



## **Simone Marzani**

Associate professor

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### ***Education and training***

**2008**

#### **PhD**

High-Energy Resummation in Quantum Chromo Dynamics  
University of Edinburgh - Edinburgh - GB

### ***Academic experience***

**2020 - ONGOING**

#### **Associate Professor**

Università di Genova - Genova - IT

**2017 - 2020**

#### **Ricercatore Tempo Determinato (tipo B)**

Università di Genova - Genova - IT

**2015 - 2017**

#### **Assistant Professor**

University at Buffalo The State University of New York - Buffalo NY - US

**2014 - 2015**

#### **Postdoctoral Research Associate**

Massachusetts Institute of Technology - Cambridge MA - US

**2011 - 2014**

#### **Postdoctoral Research Associate**

Durham University - Durham - GB

**2008 - 2011**

#### **Postdoctoral Research Associate**

University of Manchester - Manchester - GB

### ***Language skills***

#### **Italian**

Mother tongue

#### **English**

Proficient

#### **Spanish**

Basic

## *Teaching activity*

### **Lectures**

Fisica Generale I, (Università di Genova)

Fisica Nucleare, delle Particelle e Astrofisica II (Università di Genova)

General Physics I (University at Buffalo)

Quantum Field Theory (University at Buffalo)

Elementary Particle Physics (University at Buffalo)

### **Summer Schools**

Sangam@HRI: Jets and their structure.

MCnet Summer School: Boosted-Particle Techniques.

### **Tutorials**

Tutor for undergraduate courses at Durham University, Manchester University, and Edinburgh University.

Tutor for 39th and 40th British Universities Summer School in Theoretical Elementary Particle Physics.

Private tutor in Maths, Physics and English for high school pupils

## *Postgraduate research and teaching activity*

### **Supervision of PhD students, residents and post-doctoral fellows**

#### **Mentoring and Supervisions**

Chang Wu (University of Genova PhD student)

Jeremy Baron (University at Buffalo PhD student)

Stephen Muehleemann (University at Buffalo Bachelor student)

Vincent Theeuwes (University at Buffalo postdoc)

## *Research interests*

My research on fundamental physics is focussed on the high-energy frontier, the exploration of which is currently instigated by data from the CERN Large Hadron Collider (LHC). I study the way particles interact when collided at the highest energies, in order to push our understanding of the forces of Nature to the ultimate precision, thus uncovering the possible presence of new particles and interactions that, while not accounted for by the Standard Model of particle physics, can explain observed physical phenomena such as the existence of dark matter.

I apply Quantum Chromo-Dynamics (QCD), the theory of the strong force, to a range of topics which are central to the LHC program. The LHC collides protons, which are strongly interacting, and further strongly-interacting particles are abundantly produced in every such collision. Careful studies of QCD radiation in Higgs and new physics processes can be exploited in order to better understand their properties. The possibility of making discoveries depends on our ability to separate new and rare phenomena from an overwhelming background, which is often orders of magnitude bigger than the signal. This background consists of Standard Model processes and its dominant component comes from strong interactions. Therefore, precision calculations in QCD, together with the development of innovative searching

techniques, are mandatory in order to fully exploit the LHC potential.  
My research focuses on two main topics:

- precision calculations for testing the Standard Model and the properties of the Higgs boson;
- new analysis techniques for LHC discoveries in the context of jet substructure (see pictures above).

## *Grants*

2018 - ONGOING

### **Resum(e) the path to discovery**

Royal Society - GB

Principal investigator

2016 - 2017

### **All-Order Precision for LHC Phenomenology**

National Science Foundation - US

Principal investigator

## *Editorial activity*

Proposal reviewer for the US National Science Foundation and the Netherlands Organisation for Scientific Research

Referee for Physical Review Letters, Physical Review D, Journal of High Energy Physics, Physics Letters B, Nuclear Physics B and European Physical Journal C.

## *Assignments abroad*

Affiliate of the Higgs Centre for Theoretical Physics

## *Other professional activities*

### **Activities with schools and with the general public**

Activities as STEM (Science, Technology, Engineering and Mathematics)

Ambassador, e.g. motivational days in high-schools and SciBar in Greater Manchester area.

Organizer of the weekly Physics Club at Whalley Range High School, Manchester. Particle Physics Masterclass: introduction to particle physics for A-level students.

Scientific animator at the Science and Technology Museum Leonardo da Vinci in Milano, Italy.