We want DEM to reach the maturity of FEM
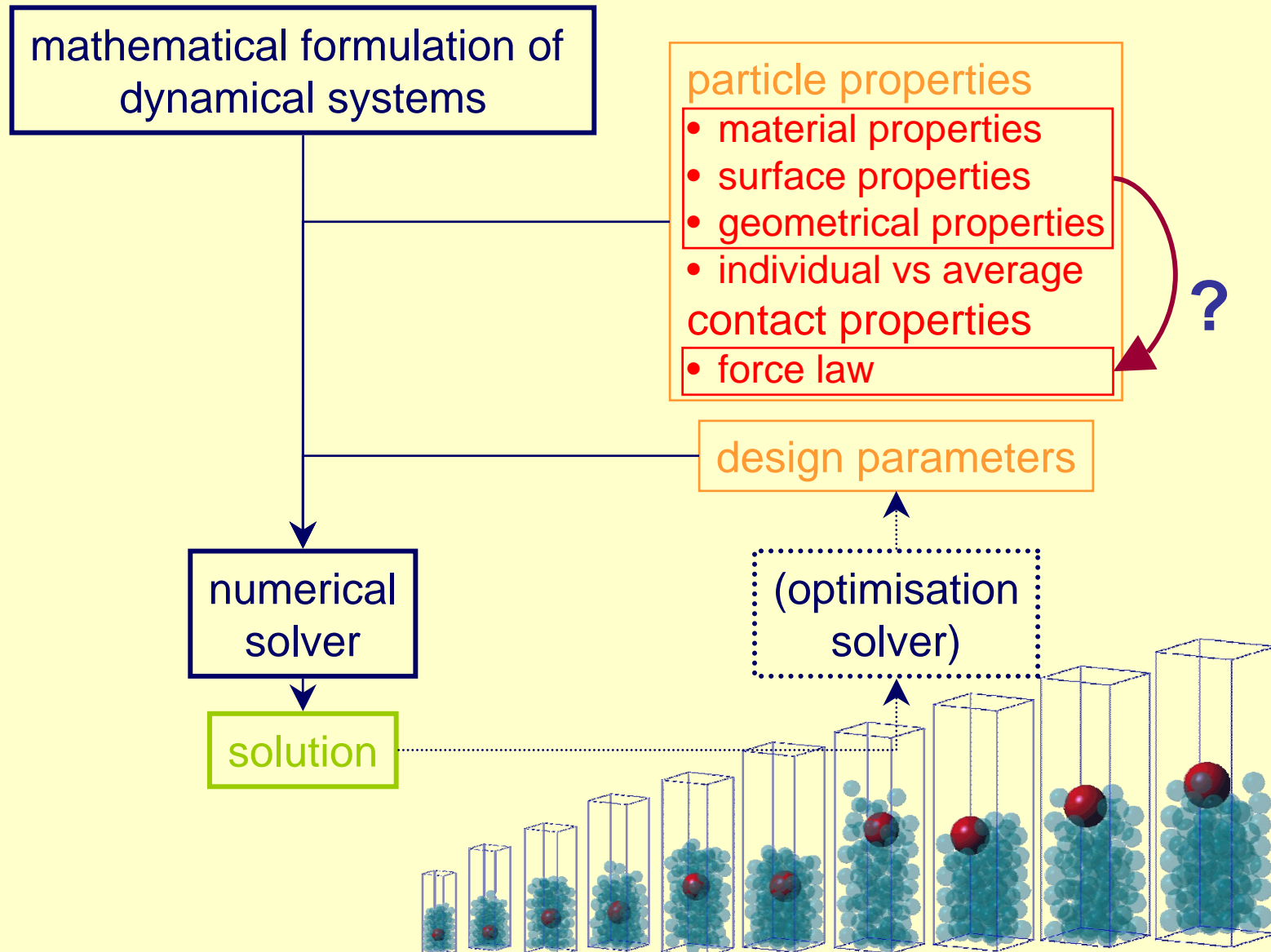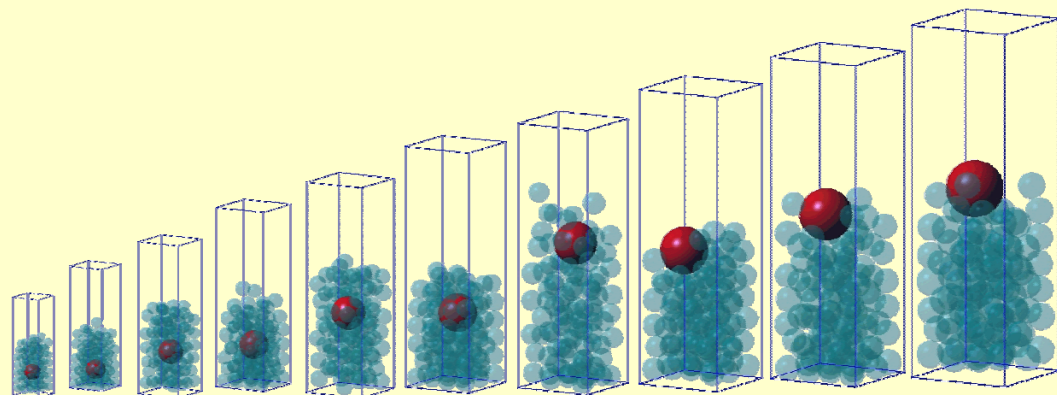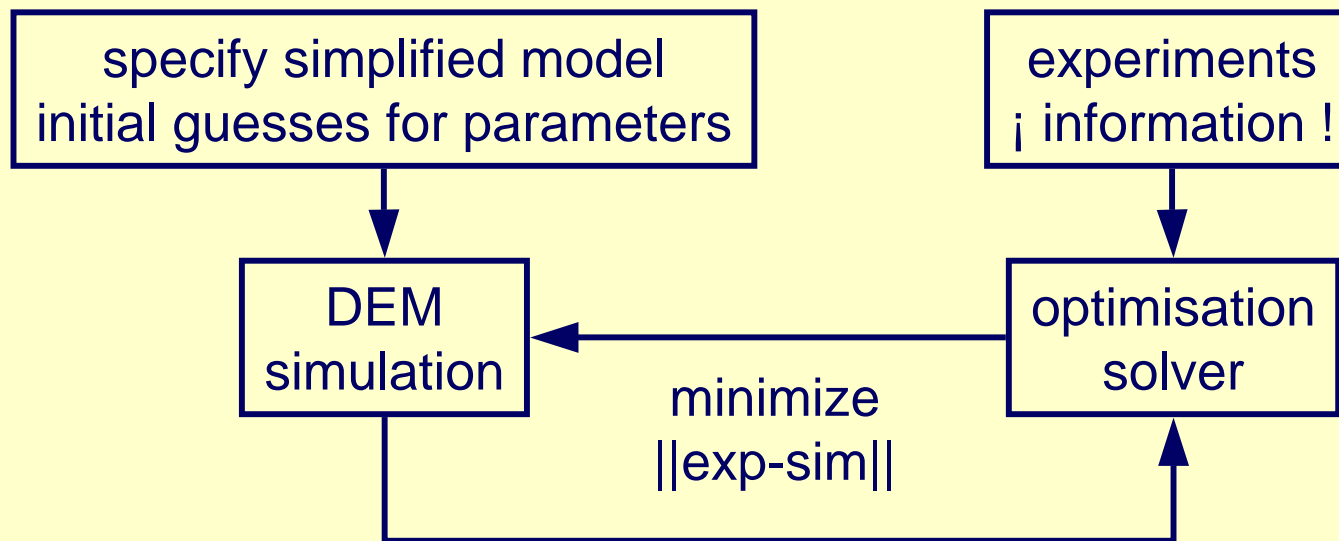
More realism – road 1

- **there is no substitute for physics**
- we need
  - (more) realistic shape representation
  - realistic contact laws relating to particle properties
  - realistic system size
  - computational resources (parallellism)
- involves efforts in
  - code development
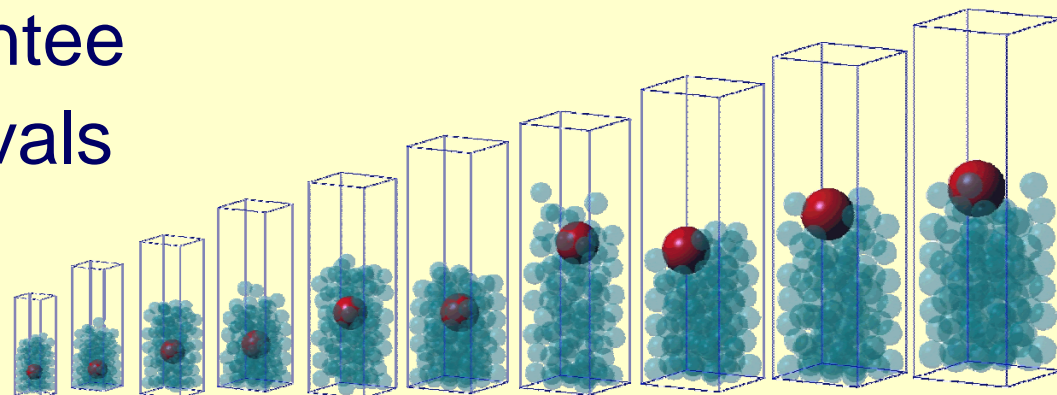 - simulations
  - experiment
  - theory

More realism – road 2

⬗ **model calibration → model optimisation**

⬗ optimality guarantee
⬗ confidence intervals

More realism – road 2

⟩ danger ahead

  ⟩ "push the button" approach

  ⟩ interpolation vs extrapolation

  ⟩ information exposure of experiment

⟩ need to be put on firm footing

⟩ involves efforts in

  ⟩ code development

  ⟩ simulations

  ⟩ experiment

  ⟩ theory