JOHANNES KEPLER
UNIVERSITÄT LINZ
Netzwerk für Forschung, Lehre und Praxis

# Computational Science Colloquium

organized by the Computational Science Initiative at the JKU

## Invitation

to a public talk (with following discussion)

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| Title: | „**Computational Mechanics - Structural elements for large deformations and strongly coupled contact problems**" |
| Lecturer: | Priv.-Doz. Dr. Johannes Gerstmayr (University of Linz) |
| Date: | Mittwoch, **20.05.2009**, **17:15 Uhr** |
| Place: | **HF 9901**, Universität Linz |

In the first part of the talk, we focus on structural problems undergoing large deformations. While conventional approaches use empirical constitutive equations (material laws) for the definition of the work of elastic forces, we present an approach which is consistently derived from classical three dimensional continuum mechanics relations and constitutive equations. A comparison of different material laws that are frequently used in the literature shows that the solution can either deviate from each other or even lead to results that are not in agreement with basic mechanical principles such as conservation of momentum.

In the second part of the talk, the mechanical and numerical modelling of strongly coupled contact problems is shown. The goal is to compute the deformation and stress distribution within layered packages, where a large number of sheets is interacting with contact and friction. The direct numerical solution with finite element discretization of the original mechanical system and the large number of contact conditions is not feasible and thus homogenized. The comparison of test problems with the homogenized material, direct finite element computations and physical experiments shows good agreement.