**University of Genova**
**Department of Earth, Environmental and Life Sciences**
**Doctorate Course in Earth and Environmental Science and Technology**

Università degli Studi di Genova

STAT

Dottorato in Scienze e Tecnologie per l'Ambiente e il Territorio

## Curriculum in biology applied to agriculture and the environment

### Theme n. 1

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| Titolo Riforestazione delle praterie algali in Italia: dal monitoraggio molecolare alla ricerca di composti bioattivi<br><br>Title Macroalgal forests restoration in Italy: from the biomolecular monitoring to the mining of bioactive compounds |
| Tutor and co-tutor<br>Sonia Scarfì soniascarfi@unige.it; Mariachiara Chiantore mariachiara.chiantore@unige.it |
| **Program description**<br>In the framework of the numerous actions of the Italian National Biodiversity Future Center (NBFC), this PhD project will contribute to the activity "Marine ecosystems restoration" (MARES), in the framework of Spoke 2. The MARES action will support the biodiversity resilience through habitat restoration to provide essential ecosystem services. The results of MARES (methodologies, maps, measures of success) will allow a step change in the marine restoration strategy at the Italian level. During the development of this action UNIGE will be involved in the restoration of degraded forests ecosystems in the Mediterranean Sea, mainly macroalgal forests (Fucales, i.e., *Cystoseira* spp.). In detail, the PhD project aims at developing reliable molecular analyses to monitor the growth and welfare of seaweed forests that will be implemented to fulfill the restoration action. The seaweeds in situ growth, colonization and "wellbeing" will be assessed by the quantification of specific markers of growth and/or of stress signals by gene expression profiling and biochemical analyses. Thus, specific genes will be selected as markers and their expression analysis, together with selected biochemical tests measuring cellular physiological pathways, will allow the monitoring of the growth of the vegetal organisms in the sites of the restoration during time. Furthermore, the PhD project aims also to exploit the wide collection of samples that will be obtained from the different sites of the restoration, at different times of the year and at different stage of the algal growth, that will be necessary for the monitoring studies, to research the production of polyphenols, flavonoids and more in general of antioxidant, anti-inflammatory and bioactive molecules for nutraceutical and pharmacological purposes, that will be assessed by specific in vitro cellular and biochemical tests. These data will help in understanding which ecological and developmental conditions are optimal to ensure the maximum production of bioactive compounds from said organisms for a future exploitation through the setup of mariculture systems contributing to the development of blue economy strategies. |
| Financial support: PNRR National Biodiversity Future Center |
| Tutor's publications (max 3):<br>1. Pozzolini M, Gallus L, Ghignone S, Ferrando S, Candiani S, Bozzo M, Bertolino M, Costa G, Bavestrello G, Scarfì S. Insights into the evolution of metazoan regenerative mechanisms: roles of TGF superfamily members in tissue regeneration of the marine sponge *Chondrosia reniformis*. J Exp Biol. 2019, 222(Pt 17). pii: jeb207894. doi: 10.1242/jeb.207894.<br>2. Scarfì S, Pozzolini M, Oliveri C, Mirata S, Salis A, Damonte G, Fenoglio D, Altosole T, Ilan M, Bertolino M, Giovine M. Identification, Purification and Molecular Characterization of Chondrosin, a New Protein with Anti-tumoral Activity from the Marine Sponge Chondrosia Reniformis Nardo 1847. Mar Drugs. 2020; 18(8):409. doi: 10.3390/md18080409.<br>3. De La Fuente G, Fontana M, Asnaghi V, Chiantore M, Mirata S, Salis A, Damonte G, Scarfì S. The Remarkable Antioxidant and Anti-Inflammatory Potential of the Extracts of the Brown Alga Cystoseira amentacea var. stricta. Mar Drugs. 2020; 19(1): E2. doi: 10.3390/md19010002. |