

Habilitation Thesis Review

Date: 16-07-2017

Thesis Title : "High performance Computing in Ultrasound Cancer Treatment"

Author : Jiří Jaroš

Reviewer: S.Arridge

Summary

This thesis summaries work carried out by Dr Jiří Jaroš in the last six years since completing his PhD in Canberra, London, and Brno on the topic of computational modelling of acoustic wave propagation and applications. This work has involved solution of non-linear, heterogeneous PDEs in 3D domains at a higher scale than has been possible with any comparable research tool. It has been implemented on state-of-the-art parallel computing hardware and made compatible with the **k-Wave** toolbox, which is extensively use worldwide for diverse aspects of ultrasonic and photoacoustic modelling. This is a highly impressive body of work confirming Dr. Jaroš' status as a leading young researcher.

- The topic is appropriate to the particular area of habilitation being concerned with high-performance computing software and architecture. It clearly indicates familiarity with the technical state-of-the-art in both computational Physics theory and implementation, and in the current landscape of supercomputing.
- The work is very original and separate from Dr. Jaroš' PhD dissertation. It has been carried out with collaborators in leading international laboratories but has a clearly defined novelty due to the candidate himself.
- There are 14 published papers included in the habilitation thesis. These are in high impact journals ranging from Physics and Medical Physics applications to Computational Physics journals.
- The thesis is very well-written with three chapters separating the theoretical, computational, and application areas, each summarising and introducing the relevant published papers. It includes an extensive bibliography.
- Dr. Jaroš' work is well-cited and he is a recognised authority in his area, being a regular invited speaker and tutorial presenter.
- Dr. Jaroš' has given several courses locally and internationally. It is an appropriate amount for an early career researcher.

Recommendation

I strongly believe that this habilitation work and Dr. Jaroš' achievements are sufficient to recommend him for appointment as associate professor.