ExxonMobil and Princeton University today announced the selection of five research projects associated with their partnership focused on energy technologies. The projects will center on solar and battery technologies, plasma physics, Arctic sea-ice modeling, and the impact of carbon dioxide absorption on the world’s oceans.

This announcement follows ExxonMobil’s June 2015 commitment to contribute $5 million over five years to the Princeton E-ffiliates Partnership, a program administered by Princeton University’s Andlinger Center for Energy and the Environment that fosters research in sustainable energy and environmental solutions. E-ffiliates promotes collaboration between industry and academia to search for energy and environmental breakthroughs. Over the past year, ExxonMobil scientists have collaborated with Princeton professors to identify areas with the most scientific potential, particularly ones that build on the university’s existing strengths and interests in emerging energy.

“Each of the five selected projects is a potential game-changer in terms of new energy development and better understanding of our natural environment,” said Eric Herbolzheimer, senior scientific advisor and section head of engineering physics at ExxonMobil Research and Engineering Company. “For example, we will examine whether photovoltaic properties can be embedded directly into polymers that could be used as coatings on building materials. Such technologies could complement current roof-mounted solar technologies and build upon our leadership in the chemical industry.”

“The collaboration with ExxonMobil is a win-win,” said Lynn Loo, director of Andlinger Center for Energy and the Environment. “ExxonMobil gains insight into new developments in emerging energy and the Princeton community benefits from industry’s view of the challenges of meeting global energy demands while being responsive to environmental impacts.”

In the coming months, Princeton’s professors will select graduate research students to be named ExxonMobil Emerging Technology Fellows. The five selected projects and the professors who will lead them are as follows:

Organic Photovoltaics: The objective is to study how new photovoltaic materials, particularly those polymeric in nature, can be applied in forms of coatings and building materials. The project will be led by Lynn Loo, director of the Andlinger Center for Energy and the Environment, the Theodora D. '78 and William H. Walton III '74 Professor in Engineering, and professor of chemical and biological engineering.

Extending Battery Lifetime and Cycle Efficiency: The project will use diagnostic tools recently developed at Princeton to study degradation pathways of electric-vehicle batteries, and how they might impact follow-on use in applications on the power grid, known as “second life” applications. Research will be led by Daniel Steingart, assistant professor of mechanical and aerospace engineering and the Andlinger Center for Energy and the Environment.

Arctic Sea-Ice Modeling: The focus of the project is to advance sea-ice models used for understanding the factors controlling Arctic sea-ice cycles and, consequently, the ability to make reliable seasonal and long-range forecasts for sea-ice formation and melting. Research will be conducted at Princeton’s Geophysical Fluid Dynamics Laboratory, a premier institution that has been developing state-of-the-art sea-ice modeling tools for decades. The project will be led by Alistair Adcroft, research oceanographer, and Olga Sergienko, research glaciologist, at the Princeton University Atmospheric and Ocean Sciences Program/NOAA-Geophysical Fluid Dynamics Laboratory.

Role of the Ocean in the Future of Atmospheric Carbon Dioxide Levels: The project’s objective is to gain insight into the future of carbon dioxide uptake by the ocean by reconstructing ocean carbon cycle changes during past periods of warming. Research will be led by Daniel Sigman, Dusenbury Professor of Geological and Geophysical Sciences.

Plasma Physics: The project will take advantage of Princeton’s world-leading facilities for studying plasma physics. It will explore low-energy plasmas’ effectiveness in enhancing or controlling energy-related chemical processes, such as converting natural gas to larger molecules for producing liquid fuels or chemical feedstocks. Egemen Kolemen, assistant professor of mechanical and aerospace engineering and the Andlinger Center for Energy and the Environment and the Princeton Plasma Physics Laboratory, is leading this research with Yiguang Ju, Robert Porter Patterson Professor of Mechanical and Aerospace Engineering.

Princeton’s Andlinger Center for Energy and the Environment is one of three university energy centers to partner with ExxonMobil to conduct fundamental research on technologies that can provide low-carbon energy solutions while meeting global energy demand, which is expected to rise by about 25 percent between now and 2040 as population and living standards rise. ExxonMobil’s $5 million contribution to Princeton E-ffiliates Partnership remains the program’s single largest financial commitment.

Last month, ExxonMobil announced that it would invest $15 million to the University of Texas at Austin Energy Institute to pursue technologies to help meet growing energy demand while reducing environmental impacts and the risk of climate change.

In 2014, ExxonMobil became a founding member of the MIT Energy Initiative, contributing $25 million over five years to support

research and establish 10 graduate energy fellowship appointments each year.

These efforts are in addition to the more than 80 universities that ExxonMobil partners with on research programs to explore new energy solutions.

About ExxonMobil

ExxonMobil, the largest publicly traded international oil and gas company, is a leader in developing and applying technology to meet global energy challenges. With more than 19,000 scientists and engineers, 2,200 of them PhDs, ExxonMobil is committed to investing in research and development of next-generation technologies across a broad spectrum of promising frontiers – both directly and in partnerships with leading academic institutions. For more information, visit www.exxonmobil.com or follow us on Twitter www.twitter.com/exxonmobil.

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About Princeton University

Princeton University is a vibrant community of scholarship and learning that stands in the nation's service and the service of humanity. Chartered in 1746, Princeton is the fourth-oldest college in the United States. Princeton is an independent, coeducational, nondenominational institution that provides undergraduate and graduate instruction in the humanities, social sciences, natural sciences and engineering.

As a world-renowned research university, Princeton seeks to achieve the highest levels of distinction in the discovery and transmission of knowledge and understanding. At the same time, Princeton is distinctive among research universities in its commitment to undergraduate teaching.

Today, more than 1,100 faculty members instruct approximately 5,200 undergraduate students and 2,600 graduate students. The University's generous financial aid program ensures that talented students from all economic backgrounds can afford a Princeton education.

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About the Andlinger Center for Energy and the Environment

The mission of the Andlinger Center for Energy and the Environment is to develop solutions to ensure our energy and environmental future. To this end, the center supports a vibrant and expanding program of research and teaching in the areas of sustainable energy-technology development, energy efficiency, and environmental protection and remediation. A chief goal of the center is to translate fundamental knowledge into practical solutions that enable sustainable energy production and the protection of the environment and global climate from energy-related anthropogenic change.

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