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| Doctoral Dissertation Proposal **Presentation**  Department of Electrical and Computer Engineering  **Monday, December 16, 2019**  **11 AM – 1 PM**  **Room ENGR 301A**  **Engineering Building** |
| **DEEP ARCHITECTURES FOR SPATIO-TEMPORAL SEQUENCE RECOGNITION: AUTOMATED ANALYSIS OF ADULT EEGs**  **Meysam Golmohammadi**  Electrical Engineering Committee: Dr. Joseph Picone, Dept. of Electrical and Computer Engineering, Temple University  Dr. Iyad Obeid, Dept. of Electrical and Computer Engineering, Temple University  Dr. Chang-Hee Won, Dept. of Electrical and Computer Engineering, Temple University  Dr. Pallavi Chitturi, Dept. of Statistics, Fox School of Business, Temple University  **Abstract:**  Scalp electroencephalograms (EEGs) are used in a broad range of health care institutions to monitor and record electrical activity in the brain using electrodes placed on the scalp. EEG records are manually interpreted by board certified physicians. Manual interpretation of EEGs is time-consuming and expensive. Brain monitoring combined with automatic analysis of EEGs provides a clinical decision support tool that can reduce time to diagnosis and assist clinicians in real-time applications.  Deep learning-based systems have generated significant improvements in performance for sequence recognitions tasks for temporal signals such as speech and for image analysis that exploit spatial correlations. The primary goal of our proposed research is to develop deep learning-based architectures that capture spatial and temporal correlations in an EEG signal. Our approach for automatic analysis of EEGs delivers a sensitivity above 90% while maintaining a specificity above 95%. We specifically apply these architectures to the problem of automated seizure detection for adult EEGs. The best result is achieved using a doubly deep recurrent convolutional structure which delivers 30% sensitivity at 6 false alarms per 24 hours. We will also analyze performance to gain additional insight into what aspects of the signal are being modeled adequately and where the models fail. |