



SAPIENZA
UNIVERSITÀ DI ROMA



HR EXCELLENCE IN RESEARCH



**Formazione Sapienza
sulle soft skills per dottorandi**

Scientific calculation tools and Big data

Coordinated by : Mauro Valorani

Speakers. : Fabrizio Silvestri, Gael Cascioli

Dates : November 30, December 1 and 2, 2021

Goals

- Big Data, Data Analytics, Machine Learning, Neural networks, Artificial Intelligence, ...
- Terms that have become (apparently) familiar to us only for the number of times we "meet" them daily
- Interacting with these technologies is not obvious despite the fact that they can be (very) useful in many different areas.
- These 3 webinars propose to all PhD students (regardless of the subject area) a quick introduction to concepts and digital tools typical of ML technologies.
- The webinars will also be useful to build a network between the PhD students more skilled in the use of these techniques with PhD students with interesting ideas to develop thanks to ML.

Speakers

Fabrizio Silvestri



- Fabrizio Silvestri is a Full Professor at Dipartimento di Ingegneria informatica, automatica e gestionale, Sapienza, University of Rome in Italy.
- Formerly a Research Scientist at **Facebook AI** in London.
- His interests are in AI applied to integrity-related problems and Natural Language Processing.
- In the past, he has worked on web search research, and in particular, his specialization is building systems to interpret better queries from search users.
- Before Facebook, Fabrizio was a **principal scientist at Yahoo**, where he has worked on sponsored search and native ads within the Gemini project.
- Fabrizio holds a Ph.D. in Computer Science from the University of Pisa, Italy, where he studied problems related to Web Information Retrieval with a particular focus on Efficiency-related problems like Caching, Collection Partitioning, and Distributed IR in general.

Speakers

Gael Cascioli



- Gael will receive his PhD degree in Aeronautical and Space Engineering on February 2022
- His research interests are in deep space exploration missions
- His master thesis dealt on the gravity experiments of ESA's mission JUICE (JUpiter ICy moons Explorer) with a particular focus on the calibration of the on-board accelerometer
- Gael is specializing in spacecraft tracking techniques and parameter estimation
- A deep interest in Estimation Theory drives his research focus on numerical methods, data analysis programming techniques and statistical signal filtering
- Gael is a member of the VERITAS scientific team coordinated by Prof. Luciano Iess (Co-Lead of the gravity experiment) composed of PhD students and young researchers from the Sapienza Aerospace Research Center (CRAS), the Department of Aerospace Mechanical Engineering (DIMA) and the Department of Information, Electronic and Telecommunications Engineering (DIET)
- VERITAS (Venus Emissivity, Radio Science, INSAR, Topography and Spectroscopy) is a NASA space mission, to which Sapienza participates with a fundamental contribution, aimed at exploring the 'Lost Habitable' World of Venus

Webinar #1 (30 novembre 2021)

Title: Introduction to Python programming

Speaker: Ing. Gael Cascioli

Department: Ingegneria meccanica e aerospaziale

Date: November 30, 2021

- Aim of this short course is to provide an introduction to the advantages of using Python for:
 - data science
 - scientific computing
 - scripting automation
- The short course will enable its participants to get started with Python, its fundamental data structures and basic operations
- At the end of the course the participants will be able to develop programs to face simple numerical and scripting problems

Webinar #2 (1 dicembre 2021)

Title: Introduction to Machine Learning (ML)

Speaker: Prof. Fabrizio Silvestri

Department: Ingegneria informatica, automatica e gestionale

Date: December 1, 2021

- Machine Learning (ML) is at the basis of most of the modern technologies used in everyone's life.
- The basic concept of ML and Neural Networks will be presented, including a brief overview of mathematical and statistical underpinning.
- The course will introduce by a practical approach concepts related to Linear Models, and Neural Network models to deal with non- linear, more realistic, problems

Webinar #3

Title: Introduction to PyTorch per ML

Speaker: Prof. Fabrizio Silvestri

Department: Ingegneria informatica, automatica e gestionale

Date: December 2, 2021

- PyTorch is a framework developed by Facebook with contributions from open-source community
- It is used mainly to develop neural network models
- PyTorch strengths reside in its ease of use and in its rich ecosystem of developed solutions
- The course will focus on some code examples with solutions to real problems on datasets available online
- The course will also show the well-known MNIST dataset for the classification of handwritten digits