

PERSONAL INFORMATION

Dorothea Fonnesu, PhD



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SCI-BIO

Dorothea Fonnesu is a senior postdoctoral researcher at the National Institute for Nuclear Physics (INFN) Legnaro National Laboratories, Italy. She previously completed a Fellowship at CERN (European Organization for Nuclear Research), Switzerland, funded by the Marie-Sklodowska-Curie Actions (MSCA) programme EASITrain. She holds a PhD in Physics, obtained at CERN in joint collaboration with the University of Siegen and the Helmholtz-Zentrum Berlin (HZB), Germany, in the field of SC thin films on copper for SRF cavity applications within the R&D activities for the FCC-ee. Dorothea Fonnesu's research work currently focuses on the coordination of the R&D activities for the production and study of Nb₃Sn films on copper via DC Magnetron Sputtering for SRF applications on small samples, toward the scalability to elliptical resonant cavities, which represents a critical technology for future particle accelerators. In the previous years, Dorothea Fonnesu has contributed to advancing the measurement capabilities for superconducting materials at the Central Cryogenic Laboratory at CERN, by commissioning a permanently installed measurement station for the contactless measurement of the critical temperature of bulk and thin-film samples. Dorothea Fonnesu also worked with superconducting quantum interference devices (SQUIDs) and superconducting metallic magnetic micro-calorimeters (MMCs) for the development of the experiment ECHO, aiming to determine the electron neutrino mass via the calorimetric measurement of the decay energy spectrum of Ho-163. Dorothea Fonnesu is author of several peer-reviewed publications and is involved in reviewing activities herself. In addition to her research activities, Dorothea Fonnesu is active in student supervision (lab tutoring, projects and theses). She participates to invited seminars and lectures at national and international institutes, contributing to scientific dissemination. She also engages with outreach activities directed to the broader community, such as public seminars, guide activities, and the making of magazine articles and online videos, to promote science and inspire interest in both cutting-edge technologies and fundamental research. She enjoys taking part to the organization of scientific events, such as workshops or conferences. Finally, Dorothea Fonnesu has recently started her mandate as officer of the Italy Chapter of the IEEE Council on Superconductivity (CSC), with the role of secretary.

Selected publications – Selected conferences

RESEARCH EXPERIENCE

Feb 2023 – Today	Senior postdoctoral research grant (call n. 24832/2022)
Institute	INFN – National Institute for Nuclear Physics, Legnaro National Laboratories
Activity	Coordination of the R&D activities for the production and study of Nb ₃ Sn films on copper via DC Magnetron Sputtering for SRF applications on small samples toward the scalability to elliptical resonant cavities
References	<p>Fonnesu D. et al., <i>Recipe Optimization and SRF Test of Cu-compatible Nb₃Sn Films by DC Magnetron Sputtering from a Stoichiometric Target</i>, 2025, to be published</p> <p>Fonnesu D. et al., <i>Influence of the Coating Parameters on the T_c of Nb₃Sn Thin Films on Copper Deposited via DC Magnetron Sputtering</i>, 2023, Proceedings of the 21st International Conference on RF Superconductivity (SRF23), Grand Rapids, MI, USA, DOI: 10.18429/JACoW-SRF2023-MOPMB013</p>

Feb 2021 – July 2022 **Doctoral grant**

Institute **CERN** – European Organization for Nuclear Research

Activity Feasibility study for the reverse-coating technique for the production of high-quality Nb films on a seamless electro-formed copper substrate via means of a sacrificial aluminum mandrel. Study of the superconducting, crystallographic and morphological properties of Nb₃Sn films deposited on copper via HiPIMS in the context of the SRF R&D activities for the FCC-ee

References **Fonnesu D.**, *Thin Films on Copper for Superconducting RF Cavities within the Future Circular Collider Study*, PhD Thesis, University of Siegen, 2023, DOI: [10.25819/ubsi/10600](https://doi.org/10.25819/ubsi/10600)

Fonnesu D. et al., *Reverse coating technique for the production of Nb thin films on copper for superconducting radio-frequency applications*, 2022, Superconductor Science and Technology, Vol. 35, DOI: [10.1088/1361-6668/ac9c99](https://doi.org/10.1088/1361-6668/ac9c99)

Feb 2018 – Jan 2021 **Fellowship**

Institute **CERN** – European Organization for Nuclear Research

Activity Construction and installation of a permanent test station at the CERN Central Cryogenic Laboratory for the measurement of the critical temperature of superconducting thin films coated via HiPIMS and DCMS on copper substrate and small bulk samples for SRF cavity applications. Operation of the test station and data collection for studies on the properties of the SC thin films produced at CERN in the context of the SRF R&D activities for the FCC-ee

References **Fonnesu D. et al.**, *CERN Based T_c Measurement Station for Thin-Film Coated Copper Samples and Results on Related Studies*, 2021, Proceedings of the 20th International Conference on RF Superconductivity (SRF21), Online, FRIB-Michigan State University, MI, USA, DOI: [10.18429/JACOW-SRF2021-SUPFDV018](https://doi.org/10.18429/JACOW-SRF2021-SUPFDV018)

Avino F., Fonnesu D., et al., *Improved film density for coatings at grazing angle of incidence in high power impulse magnetron sputtering with positive pulse*, 2020, Thin Solid Films, Vol. 706, DOI: [10.1016/j.tsf.2020.138058](https://doi.org/10.1016/j.tsf.2020.138058)

13 Oct 2018 – 17 Oct 2018 **Secondment**

Institute **INFN** – National Institute for Nuclear Physics, Legnaro National Laboratories

Activity Production and characterization of 6 GHz SRF elliptical copper cavities coated via DC Magnetron Sputtering with Nb thick films according to a custom multi-layer technique

Apr 2017 – Jan 2018 **Scholarship**

Institute **KIP** – Kirchhoff-Institute for Physics

Activity Operation and fine tuning of a detector setup for the coincidence measurement of the radiative (fluorescence, Bremsstrahlung)/non-radiative (Auger, Coster-Kronig) components of the decay spectrum of Ho-163, based on the technology of metallic micro-calorimeters (MMCs) with Superconducting Quantum Interference Device (SQUID) readout, in the context of the Electron Capture in 163-Ho (ECHO) experiment, which aims to investigate the electron neutrino mass in the sub-eV range. The experimental setup was designed and assembled as part of my MSc thesis work

Sep 2014 **Internship**

Institute **PSI** – Paul Scherrer Institute

Activity Installation of the detection and read-out experimental setup, and two-week beam time, for the measurement of the electron/muon branching ratio of the charged pion decay

SKILLS

Laboratory	Safety norms and general rules of conduct, handling of general lab equipment (oscilloscope, current/voltage sources, basic sensors and gauges, etc.), handling of cryogenics (helium, nitrogen) and related equipment (Dewars, bath cryostats, dilution refrigerators, transfer and pumping systems, helium recovery lines), conduction of experimental activities in clean environment (clean-room classes ISO 5-6-7), operation of DC magnetron sputtering systems and related equipment (vacuum pumps, baking systems), manual soldering, set up and conduction of (ultra)low-temperature superconducting material/device tests and experiments, operation of material characterization instrumentation such as scanning electron microscope (SEM), energy-dispersive X-ray spectrometer (EDS), X-ray diffractometer (XRD), surface micro-profilometer, basic design of experimental parts and circuit boards (CB), basic execution of micro-fabrication chain of tasks and integration into CB via manual wire bonding, in basic soldering, wiring and cabling of experimental setups.
Hard	Planning and coordination of R&D activities, design and assembly of experiments, data interpretation and analysis, presentation of scientific results (internal meetings, internal notes, lab reports, oral presentations at conferences, writing of peer-reviewed scientific content and articles).
Soft	Team worker, active participant in team activities, tidy and organized in both the personal and shared work spaces, attentive to detail, problem-solving oriented, promoter of clear, effective and open communication, emotional intelligence enthusiast, supporter of constructive feedback exchange among team members, micromanaging skeptic/avoider, big fan of intercultural exchange, attentive to diversity and inclusion, fluent in international scientific exchange and cooperation.
Software	L ^A T _E X, MS Office, Python, C++, ROOT, COMSOL Multiphysics
Mother tongue	Italian, Sardinian (Campidanese variation)
Other languages	English (C2*), German (B1*), French (A1*) *Self-assessed Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user Common European Framework of Reference for Languages

EDUCATION

Feb 2021 – Feb 2024	PhD in Physics University of Siegen Title <i>Thin Films on Copper for Superconducting RF Cavities within the Future Circular Collider Study</i> Supervision Prof. Dr. Jens Knobloch (HZB, University of Siegen), Dr. Sergio Calatroni (CERN) Grade Magna cum laude Defense Date 28 Feb 2024 Online Copy PhD Thesis
Sep 2013 – Dec 2016	Master of Science in Physics University of Heidelberg Title <i>Development and first tests of a new detector setup to study the de-excitation processes of Dy-163 after electron capture in Ho-163</i> Supervision JProf. Dr. Loredana Gastaldo (KIP, University of Heidelberg) Grade 1.4 - Very Good Graduation Date 29 Dec 2016 Online Copy MSc Thesis

Sep 2004 – Apr 2013 Bachelor of Science in Physics

University of Cagliari

Title	IT: <i>Misura del Tasso di Decadimento Assoluto del canale $\Lambda_c \rightarrow p K \pi$</i> EN: <i>Measurement of the absolute branching fraction of the $\Lambda_c \rightarrow p K \pi$ decay channel</i>
Supervision	Prof. Biagio Saitta (INFN Cagliari, University of Cagliari)
Grade	99/110
Graduation Date	23 Sep 2013
Online Copy	BSc Thesis

AWARDS AND SCHOLARSHIPS

26 Sep 2025	Early Career Researcher Presentation Prize (2nd place) of the 22nd International Conference on RF Superconductivity (SRF2025). Website: SRF Tokyo 2025
01 Feb 2018 – 31 Jan 2021	Marie-Sklodowska Curie Actions (MSCA) Early Stage Researcher scholarship within the EASITrain programme (GA 764879), website: EASITrain

SUPERVISION ROLES

16 Jun 2025 – 27 Jun 2025	Coordination and supervision of two high school students participating in the INFN <i>STAGE</i> activities on the topic of Superconductivity and Surface Technology
1 Mar 2024 – 11 Dec 2024	Supervision of Master's thesis work in Materials Science at the University of Padua: "Development of Nb ₃ Sn Coatings for Applications in Superconducting Resonant Cavities for Particle Accelerators", M. Lazzari
17 Jun 2024 – 28 Jun 2024	Coordination and supervision of two high school students participating in the INFN <i>STAGE</i> activities on the topic of Superconductivity and Surface Technology
01 Aug 2019 – 31 Jul 2020	Supervision of the Technical Student Program candidate A. O. P. Vaaranta assigned to the Central Cryogenic Laboratory, CERN
01 Apr 2017 – 31 Jan 2018	Tutor for "Mechanics and Vacuum" laboratory class for bachelor students in Physics at the University of Heidelberg

INSTITUTIONAL ROLES

1 Jan 2025 – today	Officer of the Italian Chapter of the IEEE Council on Superconductivity
1 Feb 2018 – 31 Jan 2021	Representative of the Early Stage Researchers (ESR) group within the MSCA EASITrain programme

SEMINARS AND LECTURES

19 Sep 2025	Invited Seminar "Nb ₃ Sn films on copper for SRF cavities: R&D progress at INFN - LNL" for the <i>New Horizons Seminar</i> of the International Center for Quantum-field Measurement Systems for Studies of the Universe and Particles (QUP) at the High Energy Accelerator Research Organization (KEK) in Tsukuba, Japan, Indico page
12 Nov 2024	Invited Lecture "Nb ₃ Sn/Cu by Magnetron Sputtering for SRF cavities at INFN-LNL" within the Thin Films and Surface Treatments class for bachelor students of the Materials Science course, University of Padua
08 Nov 2024	Invited Seminar "SRF thin films activities in INFN-LNL" for the Vacuum Surfaces Chemistry (VSC) group, Technology Department of the European Organization for Nuclear Research (CERN) in Geneva, Switzerland, Indico page
17 Nov 2023	Invited Seminar "Thin film deposition on Cu for SRF cavity production via DC magnetron sputtering at INFN-LNL" for the <i>SRF Science Group</i> of the Fermi National Accelerator Laboratory (FNAL) in Batavia (IL), USA, Indico page

COURSES AND TRAININGS

- 08 Sep 2020 – 15 Sep 2020 COMSOL Multiphysics online training course
- 01 Dec 2019 – 06 Dec 2019 Training on Scientific Writing and IP management by CERN, [Indico page](#)
- 13 Sep 2018 – 14 Sep 2018 Innovation Management and TCL Courses by Vienna University of Economics and Business (WU)
- 12 Sep 2018 Media Training by Terra Mater Factual Studios, Vienna
- 10 Sep 2018 – 11 Sep 2018 Project Management Course by Vienna University of Economics and Business (WU)
- 2018 CERN French class for Fellows. Final placement test: A1
- 2013 – 2015 German Language classes for international students. Final placement test: B2

SCHOOLS

- 28 Sep 2020 – 09 Oct 2020 EASISchool 3 on SRF Cavities, Genoa, [Indico page](#)
- 30 Sep 2019 – 04 Oct 2019 EASISchool 2 on Cryogenics, Orsay and Grenoble, [Indico page](#)
- 27 Jun 2019 – 29 Jun 2019 Tutorials of the International Conference SRF2019, Dresden, website: [SRF19 Student Tutorials](#)
- 30 Aug 2018 – 09 Sep 2018 EASISchool 1/ESAS Summer School, Vienna, [Indico page](#)

OUTREACH AND COMMUNITY ENGAGEMENT

- 1 Feb 2023 – today Official Tutor for the STAGE program at INFN-LNL, website: [STAGE INFN](#)
- 1 Feb 2023 – today Official guide at INFN-LNL
- 22 Nov 2024 Public interview for Sharper Night - Nuoro, website: [Sharper Night 2024 - Nuoro](#)
- 09 May 2024 Public Seminar "Superconduttività: *breve storia di un fenomeno straordinario*", for the event "La Scienza nel Bicchiere" in Castelfranco Veneto (IT), [YouTube channel](#)
- Mar 2024 Article written for the magazine "Galvanotecnica e Nuove Finiture" (language: IT/EN), Title: "Erasing Imperfections: a Deep Dive into the Plasma Electrolytic Polishing in Industry and Research", Issue: March-April 2024, ISSN 1121-855X, [online version](#)
- 07 Dec 2022 Article written for the CERN online magazine "Accelerating News", Topic: Future Circular Collider (FCC), Title: "Reverse coating: a new method for the production of seamless copper cavities", Issue 42, website: [Accelerating News](#)
- 22 Jul 2021 YouTube video "Unvarnished diaries of a CERN scientist - working on the biggest science experiment ever" within the web series *Collider Diaries*, winner of the "Best Online Format Award" at the SCINEMA Festival 22nd Edition, website and link to video: ["Collider Diaries" SCINEMA Festival award | CERN](#)
- Jan 2019 – Jul 2022 Official CERN guide
- 1 Feb 2018 – 31 Jan 2022 Presenter of the "Cryolab Cryogenic Show" for schools and visitors
- 1 Sep 2019 – 30 Sep 2019 Official guide for the CERN Open Days 2019
- 2008 – 2013 Member and co-founder of the student union "Collettivo Redshift", promoting the role and importance of (scientific) culture in every aspect of human life
- 2005 – 2007 Official guide at the Physics Museum of University of Cagliari

EVENT ORGANIZATION

- Dec 2025 Organizer of the outreach event Superconductivity around The Corner 2025 - LNL Edition sponsored by the Italian Chapter of the IEEE Council on Superconductivity, [Indico page](#)
- Mar 2025 Member of the Organizing Committee for the iSAS First Annual Meeting, Legnaro, Italy. [Indico page](#)
- Oct 2020 Member of the Organizing Committee for the Student Workshop on Superconductivity and Applications, Genova, Italy. [Indico page](#)
- Aug 2017 Member of the Organizing Staff and conference photographer of the Ultra-Low Temperature Physics Conference (ULT), Heidelberg, Germany. Website: [ULT2017](#)

REVIEWER ACTIVITIES

- 31 Dec 2025 – today Peer reviewer for *IEEE Transactions on Applied Superconductivity - EUCAS 2025 Special Issue*
- 1 Jan 2025 – today Peer reviewer for *Physica C: Superconductivity and its applications*, Elsevier
- 1 Dec 2023 – today Peer reviewer for *Vacuum*, Elsevier

PUBLICATIONS (SELECTED)

Full list: <https://orcid.org/0000-0002-5430-948X>
or www.linkedin.com/in/dorothea-fonnesu (under *Featured* tab)

- 2025 Recipe Optimization and SRF Test of Cu-compatible Nb₃Sn Films by DC Magnetron Sputtering from a Stoichiometric Target**
Journal Nature Scientific Reports
Authorship First author
Status Preprint (under review): [10.21203/rs.3.rs-7516819/v1](https://doi.org/10.21203/rs.3.rs-7516819/v1)
- 2022 Reverse coating technique for the production of Nb thin films on copper for superconducting radio-frequency applications**
Journal Superconductor Science and Technology
Authorship First author
Status Published: [10.1088/1361-6668/ac9c99](https://doi.org/10.1088/1361-6668/ac9c99)
- 2021 CERN Based T_c Measurement Station for Thin-Film Coated Copper Samples and Results on Related Studies**
Proceedings 20th International Conference on RF Superconductivity (SRF)
Authorship First author
Status Published: [10.18429/JACOW-SRF2021-SUPFDV018](https://doi.org/10.18429/JACOW-SRF2021-SUPFDV018)
- 2019 Improved film density for coatings at grazing angle of incidence in Hi-PIMS with positive pulse**
Journal Thin Solid Films
Authorship Co-author
Status Published: [10.1016/j.tsf.2020.138058](https://doi.org/10.1016/j.tsf.2020.138058)
- 2019 FCC-ee: The Lepton Collider**
Journal European Physical Journal – Special Topics
Authorship In-collaboration
Status Published: [10.1140/epjst/e2019-900045-4](https://doi.org/10.1140/epjst/e2019-900045-4)

CONFERENCES (SELECTED)

Full list: www.linkedin.com/in/dorothea-fonnesu (under *Featured* tab)

- 2025 22nd International Conference on RF Superconductivity (SRF2025)**
Date and Place 21 - 26 September, Tokyo, Japan
Title Development of Nb₃Sn coatings on copper at INFN-LNL
Type of contribution Invited Talk
Website [SRF Tokyo 2025](https://www.srf-tokyo2025.com/)
- 2024 11th International Workshop on Thin Films and New Ideas for Pushing the Limits of RF Superconductivity (TFSRF2024)**
Date and Place 16 - 20 September, Orsay, France
Title Nb₃Sn films on Cu by Magnetron Sputtering for SRF cavities at INFN-LNL
Type of contribution Invited Talk
Website [Thin Films SRF WS Orsay 2024](https://www.thinfilmsrfwsorsay2024.com/)
- 2024 IEEE Council on Superconductivity - Italy Chapter Annual Meeting: Applied Superconductivity in Italy 2024**
Date and Place 28 May, Rome, Italy
Title Nb₃Sn on Cu SRF cavities for next generation accelerators
Type of contribution Invited Talk
Website [IEEE CSC Italy Chapter 2024](https://www.ieee-csc-italy2024.com/)
- 2023 21st International Conference on RF Superconductivity (SRF2023)**
Date and Place 25 - 30 June, Grand Rapids, MI, USA
Title Influence of the Coating Parameters on the T_c of Nb₃Sn Thin Films on Copper Deposited via DC Magnetron Sputtering

Type of contribution [Poster](#)
Website [SRF Grand Rapids 2023](#)

2021 20th International Conference on RF Superconductivity (SRF2021)
Date and Place 28 June - 2 July, Virtual Conference hosted by Michigan State University
Title CERN Based Tc Measurement Station Optimised for Thin-Film Coated Copper Samples and Results on Related Studies

Type of contribution [Poster](#)
Website [SRF Online FRIB 2021](#)