



Key Outputs

› Quality-controlled real-time simulator of cutting and needle insertion

› Scalable method for assessing the effects of uncertainties in material parameters on quantities of interest to the practitioner

› Stochastic inverse solvers for parameter identification in soft tissue biomechanics

ERC STARTING GRANT FOR PROFESSOR STÉPHANE P. A. BORDAS

REALTCUT – TOWARDS REAL TIME MULTISCALE SIMULATION OF CUTTING IN NON-LINEAR MATERIALS

with applications to surgical simulation and computer guided surgery

Surgeons are trained as apprentices. Certain conditions are rare, and the skills they require will be trained only if those conditions are encountered. If we were able to reproduce virtually the experience of surgeons as they interact with the organs of the patient, surgeons could hone their skills without risks to the patient. Such virtual tools could also enable practitioners to rehearse complex operations, or guide them during the operation itself, e.g. through virtual reality.

RealTCut produced reliable and quality-controlled real-time simulators of cutting and needle insertion and enabled accounting for the effects of the large variability observed in the behaviour of human tissue on the outcome of interest to the practitioner.

The main question ahead, at the interface between physical modelling and machine learning/data science, lies in understanding how data acquired in real time during the operation can enrich generic a priori models and thus account for patient specificity.

ERC FELLOW'S PROFILE

Professor Stéphane P. A. Bordas is a computational engineer with strong interest in cross-disciplinary activities. He is Professor of Computational Mechanics at the University of Luxembourg since November 2013. He is special advisor to the rector for the establishment of a Centre in Scientific Computing. His work is ISI Highly Cited (Thomsons Reuters, 2015, 2016). Stéphane is enthusiastically active in the promotion of Science in schools and to lay audiences.

PROJECT DETAILS

- Grant number: 279578
- Budget: 1 343 955 €
- Duration: 60 months
- Start date: January 2012
- Members: University of Luxembourg and Cardiff University, United Kingdom

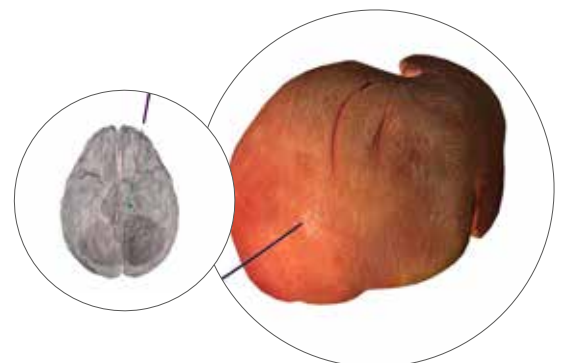
CONTACT

Faculty of Science, Technology and Communication
Institute of Computational Engineering
Research Unit in Engineering Sciences
Belval Campus
2, Avenue de l'Université
L-4365 Esch-sur-Alzette Luxembourg

Prof. Dr. Ing. Stéphane Bordas
stephane.bordas@uni.lu / T. +352 621 131 048
http://legato-team.eu



PROF. DR. STÉPHANE P. A. BORDAS



QUALITY CONTROL FOR NEEDLE INSERTION IN SOFT TISSUE

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