UBT UMBRIA BIOENGINEERING TECHNOLOGIES Spin off

X-rays Free Mammogram for Early Breast Cancer Detection

L'INNOVAZIONE SI RACCONTA

8 Maggio 2017

Speakers:
Martina Paoli - Fisico medico
Lorenzo Sani - Fisico

Our Company:

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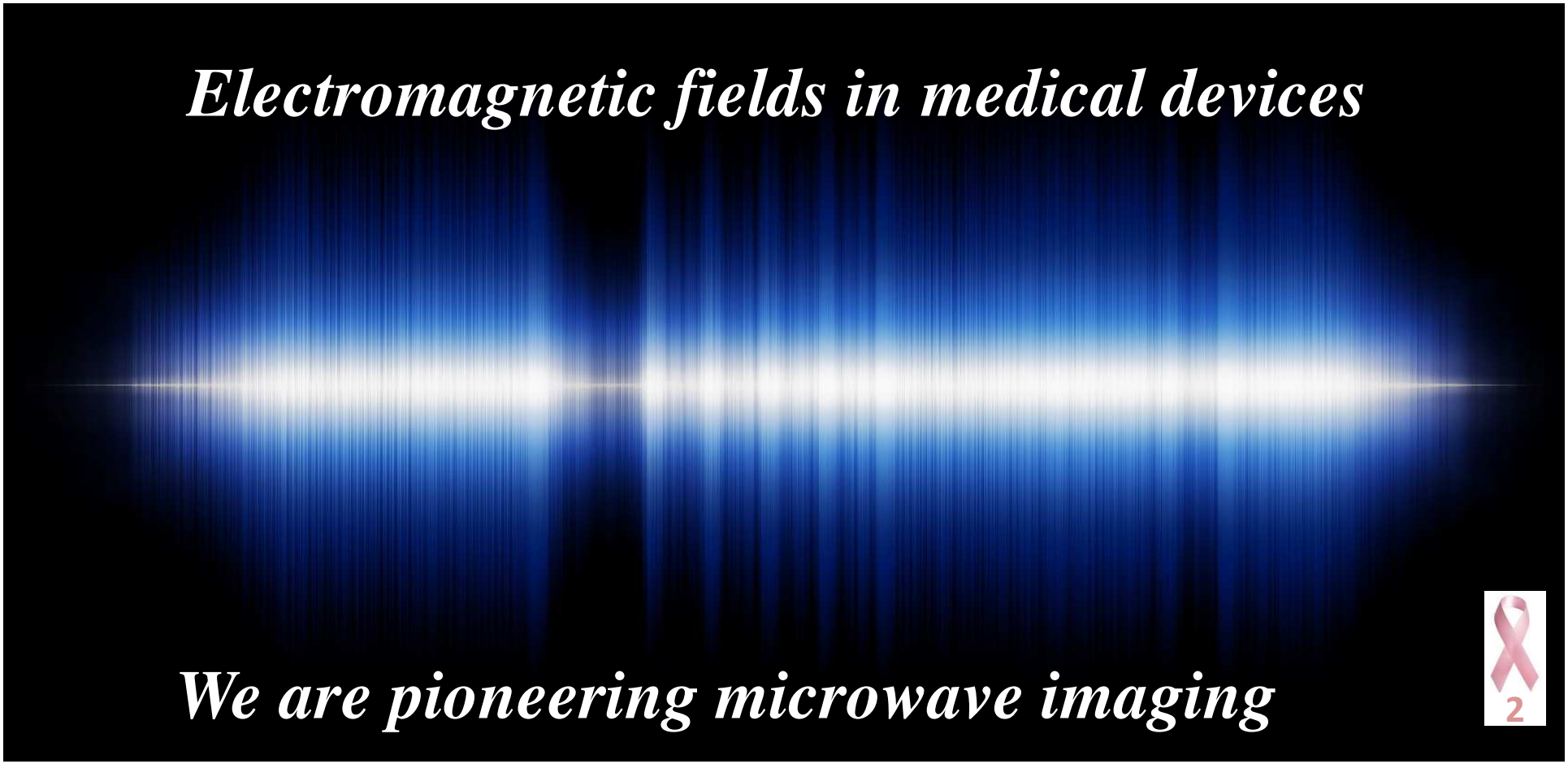

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X-rays free mammogram

Problem:

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Breast cancer:

#1 cause of death

for females in any age group

Year's cases – World

diagnosed	*death*
1.400.000	*446.000*

Mass Screening

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- *Mass Screening is absolutely essential to reduce breast cancer mortality rate;*
- *National health service is doing all the efforts to enhance mass screening;*

Mass Screening

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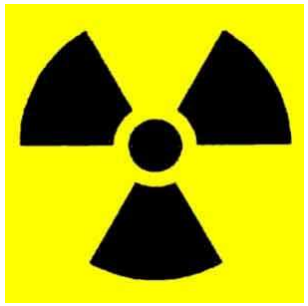
- *Currently, mass screening is performed using conventional mammography;*
- *Conventional mammography has some shortcomings, such as ionizing radiation and breast crushing;*



Ionizing Radiation

Breast crushing

Mass Screening

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- *Mass screening using conventional mammography is limited to females in the age 50/ 69 years only;*
- *It is performed every 2 years;*
- *In Italy we have that 56% of females in the age 50/ 69 years sits for screening examination;*

Question: how would it be possible to further enhance mass screening, potentially intercepting breast cancers at earliest stage?

Microwave Imaging

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- Microwave imaging has been recognized as one promising non-ionizing (X-rays free) and non-invasive screening technology;

- Microwave imaging can be applied to breast cancer detection (due to the contrast in the dielectric properties at microwave frequencies of normal and malignant tissues);

UBT Solution

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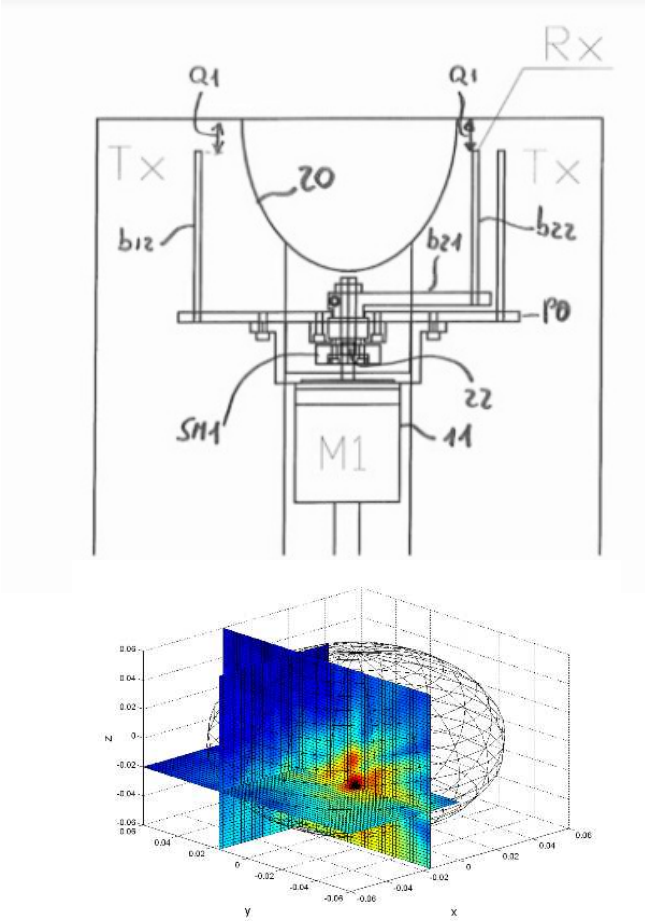
UBT has a cutting edge microwave imaging modality (based on Huygens Principle) employed in our ***X-rays free mammogram.***



Clinical Trials

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- *Clinical validation is currently in progress at Perugia Hospital, Italy (approved by the Ethical Committee of Regione Umbria, Italy, and by the Italian Ministry of Health);*
- *Each subject went through conventional screening mammography AND through our microwave examination;*
- *First results have been recently presented at IEEE IST 2016, showing that microwave images of non-healthy subjects have a signal to clutter (S/C) approximately 10% greater than that of the healthy subjects;*
- *Thus,* ***microwave images can be used for testing breast integrity****;*

Clinical Trials

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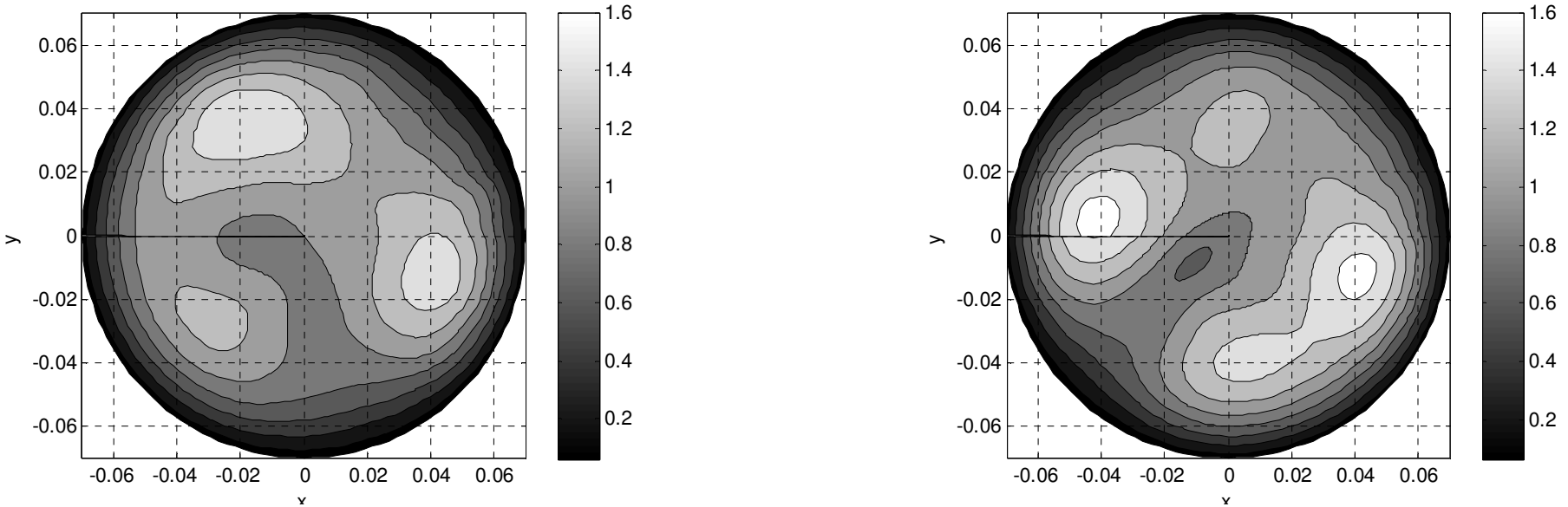
- *Example: Healty Vs non-Healty;*
- *A **quantification** of the **mismatch in the images** can be performed through the parameters S/C (max of the normalized intensity divided by the average of the intensity);*



To allow intra-subject comparison, the two images have been normalized to unitary average of the intensity. X and Y are given in meter. Intensity is given in arbitrary unit.

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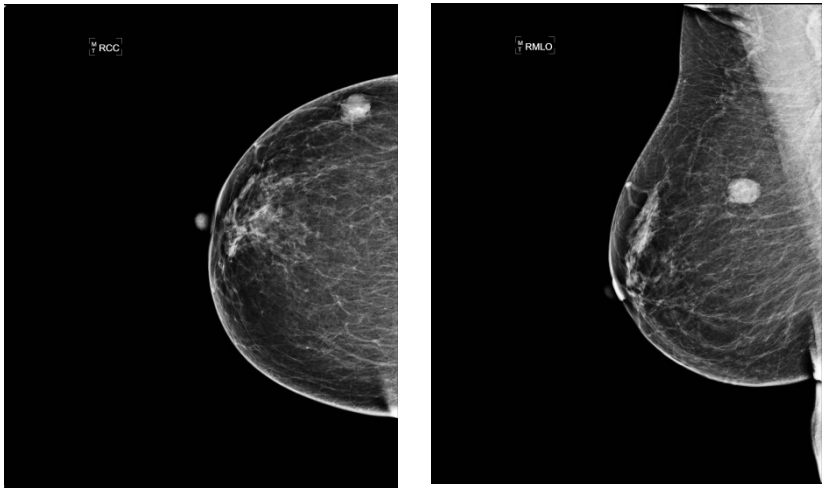
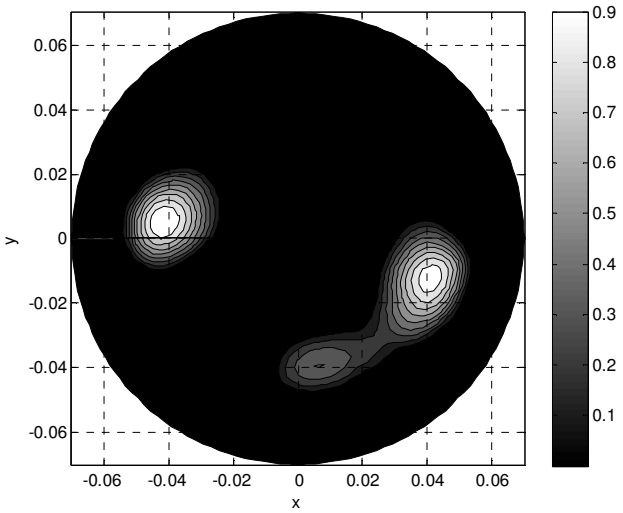
- *Example: Subject with papillary carcinoma in ACR2 breast;*



Mammography images, Example. One craniocaudal view and one mediolateral oblique view given here. The inclusion is clearly visible. Intensity is given in arbitrary unit.



Microwave image, Example. One simple 2D coronal view is given here. The inclusion is clearly visible. Mirror inclusion can be easily neglected through filtering .

Advantages

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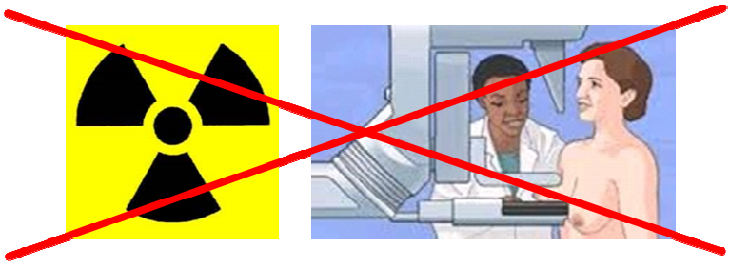
- *Safe (low-power microwave signal rather than ionizing radiation);*
- *Comfortable (absence of any breast crushing);*
- *Examination can be repeated any time, at any age, in any condition (pregnancy, specific illness, etc.);*
- *Lower cost with respect to conventional mammography;*
- *If used as complementary modality with respect to conventional mammography, we can enhance mass screening (more frequent, more women, more age groups);*



Next Steps

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- *Completion of clinical testing for all volunteers included in the trial at Perugia Hospital, Italy.*

- *Multi-center clinical trials:*
  ITALY - Foligno approved
  ABROAD – China, Germany, Uk or Swiss.

- *Statistical quantification of the capability of the microwave apparatus in testing breast integrity.*

- *Market (2019).*

Awards

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NATIONAL

STARTUP ACADEMY
UniCredit Start Lab

UMBRIA START CUP

INTERNATIONAL

Umbria Risorse S.p.A.

Europe Medtec Technology • Networking • Education

3 PNI CUBE
Associazione Italiana degli Incubatori Universitari e delle Business Plan Competition

Retis l'innovation en réseau

GLOBALSOCIALVENTURE COMPETITION

★ SEAL OF ★ EXCELLENCE

Team

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Management

Prof. Franco A. Grassini	*Honorary President - Economist*
Dr. Sabatino Tiberi	*C.E.O.*

Advisors

Prof. Luca Ferrucci	*Prof. UNIPG - Economist*
Dr. Matteo Del Savio	*Financial Analyst*

Scientific Team

PhD Gianluigi Tiberi	*Imaging Theory – (Inventor & Founder)*
P.I. Giovanni Raspa	*Mechatronic (Inventor & Founder)*
PhD Navid Ghavami	*Imaging Algorhitms - Founder*
PhD Lorenzo Sani	*Testing and data analysis - Founder*
Dr. Martina Paoli	*Medical Physics*
Dr. Alessandro Vispa	*Physics*

Medical Team

Dr. Michele Duranti	*Primary of diagnostic imaging dept*
Dr. Simonetta Ercolani	*Radiologist Breast pathology specialist*
Dr Eleonora Vannini	*Radiologist Breast pathology specialist*
Dr. Andrea Saracini	*Radiologist Breast pathology specialist*
Dr. Riccardo Loretoni	*Director Breast Unit Foligno*

With the scientific support of Prof. Francesco Sacchetti – Full Professor of Physics Of Matter - Department of Physics and Geology, University of Perugia.

Our Goal

Mass screening is the most effective way to fight breast cancer

We want to make a difference in order to make mass screening accessible to all women

Acknowledgments

- *Many thanks to the University of Perugia (especially to the Chancellor; to Prof. Nadotti, Prof.ssa Petrillo, Prof. Sacchetti).*

  Spin off and Start Cup competition have been an excellent acceleration.

- *Many thanks to BCC Spello e Bettona (direct funding and crowdfunding)*

Contacts:

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http://www.ubt-tech.com/