Horizon 2020 - Marie Sklodowska-Curie Actions
Innovative Training Network (ITN)
Complex **Rh**E**o**logies in **E**arth dynamics and industrial **P**rocesses

*In the frame of the research and training Marie Sklodwoska-Curie Actions of the European Community, the **Johannes Gutenberg-Universität Mainz** invites applications of highly motivated individuals for **an Early Stage Researcher (PhD)** position starting from September 1st, 2015*

Modelling crack propagation and fluid injection (hydrofracturing) applied to geothermics
Supervisor: B. Kaus (Johannes Gutenberg-Universität Mainz, DE) & H. Deckert (IGEM, DE)
Collaborations: M. Kendall (University of Bristol, UK) and K. Plenkers (GMuG, DE)

The aim of this Ph.D. project is to develop a new 3D numerical code to model hydrofracturing in heterogeneous viscoelastoplastic rocks which works on massively parallel computers. The code will be based on an existing code developed in the JGU research group that is used to study geodynamic processes and is based on PETSc. The advantage of the new code over existing methods is that it will allow us to model deformation in complex geological structures at an unprecedented resolution. A second goal of the project is to perform systematic simulations with the code in order to better understand the effect of geological complexities (heterogeneities, stress state) on the physics of crack propagation in reservoirs and the effective rheology of this reservoir. This will result in new, high resolution, modelling capabilities for hydraulically stimulated reservoirs and will increase our understanding of how this affects the effective permeability of the system. The student will collaborate with industrial partners and seismologists to compare the model results with both natural data and laboratory experiments. This project is a collaboration between the Johannes Gutenberg University in Mainz (DE), the Institute of Geothermal Resource Management (DE) and the University of Bristol (UK). It will also include an internship in the industrial partner GMuG (DE) which has expertise in monitoring (micro)-seismicity.

Requirements:

- Applicants must not have resided or carried out their main activity in Germany for more than 12 months in the 3 years immediately prior to their recruitment.
- Applicants must be in the first four years of their research career and do not have a PhD degree. Time is measured from the date of award of the Master degree (official maternity/paternity leaves excluded).
- Applicants must hold a Master degree in geosciences, physics, informatics, numerical mathematics or a related discipline.
- Applicants must have strong skills in numerical modelling and ideally have prior expertise in developing MPI-parallel codes for modern computer architectures and/or with PETSc.
- Applicants must be highly motivated to work in an international team.
- Applicants must have excellent written and spoken English skills. A grasp of French would be also useful.
- Prior knowledge in geodynamics, rock rheology, porous media mechanics, brittle rock failure or viscoplastic deformation processes in crystalline materials.

Employment conditions:

- Participation in the EU-funded innovative training network CREEP, which encompasses 16 Ph.D. projects in 10 major research groups in geodynamics in Europe (Montpellier, Bristol, Durham, UCL, Utrecht, ETH Zurich, FAST-Orsay, Roma 3, Mainz, Munster) and 11 private-sector partners (Schlumberger, Baker Hughes Schott, APERAM, AkzoNobel, MP Strumenti Reykjavik Geothermal, IGEM, GMuG, Geospatial Research).
- A 36-month full employment contract with social security, a net monthly salary between 2050€ and 2350€ depending on the family situation at the time of the contract signature.
- Guaranteed funding for the research project and training activities.
- A personalized training program mutually agreed on recruitment, which will directly reflect the candidate training needs and career objectives.

Application Procedure

- Applicants should apply via our **online application procedure** (http://www.itn-creep.eu). Once the application is received, they will receive an email asking for their CV and academic credentials (mark sheets and degree statements).
- Deadline for applications: 30 May 2015.

- A complete description of all 16 CREEP PhD positions and training program and online application forms can be found at http://www.itn-creep.eu

For additional information please mail us: kaus@uni-mainz.de