Bachelor or Master Thesis

Damage prediction during hot rolling through the finite element simulation

**Topic:**
The workpiece for hot rolling usually contains pores from the casting process. These pores could be closed and eliminated through favourable process conditions of hot rolling, but under unfavourable conditions, more damage could occur in the material. In order to investigate the pore and damage evolution, FEM (finite element method) simulations with the mesoscopic RVEs (representative volume element) or macroscopic damage models such as GTN model (Gurson-Tvergaard-Needleman model) are used for the hot rolling process. Within this project multiple possibilities for bachelor or master theses with different focuses are able.

**Your Tasks:**
- FEM simulation for the damage evolution in multi-pass hot rolling process (calibre rolling or flat rolling)
- Optimization and automation for modelling of multi-pass rolling simulations
- Optimization of the damage model (GTN model)
- Calibration of the parameters of the damage model

**Your Skills:**
- Basic knowledge in forming technology and continuum mechanics
- Interest in FEM simulations and experiments
- Possibly experience in programming (such as Python, Fortran, MATLAB or C++)
- German and English language

**Duration:** 3-6 Monate  
**Begin:** from now on

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