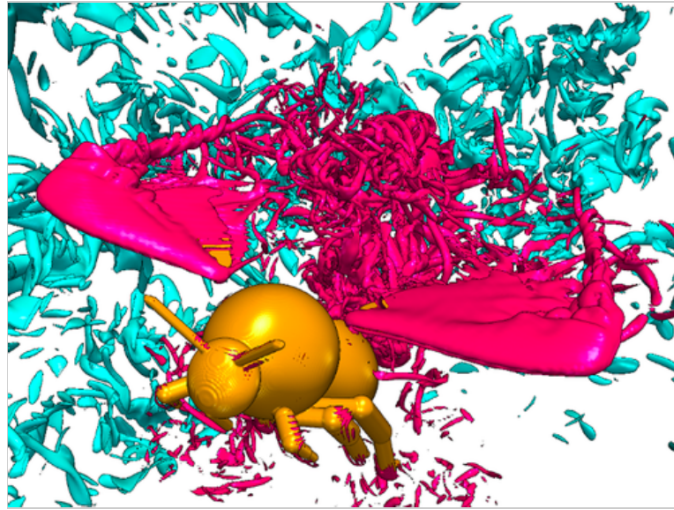

Aix-Marseille University, Institute of Mathematics of Marseille (I2M), France

Ph.D. position on Aerodynamics of Insect Flight and modeling of Wing Flexibility



A bee flight simulator shows weak (blue) and strong (magenta) vortices in the airflow around the insect during turbulent conditions. Ref. Engels et al. Phys. Rev. Lett., 116, 2016.

Application deadline: September 20th, 2016

Basic Information

Ph.D. position in Scientific Computing for 3 years, starting October 1st, 2016 or earliest possible, Ph.D. salary at level of Aix-Marseille University.

Research topic

We seek a highly motivated Ph.D. candidate with strong background in applied mathematics and scientific computing. Interest in the aerodynamics of flying animals is a necessary prerequisite. Programming skills in Matlab, Fortran 95 and MPI are requested. The aim of the Ph.D. project is to understand insect flight in turbulent environments. Ultimate goal of the project is to determine impacts, benefits and limitations of environmental turbulence on flight stability and energetic costs in flapping flight. The Ph.D. project is diverse and comprises mathematical modeling and numerical simulation of the biomechanics of insect wings. The Ph.D. student enjoys starting from a solid work basis, with working, tested and validated numerical codes and previously gathered experience, like fluid–structure interaction and simulations of insect flight and turbulence. The candidate is supposed to devise a solid model for flexible wings, based on discrete mass points connected by springs. The model must accurately predict elasticity measurements. The candidate is further supposed to incorporate the model into an existing Fourier pseudo-spectral code and to study fruit flies with flexible and rigid wings, with and without inflow turbulence. Together with a free flight solver, this is considered an ambitious but feasible work program for a three year PhD student.

The project is part of the ANR (France) and DFG (Germany) project network "AIFIT" (Aerodynamics of Insect Flight In Turbulent Flows) that consists of research groups at the University of Aix-Marseille, École Normale Supérieure (ENS) at Paris, TU Berlin and the University of Rostock, Germany. The candidate will be funded by the ANR and closely cooperate with a doctoral student at University of Rostock and a postdoctoral fellow at ENS and TU Berlin. Fluency in English is mandatory and knowledge of French and German is a plus.

Location

The position is offered by the Institute of Mathematics of Marseille (I2M) at Aix-Marseille University, France. The team has an internationally recognized expertise on scientific computing and mathematical modeling of the aerodynamics of flying insects. Access to state of the art high performance computing (Mesocentre AMU, IDRIS Paris) is provided. Marseille is the pulsating, second city of France at the Mediterranean Sea with excellent infrastructure (International Airport, High speed trains). It features Mediterranean mild climate with more than 300 sunny days and offers many opportunities for recreation including swimming, sailing, and hiking.

Application

Applicants send their application including a letter of motivation (2 pages), CV, publication list, names and contact details of at least two referees, and copies of certificates as a single file to kai.schneider@univ-amu.fr.

Deadline for application

September 20th, 2016

Further questions

For inquiries and further information please send an email to Prof. Kai Schneider: kai.schneider@univ-amu.fr <http://www.i2m.univ-amu.fr/~kschneid>. You can also visit <http://aifit.cfd.tu-berlin.de> for further reading.