

**PhD position (UNIVERSITÄT GRONINGEN)**  
**Bewerbungsfrist: 08.06.2017**

**PhD position on computational models of collective escape of bird flocks 1.0 fte (217006H)**

Organisation

Founded in 1614, the University of Groningen enjoys an international reputation as a dynamic and innovative center of higher education offering high-quality teaching and research. Flexible study programmes and academic career opportunities in a wide variety of disciplines encourage the 30,000 students and researchers alike to develop their own individual talents. As one of the best research universities in Europe, the University of Groningen has joined forces with other top universities and networks worldwide to become a truly global center of knowledge.

The Groningen Institute for Evolutionary Life Sciences (GELIFES -<http://www.rug.nl/research/gelifes/>) GELIFES, the largest institute of the Faculty of Mathematics and Natural Sciences (FMNS) fills a special niche in the life sciences by covering and integrating mechanistic, evolutionary and ecological approaches, aiming to understand adaptation on all levels of biological organisation. Researchers pursue fundamental questions while collaborating with partners from industry, medicine and other realms of society. Our research fields include behavioural biology, chronobiology, ecology, evolutionary biology, genetics and genomics, neurobiology, physiology and theoretical modelling, using a wide array of research tools. Research levels range from molecular and organismal to population and community, performed under laboratory, semi-natural and field conditions.

Job description

One of the advantages of group life, such as in birds, is increased protection against predation. Increased protection is, for instance, assured by the complex patterns of collective escape by bird flocks under attack. These patterns may confuse the predator. Collective behaviour of flocks is, however, difficult to investigate empirically. As a solution, the proposed project concerns the computational modelling of collective escapes. This is done with the help of empirical data collected by another PhD candidate using robot-falcons (RoboFalcons) for controlled attacks on flocks. The empirical study is aimed at driving flocks away in a specific direction for preventing collisions between flocks and airplanes. The PhD candidates will closely exchange data and results. The modelling project aims to gain understanding on what causes different patterns of collective escape under different conditions. For this, the PhD candidate will extend our computational model, StarDisplay, and may develop new models. The model will be informed by two empirical sources, namely, the experiments with RoboFalcons and the movies of huge starling flocks under attack by Peregrine falcons above Rome. The student will experiment with different escape strategies and attack strategies in the model to improve both understanding of the observations of patterns of collective escape and methods of driving flocks away. Daily supervision will come from Prof. Charlotte Hemelrijk and Dr Hanno Hildenbrandt; Dr Colin Torney (Glasgow, UK) will co-supervise the project.

Qualifications

The successful candidate will have previous research experience in theoretical modelling, be in good command of the English language (oral and written) and possess excellent communication skills (indicated by the ability to write scientific papers and deliver presentations). Since studies on self-organisation are highly interdisciplinary, successful candidates are expected to demonstrate an active and supportive approach to interdisciplinary research and collaborate with other group members. Suitable candidates can be either individuals with a background in the computational (life) sciences, with interest in evolutionary and biological questions, or evolutionary biologists with experience in computational modelling.

Candidates for the PhD position should have:

- MSc in theoretical biology, a MSc in computational science with focus on biology or an MSc in computational physics with specialization in biology, MSc in Artificial Intelligence with a specialization in an area of computational or mathematical biology or a MSc in Biology, with a specialization in an area of computational or mathematical biology
- experience with developing computer simulation code and a sufficient background in mathematics
- a strong interest in collective, swarming behaviour, biomechanics of flight, attack and escape.

Candidates with research experience in these areas are particularly encouraged to apply.

#### Conditions of employment

The University of Groningen offers a salary of € 2,191 gross per month in the first year, up to a maximum of € 2,801 gross per month in the final year (salary scale Dutch Universities), based on a fulltime position (1.0 fte) excluding a 8% holiday allowance and a 8.3% end of the year bonus. The position must result in a PhD thesis within the 4-year contract period. A PhD training programme is part of the agreement and the successful candidate will be enrolled in the Graduate School of Science. The successful candidate will first be offered a temporary position of one year with the option of renewal for another three years. Prolongation of the contract is contingent on sufficient progress in the first year to indicate that a successful completion of the PhD thesis within the next three years is to be expected.

#### Application

Applications, including a letter of motivation, a curriculum vitae, a list of publications (if any), a list of examination marks, and the contact information of three academic referees, must be submitted online **until 8 June / before 9 June 2017** Dutch local time by means of the application form (click on "Apply" below on the advertisement).

The position will remain open until filled. All applications received by 9 June 2017 will be given full consideration. Unsolicited marketing is not appreciated.

#### Information

For information you can contact:

Prof. Charlotte K. Hemelrijk, +31 50 3638084, [c.k.hemelrijk@rug.nl](mailto:c.k.hemelrijk@rug.nl)  
(please do not use for applications)