Call for 5 PhD Positions under Project SEDITRANS

The project SEDITRANS entitled "Sediment transport in fluvial, estuarine and coastal environment" and funded under the Marie Curie FP7-PEOPLE-2013-ITN program of the European Union will provide an elaborate and interdisciplinary training-through-research program to Early Stage Researchers (ESRs) leading to a PhD degree.

At this time, SEDITRANS invites applications for 5 ESR (early-stage researcher) positions to start on September 2014. Information about SEDITRANS, the participating partners, the description of the positions and the rules of the program (for example, about eligibility and salary) can be found at the website of SEDITRANS. Interested applicants are encouraged to contact directly the corresponding scientist of each position and apply before **June 30, 2014 (new deadline)**.

Note that in order to be eligible for these positions, applicants must meet the following mobility criterion: *at the time of the relevant deadline for submission of proposals, or recruitment by the host organisation, depending on the action, researchers shall not have resided or carried out their main activity (work, studies, etc) in the country of their host organisation for more than 12 months in the 3 years immediately prior to the reference date. Compulsory national service and/or short stays such as holidays are not taken into account.*

Questions about the program may also be directed to the SEDITRANS coordinator.

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1. **PhD Position at the University of Patras, Greece**

Project title: "Coastal wave breaking and sediment transport"
Location: Dept. of Civil Engineering, Univ. of Patras, Patras, Greece

Requirements / eligibility:
- English or Greek Language
- Master degree in engineering, physics or related disciplines
- Candidates should preferably have skills in programming using Fortran or C++ language and be able to work in Linux/Unix environment

Objectives:
- Three-dimensional wave breaking in turbulent coastal flows
- Bed and suspended sediment transport induced by waves in coastal flows

Job description:
- Code development for Large Eddy Simulations of free-surface flows using the immersed boundary (IB) method
- Development of numerical algorithms and codes to extend the immersed boundary (IB) method to simulate sediment transport induced by waves
- Validation of numerical code against experimental measurements for wave breaking and coastal sediment transport
- Documentation of computational test cases

- Preparation and submission of articles in international peer-reviewed journals and/or conferences

Interested applicants are encouraged to send a detailed CV, a statement of research interests, and names of two references to Professor A. Dimas (adimas@upatras.gr).

2. PhD Position at the University of Louvain, Belgium

The research project focuses on the work package devoted to "unsteady flows and sediment transport in river flows". The candidate will have to carry out experimental tests of flows over granular bed, both made of idealised sediment and real sediment. Accurate measurements will be obtained using non-intrusive devices such as digital imagery (PTV and PIV) and UVP for the velocity field. In parallel to this experimental work, the candidate will also be involved in the development and application of numerical simulation tools. The new models developed within the project will be applied to the new experimental cases. The results will be compared to experimental data and to results obtained by using existing models developed in the research team, with the aim of validating the new approaches and assessing the performances of each type of model, based on different assumptions.

The ideal candidate should have an interest in experimental and numerical modelling, together with significant scientific curiosity and rigour to be able to design adequate experimental campaigns and to extract from these the appropriate information for the validation of the numerical models. The work will take place in the Hydraulics Laboratory of the Civil and Environmental Engineering Research Unit (Institute of Mechanics, Materials and Civil Engineering)of the Université Catholique de Louvain, Belgium. International exchanges are foreseen, mainly with IST (Instituto Superior Tecnico, Portugal) about experimental modelling. Training periods are also planned, with one of the industrial partners of the consortium, to be defined according to the progress of the project.

Interested applicants are encouraged to send a detailed CV, a statement of research interests, and names of two references to Professor S. Soares-Frazao (sandra.soares-frazao@uclouvain.be).

3. PhD Position at the University of Cyprus, Cyprus

Project title: "Numerical simulations of sediment transport in coastal flows"
Location: Dept. of Mechanical & Manufacturing Engineering, Univ. of Cyprus, Nicosia, Cyprus

Requirements / eligibility:
- English & Greek Language,
- Honours/master degree *of 1st class or 2.1 (or equivalent) in e*ngineering, physics or related disciplines
- Candidates should preferably have skills in fluid dynamics and programing using Fortran or C++ language in Linux/Unix environment

Objectives:
- Development of numerical algorithms and codes to extend the immersed boundary (IB) method to model free-surface flows
- Validation of numerical code against the experimental measurements for coastal sediment transport from

Job description:
- Code development for Large Eddy Simulations of free-surface flows using the immersed boundary (IB) method

- Numerical simulations of particle laden turbulent flows for coastal sediment transport
- Validation of numerical code against experimental measurements
- Documentation of computational test cases
- Preparation and submission of articles in international peer-reviewed journals and/or conferences
- Preparation and submission of articles in international peer-reviewed journals and/or conferences

Interested applicants are encouraged to send a detailed CV, a statement of research interests, and names of two references to Lecturer D. Grigoriadis (dimokratisg@gmail.com, grigoria@ucy.ac.cy).

4. PhD Position at IST, Portugal

Turbulence and morphology of channel confluences
The research plan of this PhD position addresses the reciprocal influences of bedload transport, bed morphology and flow turbulence in river confluences.

The specific objectives are: i) to assess the influence of the bed grain-size distribution on the morphology of the confluence, ii) to characterize large-scale turbulence structures and its feed-back relation with bed morphology and iii) to quantify small-scale turbulence and test local isotropy hypothesis. This research will contribute to ameliorate conceptual models for sediment transport, turbulence and flow resistance in river confluences can be built. In particular, the experimental results will be used to improve the capabilities of existing LES-based models applicable to complex 3D flows wit mobile boundaries.

The main tasks are as follows
- State-of-the-art review on open-channel large-scale turbulence, mechanics of sediment transport and formation of bed structures;
- Laboratory work
    a) ADV-Vectrino measurements of the flow field and turbulence in river confluences;
    b) 3D mapping of bed morphology;
- Analysis of laboratory data;
- Production of a conceptual model for sediment transport and evolution of bed morphology;
- Inclusion of the closure model into an existing open-channel flow CFD solver and calibration with own data;
- Code validation and application to a case study.

The experimental work will be carried out at IST, in a laboratory flume designed for the study of river confluences, equipped with ADV-Vectrino and bed profilers. Calibration of a LES-based CFD code will take place at an academic partner. Code validation will be performed in conjunction with an industrial partner.

The deliverables must include two articles in international peer-reviewed journals, two articles in international conferences, a documented database of turbulent flows in confluences; a documented database of bed morphology configurations in channel confluences and annual progress reports with corresponding information.

The work will be supervised at IST by Prof. António H. Cardoso and co-supervised by Prof. Rui M.L. Ferreira. Collaborations with industrial partners within SEDITRANS are envisaged.

Applications must include CV and motivation letter. Other elements stating proficiency in programming languages, data analysis software, language skills or other elements are welcome.

Contacts:
António H. Cardoso, antonio.cardoso@ist.utl.pt
Rui M.L. Ferreira, ruif@civil.ist.utl.pt

5. PhD Position at Idrostudi, Italy

A position for one Early Stage Researcher, expected to enroll as PhD student, is open at Idrostudi, within the Marie Curie Initial Training Network "SEDITRANS". The work-programme is related to the application of new techniques for solid transport modelling and the objectives are the application of an hydrodynamic model for the analysis of solid transport on real cases of study of river and estuarine flows, and the analysis of water courses evolution. We look for a highly motivated student with, at least 4-year, Master degree in Engineering, Physics, Applied Mathematics, Informatics or Computer Science. The candidate must have proficiency in programming in Fortran, C++, Java languages, and knowledge of Matlab as well as good English language skills. Competences in river hydraulics, fluid mechanics and turbulence are well considered. Experience with parallel computing with MPI is appreciated.

The candidate should be accepted as a student from the Doctoral School in Earth Science and Fluid Mechanics (ESFM) XXX cycle offered by the University of Trieste.

The position is for three years and interaction with research groups of the network and other stakeholders will be encouraged.

Interested applicants are encouraged to send a detailed CV, a statement of research interests, and names of two references to Dr. F. Zanello (zanello@idrostudi.it).