



CAN I COMBINE SCIENCE AND BUSINESS IN A SINGLE JOB?

YES.

We'll show you how at Fraunhofer.

**THE FRAUNHOFER RESEARCH INSTITUTION
FOR MICROSYSTEMS AND SOLID STATE TECHNOLOGIES EMFT IS OFFERING A
MASTER'S THESIS POSITION FOR A DURATION OF 6 MONTHS IN THE FIELD OF:**

DESIGN OF A POWER-EFFICIENT MULTI-STAGE OPERATIONAL AMPLIFIER USING 22NM FD-SOI TECHNOLOGIES

The Fraunhofer EMFT works on the research and development of technologies and solutions in the field of microelectronics and microsystems technology. It takes an interdisciplinary approach, combining traditional silicon semiconductor technologies with MEMS, microfluidics, system integration and flexible electronics. The focus here is not on miniaturization alone, but primarily on the heterogeneous technology integration and development of intelligent systems to enable novel solutions and products for everyday use.

What is this about?

Our group aims to develop analog and mixed-signal integrated systems for different applications such as sensors, high-performance data-converters, neuromorphic computing systems, and RF transmitters. As one of the most crucial circuit blocks, operational amplifiers are commonly used in both embedded and integrated systems. In power-consumption sensitive systems (e.g., neuromorphic systems for edge applications), increasing operational amplifiers' power efficiency is key to improve entire system efficiency. However, it is not trivial to improve the operational amplifier's efficiency further for sub 1V power supply, required GBW and process limitations under the advanced technology node. A multi-stage amplifier with pseudo-AB or class-AB output stages can be a good candidate for good driving capability and gain while keeping low current consumption. Nevertheless, such amplifiers often have numerous poles and zeros and can only be made based on "smart" compensation techniques. Your responsibilities are studying the state-of-art of multi-stage operational amplifiers through literature review, designing and implementing a multi-stage operational amplifier. Under certain conditions, publication of results is possible and encouraged.

TUM students will be supervised in cooperation with the Chair of Circuit Design.

Your tasks

- Study state of art of power-efficiency multi-stage operational amplifier topologies through literature review
- Understand and develop appropriate compensation techniques
- Design and implement your amplifier with considering process variation and yield
- Layout of your design

You should have

- Course of Study in the field of Electrical Engineering or similar
- Good Knowledge of Integrated Analog Circuits
- First Experience with Cadence Virtuoso ADE is required
- Good knowledge of control theory is a big plus
- Ability to work independently
- Good analytical and structured working style
- Ability to coordinate with an international team
- Good German or English language skills

We offer you an **open, international** and **collegial** working environment, the **freedom** to contribute your **ideas** and **abilities** and **flexible working hours** that fit in with your studies.

Remuneration according to the general works agreement for employing assistant staff.

The position is initially limited for 6 month.

In case of identical qualifications preference will be given to severely disabled candidates.

Equality between women and men is a matter of course for us.

Fraunhofer is Europe's largest application-oriented research organization. Our research efforts are geared entirely to people's needs: health, security, communication, energy and the environment. As a result, the work undertaken by our researchers and developers has a significant impact on people's lives. We are creative. We shape technology. We design products. We improve methods and techniques. We open up new vistas.

For questions regarding the position, please do not hesitate to contact:

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Apply here by pushing the Apply Button

<http://www.emft.fraunhofer.de>

Job Reference: **EMFT-2021-34**

Closing Date: **30.11.2021**

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