

## INSPIRATION Marie Skłodowska-Curie Innovative Training Network

### Early Stage Researcher (PhD) Fellowships – ESR1, Quantification of phosphorus flux

#### Background

Agricultural production in Europe has significantly increased food security but simultaneously damaged soil and water resources and ecosystem biodiversity, and contributed to climate change. Further intensification of production to ensure food security for population growth must be sustainable to minimise future environmental impacts and negative externalities. Addressing this legacy and improving the quality and quantity of these critical natural resources for future use requires innovative sustainable management concepts, which must consider environmental, technical, social and economic factors. Decision-making frameworks and predictive tools must also be developed to implement sustainable agricultural practices and devise measures to mitigate impacts. These approaches must be developed from the farm- to catchment-scale and consider the cycling of nutrients and pollutants through the continuum of the atmosphere-soil-surface water-groundwater systems within European agricultural landscapes. Meeting these challenges requires an integrated analysis represented in this project.

INSPIRATION (*managing soil and groundwater impacts from agriculture for sustainable intensification*) is a multidisciplinary European Training Network composed of 26 partners in 9 European countries, which aims to develop low-technology management practices, monitoring approaches, modelling and decision-making tools, and innovative technology applications in the field of sustainable agriculture by a combination of fundamental and applied science ([www.inspirationitn.eu](http://www.inspirationitn.eu)). The research focuses on understanding and predicting the environmental fate of nutrient and organic pollutants from agricultural practices and managing their impact on soil, water and climate systems to ensure sustainable production. It links lab- to catchment-scale studies of biogeochemical processes with field-scale evaluation of novel monitoring and management concepts, using state-of-the-art methods. The network will provide high-quality research training to young scientists, through 15 fully-funded Early-Stage Researcher (PhD level) fellowships. The network includes leading research groups, regulators, advisory bodies, water utilities, consulting firms, commercial R&D and multinationals. The project has an international advisory group and will undertake a comprehensive programme of knowledge transfer and outreach activities with other scientific networks and professional bodies in this field.

#### Fellowship

Leaching losses of phosphorus (P) are a potential threat to almost half of the Flemish soil. Recent measurements suggest that phosphorus, faster than expected, migrates through groundwater to surface water and thus, in relatively short time, can pose a major threat to the quality of ground- and surface water. The amount of phosphorus determines the growth of algae in surface waters (eutrophication). In the fertilizer action plan Flanders in consultation with Europe, standards are determined on manure application with respect to P-intake. In the absence of a rapid improvement in water quality with regard to phosphorus, the Commission will take drastic measures.

The fellow will undertake a field study to quantify P transport at field and landscape scale in a P-saturated basin. The research will focus on the execution and interpretation of flux measurements to estimate P-losses from soil to groundwater and surface water. Hereby, different measurement techniques will be applied, including the innovative iFLUX sampler. Research objectives are 1) the validation of a methodology to determine F- fluxes across interfaces between soil-groundwater-surface water, 2) the validation of the iFLUX sampler at field sites with different soil type, agricultural practice and hydrological setting; 3) the development of a methodology to calculate field-scale P mass balances to assess (i) the importance of historical sources, (ii) effect of mitigating measures and (iii) relative importance of agricultural sources compared to other emissions for management.

The successful candidate will have a Masters degree in Earth Sciences/Geology, Environmental Engineering or a related field (Bio-Engineering, geography etc.), preferably with experience in field work and knowledge of numerical modelling. Fluency in English (working language) is a requirement.

### **Host organisation**

VITO is a leading European, independent research and consulting centre based in Flanders and is active in sustainable technologies in the field of energy, environment, materials and remote sensing.

### **Duration of employment**

The period of appointment is up to 36 months, from January 2017. Successful candidates are expected to register for a programme of study that leads to a PhD.

### **Benefits**

All fellows will receive a contract of employment as a full-time researcher for the relevant period of their appointment, which will include applicable benefits in the host country. All fellows will complete a comprehensive personalised career development programme, with targeted training measures and participate in a range of network events across the partnership, including industrial training experience. Participation in external relevant scientific and technical training events and conferences is also supported. Fellows will benefit from interdisciplinary cooperation and interaction with all sectors of the agri-environmental management community, providing them with the best preparation for a successful career in either academia or industry.

Marie Skłodowska-Curie Fellowships for Early-Stage Researchers provide a fixed allowance of Euros 37,320 per year, which is subject to a country correction. Additional allowances for mobility and family status are also provided, as appropriate, in line with H2020-MSCA-ITN-2015.

### **Experience and mobility conditions**

To be eligible, applicants for Early-Stage Researcher fellowships must have no PhD and less than 4 years full-time equivalent research experience from the award of the degree which entitles them to undertake a doctorate. Applicants can be any nationality but at the time of selection must not have resided or carried out their main activity (e.g. work or studies) in Belgium for more than 12 months in the 3 years immediately prior to the starting date of the fellowship. Short stays, such as holidays, are not taken into account.

The eligibility requirements for Marie Skłodowska-Curie Fellowships are non-negotiable and ineligible applicants will not be considered. Further information and the full terms and conditions regarding eligibility are provided on [http://ec.europa.eu/research/mariecurieactions/about-msca/actions/itn/index\\_en.htm](http://ec.europa.eu/research/mariecurieactions/about-msca/actions/itn/index_en.htm) or <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/marie-sklodowska-curie-actions>

**Work Programme 2014-2015.**

### **Application process**

Candidates should provide the following information in **one** file for their application :

1. A detailed CV with covering letter which explains your suitability, competence and motivation for scientific research and the fellowship
2. All undergraduate level certificates including university grades. Foreign documents should be sent as certified English translations.
3. A summary of technical and scientific experience
4. A synopsis of the undergraduate/Master's level thesis if applicable, or a detailed description of any previous research project and its appropriate work plan
5. A list of publications and/or presentations at meetings, if applicable
6. Contact information of two referees

Applications should be addressed by email to: Ingeborg Joris ([ingeborg.joris@vito.be](mailto:ingeborg.joris@vito.be)) and in cc to Ilse Van Keer ([ilse.vankeer@vito.be](mailto:ilse.vankeer@vito.be)).

**Additional information**

Further information on other fellowships available within the INSPIRATION Marie Skłodowska-Curie Innovative Training Network can be found on <http://ec.europa.eu/euraxess/>. Further information on the INSPIRATION project and consortium partners can be found on : [www.inspirationitn.eu](http://www.inspirationitn.eu)