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The C3M d.o.o. offers the following position, starting from 1 April 2020 and limited for 36 months:

Early stage researcher (THREAD ESR 12)

on the Marie Curie ITN funded project

" Nonlinear dynamics response with nonlinear constitutive material models "

(full-time employment).

The position is offered within the EU Marie Skłodowska-Curie Innovative Training Networks in the project "Joint Training on Numerical Modelling of Highly Flexible Structures for Industrial Applications [THREAD]". The salary of the Marie Skłodowska-Curie Innovative Training Networks Fellowship (MSCA-ITN) follows the regulations set by the European Commission. The salary will include social security and will be composed of living, mobility and family allowances, where applicable, as outlined in the Grant Agreement and Horizon 2020 Marie Skłodowska-Curie Actions Work Programme, please see here:

http://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-msca_en.pdf

Background:

THREAD addresses the mechanical modelling, mathematical formulations and numerical methods for highly flexible slender structures like yarns, cables, hoses or ropes that are essential parts of high-performance engineering systems. The complex response of such structures in real operational conditions is far beyond the capabilities of current virtual prototyping tools. With 14 new PhD positions at 12 universities and research institutions in Austria, Belgium, Croatia, France, Germany, Norway, Slovenia and Spain, the project brings mechanical engineers and mathematicians together around major challenges in industrial applications and open-source simulation software development. It establishes an innovative modelling chain starting from detailed 3D modelling and experimental work to build validated 1D nonlinear rod models, which are then brought to a system-level simulation thanks to the outstanding numerical properties of the developed algorithms. This holistic approach

combines advanced concepts in experimental and theoretical structural mechanics, non-smooth dynamics, computational geometry, discretisation methods and geometric numerical integration and will enable the next generation of virtual prototyping.

The current Early Stage Researcher PhD project (ESR) on modelling of nonlinear dynamics response with nonlinear constitutive material models will be supervised by Dr. Tomaž Šuštar (C3M). The ESR will focus on nonlinear material models and their implementation in nonlinear dynamics within numerical analyses of deployable beam structures for space applications. The ESR will be enrolled as a PhD student at University of Ljubljana under the supervision of Prof. Tomaž Rodič.

The workplace will be at Centre for Computational Continuum Mechanics (C3M) in Ljubljana, Slovenia. C3M is a high-tech company specialised in the development of customised finite element systems for sensitivity analyses, inverse modelling and optimisation of Multi-field, Multi-scale, Multi-body, Multi-phase and Multi-objective (M5) problems. C3M has a very advanced software development strategy that is based on a symbolic approach to automatic code generation, allowing solutions to be developed for a wide range of academic and industrial problems.

Requirements:

- MSc in Physics, Engineering, Computational physics, Computational engineering or related fields is preferred (all backgrounds are welcome to apply)
- Experience in finite element method is highly desirable.
- Experience in symbolic algebraic systems (Wolfram Mathematica, etc…) is preferred.
- Computer programming skills are favored.
- High standard of spoken and written English.
- Qualification as an „Early Stage Researcher", i.e. at the time of appointment no doctoral degree and less than 4 years of research experience (full-time equivalent) after obtaining a degree that formally allows you to embark for a doctorate.
- Mobility requirement: at the time of appointment an "Early Stage Researcher" must not have resided or carried out their main activity in Slovenia for more than 12 months in the 3 years immediately prior to their appointment.
- For more details please see here: https://thread-etn.eu/apply/

Tasks:

The ESR will be trained to apply modern techniques for automatic differentiation in development of constitutive material models using symbolic approach that allows deriving

accurate and efficient finite element (FE) routines including sensitivities with respect to the wide range of model parameters. The modelling results will have an impact on a wide variety of advanced space missions utilising deployable precision pointing antennas, solar sails, slender mechanisms for space debris removal and other deployable structures which must be compactly packaged for the limited size of launch vehicles and then expanded automatically in orbit. An optimal design of deployable structures is obtained from appropriate numerical models that assess the dynamic responses to vibrational loads during launch as well as their mechanical behaviour in space and the large geometric transformations.

The ESR will join THREAD's comprehensive secondment programme including a three-month secondment at the University of Rijeka, Faculty of civil engineering, Croatia where he will work under supervision of Prof. Jelenić on FEM modelling of large deformations and experiments using vibration table in order to obtain the calibration data for the developed model.

Women are strongly urged to apply. Mobility requirements as outlined above are mandatory. All requirements will be evaluated prior to appointment.

Please submit your full application dossier only in English until 15 January 2020. Applications must be submitted on the website https://thread-etn.eu/apply/. Applications must include a motivation letter tailored to the research project, the curriculum vitae (Europass format preferred), the digital copy of the highest academic degree (e.g. master) and the contact data of up to three scientific references. For queries about the research project please contact Dr. Tomaž Šuštar, Email: itn@c3m.si. For queries about the European Training Network THREAD, please contact the project coordinator at coordination@thread-etn.eu.

The position is offered with reservation of possible budgetary restrictions. Application portfolios will not be returned, application costs will not be reimbursed.

ESR 12: Nonlinear dynamics response with nonlinear constitutive material models

Objectives: ESR will focus on nonlinear material models and their implementation in nonlinear dynamics within numerical analyses of deployable beam structures for space applications. The ESR will be trained to apply modern techniques for automatic differentiation in development of constitutive material models using symbolic approach that allows deriving accurate and efficient finite element (FE) routines including sensitivities with respect to the wide range of model parameters.

Expected Results: The results will have an impact on a wide variety of advanced space missions utilising deployable precision pointing antennas, solar sails, slender mechanisms for space debris removal and other deployable structures which must be compactly packaged for the limited size of launch vehicles and then expanded automatically in orbit. An optimal design of deployable structures is obtained from appropriate numerical models that assess the dynamic responses to vibrational loads during launch as well as their mechanical behavior in space and the large geometric transformations.

Project specific requirements (additional to the Eligibility Criteria):

- MSc in Physics, Engineering, Computational physics, Computational engineering or related fields is preferred (all backgrounds are welcome to apply)
- Experience in finite element method is highly desirable.
- Experience in symbolic algebraic systems (Wolfram Mathematica, etc…) is preferred.
- Computer programming skills are favored.
- High standard of spoken and written English.

Host: C3M d.o.o. - Centre for Computational Continuum Mechanics, Ljubljana (Slovenia)

Primary Supervisor: Dr. Tomaž Šuštar (http://www.c3m.si)

More details on the specific offer: ▪ LINK to the ESR-Announcement at Host

Do you want to apply?: ▪ https://thread-etn.eu/apply/