CURRICULUM VITAE

EUROPEAN FORMAT

(LAST FIVE YEARS)

PERSONAL INFORMATION

Name, Surname	**Letizia Savio**
Address	IMEM-CNR c/o Dipartimento di Fisica, Via Dodecaneso 33, 16122 Genova, IT
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Website	http://www.cnr.it/people/letizia.savio
Nationality	Italian

RESEARCH FIELD **Material science (experimental), surface science and nanoscience.**

WORK EXPERIENCE

If CNR staff member: **BADGE N. (MATRICOLA): 11115**
QUALIFICATION: RESEARCHER
LEVEL: III

PRESENT POSITION

Date	Since October 1st, 2008
Name and address of employer	Consiglio Nazionale delle Ricerche, Istituto dei Materiali per l' Elettronica ed il Magnetismo (IMEM-CNR), Genova Via Dodecaneso 33, 16146 Genova, IT.
Type of business or sector	Experimental research in surface science and nanoscience: spectroscopic and microscopic studies of two-dimensional systems. Particular attention was devoted to the molecule-surface interaction (with metallic surfaces, oxide ultra-thin films and graphene layers) for applications in catalysis, green chemistry and bio.interfaces.
Occupation or position held	Researcher, III level (permanent since December 15th, 2010)
Main activities and responsibilities	Since November 2016, Member of "Consiglio d'Istituto" (scientific board) of IMEM. January 2012 – December 2015, Responsible of Commessa (research group) MD.P06.002 (Properties of nanostructures surfaces and clusters) and reference person for the surface analysis laboratory at IMEM-Genova. December 2008 – July 2010, Added member of Consiglio d'Istituto di IMEM.
Notes	March – September 2011, Maternity leave.

EDUCATION AND TRAINING

Title of qualification awarded	Ph.D. in Physics.
Date	February 7th, 2002
Name and type of organisation providing education and training	Università degli Studi di Genova.

Title of the thesis	Dynamics of the interaction of oxygen and ethylene with defected Ag surfaces. (Supervisor Prof. Mario Rocca / External supervisor Prof. Rodolfo del Sole, Università di Roma 2).
Principal subjects occupational skills covered	Experience with ultra high vacuum systems and with spectroscopic methods of use in surface and material science.
Evaluation	Excellent (Ottimo)
Title of qualification awarded	Degree in Physics (4 years).
Date	September 9th, 1998
Name and type of organisation providing education and training	Università degli Studi di Genova.
Title of the thesis	HREELS study of the reactivity and electronic excitations of different O/Ag(001) phases. Supervisor Prof. Mario Rocca.
Principal subjects occupational skills covered	Experience with ultra high vacuum systems and high resolution electron energy loss spectroscopy (HREELS).
Evaluation	110/110 e lode.

RESEARCH ACTIVITIES

RESEARCH SECTOR

Letizia Savio has developed her research activity in the field of experimental material science. In particular, she has employed electron spectroscopies and scanning tunnelling microscopy to investigate the structure, reactivity and electronic properties of single crystal metal surfaces and of ultra-thin films (oxide layers, graphene and C-based nanostructures, monolayers of biological molecules).

*R*ecent research activities (last 5 years)

I) Graphene and graphene-based nanostructures.

Research developed within projects PRIN2017 (as responsible of the IMEM-CNR sub-unit) and Fondazione Compagnia di S. Paolo (as PI).

a) The structure of pristine, n-doped and defected graphene grown on Ni(111) and the reactivity of these layers with respect to CO adsorption was characterized by combining scanning tunnelling microscopy (STM) with photoemission and vibrational spectroscopies. Contrary to expectations, weak CO chemisorption occurs also on the pristine graphene film due to the influence of the strongly interacting substrate. More recently, CO intercalation has been studied by NAP-XPS, observing CO2 formation via the Boudouard reaction.

b) The surface assisted synthesis of graphene nanoribbons from 1,6-dibromopyrene precursors and their charges following O2 exposire was investigated by STM and XPS. The different processes (Ullman coupling and dehydrogenation plus C-C colupling) leading to intermediate compounds were identified and the final products (graphene nanoribbons with well-defined edge-site sequence and polymeric networks at higher temperature) were described in detail.

c) The formation of 2D carbon-based networks doped with transition metal atoms has been investigated starting from the adsorption of Pd cyclometallated complexes on Ag(110).

II) Structure and reactivity of ultrathin MgO/Ag(100) films.

The final morphology of MgO/Ag(100) monolayers depends both on usual growth parameters (temperature, Mg flux, O_2 pressure) and on additional factors as the cooling rate after growth and the accumulation of oxygen atoms at the metal-oxide interface. Controlling these parameters allows to tune the morphology of the film, passing from monolayer islands of irregular shape to perfectly squared bilayer islands to extended monolayers, limited in size only by the width of the underlying Ag(100) terraces. Ultrathin MgO monolayers were successfully employed as substrates for the deposition of small Ni clusters.

III) Self-assembly of glutamic acid on metal (Ag) and oxide (TiO_2) surfaces.

The adsorption state and the morphology of layers of (S)-Glu molecules self-assembled on Ag surfaces were characterised combining microscopic and spectroscopic analysis with the outcome of ab-initio simulations. In collaboration with Dr. D. Costa (ENSCP, Paris) and Dr. F. Tielens (UPMC, ParisVI). On TiO_2(110) the adsorption state is correlated to the hydroxylation state of the oxide surface.

Technical skills

- Ultra high vacuum systems (UHV).
- High Resolution Electron Energy Loss Spectroscopy (HREELS).
- X-ray photoemission spectroscopy (XPS) both with conventional X-ray source and with synchrotron light source.
- Low Temperature Scanning Tunnelling Microscopy (LT-STM).
- Supersonic Molecular Beams and measurement of the gas-surface interaction dynamics with the "King&Wells" method.

ADDITIONAL INFORMATION

Teaching activity

A.Y. 2016-17, 2020-21. Co-teacher of the course "Microscopic and Spectroscopic techniques for surface and interface analysis" for the PhD School in Physics, Dept. of Physics, Università di Genova, Genova, IT.
-A.Y. 2016-17, 2018-19, 2019-20, 2020-21. Teacher of the course of "Laboratorio di Fisica della Materia" for the Master degree (laurea specialistica) in Physics, Dept. of Physics, Università di Genova, Genova, IT.
A.Y. 2018-19, 2029-20. Teacher of the course « Surface Spectroscopies (COD. 94837 – 3 CFU)" for the Master degree (laurea specialistica) in Material Science and Tecnology, Dept. of Chemistry, Università di Genova, Genova, IT.

Recent scientific collaborations

- *May 2014 – at present.* Prof. G. Pacchioni, Dr. S. Tosoni, (Università di Milano Bicocca). Morphology of ultrathin MgO films and of Ni clusters deposited on them. STM measurements and ab-initio calculations.
- *2013- at present: Prof.* Cristiana di Valenin (Università di Milano Bicocca). Self-assembly of GNRs and organometallic compounds at metal surfaces.

anaging of research projects.

- Progetto PRIN2017: "Metal Activated 2D cArbon-based platforMs (MADAM)". Referente della sottounità IMEM-CNR.

- Progetto Fondazione Compagnia di S. Paolo (2020-2023): "MC-nano - Nanostrutture a base carbonio drogate con atomi metallici per sensoristica e catalisi verde". Principal Investigator.

- Progetto bilaterale CNR-PAN 2017-19: "Catalytic conversion of N2O on ultrathin iron oxide films". Responsabile per la parte italiana del progatto.

Organization of Conferences/Congresses

International Meeting on Nanoalloys – 2019, Genova, 4.7 Giugno 2019. Membro del comitato organizzatore locale.

Editorial activity

- Referee for the following international scientific journals: Journal of Physical Chemistry, Physical Review Letters, The European Physical Journal, The e-Journal of Surface Science and Nanotechnology, Chirality, Applied Surface Science
- Since October 2012, member of the Editorial Board of The Scientific World Journal (Atomic and Molecular Physics).

Awards

- *2001:* Award of the Società Italiana di Fisica for the scientific production as a young scientist.

- *2008:* Award of the Società Italiana di Fisica for the best presentation in the "material science" session at the SIF National Conference (Genova, September 22-27, 2008).

Additional duties

- *Since Jan. 2020 – at present,* Member of the Teacher Council of the Ph.D. School in Physics of the Università degli Studi di Genova.

- Dal 2017 ad oggi, relatice/co-relatrice di 3 tesi di dottorato (UNIGE e UNIPR) e di tre tesi di laurea magistrale (UNIGE) in Scienza e tecnologia dei materiali.

Languages

Italian, mothertongue;
English, excellent (written and spoken)
French, basic.

Dissemination of results

Since 2017, 3 invited talks at national and international conferences.

BIBLIOMETRY

More than 85 publications in peer-reviewed international scientific journals;
8 book chapters;
2024 citations (1740 without self-citations) (source WOS)
H-index 22.

SELECTED PUBLICATIONS (LAST 5 YEARS)

1. "Graphene growth on Ni (111) by CO exposure at near ambient pressure", R Davì, G. Carraro, M. Stojkovska, M. Smerieri, L. Savio, M. Lewandowski, J.J. Gallet, F. Bournel, M. Rocca, L. Vattuone, *Chem. Phys. Lett.* 774, 138596 (2021). Editor's Choice.
2. ‘"Morphological characterization and electronic properties of pristine and oxygen-exposed graphene nanoribbons on Ag(110)", J.E. Barcelon, M. Smerieri, G. Carraro, P. Wojciechowski, L. Vattuone, M. Rocca, S. Nappini, I. Píš, E. Magnano, F. Bondino, L. Vaghi, A. Papagni, L. Savio, *Phys. Chem. Chem. Phys*. 23, 7926 (2021).
3. "Correlating hydrophobicity to surface chemistry of microstructured aluminium surfaces", L. Savio, K.B. Bhavitha, G. Bracco, G. Luciano, D. Cavallo, G. Paolini, S. Passaglia, G. Carraro, L. Vattuone, R. Masini, M. Smerieri, *Appl. Surf. Sci*. **542**, 148574 (2021).
4. "2D Ni Nanoclusters on Ultrathin MgO/Ag(100)", L. Savio, M. Smerieri, J. Pal, E. Celasco, M. Rocca, L. Vattuone, *J. Phys. Chem. C* **124**, 482 (2020).
5. "Vibrational fingerprint of the catalytically-active FeO_{2-x} iron oxide phase on Pt(1 1 1)", M. Stojkovska, R. Davì, G. Carraro, M. Smerieri, M. Lewandowski, M. Rocca, L. Vattuone, L. Savio, *Appl. Surf. Sci*. **512,** 145774 (2020).
6. "Chemisorption of CO on N-doped graphene on Ni(111)". G. Carraro, E. Celasco, M. Smerieri, L. Savio, G. Bracco, M. Rocca, L. Vattuone, *App. Surf. Sci.* **428, 775** (2018)"
7. "Synthesis of corrugated C-based nanostructures by Br-corannulene oligomerization". M. Smerieri, I. Pisˇ, L. Ferrighi, S. Nappini, A. Lusuan, L. Vattuone, L. Vaghi, A. Papagni, E. Magnano, C. Di Valentin, F. Bondino, L. Savio, *Phys. Chem. Chem. Phys.* 20, 26161 (2018).
8. "Chemisorption of CO on N-doped graphene on Ni(111)". G. Carraro, E. Celasco, M. Smerieri, L. Savio, G. Bracco, M. Rocca, L. Vattuone, *App. Surf. Sci.* 428, 775 (2018).
9. "On-surface synthesis of different boron-nitrogen-carbon heterostructures from dimethylamine borane". S. Nappini, I. Pís, G. Carraro, E. Celasco, M. Smerieri, L. Savio, E. Magnano, F. Bondino, *Carbon* 120, 185 (2017).
10. "Adatom Extraction from Pristine Metal Terraces by Dissociative Oxygen Adsorption: Combined STM and Density Functional Theory Investigation of O/Ag(110)". J. Pal,T.B. Rawal, M. Smerieri, S. Hong, M. Alatalo, L. Savio, L. Vattuone, T.S. Rahman, M. Rocca, *Phys. Rev. Lett.* 118*,* 226101 (2017).

TRATTAMENTO DEI DATI PERSONALI, INFORMATIVA E CONSENSO

Il D.Lgs. 30/6/2003, n. 196 "*Codice in materia di protezione dei dati personali*" regola il trattamento dei dati personali, con particolare riferimento alla riservatezza, all'identità personale e al diritto di protezione dei dati personali; l'interessato deve essere previamente informato del trattamento .

La norma in considerazione intende come “trattamento” qualunque operazione o complesso di operazioni concernenti la raccolta, la registrazione, l’organizzazione, la conservazione, la consultazione, l’elaborazione, la modifica, la selezione, l’estrazione, il raffronto, l’utilizzo, l’interconnessione, il blocco, la comunicazione, la diffusione, la cancellazione e la distruzione di dati, anche se non registrati in una banca dati.

In relazione a quanto riportato, autorizzo il CNR al trattamento dei dati contenuti nel presente *curriculum vitae* e nella documentazione della quale fa parte integrante

(*barrare la casella*) x Si, acconsento

Genova, October 18th, 2021

Letizia Savio