Project No – 02/UNESCO CHAIR AGH/STE/2012

AGH University of Science and Technology, KRAKOW, POLAND
UNESCO CHAIR FOR SCIENCE, TECHNOLOGY AND ENGINEERING
EDUCATION AT THE AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY
KRAKOW, POLAND
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UNESCO AGH Fellowships ed. 2012-B in Engineering
Project Proposal for 6 months

Naukowa oferta stypendialna UNESCO - AGH 2012 B dla młodych naukowców z krajów rozwijających

UNESCO - AGH 2012 Project B: promoting human resource capacities in the developing countries through intensive training and to enhancing international understanding and friendship among peoples of the world and the people of Poland

(in English only)

1. Project title: Development of the model of the transformation from ferrite-pearlite to austenite during heating in the continuous annealing of the Advanced High Strength Steels (AHSS).
Field of research: material/computer science
Number of fellowships with free tuition sponsored by UNESCO: 1

2. *Name of institution:* AGH University of Science and Technology,
Faculty of Metals Engineering and Industrial Computer Science.
Full address: A.Mickiewicza Av. 30, PL 30-059 Krakow, Poland

3. Name and Surname , title and full contact data of project supervisor:
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4. Project duration: 6 months
Proposed starting date: 1.10. 2012 (exact date to be agreed upon by the selected fellows and host Institution)
Language: English
Scientific contents: *individual research programme under supervision of tutor* (see page p.8)

5. Developing countries (specification): *UNESCO Member States - please specify countries or region (Asia, Africa, Latin America, Caribbean and Pacific)*
Asia.

6. Academic requirements: Candidates should have a B.Sc. or M.Sc. degree,
The candidate should have a M.Sc degree in material or computer science.

7. Qualifications required:
   - be proficient in reading and writing in English;
   - be not more than 26 years of age;
   - general knowledge in material or computer science;
   - interest in numerical modelling of phase transformation with cellular automata method;

8. Project description (in English):

R&D results: project description optional: Phase transformation into austenite during continuous annealing is usually not completed, about 20-30% of ferrite remains in the microstructure. The carbon and alloying elements distribution in the austenite is not uniform. All these aspects have influence on the following phase transformations during cooling and on the resulting microstructure and properties of products. Thus, there is a need for models with advanced predictive capabilities, which can describe microstructure and chemical composition of the AHHSs in the intercritical region during annealing.

Goal: *Development of the models, which can predict phase composition, morphology of phases and chemical composition during transformation into austenite during heating.*

One of the discrete methods should be used, probably cellular automata. Finite element solution of the diffusion equation with moving boundary (Stefan problem) will be performed, as well.
other outputs: *Digital pictures of ferrite-austenite microstructure after heating, with information about distribution of concentration of carbon and alloying elements.*

9. Others information:

Stamp of the AGH UST Faculty

Project Supervisor
(signature)

Dean of the Faculty
(signature and stamp)
dr hab. inż. Tadeusz Telejko
profesor nadzwyczajny AGH

Place and date: Krakow, 9 lutego, 2012