

# Dr.-Ing. Ekaterina Gongadze

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## Professional Profile

*Multidisciplinary. Innovative. Proactive.* **Computational Engineer** with an excellent academic record as well as proven ability to apply in-depth knowledge of numerical methods to complex systems in a range of multidisciplinary applications. Ability to develop conceptual models and translate them into analytical solutions and/or simulation models. An expert in numerical methods including FEM, FIT, BEM, committed to continual self-development in order to become the very best in the field. Proven track of teamwork and working in a multidisciplinary environment.

## Technical Skills

- **Numerical Simulation Software:** MATLAB, Abaqus, COMSOL Multiphysics, CST Microwave Studio, CST EM Studio, C/C++, Python **Post-Processing Tools:** R-Studio and Microsoft Office

## Work Experience

### SENIOR RESEARCH ASSOCIATE | UNIVERSITY OF BRISTOL | 2019 - PRESENT

*Bristol Composites Institute, School of Civil, Aerospace and Design Engineering*

- Numerical modelling and simulation of composites manufacturing process simulation;
- Computational models for composites mechanical performance;
- Developed a fully coupled thermo-mechanical consolidation model for thermosets;
- Implementing contact models and force calculation of tri elements in in-house software in C++;
- Co-PI of grant “Composites: Made Faster - Rapid, physics-based simulation tools for composite manufacture” (EPSRC Reference: EP/V039210/1) 1/12/21 → 30/11/24 (£1M). Project partners – BAE Systems, Airborne, Airbus Operations Limited, LMAT Ltd, Rolls-Royce Plc (UK).
- Part of “D-STANDART” (Horizon Europe Grant agreement ID: 101091409 ) Durability Modelling Of Composite Structures With Arbitrary Lay-Up Using Standardized Testing And Artificial Intelligence
- Co-supervision of undergrad and postgrad students

### RESEARCH ASSOCIATE | UNIVERSITY OF LJUBLJANA | 2011-PRESENT

*Laboratory of Physics, Faculty of Electrical Engineering*

- Numerical modelling and simulation of electric field and potential of an electric double layer (EDL);
- Numerical modelling and simulation of topographically and chemically designed material surfaces like titanium dioxide nanotubes;
- Further development of the previously developed FEM model to capture effectively the implant-fluids interphase by modelling the spatial variability of the relative permittivity, obtained by taking into account the distribution and dipole moment of water molecules (*Comsol Multiphysics and MATLAB*);
- Co-supervision of two PhD students;

### SYSTEMS MODELLER | ROTHAMSTED RESEARCH | 2016 - 2019

- Mathematical modelling and development of climate-smart sustainable crop systems; multiscale mathematical modelling that integrates the structural and chemical information into the new state of the

art mathematical model of plant nutrient uptake (*MATLAB*). Analysis of large long-term datasets in grassland systems; Technical training; Responsible for the project management of the UK site.

## Teaching

**Introduction to Numerical Mathematics; Software Lab Projects; Computational Electromagnetics; Supervision of MSc and PhD students;**

## Education

**PHD COMPUTATIONAL SCIENCE & ENGINEERING | 2008-2011 | UNIVERSITY OF ROSTOCK**  
(Full time scholarship DFG) *Faculty of Computer Science and Electrical Engineering*

- **Title:** *Influence of the surface structure of a biomaterial on the field distribution in the neighbouring biosystem.*
- **Procedures:** Developed a novel FEM model to capture effectively the implant-fluids interphase using *Comsol Multiphysics and MATLAB*; Modelled and simulated electric stimulation of bone cells seeded on electrode surface mimicking the cell-implant interaction; Extended study of different stimulation parameters, including stimulation time and applied electric field strength;

**MSC COMPUTATIONAL SCIENCE & ENGINEERING | 2006-2008 | UNIVERSITY OF ROSTOCK**  
*Faculty of Computer Science and Electrical Engineering*

- **Master's Thesis:** *Implementation of inflow generator into the framework OpenFoam.*
- **Procedures:**
  - Developed *C++* code for production of inhomogeneous, anisotropic turbulence; conducted RANS simulation to compute the steady flow field;
  - Heat transfer coefficient calculations and optimisation;
  - Optimisation with *CST Microwave Studio*; Concept of scattering parameters; Dimensioning/optimisation of an antenna for radiation; Far-field approximation of the radiated fields;
  - Time depending, alternating fields with *CST Microwave Studio*; Field distribution of the eigenmodes; fundamental mode, higher modes, degenerated modes, monopole-, dipole- quadrupole modes;

**BSC MECHANICAL ENGINEERING | 2002-2006 | TECHNICAL UNIVERSITY OF SOFIA**

## Languages

Mother Tongue / Fluent Speaking & Writing: **English, German, Bulgarian**

## Prizes and awards

- Vodovnik Prize for exceptional doctoral research, Faculty of El. Eng., University of Ljubljana, 2014;  
Scholarship in DFG Research Training Group 1505/1 "*welisa*", University of Rostock;  
Certificate in honour of outstanding academic achievements during the B.Sc. degree;
- PRINCE2; Web of Science: h-index 23 (as checked on 2.12.2024)