

**Host organization: Wroclaw University of Science and Technology (WUST)**

**Country: Poland**

**Organization role: Coordinator**

**MSC Fellow Supervisor: Ph.D. Joanna Bauer, Assist. Prof.**

**Project Acronym: NANOCARGO**

**Project start and end date: 01/10/2018- 30/09/2020**

**Type of MSC action, H2020: IF**



### **Project objectives and research field:**

The main goal of NANOARGO is formulating a superior therapy for treating breast cancer. For this purpose we are using functionalized nanoparticles and enhancing the effectiveness of therapy by combining optical stimulation and magnetic hyperthermia with chemotherapy in a targeted and minimally invasive procedure.

### **Tell us why the topic is important and/ or how it brings to advancement in your research field:**

Breast cancer is the leading cause of cancer death among European women. 1 in 8 women in the EU-28 will develop breast cancer before the age of 85. By the time it is diagnosed it could be already late and the cancer might be at advanced stage. This significantly reduces the chance of full recovery. Tailoring of medical procedures to the individual patient' needs as well as a development of new dedicated cancer treatment strategies with minimal side effects, is crucial to improve therapy outcomes.

Nowadays a removal of all breast tissues (mastectomy) or partial mastectomy (lumpectomy) is considered as primary treatment. In more advanced stages the adjuvant treatment merging chemotherapy, hormonal/biological and radiative therapy is applied.

In NANOCARGO we develop a simultaneous diagnosis and therapy (theranostic) approach for advanced breast cancer treatment. Our multifunctional magnetic@gold and magnetic@silver nanocomposites combined with optical and magnetic stimulation will - on the one side make the anti-cancer therapy much more effective

and on the other side improve computed tomography imaging contrast due to higher X-ray absorption of gold and silver.

### **What are the benefits of participating in a MSC action?**

The multidrug resistant tumors have become a challenge in cancer treatment and require new approach based on nanomedicine. The procedure proposed by us offers personalized, image-based theranostics that can potentially revolutionize cancer treatment and tackle the problem of chemoresistance in cancer. This is a huge challenge for us as scientists, but on the other hand, the awareness that our research can help thousands of women is something that really adds wings and motivates to work harder.

The realization of the project is also important from the personal point of view of all involved researchers. This MSC-IF, in particular brings together top researchers from four countries Poland, India, Switzerland and Ireland. Such project requires not only unconventional thinking, gaining new knowledge and developing new skills, but also expanding the current scientific network and learning work in a multicultural and interdisciplinary team. This is something extremely developing and exciting.

### **Did you encounter any challenges during application/ implementation and did you get any help?**

Planning and then executing such interdisciplinary projects as NONOCARGO is challenging but it is as well a very good experience. The success of this MSC-IF is in part originated from the long-standing collaboration between Wrocław University of Science and Technology (WUST) in Poland and University of Limerick (UL) in Ireland through European Commission Erasmus Plus Bilateral Exchange programme and the FP7 project BioElectricSurface. The MSC Fellow received a great deal of support from his current supervisor at WUST, Assist. Prof Joanna Bauer as well as previous supervisor at UL, Prof. Syed Tofail in terms of project planning and preparation. Mrs Elżbieta Mazurek from the Department of Projects Support and Realization of WUST and Mrs Elżbieta Olejnik from Wrocław Centre of Technology Transfer (WCTT) also supported all stages of proposal preparation and now when the project has already started, they constantly provide their help.

### **Would you recommend others to apply? What useful advice/ tips can you give them?**

The H2020 MSC-IF fellowships look for outstanding scientists and are recommended for high-achieving researchers. The key to success is an international collaboration and open mind. Current projects are mainly interdisciplinary, that require the cooperation of specialists from various fields. Such cooperation always gives a

synergistic effect and creates added value. Exchange of knowledge and experiences as well as outside of the box thinking is crucial here and significantly increases the chances of success.

**What strategies did your organization use to attract the fellow/s? Are they in line with national strategies supporting the widening EC policy?**

Wroclaw University of Science and Technology supports the idea of mobility and process of internationalization by actively promoting the exchange of both, staff and students. In our case the European Commission Erasmus Plus Bilateral Exchange Agreement between Wroclaw University of Science and Technology, Poland and University of Limerick, Ireland was the most helpful as it supported travels for training and teaching purposes and gave us many opportunities to develop and discuss our ideas. However, among the international mobility programmes there are also many other available such as Erasmus Mundus INTACT (Asia), MONOPHIBOT (Molecular nano- and bio-photonics for telecommunications and biotechnologies), EU-SATURN (South Africa), THELXINOE (Australia, New Zealand), FELLOW MUNDUS (South America), PHENIX (Jordan, Lebanon, Palestine, Syria) as well as Erasmus STRONG TIES and Erasmus International Credit Mobility KA107 etc.