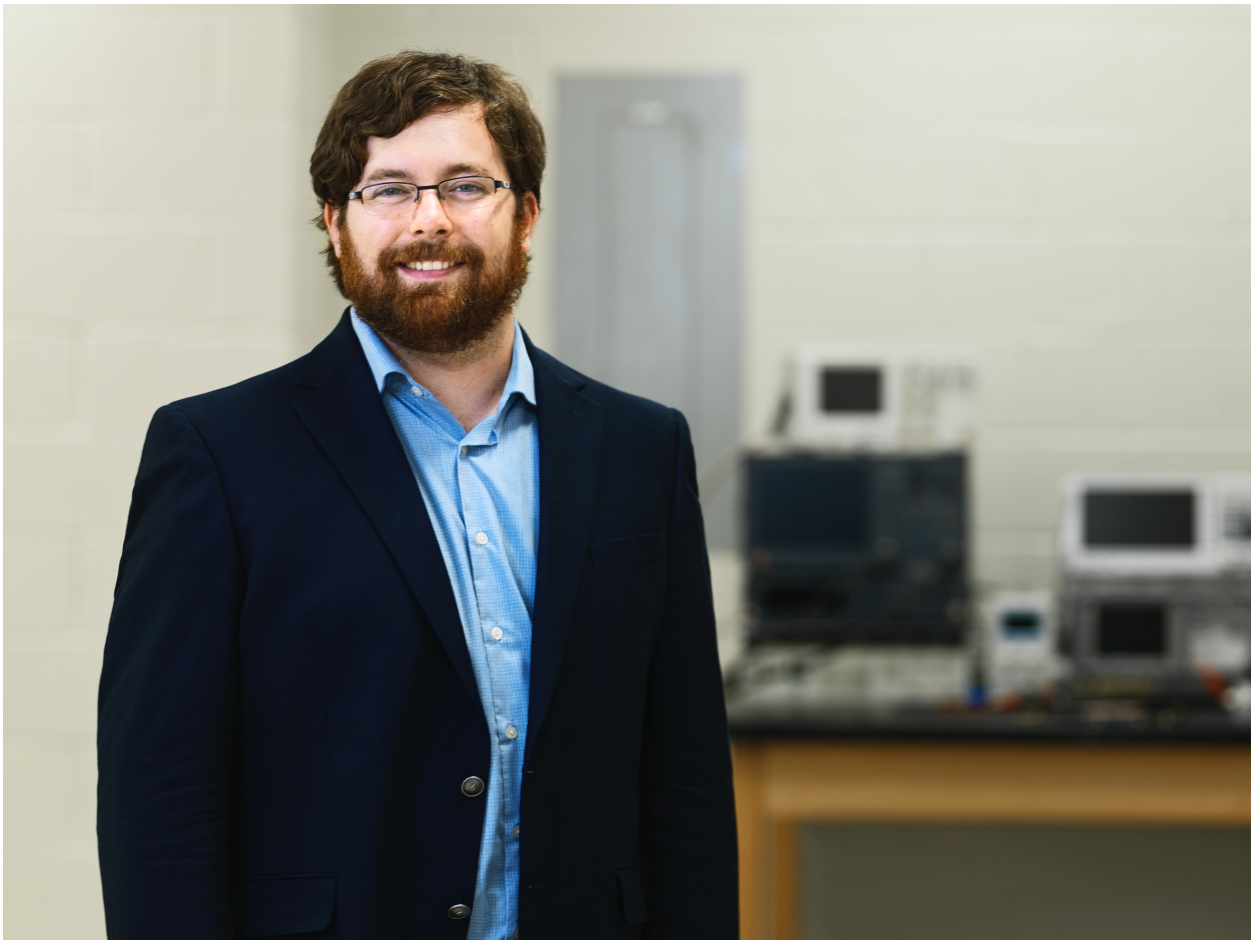
UNB Scientists Awarded Canadian Space Agency Funding to Investigate Space Weather in the Arctic

Scientists from the University of New Brunswick's Radio Physics Lab have been awarded $495244.20 in funding from the Canadian Space Agency (CSA) to develop space weather models for the Canadian Arctic region.

The projects are funded by the CSA's Solar-Terrestrial Science Data Analyses initiative, a funding program aimed at leveraging Canadian space observation infrastructure to improve our understanding of the physical processes that generate space weather, stimulate the development of models that capture this understanding, and improve Canada's resilience to space weather.

A total of two, three-year contracts were awarded to UNB, valued at approximately $250,000 each. The projects will be led by Dr. David Themens, an Adjunct Professor at UNB who is currently a Lecturer at the University of Birmingham in the United Kingdom, and by Dr. Chris Watson, a Research Scientist at UNB. Both Dr. Watson and Dr. Themens are UNB alumni, having completed their PhDs in Physics under the direction of Professor P.T. Jayachandran.



Model development will focus on the ionosphere, a layer of electrically charged plasma formed by the interactions of solar radiation and solar wind particles with the upper atmosphere above 80 km altitude. The ionosphere is important for space science, as a critical point in the sun's interaction with the Earth, and for science and technology that rely on radio communication.

Dr. Themens' project, in collaboration with researchers at the University of Saskatchewan, will focus on improving existing models of ionospheric plasma density over the Arctic using Super Dual Auroral Radar

Network (SuperDARN) data. "We have previously developed the Empirical Canadian High Arctic Ionospheric Model (E-CHAIM) to represent the three-dimensional structure and large-scale dynamics of the high latitude ionosphere", stated Dr. Themens. "Assimilation of SuperDARN backscatter data will address current gaps in the model over Canada and the Arctic regions, which will substantially improve Canada's capacity to implement over-the-horizon radar and high frequency radio communications at high latitudes."

The second project, to be lead Dr. Chris Watson, will focus on the development of a forecast model for plasma irregularities in the Arctic ionosphere. "Plasma irregularities interfere with the propagation of radio signals in the upper atmosphere," said Dr. Watson, "and the ability to predict when and where these irregularities occur is essential for the reliable operation of navigation and radio communication systems in the Arctic."

According to both Dr. Themens and Dr. Watson, the ability to navigate and communicate in the Arctic using radio signals is critical for circumpolar air travel, marine navigation and surveys, and military and industrial operations. The planned model development will significantly enhance Canada's preparedness for the unique space weather challenges it faces due to its high latitude location and proximity to the northern magnetic pole.

Graduate students at UNB will also be involved in the research, data analyses, and model developments. The University of New Brunswick Radio Physics Lab, led by Professor P.T. Jayachandran, is a Canadian leader in research related to the effects of space weather on radio and navigation systems. They operate the Canadian High Arctic Ionospheric Network (CHAIN), a network of 25 arctic space weather observatories equipped with special GPS receivers and ionospheric radars, whose operations are funded by the Canadian Space Agency. The lab also conducts research in collaboration with Defence Research and Development Canada and on behalf of the European Space Agency.