European Commission | Horizon 2020 European Union funding for Research & Innovation

Three dimensional breast cancer models for X-ray imaging research

MaXIMA

H2020-TWINN-2015, Grant Agreement 692097

MaXIMA

3rd Workshop on Applications of computational models for advancement of breast X-ray imaging techniques

17-19 September 2018, Napoli, Italy

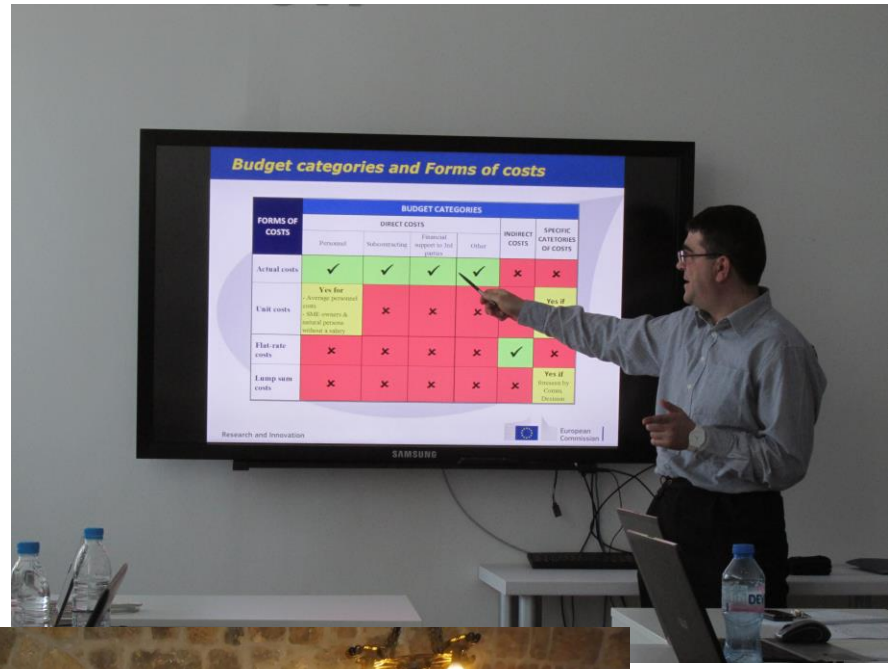
Technical University of Varna
Bulgaria

Katholieke University of Leuven
Belgium

University of Naples – Federico II
Italy

The start ☺

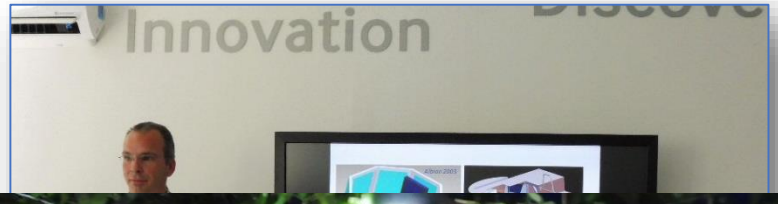
February 2016, Varna



The 1st training school …

May-June 2016, Varna

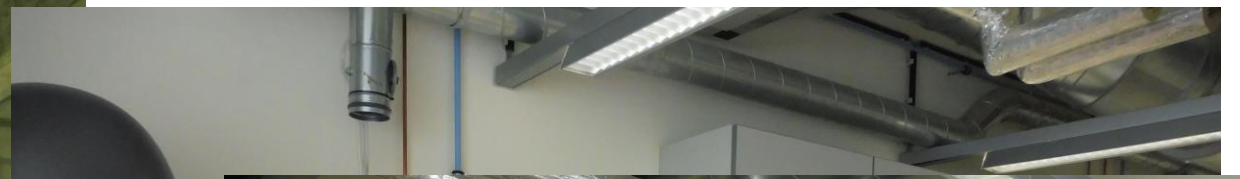
Special Session on eHealth …



The 2nd GAM …

June 2016, Malmo

MoSAIC
Molecular Small Animal Imaging Center

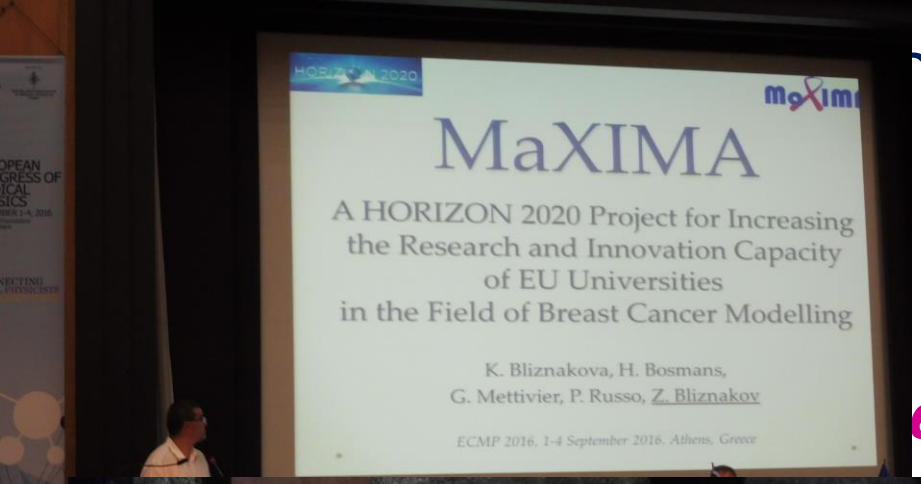


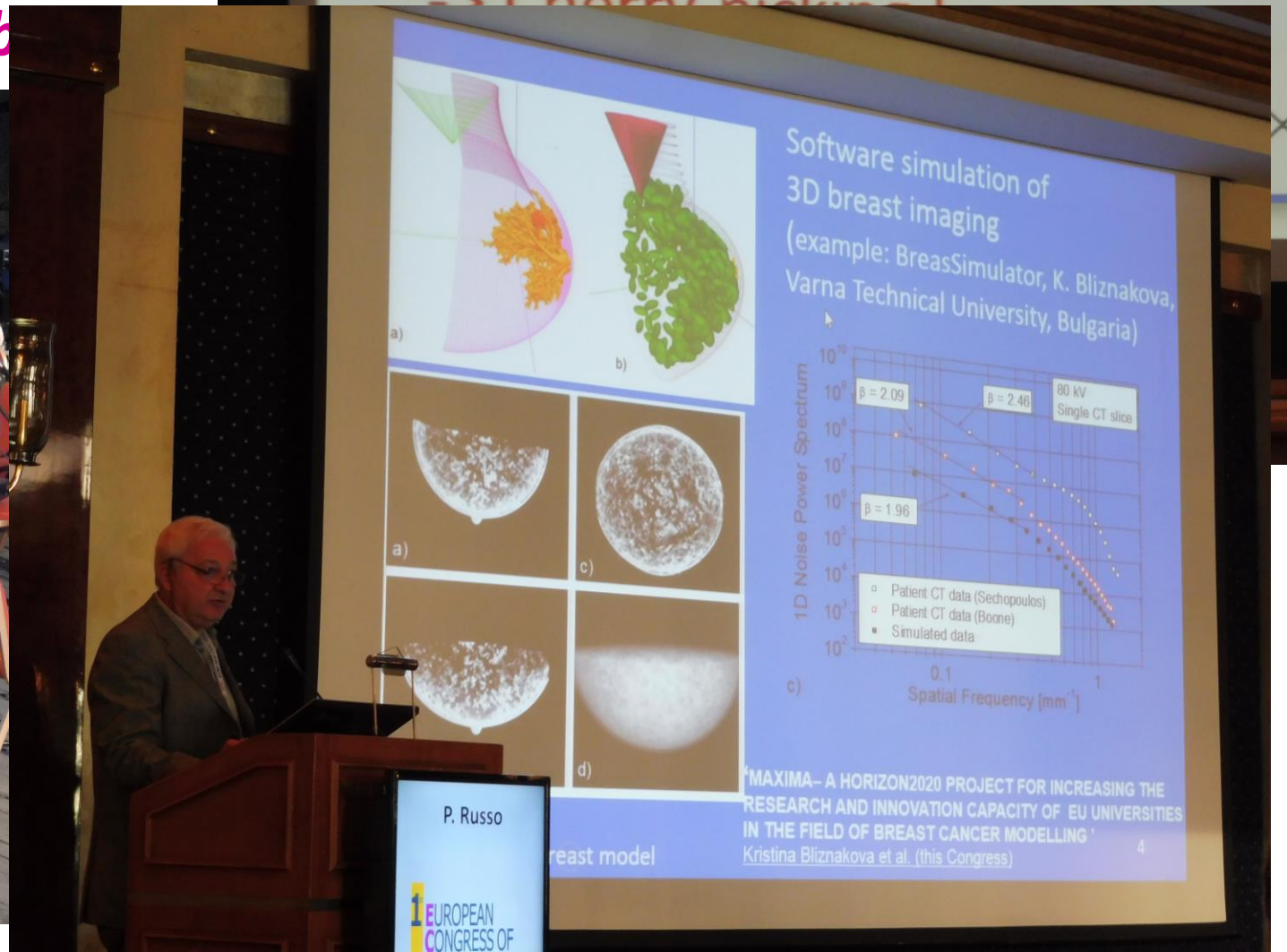
BioSpec 94/20USR
BRUKER

Twinning

ns ...

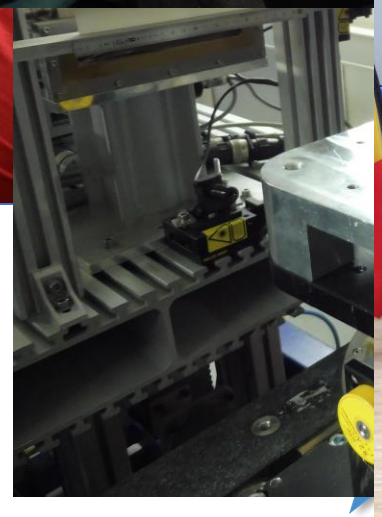
eptemb


MaXIMA
A HORIZON 2020 Project for Increasing the Research and Innovation Capacity of EU Universities in the Field of Breast Cancer Modelling
K. Bliznakova, H. Bosmans, G. Mettivier, P. Russo, Z. Bliznakov
ECMP 2016, 1-4 September 2016, Athens, Greece


Software simulation of 3D breast imaging (example: BreasSimulator, K. Bliznakova, Varna Technical University, Bulgaria)
1D Noise Power Spectrum
β = 2.09
β = 2.46
β = 1.96
80 kV Single CT slice
Patient CT data (Sechopoulos)
Patient CT data (Boone)
Simulated data
Spatial Frequency [mm⁻¹]
'MAXIMA– A HORIZON2020 PROJECT FOR INCREASING THE RESEARCH AND INNOVATION CAPACITY OF EU UNIVERSITIES IN THE FIELD OF BREAST CANCER MODELLING'
Kristina Bliznakova et al. (this Congress)
P. Russo
EUROPEAN CONGRESS OF

EMERGENCY
STOP
ARRET
D'URGENCE

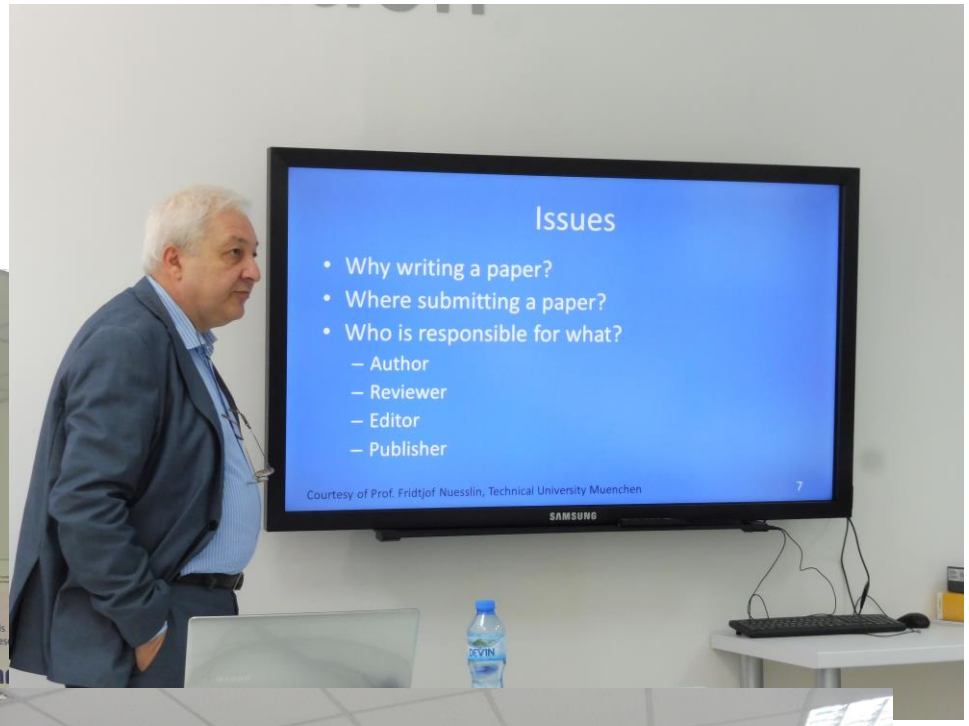
European Synchrotron Radiation Facility
Installation Europeenne de
Rayonnement Synchrotron
ESRF
Central Building

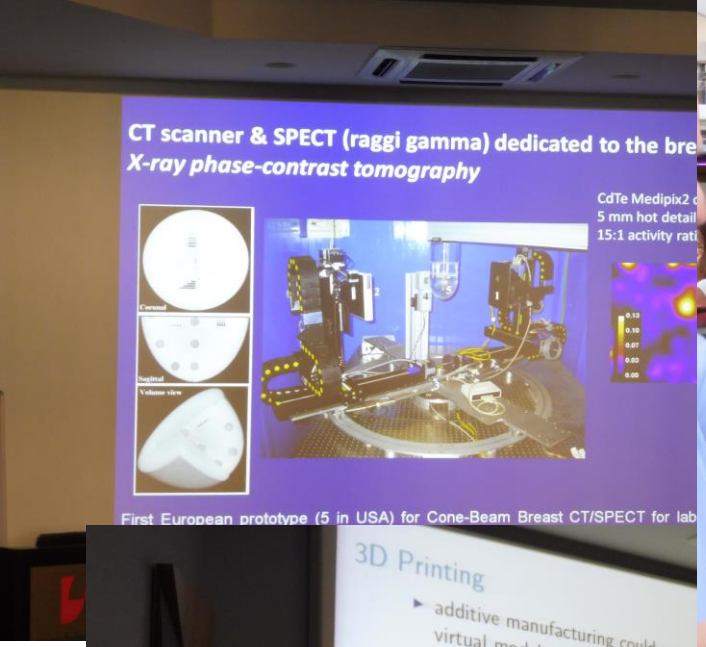


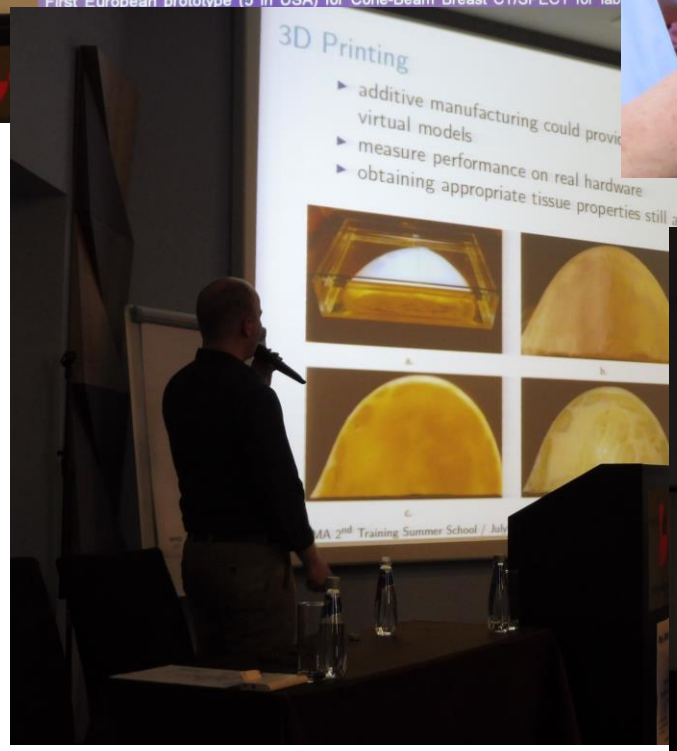
First review in Brusse

June 2

ntific article …




CT scanner & SPECT (raggi gamma) dedicated to the bre
X-ray phase-contrast tomography
CdTe Medipix2
5 mm hot detail
15:1 activity rati
First European prototype (5 in USA) for Cone-Beam Breast CT/SPECT for lab


3D Printing
additive manufacturing could provi
virtual models
measure performance on real hardware
obtaining appropriate tissue properties still a
MA 2nd Training Summer School

Development during Puberty
Nipple
Areola
A B C D E F
A – Newborn
B - Child. C - Early puberty
D - Late puberty
E - Young adult

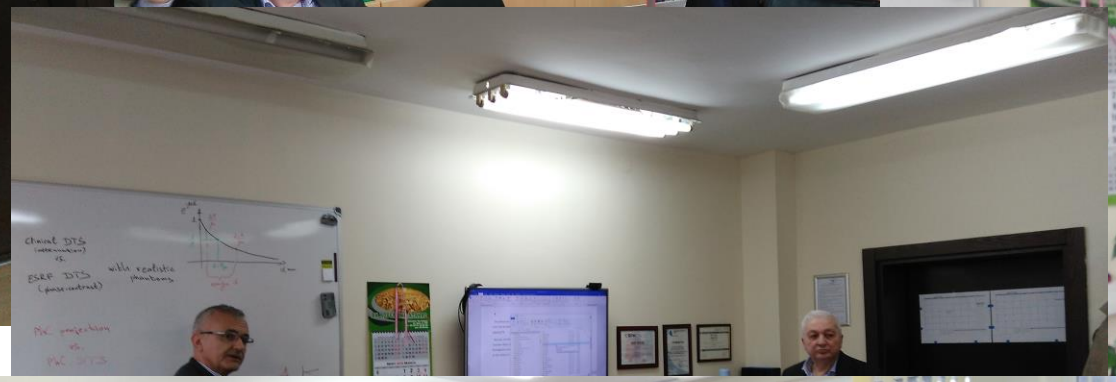
MAXIMA
Methods for breast tumour modelling
and breast imaging

r 2017, Nap

The IP System
Innovators
make significant investments in developing new products
Heavy pressure
may drive the innovator out of business
IP system

check FTO
Patent A
Patent B

ission ...



"Mean" glandular dose as reference in X-ray breast imaging
THE EFFECT OF DOSE HETEROGENEITY ON RADIATION RISK IN MEDICAL IMAGING
INFN
Istituto Nazionale di Fisica Nucleare
Abstract ID I241

MAXIMA Details

- **Score: 14 out of 15**
  - **Excellence** **5 out 5**
  - **Impact** **4.5 out of 5**
  - **Implementation** **4.5 out of 5**

- HORIZON 2020
- Spreading excellence and widening participation
- **CALL: TWINNING:** Call identifier: H2020-TWINN-2015
  Publication date: 02-07-2014
- Total available budget : **66.240.000 EUR**

- Number of proposals submitted (including proposals transferred from or to other calls and excluding abusive proposals) : **552**
- Number of ineligible proposals : **6**
- Number of above-threshold proposals : **321**
- Total budget requested for above-threshold proposals : **323.064.973 EUR**

Aim

To advance in the research aims of the biomedical engineering unit at Technical University of Varna and therefore to raise the profile of their researchers and S&T capacity of the host organisation, collaborations with top research institutions from complementary areas of expertise are a requirement.

In addition, the touch with world experts in this area is needed in order to have local researchers at host informed about the most current findings in the field and to discuss specific scientific issues that otherwise will not have such a chance.

The field

- *The **main objective** of the project is to increase the research and innovation capacity of the host organisation in the field of computational modelling of breast tumours and their use in studies of advanced x-ray breast imaging techniques such as breast tomosynthesis and phase contrast imaging.*

Impact on the host University

Could we change this?

- Increased University ranks

KU Leuven is the top University in Belgium, ranked 12th in Europe and 73th in the world.

University of Naples - Federico II is 128th in Europe and 334th in the world rank list.

Technical University of Varna is 3290th in Europe and 7174th in the world. (http://www.webometrics.info/)

In the proposal

June 2017s

Europe

Ranking	World Ranking	University	Det.	Country	Presence	Impact	Openness	Excellence
1802	6834	Technical University of Varna / Технически университет Варна			4463	10126	3834	5778

http://ec.europa.eu/research/infocentre/theme_en.cfm?item=Countries&subitem=Bulgaria
Search...
Countries - Information Ce...
research.webometrics.info
QS World University Rankings ...
Commission and its priorities
Policies, information and services
English EN
Search

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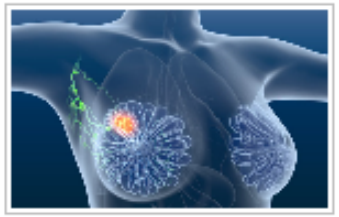
Advanced 3D models improve breast cancer detection



An EU-funded project is developing advanced three-dimensional computational and physical models of breast tumours, providing the medical community with powerful new instruments to tackle breast cancer. The initiative will reveal the possibilities for improved diagnostic techniques for detecting a disease that affects one in eight women in Europe at some point in their lives.

Published: 2 May 2018

3rd Training School on "Application of computer models for advancement of X-ray breast imaging techniques"

Phase Contrast, Photon Counting, Cone Beam CT

Grand Hotel Santa Lucia

Napoli, Italy

17–19 September 2018

Organized by
University of Naples "Federico II"
Dept. Physics "Ettore Pancini"
- Prof. G. Mettivier
- Prof. P. Russo

List of Lecturers (Confirmed)
- Prof. J. M. Boone, UC Davis, USA
- Prof. W. A. Kalender, Friedrich-Alexander Univ., Germany
- Prof. R. Longo, Univ. Trieste and INFN, Italy
- Prof. A. Olivo, UCL, UK
- Dr. A. Bravin, ESRF, France
- Prof. A. Tomal, Univ. Campinas, Brazil
- Dr. M. Esposito, Univ. Lincoln, UK
- Prof. E. Fantacci, Univ. Pisa and INFN, Italy
- Dr. J. Vignero, KU Leuven, Belgium
- Dr. Gianfranco Paternò, INFN Ferrara, Italy
- Prof. E. Cossu, Univ. di Roma Tor Vergata, Italy

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