

CURRICULUM VITÆ – CATERINA PETRILLO

Caterina Petrillo is full professor with a Chair in Experimental Physics at the University of Perugia where she led the Department of Physics for 5 years (2009-2013) and the Department of Physics and Earth Science for 3 years (2014- 2016).

She is a member of several scientific advisory and governing bodies of international research facilities, both as a scientific expert and as a representative of the Italian Ministry of Education, University and Research. She has been a member of the Science Advisory Committee of the ESRF (2006-2011) and the Steering Committee of the ILL (2002-2009). In 2007 she was appointed by the Italian Ministry of Research as Italian Delegate at the Programme Committee Research Infrastructures of the Framework Programme 7th of the European Commission. Under the FP7 Programme (2007-2013) and in cooperation with the European Strategic Forum on Research Infrastructures (ESFRI), she promoted the preparation of the first Italian Roadmap of Research Infrastructures of pan-European interest, advising on how to get the programme supported to ensure the participation of the Italian scientific communities to international research infrastructures. Since 2014, she is a member of the Physical Science and Engineering Working Group of ESFRI and was the co-chair of the Neutron Landscape Group of experts set by ESFRI. From 2015 to 2017, she served as the elected Vice-Chair of the Council of the European Spallation Source ESS (Lund, Sweden) after having represented Italy as the Italian Delegate to the ESS Council and to the ESS Steering Committee (2011-2015), and to the Lund Round Table (2007-2010). She has a broad experience of global facilities and the strategies to get them supported.

Education and Training

July 1979	Diploma di Maturità Classica, grade 60/60, Perugia, IT
March 1984	Laurea in Fisica, grade 110/110 cum Laude, University of Perugia, IT
1984 – 1985	Visiting scientist at the Physics Department of Reading University (Reading, UK) and the Rutherford Appleton Laboratory - ISIS Spallation Neutron Source (Chilton, Didcot, UK)
1985 – 1986	Visiting scientist at the Institut Laue-Langevin (ILL, Grenoble, FR)
1988	Visiting scientist at Monash University (Melbourne, AUS) and the HIFAR Reactor of the Lucas Heights Research Center (Sydney, AUS).

Employment History

1984 – 1986	<i>Post-doctoral fellowships</i> at the University of Rome “La Sapienza”, working as instrument responsible of the polarized neutron diffractometer installed at the TRIGA Reactor of ENEA-Casaccia (Roma, IT).
1986 – 1991	<i>Researcher</i> at the Consiglio Nazionale delle Ricerche, Istituto di Struttura della Materia (Frascati, Roma, IT).
1991 – 1999	<i>University Researcher</i> in Condensed Matter Physics at the University of Perugia, School of Science, Physics Department (Perugia, IT).
1999 – 2003	<i>Associate Professor</i> in Experimental Physics at the Politecnico di Milano, School of Engineering, Physics Department (Milano, IT).
2003 – 2006	<i>Associate Professor</i> in Experimental Physics at the University of Perugia, School of Science, Physics Department (Perugia, IT).
Since 2007	<i>Full Professor</i> in Experimental Physics at the University of Perugia, School of Science, Physics Department (Perugia, IT).
2009 - 2013	<i>Director (elected)</i> of the Physics Department of the University of Perugia.
2014 - 2016	<i>Director (elected)</i> of the Department of Physics and Earth Science of the University of Perugia <i>Member of the Academic Senate</i> of the University of Perugia <i>Delegate of the Rector</i> to the Joint Research Committee University of Perugia – Italian National Research Council (CNR) for the development of common research strategies and programs

Major career steps

In 1984 she began her research career in experimental condensed matter physics, initially focused upon electronic structure and vibrational dynamics of metal systems, and more recently on dynamics of complex systems like water confined in living cells or inside polymeric membranes and hydration water of proteins. Her research activity has been carried out mostly under international collaborations and has largely benefitted of neutron and X-ray scattering techniques available at the major large-scale facilities (ILL, ISIS, LLB, ESRF, Elettra) by either gaining access as a user or managing and leading long term instrument and science projects financed under national and international research programmes. A consistent thread in her research activities has been the design and development of beam line components and neutron spectrometers nowadays operated at the major European facilities (PRISMA@ISIS, BRISP@ILL, IN4C@ILL), whose implementation was supported by European funding or financed within international cooperation schemes involving countries like France, Germany, the UK and the US. In the nineties, her pioneering work on solid state detectors, based on Silicon diodes and microstrips coupled to a neutron converter to achieve high speed and high resolution performances,

was carried out under one of the first European programmes to finance networks of excellence. The searching for novel neutron detector concepts has continued along the years and it is nowadays an important issue considering the recent ^3He , the typical filling gas of a neutron detector, shortage at global level.

Since 1986, she has been serving as an expert evaluator in project review panels for the major facilities and European research organizations and as a reviewer for European Commission programs. She has a long-standing experience in leading research projects and programmes mostly funded at international level.

She is co-author of about 160 publications in international peer-reviewed journals, of several institutional reports and invited communications to international conferences. She has also contributed to several policy documents for the European Commission and science policy-making authorities in Italy.

In 1999 she was appointed national coordinator of the Neutron Committee of the Italian Institute for the Physics of Matter (INFN), a 3-member policy-advising body to the President. Until 2005, she was responsible for setting up the scientific strategy of the INFN in the neutron field, which included coordination and funding of research projects for design and construction of neutron spectrometers and ancillary equipment, management of the Italian participation in the neutron sources of the Institut Laue-Langevin (Grenoble, FR) and the Laboratoire Leon Brillouin (Saclay, FR), organization of support initiatives to the neutron users community, dissemination, outreach and training initiatives. Under this role, she had the scientific responsibility of the Italian Neutron Research Group made up of 10 young researchers and technicians seconded to the OGG (Gruppo Operativo Grenoble) and working at the High Flux Reactor of the ILL.

Her responsibilities as the Director of the Physics Department of the University of Perugia (2009 – 2013) included administration, personnel, budget, implementing the science programme of the Department and promoting the research strategy. This implies fund-raising activities for projects from the public and private sector, both at national and international level. Under her Directorship, the budget of the Department for research investment reached about 3 MEuros per year with about 30 active faculty members, gained mostly from European Commission Calls. The Department is strongly and successfully involved in international research projects and collaborations in the fields of particle and nuclear physics (CERN), astro-particles and astrophysics (ESA, ESO, NASA), and research in condensed matter physics carried out at the major synchrotron and neutron facilities (ILL, ESRF, EMBL). Under the evaluation exercise carried out by the Italian National Authority for the Evaluation ANVUR, the research activity at the Physics Department was ranked at the 6th position in the list of the comparable-size Italian universities. In 2013 it got a remarkable 1st position in the list of all the Italian universities according to the statistical analysis of performances by CENSIS - Centro Studi Investimenti Sociali, and such a 1st position is now confirmed also for the year 2014.

In Jan 2014, she took charge of the new Department of Physics and Earth Science of the University of Perugia as the Director elected with a three years mandate, with doubled personnel and budget, and a synergetic network of in-house laboratories and optimized services. Within the mandate of the new Department is also the organization of the (3+2)-years degree courses (Physics; Earth Science; Hydrocarbons) and the higher education programme of the PhD courses. The Department also takes care of organizing lectures, examinations, and training in basic Physics courses to more than 1500 students of the University of Perugia. As the Director of the Department, she has been a member of the University Senate.

Since 1991, as a staff member of the University of Perugia and the Politecnico di Milano, she has been regularly teaching courses of Mechanics, Thermodynamics, Electromagnetism to student classes of Engineering, Biotechnology and Earth Sciences, and courses of Spectroscopy, Solid State Physics and Many-body Physics to student classes of Physics. She has been the supervisors of many student theses, both graduate and PhD as a member of the PhD School of Physics of both Perugia University and Politecnico di Milano. Many of her former students now share responsibilities for experimental work in research institutions of France, Switzerland, Germany and the UK.

Leading Research Projects & Programmes

Responsibilities in major international projects

- Scientific Responsible of the Research Programme *Development of solid state detectors for neutrons and electronics for PSD detectors* – European Project **ENNI - European Network for Neutron Instrumentation** - (Framework Programme 3) - 1993/1996.
- National Coordinator and scientific responsible of the Research Programme *Demonstration of new Si based solid-state neutron PSDs* – European Project **XENNI - The 10-Member European Network for Neutron Instrumentation** (Framework Programme 4) – 1996/2000.
- Responsible for the bilateral research collaboration *Proposal to Demonstrate the Performance Characteristics of a Silicon/Gadolinium Detector on the LANSCE Reflectometer SPEAR* between the Italian National Institute INFN and Los Alamos National Laboratory, funded by the Department of Energy (US) under the Project **SNS (Spallation Neutron Source)** - 1999/2000.
- Technical Responsible of the Project **BRISP** – *Design and construction of the spectrometer for Brillouin scattering of thermal neutrons*, a neutron spectrometer to be installed at the High Flux Reactor of the Institut Laue-Langevin (Grenoble, FR) under the international collaboration CRG (Collaborating Research Group) between INFN (IT), Chemnitz University (DE) and ILL (FR) – 1999/2002.
- National Coordinator and scientific responsible for the Research Programme *Si Detectors and Neutron Zone Plates* - European Project **TECHNI - Technology for Neutron Instrumentation** (Framework Programme 5) – 2000/2004.
- National Coordinator and scientific responsible for the Research Programme *Si/Gd Microstrip Detectors* of **DETNI - Detectors for Neutron Instrumentation**, funded as a “*Joint Research Activities*” within the European Project NMI3 – Neutron and Muon Integrated Infrastructure Initiative (Framework Programme 6) - 2004/2007.
- Scientific Responsible and delegate of the Italian Ministry of Education, University and Research (MIUR) for the Italian participation in the *Preparatory Phase* of the European Project **The European Spallation Neutron Source (ESS)** (Framework Programme 7) – 2008/2010.
- Responsible for the characterization program of fuel cell materials @ the MCLab (*Material Characterization Laboratory*) of the Physics Department of the University of Perugia – European Project **H2FC - Integrating European Infrastructure to support science and development of Hydrogen and Fuel Cell Technologies towards European Strategy for Sustainable, Competitive and Secure Energy** (Framework Programme 7) – 2011/2013.
- Person in charge of the proposal SHARPER - SHARING Researchers' Passion for Excellence and Results. European Researchers' Night in the Centre of Italy 2014 – 2015. Call H2020-MSCA-NIGHT-2014 Topic: MSCA-NIGHT-2014 - Proposal number SEP-210142337 (H2020)
- Person in charge of the proposal) SHARPER - SHARING Researchers' Passion for Engagement and Responsibility.. Call H2020-MSCA-NIGHT-2016 Topic: MSCA-NIGHT-2016 Proposal number 722981 (H2020)

Participation in major international projects as a contributing member of Working Groups

- Strategic Project *Neutron Spectrometer PRISMA*, funded by the Italian National Research Council (CNR), for the design and construction of the neutron instrument PRISMA to be installed at the Spallation Neutron Source ISIS (Rutherford Appleton Laboratory, UK) – Responsible Prof. Francesco Sacchetti, 1985-1986.
- International Project Group for the *Development of the Spallation Neutron Source ISIS*, 1986-1987.
- *The Focusing Monochromator Project for IN4C*, funded by the Italian National Research Council (CNR), for the design and construction of a focusing crystal monochromator for the spectrometer IN4C installed at the High Flux Reactor of the Institut Laue-Langevin (Grenoble, FR) – Responsible Prof. Francesco Sacchetti, 1990-1992.
- Bilateral Project MURST/British Council: *Design of an Improved PRISMA Spectrometer*, 1991-1993.
- *Neutron Spectrometer Project TOSCA*, funded by the Italian National Research Council (CNR), for the design and construction of the neutron spectrometer TOSCA to be installed at the pulsed neutron source ISIS (UK) – Responsible Dr. Marco Zoppi, 1996-1999.
- EU Project *Optimisation of Cold Neutron Beams for Single Crystal Spectroscopy*, 1998-2001.
- EU Project *NMI3-Integrated Infrastructure Initiative for Neutron Scattering and Muon Spectroscopy (NMI3)*, working group on Neutron Optics, development of zone plates for cold neutrons, 2008-2011.
- *Scientific data & computing for the European Spallation Source ESS and the Free Electron Laser FERMI (CarESS)*, Elettra-INFN-Università di Perugia (2017-2020).

Responsibility for and participation in major nationally funded projects

- “Studio di fattibilità e progettazione di una linea di test per esperienze con fascio continuo di neutroni termici presso il linac del progetto SPES dell’INFN”, (*Feasibility study and preliminary design of a neutron test beamline at the linac accelerator of the SPES project*), INFN-Laboratori Nazionali di Legnaro, 1999-2001.
- *UMBRA - Understanding MgB2: Research and Applications*, Progetto di Ricerca Avanzato INFM – Advanced Research Project funded by INFM, the Italian National Institute for the Physics of Matter, 2002-2003.
- “*Perovskiti Funzionali: Sintesi, Proprietà Magnetiche e di Trasporto Elettronico e Ionico*”, (Functional Perovskites: synthesis, magnetic properties, electronic and ionic transport) COFIN 2004, funded by the Italian Ministry of Education, University and Research, 2005-2006.
- *Dynamics and Relaxation in Liquid Metals and in Proton-Exchange Membranes (PEM): Neutron Scattering Investigation*, COFIN 2005, funded by the Italian Ministry of Education, University and Research, 2006-2007.
- *Scientific data & computing for the European Spallation Source ESS and the Free Electron Laser FERMI (CarESS)*, Elettra-INFN-Università di Perugia (2017-2020).

Committees, Panels and Consultancies

Review and evaluation Panels

- Member of the *International Selection Panel* of the experiment proposals for the TFXA spectrometer (ISIS, Rutherford Appleton Laboratory, U.K.), 1986-1987.
- Member of the Crystallography Committee of Consiglio Nazionale delle Ricerche, 1995.
- Member of the International Selection Panel College 5B - Crystallography and Magnetic Structures of the Institut Laue-Langevin (Grenoble, France) for the evaluation of the experiment proposals, 1999 - 2002.
- Member of the Comité Directeur of the Collaborating Research Group Project IN-13 – The Biological Spectrometer@ ILL, 2001 – 2004.
- Evaluator for the European Commission under Framework Programme 6 – Marie Curie Actions.
- Member of the International expert group The Expert Working Group on Large Neutron Infrastructures of the European Strategy Forum on Research Infrastructures (ESFRI – Roadmap 2006), in charge of providing ESFRI with the landscape and a first analysis of the needs for neutron sources in Europe (new sources; upgrade of the existing ones), 2005.
- Member of the Scientific Council of the National Consortium of Italian Universities for Condensed Matter (CNISM), with the role of expert of large scale facilities, 2005 - 2008.
- Member of the Scientific Review Committee “Disordered systems and Liquids” for the evaluation of the experiment proposals at the European Synchrotron Radiation Facility - ESRF (Grenoble, FR), 2006 - 2009.
- Evaluator for the LAB-EX (Laboratories of Excellence – CNRS, FR) call for projects, 2011
- Panelist and rapporteur for the 2012 funding call for research projects of the National Research Council of Romania, 2012.
- Member of the selection panel for Projects of Industrial Relevance of the Region Umbria in the Energy and Materials fields, set up by the regional innovation authority, 2011 – 2012.
- Reviewer of the outreach and science communication projects (CTS) funded by the Italian Ministry of Education, University and Research, 2012.
- Member of the national Selection Panel (Comitato di Selezione) of PRIN (Projects of National Relevance) projects set up by the Italian Ministry of Education, University and Research, 2013.
- Member of the ESFRI Neutron Landscape Group, 2014 — 2016.
- Member of the International expert group PSE-WG (Physical Science and Engineering Working Group) of ESFRI, in charge of providing ESFRI with the landscape and an updated analysis of the priorities in the provision of PSE European facilities, 2014 —.
- Member of the *Review panel for the scientific evaluation of R&D activities in the research field Matter at the Forschungszentrum Jülich* – DE, 2017

Advisory and Management Panels

- Scientific Secretary of the Board of the Italian Society of Neutron Spectroscopy (Società Italiana di Spettroscopia Neutronica), 1994-1997.
- Member of the international Instrument Working Group for the European Spallation Source - Single Crystal Spectroscopy - Coherent Excitations, 1995-1996.
- Italian representative to the Steering Committee of the Institut Laue Langevin (Grenoble), 2002 - 2009.

- Member of the Scientific Advisory Committee of the European Synchrotron Radiation Facility – ESRF (Grenoble), 2006 – 2011.
- Italian Delegate to the FP7 Programme Committee Capacities-Infrastructures of the European Commission, nominated by the Italian Ministry of Education, University and Research, 2007 – 2013.
- Delegate of the Italian Ministry of Education, University and Research at the International Working Group Round Tables ESS-Lund, 2007 – 2009.
- Member of the Executive Board of the Project The European Spallation Neutron Source (ESS) financed by the European Commission under the FP7 Call - Capacities Infrastructures Preparatory Phase, 2008 – 2010.
- Representative of the Scientific Partner Countries of the Institut Laue Langevin (Grenoble) to the Associate Board, 2008 - 2009.
- Member of the ESFRI advisory Working Group on Neutron Sources in Europe, 2008.
- Member of the International group The Expert Group on Analytical Research Infrastructures (EGARI), in charge of advising ESFRI on needs and priorities for large scale facilities for material analysis in Europe, 2009.
- Member of the Expert Advisory Group supporting the Directorate for International Research of the Italian Ministry of Education, University and Research for the development of research policies, since 2009.
- Italian Delegate to the Steering Committee of the European Spallation Source (ESS), nominated by the Italian Ministry of Education, University and Research, 2009.
- Member of the Working Group for the Italian Roadmap of Research Infrastructures of pan-European Level, set up by the Italian Ministry of Education, University and Research (MIUR), 2009 - 2010.
- Member of the International expert group ILL Associates' Working Group on Neutrons in Europe for 2025 with the task of proposing a 15-years strategy for neutron production in Europe, 2010 - 2011.
- Member of the 11-Member Committee for the writing of the University Statute (Commissione Statuto) of the University of Perugia, 2011.
- Italian Delegate to the Council of the European Spallation Source (ESS), 2015.
- Vice-Chair (elected) of the Council of the ESS-ERIC, 2015 – 2017.
- Member of the Horizon 2020 Advisory Group for European Research Infrastructures (including e-Infrastructures), 2016