



## R&D Internship in numerical simulation 80-100% (f/m/d)

**Hitachi ABB Power Grids is a pioneering technology leader that is helping to increase access to affordable, reliable, sustainable and modern energy for all. We help to power your home, keep the factories running, and our hospitals and schools open. Come as you are and prepare to get better as you learn from others. Bring your passion, bring your energy, and plug into a team that appreciates a simple truth: Diversity + Collaboration = Great Innovation**

As new R&D Intern, you will join our Structural/Acoustics/Thermo-Mechanics (STAT) network team in the Swiss Technology Center of the HITACHI-ABB Power Grids joint venture. You will be part of a group of key people with specific expertise in the fields of structural, acoustic and thermo-mechanic analysis, simulation and testing. As part of our global R&D community including Technology Centers and Research Centers worldwide, you will contribute to support all factories in the PG Dry, Traction and Distribution Transformers on innovative and challenging research projects. You will focus on the setup of a methodology for numerical simulation of noise generated by dry-type transformers and reactors.

Transformer noise is characterized by several pure tones. The frequency of a number of these is in the range where the human ear is most sensitive. Moreover, transformer noise, being of tonal character, causes irritation and discomfort. We distinguish two transmission mechanisms of the transformer vibration induced noise: air-borne and structure-borne. There are different sources of noise in transformers such as:

- Magnetostrictive forces: which cause a vibration of the core at twice of the line frequency
  - Magnetomotive forces: which cause the laminations of the core to strike against each other if there are residual gaps between them
  - Lorentz forces: induced by the coupling of the alternating current and the magnetic field in the individual windings.
- Algorithms have been recently developed in finite element codes for simulating these mechanisms by a multi-physics coupling between the electromagnetic, structural and acoustic analyses.

The scope of this work is to study the current approaches as proposed by the scientific community, support the implementation of the new numerical algorithms into a simulation methodology and deliver a tool for preliminary assessment of noise generated by transformers and reactors. The duration of the internship is 6 to 8 months.

### Your responsibilities

The proposed work will be divided into the following conceptual steps:

Preliminary study of the state of the art of methodologies and prediction models

Implementation of noise source prediction algorithms into finite element multi-physics simulation methodology

Support the set-up of an ANSYS FE shell for rapid simulation of transformer/reactor noise

Final report with detailed description of the analysis procedure

## Your background

Final year master student in Mechanical or Aerospace Engineering

Solid bases in vibrational fatigue and dynamics

Experience in the finite element analysis, preferentially in the use of the ANSYS software

Knowledge of the following programming languages: a. Matlab, Visual Basic

Excellent communication skills and team spirit

Fluent in English

## More about us

Hitachi ABB Power Grids is a global technology leader with a combined heritage of almost 250 years, employing around 36,000 people in 90 countries. Headquartered in Switzerland, the business serves utility, industry and infrastructure customers across the value chain, and emerging areas like sustainable mobility, smart cities, energy storage and data centres. With a proven track record, global footprint and unparalleled installed base, Hitachi ABB Power Grids balances social, environmental and economic values, and is committed to powering good for a sustainable energy future, with pioneering and digital technologies, as the partner of choice for enabling a stronger, smarter and greener grid.

[www.hitachiabb-powergrids.com](http://www.hitachiabb-powergrids.com)

Interested in joining our team? If so, we look forward to receiving your full application (motivation letter, CV, references) only via our online careers tool.

Hitachi ABB Power Grids Switzerland

Richard Kwame Adu

Talent Acquisition

Location	Molinazzo di Monteggio,Ticino,Switzerland
Business Unit	Transformers
Publication Start Date	03.06.2021
Job Function	Research and Development
Publication ID	CH51572522_E1