SCIENCES & BIOENGINEERING SCIENCES

The Research Group
Archaeology, Environmental Changes & Geo-Chemistry

has the honor to invite you to the public defence of the PhD thesis of

Giorgio Arriga

to obtain the degree of Doctor of Sciences

Joint PhD with Università degli Studi Roma Tre

Title of the PhD thesis:
Long-term evolution of seismogenic faults in the central Apennines

Promotors:
Prof. dr. Philippe Claeys (VUB)
Prof. dr. Federico Rossetti (URT)

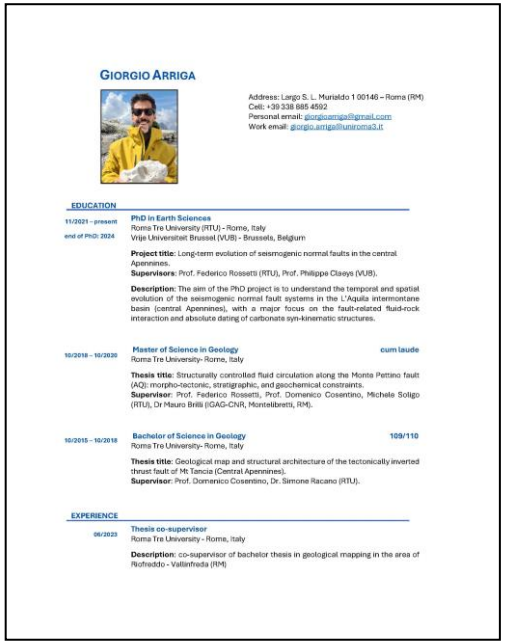
The defence will take place on

Friday, January 31, 2025 at 11a.m. in Largo San L. Murialdo 1, Room E, (URT)

Members of the jury

Prof. dr. Michele Soligo (URT, chair)
Prof. dr. Steven Goderis (VUB, secretary)
Dr. Marion Peral (Université de Bordeaux, FR)
Prof. dr. Francesca Cifelli (URT, IT)
Prof. dr. Alberto Pizzi (Università degli Studi "G. d'Annunzio" Chieti, IT)
Prof. dr. Andrea Billi (Università Sapienza Roma, IT)

Curriculum vitae



GIORGIO ARRIGA

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EDUCATION

11/2021 – present, end of PhD: 2024 — **PhD in Earth Sciences**
Roma Tre University (RTU) - Rome, Italy
Vrije Universiteit Brussel (VUB) - Brussels, Belgium
Project title: Long-term evolution of seismogenic normal faults in the central Apennines.
Supervisors: Prof. Federico Rossetti (RTU), Prof. Philippe Claeys (VUB).
Description: The aim of the PhD project is to understand the temporal and spatial evolution of the seismogenic normal fault systems in the L'Aquila intermontane basin (central Apennines), with a major focus on the fault-related fluid-rock interaction and absolute dating of carbonate syn-kinematic structures.

10/2018 – 10/2020 — **Master of Science in Geology** — cum laude
Roma Tre University- Rome, Italy
Thesis title: Structurally controlled fluid circulation along the Monte Pettino fault (AQ): morpho-tectonic, stratigraphic, and geochemical constraints.
Supervisor: Prof. Federico Rossetti, Prof. Domenico Cosentino, Michele Soligo (RTU), Dr Mauro Brilli (IGAG-CNR, Montelibretti, RM).

10/2015 – 10/2018 — **Bachelor of Science in Geology** — 109/110
Roma Tre University- Rome, Italy
Thesis title: Geological map and structural architecture of the tectonically inverted thrust fault of Mt Tancia (Central Apennines).
Supervisor: Prof. Domenico Cosentino, Dr. Simone Racano (RTU).

EXPERIENCE

09/2023 — **Thesis co-supervisor**
Roma Tre University - Rome, Italy
Description: co-supervisor of bachelor thesis in geological mapping in the area of Rocca di Mezzo - Vallelonga (AQ)

Abstract of the PhD research

Tectonic reconstructions in seismically and dynamically active regions are hampered by the co-existence of different phenomena, which can interfere at different spatial and temporal scales. In extensional settings, the long-term evolution of fault systems is governed by interactions between regional and local forces, influencing how faults nucleate, grow, and coalesce to accommodate crustal stretching. In the central Apennines, inherited compressional structures complicate this evolution, with inversion tectonics playing a pivotal role in fault localization, geometry, and seismic potential. Understanding the interaction between regional tectonics and structural inheritance is crucial for assessing seismic hazard and reconstructing the region's geological history.

This study addresses critical challenges in reconstructing the tectonic history of carbonate-rich regions, where traditional thermochronometry methods are often limited by the absence of suitable minerals. Recent advances in low-temperature trapped-charge thermochronometry, including luminescence and electron spin resonance (ESR) dating, offer new opportunities. Dolomite thermochronology, in particular, is promising due to its strong thermoluminescence signals in slowly exhuming terrains and its mechanical resistance to brittle deformation.

Focusing on the Monte Marine, Monte Pettino, and Paganica Faults along the northeast boundary of the Aterno Intermontane Basin, this research investigates their tectono-stratigraphic evolution during the Pliocene-Quaternary. By integrating thermochronological, isotopic, and structural data, we aim to unravel the long-term evolution of these key seismogenic fault segments. This includes understanding fault interaction and linkage processes that govern basin formation in continental rift zones, bridging the gap between regional structural evolution and the short-term tectonic activity of active faults.

This work contributes to advancing knowledge of extensional tectonics and seismic hazards in one of the most tectonically dynamic regions of the central Apennines, offering insights into fault system dynamics, thermal histories, and rift development from the onset of extension to the present.