

## **Position Profile for Chinese Applicants running for 2019 Helmholtz – OCPC – Program**

### **PART A (Info about the Position)**

#### **Title of the project:**

*In situ* transmission electron microscopy of magnetism and electrical transport in highly strained nanowires

#### **Helmholtz Centre and institute:**

Forschungszentrum Jülich  
Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons

#### **Project leader:**

Prof. Dr. Rafal E. Dunin-Borkowski

#### **Email address**

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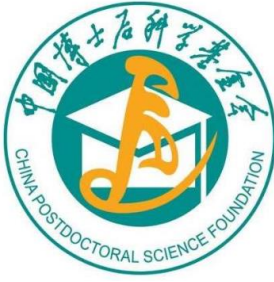
#### **Web-address:**

[www.er-c.org](http://www.er-c.org), <http://www.fz-juelich.de/er-c/EN/>

#### **Description of the project (max. half page):**

Strain can be used to induce magnetic anisotropy in soft magnetic alloys. In recent years, the mechanical and electric properties of strained materials have been investigated using *in situ* transmission electron microscopy techniques. However, there have been few reports on the influence of strain on the magnetic properties of nanoscale materials on the atomic scale. In this project, *in situ* straining of individual nanowires of Ni, Co and Fe-Ni alloys will be performed in the transmission electron microscope. Aberration corrected transmission electron microscopy and off-axis electron holography, in combination with *in situ* electrical contacting, will be used to relate the morphologies and defect distributions of strained nanowires with their electrical transport and magnetic properties during bending and tensile/compressive straining, as well as crack formation. The experimental measurements of microstructure, electrical transport and magnetic properties will be combined with simulations and theoretical calculations to provide guidance for the design of novel materials with tailored electrical and magnetic properties.

#### **Required qualification of the post-doc:**



# HELMHOLTZ

RESEARCH FOR  
GRAND CHALLENGES

- PhD in materials science, physics or a related discipline
- Experience with advanced transmission electron microscopy
- Additional skills in magnetism