

# New Major Core Courses



# Systems Thinking & Environmental Problem Solving

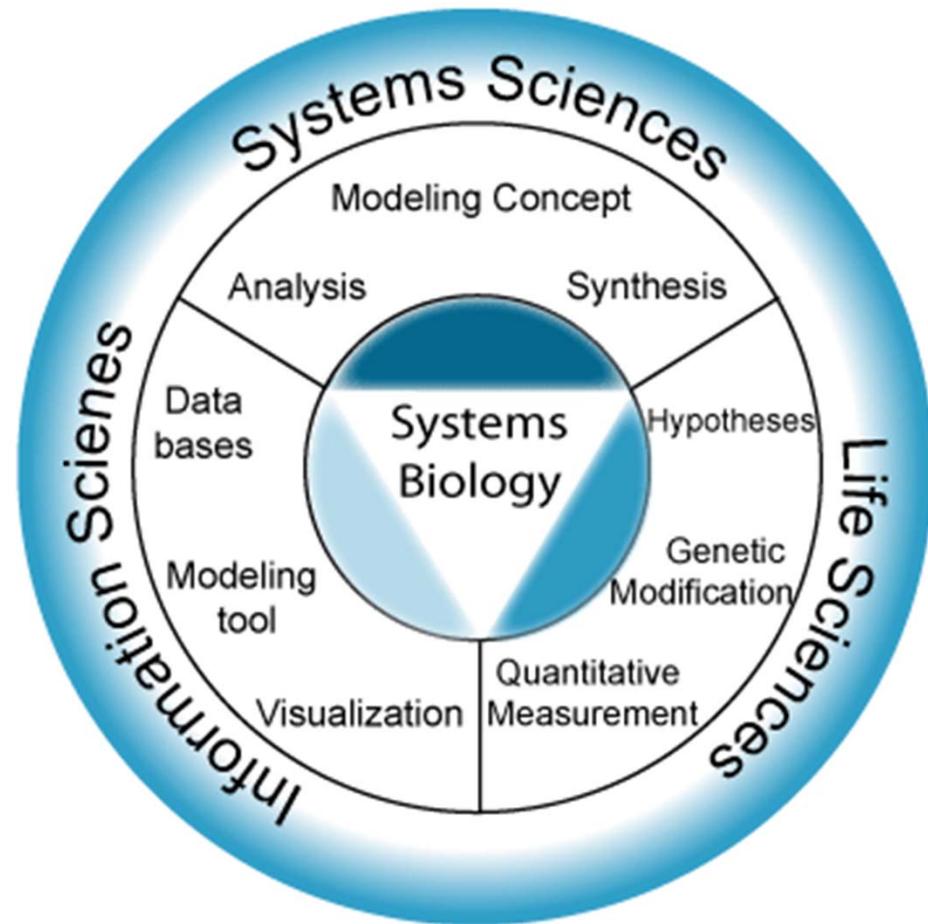
Heuristic Models and Approaches

# Systems Theory

- an interdisciplinary theory about the nature of complex systems in nature, society, and science
- ***a framework by which one can investigate and/or describe any group of objects that work together to produce some result***
- single organism, any organization or society, or any electro-mechanical or informational artifact
  - Applied in
    - living systems theory
    - software & computing
    - sociology & sociocybernetics
    - system dynamics
    - systems engineering
    - systems psychology

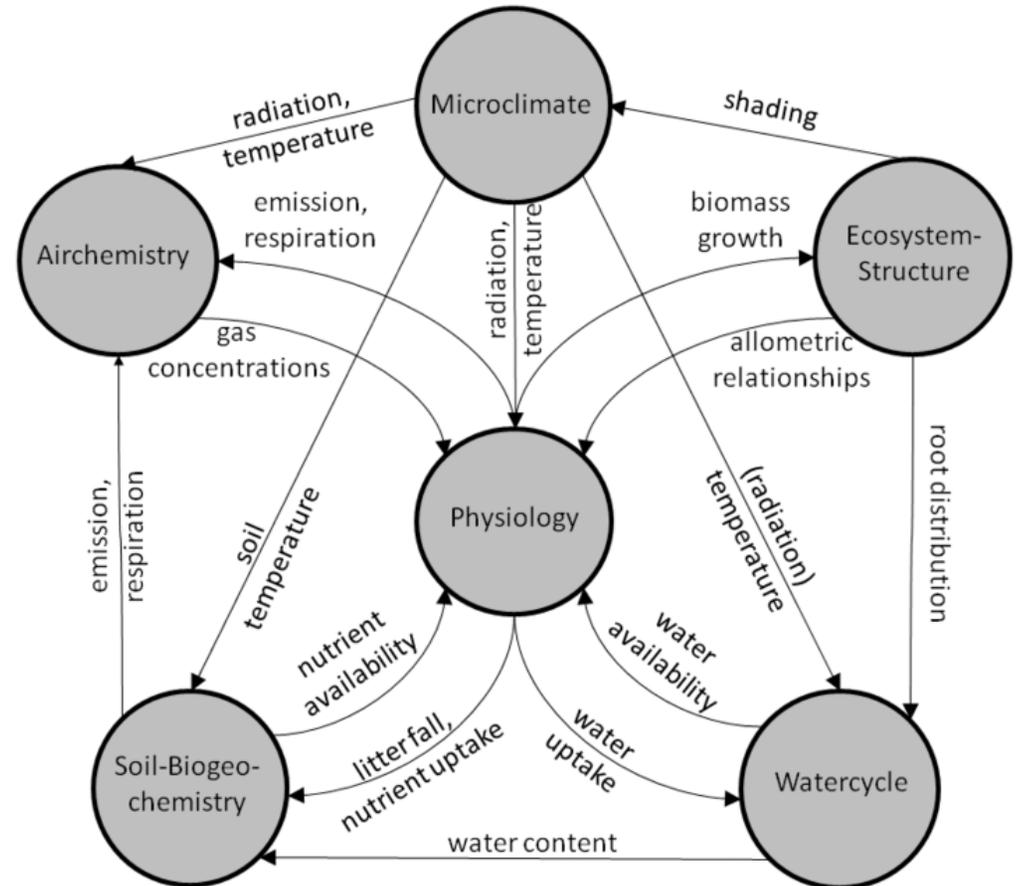
# Systems Biology

- **Systems Biology** aims to obtain a holistic understanding of biological systems such as a single cell, an organ or even a whole living organism, by combining approaches from **Systems-, Life and Computer Sciences**.
- Universities of Stuttgart, Magdeburg and Liège



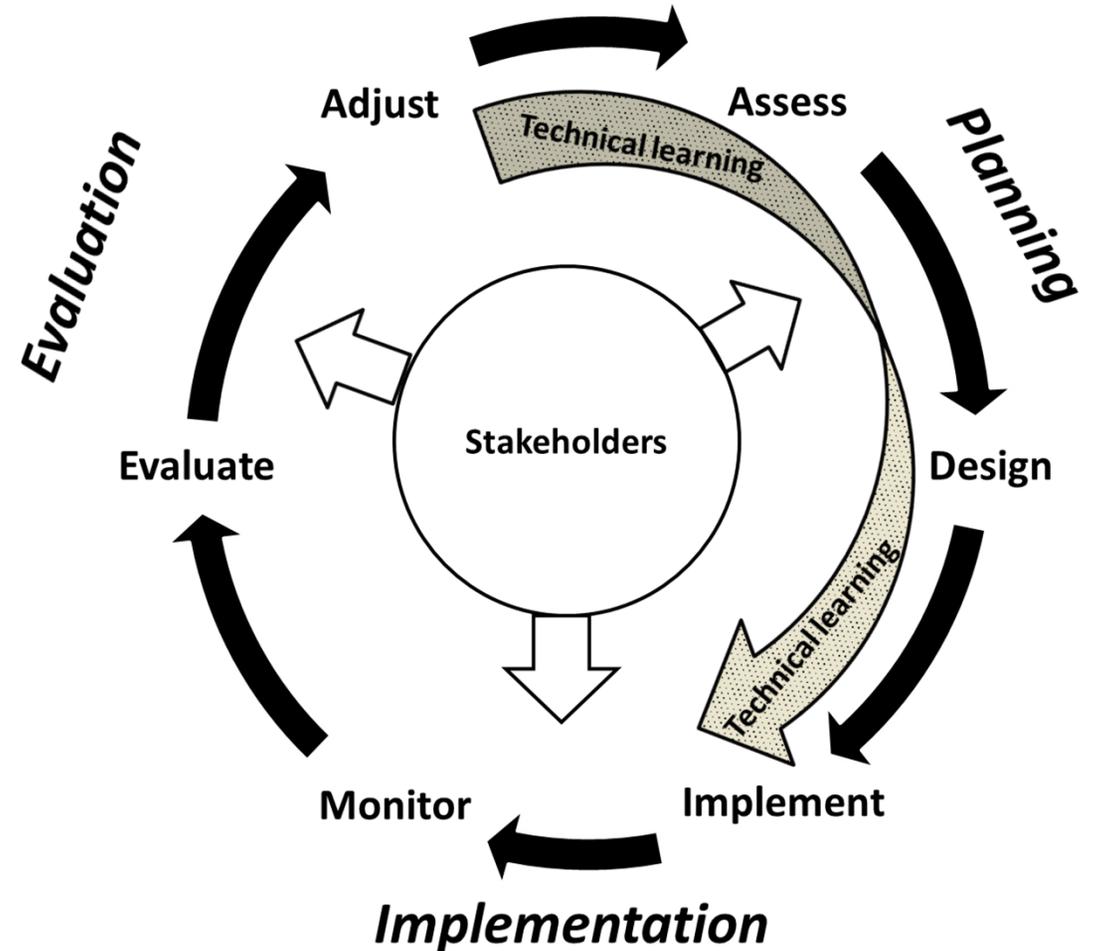
# Systems Theory

- Ecosystem science



# Systems Theory

- Applied to management
- Environmental problem solving
- Gen Z are systems thinkers



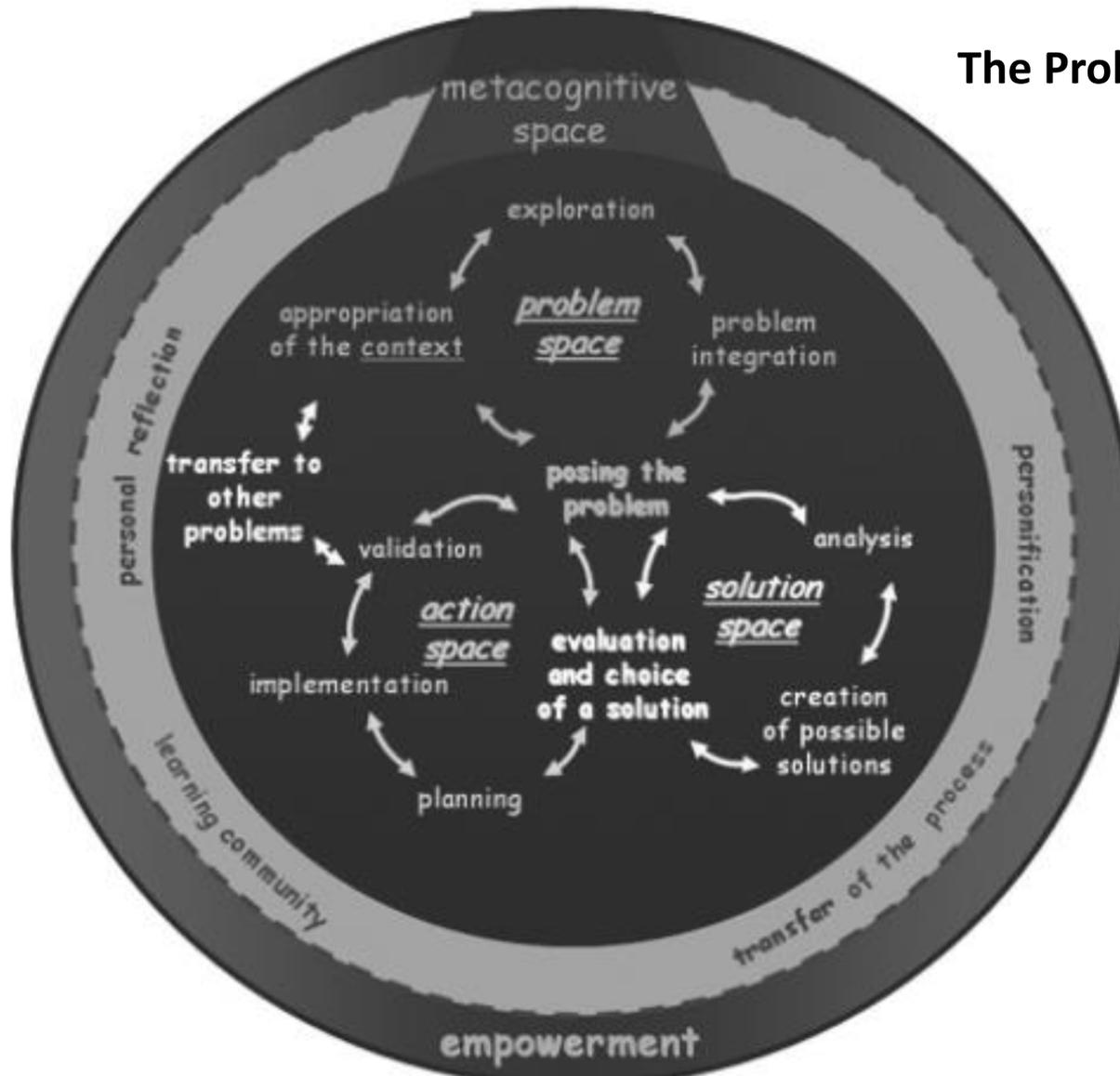
## Barbier et al. 2009

“Problem-solving consists of looking for a way to reduce the gap between a non-satisfactory situation and a desired situation (Proulx, 1999). The *cyclic* process of problem-solving usually consists of eight steps: Finding a problem, posing a problem, finding solutions, assessing and choosing solutions, planning the action, acting and evaluating the action (Higgins, 1994).”

## Barbier et al. 2009

“Problem solving is presented as a cyclic process involving constant back and forth movement between the problem space, the solution space and the action space. One perceives the presence of a problem, explores, reflects, investigates and formulates the problem in its different dimensions. These are sources, causes, players, places, impacts, time, obstacles to action and desired situation. The whole process happens in a metacognitive space, as the individual constantly monitors and adjusts his or her way of working on the problem. The success of the process empowers the individual to solve more problems and transfer the skills to other contexts. Finally, the ideal problem-solving process occurs when there is collaborative work between many people who form a learning community in which individuals help each other plan and execute various operations. Of a particular interest for our analysis is the definition of empowerment that borrows from Bandura theory of collective Self-efficacy (2003): a belief shared by a group as to its capacities to organize and perform up to a desired level (p.708).”

## The Problem Solving Process



Barbier et al. 2009

# Steps for solving environmental problems

1. Identifying a problem
2. Posing a problem
3. Finding solutions
4. Choosing a solution
5. Action plan
6. Taking action
7. Evaluating the action
8. Personal reinforcement

# DOC'S KEY

- Define the problem
  - Clearly define the problem and your desired outcome
- Objectives
  - Set clear objectives
- Constraints
  - Identify constraints, boundaries, assumptions, limitations, and unacceptable impacts
- Strategies
  - Seek creative strategies – generate ideas
- Keepers
  - Select your best strategies
- Experiment
  - Try out your strategies and make adjustments
- Yes!
  - Implement your strategies and check to make sure they give you the results you want

# S-M-A-R-T Objectives

- Specific
- Measurable
- Attainable
- Reasonable
- Time limit identified

# New Major Core Courses



# Diversity, Inclusion & Social Justice

# New Major Core Courses



# Freshman – Principles of community

- The benefit of working in diverse teams and in a diverse university
- Community expectations
- Existing in different communities
- Recognizing assumptions we make about others

# Sophomore – Implicit Bias and Microaggressions

- How we unconsciously and consciously communicate value to others
- Working in diverse teams – behaviors to promote inclusion

# Junior – Privilege and Oppression

- Identity of self
- Identity of others
- Systemic inequity and how it relates to the individuals and future careers

# Senior – Application

- How does this apply to your future profession?

# Diversity, Inclusion and Social Justice

- Tie to learning objectives
- Incorporate reflection pieces
- Make content interactive
- Setting up community – community guidelines
- Train and equip faculty who are teaching this content

# New Major Core Courses

