

Leonardo Duranti

Ph.D. in Materials for Health Environment and Energy

Date of birth 29-05-1990 | Nationality Italian

📍 Via Antonio Ligabue 44, 00045 Genzano di Roma (Italy)

📞 (+39)3485556477

✉️ leonardo.duranti@pec.it

leonardo.duranti@uniroma2.it

duranti.stm@gmail.com

📺 live:duranti.stm

Current position

Research Associate at the University of Rome “Tor Vergata”

February 2022 – to date

Department of Chemical Sciences and Technologies

Project title: Towards the energy transition: multifunctional materials for solid oxide reversible cells

PROGRAMMA OPERATIVO (PON) “RICERCA E INNOVAZIONE” 2014-2020 - “CONTRATTI DI RICERCA SU TEMATICHE GREEN” (Decreto ministeriale 10 agosto 2021 n. 1062) CUP E81B21004910005, ING-IND/22, CHIM/07

Reversible solid oxide cells (RSOC) allow to get fuel and chemicals from energy (power-to-gas technology, P2G) and energy from fuels and chemicals (gas-to-power technology, GTP) and can interchangeably operate as solid oxide fuel cells (SOFC) or solid oxide electrolyzer cells (SOEC). Using hydrocarbon tolerant electrodes, energy can be obtained from natural gas and biogas (SOFC mode), with useful CO₂ recovery (carbon capture and storage, CCS). If the electrodes are also active towards CO₂ electrolysis (SOEC mode), CO₂ is reduced to CO and O₂ with carbon capture and utilization (CCU). The key aspect to make these devices competitive on the market scale is the development of multifunctional electrodes for different fuels. The project is part of the objective 7 Clean and accessible energy of the 2030 Agenda for sustainable development, therefore in the ‘Green’ transition theme of the Ministerial Decree n. 1062 of 2021

Working experience

Post-doctoral research fellow at the University of Rome “Tor Vergata”

January 2021 – December 2021

Department of Chemical Sciences and Technologies

Project title: “Direct utilization of bio-fuels in solid oxide fuel cells for sustainable and decentralised production of electric power and heat” CUP: E84I19001050006, ING-IND/22, CHIM/07

The work was focused on: oxide-based electrodes for Reversible Solid Oxide Cells (RSOCs)

Study of solid oxide-based materials for energy conversion and storage. Development of catalysts and electrocatalysts for fuel oxidation and CO₂ electrolysis.

Education

Philosophy Doctor (Ph.D.) in Materials for Health Environment and Energy

November 2017 - March 2021

UNIVERSITY OF ROME “TOR VERGATA” - Department of Chemical Sciences and Technologies.

Qualification: **excellent cum laude**

- Thesis: “**Smart composite electrode for solid oxide cells (SOCs)**”.

The research activity was aimed at the design, development and testing of an innovative component for solid oxide cells, a leading-edge technology for energy conversion and storage. The developed device was able to interchangeably convert excess energy derived from renewable sources into fuel (including profitable CO₂

reduction) and convert back fuel into ready electricity.

Master of Science (M.Sc.) in Science and Technology Materials

October 2014 - May 2017

UNIVERSITY OF ROME "TOR VERGATA" -. Department of Enterprise Engineering *Mario Lucertini*.

Qualification: 110/110 cum laude

- Experimental Thesis: **"Compostable nanocomposites based on poly(lactic acid) and natural waste derived calcium carbonate for food packaging applications"**.

An innovative, biodegradable and sustainable material for food packaging industry has been developed. The physico-chemical properties of a bioplastic derived from renewable sources have been modified using additives obtained from the retrieval and valorization of commonly waste materials.

Bachelor Science (B.Sc.) in Materials Science

October 2009 - July 2014

UNIVERSITY OF ROME "TOR VERGATA" -. Department of Physics.

Qualification: 107/110

- Thesis: **"Production and characterization of polymer matrix and carbon nanotubes nanocomposites"**.

High school diploma (classical studies)

September 2004 - July 2009

LICEO CLASSICO UGO FOSCOLO, Albano Laziale (Italy)

Qualification: 100/100

Teaching experience

Participation in exam boards

Academic Year 2020-2021

Course name: **Technology of Materials and Applied Chemistry (TMCA)**

Master's Degree Course Dm.270/04 in Construction Engineering - Architecture

Degree Course Dm.270/04 in Construction Engineering

Degree Course Dm.270/04 in Civil and Environmental Engineering

University of Rome "Tor Vergata"

Participation in exam boards

Academic Year 2020-2021

Course name: **Chemistry**

Degree Course Dm.270/04 in Medical Engineering

Degree Course Dm.270/04 in Civil and Environmental Engineering

University of Rome "Tor Vergata"

Supplementary teaching for Piano Lauree Scientifiche (PLS)

October 2019 - March 2020

Prot. n. 0001954 del 14/10/2019

Course name **Chemistry for Energy Electrochemistry**

Total hours: 20

University of Rome "Tor Vergata"

Supplementary teaching for Chemistry course

October 2018 - March 2019

Prot. n. 0001728 del 15/10/2018

Course name **Chemistry**

Degree Course Dm.270/04 in Medical Engineering

Total hours: 20

University of Rome "Tor Vergata"

Professional training

Visiting PhD student at INRS *Institute National de la Recherche Scientifique - Centre Énergie Matériaux Télécommunications*

1650 Lionel-Boulet Blvd. Varennes, Quebec, Canada

May 2019 – November 2019

Project title: Synthesis of Oxide Materials for Oxygen Electrocatalysis

Staff member of Nanoinnovation Conference & Exhibition

Organized by Airi (Associazione Italiana per la Ricerca Industriale) and NanItaly
Hosted by Sapienza Università di Roma.

2017-2016 editions

Participation in research projects

- **FESR Fondo Europeo di Sviluppo Regionale 2014-2020 POR (Programma Operativo Regione Lazio)**

Project Title: “Innovative materials for direct use of biogas in solid oxide fuel cells for sustainable and decentralised production of electric power and heat (*MARVELOUS*)”

- **PRIN 2017 (Prot. 2017FCFYHK)**
Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR)

Project title: “Direct utilization of bio-fuels in solid oxide fuel cells for sustainable and decentralised production of electric power and heat (*DIRECTBIOPOWER*)” (36 months)

Coordination and participation in research groups

national

- 1 Master’s student thesis co-supervision. Experimental thesis title: “Synthesis and characterization of innovative anode material for solid oxide fuel cells”
- coordination of 2 PhD student in “Materials for Health, Environment and Energy”

March 2020 – October 2020

within the research group “SOFC/SOEC” di MaDE@UTV – Materials and Devices for Energy at University of Rome “Tor Vergata”
<http://made.uniroma2.it/>

international

Participation in the research activity of the group “Electrochemistry and micro energy Systems” at INRS-EMT Institute National de la Recherche Scientifique - Centre Énergie Matériaux Télécommunications, 1650 Lionel-Boulet Blvd. Varennes, Quebec, Canada

May 2019 – November 2019

Professional skills

- Organizing working activities within the tasks and deliverables of **European** and **national scientific projects**.
- Planning experimental campaigns: design of experiment, state-of-the-art survey, data collection, **critical analysis** of results, **scientific reports** production.
- Results communication and valorization: Scientific papers editing, **authors coordination**, dealing with editorial offices of top-rated scientific journals as **Corresponding Author**.

Consolidated experience in working in chemistry lab, obtained SIMDUT certification for handling hazardous materials.

Acquired working experience in chemical laboratories. Synthesis and characterization of complex oxides. Acquired familiarity with high temperature processes (500 °C - 1500 °C) for the manufacture of ceramic materials. Familiarity in the use of different gases for materials processing in controlled atmospheres. Working experience with liquid and solid state electrochemical systems for the characterization of catalytic materials.

Expertise in the following materials characterization techniques. Autonomous usage of scientific equipment. Independence in data analysis and interpretation.

- X-Ray Diffraction ([XRD](#))
- Scanning Electron Microscopy ([SEM](#))
- Thermogravimetric Analysis ([TGA](#))
- Differential Scanning Calorimetry ([DSC](#))
- Energy-Dispersive X-ray Spectroscopy ([EDX](#))
- Raman Spectroscopy
- Temperature Programmed Reduction/Oxidation/Desorption ([TPDRO](#))
- UV-vis-NIR Spectroscopy
- Fourier Transform Infrared Spectroscopy ([FT-IR](#))

Attended conferences

INTERNATIONAL

PERSONAL CONTRIBUTION

- **SOFC-XVII – The 17th International Symposium on Solid Oxide Fuel Cells**
[ONLINE](#) (2021) Oral presentation
- **NewTimes – New Trends in Materials Science and Engineering**
1st International Virtual Conference
INSTM - National Interuniversity Consortium of Materials Science and Technology
[ONLINE](#) (2021) Oral presentation
- **INDO-ITALIAN WORKSHOP: Solid oxide cells: evolving trends of electrode materials**
School of Advanced Sciences (SAS)
VIT - Vellore Institute of Technology
[ONLINE](#) (2021) Invited speaker
- **45th International Conference and Expo on Advanced Ceramics and Composites (ICACC 2020)**
10th Global Young Investigator Forum
ACerS – The American Ceramic Society
[DAYTONA BEACH – FLORIDA, USA](#) – 2021 (Online) Oral presentation
- **44th International Conference and Expo on Advanced Ceramics and Composites (ICACC 2020)**
9th Global Young Investigator Forum
Session Title: Advanced and Nanostructured Materials
ACerS – The American Ceramic Society
[DAYTONA BEACH – FLORIDA, USA](#) - 2020 Invited speaker
- **69th Annual Meeting of the International Society of Electrochemistry**
ISE – International Society of Electrochemistry
[BOLOGNA, ITALY](#) 2018 Poster presentation
- **Venice International University International PhD Academy -**
Global Challenges Initiatives: SUSTAINABLE ENERGY
VIU – Venice International University
[VENICE](#) – ITALY - 2018 Poster presentation

NATIONAL

- **XXVII Congresso nazionale della Società Chimica Italiana (SCI2021)** – La chimica guida lo sviluppo sostenibile
SCI – Italian Chemical Society
[ONLINE \(2021\)](#)
- **Italian Virtual Workshop on Fuel Cells 2021 (IWFC 2021)**
SCI – Italian Chemical Society – Electrochemistry Division
[ONLINE \(2021\)](#)
- **INNOVATIVE CATALYSIS AND SUSTAINABILITY (ICS 2019)**
Scientific and Socio-Economic Aspects - International Winter School
SCI – Italian Chemical Society
[BARDONECCHIA](#) – ITALY – 2019
- **6th International Sol-Gel Society (ISGS) Summer School**
Frontiers in Hybrid Materials
INSTM - National Interuniversity Consortium of Materials Science and Technology
[ALGHERO](#) – ITALY - 2018
- **1st ENERCHEM School - Chemistry For The Energy Transition**
SCI – Italian Chemical Society
[FLORENCE](#) – ITALY - 2018

PERSONAL CONTRIBUTION

Oral presentation

Invited speaker

Poster presentation

Poster presentation

Poster presentation

Awards and acknowledgments

- **Best presentation Award**
Title of the presentation: “*Versatile, coking tolerant Fe-Ni alloy decorated fuel electrode for Reversible Solid Oxide Cells (RSOCs)*”
Italian Virtual Workshop on Fuel Cells 2021 (IWFC 2021)
SCI – Italian Chemical Society – Electrochemistry Division
[ONLINE \(2021\)](#)
- **Best poster Award**
Title of the poster: “*Highly redox stable composite anode for SOFCs*”
1st ENERCHEM School - Chemistry For The Energy Transition
SCI – Italian Chemical Society
[FLORENCE](#) – ITALY – 2018

Personal Skills

OS Windows 10 advanced level

[Microsoft Office](#) certificate knowledge:

ECDL/ICDL certification [IT-Security – Specialized Level](#)

ECDL/ICDL certification Word processing ([Microsoft® Word 2016](#))

ECDL/ICDL certification Spreadsheet ([Microsoft® Excel® 2016](#))

ECDL/ICDL certification Presentation ([Microsoft® PowerPoint® 2016](#))

ECDL/ICDL certification Computer Essentials

ECDL/ICDL certification Online Essentials

ECDL/ICDL certification Online Collaborations

Software Origin Pro 2018, Endnote, Image J, HighScore Plus

Driving License B

Languages

Italian first language

English C1 (*CAE Certificate in Advanced English*) obtained in 2008

List of publications

Indexed scientific publications SCOPUS (Web of Science)

- “Porphyrinoids coated silica nanoparticles capacitive sensors for COVID-19 detection from the analysis of blood serum volatolome”** 2022
SENSORS AND ACTUATORS B: CHEMICAL 369 (2022): 1323291
M. Mudugantia G. Magna L. di Zazzo M. Stefanelli R. Capuano A. Catini L. Duranti E. Di Bartolomeo Y. Sivalingam S. Bernardini R. Paolesse C. Di Natale
- “One step nanoencapsulation of corrosion inhibitors for gradual release application”** 2022
MATERIALS TODAY CHEMISTRY 24 (2022): 100851
A. Privitera, L. Ruggiero, I. Venditti, U. Pasqual Laverdura, S. Tuti, D. De Felicis, S. Lo Mastro, L. Duranti, E. Di Bartolomeo, T. Gasperi, M.A. Ricci, A. Sodo
- “Enhancing Oxygen Reduction Activity and Structural Stability of La_{0.6}Sr_{0.4}FeO_{3-δ} by 1 mol % Pt and Ru B-Site Doping for Application in All-Perovskite IT-SOFCs”** 2022
ACS APPLIED ENERGY MATERIALS 5.3 (2022): 2918–2928
Martina Marasi, Anna Paola Panunzi, Leonardo Duranti, Nicola Lisi, Elisabetta Di Bartolomeo
- “Electrical stability during redox cycles promoted by Pd exsolution in LSFPd thin films”** 2022
CERAMICS INTERNATIONAL – 48.9 (2022): 12368-12375
Zhao Liu, Leonardo Duranti, Elisabetta Di Bartolomeo, Nan Yang
- “Novel Composite Fuel Electrode for CO₂/CO-RSOCs”** 2021
JOURNAL OF THE ELECTROCHEMICAL SOCIETY 168.10 (2021):104507
Leonardo Duranti, Igor Luisetto, Silvia Licocchia, Cadia D’Ottavi, Elisabetta Di Bartolomeo
- Corresponding Author: Leonardo Duranti
- “Multi-functional fuel electrode for Reversible Solid Oxide Cells (RSOCs) with superior activity for dry methane oxidation and CO₂ electrolysis”** 2021
ELECTROCHIMICA ACTA – 394 (2020): 139163
Leonardo Duranti, Igor Luisetto, Stefano Casciardi, Costantino Del Gaudio, Elisabetta Di Bartolomeo
- Corresponding Author: Leonardo Duranti
- “Novel Composite Fuel Electrode for CH₄-SOFC and CO₂-SOEC”** 2021
ECS TRANSACTIONS - 17th International Symposium on Solid Oxide Fuel Cells (SOFC-XVII)
Leonardo Duranti, Igor Luisetto, Cadia D’Ottavi, Elisabetta Di Bartolomeo
- Corresponding Author: Leonardo Duranti
- “Perovskites Doped with Small Amounts of Noble Metals for IT-SOFCs”** 2021
ECS TRANSACTIONS - 17th International Symposium on Solid Oxide Fuel Cells (SOFC-XVII) 103(1), 2137
Martina Marasi, Anna Paola Panunzi, Leonardo Duranti, Cadia D’Ottavi, Elisabetta Di Bartolomeo
- “Electrochemical performance and stability of LSFMn + NiSDC anode in dry methane”** 2020
ELECTROCHIMICA ACTA – 362 (2020): 137116
Leonardo Duranti, Igor Luisetto, Silvia Licocchia, Costantino Del Gaudio, Elisabetta Di Bartolomeo
- Corresponding Author: Leonardo Duranti
- “The role of manganese substitution on the redox behavior of La_{0.6}Sr_{0.4}Fe_{0.8}Mn_{0.2}O_{3-δ}”** 2020
JOURNAL OF THE EUROPEAN CERAMIC SOCIETY - 40.12 (2020): 4076-4083
Leonardo Duranti, Isabella Natali Sora, Francesca Zurlo, Igor Luisetto, Silvia Licocchia, Elisabetta Di Bartolomeo
- Corresponding Author: Leonardo Duranti

