

BRACCO FELLOWSHIPS EDUCATION IN RESEARCH ENROLMENT FORM

Name of Institution University of Foggia – Department of Clinical and Experimental Medicine

Radiology Unit “Dimiccoli” Teaching Hospital, Barletta

City and Country of Institution Foggia, Italy

RESEARCH GROUP

Prof. Giuseppe Guglielmi (Full Professor; Scientific and Disciplinary Sector - MED/36 - Diagnostic Imaging and Radiotherapy).

The activity of Prof. Guglielmi regards Digital Radiology diagnostics, Computed Tomography, Magnetic Resonance, Bone Densitometry, Molecular Imaging, Radiomics and Radiogenomics. In particular, in the field of Musculoskeletal Radiology, he focused his activity on the study of bone metabolic diseases, rare diseases, geriatric radiology, with particular interest in high resolution imaging for the study of the trabecular bone network and the analysis of the body composition by integrated imaging (DXA, US, CT and MRI). Another field of interest is represented by Forensic Radiology in collaboration with forensic doctors on the Virtopsy project (virtual autopsy) and subsequently on the Virtangio project (virtual angiography) which allowed the inclusion of the Italian clinical center as the only Italian branch of work on the European project of Post-mortem Angiography. Finally, a further field of interest is represented by the editorial activity (medical writing) which, since 2003, has materialized with the position of Radiology and Radiographics RSNA Editorial Fellow, allowing to carry out a significant editorial activity as Editor-in-Chief, Deputy Editor and Member of the Advisory Board of numerous national and international Radiology journals. These issues have led to numerous scientific publications, presentations at scientific conferences with both national and international relevance as well as book chapters and teaching activities.

TITLE OF PROPOSED RESEARCH PROJECT

Ability of Radiofrequency Echographic Multi-Spectrometry to identify secondary osteoporosis in cancer patients

OBJECTIVES

- Assessing bone health status in cancer patients who underwent cancer treatments, thanks to early diagnosis and continuous follow-ups with REMS technology
- Quantifying the bone loss as a consequence of various therapeutic treatments in different types of cancer
- Assessing the quality of bone microarchitecture through the REMS – based Fragility Score in cancer patients
- Evaluating the predictive capability of REMS in identifying cancer patients at high risk of fracture

LITERATURE:

1. Wickham, R. Osteoporosis related to disease or therapy in patients with cancer: Review and clinical implications. *Clin. J. Oncol. Nurs.* **15**, (2011).
2. Di Paola, M. *et al.* Radiofrequency echographic multispectrometry compared with dual X-ray absorptiometry for osteoporosis diagnosis on lumbar spine and femoral neck. *Osteoporos. Int.* **30**, 391–402 (2018).
3. Mohan, S. & Chopra, V. Chapter 18 - Biological effects of radiation. in *Woodhead Publishing Series in Electronic and Optical Materials* (eds. Dhoble, S. *et al.*) 485–508 (Woodhead Publishing, 2022). doi:<https://doi.org/10.1016/B978-0-323-85471-9.00006-3>.
4. Sodickson, A. *et al.* Recurrent CT, Cumulative Radiation Exposure, and Associated Radiation-induced Cancer Risks from CT of Adults¹. *Radiology* **251**, 175–184 (2009).
5. Diez-Perez, A. *et al.* Radiofrequency echographic multi - spectrometry for the in - vivo assessment of bone strength : state of the art — outcomes of an expert consensus meeting organized by the European Society for Clinical and Economic Aspects of Osteoporosis , Osteoarthritis. *Aging Clin. Exp. Res.* **31**, 1375–1389 (2019).
6. Conversano, F. *et al.* A Novel Ultrasound Methodology for Estimating Spine Mineral Density. *Ultrasound Med. Biol.* **41**, 281–300 (2015).
7. Adami, G. *et al.* Radiofrequency echographic multi spectrometry for the prediction of incident fragility fractures: A 5-year follow-up study. *Bone* **134**, 115297 (2020).
8. Ciardo, D. *et al.* POS0163 Incident Fracture Risk Prediction Using The Fragility Score Calculated By Lumbar Spine Radiofrequency Echographic Multi Spectrometry (REMS) SCANS. *Ann. Rheum. Dis.* **80**, 294 LP – 294 (2021).
9. Forcignano, R. *et al.* Short-Term Monitoring of Denosumab Effect in Breast Cancer Patients Receiving Aromatase Inhibitors Using Radiofrequency Echographic Multi-Spectrometry (REMS) Technology on Femoral Neck. *Arthritis Rheumatol.* **72**, 232–233 (2020).
10. Quarta, E. *et al.* SAT0461 Short-Term Monitoring Of Denosumab Effect In Breast Cancer Patients Receiving Aromatase Inhibitors Using Rems Technology On Lumbar Spine. *Ann. Rheum. Dis.* **79**, 1187 LP – 1188 (2020).

APPLICANT'S DUTIES

- Enrolling voluntarily patients according to the enrollment criteria (*i.e.* cancer patients, age between 21 to 90 year, both women and men, signed informed consent)
- To evaluate the patients by diagnostic investigation with REMS on lumbar spine and/or proximal femur
- Data processing, data analyses and management in collaboration with CNR-IFC (Lecce, Italy)
- Attending regular research meetings and journal clubs. Getting familiar with the current literature
- Preparing national and international scientific publications

APPLICANT'S BENEFITS

- Participation in programs of preventing bone loss and fracture risk in patients undergoing cancer treatments through long and short-term monitoring by the use of REMS technology
 - A higher degree of confidence in exploiting the benefits of REMS technology (radiation free) to limit radiation exposure for cancer patients
 - In addition, the fellowship will contribute to a high quality clinical research that will lead to attend international congresses and produce publications with chance of discussing scientific presentations.
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- **Project Leader:** Prof. Giuseppe Guglielmi
 - **Members:** Physicians and researcher from the team of Prof. Giuseppe Guglielmi together with the researchers from the National Council of Research-Institute of Clinical Physiology (CNR-IFC) of Lecce.