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- Publications
- Center for Biomedical Computing
- Projects
- Available Master's topics
- Intranet
- People

CBC Workshop on Shock Waves in the Body, June 25, 2009

Total number of participants: 20
 Total number of guests outside of CBC: 3
 Number of different nationalities represented: 4
 Total number of speakers: 1
 Total number of talks: 1

As a part of a visit by Professor Randall LeVeque from the University of Washington, we organized a seminar with a talk "Algorithms for shock wave propagation in tissue, bones and kidney stones" in Bakrommet at 13:00.

Abstract

Algorithms for shock wave propagation in tissue, bones and kidneystones

Randall J. LeVeque
 Applied Mathematics Dept
 University of Washington

Extracorporeal shock wave lithotripsy (ESWL) is a well established non-invasive clinical procedure for breaking up kidney stones by the external application of shock waves that (ideally) focus on the kidney stone with minimal collateral damage. Recently lithotripter devices have been applied to treat a variety of other medical conditions where the goal is to stimulate rather than to pulverize. Applications of extracorporeal shock wave therapy (ESWT) include treatment of plantar fasciitis, tennis elbow, hip necrosis, and non-unions (bone fractures that do not heal on their own).

Numerical algorithms for modeling nonlinear elastic wave propagation including shock waves are being developed in two and three space dimensions to aid in the study of the mechanisms of ESWL and ESWT. High resolution finite volume methods using Riemann solvers are employed along with adaptive mesh refinement. These methods work well for wave propagation problems in heterogeneous media and can accurately capture the transmission and reflection of waves at material interfaces (e.g. tissue/bone), which is an essential aspect of this problem.

I will discuss these methods and some of the applications being studied in work with student Kirsten Fagnan in connection with experiments being performed in the UW Center for Industrial and Medical Ultrasound and clinical work at the UW Medical School.

What	▪ Talk
When	Jun 25, 2009 from 01:00 PM to 02:00 PM
Where	Bakrommet @ Simula
Contact Name	Hans Petter Langtangen
Attendees	Martin Alnes Rolv Erlend Bredesen Xing Cai Øyvind Hjelle Hans Petter Lantangen Randall LeVeque Megan Lewis Glenn Lines Molly Maleckar Kent-Andre Mardal André Massing Bjørn Fredrik Nielsen Harald Osnes Tomas Ruud Johannes Ring Marie E. Rognes Joakim Sundnes Kristian Valen-Sendstad Sam Wall Ilmar Wilberg
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