UNIVERSITÀ DI PAVIA
DIPARTIMENTO DI SCIENZE DELLA TERRA E DELL'AMBIENTE
DOTTORATO DI RICERCA IN SCIENZE DELLA TERRA E DELL'AMBIENTE

FORM PER PROGETTI BANDO DOTTORATO

1. Project title

Origin and Localization of Garnet-Rich Layers in the Continental Crust: Geochemical Insights and REE Potential

2. Proposer

Surname	Langone
Name	Antonio

3. Research Unit

Surname	Name	Institution
Corvò	Stefania	Università di Pavia - Italy
Moroni	Marilena	Università di Milano - Italy
Maino	Matteo	Università di Pavia - Italy
Piazolo	Sandra	University of Leeds - UK
Locmelis	Marek	University of Texas - USA
Dackzo	Nathan	University of Macquarie - Australia

4. Key words
(Max. 5 – at least 2)

Continental crust, Geochemistry, Garnet-rich layers, Rare-Earth Elements, Experimental petrology

5. Abstract
(Max.1.500 characters with spaces)

Garnet is a common mineral within high temperature metamorphic rocks and lower crustal intrusives. It is used as industrial mineral, but it has only recently been considered as a potential enriched source of Heavy Rare Erath Elements (HREE), Yttrium and Scandium. The project is focused on garnet-rich rocks occurring within the continental crustal sections exposed in the Alps (Ivrea-Verbano Zone) and in Central Calabria. In these two domains of the Adria lower crust garnet is occurring in both metamorphic (migmatite and granulite) and magmatic rocks, with concentrations up to 75 vol.%. The formation of garnet-rich lithologies remains debated. In migmatites and magmatic rocks, garnet accumulation is linked to its high density relative to melt and coexisting minerals. Deformation may further promote its growth in high-temperature metamorphic and intrusive rocks. While garnet-rich rocks are expected in the deep crust, their presence in intermediate-level intrusives (diorite/tonalite) is less understood. The project includes three phases: (1) characterization of garnet-rich layers at different crustal levels, from outcrop to thin section, including bulk rock composition analysis; (2) geochemical analysis of garnet, focusing on major and trace elements; (3) experimental petrology to replicate garnet formation and accumulation in magmatic rocks at lower and middle crustal levels.