Medical Physics
applied to other Specialities

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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’Azir, 1779, Paris

• First definition of Medical Physics:
  Physics applied to the knowledge of the human body, to ist preservation and to the cure of its illnesses.
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
Microchip implant monitors tumour growth
S. Becker, TUM 2011
Hearing Research

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

Birger Kollmeier, 2012
Retina Implant

Chip for electrical retina stimulation
Chip with 1500 Pixel (70x70 μm)
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)
Merci beaucoup