

Eleonora Isotta
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Eleonora Isotta

PhD student in thermoelectricity and energy materials

Summary: PhD student in nanostructured thermoelectric materials (production of chalcogenide materials, Cu_2ZnSnS_4 , XRD and Rietveld refinement, SEM, thermoelectric characterization of bulk and thin film samples), at University of Trento. **Member of AIT**, Italian Association of Thermoelectricity. **Teaching assistant** in Material Science. **Master Degree in Energy Engineering** (with Honours) as excellence student of Collegio Bernardo Clesio, **Exchange at NTNU**, Norway, and **Master thesis at LOMC Le Havre**, France. **Bachelor Degree in Environmental Engineering** (with Honours).

Education

PhD Student at University of Trento – Nov 2017 - Now

Department of civil, environmental and mechanical engineering at the Energy and Materials Laboratory (EMAT LAB) and Laboratory of Bio-inspired, Bionic, Nano, Meta Materials and Mechanics. The topic is nanostructured thermoelectric materials (production of chalcogenides, characterization of bulk and thin film samples, Cu_2ZnSnS_4 and Cu_2SnS_3 , XRD and Rietveld refinement, SEM, thermal and electrical characterizations for thermoelectricity, experience with Density Functional and Density Functional Perturbation Theory, Molecular Dynamics).

Master at University of Trento and Free University of Bolzano – 2015 - 2017

Inter-Faculty Master Degree in Energy Engineering (110/110 with Honours) as Alumna of college of excellence Bernardo Clesio.

Master Thesis Internship at LOMC Le Havre, France – Jul 2017 - Oct 2017

Laboratoire Ondes et Milieux Complexes, Thesis on "Acoustic metamaterials with enhanced dynamic properties: from sound insulation to energy harvesting applications through numerical and experimental studies". The modelling was performed using Comsol Multiphysics.

Erasmus at NTNU – 2016

Erasmus at Norwegian University of Science and Technology, Norway, from August to December 2016.

Bachelor at University of Trento – 2012 - 2015

Bachelor Degree in Environmental Engineering (110/110 with Honours). Thesis on acoustic hierarchical metamaterials (3D printing of samples and mechanical characterization).

Academic Experience

Teaching Assistant in Material Science – Oct 2019 - Now

Exercise lecturer for the Course "Tecnologia dei Materiali per l'Ambiente" (Material Science), Bachelor in Environmental Engineering.

Exam Assistant in Solid Mechanics – Feb 2018 - Now

Examiner for the Course "Scienza delle Costruzioni" (Solid Mechanics), Bachelor in Civil and Environmental Engineering.

Teaching Assistant in General Physics – Feb 2017 - Jun 2017

Exercise lecturer for the course of General Physics at the Bachelor in Viticulture and Enology.

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Awards

AIT Best junior article 2019

Best Italian junior article on thermoelectricity for the year 2019 awarded by the Italian Thermoelectric Society (AIT) for the article "Effect of the order-disorder transition on the Seebeck coefficient of nanostructured thermoelectric Cu_2ZnSnS_4 . Nanomaterials". Award consisting in the sponsorship for the 40th International Conference on Thermoelectrics - ICT/ECT 2021 Krakow, Poland.

Alumna Collegio Bernardo Clesio – 2015-2017

During my master course I have been a member of Collegio Bernardo Clesio, University of Trento, offering residence and an advanced academic training to excellence students.

GlaxoSmithKline Study Award – 2013-2018

Scholarship for university merits (received for the academic years 2012/2013, 2014/2015, 2015/2016, 2016/2017), by GlaxoSmithKline, Verona.

Grants

Mesquik Beamtime at Swiss Light Source – 2020

Awarded short mail-in measurement campaign. Project "Determination of disorder in cubic kesterite: a novel polymorph with outstanding thermoelectric behaviour"

Co-Proposer GCS HPC Access – 2020

Awarded 2-million CPU hours at the Gauss center for supercomputing facility, Germany, for the project DISKESTE (Understanding disorder in kesterite to achieve high thermoelectric performance: from electronic to thermal properties).

Co-Proposer Beamtime Swiss Light Source – 2020

Awarded 9 shifts (3 days) of beamtime at the MS Beamline of Paul Scherrer Institute, Swiss Light Source for the project "Analysis of crystal phases and structural disorder in thermoelectric Cu_2ZnSnS_4 and Cu_2SnS_3 nanoparticles: a temperature-dependent kinetic study"

ISCRA class C CINECA project – 2019

Awarded 40 000 CPU hours at the Italian supercomputing facility for the project "Energy band structure calculation for kesterite CZTS".

Publications

Journal Articles

1. *Nanostructured kesterite (Cu_2ZnSnS_4) for applications in thermoelectric devices* - **E. Isotta**, N.M. Pugno, P. Scardi - Powder Diffr. (2019).
2. *Effect of the order-disorder transition on the Seebeck coefficient of nanostructured thermoelectric Cu_2ZnSnS_4* - **E. Isotta**, C. Fanciulli, N.M. Pugno, P. Scardi - Nanomaterials (2019).
3. *Ultra-low thermal conductivity and improved thermoelectric performance in disordered nanostructured copper tin sulphide (Cu_2SnS_3 , CTS)* - K. Lohani, **E. Isotta**, N. Ataollahi, C. Fanciulli, A. Chiappini, P. Scardi - J. Alloy. Compd. (2020).
4. *Order-disorder transition in kesterite Cu_2ZnSnS_4 : thermopower enhancement via electronic band structure modification* - **E. Isotta**, B. Mukherjee, C. Fanciulli, N. M. Pugno, P. Scardi - J. Phys. Chem. C (2020).

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Schools and Conferences

Conferences

- Virtual Conference on Thermoelectrics - Oral presentation - Jul 2020
- 10th European Kesterite+ Workshop and PhD Day - Poster presentation - Nov 2019, Uppsala (Sweden)
- Joint KITES 2019, Joint Korean-Italian Thermoelectric Symposium - Attendance - Sep 2019, Limassol (Cyprus)
- ECT 2019, 17th European Conference on Thermoelectrics - Oral presentation - Sep 2019, Limassol (Cyprus)
- GiTe 2019, Italian conference of Thermoelectricity - Oral presentation - Feb 2019, Bologna (Italy)
- EPDIC 16 2018, 16th European Powder Diffraction Conference - Poster presentation - Jul 2018, Edinburgh (UK)
- EuroEAP 2018, Conference on Electromechanically Active Polymers - Oral presentation for the contest EuroEAP Society Challenge - Jun 2018, Lyon (France)
- GiTe 2018, Italian conference of Thermoelectricity - Attendance - Feb 2018, S. Margherita Ligure (Italy)

Schools

- Software Carpentry, scientific and high-performance computing school 2019 - Sep 2019, University of Trento (Italy)
- International School of Physics Enrico Fermi, Course 207 on “Advances in Thermoelectricity: Foundational Issues, Materials and Nanotechnology” organized by SIF - Jul 2019, Varenna (Italy)
- Software Carpentry, scientific and high-performance computing school 2018 - Nov 2018, University of Trento (Italy)
- Powder Diffraction and Rietveld Refinement School 2018 - Apr 2018, Durham University (UK)

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Interests

Professionals

Thermoelectricity, Energy Materials, Condensed Matter Physics, Photovoltaics, Physics of Phase Transitions, Crystallography and X-ray Diffraction, Renewable Energy Sources, Energy Engineering, Computer Programming, Foreign Languages

Personal

Music, Drums, Health and Nutrition, Sport, Volunteering and Social Action

Competences

Languages

Italian: mother tongue (C2)

English: complete and fluent (C1)

German: basic (B1)

French: basic (A2)

Experimental Techniques

XRD and Rietveld refinement, Seebeck and electrical resistivity measurements on bulk and thin film, LFA, Ball-milling, SEM imaging: advanced knowledge

TEM data analysis, DSC: good knowledge

Experience with **Raman spectroscopy, Hall and Van der Pauw measurements, synchrotrone XRD, XPS, Nuclear Inelastic Scattering**

Software and Codes

Python, TOPAS, Matlab, LaTeX, Office Pack, NetObjectFusion15 for web designing: advanced knowledge

COMSOL Multiphysics, Adobe Illustrator, Arduino IDE: good knowledge

Experience with **VASP, Quantum Espresso, LAMMPS, AutoCAD, Therm, Transys**

Links

Energy and Materials Laboratory

Laboratory where I currently work, I substantially contributed in the designed of the website

<http://energymaterials.unitn.it/index.html>

University of Trento

<https://webapps.unitn.it/du/en/Persona/PER0145105/Pubblicazioni>

Researchgate

https://www.researchgate.net/profile/Eleonora_Isotta

Google Scholar

<https://scholar.google.com/citations?user=W01puQgAAAAJ&hl=it>

Linkedin

<https://www.linkedin.com/in/eleonora-isotta/>