

## **MSc-projects on long term trends in virus epidemics and ecotoxicology**

Daily Supervisor: Reina Sikkema (Erasmus MC/NIOO)

Secondary Supervisors: Henk vd Jeugd (NIOO), Rene Dekker (Naturalis)

Changes in climate and habitat are happening in an unprecedented rate, and are affecting animal health and behavior as well as human health. In such a rapidly changing world, viruses are on the move. Birds are particularly affected by this. Recently, novel techniques were developed to use bird feathers for RNA/DNA-based screening of viruses. Besides a far better understanding of virus outbreaks in birds, and their role as a reservoir for a diversity of viruses, such as avian influenza, Usutu virus and West Nile virus, this technique potentially allows us to investigate past epidemics, and trace disease outbreaks on a day-to-day basis with little or no harm to birds. In relative separation, techniques have been developed that offer increasing power to use feathers for toxicological studies. The joint study of viruses and environmental toxins potentially allows for important breakthroughs concerning possible links between pollution and disease outbreaks.

For 2 student projects we are looking for *highly motivated students*. You will be expected to design your own research and experimental work, collect samples from museum collections and possibly from the wild, using networks of citizen scientists, carry out the necessary protocols for sample processing and analyzing and reporting on the data collected. If your MSc-project results in exciting data we will seek opportunities to publish this in peer reviewed journal.

### *1) Optimal storage conditions for biobanking of feathers*

To determine optimal storage conditions for the feather samples, a review of current storage conditions and practices would be necessary. This includes both literature research as well as an inventory of current (best) practices in existing biobanks and historical collections. These would need to be evaluated based on the research questions above (ability to detect (RNA) viruses, bacteria, resistance genes, toxins and morphology after a period of 10 years). This includes an analysis of involved costs, reflecting also storage space, energy use, etc. The ultimate output would be an evidence-based advice on how to set up the feather biobank in a sustainable fashion.

### *2) Review of possible model organisms for virus (RNA and DNA), bacteria and parasite families*

Both in scientific literature as well as historic documents, information can be found on the incidence and prevalence of infectious diseases in wild birds including the timing of possible outbreaks. Using this information, feathers can be selected from existing historic collections at Naturalis and NIOO. These materials are selected for the purpose of testing for the presence of RNA/DNA and/or antibodies against the selected pathogens to validate our approach to use feathers in historic collections for infectious disease research. In addition, novel feather collection can be set up. The output would be an overview of common infectious diseases and disease outbreaks in wild birds in the Netherlands and a feather collection that can be used for infectious disease testing. Depending on time and experience, the internship can also include PCR and/or antibody testing.

Interested students can contact Reina Sikkema at [r.sikkema@erasmusmc.nl](mailto:r.sikkema@erasmusmc.nl), Henk van der Jeugd at [h.vanderjeugd@nioo.knaw.nl](mailto:h.vanderjeugd@nioo.knaw.nl) or René Dekker at [rene.dekker@naturalis.nl](mailto:rene.dekker@naturalis.nl).

Starting date and internship length can be discussed. Please include a CV and a short motivation with your application.