

Alberto PASSERONE

Curriculum

Personal data:

- Born in Perinaldo (IM), Italy, August 23rd, 1943.
- Married, two children.

Education and Degrees:

- “**Maturità Classica**”, 1962.
- “**Laurea**” in Chemical Engineering, with honours, Univ.of Genova, 1967.
- Qualification as a Chemical Engineer (“**abilitazione** alla professione”), 1968.
- “**Docteur es Sciences**” (Ph.D.), with honours, at the Institut National Polytechnique and University, Grenoble, France, 1981.
- “**Director of Research**”, Italian National Research Council, 1991.

Languages:

English (fluent), French (fluent).

Honors, memberships, professional societies:

- ELGRA Medal for Physical Sciences (2009)
 - Vice-president of the European Low Gravity Research Association-ELGRA,(1993-97).
 - ESA "Certificate of Merit" for the contributions to the First EURECA Mission (1992-93).
 - Member of the Editorial Board of the “Journal of Materials Science” (2016-present).
 - Member of the Board of Foreign Ass. Editors of “Archives of Foundry Engineering” (2015-present)
 - Member of the Editorial Adv. Board of “Archives of Metallurgy and Materials” (2012-present)
 - Member of the Scientific Committee of “Transactions of the Foundry Research Institute” (2008-2019)
 - Member of the Board of Referees of Surface Science, Applied Surface Sci., J.Colloid & Interface Science, Acta Materialia, Scripta Materialia, J. de Chimie Physique, Langmuir, J. of Mater. Sci., J. Eur. Cer. Soc., Metall. Trans., Materials Chem. and Phys., J. of Mater. Eng and Performance, Nanoscience and nanotechn. Letters, J. of Vacuum, and of national and international bodies (European Union, Third World Acad. of Sciences, IPA Belgium, ESA, Ecoles Polytechn. France, ASI, MIUR).
 - Member of the MRS, ELGRA, E-MRS, ACERS scientific Societies.
 - Member of the European Academy of Arts, Sciences and Humanities.
 - Nomination in the “Marquis Who’s Who in the World” (from 2001) and in the “Marquis Who’s Who in Science and Engineering” from 2005.
 - Member of the Scientific Council of International Congresses and Symposia.
 - Invited Speaker and Chairman in Intern. Conferences, Symposia and Meetings.
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Career, posts and responsibilities:

Year	Title
1/9/2010→2020	Retired- Associate Researcher at ICMATE (Formerly IENI until 2015)
2002- 2009	Head of the Genoa Unit of the Inst. for Energetics and Interphases –IENI CNR
1999- 2001	Member of the Scientific Advisory Council of the Italian Space Agency –ASI
1998-2000	Chairman of the ESA Microgravity Advisory Committee (MAC)
1994- 2001	Director of the CNR “Ist. di Chimica Fisica Applicata dei Materiali” ICFAM, Genoa.
1992	“Director of Research” at CNR
1970	Engaged, after open competition, as Researcher in CNR.

Part 1. Experience in the managerial and organisational fields.

Alberto Passerone has gained managerial and organisational experience in the following organisations:

- 1. Consiglio Nazionale delle Ricerche**
- 2. Ministero Istruzione, Università e Ricerca - MIUR**
- 3. Agenzia Spaziale Italiana-ASI**
- 4. European Space Agency - ESA**
- 5. European Materials Research Society E-MRS**
- 6. European Low Gravity Research Association - ELGRA.**

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1) Consiglio Nazionale delle Ricerche.

- **Member of the Expert Group** supporting the CNR “Comitati Ordinatori” Oct. 2005- Feb 2006.
- **Responsible of the Genova Department** of the CNR Institute for Energetics and Interphases IENI (2002-2008);
- **Organiser and Congress Chairman** of the 4th Intern. Congress “High Temperature Capillarity”, held in Sanremo (2004)
- **Director of the CNR Institute** "Chimica Fisica Applicata dei Materiali" (1994-2001).
- **Member, designed by CNR,** of the Scientific Committee of ICMM-CNR, Genoa (1998-2001);
- **Member elect and secretary of the** Scientific Committee of ICFAM-CNR. Genoa (1982-1994);
- **Member of the management Committee** of the "Istituto Nazionale di coordinamento MITER" (1996-1999);
- **Member** of the "Commissione di Fattibilità del Progetto Finalizzato "Materiali Speciali per Tecnologie Avanzate" (1986);
- **Member/chairman** of the Board of Examiners in many CNR-Competitions.

2) Ministero Istruzione, Università e Ricerca – MIUR

- **Member** of Panel 9) “Industrial and information Engineering” and 15d) “Aerospace Science and Technology“ in the mainframe of the 2001-2003 Evaluation of Italian Research : CIVR.

3) Agenzia Spaziale Italiana

- ❖ **Member** of the Scientific Advisory Committee (1998-2000)
- ❖ **Component** of the CNR "Gruppo di Lavoro Intercomitato", advising ASI in preparing the National Space Plan 1998-2002 (1998);
- ❖ **Head of the Italian delegation** in the ESA "User Support Organisation" in Köln (Germany) to prepare the ground infrastructure for the scientific utilisation of the International Space Station (1989-1990).

4) European Space Agency

- **Chairman** of the ESA **Microgravity Advisory Committee** (1998-2000); the **MAC** defines the ESA scientific policy in the fields of life and physical sciences, selects the research projects, gives its advise on the flight opportunities, the Announcement of Opportunities for research programmes etc. After a suggestion of ing. Passerone the Committee has been re-named "Life and Physical Sciences Advisory Committee LPSAC ";
- **Expert scientist** of the European Science Foundation to evaluate the ESA Space Policy in Physical Sciences for the years 2001-2005 (2000);
- **Coordinator** of the Project FASES to prepare experiments and hardware for the International Space Station. Participants: Univ.of Firenze, Max-Planck Inst. - Berlino, Univ. of Marseille, Univ. of Compiegne, Univ. of Nice (1999-2002);
- **Member of the** ESA Microgravity Advisory Committee for Physical Sciences (1996-1998);
- **Science Representative of Users** of the laboratory "Multi-furnace assembly" of the Space Platform EURECA 1 (1988-1993) for experiments in the field of Materials Science;
- **Member of the Scientific Committee** and Organising Committee of Intern. Congresses organised by ESA (Collioure 2006, Toronto 2003, Noordwijk 2003, Lyon 2001, Darmstadt 1996, Berlin 1995, Oxford 1992);
- **Responsible-co-ordinator** of the ESA Topical Team " Equilibrium and Dynamic Properties of Adsorbed Layers" ; participants: Max-Planck Inst. Berlin, MRC-Univ. Libre Bruxelles, Univ. Firenze, Univ. Aix-Marseille, Univ. Sofia (1996-1998);
- **Member of the Advisory Team** "Materials Science Laboratory" (1993-1995) to verify the performances of the Materials Science Laboratory to be put on board the Int. Space station in relation to the scientific needs of the scientists;
- **Member of the ESA Board** "Physics, Fluids and Materials Science " (1993-1996) to select and monitor European research projects in that field;
- **Member of the ESA Board** "Interfacial Phenomena " (1991-1992) to select and monitor European research projects in that field;

5) European Materials Research Society

- **Member elect** of the Board of National Delegates of the E- MRS (1994-1998).

6) European Low Gravity Research Association ELGRA.

- * Vice-President of ELGRA (1993-1997).
 - * Member of the Management Committee (1986-1993);
 - * General Secretary of the Association (1987-1991);
 - * Editor of ELGRA-NEWS, bulletin of the Association (1986-1997);
 - * Organiser of the 1993 ELGRA General Meeting in Genova.
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Part 2. Scientific activities

The scientific activity of A. Passerone, can be assigned to the following fields of research:

- *Interfacial solid-liquid interactions in metal-metal and metal-ceramic systems. Advanced studies in joining processes.*
- *Theoretical models and experimental determination of interfacial energies and structure of metallic systems.*
- *Measurement of static and dynamic interfacial tensions and density; set-up of new experimental techniques and apparatuses for surface tension measurements.*
- *Theoretical models and experimental determination of oxygen influence on the surface properties of liquid metals.*
- *Thermodynamic and kinetic studies of interfacial adsorption.*
- *Experiments on the materials behaviour in weightless conditions (microgravity) on Sounding-rockets, satellites and Space Laboratories.*
- *Studies on the structural transformations in catalysts.*

A) Organization and Editorial activities

The most recent activities regard two main fields: a) Organization of Conferences and Symposia; b) Serving as Guest-Editor of important Scientific Journals. In particular:

- Organization of the High Temperature Capillarity Conference (Sanremo, Italy, **2004**), the fourth of a still existing series.
- Organization of the Symposia “Joining” in the Conferences EUROMAT **2009** (Glasgow, **2009**), EUROMAT **2011** (Montpellier, France, 2011), EUROMAT **2013** (Seville, Spain, 2013), AIM 2014 (Roma, **2014**)
- Organization of the “Triple line” Symposium (Les Houches, France 2010)
 - Editor of 1) “**Materiali per lo spazio: sintesi, metodologie, tecnologie**”, G&G Del Cielo, **2001**.
 - 2) “**Ceramics Surfaces for Tribology and Corrosion & Ceramic Joining Science and Technology**” with Vincenzini P. and Hadfield M., Trans Tech Publ, **2011**, ISBN-13: 978-3-908158-47-49
 - 3) “**Microgravity research: materials and fluid sciences**”, Pergamon Press, Vol 11, **1991**.

- **Guest-Editor** of “**Adv. in Space Research**”, Vol. 11 (7) **1991**; **J. Materials Science**: Vol. 40 (9/10) **2005**; Vol. 41 (8) **2010**; Vol. 45 (10) **2010**; **Scripta Materialia** Vol.62 (12) **2010**; **J. Mater. Eng. Perform.** Vol. 21 (4) **2012** and Vol. 23 (5) **2014**
- **Author** of “**Elementi di Metallurgia Fisica**”, **ECIG, Genova, 1971** (for engineering and technical schools).

B) Scientific co-ordination and responsibilities

- 2012-2015 Chairman of the Scientific Committee of the “**High Temperature Capillarity** “ International Conferences series, dedicated top advances in the study of high temperature interfacial phenomena.
- 2013-2016 Scientific Consultant and collaborator for the FP7-2013-NMP-ICT-FOF EU project ADMACOM
- 2012-2016 Scientific Responsible of SP1-WP5-AZ1- UO 09 of the CNR Flagship Project RITMARE
- 2009-2012 Member of the ESF Pool of Reviewers
- 2010 Scientific Responsible of the Research Project “JOINHT” financed by CARIPOLO.
- 2009 Member of the CNR “Work-Group for the evaluation of participation of CNR in the -Parco Tecn. Erzelli-, Genoa.
- 2007-2010 Responsible of the CNR-DET Observatory for Aerospace Policies.
- 2006-2008 Scientific responsible of the MIUR-FIRB proposal “MITGEA”
- 2005 Scientific responsible of the TECFIL Project of Liguria Region.
- 1999- 2002 Co-ordinator of the International Space Programme FASES (Fundamental studies in Emulsion stability) of ESA (highly-recommended programme).
- 1996-1999 Responsible of the International ESA Topical Team “Adsorption and dynamic Properties of adsorbed layers”.
- 1993-2003 Co-investigator for Research Programmes in μ -gravity in TEXUS 33 sounding rocket (1993), SPACEHAB STS-95 (1998) and STS-107 (2003).
- 1993 ESA Science Advisor for the Materials Science Lab. of the Int. Space Station.
- 1992 -1996 Principal Investigator of "Interfacial tension and adsorption studies -FAST-". Space Project recommended by ESA as an "Exceptional proposal".
- 1991-1992 Member of the ESA Working Group " Gravity dependent Phenomena in Physical Chemistry".
- 1989 Member of Managment Committee of the "Centre de reflexion et d'etude en

- Thermodynamique - CERET", Paris.
- 1989-1999 Responsible of a Research Team of the CNR "Progetto Finalizzato MSTA"
- 1987-1993 Representative for the Multi-Furnace-Assembly Laboratory Users Team in the EURECA Programme of ESA (STS-46 flight, 1992-93).
- 1986 Scientific Coordinator for Materials Science in μ -gravity of the Italian PSN, for Tether Satellites.
- 1985- 2000 Responsible of Research Teams of ASI-funded Projects in "Fundamental Research"
- 1985-1993 Principal Investigator for Research Programmes of Materials Science in μ -gravity in MASER 1 (1987) and MASER 4 (1990) sounding-rockets, EURECA 1 space platform (1992-93) and SPACELAB D2 (1993).
- 1985-1986 Contract-Professor of Applied Chemistry, Faculty of Engineering, Univ. Genova
- 1983 Responsible of a Research Team of the CNR "Progetto Finalizzato Metallurgia".
- 1979-1981 Resp. of co-operation Contracts between Italy (CNR) and France (CNRS).
- Responsible of a Research Teams in the CNR Laboratory, Genova, since 1974.

C) Research activities and results.

Publications:

A. Passerone has already published more than 250 scientific contributions. Among them more than 200 refereed papers, 10 book chapters, 4 Patents, etc.

[Passerone A Papers](#)

From Google Scholar (Feb. 2020): Citations 3400, h-index =34 on 220 documents

From Scopus (Feb. 2020): Citations 2600, h-index=30 on 135 docs.

D) Dissemination activities

A. Passerone participated many times in the RAI TV program LEONARDO to present his CNR group activities in Space projects for research in microgravity Science.

- 1997-2005 From the launch date of the interplanetary vehicle Cassini until the landing on Titano of the sub-vehicle Huygens, A. Passerone contributed in an essential way to the organization of yearly Congresses to present to the wide public the scientific results of the Mission. These Conferences, with the participation of a number of Principal Investigators having instruments on board, have been held in Genova (University) and yearly, in Perinaldo (IM), the village where G.D. Cassini was born in 1625.

- 2000-present A.P. is co organizer of (and Speaker in) the yearly meetings dedicated to scientific dissemination related to Astronomy and Space Research held in Perinaldo (IM) at the local Astronomic Observatory (details at: <http://www.astroperinaldo.it/>).

Additional notes on A. Passerone scientific activities.

The main, qualifying aspects of A. P. activity of research can be summarised in the following points:

- Pioneering work (1968-1970) on the study of structural modifications of catalysts by using EPR spectroscopy;
- Utilisation of new techniques (sessile drop, dihedral angle, contact angles etc.) to define the adhesion/wetting/reaction phenomena of metal-metal and metal-ceramic systems and of their interfacial properties;
- Development of an advanced theoretical approach, based on statistical thermodynamics, to evaluate solid-liquid interfacial energies in metallic systems; (see in particular, the Ph.D. Thesis);
- Experimental evidence, for the first time, of a rough-smooth atomic interfacial transition in metallic systems;
- Development of new mathematical models for the evaluation, from experimental data, of interfacial energies in metallic systems;
- Set-up of a new fluid-dynamic theory on the gas-liquid metal surface reactivity;
- Design and construction (Italian Patent N.19260 A/89) of a new method and apparatus for surface and interfacial tension measurements, especially apt to work under microgravity conditions (e.g. on space platforms). This apparatus, built under ESA contract by Officine Galileo, Florence, has already flown on board Space Shuttle (STS-95 and STS-107) and is, at present, under refurbishment for use on the International Space Station. This apparatus, called "*Capillary Tensiometer*", is being used, at present, in many international laboratories.
- Improvement of experimental techniques for surface and interfacial measurements, from room temperature to 1500°C, by means of new image analysis techniques, which make it possible to obtain real-time and dynamic data;
- Set-up of a new model to define the dynamic oxidation conditions of liquid metals;
- Design of new experimental techniques and of new computational approaches to study the adsorption kinetics of surfactants at liquid-liquid and liquid-gas interfaces and of their surface and interfacial elasticity.
- Basic studies and set-up of new joining processes for metal-ceramic and ceramic-ceramic systems for high temperature applications (ex.: thermal shields for gas turbines combustion chambers, Thermal protection shields for re-entry vehicles etc.).

A. Passerone has taken an active part in all the aforementioned activities as Head of a Research group, both defining the research lines and directly working to develop them, but also with the important contribution of Colleagues whose names appear in the publication list.

In parallel with the realisation of these research lines, A. Passerone's activities have been devoted to the set up and the organisation of efficient Research Groups, also through the formation of students and post-doc researchers, and to the design and optimisation of experimental facilities, often of a completely new conception, specifically dedicated to the study of interfaces.

In this context, he has contributed to the development, inside the CNR Laboratory where he has been working since 1970, of three specific Research Lines devoted to the study of Physical-Chemistry of surfaces at high temperature, to the study of metal-metal and metal-ceramic interfaces and joints, and to the study of adsorption dynamics at liquid-liquid interfaces. These Groups are now enjoying a growing international recognition.

In the IENI-GE Institute a "laboratory" exists today where surface and interfacial tension and wettability measurements can be done in a temperature range from ambient to above 1500 °C, which makes it among the few ones in the world.

These activities, performed both as a Group responsible, as the director of the ICFAM Institute (1994-2001) and as the Responsible of the Genoa Section of IENI and then as Associate Researcher after his retirement, are firmly based on a continuous deepening of the studies of materials and surfaces both from a theoretical and an experimental point of view. This also through long stays in high level laboratories like the National Physical Laboratory (London), the Lab. de Thermodynamique et Physico-chimie Métallurgiques (Grenoble), the Max-Planck Institut (Berlin), the DLR (Köln), and scientific visits to and scientific exchanges with laboratories in France (Marseille), England (Southampton, Brighton, London), Sweden (Goteborg), U.S.A. (MIT Boston), Russia (Acc.of Science), Germany (DLR Koeln, Aachen), Belgium (Univ. Libre Bruxelles) etc. There are also frequent exchanges and co-operation with Italian institutes and laboratories, like the ones in Genova, Milano, Padova, Bologna, Cagliari, Roma etc.

A. Passerone obtained the title of "Docteur ès Sciences" (Doctorat d'Etat) in France in 1981.

He has also contributed to numerous International Meetings and Symposia with invited talks, oral presentations and posters and to a relevant number of International schools and University courses. He is also the Author of invited book chapters and the Editor of Books and Proceedings.

Part of his activity is at present dedicated to foster the co-operation with industries and foreign laboratories, activity which has produced contracts, like the bilateral CNR-CNRS (France) contracts

in the years 1978-81 and 1983-86, the "Action Stimulation" of the European Community with the Universities of Grenoble, Lovanio and Copenhagen (1984-87), the "Jumelage" action, with the Inst. Polytechnique -Grenoble, the Univ. Libre de Bruxelles and the J.R.C. - Petten, and contracts with the European Union, ESA (FAST, FASES, Thermolab), the Italian Space Agency ASI, Enitecnologie, CEZUS (F), Officine Galileo.

More recently a strong cooperation activity has been undertaken with important Italian and international industries, e.g. in the framework of FISR and MIUR-FIRB contracts, where the FIAT Res. Center, ANSALDO, ENEA, C.S.M., EMA, and DLR in Germany are the main industrial contractors., with Cochlear-implantable devices (Belgium), and in the framework of the CNR Flagship Project RITMARE, and the European Union FP7-2013-FOF- ADMACOM project, where POLITO (Italy), EADS (D), Fraunhofer (D), ASTRIUM (D), Polito (I), Nanoforce (GB) are involved.

At present, he is still actively engaged as collaborator, in the M-ERANet "INSURFCAST" project involving ICMATE(leader), DCCI-UNIGE, Foundry Res. Inst. In Krakow and Specodlew Foundry Company in Poland.

Authorization to use my personal data, as required by the Italian law:

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

Genoa, February 2020.