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Transforming Hope into Action
Research & Development Council of New Jersey
Hosts 41st Thomas Edison Patent Virtual Award Ceremony

Special Sponsors Merck & Janssen

Chatham, NJ (November 13, 2020) . . . Last night before a virtual audience of hundreds, the Research & Development Council of New Jersey ("R&D Council") hosted its 41st Edison Patent Awards Ceremony themed "Transforming Hope into Action." The evening's nearly 60 honorees included 2020 Thomas Edison Patent Award winners, along with three special winners—Dr. Roger Perlmutter, Merck & Co. Executive Vice President and President of Merck Research Laboratories; Dr. Joachim Messing of the Rutgers Waksman Institute; and, Dr. Dawood Farahi, Former President of Kean University.

Virtual ceremony guests included hundreds of representatives from the largest research organizations in the world. The ceremony program can be viewed here. The full list of event sponsors included: Merck, Janssen, Kean University, PSEG, Rutgers, Siemens Technology, Stryker, American Standard part of LIXIL, Avaya, BASF, BMS, NJIT, Nokia Bell Labs, and Princeton University.

In the program's opening letter, R&D Council Chairman Dr. Kevin Campos of Merck wrote, "Today the entire world is standing by with the hope that the acts of the research community will result in the development of an effective vaccine that will combat the largest health crisis our generation has ever seen. This hope is fueling the research community's work, reinforcing the importance of science, data, and discovery, and empowering researchers to truly live out our theme of 'Transforming Hope into Action.'"

The 2020 Edison Patent Award winners included 14 research organizations: American Standard part of LIXIL, Avaya Inc., BASF Corporation, Colgate-Palmolive Company, Ethicon, Inc. – a Johnson & Johnson Company, ExxonMobil Research & Engineering Company, Merck & Co., Inc., New Jersey Institute of Technology, Nokia Bell Labs, Princeton Plasma Physics Laboratory, Princeton University, Rowan University, Siemens Technology, and Stevens Institute of Technology. The complete 2020 Edison Patent Award winners' patent descriptions and inventors are listed below.

During the ceremony, each award winner had a special tribute film developed by the R&D Council premiered in their honor. These films will be available on the R&D Council's YouTube channel. Every Edison Patent Award winner and their winning organization received their own award—a unique Thomas Edison bust, the design of which was approved by Edison's last surviving son, Theodore.

The special individual honors began with the Science and Technology Medal. This medal was given posthumously to Dr. Joachim Messing, whose son, Dr. Simon Messing, provided acceptance remarks. Dr. Joachim Messing, former Director of the Waksman Institute of Microbiology and the Waksman Chair of Molecular Genetics at Rutgers University, made seminal contributions to the development of genomics and biotechnology. His work as a translational scientist contributed directly to breakthroughs in global issues, including food security and cancer therapies. While still a research fellow, Dr. Messing began work on what would become "shotgun DNA sequencing," a pioneering cloning technology that transformed genomics and was quickly adopted across the life science research community. A loss to the world, Dr. Messing passed away in 2019.

Merck & Co. Executive Vice President and President of Merck Research Laboratories Dr. Roger Perlmutter was the next individual award honoree. He received the Chairman's Award for his world-renown work in guiding the research at Merck, one of the world's leading pharmaceutical companies; in particular, Dr. Perlmutter was honored for his leadership directing the Merck team on the oncology product Keytruda®, which is having a significant impact in cancer care throughout the world. His tribute film included words from Merck CEO Ken Frazier and former Merck CEO Dr. P. Roy Vagelos.

This year's Educator of the Year Award went to Dr. Dawood Farahi, Kean University President from 2003-2020. During this seventeen-year tenure, Dr. Farahi transformed the University, both physically through his expansion of facilities and dormitories, and academically through his emphasis on establishing curricula and programming related to STEM majors. Dr. Farahi also partnered with the Ministry of Education of China to launch Wenzhou-Kean University. His tribute film included remarks from former New Jersey Governor Tom Kean and current Kean President Dr. Lamont Repollet.

"We want to again congratulate this year's class of winners, one of the best yet," said R&D Council President Anthony Cicatiello. "We also want to thank our generous sponsors for supporting this event. The funds will be used to support the Council's STEM programming which reaches thousands of students across New Jersey."

For more information on the award winners, event or the R&D Council, please call Executive Director Kim Case at 908.875.7167 or email kcase@rdnj.org.

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As the Research & Development Council of New Jersey, we collaborate among industry, academia and government to grow and strengthen STEM in education, innovation and the economy. The R&D Council is a nonprofit 501(c)(3) organization. More information can be found at the R&D Council's website: www.rdnj.org.

Growing STEM. Advancing Innovation. Impacting the World.

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2020 EDISON PATENT AWARD WINNERS

American Standard, part of LIXIL, and inventors Christophe Bucher, David Grover and James McHale received a patent award in the Consumer category for "Primed Siphonic Flush Toilet" (U.S. 10,145,097). This patent uses a toilet hydraulic engine that puts the VorMax toilet in a primed state prior to flush, eliminating air management and energy losses. This innovation allows 3-4 times more water to exit the rim and cycle again to achieve siphon duration. The result is a powerful, water efficient, cleaner toilet.

Avaya Inc. and inventors Heinz Teutsch and John Lynch received a patent award in the Communications Technology category for "System and Method for Improving Speech Intelligibility of Voice Calls Using Common Speech Codecs" (U.S. 8,645,142), a novel technique of ensuring clarity of speech when signals are processed through multiple transmission points. The invention recognizes which encoding standards are used in transmission of the voice signal and employs frequency spectrum compensation that improves the intelligibility of the received voice. This technique is used throughout Avaya's communications product line.

BASF and inventors Laif R. Alden, Mark T. Buelow, Gerard D. Lapadula, Pascaline H. Tran, Tiep Pham, Howard Furbeck, and Francis S. Romanski received a patent award in the Environmental category for "Base Metal Catalyst and Method of Using Same" (U.S. 20140255284), an innovative catalyst named VOCat™ 200, which enables the economic abatement of emissions from industrial processes such as purified terephthalic acid (PTA) production.

Colgate-Palmolive inventors Iraklis Pappas, Bartosz Luczynski, Donghui Wu, and Don Kim received a patent award in the Adaptive Technology category for "Systems and Methods for Evaluating Compositions" (U.S. 10,515,715). The award honors a patented artificial intelligence algorithm that fuels a predictive modeling tool which empowers scientists to digitally test new

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formulation ideas based on data from thousands of already-tested Colgate formulations, ingredient profiles, and other information like product trends. The algorithm brings together the collective intelligence of Colgate scientists and reputable third-party sources to predict how well new formulas are likely to perform across criteria including stability, biodegradability, and consumer appeal. This approach will enable Colgate to more rapidly meet the evolving needs of its billions of global consumers and also meet Colgate's environmental sustainability goals.

Ethicon, a Johnson & Johnson Company, and inventors Benjamin D. Fitz, Dwayne Looney, Thomas Lee Craven, Clifford Dey, and Atul Garg will receive a patent award in the Medical Device category for "Resorbable Laparoscopically Deployable Hemostat" (U.S. 10,111,782). This patent relates to methods of making a non-woven hemostatic material with significantly enhanced properties for stopping nuisance, continuous oozing bleeding during surgical procedures. Starting with the oxidized regenerated cellulose (ORC), one of the main absorbable hemostatic materials in the surgeon's toolbox, the inventors were able to develop this new and highly beneficial surgical material. The invention was developed through the discovery, after numerous failures, that needle-punching and three-dimensionally entangling the ORC fibers can be used to form a single layer non-woven felt with excellent mechanical and hemostatic properties, the resulting material particularly suitable for laparoscopic and minimally invasive surgery. A trademark associated with this material is SURGICEL SNoW™ Absorbable Hemostat.

ExxonMobil inventors Rohit Vijay, Ajit B. Dandekar, Michel Daage, Christopher G. Oliveri, Christine N. Elia, Darryl D. Lacy, Scott J. Weigel, Bradley R. Fingland received a patent award in the Industrial Process category for "Hydrocracking of Gas Oils with Increased Distillate Yield (U.S. 9,309,472). This patent describes the integration of novel catalyst and process technology discoveries that when employed together can increase the production of distillate fuels from gas oil hydrocracking. Additionally, the process enables the production of a high-quality Group II quality base oil, which can be used as a blend component to formulate high quality engine and industrial lubricating oils.

Merck and inventors Chakravarthy Nachu Narasimhan, Kevin James Gergich, Manoj K. Sharma and Soonmo Peter Kang received a patent award in the Pharmaceutical category for "Stable Formulations of Antibodies to Human Programmed Death Receptor PD-1 and Related Treatments" (U.S. 9,220,776 B2). U.S. 9,220,776 discloses drug product formulations and methods of use for treating various cancers and chronic infections using pembrolizumab (Keytruda®). Pembrolizumab is approved for the treatment of several cancer types. The development of an antibody drug product formulation is a non-trivial process due to the complex protein structure that defines its function. The structure and activity of a monoclonal antibody are sensitive to both internal (e.g., interaction with excipients, solution pH, etc.) and external factors (e.g., temperature excursions resulting from freeze/thaws, agitation, exposure to light, etc.). The

identification of the formulation solution conditions aimed to maintain the integrity of the antibody during manufacturing, packaging and shipping processes on its passage to be administered to an appropriate patient.

NJIT and inventors Chao Zhu, Ph.D., Zhiming Ji, Ph.D., Mengchu Zhou, Ph.D., Guangyu Guo, and Bo Zhang, Ph.D. received a patent award in the Sustainability category for "Vacuum Distillation and Desalination" (U.S. 10,661,194). As population and economic growth drive demand for energy and clean water, the team's patent proposes an innovative vacuum spray flash distillation and desalination technology that uses waste heat or low-grade energy to treat wastewater and saline water effectively and economically. The technology, which does not use filters, is composed of staggered, multi-staged spray evaporators and condensers with active vacuuming to speed the evaporation and self-distillation of the water being treated. It produces water condensate and concentrated liquid efficiently. As its unique advantage, the entire system operates at low temperatures and low pressure on low-grade energy, such as any renewable energy, or industrial residual energy that would be otherwise wasted as heat. The technology overcomes myriad drawbacks commonly encountered in the current membrane and thermal distillations to deliver a more energy-efficient and environmentally friendly solution to dirty and ocean water. It requires neither filters nor membranes, which would normally need regular replacement, and encounters neither surface scaling nor fouling.

Nokia Bell Labs and inventors Semyon Mizikovsky and Suresh Nair received a patent award in the Telecommunications category for "Security Key Generation for Simultaneous Multiple Cell Connections for Mobile Device" (U.S. 9,338,136). This patent significantly improves the capabilities of cellular devices to establish secure communication channels with multiple serving systems for simultaneous connections and services, while allowing these channels to have unique cryptographic protection. Modern cellular systems employ a large number of smaller interconnected cells and carriers, requiring frequent transition from cell to cell to maintain seamless mobility. A lean and efficient signaling protocol that preserves simultaneous connections while maintaining security from eavesdropping or manipulation has become increasingly important. In addition, encryption secrets established with one serving cell need to be unique and not devisable by other cells in the area. This patent addresses and solves such problems by providing a very efficient and secure protocol for pre-computing and establishing secure channels between mobile devices and serving communication systems. The solution described in this patent has been adopted as an International Standard and is being deployed in LTE/4G and upcoming 5G wireless systems.

Princeton Plasma Physics Laboratory and inventors Samuel A. Cohen, Ph.D., Gary A. Pajer, Michael A. Paluszek, and Yosef S. Razin received a patent award in the Emerging Technology for "Method and Apparatus to Produce High Specific Impulse and Moderate Thrust from a Fusion-Powered Rocket Engine" (U.S. 9,822,769). This patent is for a nuclear fusion rocket

engine for space operations. It employs a nuclear fusion reaction, using deuterium and helium-3 to produce thrust and electric power at the same time. The engine is very efficient and would reduce trip times for human missions to Mars and robotic missions to the outer solar system and interstellar space. The same reactor could be used to produce power for lunar and Mars bases.

Princeton University and inventors Yueh-Lin (Lynn) Loo, Nicholas Davy and Melda Sezen-Edmonds will receive a patent award in the Energy category for "Single-Junction Organic Photovoltaic Devices Having High Open-Circuit Voltages and Applications Thereof" (U.S. 10,476,018). Princeton University has licensed this patent to Andluca Technologies to commercialize the transparent solar cell to serve as onboard power supply for a smart window. The patent protects ultraviolet solar cells and any high-efficiency organic solar cells that produce a photovoltage > 1.4 V. The solar cell was designed to selectively capture non-visible UV light, allowing it to be transparent and suitable for a window application. Typical solar cells made of silicon are black because they absorb all visible light and some infrared heat, which would not be usable for window uses. The solar technology provides the power to activate the tint and control the amount of the light and heat coming through the window, which promotes energy efficiency and occupant comfort in buildings.

Rowan University and inventor Dr. Robert G Nagele received a patent award in the Medical Health Diagnostic category for "Diagnostic Biomarker Profiles for the Detection and Diagnosis of Alzheimer's Disease" (U.S. 10,132,817). This invention provides methods, compositions and kits for a blood test for early diagnosis of Alzheimer's disease (AD) based on detection of disease-specific autoantibodies as blood-based biomarkers. The goal is to definitively diagnose early-stage AD in patients that arrive for the first time in their doctor's office with a cognitive or memory complaint. Currently, diagnosing early-stage AD has been difficult and often inconclusive even after using expensive neuropsychological evaluations and brain imaging. This test is based on the finding that all humans have thousands of self-reactive antibodies (called autoantibodies) in their blood that function to clear cell and tissue debris their bodies generate daily. Relevant to the patent, in the presence of disease, the amount of cell debris produced and released into the blood by the diseased organs or tissues is dramatically increased. In response, the immune system markedly increases production of the specific autoantibodies charged with clearing this disease-specific debris from the blood. This new test uses a single drop of blood to detect the increased levels of these disease-associated autoantibodies as blood-based biomarkers for early AD detection.

Siemens Technology and inventors Juan L. Aparicio Ojea, Justinian Rosca and Lingyun Wang received a patent award in the Information Technology category for "Automatic Compression Algorithm Selection and Parameter Tuning Based on Contextual Knowledge" (U.S. 10,303,148), a novel data compression approach that automatically adjusts key parameters in time-series lossy compression algorithms, by leveraging process specific knowledge and prioritizing which

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statistics should remain as close as possible to the original signal and which ones are not relevant.

Stevens Institute of Technology and inventors Hady Salloum, Alexander Sedunov, Nikolay Sedunov and Alexander Sutin received a patent award in the Homeland Security category for "Passive Acoustic Detection, Tracking and Classification System and Method" (U.S. 9,651,649). This technology uses several systems which each have five microphone clusters. Each of these clusters consists of 64 tiny linked microphone capsules to detect sounds of aircraft engines. This allows the detection of smaller aircrafts including private planes, helicopters and drones, which might fly under the radar that typically detects larger aircrafts. It has a wide-variety of applications for airports, including collision-detection, security and better understanding of the source of noise complaints in residential areas near airports.

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