PhD in Bioengineering

Final Defense

POLITECNICO MILANO 1863

PHD BIOENGINEERING – THESIS FINAL DEFENSE

PHD Student NICOLO' PINI

Advisor Prof.sa Maria Gabriella Signorini

SAVE THE DATE

15.12.2020
h. 15:00
Aula Seminari «Alario»
Online Teams

THESIS: PHYSIOLOGY BASED MACHINE LEARNING AND DATA ANALYTICS FOR PERINATAL MONITORING

COMMITTEE MEMBERS		
Prof. Laura Burattini	Prof. Petar Djuric	Prof.ssa Anna Maria Bianchi
Università Politecnica delle Marche – Ancona	Stony Brook University Department of Electrical and Computer Engineering	Politecnico di Milano Dipartimento DEIB

SCHEDULE OF THE DAY	
15:00 – 15:15	Committee Meeting
15:15 – 16:15	PhD Student NICOLO' PINI Thesis presentation - Discussion
16:15 – 16:30	Committee meeting
16:30	Award Ceremony

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PhD in Bioengineering Final Defense

POLITECNICO MILANO 1863

PhD student: **PINI NICOLO' – XXXIII Cycle**

Thesis title: PHYSIOLOGY BASED MACHINE LEARNING AND DATA ANALYTICS FOR PERINATAL MONITORING
A novel framework for a comprehensive maternal, fetal, and neonatal profiling

Advisor: Prof. Maria Gabriella Signorini

Abstract:

The definition of perinatal period covers pregnancy, delivery, and postpartum. During this lifetime interval, mothers-to-be and their children are strongly interconnected resembling a dynamic system in rapid evolution. Additionally, the perinatal period plays a crucial role in shaping early stages of life and has profound repercussions with the potential to extend beyond the first years of life. Nevertheless, the majority of the investigational approaches in this field lack of longitudinal perspective and tend to study mothers, fetuses, and babies as independent entities. The scope of this Ph.D. thesis is to propose an innovative framework towards a comprehensive and rigorous characterization of the perinatal period as a continuum. The original methodological contribution centers on the utilization of tools encompassing machine learning, artificial intelligence, and advanced signal processing techniques towards data imputation, non-parametric clustering, prediction, and network physiology analysis. The quantitative framework proposed in this Ph.D. thesis is expected to contribute toward promoting healthy pregnancy, safe childbirth, and reduce adverse outcome by building a sustainable network for perinatal health monitoring trained on heterogenous data fusion. The ultimate goal is to inform monitoring solutions for risk assessment with dynamical and longitudinal indicators of perinatal health.