stages of their careers.

Lal’s research project, titled “Exploring Place-Based Opportunities for Bioenergy Sustainability,” will focus on place-based policy solutions that develop forest- and agriculture-based bioenergy as a fossil fuel alternative. His solutions will be based on analysis of factors such as location suitability, socioeconomic uncertainty and environmental impact.

The project’s strong educational component will also help strengthen the pipeline of young talent in STEM disciplines through research and student mentorship opportunities, as well as the development of new courses.

“I’m honored and excited to receive this prestigious award, which acknowledges that we are doing something special here at Montclair State in the study of the sustainability of renewable energy resources in general and bioenergy in particular,” says Lal. “The real-world value of this research makes it a worthwhile effort.”

Graduate School Dean Joan C. Ficke is equally gratified by the new designation. “Our accomplished scholar-faculty have historically provided, and will continue to provide, forward-looking research as they mentor and challenge students.”

For researchers at the University, the designation means validation of their work and greater future opportunities for grant funding. Department of Earth and Environmental Studies Professor and Chair Stefanie Brachfeld directs the PhD program in Environmental Management and is engaged in a three-year research project in Antarctica with national and international collaborators funded by the National Science Foundation.

“Montclair State has been successfully expanding its research activities in important fields,” says Montclair State University President Susan A. Cole. “This new designation reflects the efforts of our distinguished faculty and the programs they have created that both challenge our students and address the issues facing society today,” says Cole.

According to Robert Prezant, dean of the College of Science and Mathematics, the upgraded designation is a long-deserved recognition. “It should translate into new funding opportunities and a growing number of both academic and industry partnerships for our research.” —Robert Prezant

“This designation is external recognition that our faculty are leaders in their disciplines and are advancing the frontiers of exploration, innovation and discovery in our respective fields,” she says.
Response to a Changing Shoreline

Coastal areas in New Jersey and elsewhere face a growing threat of erosion, flooding and other changes from rising sea levels and storm impacts.

Earth and Environmental Studies Professor Jorge Lorenzo-Trueba has received a four-year sub-award from a National Science Foundation grant to the Woods Hole Oceanographic Institution to investigate “Coastal Processes and Human Response to Shoreline Change.”

“It is clear that new approaches to coastal erosion are desperately needed,” says Lorenzo-Trueba. Working with Montclair State graduate students, he is developing integrated geological and economic models to help mitigate coastline changes caused by accelerated rising sea levels.

“These models will simulate historical and risk-averse future adaptations to shoreline change, including the effects of soft, or beach nourishment, and hard, or seawall, responses,” he says.

According to Lorenzo-Trueba, the ideal response would employ a mix of strategies such as beach replenishment or dune construction and the maintenance of seawalls in critical locations.

Developing a modeling framework that is portable to different coastal locations is his team’s first step.

“The next step will be to test and calibrate the model on specific — but as yet undetermined — locations along the New Jersey and Massachusetts coastlines,” he says.

Analyzing the Elements

Montclair State researchers now have access to a powerful new tool to help them detect and analyze the presence of trace amounts of metals in everything from storm water to samples from the Antarctic Ice Sheet.

With a grant award from the National Science Foundation Major Research Instrumentation Program, University researchers purchased a Thermo ICAP Qc Inductively Coupled Plasma Mass Spectrometer (ICP MS). This new analytical instrument, which replaces a 12-year-old instrument, will enhance research and hands-on education activities in geoscience, environmental science, biology, archaeology and chemistry.

The new instrument is impressively powerful, according to lead principal investigator (PI) Xiaona Li, an earth and environmental studies analytical instrumentation specialist, who is working on the ICP MS acquisition project with co-PIs Department Chair Stefanie Brachfeld and faculty Yang Deng and Sandra Passchier.

“You can basically detect every single element in the periodic table all at once, ranging from the lower
Exploring the Art of Collecting

Few 19th-century women were able to assemble art collections, let alone build museums to house their treasures. Yet that is precisely what working-class Frenchwoman Clémence d'Ennery was able to do.

With funding from the National Endowment for the Humanities (NEH), Montclair State Professor of French Elizabeth Emery, who is one of just 80 recipients nationwide to receive a 2015 NEH award, is conducting archival research and will complete a book about d’Ennery.

Against the odds, d’Ennery built a museum in Paris to house her collection of 6,000 small-scale Asian objets d’art. Bequeathed to France upon her death, the Musée d’Ennery continues today to offer a remarkable glimpse into the mind and eye of a collector.

“It seems almost unimaginable that she could have amassed so many pieces without traveling to Japan or China, and yet it is true,” says Emery.

Just as remarkable, with the encouragement of her second husband, playwright and librettist Adolphe d’Ennery, she was able to design and build the house near the Bois de Boulogne that displays her collection.

Emery’s book, Clémence d’Ennery: A Female Connoisseur in the Age of Male Collecting, will explore the obstacles that the working class — and women collectors — faced in accessing elite cultural institutions, as well as d’Ennery’s own determined efforts to share her collection with the public.

“It’s an incredible honor to be recognized by the NEH because of its dedication to bringing widespread public attention to ideas and events that continue to impact human development,” Emery says.

Breaking News in New Jersey

The Center for Cooperative Media at Montclair State’s School of Communication and Media is making news with two yearlong collaborative enterprise journalism projects: “In the Shadow of Liberty: New Jersey Immigration” and “Dirty Little Secrets.”

The Center’s innovative work is funded in large part by grants from The Geraldine R. Dodge Foundation and the John S. and James L. Knight Foundation.

“The goal of these collaborative projects is to bring an economy of scale to reporting so the work has a bigger, more statewide impact than it would have had otherwise,” says Center for Cooperative Media Director Stefanie Murray.

More than 1.9 million immigrants from all over the world call New Jersey home. Since February, the Center’s New Jersey News Commons has been partnering with community and ethnic media on a project titled “In the Shadow of Liberty,” with in-depth research and coverage of immigration issues. Funded by donations received through beaconreader.com, a journalism crowdfunding site, the series examines the struggles and achievements of New Jersey’s documented and undocumented immigrants.

With the Center’s first and ongoing project, titled “Dirty Little Secrets,” the Center and its media partners are looking closely at the state’s more than 13,000 toxic sites and their potential to undermine environmental and human health. The research-driven series received early praise from the Columbia Journalism Review for embodying “the future of investigative reporting at the local level.”

Murray agrees. “Journalists working together across company lines for the benefit of citizens, in the public interest, is a critical new model in our field. New Jersey is leading the nation with respect to this kind of model,” she notes. “We’re seeing that the work the Center has led in this area is being replicated more and more across the country.”
Studying Youth Character Development

Do programs aimed at helping youth develop character really work? The John Templeton Foundation recently awarded Family and Child Studies professors Jennifer Brown Urban and Miriam Linver two sizable grants to help them answer that question. The team has received a three-year Templeton Foundation award of more than $1.7 million — the largest multiyear grant received at Montclair State in fiscal year 2015 — to continue the work begun by their earlier pilot study of Scotland’s Inspire>Aspire teen development program.

“Pilot study results have helped us refine the program and its delivery,” Urban says. “One of the encouraging findings was that Inspire>Aspire is most effective when teachers are able to incorporate the program into the broader curriculum.”

Data collection on the new, larger-scale outcome evaluation project, Inspiring Youth Purpose through Reflection on the Laws of Life, will begin in fall 2016. The team will survey approximately 900 students and will interview their teachers and a subset of students across Scotland as part of this longitudinal study.

The professors began work in February on the Partnerships for Advancing Character Program Evaluation (PACE), which is funded by a nearly $1.3 million Templeton award. “This exciting new project will provide an opportunity to bring our Evolutionary Evaluation approach to a much larger group of character development programs and evaluators,” Urban explains.

An innovative approach to evaluation capacity building, PACE provides unique professional development opportunities for both youth character development program staff and evaluators.

“The PACE project is designed to promote high-quality program evaluation that’s critical for obtaining funding, improving program quality and, ultimately, increasing a program’s positive impact on youth,” says Urban.

Measuring Environmental Change in the Arctic

“NASA scientists have seen large changes in vegetation over the last few decades, mostly towards greater shrub cover and a corresponding lowering of albedo — the reflection of solar energy back into space,” says Chopping. “However, we need to know more about the rates and directions of change and the magnitude of the impact on summer albedo, when there is sunlight for more than 20 hours a day.”

Using semi-automated interpretations of high-resolution satellite imagery, Chopping and Montclair State graduate students will assess the changes in Arctic tundra shrub cover since 2002. These changes not only affect Arctic climate and ecosystems, but also have the potential to accelerate permafrost thawing and global warming.

“Permafrost holds huge volumes of carbon that will outgas as methane or carbon dioxide — both important greenhouse gases,” explains Chopping. “The effects are not restricted to the Arctic, but will ultimately contribute to more extreme weather in New Jersey.

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Earth and Environmental Studies Professor Mark Chopping is directing a three-year, NASA-funded project that is part of the Arctic-Boreal Vulnerability Experiment (ABoVE), a large-scale NASA Terrestrial Ecology Program study of environmental change in the region and its social and ecological implications.

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“This research builds on our earlier NASA-funded project that created a shrub abundance database for over 1,000 sites in Alaska using satellite imagery, field survey data and our canopy analysis software.”
SPOTLIGHT: News Briefs

Challenging Assumptions

Montclair State will be an official host of the ReelAbilities Film Festival — the largest disability film festival in the country — in November. Fran Karen Prezant, a festival organizer and professor in the Department of Communication Sciences and Disorders, has received a Special Initiative Grant from West Orange-based Kessler Foundation to support the festival.

“ReelAbilities promotes awareness of the lives, stories and artistic expressions of people with different abilities by challenging assumptions and generating discussions about abilities, differences and similarities, and inclusion in society, while busting stereotypes and attitudes that can be discriminatory, restrictive and limiting,” says Prezant.

Since its founding eight years ago in New York City, ReelAbilities has grown to include more than 15 venue cities nationwide. Montclair State previously served as a site venue in 2013 and 2014.

Actress and Jersey native Ali Stroker will appear on a post-film discussion panel. Although Stroker is best known for her role in the hit TV show Glee, she is also the first actress in a wheelchair to perform on Broadway (appearing in Spring Awakening) and a leading advocate for people with different abilities.

Preserving Sicily’s Past

With support from the Cali Family Foundation and the dean of the College of Humanities and Social Sciences, History Professor Dawn Marie Hayes has embarked on an ambitious digital conservation project to document the cultural heritage of Sicily.

The Norman Sicily Project focuses on the transformative period in the 11th and 12th centuries, using print, photographic, web and geolocation technologies to identify and explicate dilapidated, at-risk and hard-to-access monuments.

Hayes and her computer programmer spouse, Joe, are compiling a database of Sicily’s hundreds of historic Norman monuments — from monasteries and bridges to palaces and even a laundry. While information is already up on normansicily.org, it will ultimately be available as an app.

“We hope the site will appeal to students, visitors and scholars, attract positive attention to the island and challenge the negative stereotypes by which, unfortunately, Sicily is often characterized,” says Hayes.

Greener Water Reuse Solutions

Doctoral candidate Lei Zheng wants to develop greener technology for water reuse at wastewater treatment plants. With the supervision of Earth and Environmental Studies Professor Yang Deng, Zheng has recently received a one-year student research grant from the New Jersey Water Resources Research Institute to do just that.

“This research will advance the fundamental understanding of phosphorus removal by ferrate and potentially lead to a reuse technology that will recycle phosphorus from sludge for such beneficial applications as use as fertilizer,” he explains.

An added benefit to this process is that reducing sludge lessens the landfill burden.

Zheng’s funding began in March and he has begun preliminary studies to evaluate phosphorus removal performance. “Further investigations on the mechanism and recovery will be conducted throughout this summer,” he says.
Supporting Graduate STEM Education

Policymakers, educators and executives have long warned that a looming crisis in Science, Technology, Engineering and Mathematics (STEM) fields could cause the United States to lose its competitive edge in the global economy.

To address this challenge, Montclair State researchers are educating and training a new generation of STEM scholars, with the help of a five-year grant from the National Science Foundation's Scholarships in Science, Technology, Engineering and Mathematics Program.

During the past year, Chemistry and Biochemistry Professor and Principal Investigator (PI) Nina Goodey has worked with co-PIs and departmental colleagues Marc Kasner and John Siekierka, as well as Computer Science Professor Katherine Herbert and Biology Professor Jennifer Krumins to lay the foundation for the "Opening Pathways, Engaging and Networking in Chemistry in Northern New Jersey" program, also known as OPEN-NJ.

"We have designed a new three-year curriculum that enables academically talented students with demonstrated financial need, who did not major in chemistry or biochemistry, to matriculate into chemistry and biochemistry master's degree programs at Montclair State," says Goodey.

Each participating OPEN-NJ student also receives a scholarship award of $10,000 per year. Some 51 scholarships totaling $510,000 will be disbursed over the next five years.

The scholarship aid will reduce the challenges — family obligations, the high cost of living and the need to work — that often discourage students from pursuing a graduate degree.

"Our undergraduate population is extremely diverse and the OPEN-NJ program is likely to increase enrollment of minority students in our graduate programs," says Goodey.

OPEN-NJ students also receive free access to tutoring, mentoring, academic advising and career development activities.

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The Revealing Sounds of the Cosmos continued from page 1

The measurement is astonishingly precise: It’s equivalent to measuring the distance to the nearest star to within the thickness of a human hair, according to Favata.

A member of the LIGO project team of more than 1,000 scientists from over 70 institutions in 15 countries, Favata recently received an extension of an earlier National Science Foundation (NSF) award to continue to explore issues in modeling gravitational-wave sources.

Favata’s award has supported both technical and educational outreach work on the LIGO project. Favata is also studying a strange phenomena in Einstein’s theory called the “memory effect” that predicts that gravitational waves themselves produce more gravitational waves. He has worked with various students and recent graduates on these projects.

“We were lucky in that the first detection was a very loud and unambiguous signal,” he says. “We expect to detect many more in the coming months and years.”

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Analyzing the Elements continued from page 3

parts per trillion level to the higher parts per million level,” she explains. “It’s more powerful in terms of how low we can detect certain elements.”

The new instrument will support ongoing research funded by the National Science Foundation, Department of the Interior, New Jersey Sea Grant and other state and federal agencies, including projects examining the geochemical records of climate change currently conducted by Li, Brachfeld and Passchier. Deng and his doctoral students are engaged in research projects focused on environmental contamination, waste recycling and environmental remediation problems that will rely on the new instrument for metal analysis and speciation.

“I used it to measure lead, copper and zinc in synthesized urban runoff,” says doctoral student Hanieh Soleimanifar. “It’s essential to my research.”
Helping New Jersey’s Children

Grow NJ Kids is a statewide initiative dedicated to improving the quality of child care and early learning across New Jersey. It helps child care and early learning programs assess and enhance their programs, and it offers families a rating system to help them make the best child care choices for their children.

With help from a $200,000 sub-award from Prevent Child Abuse New Jersey for the NJ Department of Human Services-funded Grow NJ Kids, Gerard Costa, director of Montclair State’s Center for Autism and Early Childhood Mental Health, has been providing support for Grow NJ Kids-engaged centers. From November 2015 through June 2016, Costa partnered with Prevent Child Abuse New Jersey and four regional technical assistance centers to provide support to Grow NJ Kids-engaged centers in the areas of socio-emotional development and the promotion of inclusion.

“Our Center for Autism and Early Childhood Mental Health conducted three-day long training sessions with 40 statewide technical assistance specialists

“Center staff also spearheaded the development of specialized screening tools that measure the performance of Grow Kids NJ—engaged centers and identify those centers needing additional help in meeting social and emotional development and inclusion goals.

“We developed customized sub-strands of two standard assessment scales, the Early Childhood Environmental Rating Scale III and the Infant-Toddler Environmental Rating Scale IT-REV,” Costa explains. “It’s like a triage system, as we can use this to readily identify the centers that need the most help.

“This is a game-changing opportunity for us that will let us help people keep the welfare of babies and children fully in mind.”

–Gerard Costa

“Building on a distinguished history dating back to 1908, Montclair State University is a leading institution of higher education in New Jersey. Designated a Research Doctoral University by the Carnegie Classification of Institutions of Higher Education, the University’s nine colleges and schools serve more than 20,000 undergraduate and graduate students with more than 300 doctoral-, master’s- and baccalaureate-level programs. Situated on a beautiful, 252-acre suburban campus just 14 miles from New York City, Montclair State delivers the instructional and research resources of a large public university in a supportive, sophisticated and diverse academic environment.

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