

Medical Physics at Lancaster

a status report

Aneta Stefanovska

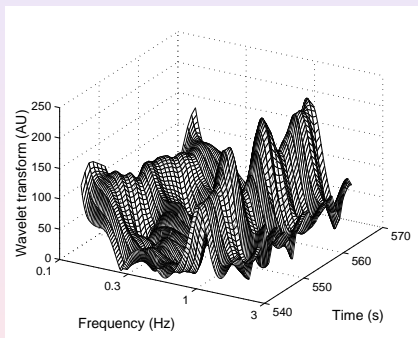
Department of Physics, Lancaster University

Tuesday 14 November 2006

Outline

- 1 Where from?
 - Medical Physics in Lancaster
 - My own background
- 2 Current activities
 - Research programme
- 3 Future
 - Future plans

Medical Physics at Lancaster
and where it is going



Wavelet transform of human blood flow
(Bračič & Stefanovska, 1999)



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- Medical physics **research** started 2000 in Peter McClintock's nonlinear dynamics group, when I came as a Royal Society Visiting Research Fellow, combining my biomedical/nonlinear expertise with the group's expertise in stochastic dynamics.
- Since then, publications, research grants, new Medical Physics Laboratory, and **rapid growth** of activity.

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- Headed **Nonlinear Dynamics and Synergetics Group** in Ljubljana, 1993–2006 –
 - Pioneered application of **wavelets** to blood flow
 - For the first time revealed **low frequency** oscillatory components (< 0.1 Hz) in blood flow
 - Identified physiological **origins** of oscillatory components
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- March 2006, moved to Lancaster as a **Reader in Medical Physics**.



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Our expertise

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- As well as in Prague, Stuttgart, Grenoble, Frankfurt, New York, Chicago, San Francisco, Potsdam, Lausanne, . . .



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Our current funding is mainly from –

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- **EC**, £971k, *“Brain, respiration and cardiac causalities in anaesthesia”* (BRACCIA, a 7–node STREP), 2005–2008.
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Also grants from e.g. **Royal Society** to support visiting researchers.



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 - the brain, with emphasis on **information** transfer.

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- To understand which **oscillations** are in common for the two systems.

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 - changes in **brain** function in epilepsy, Alzheimer disease, etc.

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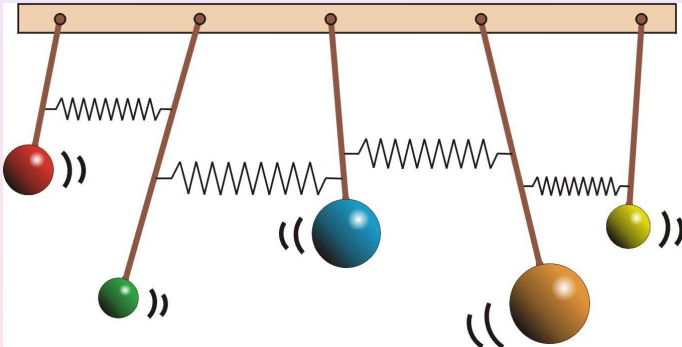
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- To develop noninvasive techniques for simultaneously **visualizing** vascular and lymphatic networks, and monitoring their dynamics
- To make coupled oscillators approach **realistic**, experimentally verifiable and useful in diagnosis and prediction

