IC1301 - WiPE
Wireless Power Transmission for Sustainable Electronics

Working Group 3: Novel Materials and Technologies

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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 systems
  > 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)

» 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
Upcoming events

» PIERS 2014 Special Session, Guangzhou (China)
  > SC4: Novel Materials and Technologies for Microwave Components (M. Bozzi, H. Rogier)