

Soft Prosthetics

Biomedical applications of soft robotics

Keene Chin, 16-848 Hands Presentation

A Brief Disclaimer About Quality

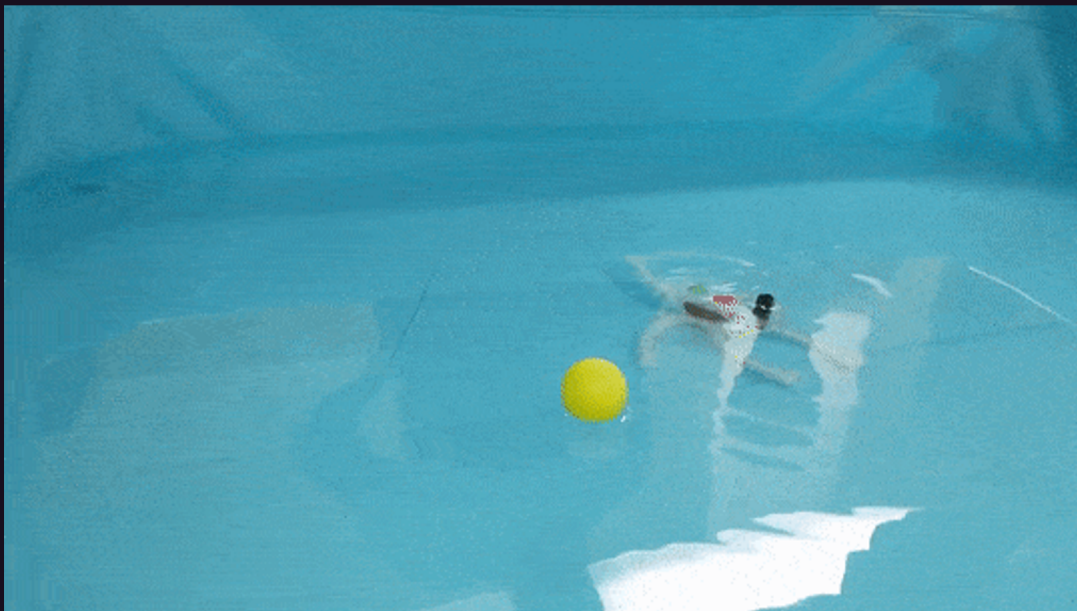
- I procrastinated on this

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- Here's why



Meet the Authors!

- All @ The BioRobotics Institute - Scuola Superiore Sant'Anna
 - Matteo Cianchetti
 - Cecilia Laschi
 - Arianna Menciassi
 - Paolo Dario

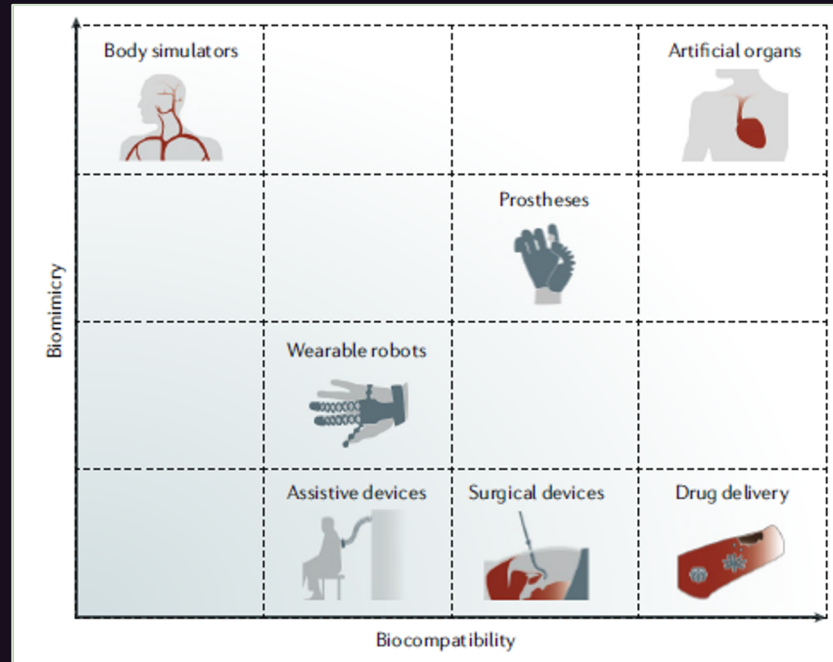


Meet the Authors!

- Matteo Cianchetti -The BioRobotics Institute - Scuola Superiore Sant'Anna
 - [A Bioinspired Soft Robotic Gripper for Adaptable and Effective Grasping](#)
- Cecilia Laschi
 - [Soft-robotic arm inspired by the Octopus](#)
 - Founding member of [RoboTech SRL](#)
- Arianna Menciassi
 - [Soft Robotics Technologies to Address Shortcomings in Today's Minimally Invasive Surgery: The STIFF-FLOP Approach](#)
- Paolo Dario
 - [Control of Multifunctional Prosthetic Hands by Processing the Electromyographic Signal](#)

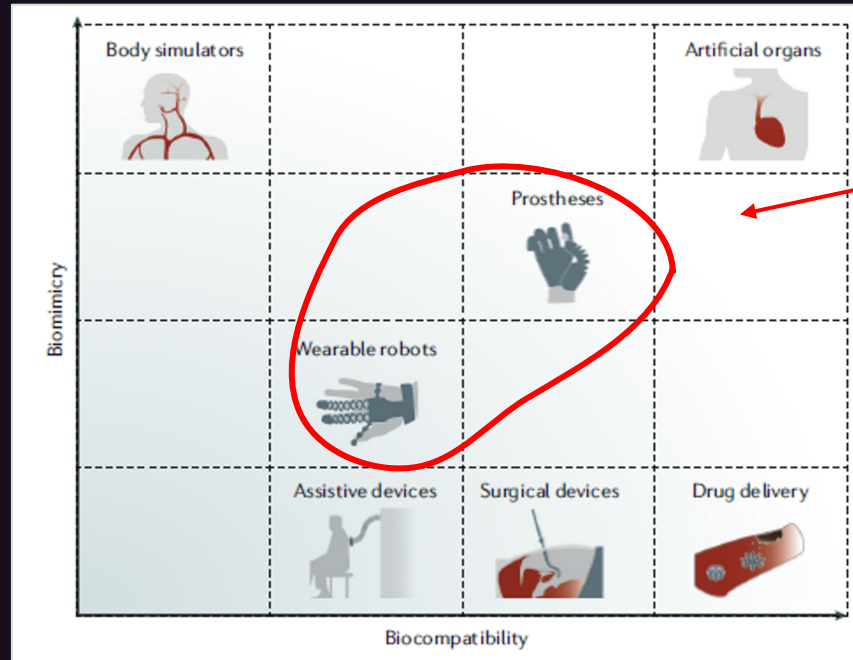
“Biomedical applications of soft robotics”

- A survey of many applications of soft robots, including surgical tools



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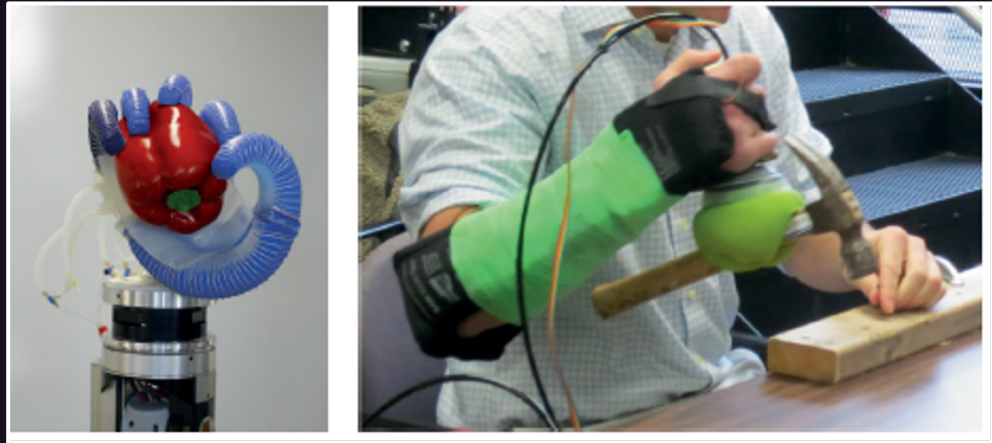
HANDS!

“Biomedical applications of soft robotics”

Wearable Robots



Soft Prosthetics



Wearable Soft Robots

- Exo-Glove Poly
 - Cable - driven
 - Coupled-adaptive tendon routing
- Soft robotic glove for combined assistance and at-home rehabilitation
 - Pneumatic
 - 3 DOF per finger

“Soft robots mimicking the human body”

- Morphological Intelligence: Programming primitives into materials
 - [Methodology for designing and manufacturing complex biologically inspired soft robotic fluidic actuators: prosthetic hand case study](#)
 - [3D printed flexure hinges for soft monolithic prosthetic fingers](#)
- Hands “for Prosthetics”
 - [5-DOF Anthropomorphic Grasper](#)
 - [Website showing grasp array](#)
 - [A novel type of compliant and underactuated robotic hand for dexterous grasping](#)
 - [Modeling and Prototyping of a Soft Prosthetic Hand Exploiting Joint Compliance and Modularity](#)

“Soft robots mimicking the human body”

- Prosthetic Hands

- [Prosthetic Jamming Terminal Device: A Case Study of Untethered Soft Robotics](#)
- [XLimb](#)

Discussion

- Do the attempts at biomimicry seem well formulated?
- Actuation strategies remain varied, what benefits actually seem relevant for decision making
- Which approaches seem promising for enabling human dexterity
 - What concerns do you think should be kept in mind?