



34th Annual **INCOSE**
international symposium

hybrid event

Dublin, Ireland
July 2 - 6, 2024



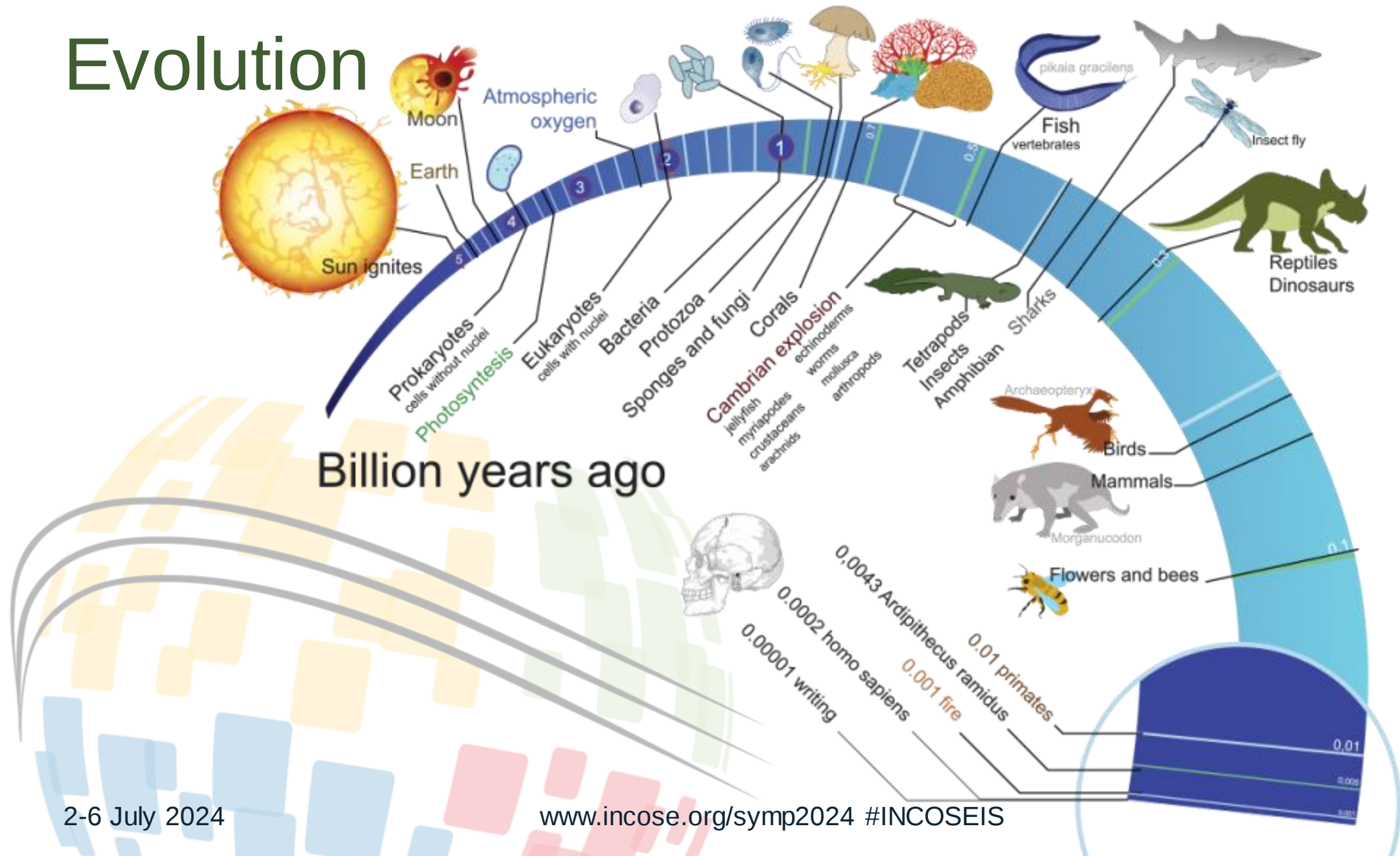
Rae Lewark, Casey Medina & Allison Lyle

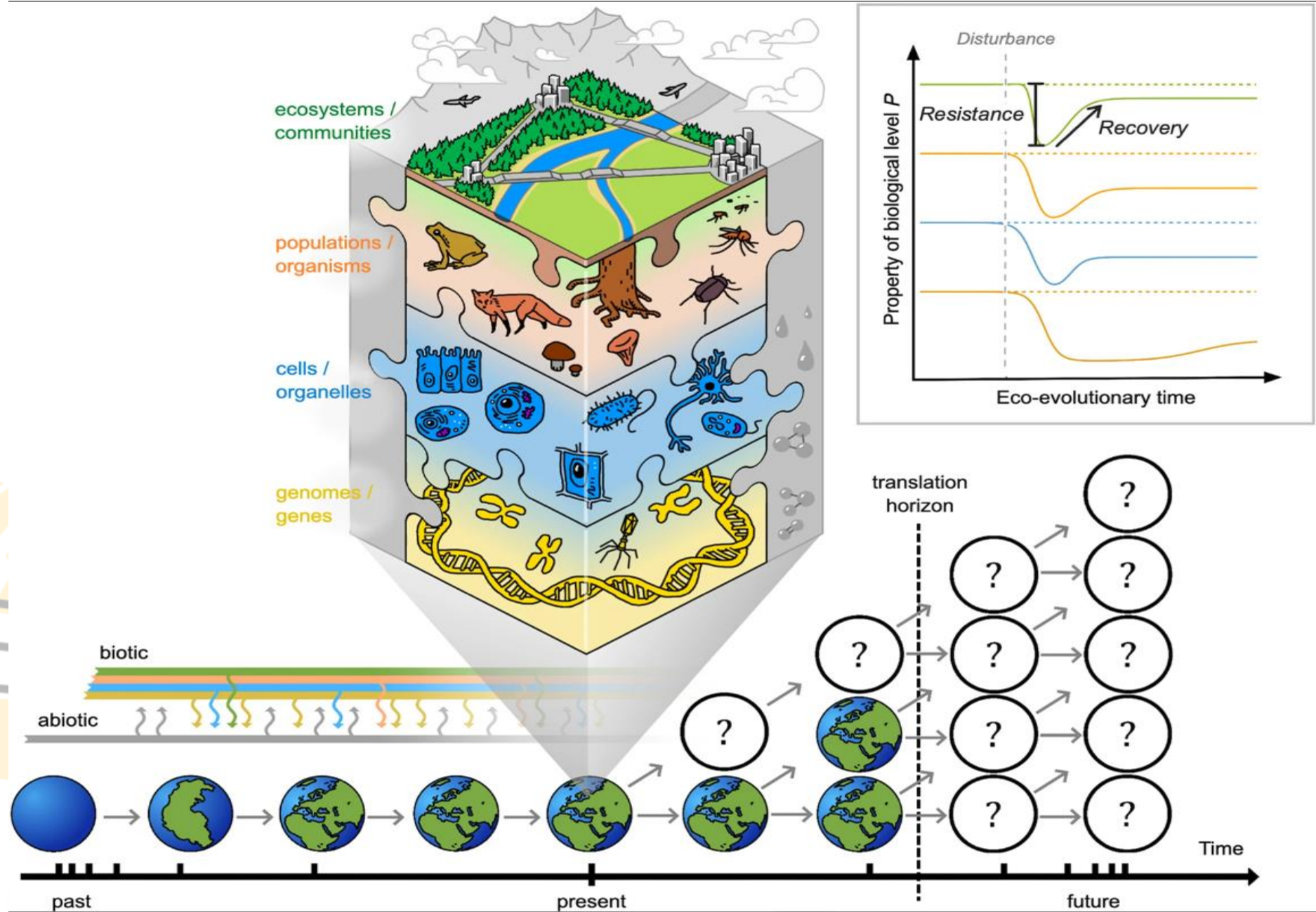
Designing for Resilience: Integrating Ecology into the Engineering Process



Resilience in Nature

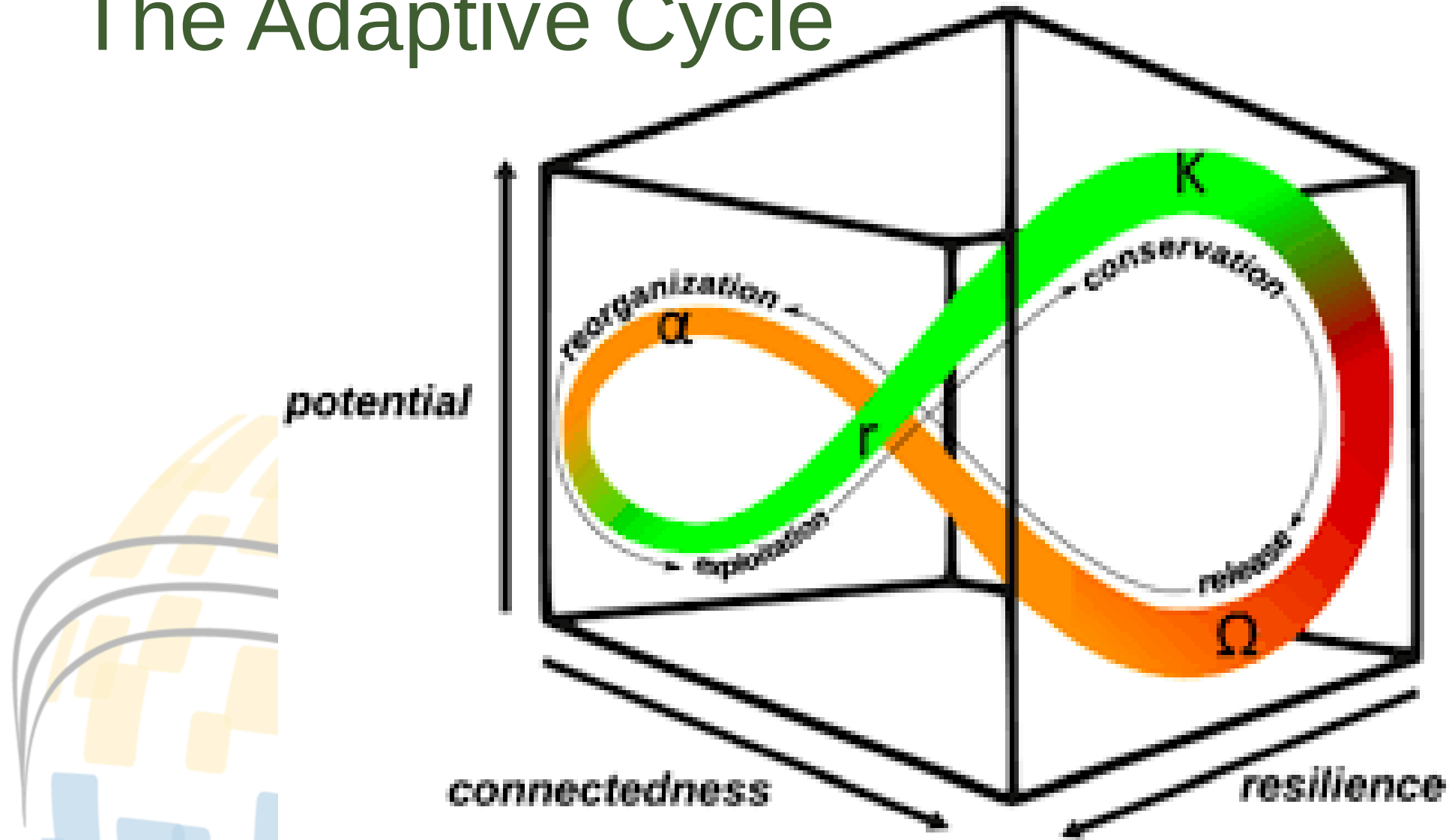
Evolution



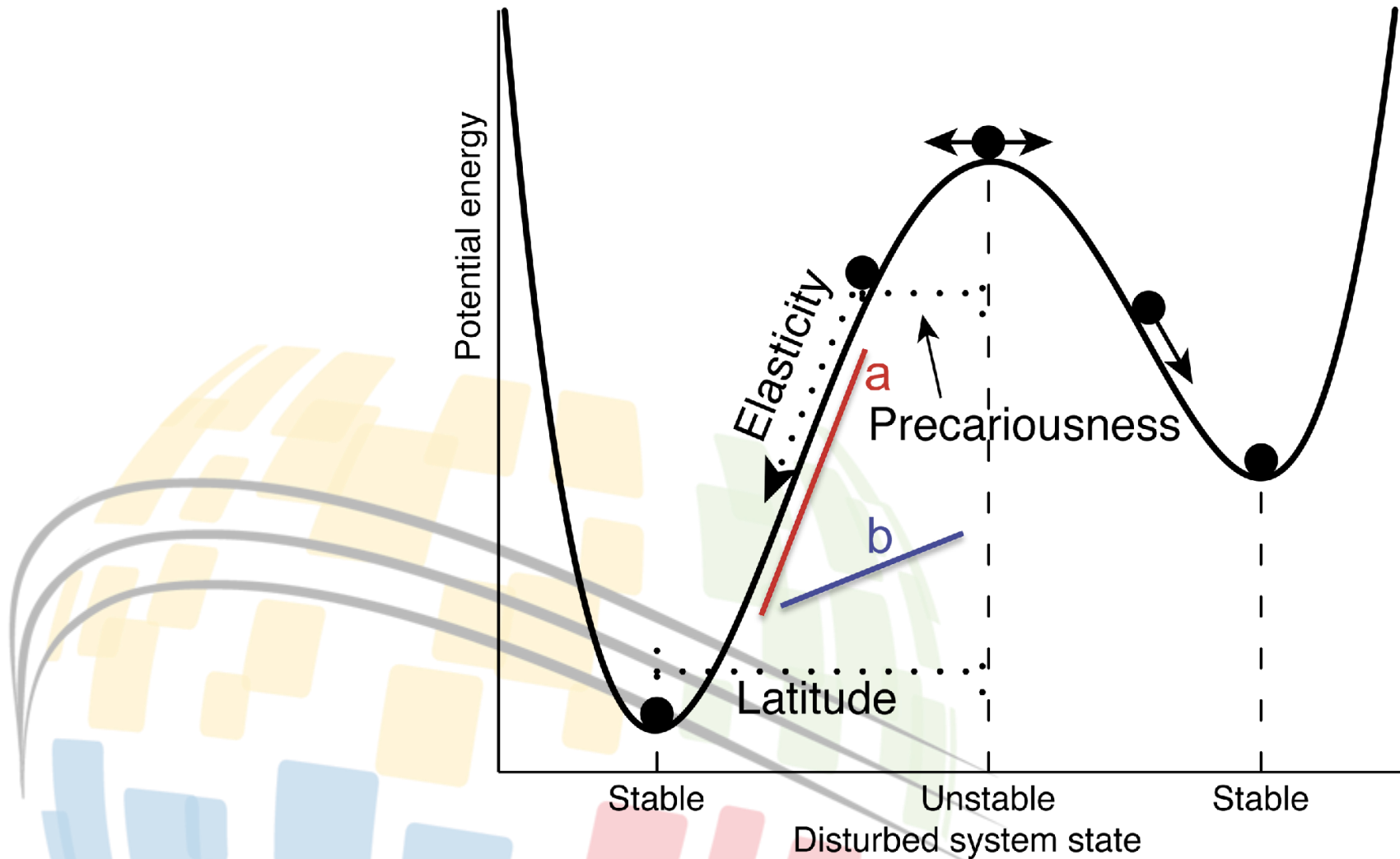


(Thorogood et al 2023)

The Adaptive Cycle



The Adaptive Cycle

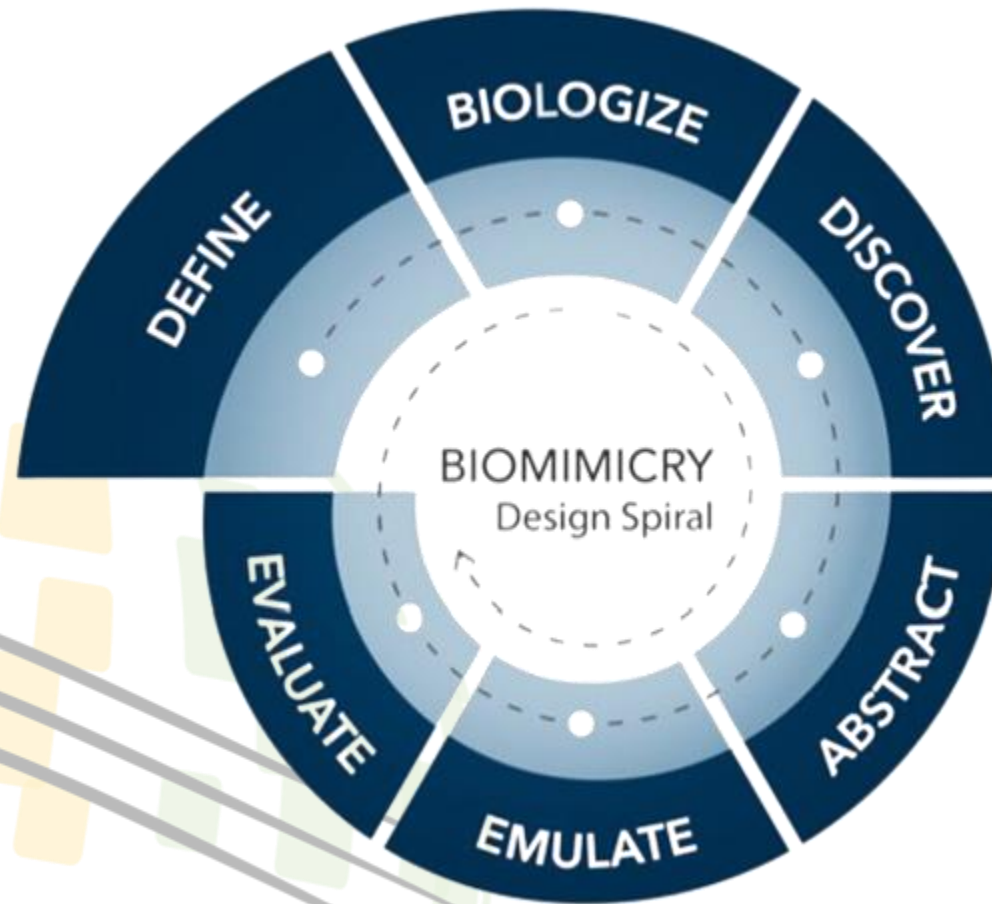


(Seddan et al 2016)

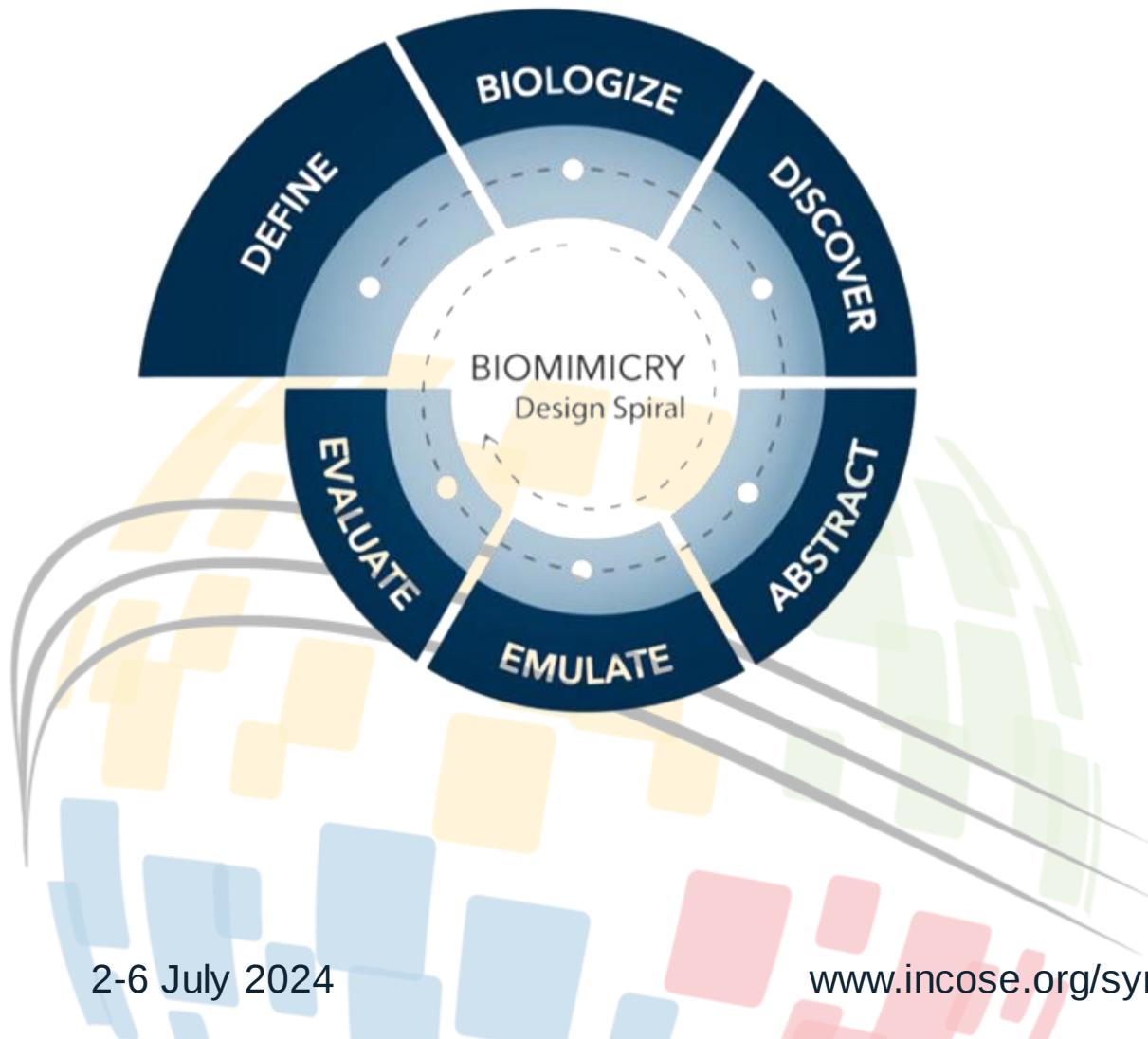


The Biometric Approach

The Spiral



The Process



- **Integrate the biomimicry principles into the Engineering approach:**
 - **Define the Engineering Problem**
 - **Define the Operating Context**
 - **Query Nature:**
 - Identify trophic level/operating scale
 - Identify ecological candidates
 - Identify operating conditions
 - Identify behavior
 - Identify incentives and evolutionary pressures
 - Study the lifecycle
 - Study mechanics, physics, and chemistry
- **Integrate data into development process**

The Mantis Shrimp



The Mantis Shrimp

