

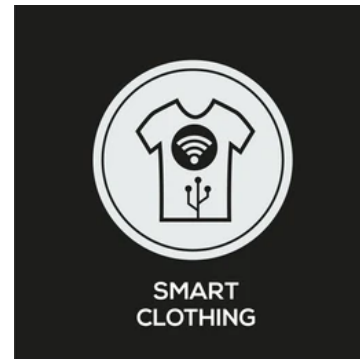


WEARABLE TECHNOLOGY & SOFT ROBOTIC SOLUTIONS

2024-2025

Soft Sensors Lab is an advanced research hub specializing in **wearable technologies, sustainable e-textiles, electronic textiles, and soft robotics.**

With a strong focus on **textile-based sensing systems** and **soft actuators**, the lab is dedicated to creating intelligent, flexible solutions for applications **industry, healthcare, and entertainment.**



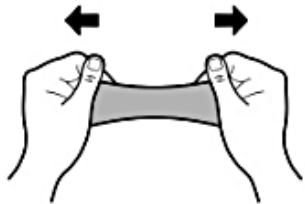


Video

SENSOR TECHNOLOGIES

Hybrid Capacitive Strain Sensor

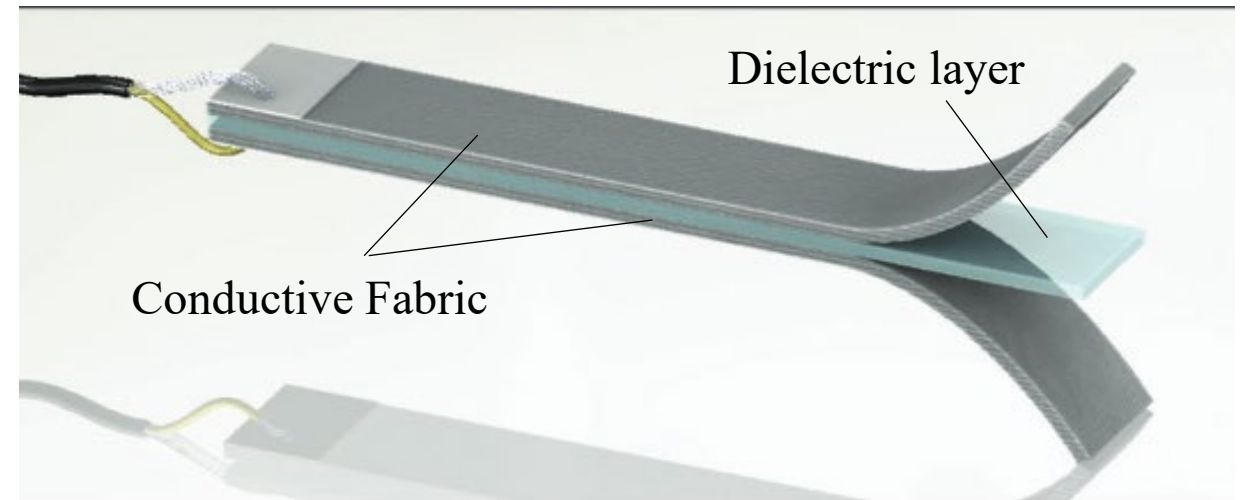
- Stretchable, Flexible, and Deformable
- Wearable Technology



STRETCH

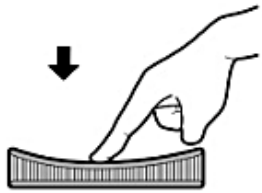


BENDING



Capacitive Pressure Sensor

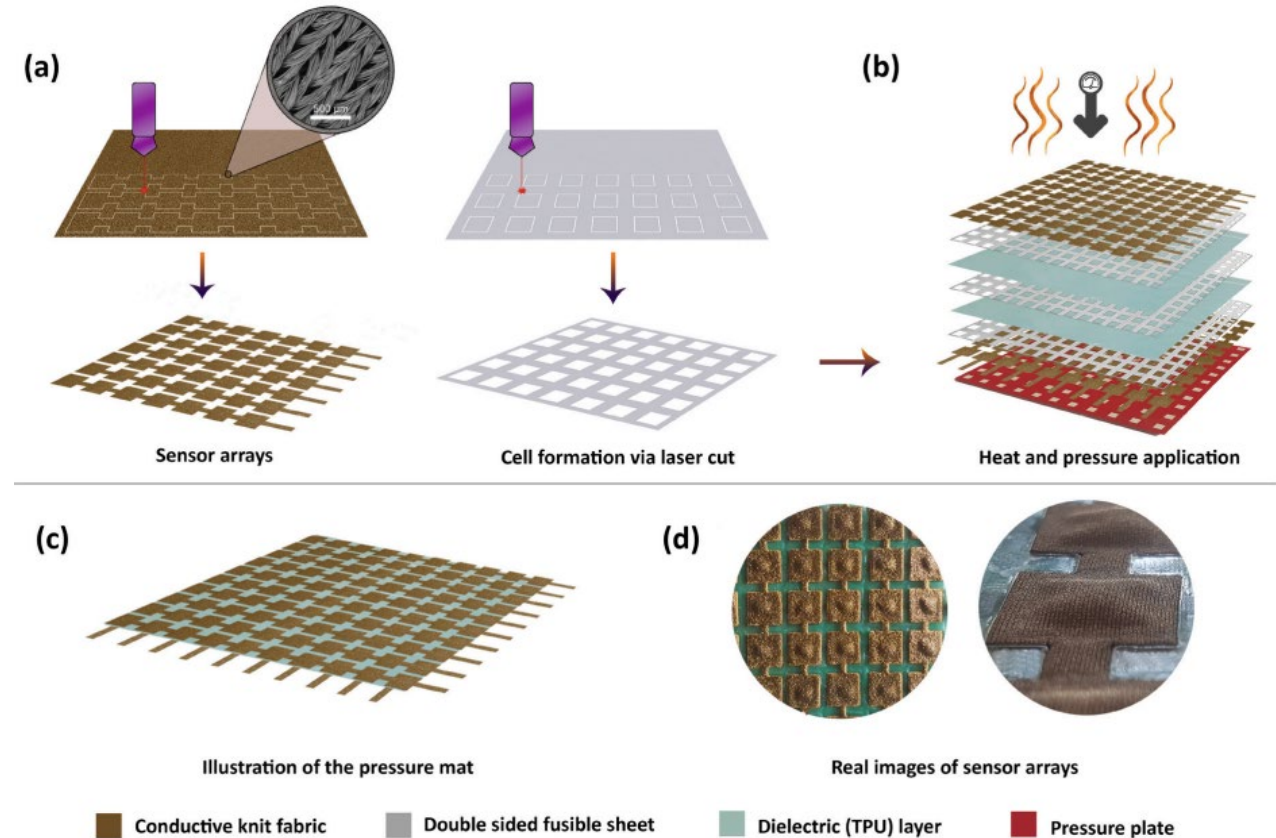
- Flexibility
- Capacitive Sensor Technology
- Wearable Technology Applications



PRESSURE



SOFT TOUCH



Video

Publication

Patent

Award

Machine Knitted Interdigital Strain Sensor

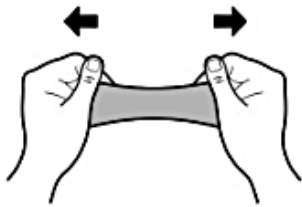


EU-ERC Grantee
Project No: 101042402
11/2022-10/2027



TUBITAK
Project No: 120C118
04/2021-04/2024

- Seamless Knitting Technology
- Capacitive Sensor Technology
- Wearable Technology Applications



STRETCH



BENDING



Video

Publication

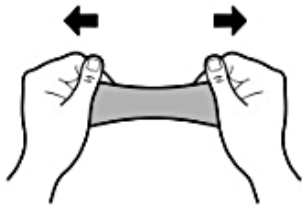


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Project No: 101042402
11/2022-10/2027



TUBITAK-PSF
Project No: 118M668
07/2019-12/2021

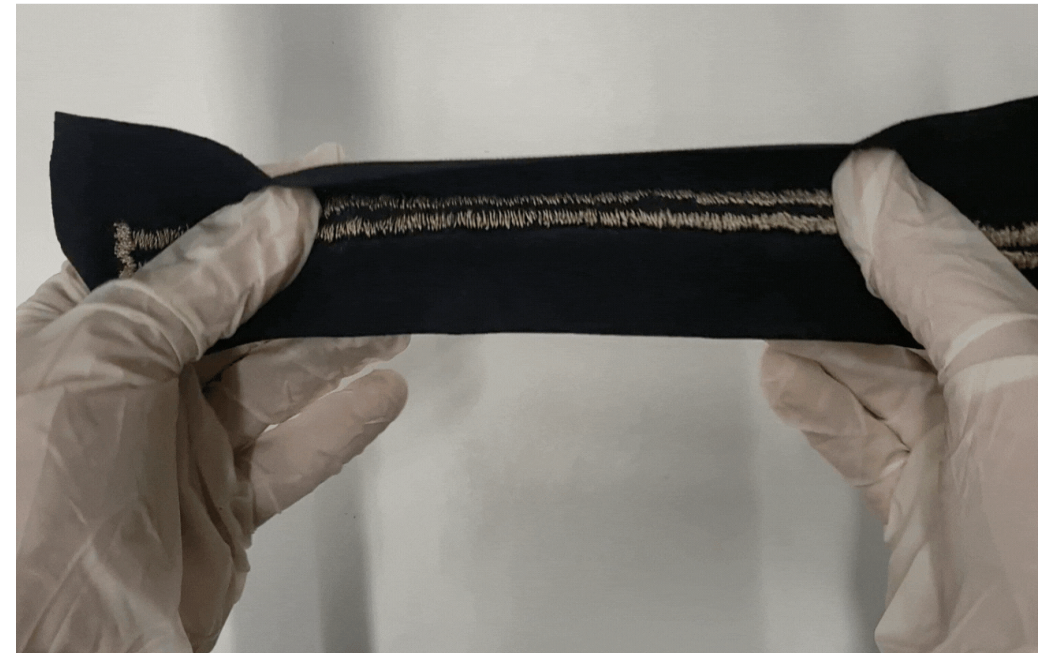
- Resistive Sensor Technology
- Sewing Technology
- Soft Robotics



STRETCH



BENDING



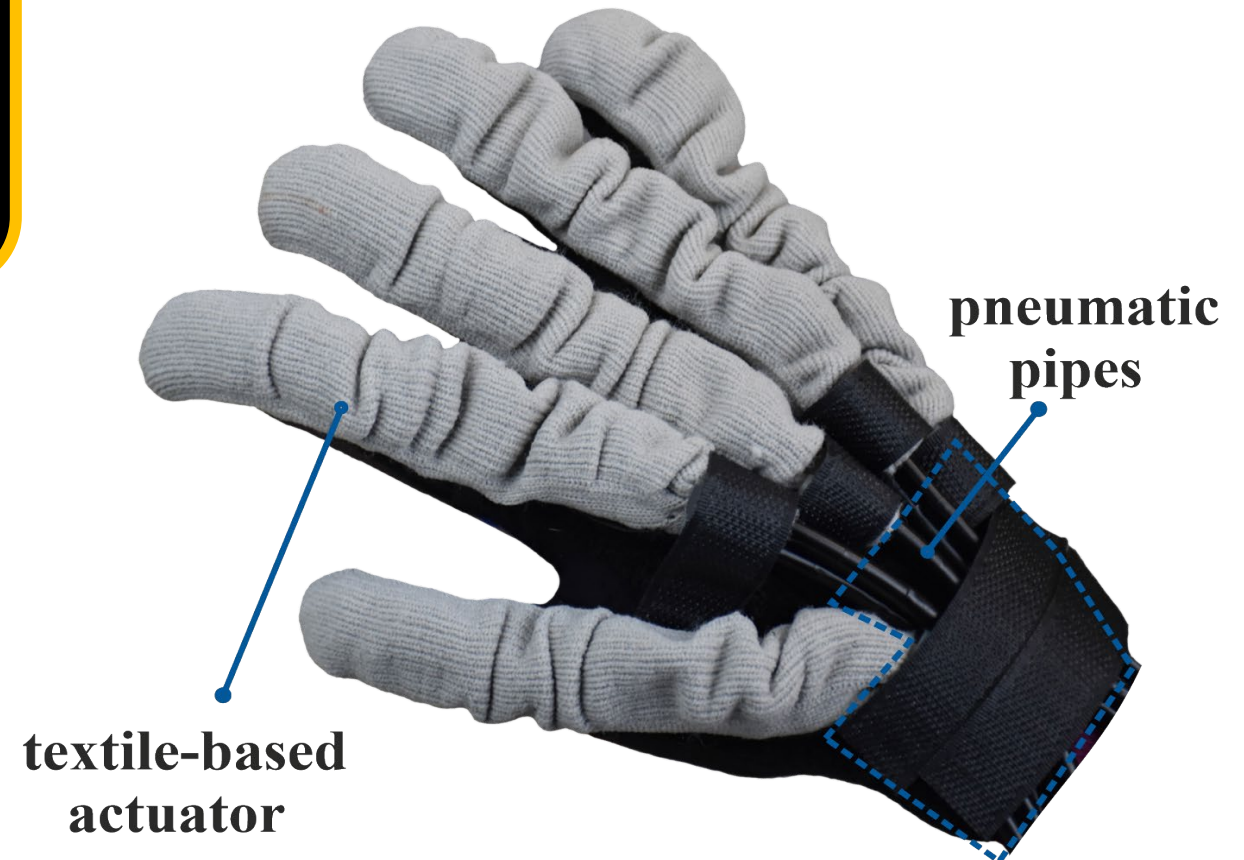
SOFT ROBOTIC TECHNOLOGIES

Machine Knitted Robotic Glove



EU-Marie Skłodowska Curie
Project No: 842786
05/2019-04/2021

- Seamless Knitting
- Robotic Technology



[Video](#)

[Publication](#)

[Patent](#)

[Award](#)

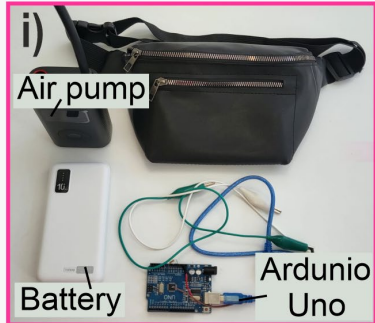
Pouch Motors For Foot Drop



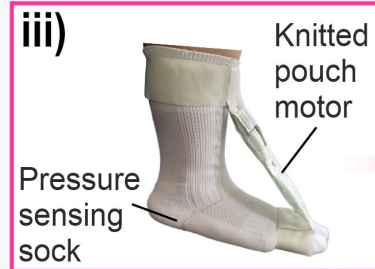
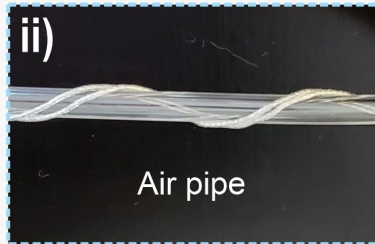
EU-ERC Grantee
Project No: 101042402
11/2022-10/2027



TUBITAK
Project No: 120C118
04/2021-04/2024



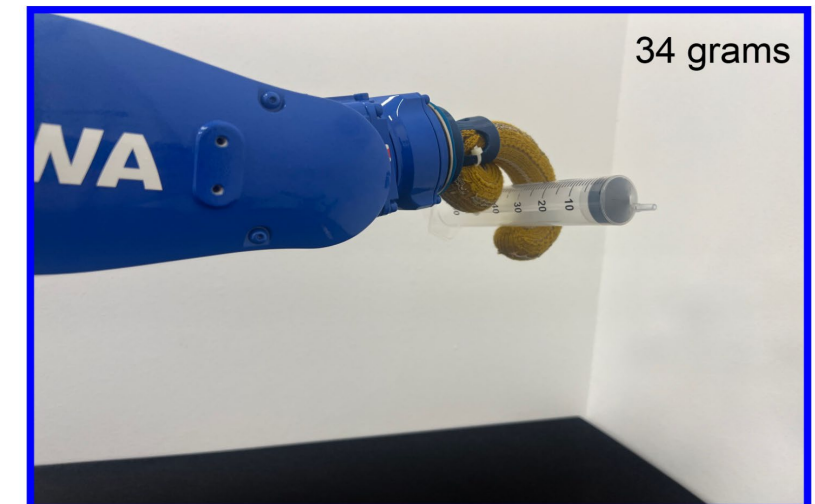
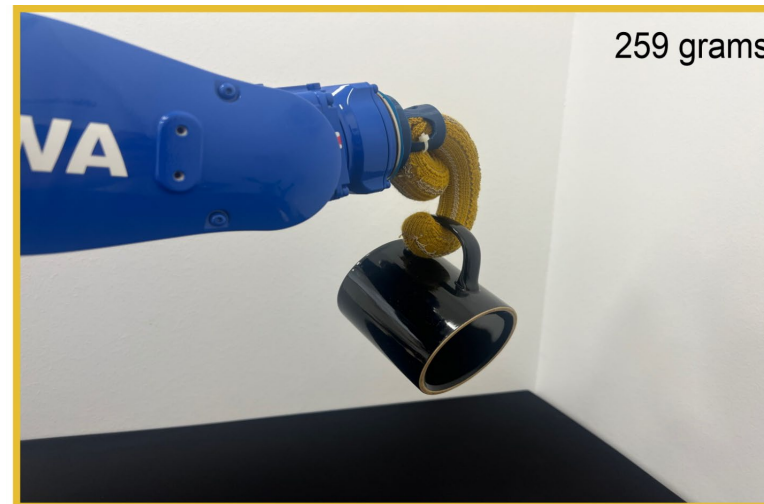
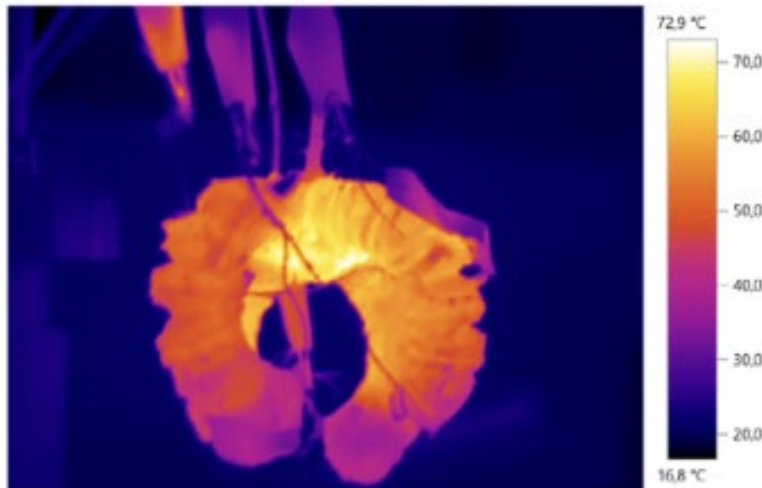
Control system
belt



Video

Publication

- Low Boiling Liquid Actuation
- Resistive Heating and Sensing Robotic Glove



TEXTILE-BASED INTERNET of THINGS (T-IoT) APPLICATIONS

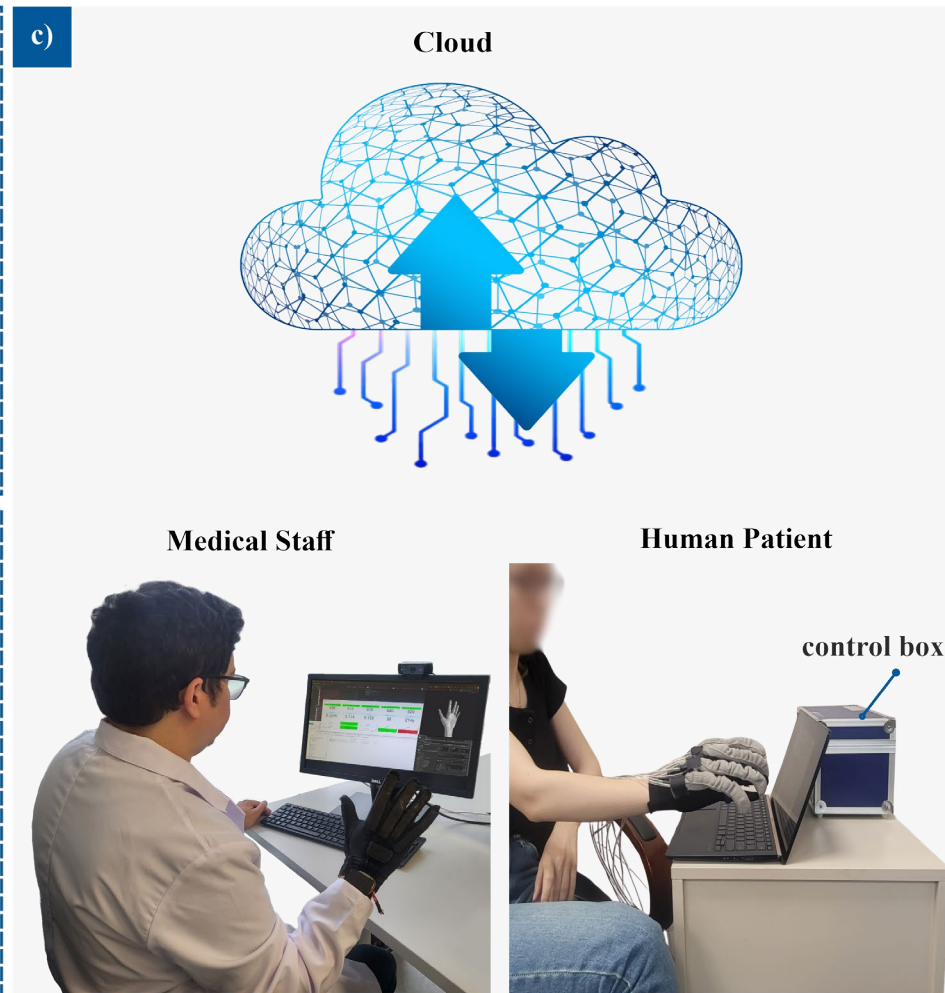
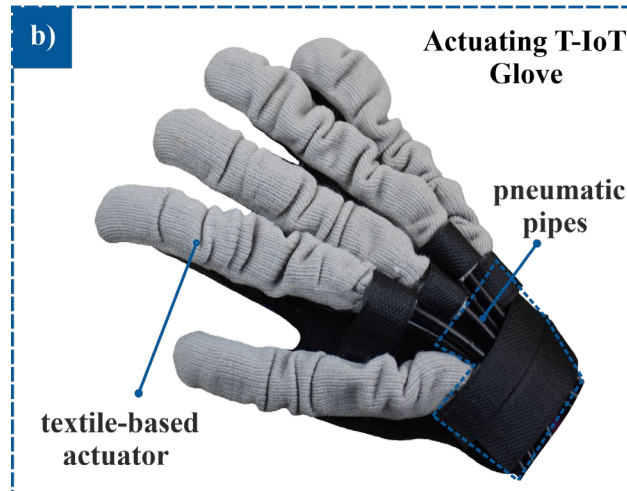
- Stretchable
- Capacitive Textile Strain Sensor
- Monitoring Finger Motions



Actuating T-IoT Glove



EU-Marie Skłodowska Curie
Project No: 842786
05/2019-04/2021



Video



UP



DOWN

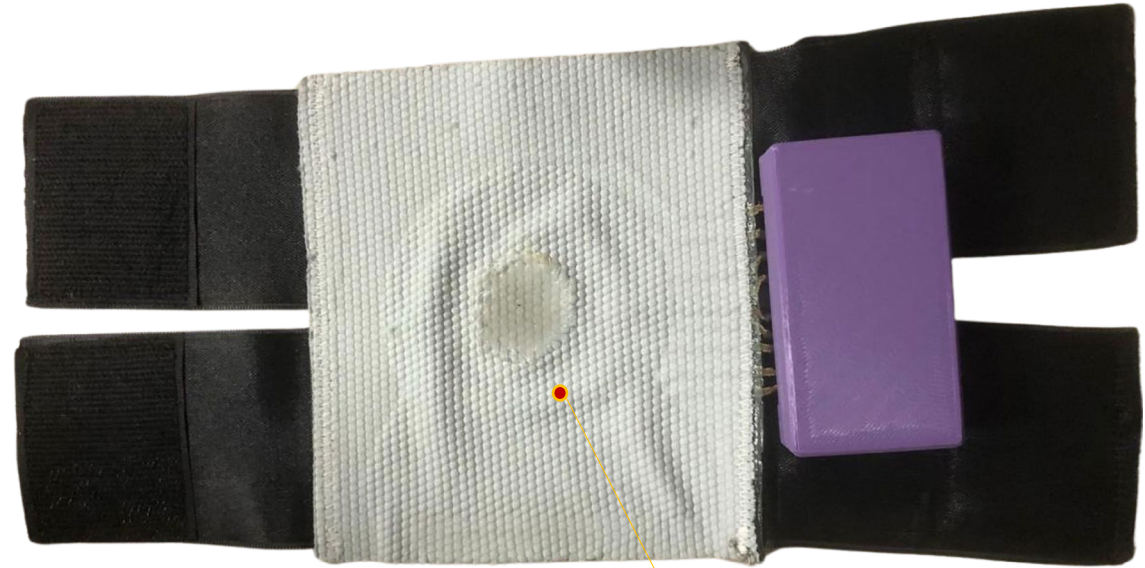
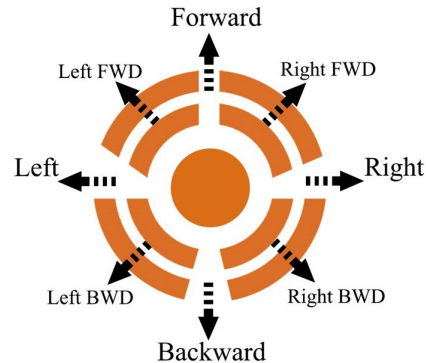


PINCH



ZOOM

- Wearable Sensors
- Human Computer Interaction
- Remote Control



Multidirectional
T-IoT Controller

Sensing T-IoT Shirt



Heartrate Detection & Respiratory Analysis



Posture Recognition

[Video](#)

[Press Release](#)

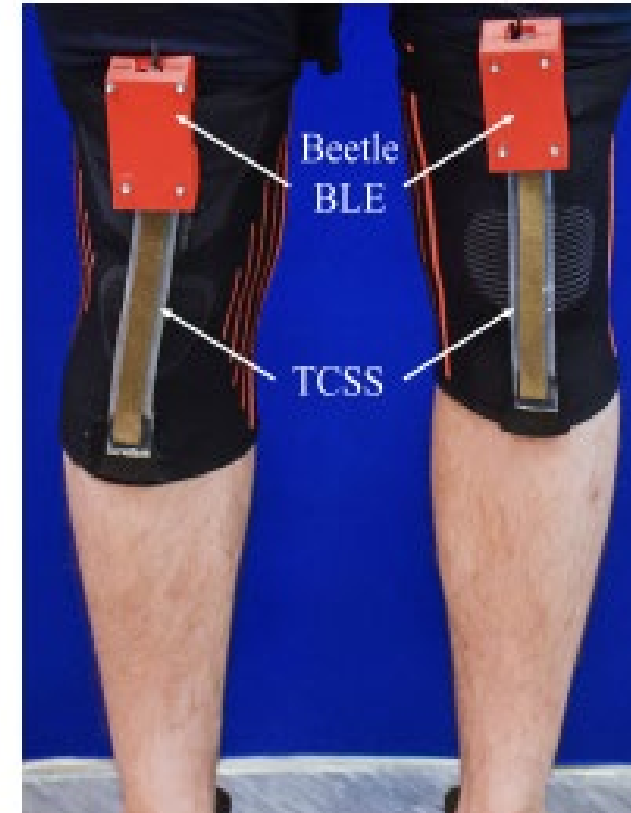
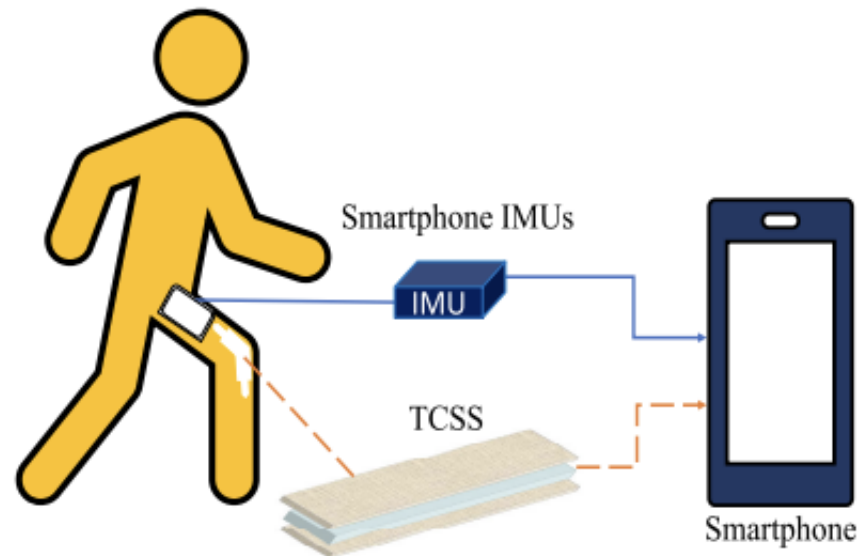


EU-Marie Skłodowska Curie
Project No: 842786
05/2019-04/2021



İTÜ-BAP
Project No: MGA-2018-41481
05/2018-08/2019

- Stretchable, Flexible, and Deformable
- Capacitive Technology





HEATING TECHNOLOGIES

Heating Mat

- Resistive Heating
- Seamless Knitting Technology



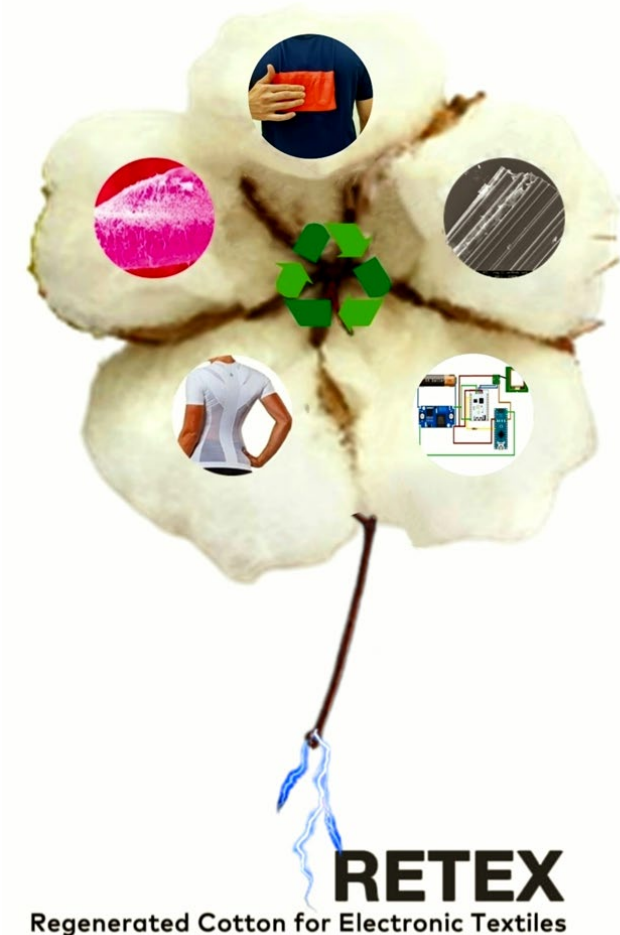
SUSTAINABLE E-TEXTILES

Regenerated Cotton for Electronic Textiles (RETEX)



EU-Marie Skłodowska Curie
Project No: 101086305
01/2023-12/2026

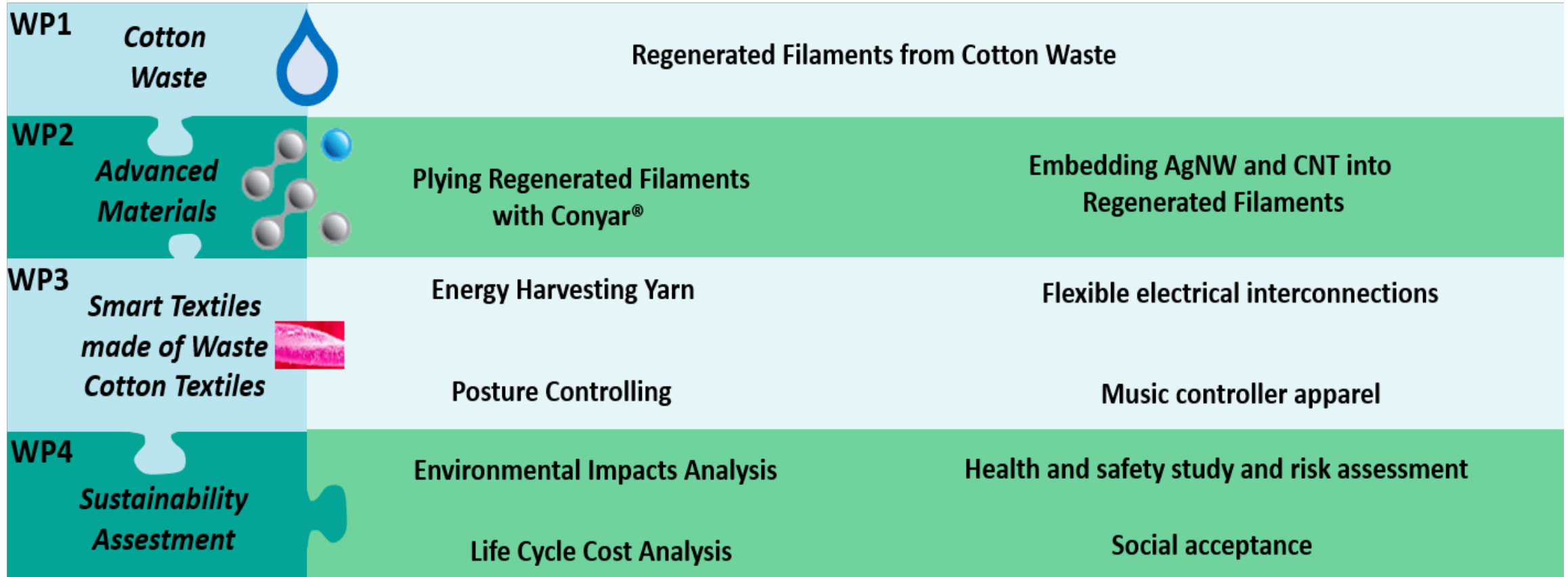
RETEX consortium is proposing to create regenerated cotton from cotton waste to create electronic textiles.





EU-Marie Skłodowska Curie
Project No: 101086305
01/2023-12/2026

Research Objectives





EU-Marie Skłodowska Curie
Project No: 101086258
01/2023-12/2026

- Novel Sustainable Smart Textile Materials
- Replacing Conventional and High Costs Textile Materials
- Sustainable, Environmentally Friendly, Cheaper and Novel Materials
- Smart Textiles Made of Sustainable Materials & Waste Materials

Smart Textiles made from Agriculture and Natural Waste Materials (SMARTWASTE)



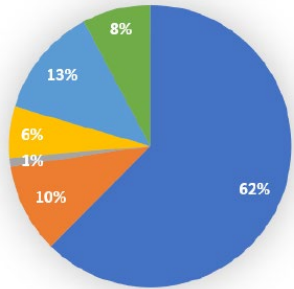
- Divers, interdisciplinary, cross-sectoral, international consortium
- 10 Partners, 6 countries
- 5 industrial partners
- 5 RTOs

COORDINATOR	Organisation - İSTANBUL TEKNİK UNIVERSİTESİ - İTÜ	EDIT ROLES	>
BENEFICIARY	Organisation - MARMARA UNIVERSITY - MarUn	EDIT ROLES	>
BENEFICIARY	Organisation - AKILLI TEKSTİL VE SANAYİ LIMITED SİRKETİ	EDIT ROLES	>
BENEFICIARY	Organisation - TOETERS MIENTJE JENNIGJE - TOETERS MIENTJE JENNIGJE	EDIT ROLES	>
BENEFICIARY	Organisation - GRADO ZERO ESPACE SRL	EDIT ROLES	>
BENEFICIARY	Organisation - TECH2MARKET SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA - TECH2MARKET	EDIT ROLES	>
BENEFICIARY	Organisation - RHEINLAND-PFALZISCHE TECHNISCHE UNIVERSITÄT	EDIT ROLES	>
BENEFICIARY	Organisation - İTUNOVA TEKNOLOJİ ANONİM SİRKETİ - İTUNOVA	EDIT ROLES	>
BENEFICIARY	Organisation - TECHNISCHE UNIVERSITÄT DRESDEN - TUD	EDIT ROLES	>
Organisation not part of the consortium - THE UNIVERSITY OF MANCHESTER - UNIVERSITY OF MANCHESTER		EDIT ROLES	>



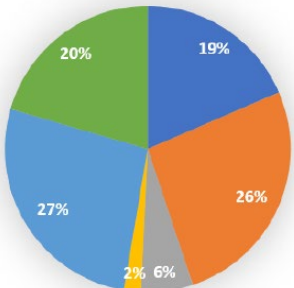
EU-Marie Skłodowska Curie
 Project No: 101086258
 01/2023-12/2026

Home Country



■ Turkey ■ Italy ■ Netherlands ■ Poland ■ Germany ■ UK

Hosting Country

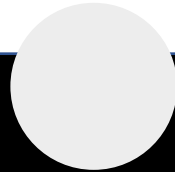


■ Turkey ■ Italy ■ Netherlands ■ Poland ■ Germany ■ UK

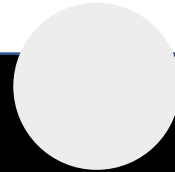
Gumus, C., Ozlem, K., Khalilbayli, F., Erzurumluoglu, O.F., Onal, E., Ince, G., Atalay, A.T., Atalay, O. 2023. Textile based large-area pressure sensing arrays. Patent Number: WO2023177380A1. [[Link](#)]

Yilmaz, A.F., Ozlem, K., Khalilbayli, F., Elmoughni, H.M., Atalay, A.T., Ince, G., Atalay, O. 2022. Actuators for Soft Robotic Applications. Patent Number: WO2022231556. [[Link](#)]

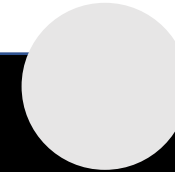
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- Yilmaz, A.F., Ozlem, K., Celebi, M.F., Taherkhani, B., Kalaoglu, F., Atalay, A.T., Ince, G., Atalay, O. 2024. Design and Scalable Fast Fabrication of Biaxial Fabric Pouch Motors for Soft Robotic Artificial Muscle Applications, *Advanced Intelligent Systems*, 6, 2300888. [\[Link\]](#)
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- Yilmaz, A.F., Ahmed, I. A. K., Gumus, C., Ozlem, K., Cetin, M.S., Atalay, A.T., Ince, G., Atalay, O. 2024. Highly Stretchable Textile Knitted Interdigital Sensor for Wearable Technology Applications, *Advanced Sensor Research*, 3, 2300121. [\[Link\]](#)
- Gumus, C., Ozlem, K., Khalilbayli, F., Erzurumluoglu, O.F., Onal, E., Ince, G., Atalay, A.T., Atalay, O. 2022. Textile-based Pressure Sensor Arrays: A Novel Scalable Manufacturing Technique. *Micro and Nano Engineering*, 15, 100140. [\[Link\]](#)
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- Elmoughni, H.M., Yilmaz, A.F., Ozlem, K., Khalilbayli, F., Cappello, L., Tuncay Atalay, A., Ince, G., Atalay, O. 2021. Machine-Knitted Seamless Pneumatic Actuators for Soft Robotics: Design, Fabrication, and Characterization, *Actuators*, 10, 94. [\[Link\]](#)



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OZGUR ATALAY**



**ASSOC. PROF. DR.
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**ASST. PROF.
ASLI ATALAY**

Team Members



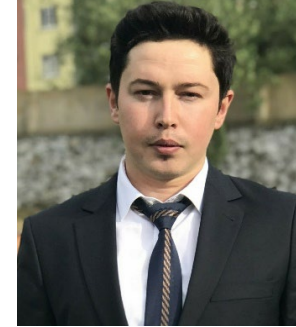
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Hend Elmoughni [Designer]

Doctor of Philosophy

Zuhaib Hassan [Textile Engineering]

Mehmet Fatih Çelebi [Mechatronics Engineering]

Master of Science

İrem Nur Yüncüler [Textile Engineering]

İlknur Çelik [Computer Engineering]

Abdullah Ömer Tosun [Textile Engineering]

Fidan Khalilbayli [Computer Engineering]

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