

## **Analysing and modelling C and N cycles and GHG emissions in innovative cropping systems based on grain legumes and cover crops**

**Starts 1st April 2014, for at least 30 months**

**Position short description:** we are seeking a young researcher in agronomy and soil-crop modelling who will develop an agronomic analysis based on a large existing dataset, and publish the results by scientific papers.

**Context:** the VASCO team of UMR AGIR research unit has been engaged for more than 20 years in the prototyping of innovative, low-input cropping systems aiming at reducing the dependence of agriculture on chemical inputs (pesticides and fertilizer-N). Since 2003, the team has carried out an original cropping experiment based on grain legumes and cover crops and designed to optimize the use of all N sources and reducing environmental impacts. This experiment was equipped with lysimeters for evaluating nitrate and pesticides transfer, and over 3-year continuous measurements of GHG emissions were carried out. Thus a comprehensive database is now available for analysing the impact of grain legumes and cover crops on water, C and N cycles, and soil C and N fertility. The VASCO team has also developed strong competences in soil-crop modelling by participating in the development of the STICS soil-crop model (Brisson et al., 1998; 2002; 2003; 2008). This model simulates the water, C and N cycles at the daily step and at the cropping system scale and is able to represent a wide range of crops and cover crops, and includes formalisms to simulate in particular the N<sub>2</sub> fixation, the decomposition of residues and GHG emissions (CO<sub>2</sub> and N<sub>2</sub>O) in addition to growth and water and N uptake.

**Position description:** the young researcher will be in charge of mining and analysing the database by performing a deep agronomic and statistical analysis and using the STICS soil-crop model to calculate non measured water, C and N fluxes. The final objective is to publish papers in well-ranked international scientific journals. The second objective is to write a synthesis highlighting the ecosystem services related to water, C and N and provided by grain legumes in the framework of a starting French ANR project called Legitimes, which could be also published.

**Qualifications and skills** (Young Doctor accepted):

- PhD in agronomy and/or modelling in plant or soil science
- Knowledge in soil and plant C and N cycles and GHG emissions
- Background in crop functioning (grain legume, cereal and cover crops)
- Background in statistics and data analysis
- Strong ability to work independently and also interact with other researchers
- Strong scientific writing skills for publication in scientific journals

**Employment and practical conditions:** Post-doc position during 30 months at INRA Toulouse (UMR AGIR).

**Net salary: 1800 euros/month up to 2200 euros/month** depending on experience, **all social security and pension contributions are supported by INRA.**

Access to on-site INRA restaurant for lunch at subsidized price.

The INRA Centre is located in a nice surrounding area of Toulouse and is well connected to public transportation.

**To apply: Application to be sent no later than February 28, 2014 at 18:00 by e-mail only**

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AGIR web site: <http://www6.toulouse.inra.fr/agir>

MicMac-design project web site: <http://www6.inra.fr/micmac-design>