# Master Thesis

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## Gerald Stanje: Design, development, and implementation of energy-harvesting-aware communication protocols for the EnHANTs (Energy-Harvesting Active Networked Tags)

## Description

This thesis deals with the design, development, and implementation of energyharvesting-aware communication protocols. Therefore it's necessary to implement a basic protocol of energy-harvesting-adaptive control of data generation rate depending on the energy harvesting. EnHANTs will be small, flexible, and self-reliant (in terms of energy) devices that can be attached to objects that are traditionally not networked (e.g., books, furniture, walls, doors, toys, keys, clothing, and produce), thereby providing the infrastructure for various novel tracking applications. Examples of these applications include locating misplaced items, continuous monitoring of objects (items in a store, boxes in transit), and determining locations of disaster survivors. Recent advances in ultralow-power wireless communications, ultra-wideband (UWB) circuit design, and organic electronic harvesting techniques will enable the realization of EnHANTs in the near future. More information about the EnHANTs project is available at the project website, enhants.ee.columbia.edu.

## Advisor

Univ.-Prof. Bernhard Rinner