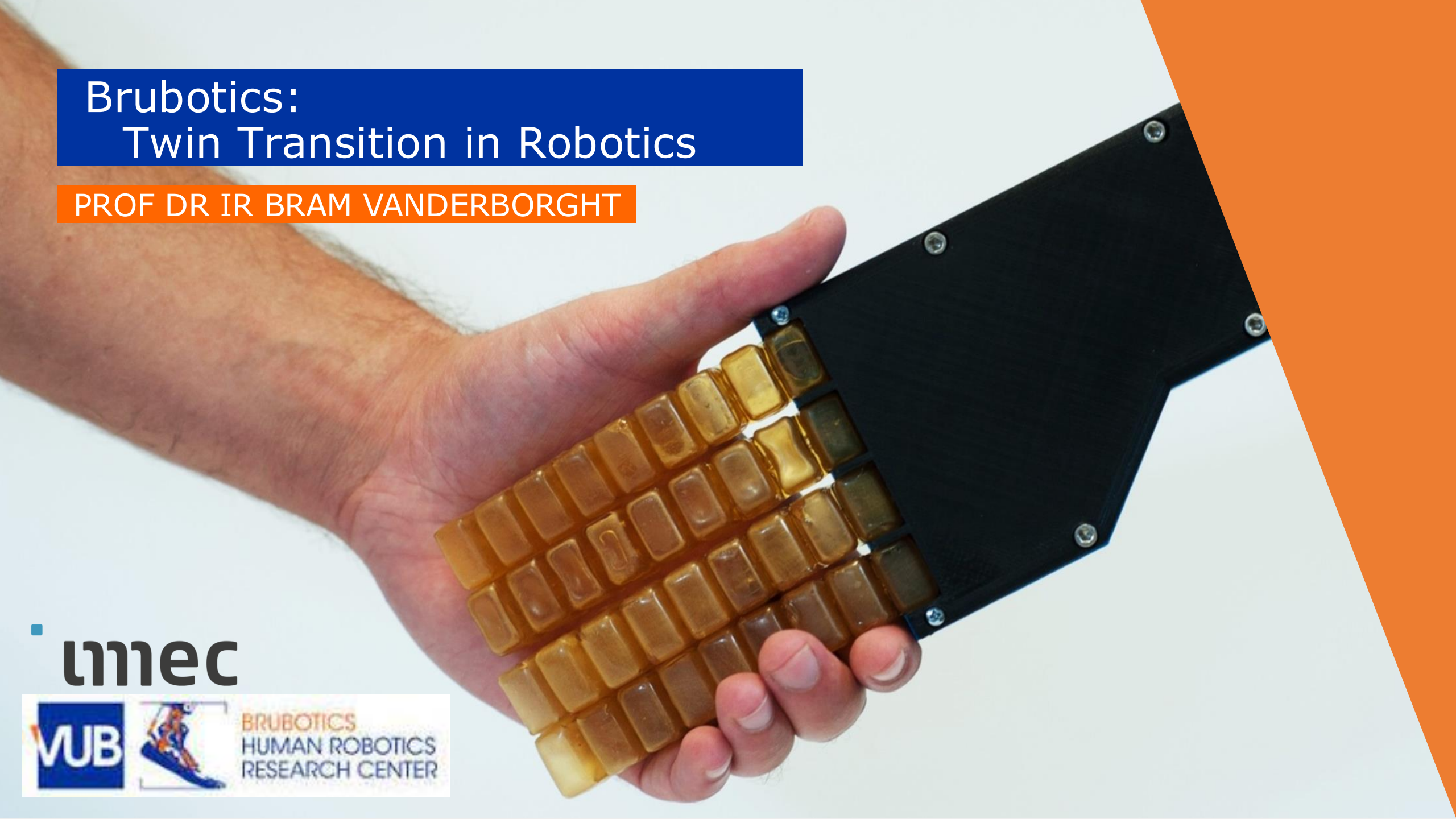
Brubotics:
Twin Transition in Robotics

PROF DR IR BRAM VANDERBORGHT



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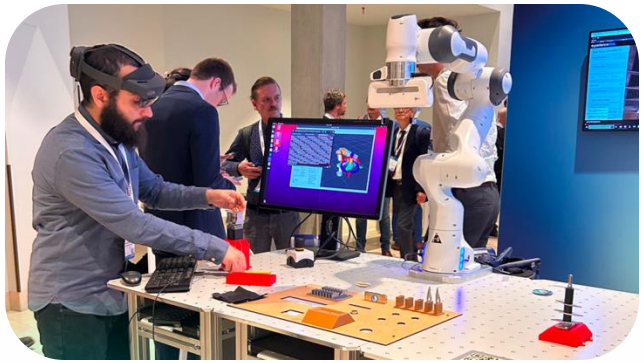
VUB BRUBOTICS HUMAN ROBOTICS RESEARCH CENTER

Twin Transition: digital and sustainable

BruBotics: Brussels Human Robotics Research Center



Human Physiology

Marketing

Rehabilitation

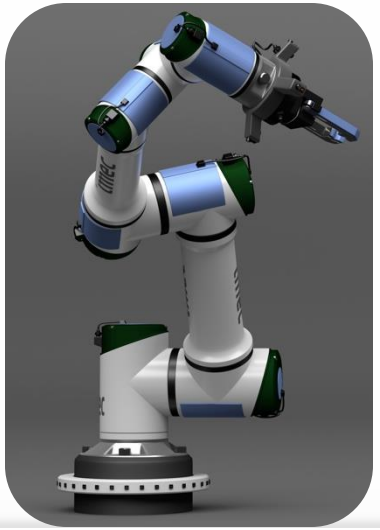
Social studies

Robotics

Aging Studies

AI

Electronics & Informatics



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FLANDERS MAKE DRIVING INNOVATION IN MANUFACTURING

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40%

European workers suffer from
work-related musculoskeletal disorders

70%

of absenteeism is due to locomotoric problems at Colruyt (retailer)

We need to change the way we work

52%

EU construction workers had back pain in last 12 months

100.000 €/day

Cost of absenteeism at Audi Brussels

Exoskeletons are the solution:
Wearable robots that support the body, while keeping human flexibility

Most current exoskeletons **are passive** (no motors). They **hinder** too much, cannot provide **enough support**, and are **not versatile**

Laevo

The few **powered** ones out there are **bulky**, **heavy** or just plain **ineffective**

German Bionics

We present a next-generation of powered exo's

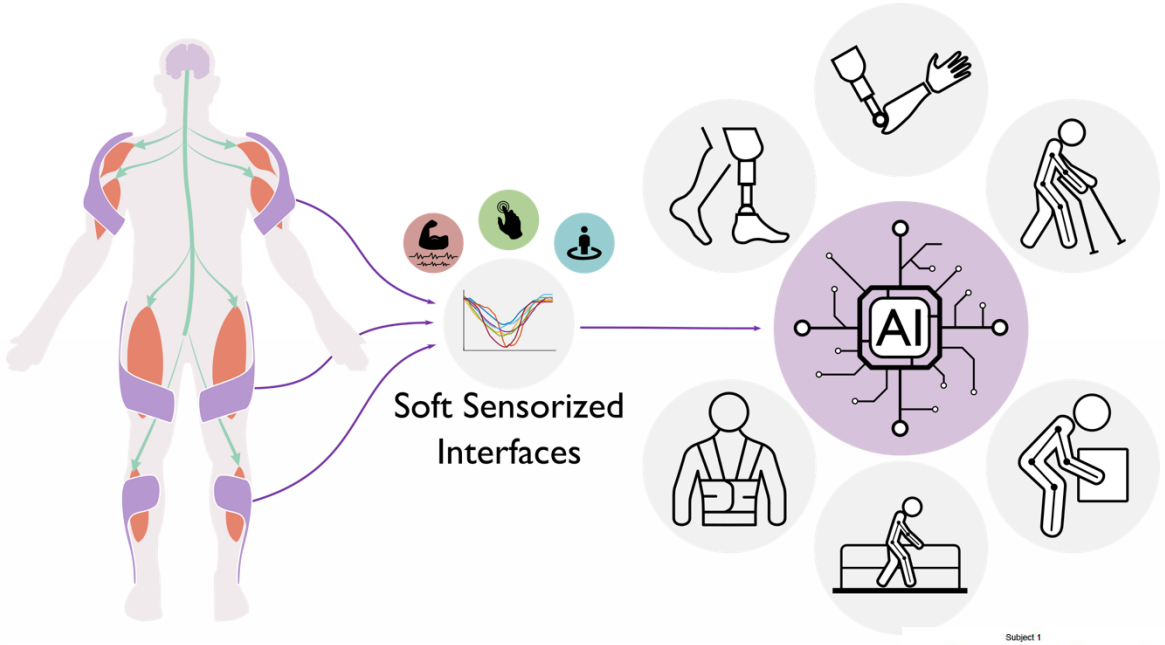
HUSKK's Dors Exo

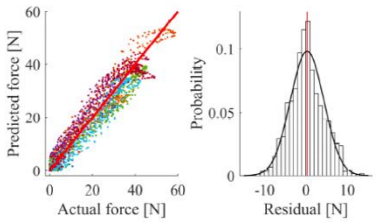
The power of a robotic back exo in the form of a passive one

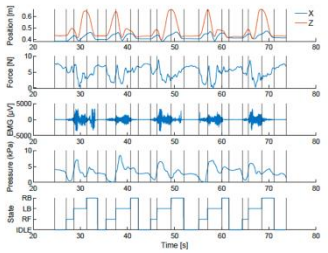
- **Effective** decrease of dangerous loads
- **Dynamic** and **high level** of **support**
- Proven **limited hindrance**
- In a **light** and **compact** format

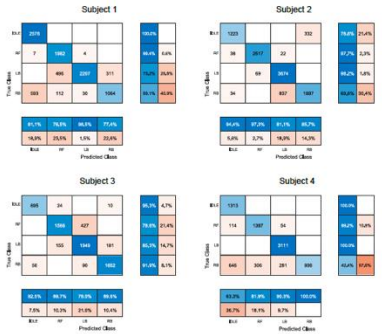

FLANDERS
MAKE | AUGMENTX

Human intention detection









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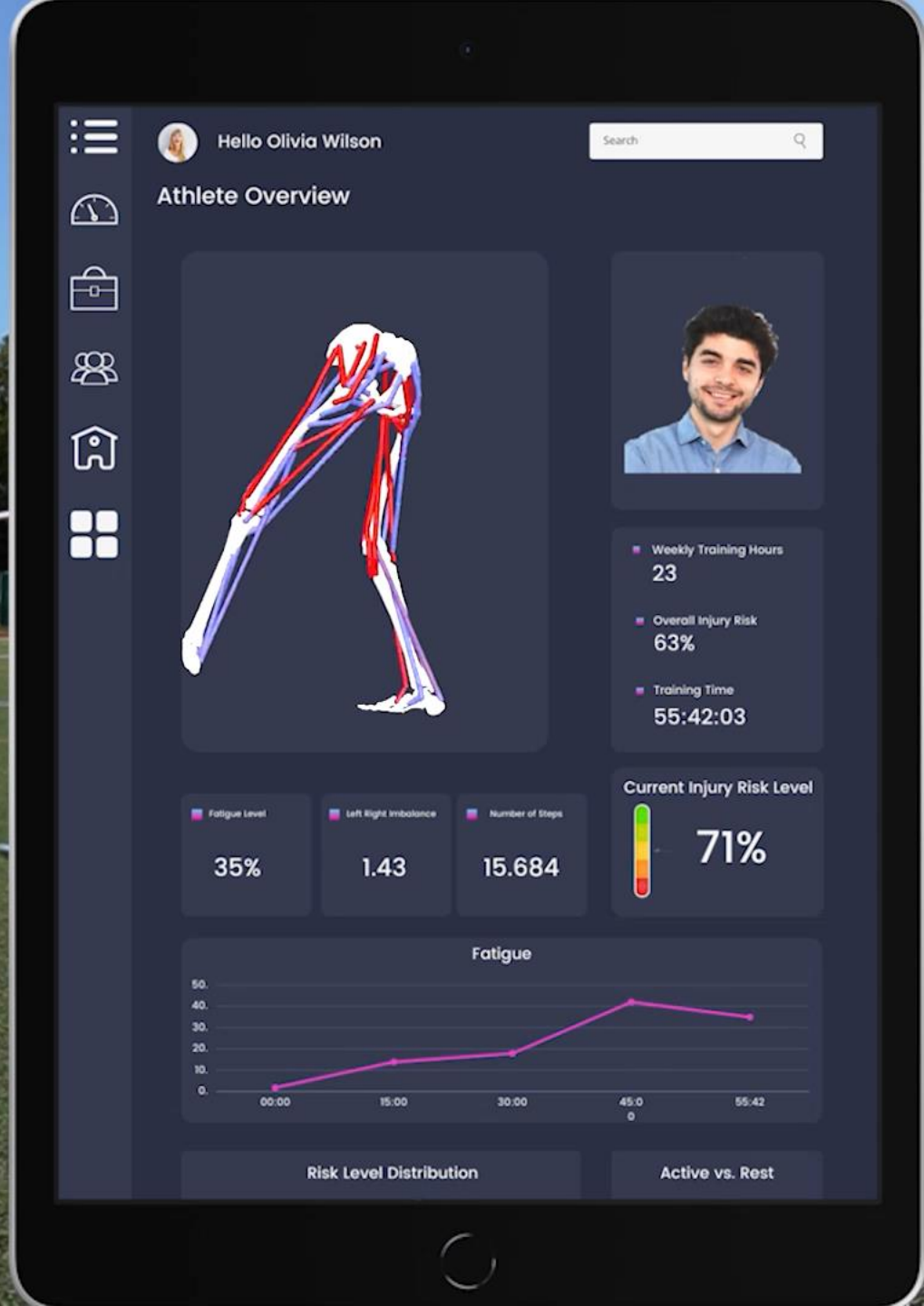
skinetix

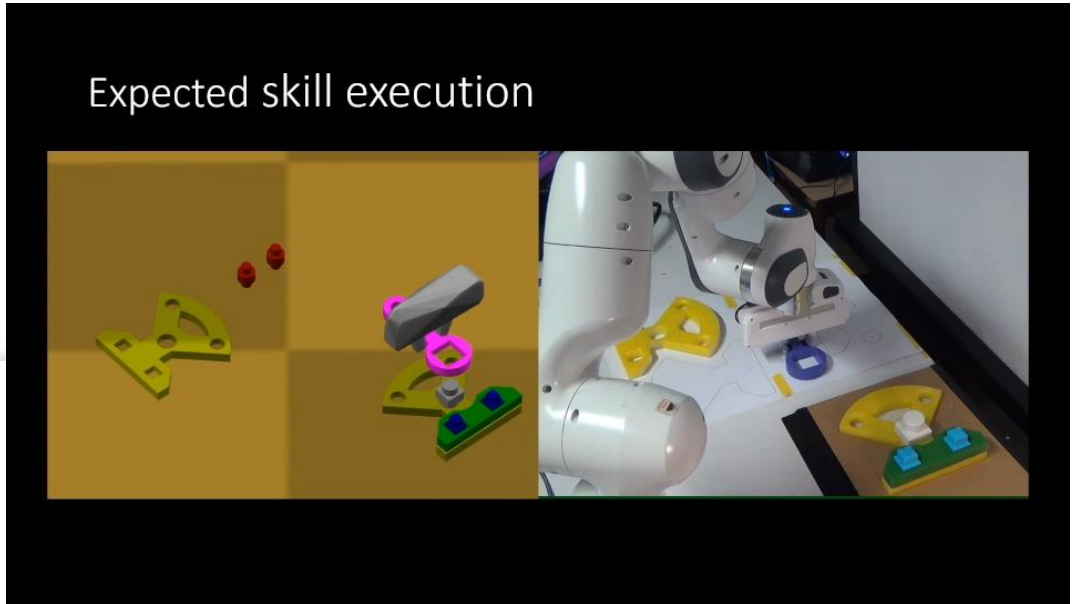
AI Models

Real-time

On the field



Using AI in human robot collaboration



Improving ergonomics in manufacturing

SOPHIA

Human Robot Collaboration and Communication with flexible robotic skin

Volkswagen Motorenwerk Chemnitz

24th Feburary 2023

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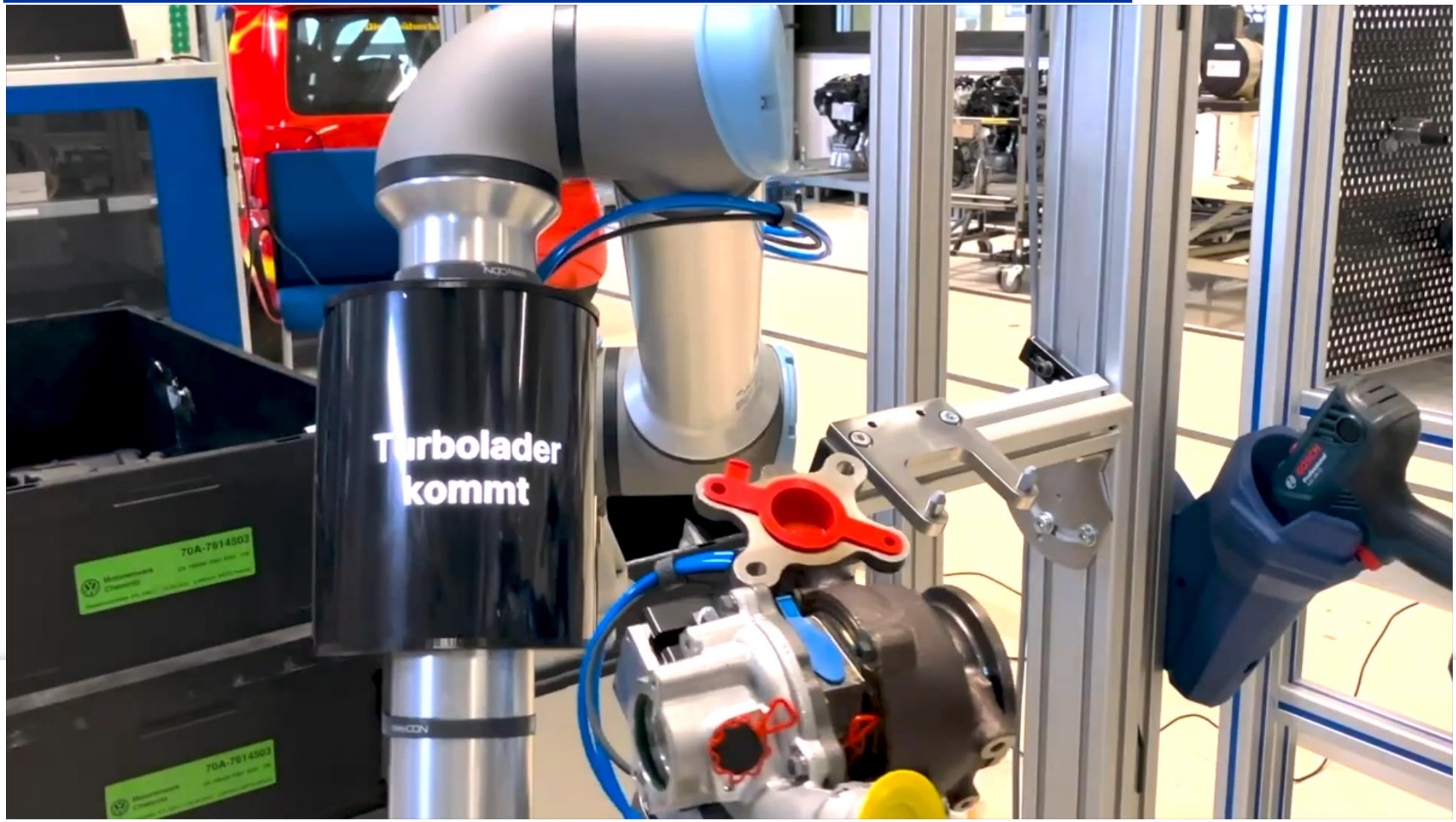
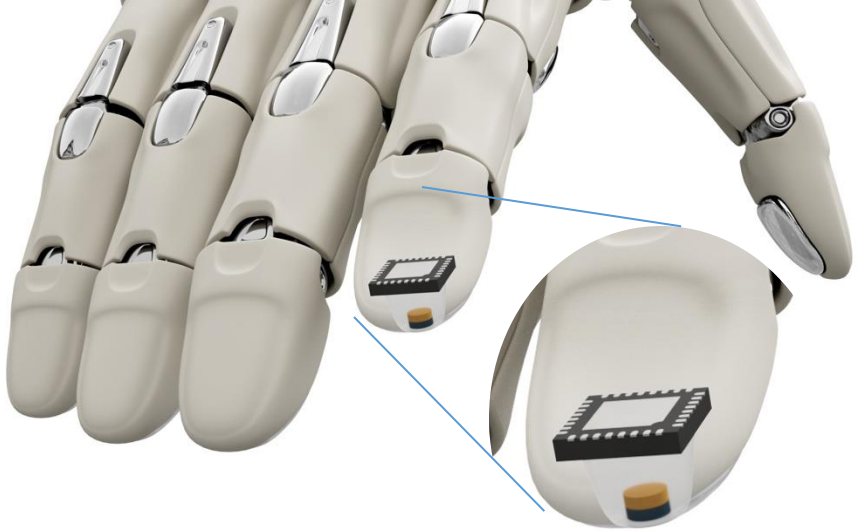
SAFEBOT

making robots situationally intelligent and fast

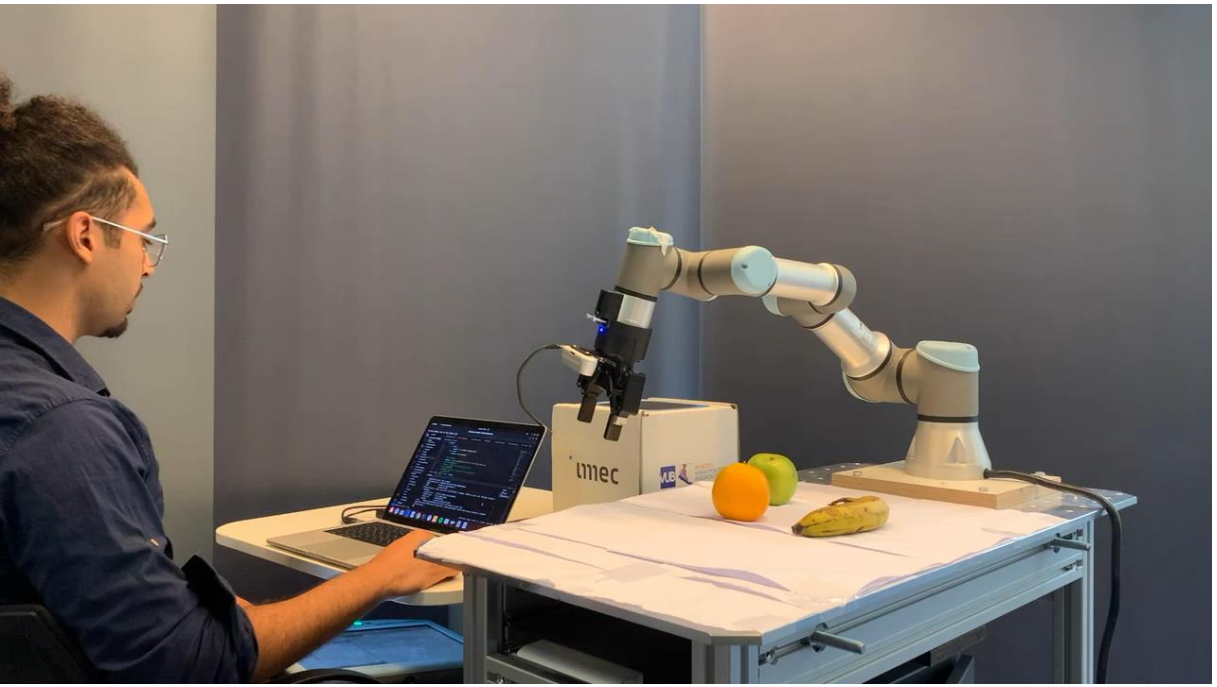


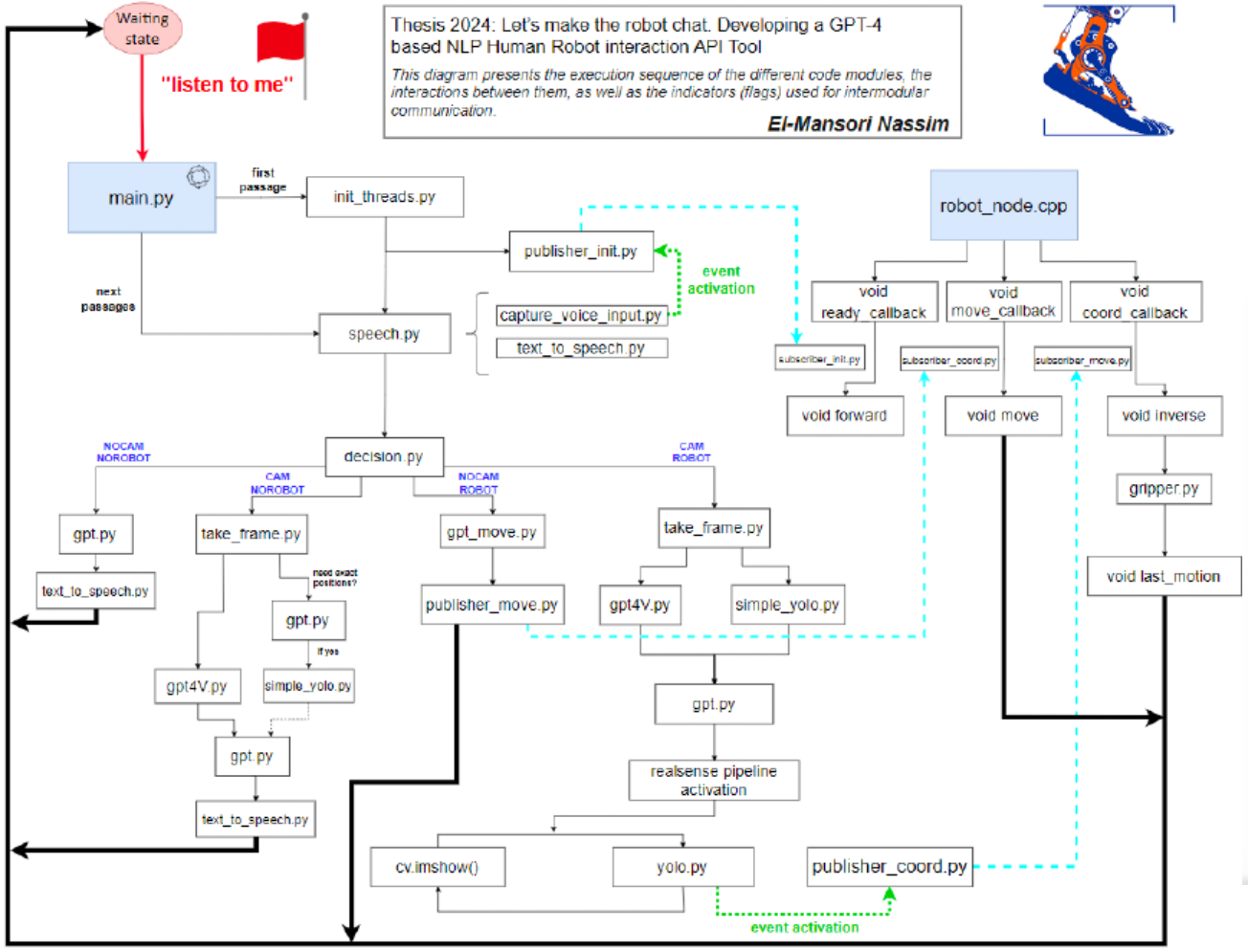


Melexis 3D magnetic touch technology

Melexis
INSPIRED ENGINEERING

GPT-4 based Human-Robot interaction





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Self-Healing Soft Gripper for Universal Adaptive Grasping under Hazardous Environment

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Guy Van Assche [3] and Fumiya Iida [1]

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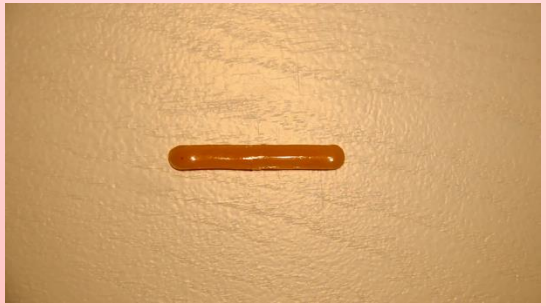
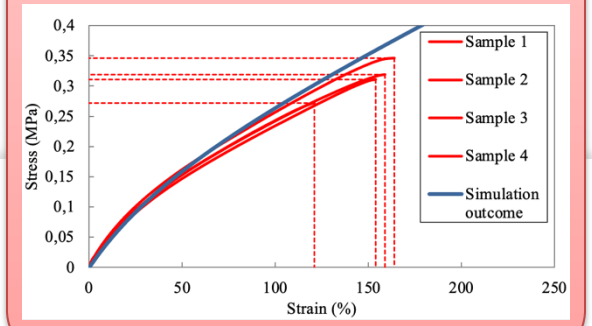
* Corresponding Author: hw567@cam.ac.uk

Self healing soft robots

Material Level

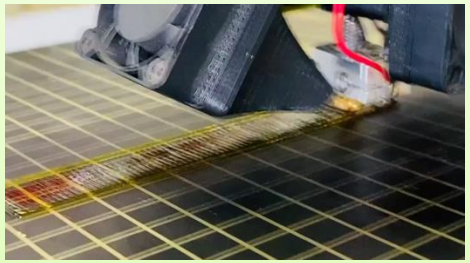
Portfolio of
sustainable self-healing
polymers/composites





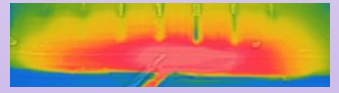
Manufacturing Level

Formative and Additive manufacturing
of (multi-material) self-healing parts



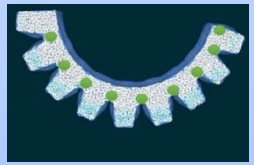
Sensor Level

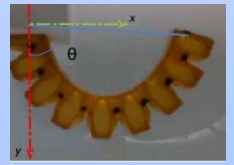
Self-healing flexible electronics
Sensors and heaters



Robotics Level

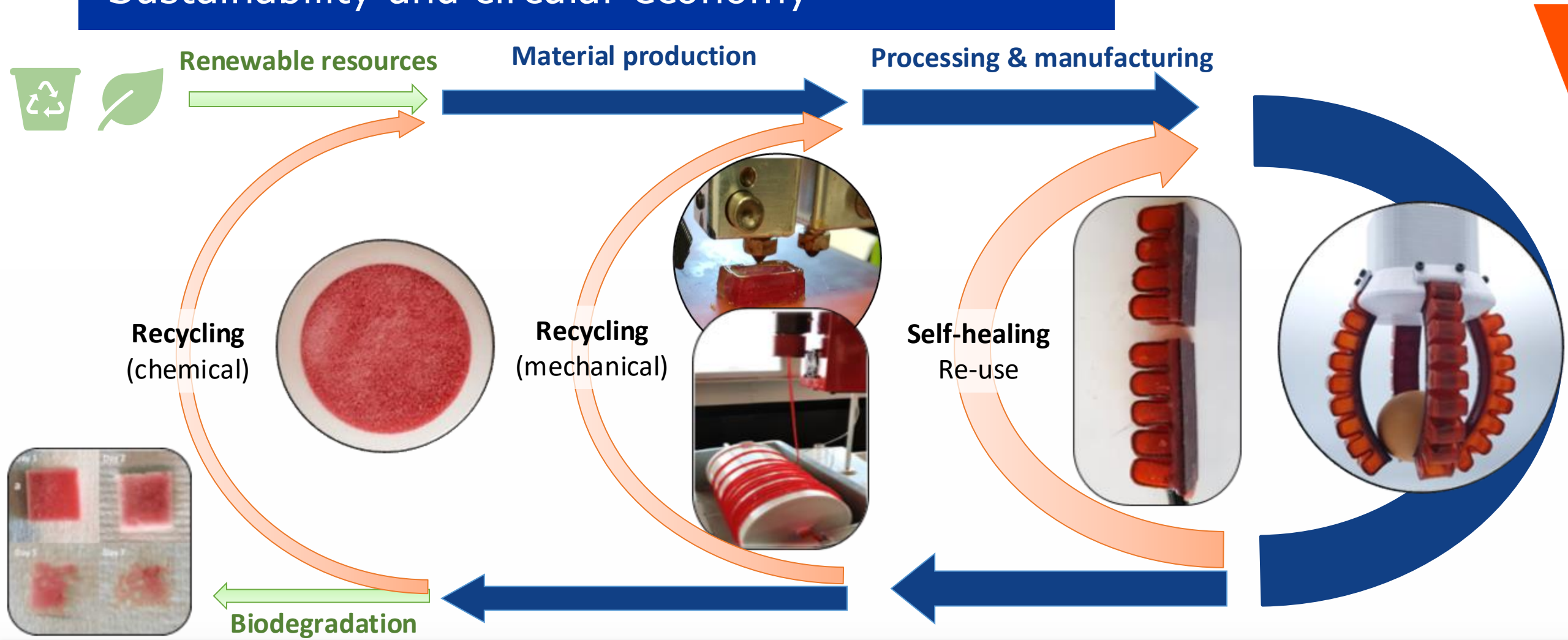
Sensorized healable
soft grippers and bionic hands



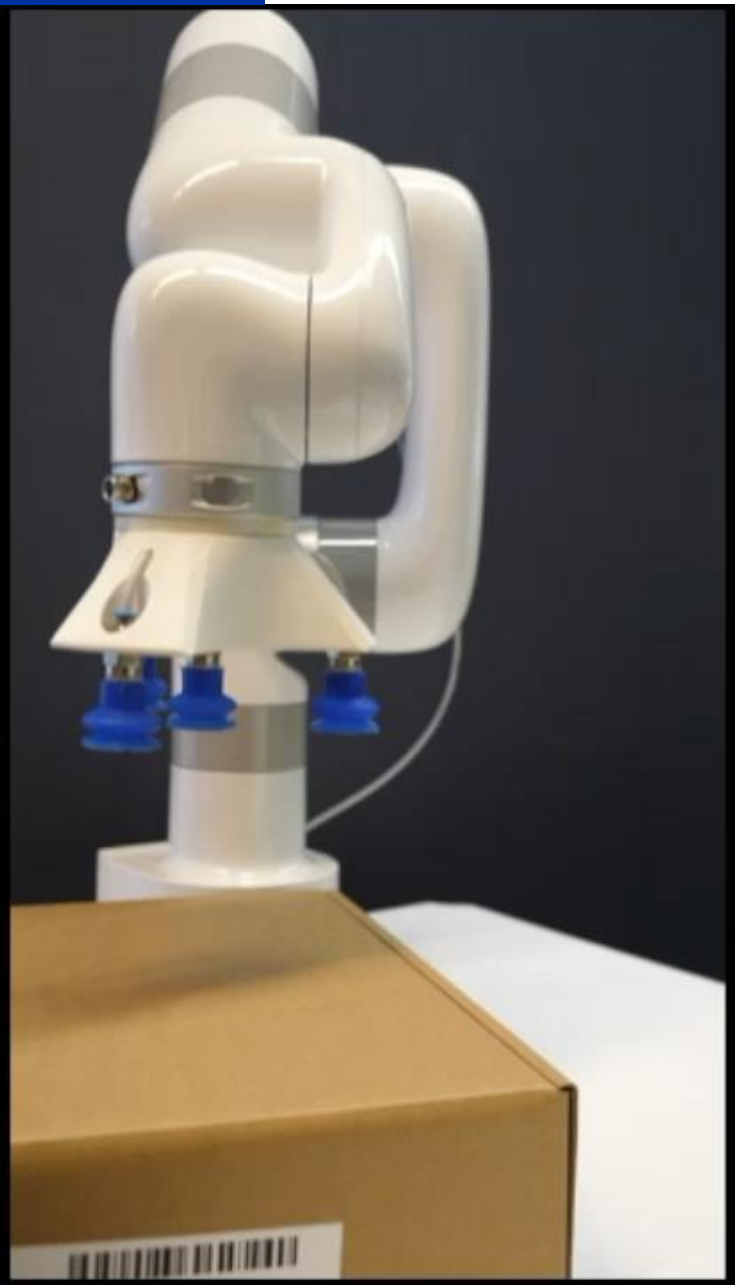


VALENCE
TECHNOLOGIES

Sustainability and circular economy



Self locking suction cups



Conclusion: triple helix for robotics control

Artificial intelligence

Model based control

Embodied intelligence

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BRUBOTICS

associated with

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VUB's human robotics research center

Our aim is to drive the twin transition in robotics by uniting digital and sustainability agendas to address societal, economic, and environmental challenges through groundbreaking innovation.

Axiles Bionics
Bionic feet prosthesis

Valence technologies
Self-healing material

Safebot
Safety proximity system

Skinetix
Sports injury detection

Huskk
Active occupational exoskeletons

Ailos
Highly energy efficient gears

AugmentX
Assessment of human physical activities

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