

ADAPTIVE EVOLUTION AND BIOMIMICRY

Translating Seahorse Mechanics into Robotic Applications

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Bio-inspiration ... then



1400 BC



950 BC

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Bio-inspiration ... now



1997

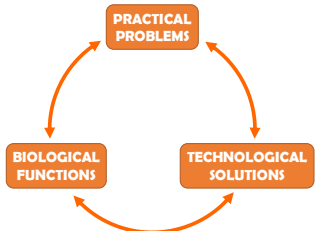


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Bio-inspiration ... what's in a name?

- Biomimicry
- Biomimetics
- Bio-inspiration
- Bionics
- Bioreplication
- Bio-exploration



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    graph TD
      A[BIOLOGICAL FUNCTIONS] --> B[TECHNOLOGICAL SOLUTIONS]
      B --> C[PRACTICAL PROBLEMS]
      C --> A
  
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Bio-inspiration ... the role of biologists!

Abstract Biological knowledge is becoming an important source of inspiration for developing creative solutions to engineering design problems and even has a huge potential in formulating ideas that can help firms compete successfully in a dynamic market. To identify the

For a successful implementation in technical applications, biological insights have to be made understandable for non-experts in biology i.e. the project partners from engineering, physics or chemistry. The next step deals with the

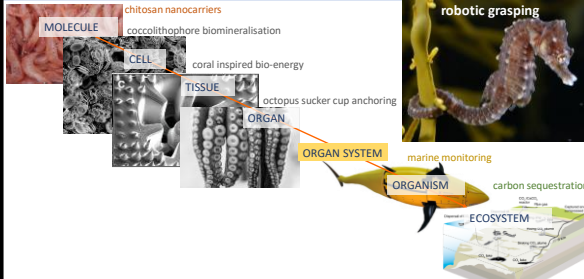
For designers to successfully use biologically inspired design in a systematic way with the problem driven approach, we need efficient methods to translate biological abstractions into technical solutions. One promising way is to expand the

104, p. 4, Creative Design Inspired by Biological Knowledge: Techniques and Methods, Teachers of Mechanical Engineering, 2015.
 104, p. 4, and 5, Open, Process approach to biomimetic innovation in design and history, IC 4.0 Biomimicry, 2018, MIT Press, Cambridge, MA, p. 11.

104, p. 4, A. C. White and J. T. Houghton, Examples for Integrating Inspired Design, Proc. SPIE 10015, Biomimetics, Marine@UGEC 2024, MIT Biomimetics Vol. 2018, 10015EJ, p. 110.

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Levels of marine bio-inspiration



MOLECULE: chitosan nanocarriers, coccolithophore biomineralisation
CELL: coral inspired bio-energy
TISSUE: Octopus sucker cup anchoring
ORGAN: marine monitoring
ORGAN SYSTEM: carbon sequestration
ORGANISM: robotic grasping
ECOSYSTEM

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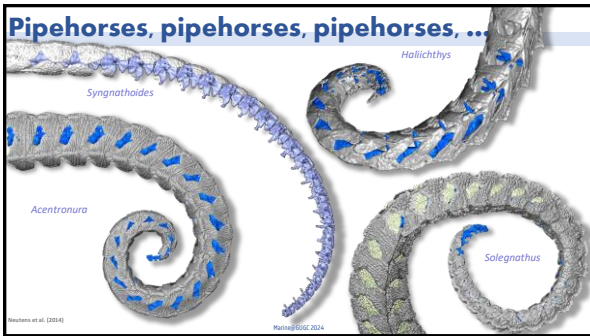
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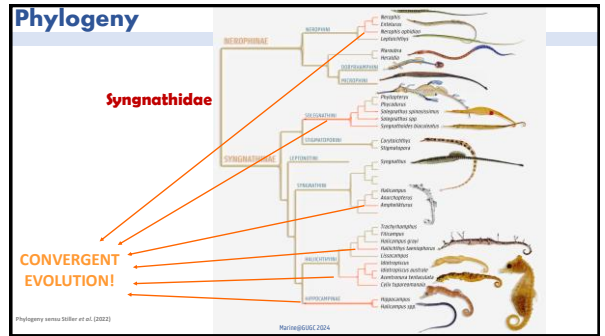
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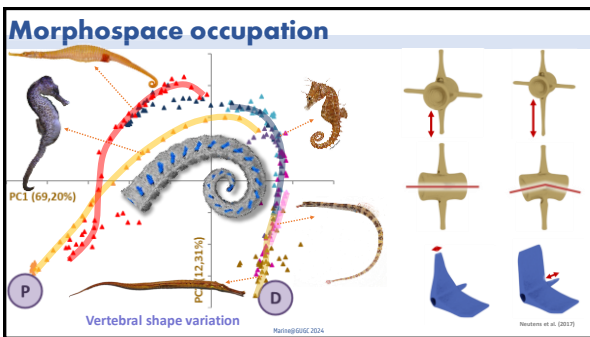
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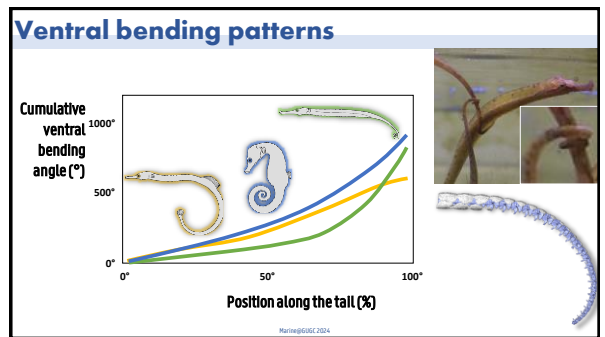
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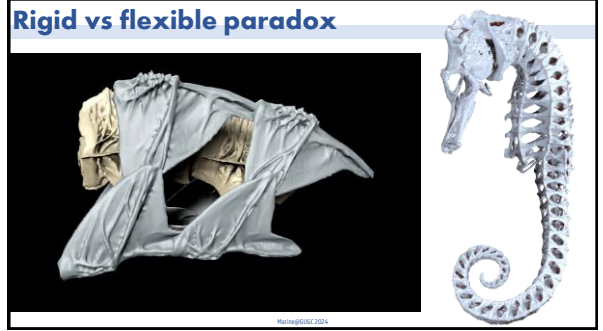
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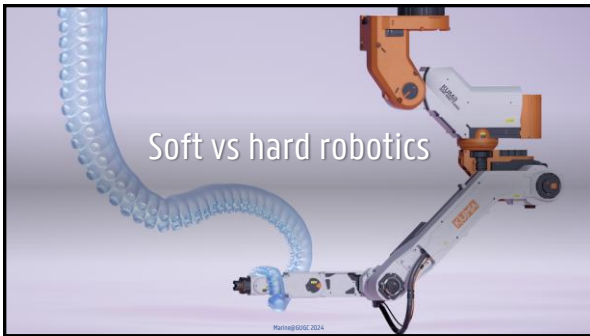
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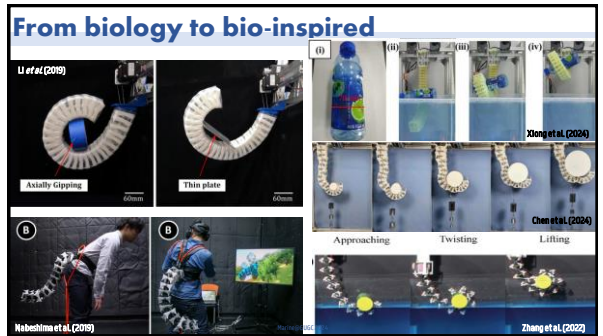
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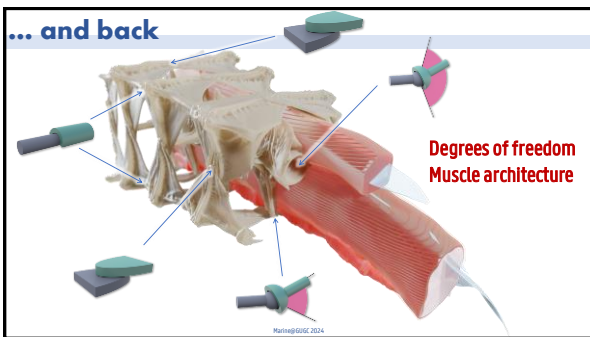
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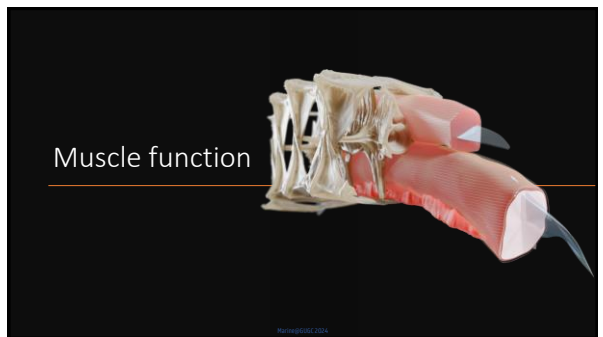
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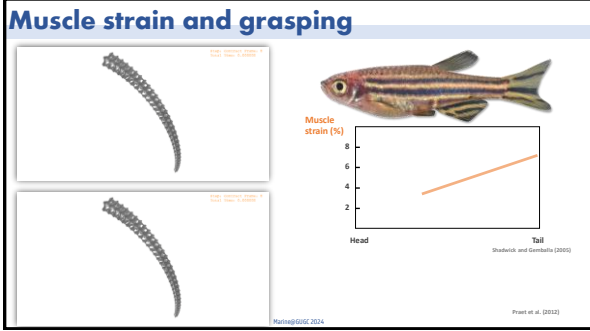
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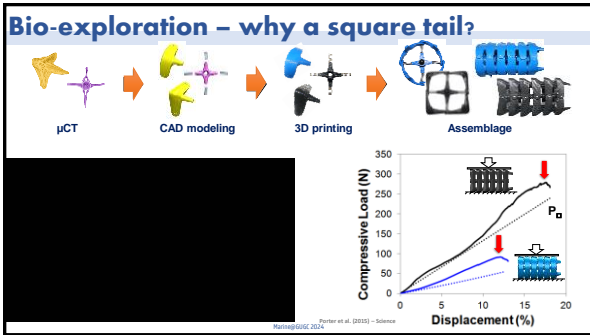
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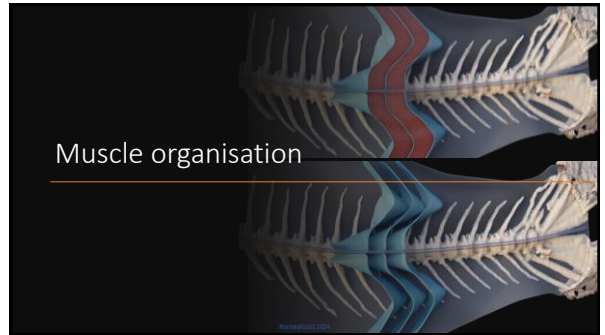
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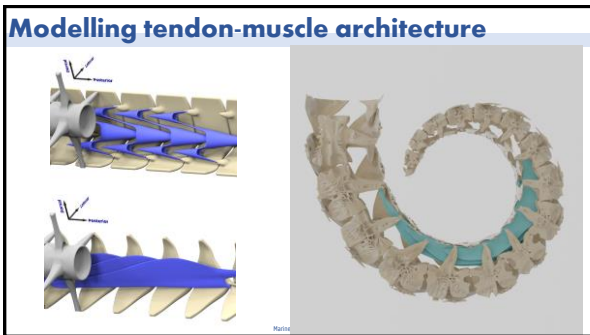
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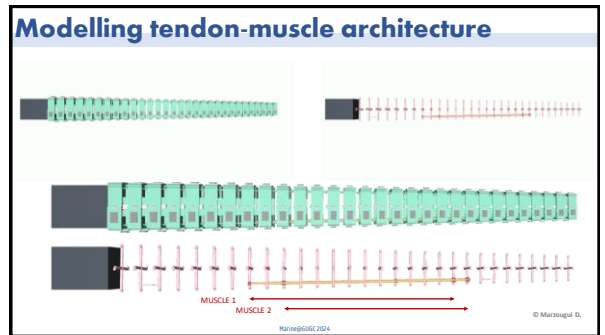
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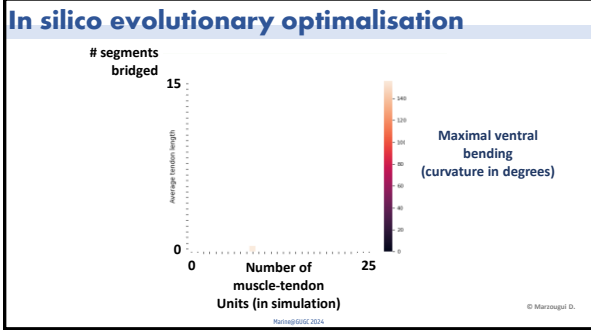
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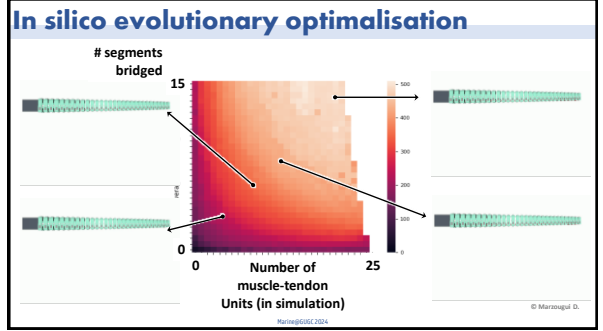
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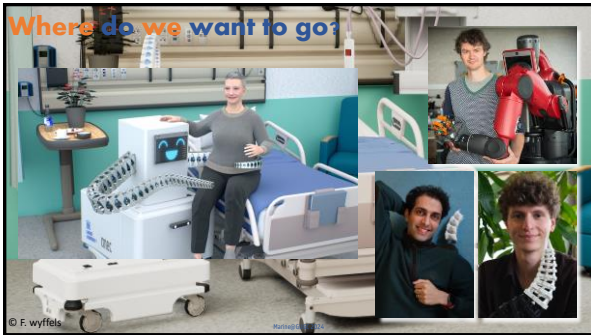
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