# Master□s Thesis: Coil Design for Magnetic Nanoparticle Stimulation

Department Chemie und Pharmazie, Vollzeit, Befristete Anstellung, Bewerbungsschluss: 30.06.2026

**Aufgaben**

We are developing an experimental platform for remote stimulation of neural tissue using magnetoelectric nanoparticles. By applying alternating magnetic fields, these nanoparticles transduce magnetic energy into local electrical or mechanical stimuli, enabling wireless, non-contact neuromodulation.

We are looking for a highly motivated Master□s student with a background in engineering, physics, or a related field to support an experimental research project that uses alternating magnetic fields to stimulate magnetic nanoparticles. A key challenge is that coils heat up when generating sufficiently strong fields, which can disturb temperature-sensitive experiments. Your task will be to develop coil designs with an optimized temperature profile while meeting magnetic field requirements.

Your mission

- Design and optimize coil geometries that generate the required AC magnetic field at the sample while minimizing coil temperature rise.
- Build coupled electromagnetic COMSOL models (Magnetic Fields + Heat Transfer, optionally convection).
- Evaluate trade-offs between field strength, homogeneity, frequency, power loss, and heating.

What we offer

- Hands-on work on an active research topic in wireless magnetic stimulation.
- A highly interdisciplinary research environment at the interface of engineering, materials science, and neuroscience
- Access to a 3D printer and electronics lab.
- Active collaboration with an electronics research group at a partner European institute.

**Qualifikationen**

**Notwendige Qualifikationen:**

BSc or BEng with the following skills:

- Experience with COMSOL or comparable simulation software and AC electromagnetics, high-frequency loss modeling, and heat transfer.
- Comfortable working independently and documenting results clearly.

**Ergänzende Hinweise**

How to apply

Send a short paragraph describing your experience with electromagnetic or multiphysics simulation software

(e.g., COMSOL, ANSYS, CST, or similar tools), CV (1–2 pages) to: contact-biointerfaces@fau.de

**Interessiert?**

Die vollständige Stellenausschreibung sowie alle Infos zum Bewerbungsverfahren finden Sie hier: