

**ECT\***

EUROPEAN CENTRE  
FOR THEORETICAL STUDIES  
IN NUCLEAR PHYSICS AND RELATED AREAS

FONDAZIONE BRUNO KESSLER

# ECT\* TALENT School 2020

Trento, June 22 – July 10

## Machine Learning applied to Nuclear Physics, experiment and theory

### Lecturers and Organizers

**DANIEL BAZIN** (*Michigan State University, USA*) | **MORTEN HJORTH-JENSEN** (*Michigan State University, USA and University of Oslo, Norway*) | **MICHELLE KUCHERA** (*Davidson College, USA*) | **SEAN LIDDICK** (*Michigan State University, USA*) | **RAGHURAM RAMANUJAN** (*Davidson College, USA*)

### Student Coordinator and Advisor

**MORTEN HJORTH-JENSEN** (*Michigan State University, USA and University of Oslo, Norway*)

### Topics

Basic concepts of machine learning and data analysis and statistical concepts like expectation values, variance, covariance, correlation functions and errors | Estimation of errors using cross-validation and bootstrapping | Linear Regression and Logistic Regression | Dimensionality reductions, from PCA to clustering | Neural networks and deep learning | Convolutional Neural Networks and classification problems | Recurrent Neural Networks and Autoencoders | Decision trees, random forests and boosting methods | Support vector machines and kernel transformations | Bayesian Neural Networks

### Applications

Applications for the ECT\* Talent School should be made electronically through the ECT\* web page. It should include: a curriculum vitae, a 1-page description of academic and scientific achievements, a short letter expressing the applicants' personal motivation for participating in the programme.

In addition, a reference letter from the candidate's supervisor should be sent to:

Professor Jochen Wambach - Director of ECT\* – Strada delle Tabarelle, 286 - 38123 Villazzano (TN) Italy  
(email to Barbara Gazzoli [gazzoli@ectstar.eu](mailto:gazzoli@ectstar.eu))

**Deadline for applications: April 13, 2020**

For further details see [www.ectstar.eu](http://www.ectstar.eu)