

**Institute:** Institute of Environmental Sciences

**Topic:** Genetic drivers of microbiome variation on local and comparative scale

**Name of supervisors:** dr hab. Szymon Drobnik  
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**Background information:**

Project within the tasks planned in an OPUS research grant “Microbiome: heritable and repeatable?”. The research grant aims at estimating the genetic factors influencing microbiome variability in a wild bird population, and its potential links to individual fitness. It will be the first attempt to estimate two key ingredients of an evolving trait (here – microbiome diversity): its underlying genetic variance, and selection acting on it in a wild population. This PhD. fellowship will focus on the heritability and genetic variance underlying variation of microbiome in a wild population of birds.

**The main question to be addressed:**

What is the genetic background (both in terms of quantitative genetic variance and specific genetic variants) of microbiome diversity in a wild bird population?

**Information on methods/description of work:**

The tasks of the student will comprise: sample collection in the wild population of collared flycatchers in Sweden (Baltic island of Gotland), contribution to the planning and logistics of fieldwork, molecular genetic analyses of collected material in a genetic laboratory and preparation of samples for sequencing (next-generation sequencing using in-house platform as well as outsourced), analysis of resulting data. The position will give unique opportunities to learn cutting-edge molecular tools, modern statistical and mathematical modelling skills, and recent meta-analytical and research synthesis methods.

**Additional information:**

Students applying for this project should have keen interest in evolutionary biology and ecology, preferably experience (or strong motivation to gain it) in modern genetic molecular tools. European driving license and interest in modern statistical methods used in biology will be a plus. Fluency in English is a must. The student will be a member of inclusive and strongly collaborative research team and will have opportunities to contribute to many research outputs as co-author.

**References:**

Drobnik SM, Cichoń M, Janas K, Barczyk J, Gustafsson L, Zagalska-Neubauer M (2022). Habitat shapes diversity of gut microbiomes in a wild population of blue tits *Cyanistes caeruleus*. *Journal of Avian Biology* 2022.

Drobnik SM, Sudyka J, Cichoń M, Arct A, Gustafsson L, Lutyk D, et al. (2022). Differential effects of steroid hormones on levels of broad-sense heritability in a wild bird: possible mechanism of environment × genetic variance interaction? *Heredity* 128: 63–76.

Henry LP, Bruijning M, Forsberg SKG, Ayroles JF (2021). The microbiome extends host evolutionary potential. *Nat Commun* 12: 5141.