

OZGUN KILIC AFSAR

HCI & Haptics Researcher • Material Scientist • Engineer & Maker • Interaction Designer
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Education

Massachusetts Institute of Technology (MIT)	Cambridge, MA
Ph.D. Candidate, <i>Media Arts and Sciences, MIT Media Lab. Tangible Media Group</i>	2022-...
Ph.D. Candidate, <i>MIT MechE, BioInstrumentation Lab</i>	
Uppsala University (UU), Sweden	Uppsala, Sweden
Ph.D. Licentiate, <i>Materials Science and Engineering, Division of Microsystems Technology</i>	2019-22
Royal Institute of Technology (KTH), Sweden	Stockholm, Sweden
Ph.D. Licentiate, <i>Human Computer Interaction, Division of Media Technology and Interaction Design</i>	2019-22
Royal College of Art (RCA) & Imperial College, UK	London, UK
MA & MSc., <i>Innovation Design Engineering, GPA 4.0/4.0</i>	2012-15
Sabanci University (SU), Turkey	Istanbul, Turkey
Bachelor of Industrial Engineering, GPA 3.76/4.0	2007-11

Selected Awards & Honors

Nagashima **Fellowship**, MIT, Fall 2023 - Spring 2024
Fast Company's 2022 Innovation by Design Awards, **Finalist in Materials Category**, *OmniFiber*
A'Design Awards, **Award winner in Textiles Category**, *OmniFiber: Self Sensing Morphing Textiles*, 2022
Hackaday Prize, **Grand Prize Winner**, *FlowIO*, 2021
iF DESIGN TALENT AWARD, **Winner**, *FlowIO*, 2021
Two Best Paper Awards at ACM's Designing Interactive Systems Conference, ACM DIS 2018 and DIS 2020
QEPrize, The Queen Elisabeth Prize for Engineering, **Finalist**, 2013
Royal College of Art, **Outstanding Graduate Student Award**, Innovation Design Engineering, 2015
Tubitak **Undergraduate Scholarship for Outstanding Achievement**, 2007 – 2011
Recipient of Sabanci University Sakip Sabanci **Full Bright Scholarship**, 2007 – 2011
15th place in Maths & Sciences, **91st place** in the overall **out of 1.7 million** entrants in the nation-wide University Entrance Exams (OSYM), Turkey, 2007

Publications

Ozgun Kilic Afsar, Antonio Loconte, Wedyan Babatain, Sarah Nicita, Michael Smith, Hiroshi Ishii, Herbert Shea and Vito Cacucciolo. Coupling of Fiber Pumps and Antagonistic Fiber Muscles Using Bias Pressure for Textile Robotics. **2024. (To Appear in Science Robotics)**

Wedyan Babatain, Ozgun Kilic Afsar, Hiroshi Ishii. 2023. Graphene-Enabled Selective Wetting of Liquid Metal on Polyamide Substrate for the Fabrication of Soft Wearable Electronics, MRS Fall Meeting 2023.

Jack Forman, Ozgun Kilic Afsar, and H. Ishii et al. FibeRobo: Fabricating 4D Fiber Interfaces by Continuous Drawing of Temperature Tunable Liquid Crystal Elastomers. 36th Annual ACM Symposium on User Interface Software and Technology (UIST'23).

Wedyan Babatain, Ozgun Kilic Afsar, Fabian Velasquez, Hiroshi Ishii. 2023. Selective Patterning of Liquid Metal-Based Soft Electronics via Laser-Induced Graphene Residue. IEEE-EMBS International Conference on Body Sensor Networks.

Ozgun Kilic Afsar, Y. Luft, K. Cotton, E. Stepanova, C. N. Pacheco, K. Höök, Hiroshi Ishii. 2023. Corsetto: A Kinesthetic Garment for Designing, Composing for, and Experiencing an Intersubjective Haptic Voice. ACM CHI Conference on Human Factors in Computing Systems, 2023.

Ozgun Kilic Afsar, A. Shtarbanov, H. Mor, K. Nakagaki, J. Forman, S. Hee Jeong, K. Hjort, K. Höök, and Hiroshi Ishii. 2021. OmniFiber: Integrated Fluidic Fiber Actuators for Weaving Movement based Interactions into the 'Fabric of Everyday Life'. 34th Annual ACM Symposium on User Interface Software and Technology (UIST '21).

Anke Brocker, Jose A. Barreiros, Ali Shtarbanov, Kristian Gohlke, **Ozgun Kilic Afsar**, and Soren Schoder. 2022. Actuated Materials and Soft Robotics Strategies for Human-Computer Interaction Design. ACM CHI Conference on Human Factors in Computing Systems Extended Abstracts CHI EA'22.

Catarina Silveira, **Ozgun Kilic Afsar**, Sarah Fdili Alaoui. 2022. Wearable Choreographer: Designing Soft-Robotics for Dance Practice. In Proceedings of the 2022 ACM Designing Interactive Systems Conference (DIS '22).

Ozgun Kilic Afsar*, M. L. J. Søndergaard*, M. Balaam, Material experiences of menstruation through symbiotic technologies, Materials Experience II, 2021, 147-152.

Ozgun Kilic Afsar*, K. Cotton*, Y. Luft, P. Syal, and F. B. Abdesslem. 2021. SymbioSinging: Robotically transposing singing experience across singing and non-singing bodies. In Creativity and Cognition (C&C '21). ACM, Article 52.

Ozgun Kilic Afsar*, H. Mor, C. Honnet and Hiroshi Ishii. "Choreographic Interfaces: Wearable Approaches to Movement Learning in Creative Processes." ACM ICPS, 2021.

M. L. J. Søndergaard, **Ozgun Kilic Afsar**, M. C. Felice, N. C. Woytuk, and M.e Balaam. 2020. Designing with Intimate Materials and Movements: Making "Menarche Bits". In Proceedings of the 2020 ACM Designing Interactive Systems Conference (DIS '20). ACM 587–600. (*The paper won Best Paper Award at ACM DIS'20.*)

Patents

Ozgun Kilic Afsar, C. Honnet, J. Forman, A. Kothakanda, R. Lin, S. Nicita, and Hiroshi Ishii. Apparatus for Body Temperature Long Liquid Crystal Elastomer Fibers. Provisional Patent, MIT TLO, November 22, 2022.

Ozgun Kilic Afsar, A. Shtarbanov, H. Mor, K. Nakagaki, J. Forman, K. Modrei, S. Hee Jeong, K. Hjort, K. Höök, and Hiroshi Ishii. System Design and Apparatus for Morphing Microfluidic Fibers with Strain Tunability. Provisional Patent, MIT TLO, November 5, 2021.

Ozgun Kilic Afsar. System Design and Apparatus for Respiratory Regulation Device. TurkPatent 2017 08798.

Selected Experience

L'Oréal, Augmented Beauty <i>Independent Contractor, MIT Media Lab, Tangible Media Group</i>	12/23 – present Cambridge, MA
adidas AG <i>Independent Contractor, MIT Media Lab, Tangible Media Group</i>	06/21 – present Cambridge, MA
Google, ATAP <i>Project Lead, FRP, MIT Media Lab, Tangible Media Group</i>	01/22 – present Cambridge, MA
Shima Seiki & MIT Media Lab <i>Project Lead, FRP'22 & 23 MIT Media Lab, Tangible Media Group</i> — Research on 4D Knit using Shima Seiki MACH2XS WholeGarment	Cambridge, MA 2/21 – present
Massachusetts Institute of Technology (MIT) <i>Research Affiliate, MIT Media Lab, Tangible Media Group</i> — Research, hardware training (Shima Seiki MACH2XS WholeGarment)	Cambridge, MA 01/20 – 01/21
Uppsala University (UU) <i>Research Engineer, Project: Soft Milli-robots Advisor: Prof. Klas Hjort</i> — Pneumatic Energy Harvesting and Sensor-Actuator Nodes: <ul style="list-style-type: none">• Prototyped fiber reinforced pneumatic artificial muscle fibers• Developed liquid alloy based stretchable sensors• Developed multi-step surface treatment method for adhering non-elastomeric components to PDMS substrates	Uppsala, Sweden 09/19 – 12/19
Royal Institute of Technology (KTH) <i>Research Engineer, Project: Robotic Wireless Materials Advisor: Kia Hook, Klas Hjort</i> — Fiber-based Soft Robotics for Human Assistance: <ul style="list-style-type: none">• Developed fabrication method for fluidic fiber actuators with reinforcement• Explored multimodal haptic feedback (vibration, texture, compression)• Presented results at a workshop with the industry stakeholders (Ericsson, ABB Robotics)	Stockholm, Sweden 10/18 – 06/19

Cell-Free Tech / Open Cell	London, UK
<i>UI/UX Lead</i> , London Labs for Life Science Companies	10/16 – 01/18
Yamaha	London, UK
<i>Research Engineer</i> , Project: Sound with Creative Intention Commissioner: Yamaha	08/15 – 08/16
Ideal Standard Group	London, UK
<i>Research Engineer</i> , Project: Biosensors Research for Product Development	01/15– 06/15

Teaching Experience & Mentoring

Massachusetts Institute of Technology (MIT), Lecturer & Teaching Assistant	
Tangible Interfaces, <i>MAS.834 (MSc)</i>	Fall 2022
Mentoring four Mech-e UROP students	Fall 2022 - ...
Uppsala University (UU), Teaching Assistant & Mentor	
Artificial Muscles (<i>MSc</i>)	Fall 2021
Royal Institute of Technology (KTH), Lecturer & Teaching Assistant	
Human Computer Interaction, <i>DH 1588 Sensor Programming (BSc)</i>	Spring 2022
Human Computer Interaction, <i>DH 2628 Interaction Design Methods (MSc)</i>	Spring 2021
Degree Projects at Human Computer Interaction, <i>Mentoring (MSc Thesis)</i>	
Human Computer Interaction, <i>DH 1621 Introduction to Human Computer Interaction (BSc)</i>	Spring 2019
Mentoring eight MSc students	Fall 2020 - 22

Conference Presentations & Selected Talks

- MIT Lincoln Lab. Seminar, “*Distributed Fluid-powered Wearables for Motor Assistance*”. Nov 29, 2022
- Invited Talk and Live Demo at Issey Miyake Tokyo HQ. “*Robotic Fabrics*”. June 29, 2022.
- University of Tokyo. Seminar, “*Robotic Fabrics for Kinesthetic Learning and Sharing*”. June 28, 2022.
- MIT CSAIL HCIE. Seminar, “*Robotic Fabrics for Kinesthetic Learning and Sharing*”. May 25, 2022.
- Carnegie Mellon University, Morphing Matter Lab. Public Gues Lecture, “*Shaping and Being Shaped by Fabric Machines*”. February 8, 2022.
- ACM UIST’21. Research Paper Presentation at ACM Symposium on User Interface Software and Technology, “*OmniFiber: Integrated Fluidic Fiber Actuators for Weaving Movement-based Interactions into the Fabric of Everyday Life*”. October 12 – 14, 2021.
- ACM C&C’21. Research Paper Presentation at ACM Creativity and Cognition, “*SymbioSinging: Robotically transposing singing experience across singing and non-singing bodies*”, June 2021.
- KTH Royal Institute of Technology, PhD Seminar, “*Translating, Transferring and Proprioceiving Somatics by Polyhaptic Notations*”. April 29, 2021.
- E-Stitches Berlin. Vision Talk, “*Shaping and Being Shaped by Computing Fabrics*”. June 3, 2021.

Relevant Skills

Software: Unity, Autodesk Maya (+Arnold, Octane), Fusion 360, Eagle, Solidworks, Adobe Suite, Blender, 3D Studio Max, Rhino/Grasshopper, Houdini, Max/MSP, Python, Processing, Javascript, LaTeX, Julia (beginner)

Hardware: Microcontrollers (Adafruit NRF52840, Arduino, ESP32, Xiao), actuators (pneumatics, hydraulics, linear motors, piezo motors, liquid crystals), sensors (EMG, EEG, ECG, strain gauge, piezo, force cells)

Laboratory: Instron mechanical testing, dynamic mechanical analysis, planetary and centrifugal mixing, Soft lithography, Plasma treatment, wet etching, electroplating.

Fabrication: Digital prototyping and manufacturing of polymers (specialized to elastomers), liquid crystal polymer synthesis, photoresponsive polymers, digital and physical prototyping of textiles, machine-knitting, 3D printing, fiber extrusion and spinning, spray deposition of conductive elastomers, fiber-reinforced soft robotic actuators, pcb fabrication, liquid metal-based flexible electronics, laser induced graphene, CNC milling, PCB milling, waterjet, vinyl cutting, laser cutting, molding and casting

Press

- Zewe, A., “*Shape-shifting fiber can produce morphing fabrics*”. **MIT News Office**, October 26, 2023. (Web Article and Interview) <https://news.mit.edu/2023/shape-shifting-fiber-can-produce-morphing-fabrics-1026>
- Paul, A., “*This liquid crystal fabric is ‘smart’ enough to adapt to the weather*”. **Popular Science**, October 26, 2023. (Web) <https://www.popsci.com/technology/fiberobo-smart-textiles-mit/>
- Sharma, S., “*This new unique shape-shifting liquid fiber adapts to the environment*”. **Interesting Engineering**, October 27, 2023. (Web) <https://interestingengineering.com/innovation/shape-shifting-liquid-fiber-changes-weather/>
- New Scientist, “*This shape-shifting thread can create morphing fabrics*”. **New Scientist**, October 27, 2023. (Web) [newscientist/video/7296183526104272161](https://www.newscientist.com/video/7296183526104272161)
- Chandler David L., “*New fibers can make breath-regulating garments*”. **MIT News Office**, October 15, 2021. (Web Article and Interview) <https://news.mit.edu/2021/fibers-breath-regulating-1015>
- Gonick, M., “*Robotic fibers can make breath-monitoring garments*”. **MIT Youtube**, October 15, 2021. (Web Video Story) https://www.youtube.com/watch?v=JDT7Nt_sBqQ
- Bonifacic, I., “*MIT researchers create fabric that can sense and react to its wearer’s movement*”. **Engadget**, October 16, 2021. (Web) <https://www.engadget.com/mit-omnifiber-172907843.html/>
- SciTechDaily, “*Robotic OmniFibers: New Fibers Can Make Breath-Regulating Garments*”. **SciTechDaily**, October 15, 2021. (Web) <https://scitechdaily.com/robotic-omnifibers-new-fibers-can-make-breath-regulating-garments/>
- White, R., “*Researchers designed a fabric that comes to life when you breathe — Strictly Robots*”. **Mashable**, November 10, 2021. (Web) <https://mashable.com/video/omnifibers-breathing-fabric-mit-researchers>
- Wevolver, “*Robotic fibers can make breath-monitoring garments*”. January 17, 2023.
- Nugent, J., “*Robotic Textiles in Action: OmniFiber*”. **Azo Materials**, November 2, 2021. (Web Interview) <https://www.azom.com/article.aspx?ArticleID=20898>
- Hiserman, J. (PT), “*A Touching Experience*”. **Spectrum Ergonomics**, November, 2021. (Web Podcast, 2 Episodes) <https://anchor.fm/spectrum-ergonomics/episodes/A-Touching-Experience--Part-One-e1a80nd> (Part 1)
<https://anchor.fm/spectrum-ergonomics/episodes/A-Touching-Experience--Part-Two-e1a812m> (Part 2)
- Shtarbanov, A., “*Project OmniFiber*”. **Hackaday**, October 28, 2021. (Web) <https://hackaday.io/project/179845-flowio-platform/log/199725-project-omnifiber>
- TMS, “*Fluidic yarn system for haptic measurements*”. **TMS Market Intelligence on Advanced Materials**, October 15, 2021. (Monthly Newsletter) <https://www.textilemedia.com/smart-textiles-and-wearables/latest-news/fluidic-yarn-system-for-haptic-measurements/>
- Owen J., “*New fibre senses and responds to movement*”. **WTIN**, November 8, 2021. (Web Article and Interview) <https://www.wtin.com/article/2021/november/081121/new-fibre-senses-and-responds-to-movement/>
- WTI, “*New Fibres Make Breath-Regulating Garments*”. **Wearable Technology Insights**, October 19, 2021. (Web) <https://www.wearabletechnologyinsights.com/articles/24987/new-fibres-make-breath-regulating-garments?stv1=1%3A265842%3A20008>
- Nisa, J.U., “*This New Omnifiber Fabric Can Capture And Replay Wearers’ Breathing Patterns*”. **Wonderful Engineering**, October 18, 2021. (Web) <https://wonderfulengineering.com/this-new-omnifiber-fabric-can-capture-and-replay-wearers-breathing-patterns/>
- Dziarkach, A., “*Muscle memory! Scientists have created clothes from smart threads*”. **VoA (Voice of America)**, October 23, 2021. (Web Interview and TV Show) <https://www.golosameriki.com/a/detali-10232021/6282706.html>
- Printed Electronics World, “*New Fibres Make Breath-Regulating Garments*”. **Printed Electronics World**, October 19, 2021. (Web) <https://www.printedelectronicsworld.com/articles/24987/new-fibres-make-breath-regulating-garments>

TechnoPixel, “*New Technological Fabric from MIT: OmniFiber that Detects Human Movement!*”. **TechnoPixel**, October, 2021. (Web) <https://www.technopixel.org/new-technological-fabric-from-mit-omnifiber-that-detects-human-movement/>

Sengupta, D., “*MIT Researchers Design a Soft, Robotic Fiber That Can React to Wearers’ Body Movements*”. **Beebom**, October 17, 2021. (Web) <https://beebom.com/mit-researchers-design-robotic-fiber-reacts-wearers-body-movements/>

Gigazine, “*Robot fiber that records muscle movements and reproduces them for others is developed*”. **Livedoor News**, October 19, 2021. (Web) <https://news.livedoor.com/article/detail/21052137/>

Hedlund, A., “*Robotic textiles for everything from breathing recovery to feeling surfaces in Space*”. **Uppsala University News**, October 19, 2021. (Web Article and Interview) <https://www.uu.se/en/news/article/?id=17678&typ=artikel>

Soold, H., “*Portable textile robot muscles help singers with the breathing technique*”. **Royal Institute of Technology, KTH News**, November 29, 2021. (Web Article and Interview) <https://www.kth.se/aktuellt/nyheter/barbara-textila-robotmuskler-hjalper-sangare-med-andningstekniken-1.1123682>

Sebambo, K., “*Audio sculptures that modify your perception of the world*”. **Design Indaba**, July 13, 2015. (Web) <http://www.designindaba.com/articles/creative-work/audio-sculptures-modify-your-perception-world>

Ideal Standard News Press, “*Ground-breaking study by Ideal Standard Reveals How Design and Function Impact our Perception of Beauty*”. **Ideal Standard**, July 13, 2015. (Web) <https://www.idealstandard.lt/news-press/newspress/2015-03-11-project-perceive.html>