BioEM2015

Bioelectromagnetics Applied to Emerging Body-Centric Wireless Technologies

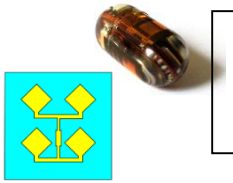
Dr. Maxim Zhadobov

Institute of Electronics and Telecommunications of Rennes

French National Center for Scientific Research

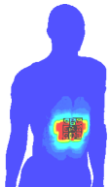
Overview of recent BioEM activities at IETR

Design, modeling, and optimization

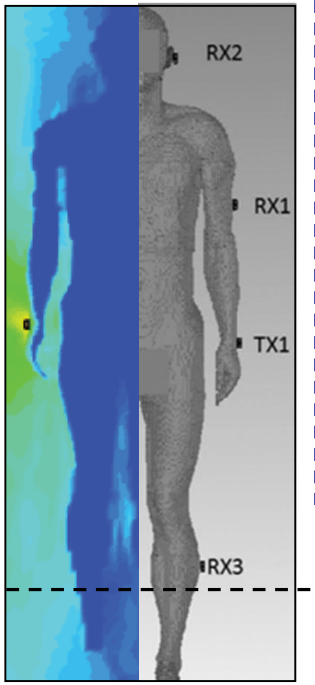


Antenna design / optimiz.
intelligent clothing, implants, wireless sensors

Antenna / body modeling
antenna ⇔ body coupling, on-body propag.

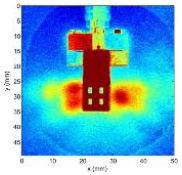


Reduction of antenna / body coupling
EBG, electrotext., feeding type



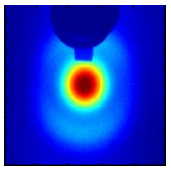
Instrumentation and measurements

New multi-physics measurement techniques

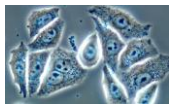


Design of EM / T models of the body

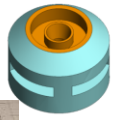
New techniques for tissue characterization
mainly at mm waves

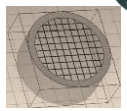


Optimizing exposure cond. for BEM *(in vitro & in vivo stud.)*



Novel tools for BEM
anechoic and reverberating environments





Biocompatibility of EM radiations

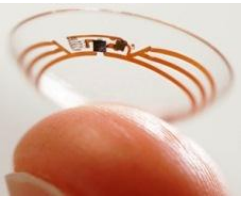
⇒ **Focus**: antenna / human body interactions in emerging BAN

Body-Area Networks

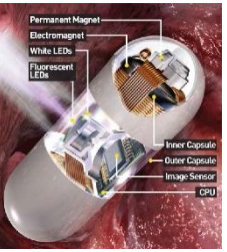
❑ Body-Centric Wireless Communications

Wireless networking between **on-body sensors and other communicating devices** placed on, off, or implanted in the human body

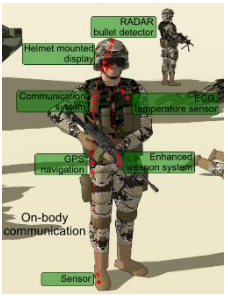
healthcare, sports, smart home, entertainment, military



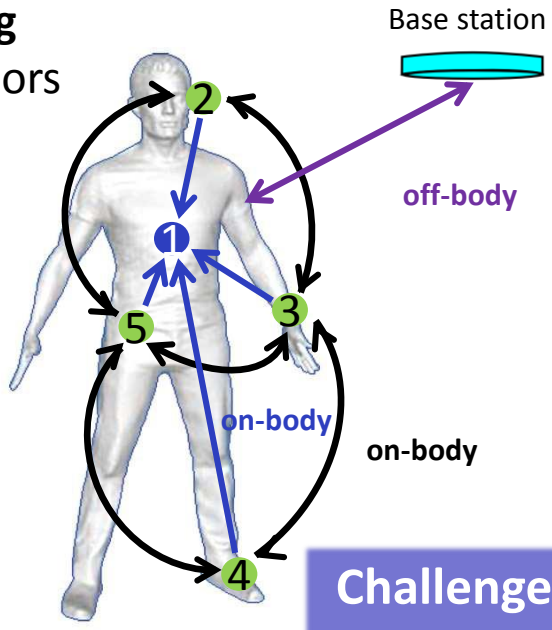
E-health monitoring
Smart wireless sensors



Wireless implants
Powering through the body

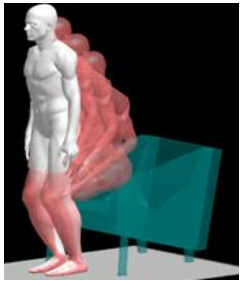


Person-to-person wireless communications



Smart Clothing
Connected textiles for sports

Positioning & gesture recognition
Movement monitoring



Challenges: antenna / body interactions
1) Antenna design and expos. reduction
2) Phantom design and characterization
3) Accurate dosimetry

Acknowledgements

EBEA
european bioelectromagnetics association

anses
agence nationale de sécurité sanitaire
alimentation, environnement, travail

ANR AGENCE NATIONALE DE LA RECHERCHE

SEVENTH FRAMEWORK PROGRAMME

Collaborators

Ronan Sauleau
Yves Le Dréan
Daniel Thouroude
Gerard Dubost
Stan Alekseev
Marvin Ziskin
Mohsen Koohestani
Anda Guraliuc
Robin Augustine

PhD Students

Denys Nikolayev
Carole Leduc
Alexis Haas
Jeanne Frere
Abdou Fall
Nacer Chahat