Computer Science and Medicine

“a glance in the future”

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Who am I?

A computer scientist who has spent 30 years at CERN (and in other scientific laboratories) developing HPC systems for physics and other sciences.

Started in real-time, data acquisition and networking.

Pioneered ES, AI, MPP systems, cluster computing and in the last 7 years, Grid computing.

Initiator of EU-DataGrid, EGEE and more than 10 other HPC and Grid projects (mostly within the EU IST programmes).

Co-founder of the Global Grid Forum (started in Amsterdam in 2001 together with EU-DataGrid).

See my article on IEEE Spectrum Magazine (July 2006).
• Joined Microsoft on 1/November/2005

• My mission: Promoting Microsoft Computing into Science and Science into Microsoft Computing by exploring and building important collaborations with leading scientists in Europe, Middle East, Africa and Latin America
Medicine and Computer Science: Current status

• Computing is everywhere in medicine: patient records, instruments, visualisation, telemedicine, genetic and proteomic research, drug modelling, etc…

• But:
  • Hard to access basic clinical / patient data in homogeneous and distributed ways
  • Data are not “mobile” with the patient
  • No single patient record standards
Medicine and Computer Science: Current status

• Lack of preventive and early healthcare

• Lack of personalised health care

• Impediments are more policy based than technology issues
  • standards, regulatory, privacy-personal data protection etc…

• Research is still too slow in moving from the lab to the clinic, still too expensive and fails to harness healthcare data
An example: By-pass surgery

Current Situation

Observation

Diagnosis & Planning

Treatment

Peter Sloot: Computational Science, University of Amsterdam.
http://www.science.uva.nl/research/scs/papers/sloot.html
Computing supported by-pass surgery
Current status

- Currently in use as training environment at Amsterdam Medical Centre
- Newly developed Personal Virtual Reality System for office use

- VR bypass placement (30 seconds)


A glance to the future...

- Quickly assemble persuasive information
  - ..from multiple sources
  - ..tailored to the individual
  - ..empowering to make them healthy choices
  - ..anywhere

- Integrated communication, storage, processing, and visualisation frameworks among patient, care manager, clinical research coordinator, doctor

Microsoft vision video
Remote Monitoring

Virtual Visit with Care Manager

Hospital Rounding

Medication Management
Conclusions

Computing technology is basically there to enable new ways to provide patients with more powerful, more proactive and cost effective medicine.

Is up to the MDs to tell us if we are on the right track and define ways to accelerate the technology transfer from the research labs to the clinics.

Microsoft is investigating solutions in collaboration with leading scientists around the world to facilitate this process.
Thanks!

- This event is a good occasion to exchange ideas between computer and medical experts
- I welcome your opinion and input
- Many thanks for your time and attention