IC1301 -WiPE

Wireless Power Transmission for Sustainable Electronics

Working Group 3: Novel Materials and Technologies

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WIPE

COST IC1301

EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

Agenda

- Partners and Interests
- Research Topics
  - Materials
  - Technologies
- Collaboration tools
- Planned activities

Partners and Interests

- Hendrik Rogier, iMinds/Ghent University
  - Wearable, flexible and textile (active) antenna systemss
  - Body-centric communication
  - Electromagnetic Wave solvers
  - Substrate Integrated Waveguide Technology
- Maurizio Bozzi, University of Pavia, Italy
  - Flexible, textile and paper antennas
  - Electromagnetic Wave solvers
  - Substrate Integrated Waveguide Technology
- Paolo Arcioni, University of Pavia, Italy
  - Electromagnetic Wave solvers
  - Substrate Integrated Waveguide Technology
- Ana Collado, CTTC, Barcelona, Spain
  - Flexible and plastic antennas
  - Reflectarrays
  - Oscillators
  - Substrate Integrated Waveguide Technology

Partners and Interests

- Luca Roselli, University of Perugia, Italy
  - System on Paper
  - Wearable antennas
- Alessandra Costanzo University of Bologna, Italy
  - Fully fabrics-based multi-layer multi-band circularly polarized rectennas
  - Synthesis, characterization and measurements of magneto-dielectric substrates for miniaturized antenna systems
- Rafael Caldeirinha, Instituto de Telecomunicações (IT), Polytechnic Institute of Leiria (IPL), Portugal
  - Frequency selective surfaces (FSS);
  - Hybrid FSS and rectantenna design for wireless power harvesting;
  - Phase conjugated antenna array design;
  - Radio wave propagation modelling in complex environments (e.g. vegetation), including ray-tracing based models;
  - RF measurement systems (both for anechoic chamber 6m*5m*3m and outdoor environments) and channel sounder topologies.

Partners and Interests

- Motti Haridim, HIT, Israel
  - Wearable antennas
- Alex Takacs, University Paul Sabatier (Toulouse III), France
  - Co-simulation techniques for millimeter wave energy harvesters
  - Short Range Inductive Wireless Powering Systems for Automotive Applications
- Zbynek Raida, Brno University of Technology, Czech Republic
  - Woven antennas (energy harvesting integrated to clothing)
  - On-body antennas (remote feeding of on-body sensors)
- Marco Antoniades – University of Cyprus
  - Antenna design and miniaturization, including active integrated antennas
  - Engineered electromagnetic materials such as negative-refractive-index metamaterials
  - Implantable and wearable antennas and devices for biomedical applications
  - Electromagnetic energy harvesting systems for wireless sensor networks and RFIDs
  - Non-radiative wireless power transfer systems

Partners and Interests

- Jasmin Grosinger, Graz University of Technology, Austria
  - Backscatter RFID sensor tag design
  - Body-centric backscatter communication; Wearable antennas
  - On-chip antennas; System in package
  - Booster antenna technology; Flexible antennas
  - RF measurement systems (anechoic chamber, automated wafer prober, channel measurements, etc.)
- Benoit Guiffard, Institute of Electronics and Telecommunications of Rennes (IETR), France
  - Ferroelectric/magnetoelectric thin films for RF energy harvesting
  - Electrostrictive polymer composite films for tunable soft printed antennas.
- Stepan Lucyszyn, Imperial College London, UK
  - Please specify?
- Mohamed Cheikh, Continental Automotive France SAS
  - Please specify?

Research Topics: Novel Materials

- Wearable WPT systems
  - Textile systems
- Implantable WPT systems
  - Biocompatible materials
- Flexible/conformable WPT systems
  - Plastics
- Recyclable/green WPT systems
  - Paper
- Low-cost/disposable WPT systems
  - Enhanced RFID tags

Research Topics: Novel Technologies

- Novel WPT topologies
  - Substrate Integrated Waveguide (SIW) technology
  - Novel active antenna topologies
  - Multi-antenna systems, reflectarrays
  - Metamaterials
- Novel CAD tools for WPT
  - Dedicated full-wave/circuit co-design and co-optimization
  - Dedicated propagation tools, integrated frameworks
    - Body-centric environments
    - Assessment of health effects

Collaboration tools

- Short-Time Scientific Missions (STSM)
  - Prime tool to initiate collaboration by exchanging ESRs
- Bilateral Erasmus+ Proposals
  - Exchange of students, e.g. Master Thesis students
- Joint research
  - Reference scenarios
  - Comparing designs based on different novel materials
    - Textile vs. paper vs. plastic
    - CNT, graphene, fullerine vs. conventional semiconductors

Collaboration tools

- Synergetic research
  - Combining novel materials with novel technologies
    - Textile/paper/plastic + SIW technology
    - Novel active antennas based on carbon/ferromagnetic materials
    - Validating new CAD tools based on realistic examples
- Sharing measurement tools
  - VNAs, anechoic chambers, wireless testbeds
- Joint measurement campaigns

Collaborations tools

- Joint European Project applications
  - Horizon 2020

Upcoming events

- EUCAP 2014 short course, Den Haag (NL)
  - Wearable Antenna Systems for Energy-Efficient Body-Centric Communication (lecturer H. Rogier)
  - **http://www.eucap2014.org/short-courses/Course%20Description%20-%20Rogier.pdf**
- NEMO 2014 conference, May 14-16, Pavia (IT)
  - Numerical EM Modeling and Optimization
  - **http://nemo-ieee.org/**
- Special issue, deadline 31/7/2014
  - International Journal of Numerical Modelling (IJNM): Electronic Networks, Devices and Fields
  - **Special Issue on Innovative modeling techniques for novel technologies in wireless power transfer**
  - **http://onlinelibrary.wiley.com/doi/10.1002/jnm.1978/abstract**

Upcoming events

- PIERS 2014 Special Session, Guangzhou (China)
  - SC4: Novel Materials and Technologies for Microwave Components (M. Bozzi, H. Rogier)
  - **http://piers.org/piers2014Guangzhou/session.php?session_id=S051**