

# Welcome

Marco Zennaro, PhD  
ICTP



# Hello

Marco Zennaro, Research Officer, ICTP

Applied Physics → Telecommunications/ICT4D Lab

Focal Point of the ITU Centre of Excellence in IoT  
and Big Data and Statistics

Visiting Professor at Kobe Institute of Computing in  
Kobe, Japan



# Hello

Ermanno Pietrosemoli, Researcher, ICTP

Applied Physics → Telecommunications/ICT4D Lab

Internet Hall of Fame Inductee

World Record holder for the longest WiFi link



# Hello

Sebastian Büttrich

Research Lab Manager, IT University of Copenhagen

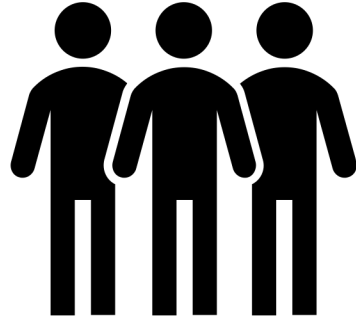
Trainer & Network Developer, Network Startup

Resource Center

Founder, [wireless.dk](http://wireless.dk)



# You?



# Learning targets

Understanding IoT systems and their fundamental concepts, including the acquisition, transport and visualisation of sensor measurements.

Experimenting with the software part, without electronics, of an end-to-end IoT system based on IoT platforms.

# Today

Introduction to IoT (Marco Zennaro, ICTP)

Getting started with TTN (Sebastian Buettrich, NSRC)

Wireless standards for IoT (Ermanno Pietrosemoli, ICTP)

**LAB: Getting started with TTN Gateways (Sebastian Buettrich, NSRC)**

# Tuesday

A gentle introduction to RF concepts for IoT (Ermanno Pietrosemoli, ICTP)

**LAB: Getting started with Pycom devices (Marco Zennaro, ICTP and Sebastian Buettrich, NSRC)**

**LAB: LoRaWAN examples: sending temperature via TTN (Marco Zennaro, ICTP and Sebastian Buettrich, NSRC)**





# Wednesday

Introduction to MQTT and MQTT Lab (Marco Zennaro, ICTP)

**LAB: RPiDC: a data center in a RPi (Marco Zennaro, ICTP)**

TTN in an Academic Network (Sebastian Buettrich, NSRC)

# Thursday

Outdoor installation of wireless equipment (Ermanno Pietrosemoli, ICTP)

**LAB: Introduction to TTN coverage mapping  
(Sebastian Buettrich, NSRC)**

**LAB: Measuring coverage around the campus  
(Marco Zennaro, ICTP and Sebastian Buettrich,  
NSRC)**

# Friday

IoT Applications (Ermanno Pietrosemoli, ICTP)

TTN Advanced use (Sebastian Buettrich, NSRC)

Open Discussion and Case Studies

# GitHub

All material (slides, code, examples) will be available on this repository:

<https://github.com/marcozennaro/uganda-2020>

# Hands-on sessions

"Be excellent to each other", asking / helping is OK.

Google error messages to fix issues.

Coping blindly does not lead to new insight.

Reading other people's code helps a lot.

# Books on IoT

A book is not required for this worksgop.

We will read individual articles on demand.

This [Wiki](#) has [a list of books](#) on a range of topics.



# Feedback?

Email me [mzennaro@ictp.it](mailto:mzennaro@ictp.it)