

Title: *Sedimentary and Diagenetic Facies distribution in shallow water carbonate rocks and their role in determining reservoir properties*

Name of the supervisor: **Simonetta Cirilli**

Name(s) of a potential co-supervisor(s)

Enrico Capezzuoli

Prospective **assistance** in the supervision (Lab activity, fieldwork,):

Fieldwork: Facies analysis, distribution, vertical and lateral variations

laboratory activity: exam under microscope of thin sections to characterize microfacies and the products of diagenesis (early and burial): cements, dolomitization, dissolution, etc etc.

Prerequisites. It is preferred (but not mandatory) have been attended the course on Sedimentary Petrography.

Description of the planned research

Introduction: Carbonate depositional environments are inherently heterogeneous because of the superposition of sedimentary and diagenetic processes following relative sea level changes. Diagenesis can significantly alter petrophysical properties of subsurface carbonate reservoirs.

objectives,

- to reconstruct the depositional environment, facies distribution and architecture, in order to provide an integrated and quantitative description of carbonate platform geometry;
- to determine the diagenetic overprint, type, timing and intensity of the diagenetic processes (from early phases to burial): characterization of the near-surface/vadose, meteoric, marine, shallow and deep burial diagenetic processes which have modified the primary depositional texture of different lithofacies.
- to characterize, if present, the dolomitization processes and resulting dolomite textures;
- To determine the fundamental relationship between sedimentation, carbonate platform growth, and diagenesis (early and burial).

the **study area**: mainly in the northern- central Apennine

the **research methods** foreseen

Field works on selected outcrops where detailed sedimentological and stratigraphical analyses will be performed.

Laboratory analyses will be performed on representative samples. These will be analysed by several approaches such as petrography, mineralogy and geochemistry, combining classical with more innovative methods also by means of Raman, FTIR absorption and spettroscopy.