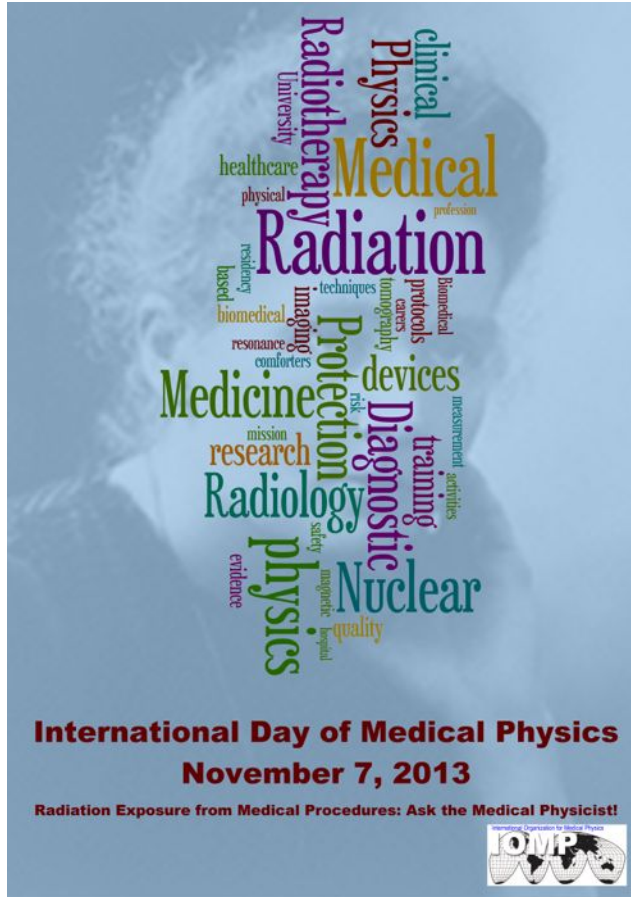




JIPM 2013: 1ère journée International de Physique Médicale



Medical Physics applied to other Specialities

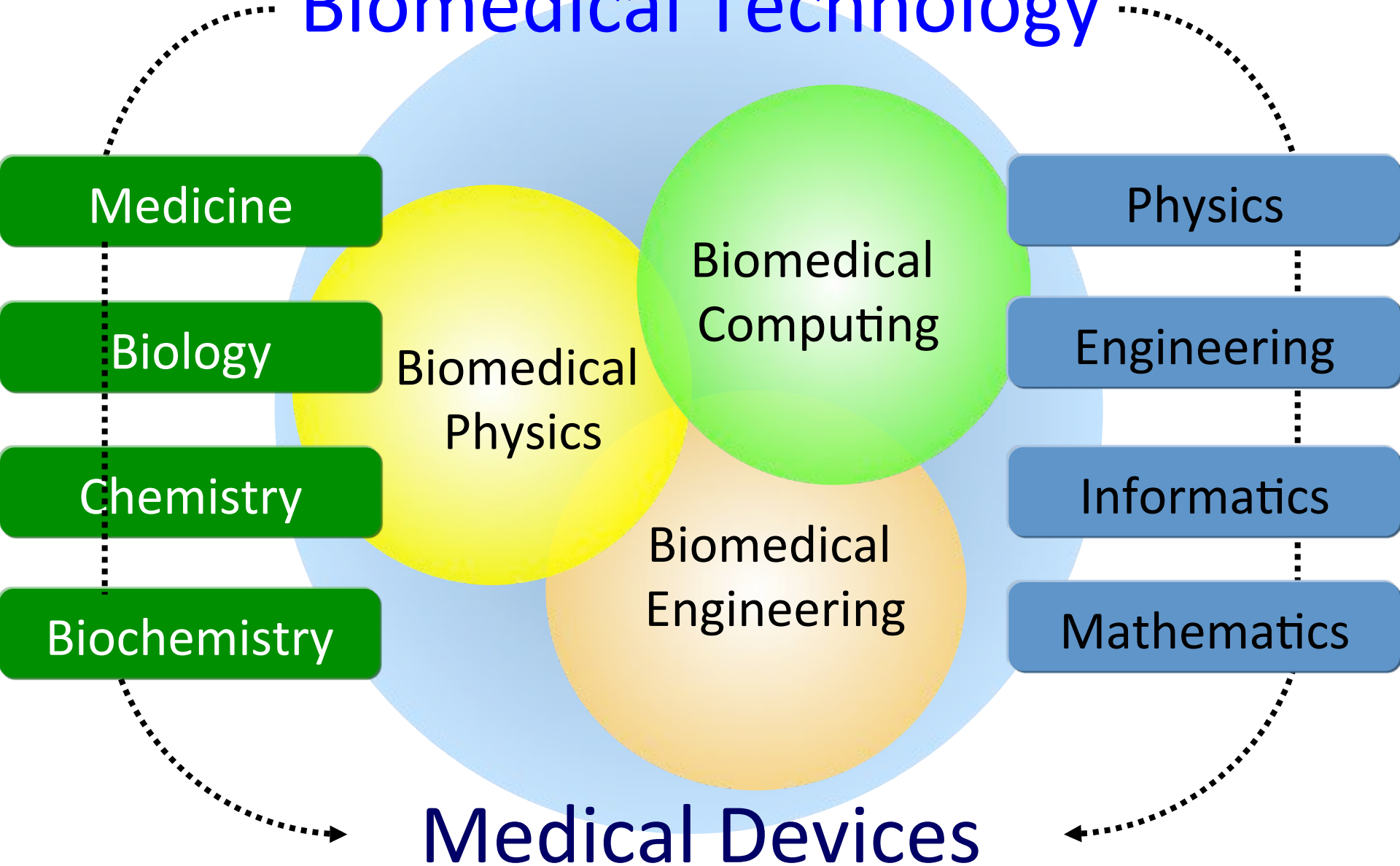
Fridtjof Nuesslin
Past President IOMP

Technische Universität München
www.radonc.med.tu-muenchen.de

Medical Physics: History

- „The study of medicine always starts with the study of physics. It is not possible to be a doctor without being a physicist.“ **Compte de Fourcroy, 1791**
- First published use of „Medical Physics (Physique Médicale): Félix Vicq d'Ázir, 1779, Paris
- First definition of Medical Physics:
Physics applied to the knowledge of the human body, to its preservation and to the cure of its illnesses.

Biomedical Technology



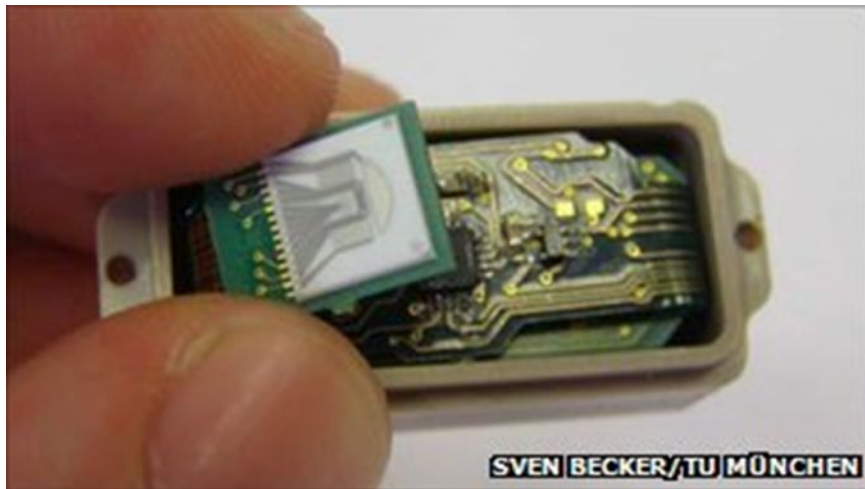
Areas of Medical Physics beyond Ionizing Radiation

- Medical imaging
- Fibre-optic laparoscopy & endoscopy
- Microscopy
- Implants
- Joint replacement
- Laser surgery
- Biosensors, Lab-on-the-Chip
- Diathermy, Hyperthermia
- Optical spectroscopy
- Physiological measurements
- Physiological acoustics
- Bioelectricity
- Bioenergetics
- Medical Computing
- Haemodynamics
- Biomechanics

German Research Foundation: Top Research Areas in Biomedical Technology

- Mechatronics, Microsystems
 - Medical Sensors & Biosignals
 - Cellular Diagnostics
- Modeling and Simulation
- Computer- and Robotic-guided Interventions
- Medical Imaging
 - Optical Systems
 - 4D Medical imaging & processing

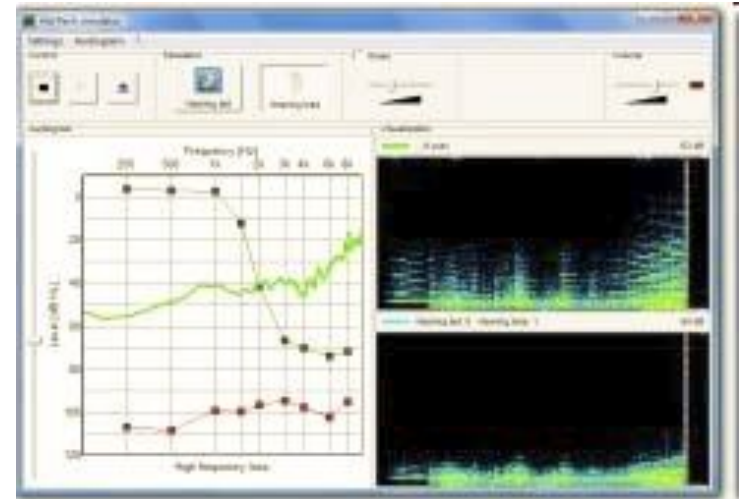
Micro Systems



Microchip implant monitors
tumour growth
S.Becker, TUM 2011

- Micro-Miniaturization in Electronics
- Computer
- Imaging
- Merging Biology and Physics
- Molecularbiology
- „Personalized Medicine“

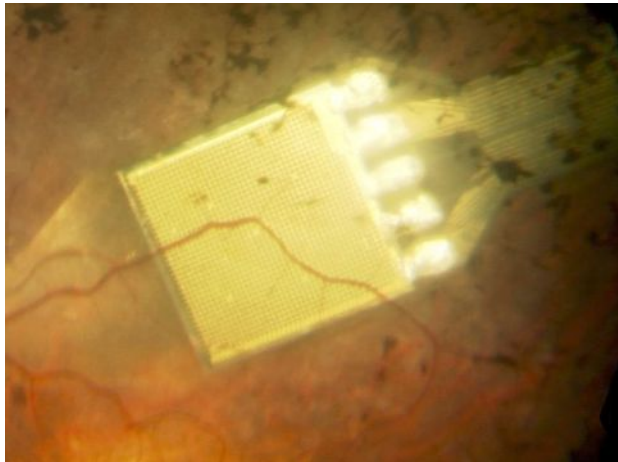
Hearing Research



- hardness of hearing is a frequent phenomenon
- 15 % of the population is affected
- 1% of newborn
- 60 % of over 70-aged need hearing aid

Birger Kollmeier, 2012

Retina Implant

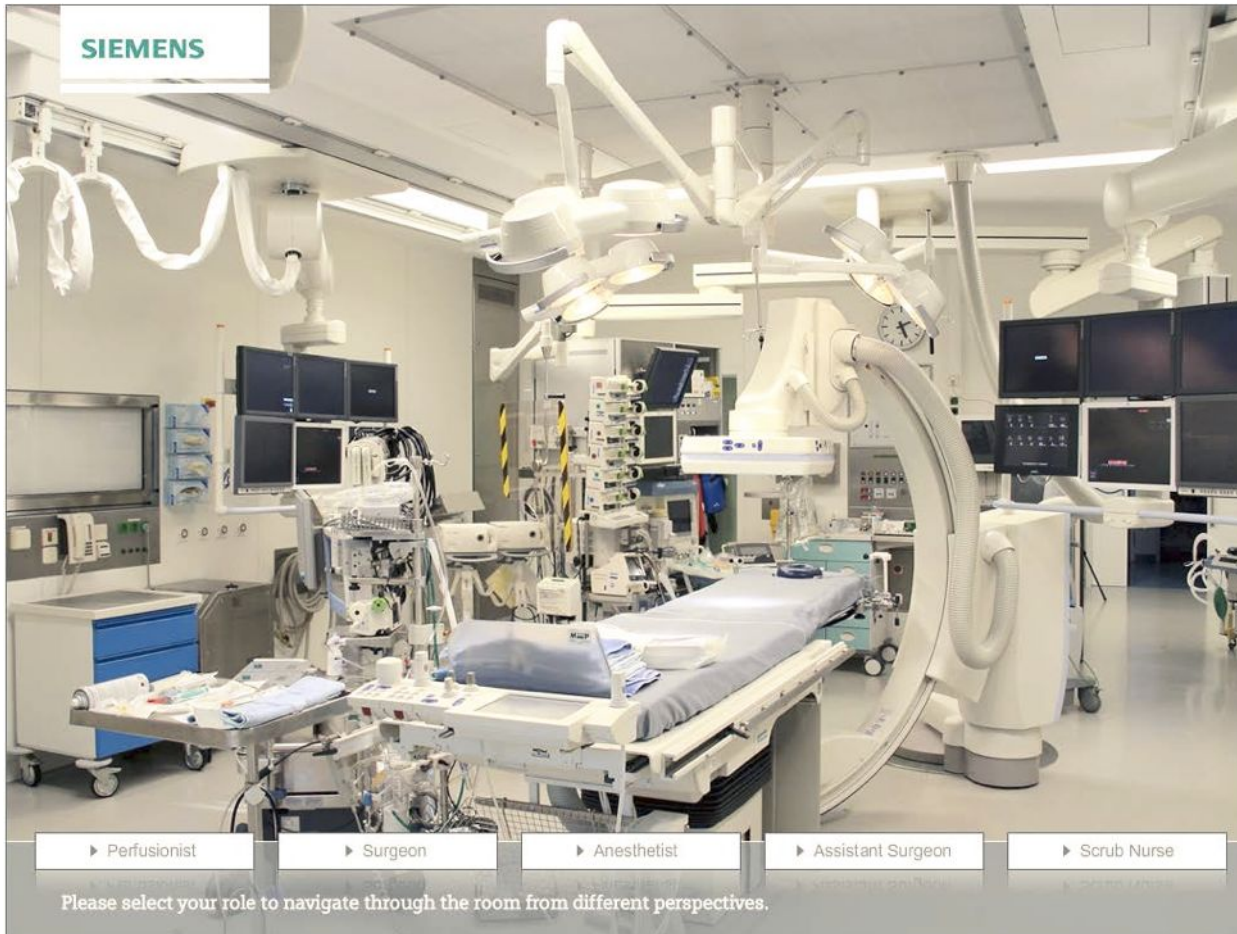


Chip for electrical retina stimulation
Chip with 1500 Pixel ($70 \times 70 \mu\text{m}$)
Chipsize 3x3 mm
External power supply



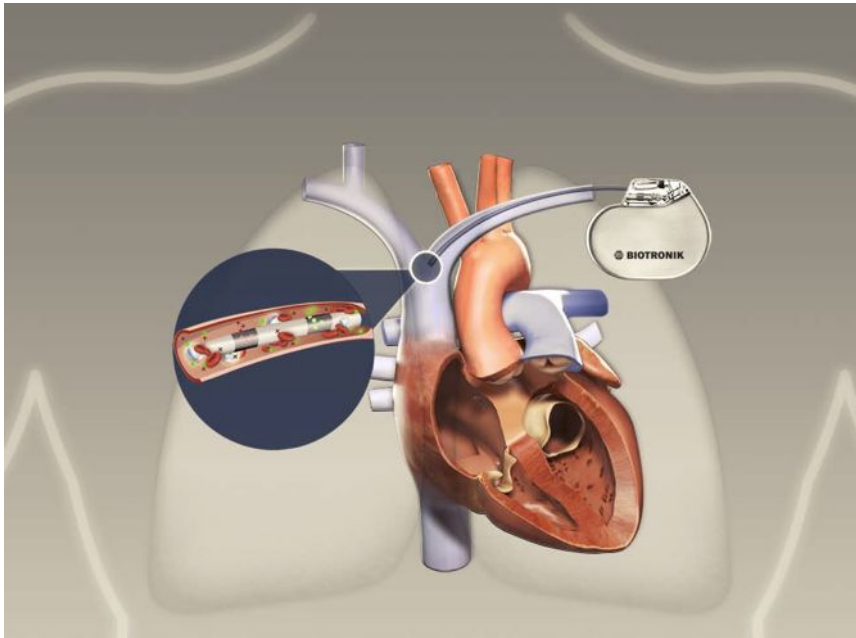
NMI-Reutlingen

Integrated systems in a modern operation theatre

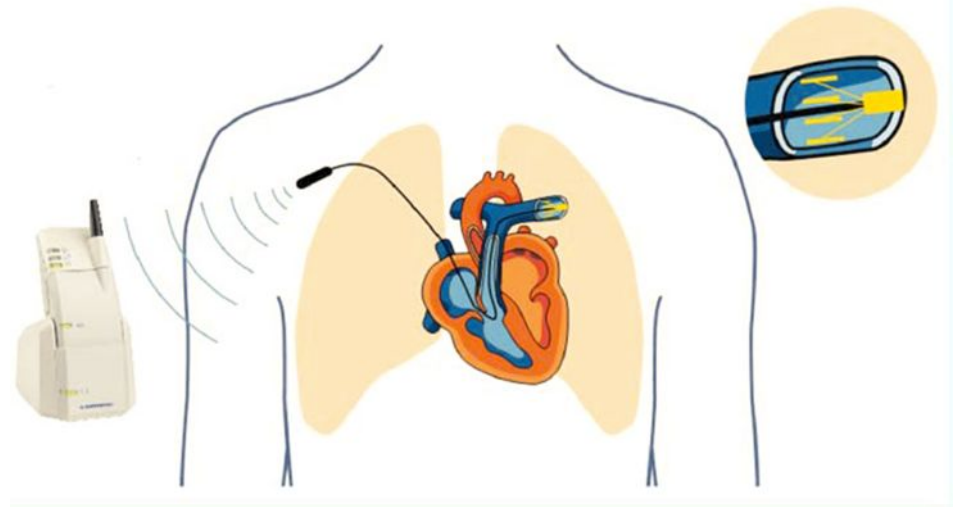


Siemens / Hybrid-OP im Deutschen Herzzentrum München

Cardio - Physiology



DialImplant: Implantable System for the measurement of physiological relevant Biomarker in the blood stream



Pressure and temperature measurement in A. Pulmonalis e

G.Urban, 2012

Conclusion

„The physicist, working in the silence of his laboratory or his study ... can hope that his labours can lessen the mass of ills that afflict mankind; and to increase humanity's joys and contentment and he may aspire to the glorious title of benefactor of mankind“.

Antoine-Laurent Lavoisier (1743-1794)

International Day of Medical Physics
November 7, 2013

Radiation Exposure from Medical Procedures: Ask the Medical Physicist!

International Organization for Medical Physics

Merci beaucoup