



# Alessandro Ruggeri

Nazionalità: Italiana

## ● ESPERIENZA LAVORATIVA

25/05/2020 – 25/11/2021 – Cagliari, Italia

**BORSISTA DI RICERCA – UNIVERSITÀ DEGLI STUDI DI CAGLIARI**

Bando numero 20/2020 del 13/03/2020 - Progettazione di un sensore per applicazioni industriali. L'attività consiste nella progettazione di un sensore per applicazioni industriali, per monitorare gli intermedi di processo nelle realtà industriali.

25/11/2020 – 30/11/2021 – Cagliari, Italia

**BORSISTA DI RICERCA – UNIVERSITÀ DEGLI STUDI DI CAGLIARI**

Bando numero 54/2020 del 18/09/2020 -Tecniche per il conteggio delle persone in ambienti complessi. L'attività riguarda l'analisi, studio e implementazione di tecniche per monitorare il flusso e conteggio delle persone.

## ● ISTRUZIONE E FORMAZIONE

2010 – 2015 – VIA TOMMASEO 3/5, AN GAVINO MONREALE, Italia

**DIPLOMA DI MATURITÀ DEL LICEO SCIENTIFICO – Liceo Scientifico G. Marconi**

Studio delle materie scientifiche, umanistiche, e della lingua inglese

09/2015 – 25/02/2020 – Cagliari, Italia

**LAUREA IN INGEGNERIA BIOMEDICA, CLASSE N. L-8 D.M. 270/2004 – Università degli studi di Cagliari**

### Campi di studio

- Ingegneria e studi correlati

## ● COMPETENZE LINGUISTICHE

Lingua madre: **ITALIANO** | **SARDINIAN**

Altre lingue:

	COMPRESIONE		ESPRESSIONE ORALE		SCRITTURA
	Ascolto	Lettura	Produzione orale	Interazione orale	
<b>INGLESE</b>	B2	C1	B1	B2	B1
<b>FRANCESE</b>	A2	A2	A1	A1	A1

Livelli: A1 e A2: Livello elementare B1 e B2: Livello intermedio C1 e C2: Livello avanzato

## ● **COMPETENZE DIGITALI**

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Padronanza del Pacchetto Office (Word Excel PowerPoint ecc) | Ottima padronanza del software antivirus Kaspersky | Ottima padronanza del software COMSOL Multiphysics | Buona padronanza del software MATLAB | Buona padronanza del software CST STUDIO SUITE | Buona padronanza dei software di browsing online | Discreta padronanza di programmazione in C | Buona padronanza delle suite per ufficio | Discreta padronanza dei software di fotoritocco (Photoshop, paint.net)

## ● **PUBBLICAZIONI**

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### **Towards the Robust and Effective Design of Hyperthermic Devices: Case Study of Abdominal Rhabdomyos**

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10.1109/JERM.2020.3016890

<https://ieeexplore.ieee.org/document/9169813> - 2020

M. B. B. Lodi, G. Muntoni, A. Ruggeri, A. Fanti, G. Montisci and G. Mazzarella, "Towards the Robust and Effective Design of Hyperthermic Devices: Case Study of Abdominal Rhabdomyosarcoma with 3D Perfusion," in IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology, doi: 10.1109/JERM.2020.3016890.

**Abstract:** This work addresses the challenge of deriving a simple effective multiphysic model useful for the design and simulation of hyperthermia devices for high-quality treatment. An existing compact patch antenna working at 434 MHz is re-designed using the proposed methodology. The proposed general approach is used to investigate the peculiar case of the hyperthermia treatment of abdominal rhabdomyosarcoma. Instead of patient-specific geometries with discrete vascular tree models, a surface phantom with a 3D blood perfusion model of tumors is used. The antenna is reworked to be robust. The effectiveness of the antenna is evaluated simulating the treatment with a recent non-linear multi-physic model, considering the different descriptions of tumor vasculature. A more robust and effective design is obtained, with respect to its previous version. The antenna bandwidth is increased of about 7%. The treatments with the old version of the antenna were unsatisfactory (40°C after 60 min), whilst the novel design could successfully treat the target region, reaching 42.5°C for 60 min of treatment. To enhance the effectiveness of the treatment, the use of a time-modulated power is studied. The proposed model could be extended to different body region and used to develop an application-oriented design of antennas for hyperthermia treatment.

### **Fat Tissue Simulation for Hyperthermia Applications: Permittivity Measurements and Preliminary Studies**

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10.1109/TELFOR52709.2021.9653236

<https://ieeexplore.ieee.org/document/9653236/> - 2021

**Abstract:**

Hyperthermia is one of the most interesting auxiliary therapies for tumours, due to its potentiality as a non-invasive and targeted treatment. To be effective, it needs a preliminary study phase of the area under treatment and of the device to be used. For this reason, the research around hyperthermia focused on the development of phantoms, substances, or materials able to simulate biological tissues and useful to test the treatment, as well as on calibrating the operative parameters and conditions. One of the most important characteristics that phantoms must simulate is the dielectric permittivity. In this paper, some permittivity measurements, performed using a self-made parallel plate cell connected with an impedance analyser, are reported for the development of phantom for biomedical applications. Different mixtures of 1-butanol and vaseline were prepared and tested with the purpose of realization of a fat tissue-mimicking phantom useful to study liposarcoma treatment.

## Application of a non-Linear Heat Transfer Model to the Microwave Heating of Agricultural Soils

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10.1109/TELFOR52709.2021.9653218

<https://ieeexplore.ieee.org/document/9653218> – 2021

### **Abstract:**

Agricultural soil heating by microwaves is a cost-effective and efficient method to disinfect agricultural soils. By irradiating with an antenna and heating the soil up to pasteurization temperatures it is possible to kill pathogen agents such as pests, fungi, and bacteria. It is possible to calibrate the treatment with respect to the exposure time and temperature distribution. Here, a computational model to solve the non-linear multi-physic problem, including dielectric heating and heat transfer phenomena, is presented. The model takes account of the temperature effect of both the dielectric and the thermal properties of the soil.

## Development and Multiphysic Analysis of a Neck Phantom for Microwave Hyperthermia

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10.1109/TELFOR51502.2020.9306679

<https://ieeexplore.ieee.org/document/9306679> – 2020

### **Abstract:**

Thyroid tumors are aggressive pathology which calls for innovative therapies. Hyperthermia treatment is now investigated as therapeutic strategy. This work deals with the development of an accurate surface phantom for the neck region, including the thyroid gland. Then multiphysic simulations are performed using a novel description of the tumor tissue perfusion.

## Improvement of a WSN for Quality Monitoring in Carasau Bread Industry: Hardware and Software Testing

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10.1109/TELFOR51502.2020.9306667

<https://ieeexplore.ieee.org/document/9306667> – 2020

### **Abstract:**

The digitalization challenges and high quality standards offered by Industry 4.0 to the traditional bread manufacturing sector calls for engineering solutions, such as wireless sensors network (WSN). In this work it is presented the long-term test and statistical analysis of the improvement of the hardware and software modules of an existing WSN for Carasau bread industry.

## Design and Multiphysics Analysis of a Microwave Reactor for Lipase Activation

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10.1109/TELFOR51502.2020.9306526

<https://ieeexplore.ieee.org/document/9306526> – 2020

### **Abstract:**

Microwave heating are known to catalyze biochemical reactions in pharmaceutical and cosmetic industry. Effective system operating in continuous flow conditions lacks in the literature. This work deals with the design and the multiphysics simulation of a resonant cavity used as bioreactor for the thermal activation of the lipase enzyme.

## ● **PATENTE DI GUIDA**

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**Patente di guida:** AM

**Patente di guida:** B

## ● **COMPETENZE ORGANIZZATIVE**

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### **Competenze organizzative**

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- Buone competenze organizzative e di team-leading di un gruppo, acquisite durante gli studi universitari e tramite l'esperienza amministrativa di forum.

## ● **COMPETENZE COMUNICATIVE E INTERPERSONALI**

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### **Competenze comunicative e interpersonali.**

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- Ottime competenze comunicative di lavoro in gruppo;
- Ottime competenze comunicative con i bambini e i ragazzi, acquisite durante gli innumerevoli eventi ludici organizzati da volontario in spiagge e nei giardini pubblici.

## ● **ALTRE COMPETENZE**

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### **Brevetti**

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- Brevetto *OPEN WATER DIVER* rilasciato da: **PSS**
- Brevetto *ADVANCED OPEN WATER DIVER* rilasciato da: **PSS**
- Brevetto *NITROX DIVER* rilasciato da: **PSS**

## ● **TRATTAMENTO DEI DATI PERSONALI**

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### **Trattamento dei dati personali**

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Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base all'art. 13 del D. Lgs. 196/2003 e all'art. 13 del [Regolamento UE 2016/679 relativo alla protezione delle persone fisiche con riguardo al trattamento dei dati personali](#).