The **Laboratory of Intelligent Decision Support Systems** (IDSS)

within the Institute of Computing Science

at the Faculty of Computing

of the Poznań University of Technology

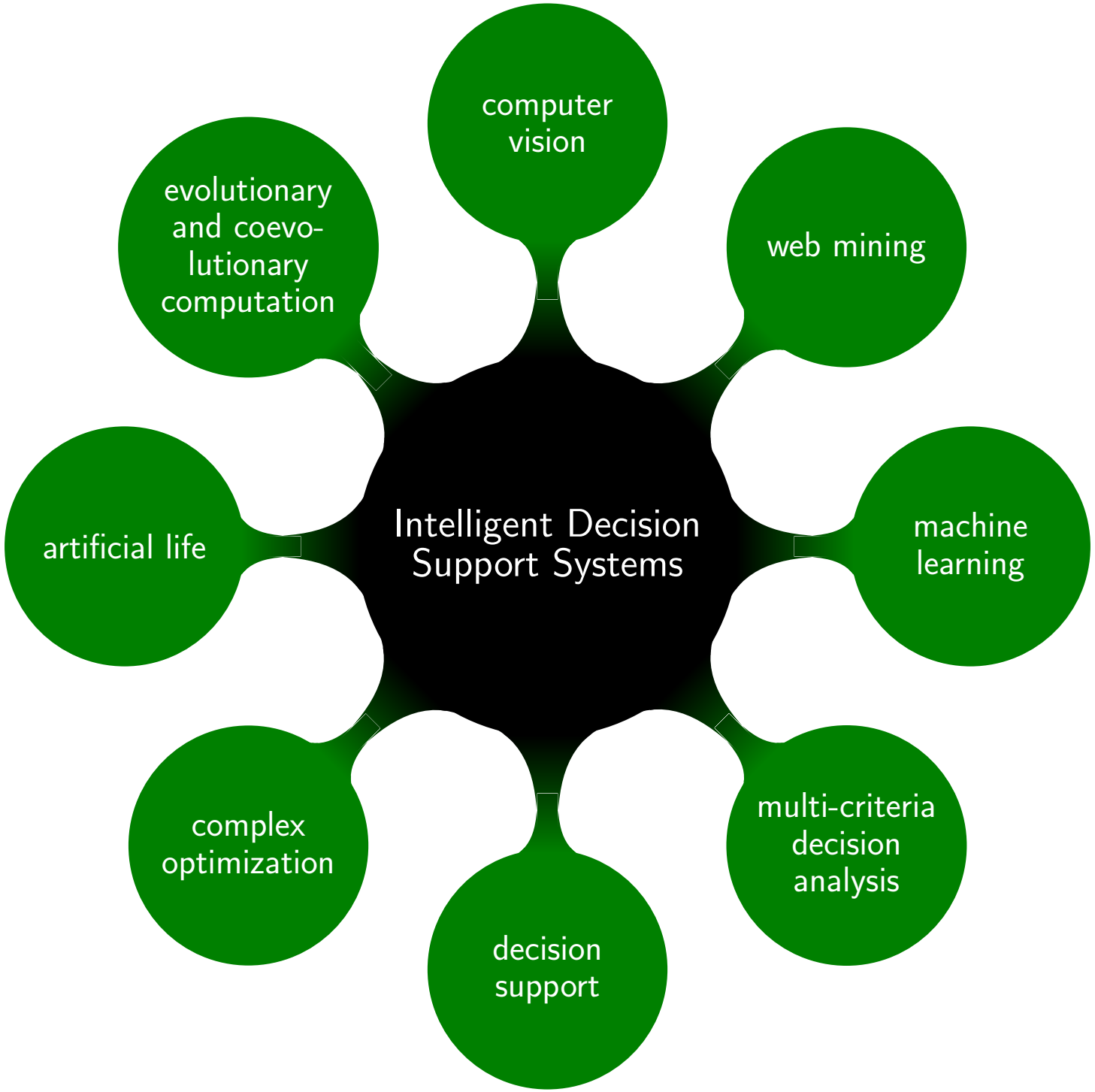
is chaired by Professor Roman Słowiński,

expert in methodology and techniques of decision support, including multiple criteria decision aiding,

preference modeling and knowledge-based decision support,

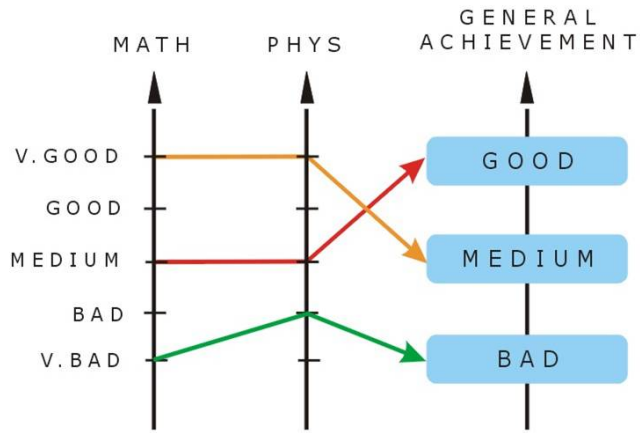
where he combines Operations Research and Computational Intelligence.

- IDSS is headed by **Roman Słowiński**:
  - EURO Gold Medal (1991)
  - Doctor Honoris Cause of Polytechnic Faculty of Mons (2000), University Paris Dauphine (2001) and Technical University of Crete (2008).
  - Edgeworth-Pareto Award by International Society on Multiple Criteria Decision Making (1997)
  - Annual Prize of the Foundation for Polish Science (the most prestigious scientific award in Poland – 2005)
  - Coordinating editor of European Journal of Operational Research (since 1999)


computer vision
web mining
machine learning
multi-criteria decision analysis
decision support
complex optimization
artificial life
evolutionary and coevo-lutionary computation
Intelligent Decision Support Systems

Multi-Criteria Decision Support

- MCDA research areas:
  - Preference modeling from ordinal data
  - Rule-based models:
    if price $\leq$ 5000 and color $=$ white **then** buy
  - Robust ordinal regression
  - Ranking methods
  - Multi-criteria optimization



- Over 200 publications and 10 000 citations (Roman Słowiński's h-Index $\geq$ 36)
- Industrial research projects: Philips Lighting, Wielkopolska Voivodship Office

Mobile Emergency Triage

- Computer-based support for healthcare institutions:
  - Patient management process
  - Coordination and cooperation within an interdisciplinary healthcare team
  - Mitigation of adverse interactions between multiple clinical practice guidelines
  - Clinical decision making by constructing decision models from patient data

- Collaboration with University of Ottawa
- `http://www.mobiledss.uottawa.ca/`

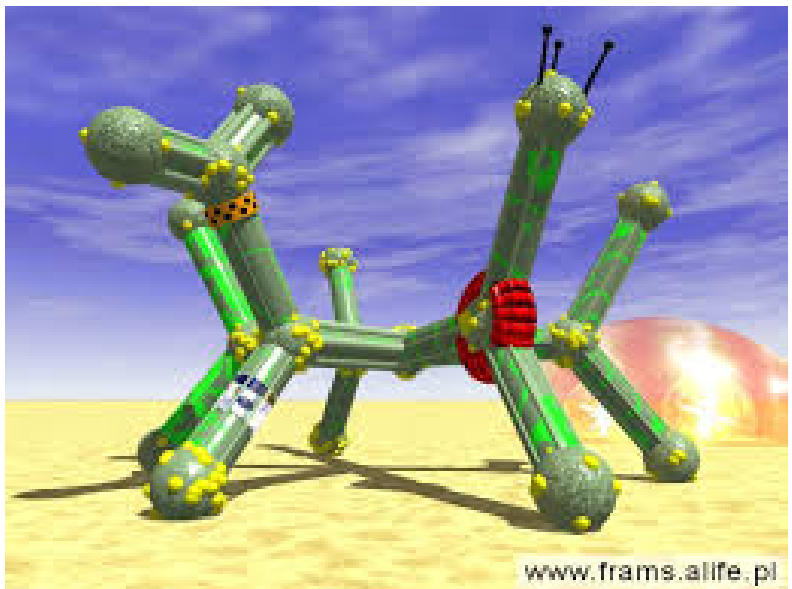
NaviExpert

- Online car navigation system:
  - Use of floating car data
  - Online prediction of travel times
  - Online optimization of routes

- One of the most popular systems in Poland
- `http://www.naviexpert.com/`

Framesticks

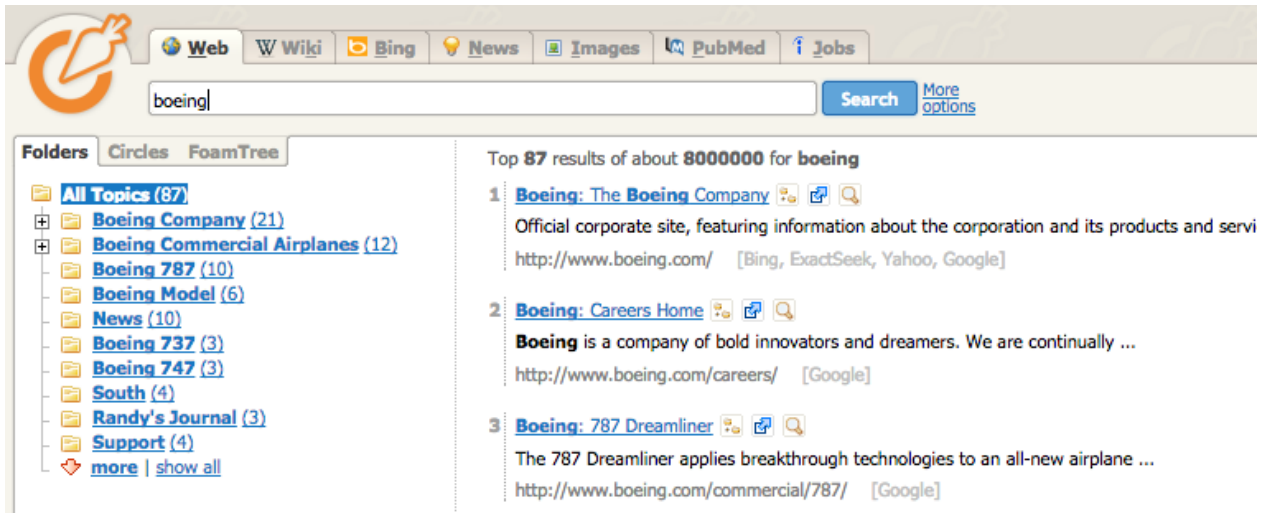
- Artificial life simulation project:
  - Evolutionary algorithms
  - Artificial intelligence
  - Neural networks
  - Biology
  - Robotics and simulation



- `http://www.framsticks.com/`

Carrot

- Document clustering engine:
  - Hierarchical clustering of web search results
  - Based on the **description-comes-first** approach



- `http://carrotsearch.com/`

Machine Learning

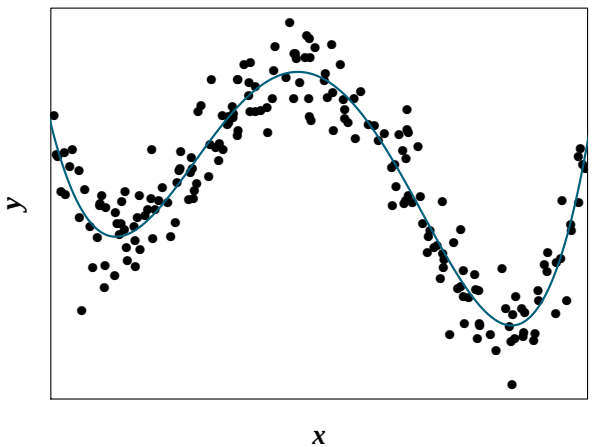
- Research areas:
  - Ordinal classification and ranking, multi-label classification and structured output prediction
  - Imbalanced data
  - Data streams
  - Ensemble methods
  - Deep learning
  - Statistical and online learning theory

Theorem 3.2. *Let* $\mathrm{Reg}_{\exp}(\boldsymbol{h}, P)$ *and* Reg *the regrets for exponential and logistic los tively. Then*

$$\mathrm{Reg}_{\mathrm{rnk}}(\boldsymbol{h}, P) \leq \frac{\sqrt{6}}{4} C \sqrt{\mathrm{Reg}_{\exp}(\boldsymbol{h},}$$

$$\mathrm{Reg}_{\mathrm{rnk}}(\boldsymbol{h}, P) \leq \frac{\sqrt{2}}{2} C \sqrt{\mathrm{Reg}_{\log}(\boldsymbol{h},}$$

where $C \leq m \sqrt{mu}$



- Industrial projects:
  - B&R Diagraphe Orange Labs,
  - Allegro Group

International Collaboration

- European Union
- Foundation for Polish Science
- National Science Centre
- National Centre for Research and Development
- Scholarships for Distinguished Young Researchers

Funding of research projects

- University Paris Dauphine
- University of Catania
- Polytechnic Faculty of Mons
- Centrum Wiskunde & Informatica (CWI)
- University of California, Santa Cruz
- Massachusetts Institute of Technology (MIT)
- University of Ottawa
- Ghent University
- University of Paderborn
- University of Marburg
- ...