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

Juliette Faucher

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:
Untangling impact processes during hypervelocity meteoritic impacts: petrography and geochemistry of impactites formed on igneous and metamorphic targets

Supervisor:
Prof. dr. Steven Goderis (VUB)
Co-supervisor:
Prof. dr. Philippe Claeys (VUB)
The defence will take place on
Monday, June 15, 2026 at 4 p.m.
VUB Etterbeek campus, Pleinlaan 2, Elsene, auditorium D.2.01

The defence can be followed through a live stream:
https://teams.microsoft.com/meet/373493948752945?p=3KRyttW7Gum3u5hlKA

Members of the jury

Prof. dr. ir. Christophe Snoeck (VUB, chair)
Prof. dr. Martine Leermakers (VUB)
Prof. dr. Harry Zekollari (VUB)
Prof. dr. Sanna Alwmark (Lund University, SE)
Dr. Ludovic Ferrière (Natural History Museum Vienna, AT & Abu Dhabi, AE)
Dr. Béatrice Luais (Université de Lorraine, FR)

Curriculum vitae

In 2021, Juliette Faucher obtained both her Master's degree in Geosciences from the Université de Lorraine (Nancy, France) and her Engineer diploma (ENSG, Nancy, France), before starting her PhD at the Archaeology, Environmental Changes, and Geo-Chemistry research group of the VUB in 2022.

She is first author of one peer-reviewed publication and has presented her work at several international conferences.

Abstract of the PhD research

Impact cratering is a fundamental process in the Solar System, shaping planetary surfaces and potentially influencing the emergence and evolution of life on Earth. Impact craters occur on all rocky and icy bodies and represent the most common geological landform across the Solar System their surfaces. On Earth, however, the geological record of impact structures is incomplete due to continuous surface reshaping by erosion, sedimentation, volcanism, and tectonics. To date, only ~200 terrestrial impact structures have been confirmed, making them crucial archives for understanding the processes associated with hypervelocity impacts and the formation of impact-related rocks.

This PhD thesis aims to improve our understanding of meteorite impact processes and the formation and evolution of impactites through an integrated petrographic, geochemical, and isotopic approach. The study focuses on terrestrial impact structures formed in igneous and metamorphic targets, which provide complementary insights into impact cratering processes. Drill core samples from the Rochechouart impact structure (France) offer rare access to subsurface impactites and enable detailed investigation of impact-generated rocks. In addition, the Vargeão Dome and Vista Alegre impact structures (Brazil), both formed in basaltic targets, represent valuable terrestrial analogues for impact processes occurring on basaltic planetary surfaces such as Mars.

The research presented in this thesis seeks to disentangle the petrographic, geochemical and isotopic signatures produced during meteorite impact events in order to constrain the processes responsible for their formation and subsequent modification. By integrating petrographic observations with geochemical and isotopic analyses, this work provides new constraints on the processes governing the formation and evolution of impact-generated rocks and contributes to refining the analytical framework used to investigate meteorite impact structures on Earth and other planetary bodies.