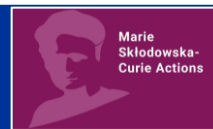




# Open PhD Position in European Industrial Doctoral Network (DN-ID)



[www.cesaref.eu](http://www.cesaref.eu)

## Concerted European action on Sustainable Applications of REfractories (CESAREF)

### What is CESAREF and what is the focus of this network?

CESAREF will train researchers in multi-engineering areas and expose them to the academic and non-academic sectors through international and inter-sectoral mobility combined with an innovation-oriented mind-set. They will get the right combination of research-related and transferable competences in the **full production-to-the-end-of-life cycle of refractory materials applied to Iron & Steelmaking processes** with regards to the new operation conditions requested by the drastic reduction of greenhouse gas emissions, improved energy efficiency, and by life cycle assessment requirements. An important part of the project will be dedicated to the sustainability of refractories, including recycling issues, using the **Life Cycle Assessment** methodology. **15 doctoral candidates** will take advantage of the most sophisticated numerical tools and laboratory equipment to model, design and predict the life of refractory materials in critical operational conditions. Being trained in scientific, technical, and soft skills, these PhDs are the next generation of highly employable scientists and engineers in the refractory sector and related areas. New testing methods and models will be developed to address the Scientific/Technological challenges for these applications and help to design better performing and sustainable refractory materials and linings. The research training is implemented through strong relationships between 10 academia and 16 industrial partners across the EU. The CESAREF network ([www.cesaref.eu](http://www.cesaref.eu)) is structured to take full advantage of intensive cooperation between **academia, raw material suppliers, refractory suppliers and high-tech metal component producers** with a direct link to the **FIRE federation** ([fire-refractory.org](http://fire-refractory.org)).

### Specific subject of PhD15 (one of 15 PhDs of the CESAREF DN-ID project)

#### PhD15 Topic: Smart Factory: Enhancing energy efficiency in steel making through advanced digital technologies

**Objectives:** One of the main levers to improve the energy efficiency of steel-making processes is to optimize the ladle logistics with regard to heat losses and the remaining useful lifetime of the refractory lining. An optimization model for managing the ladles is to be developed. To enable application of this optimization model in plant operation, an information management approach is to be set up that brings together information from PhD13, PhD14 as well as from the process itself. The impact of optimizing the ladle logistics is to be evaluated.

**Expected Results:** A real-time optimization model for improving the ladle logistics in a steel making plant. An information management approach that provides the optimization model with the necessary information on the ladle, the refractory lining and the process. An evaluation report on the performance of the ladle optimization.

**Keywords:** Process optimization, mathematical programming, information management

**Applicant Profile:** **Master's level in Mechanical engineering, Process engineering, Computer science/engineering, Material science.** Candidates should have in-depth knowledge in at least one of the following subject areas: thermal engineering, process optimization, mathematical programming, knowledge engineering. Advanced programming skills. Excellent oral and written communication skills (English). Ability to work in an interdisciplinary team. Proactivity. Willingness to travel frequently.

#### PhD main locations:

**Period 1** - Tata Steel ([www.tatasteeleurope.com](http://www.tatasteeleurope.com)), IJmuiden, Netherlands (18 months)

**Period 2** - TU Wien ([www.tuwien.at](http://www.tuwien.at)), Vienna, Austria (18 months)

Due to the Mobility Rule by the funding agency, residents of Netherlands cannot apply for this PhD15 position

Apply until June 27<sup>th</sup> following indications at [www.cesaref.eu/recruitment-procedure](http://www.cesaref.eu/recruitment-procedure)

If you have any questions, feel free to contact the supervisors:

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