Good Afternoon,
You are invited to attend our weekly ECE Graduate Seminar.

Old Dominion University
College of Engineering and Technology
Department of Electrical and Computer Engineering

All lectures to be held at 3:00pm on Fridays online at [ODU DL: ECE 731 831 Grad Seminar](#)

For more information, contact Dr. Chung Hao Chen at (757) 683-3475 or email [cxchen@odu.edu.](#)

Friday, November 19, 2021 Seminar Topic:
PROTECTION AND DISTURBANCE MITIGATION OF NEXT GENERATION SHIPBOARD MVDC POWER DISTRIBUTION SYSTEMS by Marounfa Djibo, Ph.D. Candidate in the Department of Electrical & Computer Engineering at Old Dominion University

Abstract:
    Today, thanks to modern advances mainly in the power electronics field, many new megawatt-level technologies such as electric drives for ship propulsion, magnetic levitation, advanced combat systems are being integrated into the marine power grids. These technologies operate based on DC power, which require AC to DC conversion within the current grid. Medium-voltage Direct Current (MVDC) is the next state-of-the-art technology that researchers are leaning on to produce, and distribute power with improved power quality, reliability, and flexibility. On the other hand, with the extensive integration of high-frequency power electronic converters, system stability analysis and the true system dynamic behaviors assessment following grid disturbances have become a serious concern for system control designs and grid protection.
    This work first explores emerging MVDC shipboard power distribution topology now being considered for enabling new capabilities for future warfighters. Furthermore, the important topic of how these systems perform in dynamic conditions with pulsed power loads (PPLs), faults, as well as designing robust electrical system protection are studied. A communication-based fault detection and isolation system controller that improves upon a directional ac overcurrent relay protection system is proposed offering additional protection discrimination between faults and PPLs in MVDC systems. The controller is designed to distinguish between system dynamic short-circuit faults and bus current disturbances due to a future PPLs in naval vessels.
    Finally, to validate the effectiveness of the proposed protection controller, different bus current disturbances are simulated within a time-domain electromagnetic transient simulation of a shipboard power