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Ph.D. DISSERTATION DEFENSE

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Degree:	Doctor of Philosophy
School/Department:	Charles V. Schaefer, Jr. School of Engineering and Science / Physics
Date:	Friday, April 19th, 2024
Time/Location:	3:00 pm**,** Burchard 714
Title:	Improvements to Remote Sensing Algorithms using Machine Learning Neural Networks
Chairperson:	Dr. Knut Stamnes, Department of Physics, School of Engineering & Sciences
Committee Members:	Dr. Wei Li, Department of Physics, School of Engineering & Sciences Dr. Vladimir Lukic, Department of Physics, School of Engineering & Sciences Dr. Marouane Temimi, Department of Civil, Environmental & Ocean Engineering, School of Engineering & Sciences

ABSTRACT

Modern satellite remote sensing plays a crucial role in providing data on various water, atmosphere, and land surface conditions. This research introduces improvements to remote sensing methods through a new method for quantifying measurement uncertainties in atmospheric correction algorithms of an existing tool for retrieval of aerosol and marine parameters from ocean color data (OC-SMART); an exploration of the impact of hyperspectral versus multispectral data channels on snow parameter retrieval algorithms; and applications of OC-SMART to Arctic water inherent optical property retrievals. Chapter 1 contains a background on remote sensing of environments; chapter 2 discusses critical tools used in this research; chapter 3 describes how to quantify uncertainties in OC-SMART using Bayesian inversion; chapter 4 explores the impact of hyperspectral information on retrievals of snow grain size and impurity concentration; chapter 5 discusses the application of OC-SMART to Arctic water inherent optical property retrievals; and chapter 6 summarizes the research and provides closing remarks.