Overview of FOCAPO session on
Optimization – Modeling & Techniques

Costas Pantelides

Centre for Process Systems Engineering

Department of Chemical Engineering and Chemical Technology

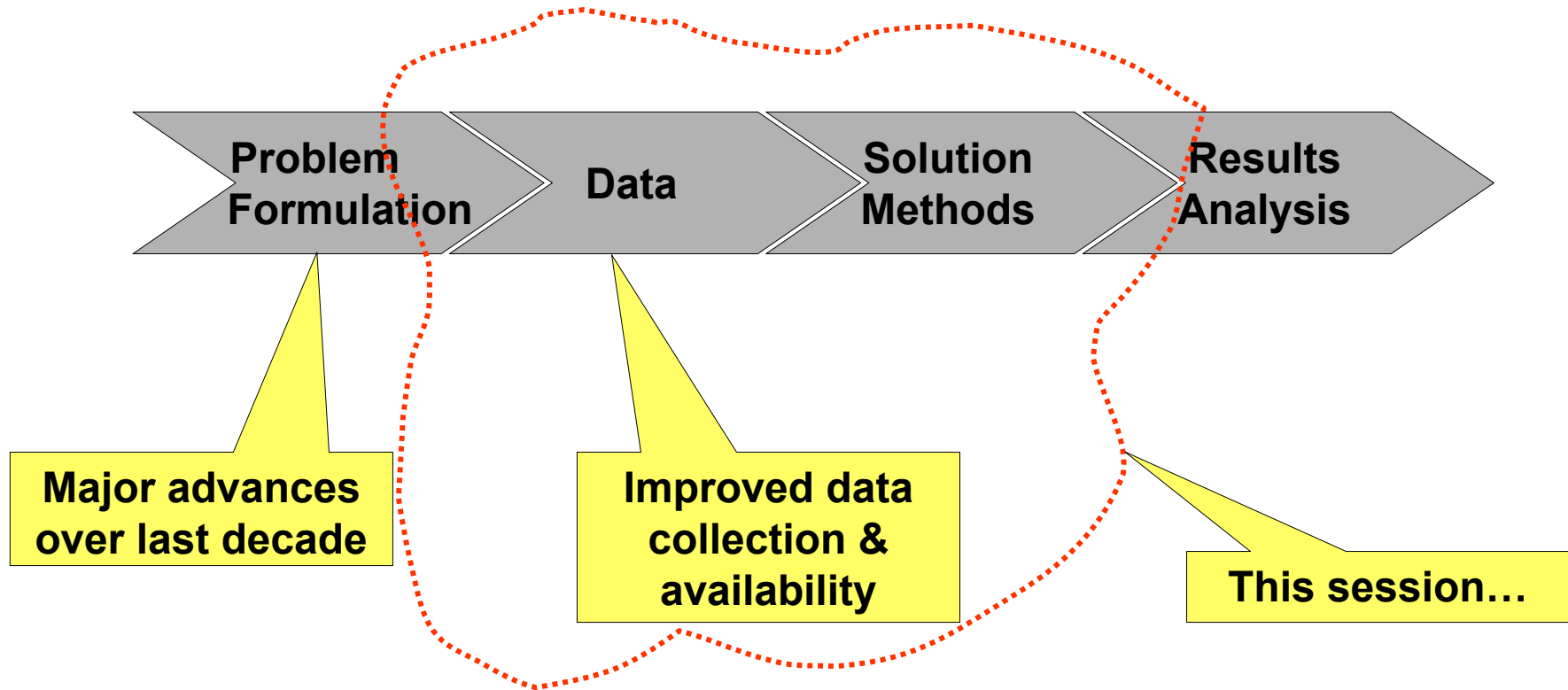Imperial College of Science, Technology and Medicine

Medicine

London SW7 2BY

Process Systems Enterprise Ltd.

London W6 9DA

# Engineering problem solving

Data uncertainty

- **Different sources**
  - external uncertainty (e.g. product demands)
  - internal uncertainty (e.g. process variability)

- **Model it or eliminate it ?**

- **What do we characterize uncertainty ?**
  - how much effort is required ?
  - are we willing to invest this effort ?

Optimisation solution methods – a classification

- **Model type**
  - linear algebraic, nonlinear algebraic, DAE, DAE/STN, PDAE/STN
- **Decision variables**
  - continuous vs. discrete
- **Data**
  - deterministic vs. stochastic
- **Type of solution obtained**
  - local vs. global optimum
  - point vs. parametric solution

Example of solver hierarchy for MIDO
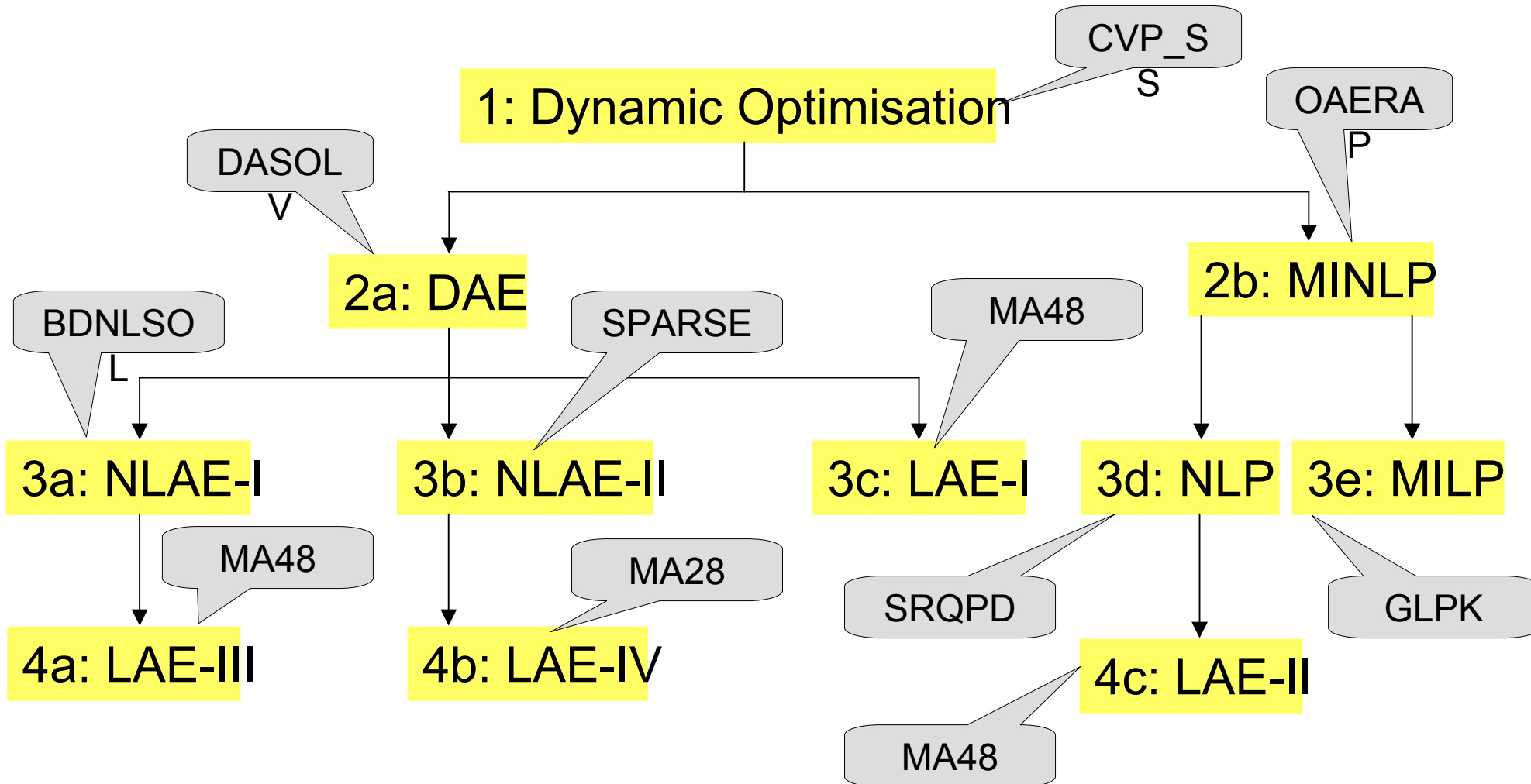
This session's papers

- **Irv Lustig**
  - **Progress in Linear Programming and Emergence of Constraint Programming**
- **Nick Sahinidis**
  - **Optimization under Uncertainty: State of the Art & Opportunities**
- **Erik Ydstie, Duncan Coffey, Mark Reid**
  - **Control and Optimization of Supply Networks**