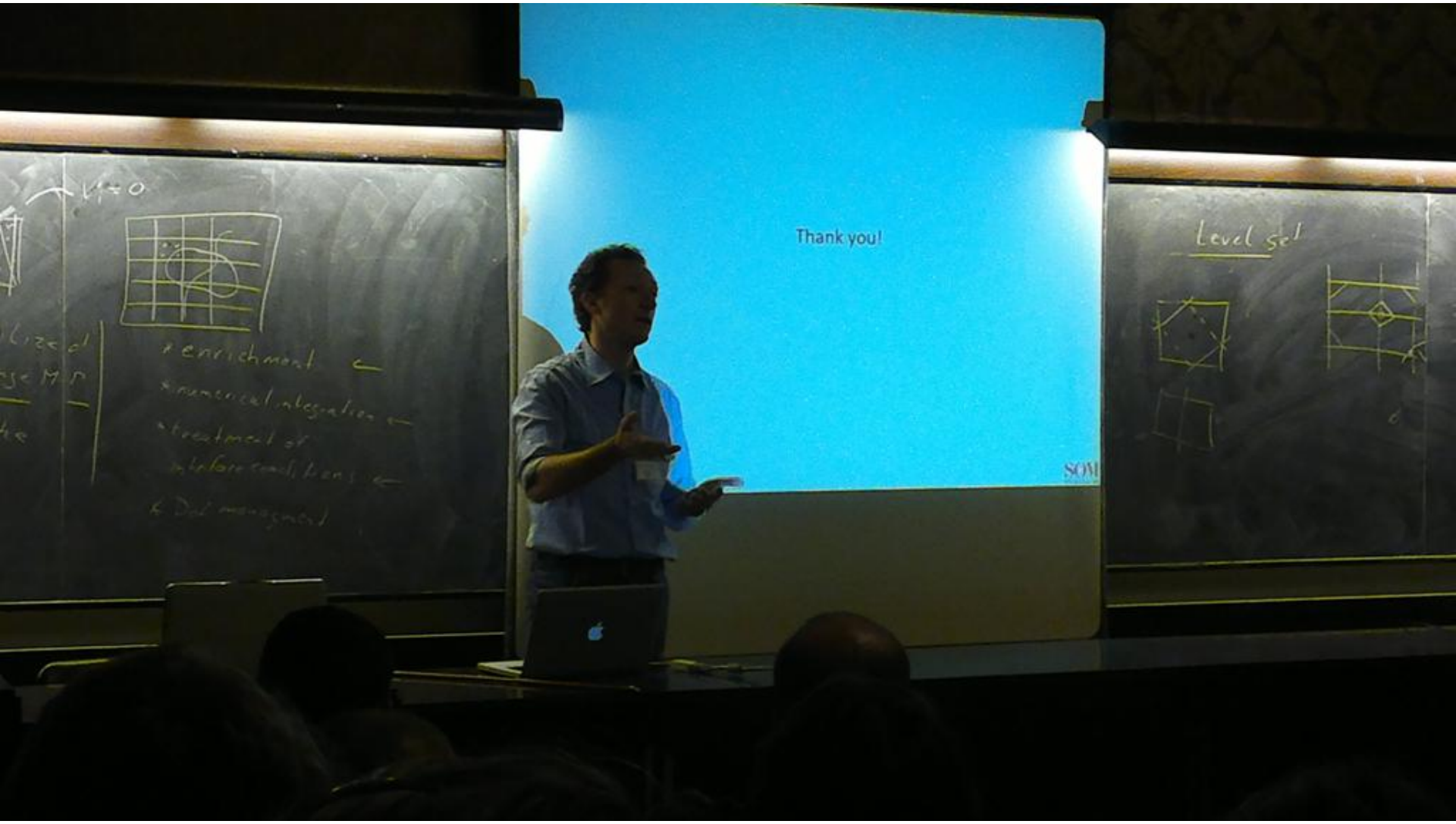
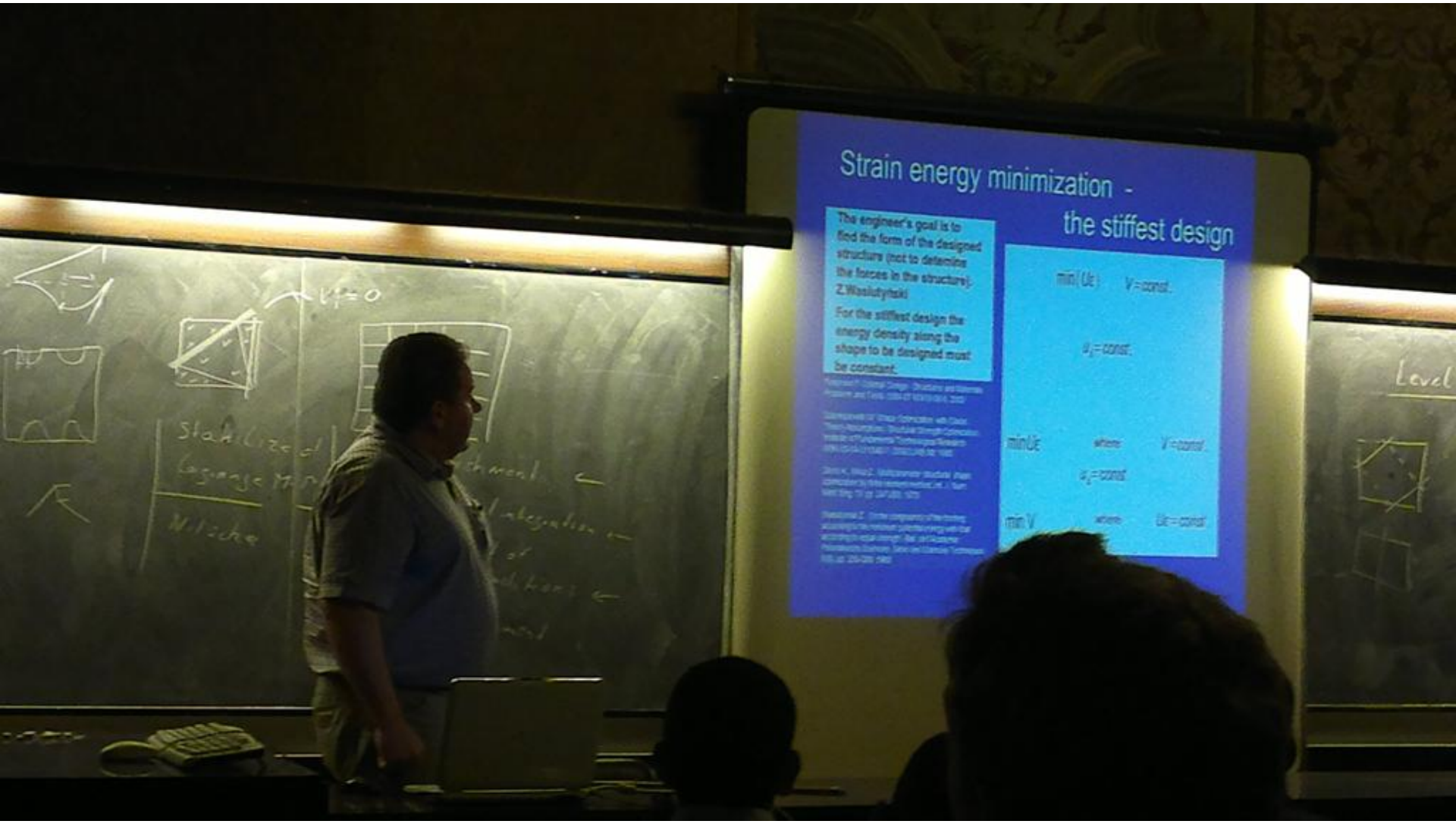
CISM Udine 2012

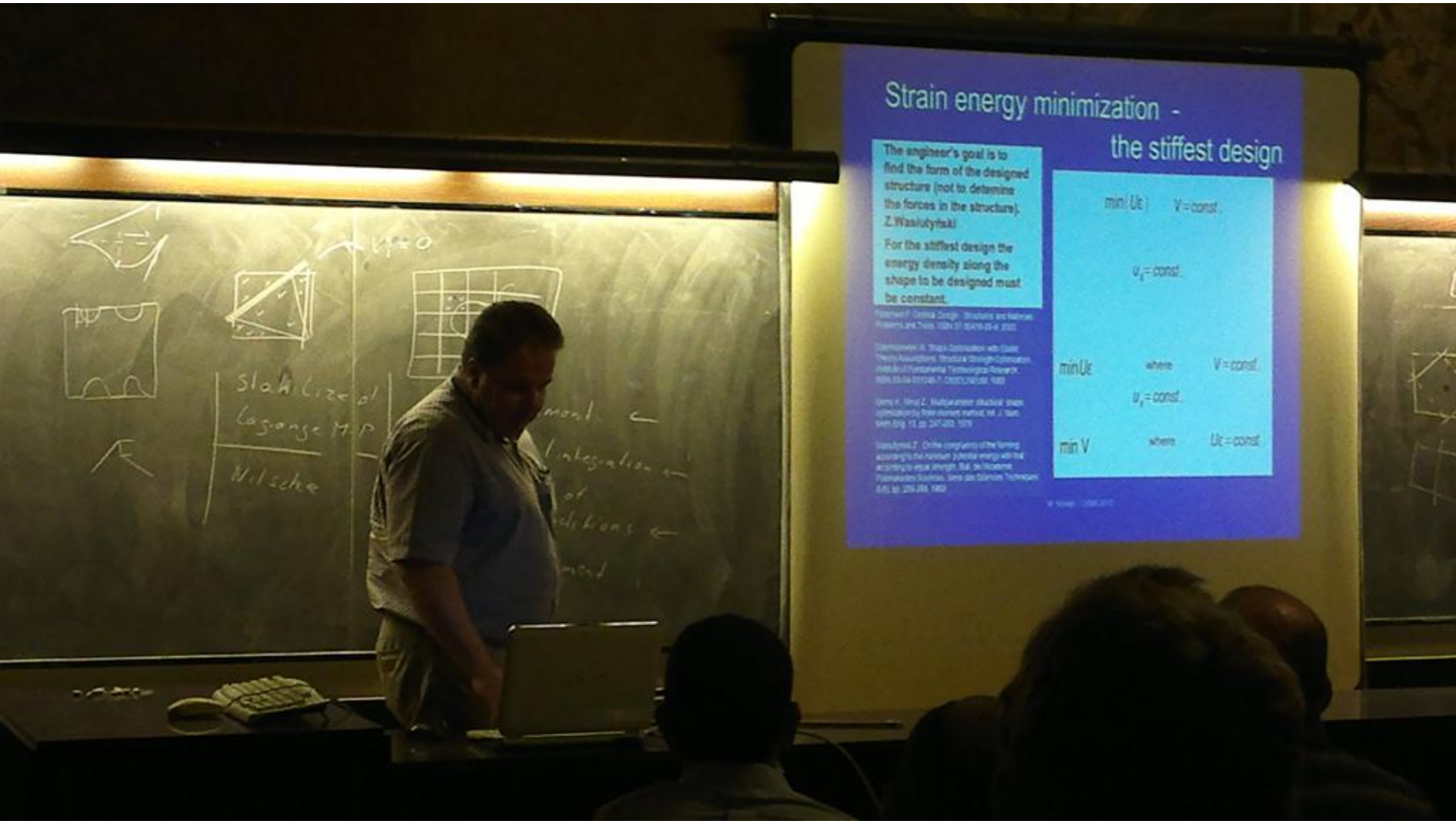
autor: MN


Thank you!
Level set


Michal Nowak
3-D Structural Optimization
Different Approach


Outline
- INTRODUCTION
- BIOFITEST DESIGN: ISED an software
- TRABECULAR BONE REMODELING PHENOMENON
- ELEMENTS OF THE PARALLEL NUMERICAL ENVIRONMENT
- COSMOPROJECTOR - STRUCTURAL OPTIMIZATION TOOL
- CONCLUSIONS


Strain energy minimization -
the stiffest design
The engineer's goal is to find the form of the designed structure (not to determine the forces in the structure).
Z.Wasiutyński
For the stiffest design the energy density along the shape to be designed must be constant.
min(Ue) V=const.
u_e=const.
minUe where V=const.
u_e=const
min.V where Ue=const


Strain energy minimization -
the stiffest design
The engineer's goal is to find the form of the designed structure (not to determine the forces in the structure).
Z.Wasiutyński
For the stiffest design the energy density along the shape to be designed must be constant.
min(Ue) V = const.
u_i = const.
min Ue where V = const.
u_i = const.
min V where Ue = const.


Trabecular bone surface adaptation


Trabecular bone surface adaptation
- Bone remodeling – tissue growth and resorption on the surface
- Mechanical stimulation – tissue mechanosensation
Trabecular
Cortical bone
Level set


C I S M
CENTRE INTERNATIONAL
DES
SCIENCES MÉCANIQUES


CISM
CENTRE INTERNATIONAL
SCIENCES MÉCANIQUES


18
CNRS
SCIENCES