

# Queen's UNIVERSITY

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## Queen's Gazette

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### Partnering with industry to advance technological innovation

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By Kayla Dettinger, Research Promotion Coordinator

*Over \$6 million has been awarded to Queen's researchers through NSERC's Alliance grants to collaborate with industry partners in areas such as computing, wireless communications, and nuclear power.*

The Government of Canada recently announced its investment of \$118 million in funding through the Natural Sciences and Engineering Research Council of Canada's (NSERC) inaugural Alliance grants program. More than \$6 million was secured by 12 Queen's researchers, with four projects awarded more than \$1 million each. Of the 20 projects that received more than \$1 million, Queen's and the University of Calgary tied for attracting the largest individual investments.

The Alliance grants program was established in 2019 to provide resources to support greater collaboration in research and development between researchers and partner organizations in the private, public, and not-for-profit sectors. The goal is to develop

collaborative teams with different skills and perspectives to generate new knowledge in the natural sciences and engineering and accelerate the real-world application of research results.

“My congratulations to our researchers and industry partners on their extraordinary success in the new Alliance program,” says Kimberly Woodhouse, Vice Principal (Research). “Through their work, we will advance knowledge in fields critical to the prosperity and economic growth of Canadians.”

The four Queen’s projects that received more than \$1 million in funding are:

## Edge Computing

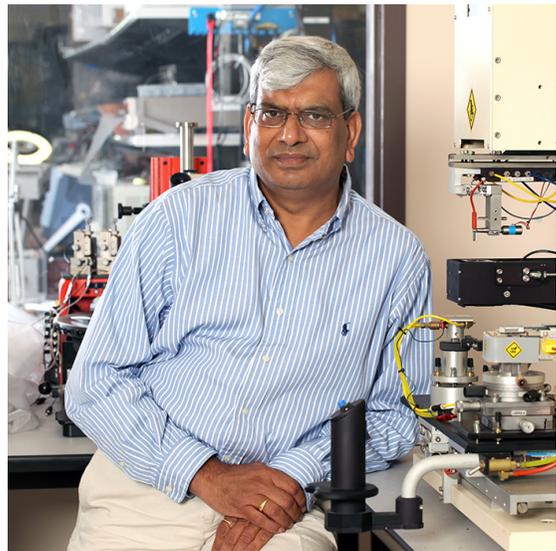


Researchers Hossam Hassanein and Sameh Sorour (Computing) with partners from Kings Distributed Systems, including President Dan Desjardins (PhD'15).

Queen’s researcher Hossam Hassanein, Director of the School of Computing, has received \$1.2 million to develop “A Framework for Democratized Edge Computing and Intelligence” with industry partner and Queen’s Partnerships and Innovation collaborator, Kings Distributed Systems (KDS). Edge computing is a distributed, open IT architecture that has significant impact on user quality of service and will likely be a necessary component of all digital business by as early as 2022. This project will focus on creating distributed edge computing clusters that will make this technology accessible to all, reduce existing monopoly power of cloud service providers and network operators, and open an entirely new market for Canadian businesses and governments. Working with KDS, Dr. Hassanein also intends to train more than 20 highly qualified personnel to further advance edge computing technologies and applications.

## Renewable Nano Power Grid

A team of researchers led by [Praveen Jain](#) with Majid Pahlevani and Suzan Eren at the Queen's Centre for Energy and Power Electronics Research ([ePOWER](#)) received \$1.2 million in funding to partner with Cistel Technology and EION Wireless to develop a "Renewable Nano Power Grid for Wireless Communications." Modern communications networks employ wireless towers at remote locations where grid power may not be available. Dr. Jain and his team are venturing into the next-generation renewable nano energy grid that will provide "five nines" availability required in the communications networks.



Praveen Jain, Canada Research Chair in Power Electronics

## **Nuclear Energy**

Queen's researcher [Suraj Persaud](#), UNENE Research Chair in Corrosion Control and Materials Performance, secured funding for two projects related to nuclear energy. The first is a partnership with Bruce Power, Canadian Nuclear Laboratories, Ontario Power Generation, and UNENE, with \$1.4 million in support, to investigate "Corrosion Control and Materials Performance in Nuclear Power Systems." In collaboration with the University of Toronto, Dr. Persaud will investigate metallic corrosion, in particular the combined effect of irradiation and corrosion on material performance in nuclear power plants and small modular reactors. Application of innovative microscopy methods will be a key component to identify the effects of stress and corrosion on materials degradation at the nanoscale. The team will leverage state-of-art research infrastructure, such as the proton accelerator and microscopy facilities, available at the Ontario Centre for Characterization of Advanced Materials (OCCAM) in Toronto and the [Reactor Materials Testing Laboratory](#) (RMTL) at Queen's.

Dr. Persaud's second project applies the same focus on nanoscale corrosion and materials degradation to the safe disposal of nuclear waste, an often-cited drawback of nuclear energy. With \$1.03 million in funding, Dr. Persaud has partnered with the Nuclear Waste Management Organization (NWMO) to collaborate on the "Advanced Characterization and Modelling of Degradation in Nuclear Waste Canister Materials" with an interdisciplinary scientific approach and a diverse team of senior and early-stage researchers. NWMO is the organization mandated to develop a plan for disposal of spent fuel, which is currently focused on design and commission of the deep geological repository (DGR) where spent nuclear fuel is stored in a multi-barrier system. Dr. Persaud and his team will work with NWMO scientists to employ novel



Suraj Persaud, UNENE Research Chair in Corrosion Control and Materials Performance

microscopy, experimental and modelling methods, and state-of-the-art facilities to study micro-to-atomic scale interactions and the performance of materials proposed for DGR application with the ultimate goal of ensuring Canada's safe and responsible disposal of nuclear waste.

Nine other projects were funded through the program, including:

For more information about the Alliance program, visit the [NSERC website](#).

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