

# Paris Session 2022



Ceebios



**cigre**

For power system expertise

## Biomimicry and energy, a systemic eco-design approach to address the challenges of the energy and ecological transition

### PS 1 Setting ambitious climate targets in the energy sector

Question 1.9. What practical examples of multifunctionalities of self-healing, self-cleaning, renewal, life extension can be? What are the further developments and achievements that the authors can share? What are the needed research pathways that will be needed to take full advantage of this knowledge?

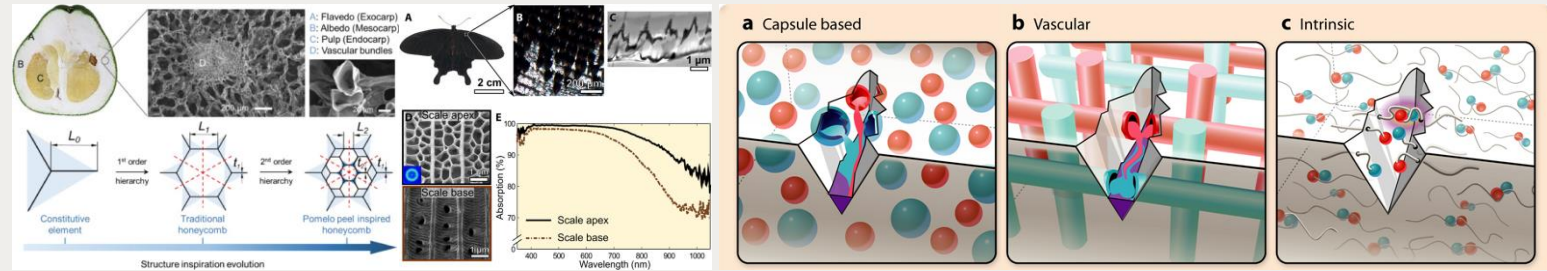
Dr. Kalina Raskin, France

# Multifunctional systems for the energy sector, current trends



Multifunctionality through surface structuring  
[Barthlott, 2017] [Yu, 2020]

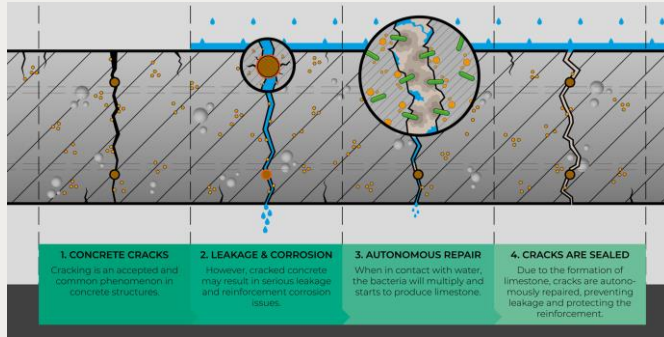
Multifunctionality through material composition and organization [Speck, 2019] [Zhang, 2019] [Siddique, 2017]



Multifunctionality through their optimized answers to trade-offs formalized by life principles [Vincent, 2006][Goupil, 2019]



# Practical examples



## Self-healing concrete

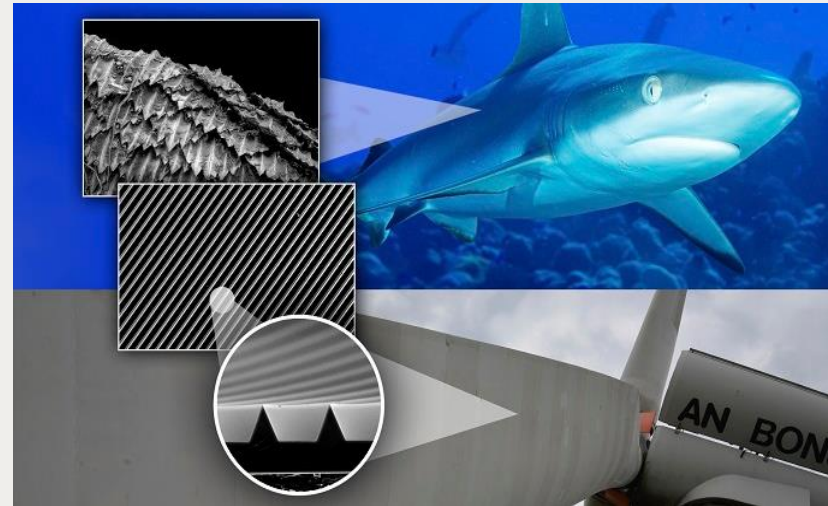
Basilisk company has successfully conducted 12 projects in the past 5 years on various infrastructure, from roads to water tanks

<https://basiliskconcrete.com/en/> .

**35% reduction of shrinkage reinforcement in parking garage**  
Basilisk Healing Agent  
35% reduction of shrinkage reinforcement in parking garage in

**Japanese water purification plant built with self-healing concrete**  
Basilisk Healing Agent  
Japanese water purification plant built with self-healing concrete. The superior

**Life span concrete bus lane extended by 15 years**  
Basilisk Liquid Repair System E37  
Life span concrete bus lane extended by 15 years. The smallest hairline cracks in a concrete road surface will eventually lead



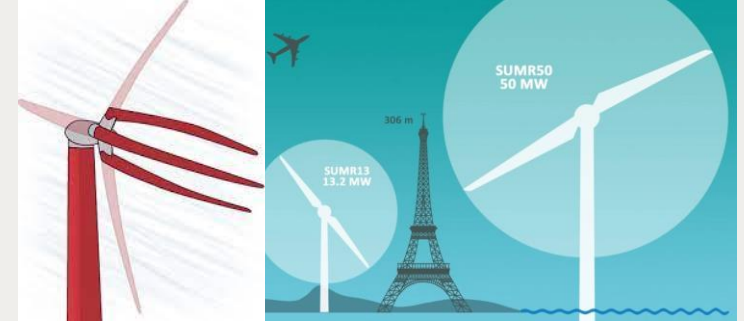
## Surface material structuring

*“The Riblet4wind project has proven that a Riblet structured coating [...] leads to an observable improvement of the performance”* EU funded project coordinated by the Fraunhofer Society



## Optimized solution facing trade-offs

*“Drawing inspiration from palm trees, US researchers have found a way to significantly scale up offshore wind turbines a development that could dramatically increase the amount of electricity we generate from wind power.”* [Freethink, Houser, 2022]



# Research next steps ?



## From Nature to labs

Investment to keep on analyzing and abstracting solutions from living beings



## From labs to industries

Investment to scale up these technologies and apply them on as many systems as possible



## From industries back to Nature

Investment to ensure an eco-friendly transfer of biomimetic solutions



Group Discussion Meeting



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