# Description of scholarships referred to specific programs funded by external Institutions or associated locations

- **Environmental and energy engineering sciences – Electrolux scholarships (see link below)**

https://theresearchhub.electrolux.com/phd/

- **Agricultural sciences and biotechnology – CREA scholarship**

The research program will be explain to the candidates during the oral exam.

- **Agricultural sciences and biotechnology – F.Mach scholarship "FUNctional characterization of resistance gene against Apple Scab - FunAppleS"**

Apple is an economically important fruit crops well known for his unique textures, flavours and nutritional qualities. This species is subject to numerous attacks. Among them the fungal pathogen Ventuira ineaqualis, the causal agent of apple scab, is a major threat of apple in Europe and in particular in Trentino-Alto Adige. In 2001 this pathogen caused an economic loss of about 100 Million euro. Most of the apple cultivars grown in the Trentino Alto Adige province are highly susceptible to the pathogen and require between 15 to 30 fungicide treatments every year. Much progress has been made in unravelling the molecular basis of apple scab infection, and recently few new resistance genes candidates for Rvi12 (Vb) and Rvi5 (Vm) have been identified. Nevertheless, the function of these genes is not yet been proven. This project is aimed to verify if these candidate genes are really involved in apple scab resistance, to study the function of these new genes and to characterize transgenic/cisgenic plants expressing Rvi6 and Rivi15. This work will also give a unique opportunity to gain further information to better understand and improve resistance against apple scab and to study the mechanisms underlying plant pathogen interaction.

- **Agricultural sciences and biotechnology – F.Mach scholarship "Understanding the mechanisms of resistance to powdery and downy mildew in grapevine applying omics approaches"**

The grapevine is the most economically important fruit crop worldwide. Viticulture is threatened by numerous pathogens causing severe harvest losses. Downy mildew (DM) and Powdery mildew (PD) are considered as extremely destructive diseases of the grapevine caused by the Plasmopara viticola and Erysiphe necator. One of the most promising future strategies to ensure plant protection against diseases is to stop the use of chemical compounds and focus on the selection of varieties showing durable specific resistance. Understanding plant-pathogen interaction is important for the future of the breeding; indeed, grapevine species can be crosses, including resistant traits using conventional breeding techniques. The objective of this project is the evaluation of grapevine with one or more than one different sources of resistance against the pathogens considering different omics approaches. The expected results are a different characterization of the resistant mechanisms underlying the grapevine-pathogen interaction and their fight against the diseases. This project is directed towards better understanding plant defense mechanisms and characterization of the plant-pathogen interactions affecting the species.

- **Computer science, mathematics and physics – beanTech scholarship**

Design and development of machine learning and deep learning models to address the problem of complex data classification. Supervised and unsupervised methods will be studied with particular emphasis to neural trees. Applications will be developed in the context of unmanned aerial vehicles, automated image recognition and tracking of multiple target in complex environments.

- **Computer science, mathematics and physics – INFN scholarship**

The HERMES project (High Energy Rapid Modular Ensemble of Satellites), involves the construction of a swarm of satellites for astrophysics and fundamental physics studies. The constellation of Nano / Micro-satellites HERMES (each one with a weight <10 kg, completely autonomous, with high-resolution energy detection systems based on SDD - silicon drift detectors - and scintillator crystals, capable of high temporal resolution, operating in the interval of KeV energies - MeV), will be placed in low orbit and will allow a new perspective of study of gamma ray bursts and of the structure of space-time. HERMES pathfinder, is the technological precursor that will lead to the creation and launch of the first three modules with the aim of demonstrating the feasibility of the entire project. The work takes place within the framework of an international collaboration including ASI, INAF, INFN-Ts, Milano Politecnico, FBK-Trento and some Italian universities. In the Udine University it is associated with a DIMF department project active since 2017. The INFN fellowship is dedicated this line and requires a clear identification of the physics objectives and the consequent optimization of the instrument within the constraints posed by the structure of nano-satellites. The implementation times are very tight, HERMES pathfinder will have to be implemented over a period of three years.