

# Open Thesis / Project

## Towards BLE-enabled Pacemakers

### Thesis Type

Master Project / Master Thesis

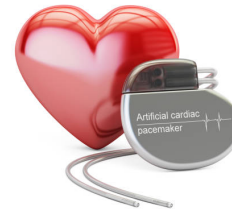
### Motivation

Pacemakers are crucial in extending lives and maintaining heart health, as they regulate heartbeats while also monitoring vital patient data. It's critical that these devices have a long-lasting battery life and reliably communicate critical events to ensure timely intervention and protect patient well-being. Most state-of-the-art pacemakers, however, employ proprietary wireless protocols, limiting their data transmission to once every 24 hours. This constraint hinders real-time monitoring and responses to potential cardiac irregularities, ultimately impacting the quality of patient care.

In this thesis, you will work towards making pacemakers more efficient and reliable to improve patient care. You will use Bluetooth Low Energy (BLE) technology to implement a highly efficient and reliable communication protocol for pacemakers that allows to reliably exchange time-critical data between a pacemaker and its base station. Partnering with the Medical University Graz and LKH Graz, you'll conduct real-world experiments, implanting your prototype in a living pig to assess the impact of body-shadowing on wireless signal propagation.

Your work will enable a new class of pacemakers that use BLE technology to reliably and efficiently exchange timely patient data. Get ready to improve patient care by pioneering cutting-edge BLE communication for pacemakers and contact us today.

For more information about time- and safety-critical BLE applications visit [dewinelabs.com](http://dewinelabs.com).



### Goals and Tasks

Within this context, you can explore several directions and perform different tasks, such as:

- Investigate the performance of BLE in in-body deployments using our high-fidelity measurement equipment;
- Learn and improve your embedded programming skills (specifically in creating reliable and energy-efficient systems);
- Elevate your BLE expertise as you tackle real-world challenges, bridging the gap between theory and practical application.

We offer the **possibility to pay** you for your work.

### Target Group

- Students of ICE/Telematics;
- Students of Computer Science.

### Required Prior Knowledge

- Basic knowledge of Bluetooth Low Energy (BLE) and wireless communication;
- Experience with embedded system development in C (e.g., in Zephyr RTOS).

### Contact Person

- Dr. Michael Spörk  
[michael.spoerk@dewinelabs.com](mailto:michael.spoerk@dewinelabs.com)
- Dipl.-Ing. Theo Gasteiger  
[gasteiger@tugraz.at](mailto:gasteiger@tugraz.at)
- Assoc.Prof. Carlo Alberto Boano  
[cboano@tugraz.at](mailto:cboano@tugraz.at)

