



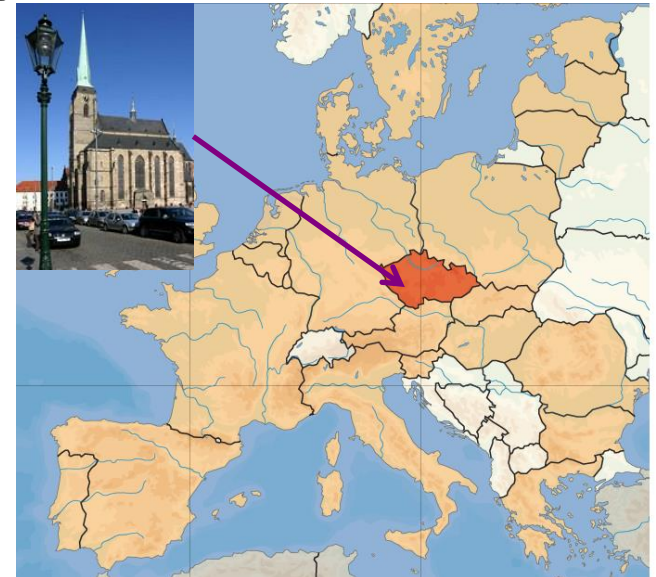
# VIRTUAL HUMAN MODELS FOR INDUSTRY AND MEDICINE

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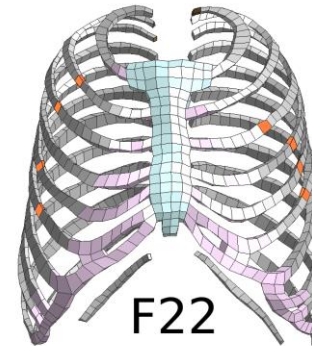
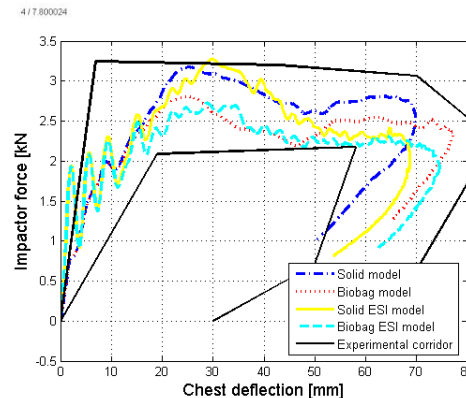
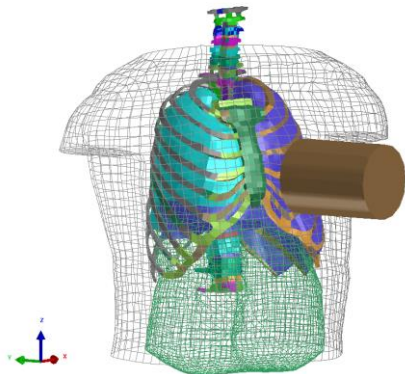
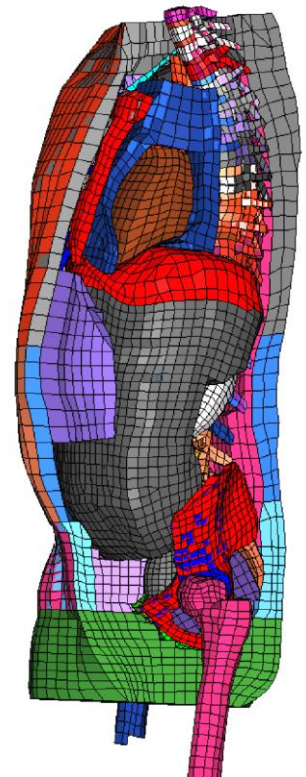
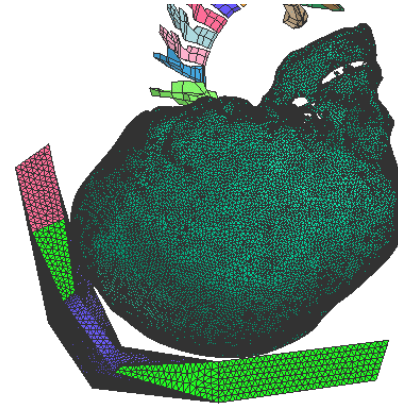
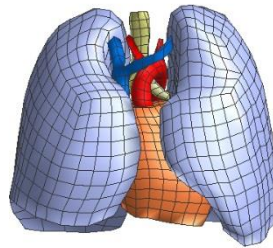
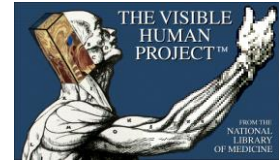
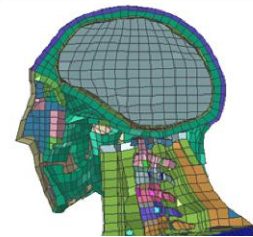
Czech-Norwegian Research Programme  
30 May 2013, Praha

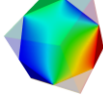
- ▶ Self-financed R&D&I institute of University of West Bohemia
- ▶ Modern computational and laboratory facilities
- ▶ Direct link to industrial subjects
- ▶ 80 FTE, ~ 3 mil. EUR annual turnover
- ▶ Projects & contract research
- ▶ Department of Human body modelling and monitoring
  - ▶ Virtual human models
    - ▶ Injury assessment
    - ▶ Ergonomics
  - ▶ Human body monitoring (EMG, motion)
  - ▶ FEM code <http://sfepy.org>

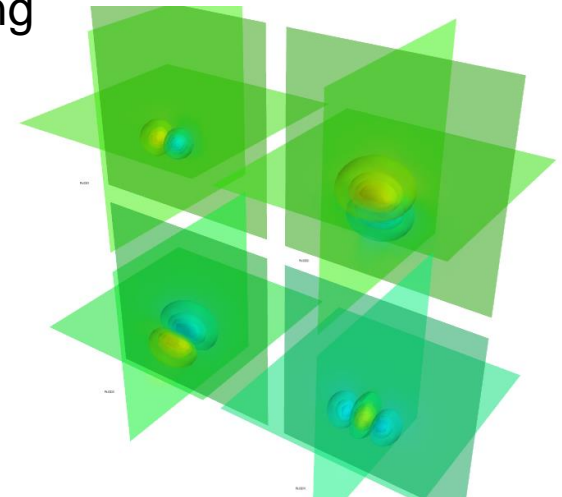
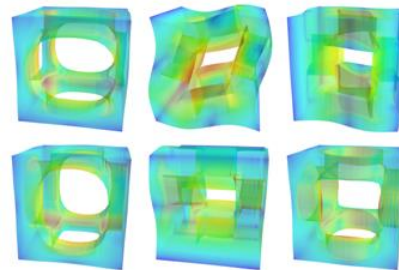
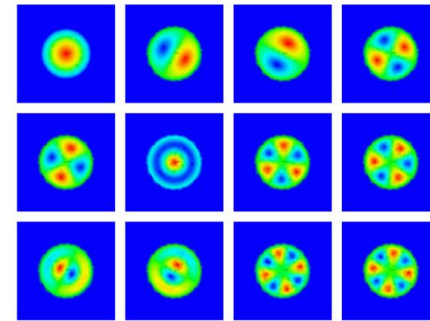


# VIRTUAL HUMAN MODEL

- ▶ VHP database
- ▶ Literature based data
- ▶ Robustness and sensitivity
- ▶ Injury assessment  
(fracture models)
- ▶ Simple geometrical age scaling



- ▶ SfePy (Simple finite elements in Python) 
  - ▶ Base package available under BSD license: <http://sfepy.org>
  - ▶ Multiplatform: Linux, Mac OS X, Windows
- ▶ Features
  - ▶ General finite element analysis software
  - ▶ Multiphysics and multi-scale simulations
  - ▶ Problem description similar to mathematical description
  - ▶ Modelling of strongly heterogeneous materials using the theory of homogenization
- ▶ Applications
  - ▶ Porous media modelling
  - ▶ Prediction of acoustic band gaps
  - ▶ Ab-initio electronic structure solver



- ▶ International project
  - ▶ FP6 projects (APSN, APROSYS, SIM), FP7 project (THOMO)
- ▶ National projects related to industry
  - ▶ Ministry of Industry and Trade, Ministry of Transport
  - ▶ Technology Agency of the Czech Republic
- ▶ Cooperation with companies
  - ▶ ESI Group, France    ▶ MECAS ESI, Czech Republic
  - ▶ CEESAR, France    ▶ TRW, Alfdorf, Germany
- ▶ Cooperation with public bodies
  - ▶ Institute of Criminalistics, Czech Republic
  - ▶ Warsaw University of Technology, Poland
  - ▶ Czech Technical University, Faculty of Transportation Sciences , Czech Republic
  - ▶ Charles University, Faculty of Medicine, Czech Republic
  - ▶ University hospital, Plzeň, Czech Republic
  - ▶ University hospital, Olomouc, Czech Republic



# CONCLUSION

## ► Offers

- Confidentiality based bilateral cooperation
- New consumer based approaches and solutions towards safe design

## ► Expectations

- To find partnerships for coordination and dissemination bringing new solutions to market and/or public
- To address industrial partners transfer of knowledge and for contract research



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