PERSONAL INFORMATION

Lucia Seminara

Via Crocco, 2/4, 16122, Genova, Italy

+3407460704

lucia.seminara@unige.it

http://www.cosmiclab.diten.unige.it/

Sex F | *Date of birth* 27/09/1974 | *Nationality* Italian

Enterprise	University	EPR
☐ Management Level	☐ Full professor	☐ Research Director and 1st level Technologist / First Researcher and 2nd level Technologist
☐ Mid-Management Level	☒ Associate Professor	☐ Level III Researcher and Technologist
☐ Employee / worker level	☐ Researcher and Technologist of IV, V, VI and VII level / Technical collaborator	☐ Researcher and Technologist of IV, V, VI and VII level / Technical collaborator

WORK EXPERIENCE

November 2022 – Present

Associate Professor
"Connected Objects, Smart Materials, Integrated Circuits - COSMIC Laboratory", DITEN, University of Genoa, Genova, Italy.
Topic: Haptic interfaces for human-in-the-loop applications.

December 2019 – October 2022

Researcher (RTDB)
"Connected Objects, Smart Materials, Integrated Circuits - COSMIC Laboratory", DITEN, University of Genoa, Genova, Italy.
Ricercatore a tempo determinato ai sensi dell'art. 24 comma 3, della Legge 30.12.2010, n.240, lettera b
Topic: Design and development of electronic skin systems for robotic and biomedical applications (eg neurorehabilitation). See below for main activities.

December 2018 – November 2019

Researcher (RTDA)
"Connected Objects, Smart Materials, Integrated Circuits - COSMIC Laboratory", DITEN, University of Genoa, Genova, Italy.
Ricercatore a tempo determinato ai sensi dell'art. 24 comma 3, della Legge 30.12.2010, n.240, lettera a
Topic: Design and development of electronic skin systems for robotic and biomedical applications (eg neurorehabilitation). See below for main activities.

May 2009 – November 2018

Research fellow
"Connected Objects, Smart Materials, Integrated Circuits - COSMIC Laboratory", DITEN, University of Genoa, Genova, Italy.
Topic: Design and development of electronic skin systems for robotic and biomedical applications (eg neurorehabilitation).

April 2005 – April 2009

R&D employee (companies)

- Selex Communications, Genova, Italy.
- LAB33, Genova, Italy.

Topic: intelligent nanostructured gas sensors.

EDUCATION AND TRAINING

2018

Habilitation to Associate Professorship in Electronic Engineering

2004

PhD in Physics
Physics Institute, EPFL, Lausanne, Switzerland
Thesis title: Study of the microscopic processes induced by the deposition of silver nanostructures on graphite (HOPG) and Platinum.

1999 **Master's degree (110/110) in Physics**
Thesis title: Study of the magnetism of thin films by optical methods.

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2
French	B2	B2	B2	B2	B2
Spanish	A2	A2	A2	A2	A2

Job-related skills

Research activity: My research focuses on developing electronic systems to artificially restore the sense of touch in different applications (robotics, biomedical applications eg prosthetics, virtual reality). My experience in tactile data processing using model-based approaches resulted in an original and patented method for the reconstruction of contact force distributions starting from e-skin sensor data. My main interests are now focused on how to enable intuitive and effective communication between the wearable haptic devices and humans. I am coordinating the multidisciplinary consortium TACTA, involving different italian universities and institutions (University of Genoa, Milan, Florence, Pisa, Scuola Superiore Sant'Anna – Pisa, Siena, Rome, Salento) for combined artistic-scientific research in Haptics to develop novel advanced communication paradigms based on the sense of touch.

Editorial activity:

- **Member of the editorial board for the Special issue entitled** "Towards a transdisciplinary approach to the development and control of haptic devices for human-in-the-loop applications" for the journal IEEE Transactions on Haptics (2025)
- **Associate Editor:** IEEE International Conference on Intelligent Robots and Systems (IROS), IEEE International Conference on Artificial Intelligence Circuits and systems (AICAS), New Generation of Circuits And Systems (NGCAS)
- **Reviewer for different journals such as:** Robotics and Autonomous Systems, IEEE Robotics and Automation Letters, Advanced Robotics, Mechatronics, IEEE Sensors, Sensors and Actuators: A. Physical, Sensors (MDPI).

Organization of scientific meetings:

- **Organizing Committee Member**
  - 2025 workshops "Mental Heath and Movement" at Movement Academy 2025, June 24-25, Bensheim, Germany
  - 2025 workshop "Digital communication moving beyond human-centric replication" at CHI 2025, 26th April – 1st May, Yokohama, Japan
  - 2024 workshop "Haptics beyond human-centric mimicry and replication" at EuroHaptics 2024, 30th june – 3rd July, Lille, France
  - 2024 workshops:
    1) Sensory feedback in prosthetics
    2) Common and Social Brain
    at Movement Academy 2024, June 13-14, Bensheim, Germany
  - 2023 workshop HEART (Humanities Emotions Art Robotics Touch) at WorldHaptics 2023, July 10-13, Delft, Netherlands
  - 2022 6th International Conference on System-Integrated Intelligence. Intelligent, flexible and connected systems in products and production (SYSINT), September 07-09, 2022 in Genoa, Italy

- 2020 5th International Conference on System-Integrated Intelligence (SYSINT), November 11-13, 2020 in Bremen, Germany
- 2020 workshop THUMB (AcTive Haptic hUMans and Robots) at EuroHaptics 2020, September 6 – 9, Leiden, Netherlands
- 2019 IEEE International Conference on Electronics Circuits and Systems (ICECS), November 27 - 29, 2019, Genoa, Italy
- 2018 Electronic Skin Workshop 2018, February 20, 2018, Bangor University, UK

- **Chair / Discussant**
  - Track: Touch. The Aesthetics and the Atmospheres of the Five Senses Conference, July 07-08, 2025, Genoa, Italy - ERC Project https://pea.unige.it/it
  - Track: Human-Machine Interaction. SYSINT, September 07-09, 2022, Genoa, Italy
  - Special Session - Human-in-the-loop control of haptic devices: now and the future, SYSINT, September 07-09, 2022, Genoa, Italy
  - Track: Tutorial - Biomedical technologies and applications / Virtual and augmented reality. ICECS, November 27 - 29, 2019, Genoa, Italy
  - Track: Tutorial - Human-Machine Interaction. ICECS, November 27 - 29, 2019, Genoa, Italy
  - Special Session - Sensors and Systems for the Restoration of the Sense of Touch in Prosthetics. NGCAS, September 6-9, 2017, Genoa, Italy

Invited talks:

- L. Seminara "Novel routes for prosthetics – a sensorimotor approach to haptics", at EuroHaptics **2024**, June 30, Lille, France
- L. Seminara "TACTA: A transdisciplinary approach to haptics", at WorldHaptics **2023**, July 10, Delft, Netherlands
- L. Seminara "Art Can Touch" @ "Haptics for Inclusion" workshop, November 6-7 **2023**, University of Boras, Sweden
- L. Seminara "Towards artificially restoring the sense of touch", @ "Challenges and Trends in Haptics" workshop **2023**, September 28, Centro Piaggio – University of Pisa, Italy
- L. Seminara "A hierarchical sensorimotor control framework for human-in-the loop robotic hands", @ INTUITIVE PhD School https://www.robotact.de/intuitive-springschool-2023 – Malta, 17-20 April, **2023**
- e-skin systems. @ 2018 Electronic Skin Day organized with Prof. Farina (Chair in Neurorehabilitation Engineering), February 14, **2018**, Imperial College, London, UK
- A system perspective on human and artificial tactile sensing @ Electronic Skin Workshop 2018, February 20, **2018**, Bangor University, UK
- L. Seminara, "A system for electrotactile feedback using electronic skin and flexible matrix electrodes". Transactions on Haptics Featured Session @ IEEE World Haptics 2017, Fürstenfeldbruck, Germany, June 6-9, **2017**
- L. Seminara, "Tactile data processing method for the reconstruction of contact force distributions". @ Special Session on "Recent advances in modeling skin mechanics and tactile afferent responses", IEEE World Haptics **2017**, Fürstenfeldbruck, Germany, June 6-9, 2017

Teaching activity:

ELECTRONIC ENGINEERING

- **Course title: Distributed electronic systems and technologies for environmental monitoring** *(2023-2024)*
  Master Degree: Engineering for Natural Risk Management, University of Genoa
- **Course title: Electronics** *(2022-2023)*
  Bachelor Degree: Ingegneria Elettronica e Tecnologie dell'Informazione, University of Genoa
- **Course title: Electronic devices** *(2024-2025)*
  Master Degree: Electronic Engineering, University of Genoa
- **Course title: Sensors** *(2024-2025)*
  Master Degree: Electronic Engineering, University of Genoa
- **Course title: Sensing Systems** *(2019-2025)*
  Master Degree: Ingegneria Elettronica, University of Genoa
- **Course title: Integrated Electronics** *(2021-2023)*
  Master Degree: Ingegneria Elettronica, University of Genoa

PHILOSOPHY

- **Course title: Prosthetics - Philosophy of Medicine** *(2024-2025)*
  Master Degree: Metodologie filosofiche, University of Genoa

Participation to research projects

- HORIZON EU, **IntelliMan (AI-Powered Manipulation System for Advanced Robotic Service, Manufacturing and Prosthetics**) - Call. HorizonEU-ICT-2022
- EU H2020 RIA, **Tactility (TACTIle feedback enriched virtual interaction through virtual reality and beyond)**, Call. H2020-ICT-2018
- Principal Investigator: **Innovative ICT system to restore the sense of touch in patients with sensory deficit.** Project funded by Compagnia San Paolo, grant no.: 2017.0559, ID ROL: 19795 (https://compagniadisanpaolo.it/)
- **Roboskin: Skin-based Technologies and Capabilities for Safe, Autonomous and Interactive Robots**, call for proposals 7th Framework Programme for Theme 3 - Information and Communication Technologies, FP7-ICT-2007-3-2-2 – Cognitive Systems, Interaction, Robotics. Project ID: 231500.

PhD committees:

- Teaching Board of the Ph.D. program of national interest in Robotics and Intelligent Machines (PhDRIM)
- Teaching Board of the JOINT DOCTORATE IN INTERACTIVE AND COGNITIVE ENVIRONMENTS (JD ICE) - University of Genova / Queen Mary University, London
- Teaching Board of the PhD program in Science and Technology for Electronic and Telecommunication Engineering at the University of Genova

Patents

- 001429044, Approved: 30/06/2017, Title: “Metodo per la ricostruzione della distribuzione delle forze di contatto agenti sulla superficie di uno strato elastico sensorizzato". Inventors: L. Seminara, M. Capurro.

Interviews

- Title: Con-tatto https://bit.ly/CONtatto (2022)
  Interview by Roberta Fulci @ Radio3Scienza -- with Prof. Alessandro Moscatelli, Department of Systems Medicine, University of Rome Tor Vergata and Fondazione Santa Lucia IRCCS of Rome.

ADDITIONAL INFORMATION

Selected journal Publications

L. Seminara, Dosen, S., Berselli, G., Loeb, G. E., Pirozzi, S., Klatzky, R., ... & Zhu, M. (2025). Special Issue Editorial: Towards a Transdisciplinary Approach to the Development and Control of Haptic Devices for Human-in-the-Loop Applications. *IEEE Transactions on Haptics*, *18*(1), 3-5.

A. A. Bonzini, **L. Seminara**, S. Macciò, A. Carfì, & L. Jamone (2025). Robotic Haptic Exploration of Object Shape with Autonomous Symmetry Detection. *IEEE Transactions on Robotics, 41,* 2391–2405

C. Micheli, G. Berselli, **L. Seminara** (2024). Model-based approach for indentation on soft electronic skin. Mechatronics 102, 103225.

L. Seminara, Dosen, S., Mastrogiovanni, F., Bianchi, M., Watt, S., Beckerle, P., ... & Loeb, G. E. (2023). A hierarchical sensorimotor control framework for human-in-the-loop robotic hands. Science Robotics, 8(78), eadd5434.

Yahya Abbass, Strahinja Dosen, **Lucia Seminara**, and Maurizio Valle (2022). “Full-hand electrotactile feedback using electronic skin and matrix electrodes for high-bandwidth human-machine interfacing”. In: Phil. Trans. R. Soc. A. 380.2228, http://doi.org/10.1098/rsta.2021.0017

Sara Nataletti, Fabrizio Leo, **Lucia Seminara**, Carlo Trompetto, Maurizio Valle, Strahinja Dosen, and Luca Brayda (2020). “Temporal asynchrony but not total energy nor duration improves the judgment of numerosity in electrotactile stimulation”. In: Frontiers in bioengineering and

biotechnology, p. 555.

Hoda Fares, Yahya Abbass, Maurizio Valle, and **Lucia Seminara** (2020). “Validation of screen-printed electronic skin based on piezoelectric polymer sensors”. In: Sensors 20.4, p. 1160.

Lucia Seminara, Hoda Fares, Marta Franceschi, Maurizio Valle, Matija Štrbac, Dario Farina, and Strahinja Dosen (2019). “Dual-parameter modulation improves stimulus localization in multichannel electrotactile stimulation”. In: IEEE Transactions on Haptics 13.2, pp. 393–403.

Lucia Seminara, Paolo Gastaldo, Simon J Watt, Kenneth F Valyear, Fernando Zuher, and Fulvio Mastrogiovanni (2019). “Active haptic perception in robots: a review”. In: Frontiers in neurorobotics, p. 53.

M. Osta, A. Ibrahim, **Lucia Seminara**, H. Chible, M. Valle (2018), “Low Power Approximate Multipliers for Energy Efficient Data Processing”. Journal of Low Power Electronics 14, p. 110-117

Lucia Seminara (2018). “Modeling electronic skin response to normal distributed force”. In: Sensors 18.2, p. 459.

Marta Franceschi, **Lucia Seminara**, Strahinja Dosen, Matija Strbac, Maurizio Valle, and Dario Farina (2016). “A system for electrotactile feedback using electronic skin and flexible matrix electrodes: experimental evaluation”. In: IEEE transactions on haptics 10.2, pp. 162–172.

A. Spanu, L. Pinna, F. Viola, **Lucia Seminara**, M. Valle, A. Bonfiglio, P. Cosseddu (2016), “A high-sensitivity tactile sensor based on piezoelectric polymer PVDF coupled to an ultra-low voltage organic transistor”. In: Organic Electronics 36, p. 57-60. doi:10.1016/j.orgel.2016.05.034

Lucia Seminara, Luigi Pinna, Ali Ibrahim, Luca Noli, Stefano Caviglia, Paolo Gastaldo, and Maurizio Valle (2016). “Towards integrating intelligence in electronic skin”. In: Mechatronics 34, pp. 84–94.

Lucia Seminara, Marco Capurro, and Maurizio Valle (2015). “Tactile data processing method for the reconstruction of contact force distributions”. In: Mechatronics 27, pp. 28–37.

Paolo Gastaldo, Luigi Pinna, **Lucia Seminara**, Maurizio Valle, and Rodolfo Zunino (2015). “A tensor-based approach to touch modality classification by using machine learning”. In: Robotics and Autonomous Systems 63, pp. 268–278.

Paolo Gastaldo, Luigi Pinna, **Lucia Seminara**, Maurizio Valle, and Rodolfo Zunino (2014). “Computational intelligence techniques for tactile sensing systems”. In: Sensors 14.6, pp. 10952–10976.

Paolo Gastaldo, Luigi Pinna, **Lucia Seminara**, Maurizio Valle, and Rodolfo Zunino (2014). “A tensor-based pattern-recognition framework for the interpretation of touch modality in artificial skin systems”. In: IEEE Sensors Journal 14.7, pp. 2216–2225.

Lucia Seminara, Luigi Pinna, Maurizio Valle, Laura Basiricò, Alberto Loi, Piero Cosseddu, Annalisa Bonfiglio, Alberto Ascia, Maurizio Biso, Alberto Ansaldo, et al. (2013) “Piezoelectric polymer transducer arrays for flexible tactile sensors”. In: IEEE Sensors Journal 13.10, pp. 4022–4029.

L. Seminara, M. Capurro, P. Cirillo, G. Cannata, and M. Valle (2011). “Electromechanical characterization of piezoelectric PVDF polymer films for tactile sensors in robotics applications”. In: Sensors and Actuators A: Physical 169.1, pp. 49–58.

Genoa, July 16, 2025