

## PhD students

**RedBioLab** is seeking 2 candidates for application to the PhD [Program in Veterinary and Animal Science](#) of the University of Milan - Class 40 Academic Year 2024/25.

The candidates will have the opportunity to work on one of the following RedBioLab-based projects:

### **The role of fertility in biodiversity conservation programs of endangered livestock breeds**

**PI: Prof. Federica Franciosi**

With many local livestock breeds being endangered, biodiversity conservation programs strive to counteract the loss of genetic variability. In critical cases, plans for breed 'resuscitation' must be made, consisting of embryo cryopreservation for transfer into surrogate mothers of other breeds. Since 2019, with the projects [INNOVA and R-INNOVA](#) funded by Regione Lombardia, RedBioLab has led a conservation program for the critically endangered Varzese-Ottone-Tortone cow. The success of 'resuscitation' schemes rests on two inherent biological factors: fertility of the breed and establishment of cross-bred pregnancies. The project investigates factors in the Varzese cow to better tailor the conservation program.

### **The contribution of Reactive Oxygen Species in early mammalian development**

**PI: Prof. Valentina Lodde**

Reactive oxygen species (ROS) are a wide range of molecules known to trigger oxidative stress in many biological processes, including gametogenesis and early embryogenesis. Oxidative stress occurs when ROS production exceeds a certain threshold and/or the antioxidant intracellular systems can no longer scavenge them. Nevertheless, their role as regulators of physiological mechanisms is also accepted, leading to the assumption that excessive ROS suppression may alter cellular functions. A better understanding of the role of ROS in early development is needed to modulate culture systems to treat infertility and/or improve reproductive efficiency. So far, a significant limitation in this type of study was the lack of appropriate molecular tools for specifically and quantitatively assessing ROS over time. We have recently optimized a live imaging system using a ratiometric sensor (Hyper7) that tracks the fluctuation of mitochondrial and cytosolic H<sub>2</sub>O<sub>2</sub>, overcoming the limitations of traditional methods. With this PhD project, we will test the hypothesis that H<sub>2</sub>O<sub>2</sub> contributes to the mechanisms driving meiotic progression and early embryogenesis and that the maternal microenvironment contributes to the control of ROS.

**What is required:** Applicants must have excellent degree scores, possess scientific curiosity, a strong work ethic, and be willing to work in a multicultural environment. Previous research experience in reproductive/developmental biology, molecular biology, bioinformatics, and image analysis will be considered an advantage.

**How to apply:** the application procedure can be found [here](#). Access to the PhD Program is through a public competition. An independent Examination Board will assess candidates.

**Application Deadline: 27-06-2024 - If selected, candidates must enroll by 30-09-2024**

**Type of appointment:** full-time basis for 3 years. **Starting date: 01-10-2024**

**We strongly encourage prospective candidates to get in touch beforehand.**

#### **Contact details**

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