

# A & O

## Apprentissage & Optimisation

Michèle Sebag

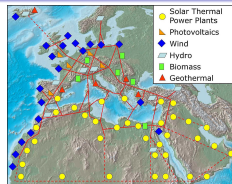
**Datasense**

Tasks 3, 4, 5

**2014-2018:** Tackling the under-specified

- e-Science: Center for Data Science
- Under-specified problems: Power Systems Modeling and Control
- Under-specified goals: Programming by Feedback

## Power systems at the transcontinental scale



## The known unknowns

- Model error  
 optimization with simulations: beware of the reality gap !  
 Transferring ML validation culture in the optimization community
- Stochastic uncertainties  
 e.g. spatial and temporal correlations in renewable energies  
 How Markovian are random natural processes ?
- Epistemic uncertainties (time horizon: 40 years)  
 Designing scenarios leads to multi-objective optimization  
 Scaling up to many-objective opt; beyond worst-case analysis

# Under-specified goals: Learning, Interaction, Optimization



Knowledge-constrained  
Scientific questions

- Exploration vs exploitation: human/machine division of labor
- Non-stationarity; multi-criteria in preference learning

## Links

- H2020 ICT 2014 - Information and Communications Technologies  
Topic: Multimodal and Natural computer interaction ICT-22-2014
- Microsoft: The shifting boundary between computers and the everyday world
- NSF Information and Intelligent Systems (IIS) [5] : to systems that merge physical and virtual for both places and people
- ANR Plan d'action 2014, Interactions des mondes physiques, de l'humain et du monde numérique
- Collaborations In-situ; Aviz; Sequel; LIMSI, LAAS; U. Darmstadt; U. Marburg.



Computation, memory-constrained