S VILLANOVA CENTER FOR ANALYTICS OF DYNAMIC SYSTEMS



Mission

To develop techniques for modeling of dynamic systems integrating nonlinear physics, machine learning and expert insights with applications to engineering and medicine

Current Funded Projects

- Adaptive Modeling of Nonlinear Systems (ONR)
- Fault Compensation of Nonlinear Systems Using Control (ONR)
- CPR-NOVA (NIH, with CHOP)
- Structural Health Monitoring (CoE)
- Counter-UAS (TDI), with CENDAC





- Vital signs (HR, MAP, RAP, SpO2)
 - Blood gas data (O2, Co2, HCO3,
 - K++, Ca++, etc.)
 - Optical (rCBF, HbO2, etc.)

Our algorithms can predict PVL (yes/no) after 6 hours of monitoring with 88% certainty

- Innovative CPR Quality Monitoring
 System with noninvasive measurements
- Personalized pediatric CPR using highly accurate modeling and machine learning

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Premiere international competition in maritime autonomy



- Navigation, obstacle management, docking, acoustic tracking and sign recognition
- Innovative Bayesian algorithms for accurate perception in dynamic and







uncertain conditions



Our algorithms are able to identify a fault with 97% certainty











