



## Master's Thesis: Design of an Integrated Circuit Transimpedance Amplifier Operating at Cryogenic Temperature

The ongoing research in spin-based quantum computers and spintronic devices has been driven by current advancements in the control and readout of electron spins on silicon. New manufacturing steps and the use of cryogenic cooling down to mK temperatures allow the control of a single electron spin. This creates a challenge in the front-end design of the signal readout circuitry, requiring a low noise and high bandwidth, as well as a large gain to amplify the small current signals in the nA range efficiently.

**In this project, you will design an analog circuit (operational amplifier plus additional circuitry) on the transistor level in the Cadence Virtuoso design environment. You will perform simulations to verify the performance of the circuit. The design goal is a low-noise, high-bandwidth transimpedance amplifier. The amplifier will be used for current sensing in quantum physics experiments at cryogenic temperature at various international collaboration partners.**

Requirements:

- ✓ Basic knowledge of transistor-level analog circuit design and simulation is mandatory
- ✓ Basic experience in Cadence analog design software tools is mandatory

Duration: 6 months

**What we expect:** Motivation, dedication and the curiosity to explore new approaches

**What we provide:** Access to state-of-the-art design tools and the possibility to participate in a research project with leading academic partners in Australia (University of New South Wales)

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