Curriculum Vitae (January 2014)

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Lucia Banci is Professor of Chemistry at the University of Florence. Her research expertise is focused on structural biology, within an integrated, cellular perspective. She is extensively exploiting high resolution NMR spectroscopy, to which she has also contributed with methodological and theoretical advancements. In the recent past years she has been an active player in Structural Genomics projects. Her approach was driven by the "function perspective" more than by a broad coverage of genome products. As an advancement of this approach, she is now extensively contributing to the development of Integrated and Cellular Structural Biology projects, combining atomic level characterization with a cellular context. She is also extensively contributing to methodological advancements in this field.

Her research work is focused on systems involved in several pathways responsible for metal homeostasis, and that of copper and iron in particular, and on protein import and maturation processes in mitochondria, through metal incorporation and/or oxidative folding. In her research she is exploiting the combination, in an integrated manner, of NMR, SAXS and X-ray crystallography. She is providing unique contributions to mechanistic aspects of Systems Biology of metal ions. She has been pioneer in the development of, and she is now exploiting, an absolutely innovative approach in vaccine design, i.e. Structural Vaccinology, based on the structural characterization of the antigens and of their interaction with antibodies. Most recently she has also made and is making major advances in developing innovative approaches in in-cell NMR and is applying them for characterizing conformational and functional states of proteins at atomic resolution directly in living cells. Finally, she is characterizing proteins which are naturally unstructured or partially unfolded and the mechanisms of protein aggregation involved in several neurological diseases. She has published more than 330 research articles on peer reviewed journals and has solved above 100 protein structures. (h-Index (Google Scholar) = 61)

She is one of the founders and now Director of the Center of Magnetic Resonance (CERM) of the University of Florence, which features an impressive battery of NMR spectrometers. The Center constitutes a major European NMR

infrastructure in the Life Sciences and is a Core Center of the ESFRI Research Infrastructure INSTRUCT. Flanking institutions and spin-off companies have flourished around CERM in the fields of biotechnology and drug discovery thanks also to her research achievements.

She is member of EMBO and of AcademiaNet.

Place and Date of birth

Florence, May 20, 1954

Degree
Doctorate in Chemistry, 110/110 cum laude, July 1978, University of Florence

Positions held (all at the University of Florence)

Director of CERM (Centro di Risonanze Magnetiche)- University of Florence 2011-present
Professor of Chemistry (Faculty of Science) 1999-present
Associate Professor of Chemistry (Faculty of Science) 1989-1999
Associate Professor of Chemistry (Faculty of Pharmacy) 1987-1989
Tenured researcher 1983-1987 (Tutor in Chemistry, Faculty of Sciences)
Postdoctorate 1978-1983

Honors

2013 Appointed Member of AcademiaNet
2013 Member of the Scientific Committee for “Life, Environment and Geo Sciences” of Science Europe
2012 Elected Member of EMBO (European Molecular Biology Organization)
2011 Listed among the 45 Top Italian Female Scientists
2004 Joint Gold Medal of GIDRM (Italian Group on Magnetic Resonance) and GIRM-SCI (Interdivisional Group on Magnetic Resonance of the Italian Chemical Society.
1998, “Premio Federchimica - Per un Futuro Intelligente
1994 “Raffaele Nasini” Medal of the Inorganic Division of the Italian Chemical Society.

Journal Services and Society Memberships

She has been member of the Editorial Board of: Journal of Magnetic Resonance, Biomolecular NMR Assignments, JBIC, Journal of Structural Proteomics, and of EurJIC (European Journal of Inorganic Chemistry). She is a referee of many

international journals, among which there are PNAS (Proceedings of the National Academy of Sciences), JACS (Journal of the American Chemical Society), EMBO Journal, Nature Structural & Molecular Biology, Nature Chemical Biology, the Journal of Biological Chemistry.

She has been and is evaluator for many Funding Institutions at the international level: Member of the HFSP (Human Frontier Science Program) Review Committee (2008-2012) and ad hoc reviewer for EC (Cooperation and Marie Curie types of projects), DFG (German Research Foundation), EMBO (European Molecular Biology Organization), NIH (National Institutes of Health), NSF (National Science Foundation), AERES (French Evaluation Agency for Research and Higher Education), as well as of several funding applications for many European and International Countries. Member of the Chemistry Committee for the Evaluation of the Italian Research.

She is a member of the Protein Society, Society of Biological Inorganic Chemistry, Societa' Chimica Italiana, Ampere Society. She is member of the ISMAR Council (2011-2014), of the Executive Committee of EUROMAR (2009-2012), has been Chair of the ICMRBS Council (2008-2010), Scientific Secretary of the Society of Biological Inorganic Chemistry (1999-2006)

Fellowships and Collaborations

Visiting Professor, Princeton, 2002
Visiting Scientist, Harvard Medical School, 1994
Visiting Scientist, Pennsylvania State University, 1993
NATO grant with the Department of Chemistry, Pennsylvania State University, 1991.
Visiting Scientist, University of California at San Francisco, 1990 and 1991
NATO Fellow, University of California at San Francisco, July-August 1989
Visiting Researcher, University of California at Davis, USA, April-May 1987, January 1988, July-August 1988

Responsible of the Italian Core Center of the ESFRI Reasearch Infrastructure INSTRUCT, member of the Executive Committee and of the Council.
Scientific partner EC Cooperation Project BioMedBridges 2012 – 2015
Scientist Responsible of the POR Project BIOVAX 2011-2013
Scientific Partner EC SSA Project "FESP – Forum for European Structural Proteomics, 2005-2006
Scientific partner EC STREP Project "Very Innovative AIDS Vaccine", 2005-2006

Scientific partner EC STREP Project “Understanding Protein Misfolding and Aggregation by NMR “, 2004-2007.
Scientific partner EC RTD Project “Capillary NMR”, 2000-2002.
Scientific partner EC RTD Project “Fungal Metalloenzymes of industrial interest”, 2000-2002.
Scientific Partner EC TMR Network “Heamworks”, 1998/2000.
Scientific co-responsible, EC Biomedical Program, “Activation of Isoanazid by *M. tubercolosis katG*” project, 1996-1998.
Scientific co-responsible, EC Biotechnology Program, “Heme-based Catalysts” project, 1994-1996.
Scientific co-responsible, Human Capital and Mobility Network of the European Community on “Heme Proteins” 1994-1997
Partner in the MEDINTECH project of the Italian National Cluster for Life Sciences “ALISEI”.

Patents
Use of matrix metalloproteinases, mutated and not mutated, for the preparation of pharmaceutical compositions, and mutated metalloproteinases with increased stability - **WO 2007020223 A1**

Modified meningococcal fhbp polypeptides - **WO 2011051893 A1**

A Summary of Scientific Activity

She is the author of above 340 publications, in scientific journals of international renown. After her initial work in the field of Inorganic Chemistry, where she characterized magnetic properties (such as magnetic coupling between metal ions, electron and nuclear relaxation, hyperfine coupling) of small complexes and biological cofactors, through EPR and NMR spectroscopies, she provided a strong contribution to the comprehension of relaxation phenomena of nuclear spins in paramagnetic systems. She is co-author, together with I. Bertini and C. Luchinat, of the book “Nuclear and Electron Relaxation”, VCH, Wenheim, which presents an unified picture of the relaxation processes for nuclear and electron spins, combining a pictorial description of the relaxation processes for nuclear and electron spins with a rigorous mathematical presentation.

In the eighties, when recombinant DNA techniques produced a major revolution in the study of biological systems, she applied her background knowledge and expertise to the spectroscopic characterization, in particular through NMR spectroscopy and ^{1}H NMRD measurements, of paramagnetic metalloproteins, such as superoxide dismutase, alkaline phosphatase, carbonic anhydrase, iron-sulphur proteins, peroxidases, and of their mutants or derivatives modified by metal

substitution. Advanced (in those days) NMR techniques, like NOE and 2D NOESY and COSY experiments on highly paramagnetic systems, were used for obtaining structural characterization of the active site of the paramagnetic metalloproteins and of their adducts with inhibitors. These studies allowed and are still allowing a deeper understanding of the structural and catalytic properties of the investigated proteins and enzymes and the correlation between structural features and functional and enzymatic behavior.

In the meantime, she developed approaches for molecular dynamics calculations applied to metal-containing proteins, in order to rationalize their structural and dynamical behavior when they are interacting with the solvent, to interpret the NMR data and to analyze the factors affecting the protein-substrate interactions. These calculations were applied to metalloproteins, where the presence of one or more metal ions requires, for a correct description of the system, the development of their force-field parameters, which is still one of the frontiers in this area of research. These force-field parameters were developed by Lucia Banci for several metal ion centers of various proteins.

In the ninenties, Lucia Banci developed spectroscopic and computational methodologies for the determination of solution structures of paramagnetic metalloproteins through NMR spectroscopy. The combined use of standard 2D and 3D experiments together with experiments tailored for systems characterized by broad signals spread over a large spectral width allowed the resolution of the first solution structure of a paramagnetic metalloprotein. This structure broke a dogma stating that, “solution structures of paramagnetic proteins could be never determined” This achievement took also advantage of the force field parameters she developed on metal ions. Her research in this area was devoted to the structural and dynamical characterization of several electron transfer proteins. Having optimized the methodology for structural determination of these “difficult” proteins, she then addressed and is addressing more challenging projects, such as the determination of the internal motions on very large time scales, the comprehension of the factors determining the folding of the protein and of those determining molecular recognition between two partners during the biological process, and the structural and dynamical features which lead to misfolding and protein aggregation. The answer to these fundamental questions is important for several aspects of Science.

After the Genome revolution, Lucia Banci has been an active player in Structural Genomics projects. Her approach was driven by the “function perspective” more than a broad coverage of genome products, as several Structural Genomics projects are organized. Target selection was focused on all the proteins involved in the pathways under investigation. In particular, she provided unique contributions to the understanding of the processes of copper transfers and of copper incorporation

in a few systems, such as the Golgi system and cytochrome c oxidase. The latter process involves several proteins that were not structurally characterized before or not even identified. Through bioinformatic tools and browsing the available genomes she identified new proteins and for most of them (new or already reported) she determined the structure and characterized the interaction with the metal cofactor and with the potential partners. From all these studies a picture of the various steps of copper transfer in cytochrome c oxidase has been obtained. She has also worked on the pathway of copper transfer from the soluble chaperone to the soluble domains of membrane Cu-binding ATPases, and then to the membrane-embedded metal binding site. Overall she provided unique contributions to the understanding of the processes of copper transport in the cell and its incorporation into the final targets. Within this frame, she has also addressed the weak, transient protein-protein interactions which are at the basis of a large number of biological processes. From her work a new feature of the interactome emerged, i.e. that a portion of the protein-protein interaction network is metal mediated. In other words, the interactions among proteins are mediated by metal ions. In the frame of this cellular, system-wide, approach she also addressed, within a structural and functional perspective, the processes of protein import in mitochondria and their folding and how these processes are tightly interconnected with those of metal transport and homeostasis as well as with electron transfer processes. Within this functional approach, she has also addressed the weak, transient protein-protein interactions which are at the basis of a large number of biological processes.

She has a long time experience in the structural and functional characterisation of SOD1, more recently focusing on the mechanism and factors inducing protein aggregation. She has proposed a new mechanism for the latter process allowing the rationalization of the behavior all the SOD1 mutants relatated to ALS. She is now developing new strategies and identifying molecules which prevent this aggregation.

She has characterized and is characterizing proteins which are naturally unstructured, at least locally, as required by their function. This feature has profound effects on their properties and pattern of interactions. On the contrary, local structural disorder in naturally ordered proteins is appearing as one of the factors leading to toxic protein aggregates, whose formation is also triggered by metal or by the lack of native metal ions, in several cases. She is providing important contributions to the understanding of these processes.

She has been pioneer in developing the field of “Structural Vaccinoly”, a new and innovative strategy to design effective vaccines. Based on the knowledge of the structure of the antigens, of the location of the various epitopes and on the interaction mode with antibodies, new vaccines with very broad protection coverage can be designed and produced. This innovative approach has been successful.

Finally, she is now developing new challenging approaches for in cell NMR and for its exploiting to characterize biomolecules directly in living cells with atomic resolution. Within this approach she is studying folding, protein maturation and metal uptake also through the coordinated expression of the various proteins involved.

She has solved above 100 structures of protein systems, all deposited in the PDB.

Conferences and Seminars

She has been invited to present lectures at the following meetings:

1985
"VIII School-Symposium on Inorganic Biochemistry and Molecular Biophysics", Wroclaw, Poland.
1986
"IIIrd Swiss-Italian Meeting on Inorganic and Bioinorganic Chemistry", Ferrara, Italy.
1988
"Trends in Bioinorganic Chemistry", Firenze, Italy; "Inorganic Chemistry Workshop of the Italian Chemical Society", Siena, Italy; "XIII International Conference on Magnetic Resonance in Biological Systems", Madison, WS, USA
1989
NATO - ASI School: "Enzymatic and Model Carboxylation and Reduction Reactions for Carbon Dioxide Utilization", Riva dei Tessali, Italy; "IV International Conference on Bioinorganic Chemistry", Cambridge, MA USA.
1990
"2nd EurAsia Conference on Chemistry", Seoul, Korea
1992
2nd Joint Israel-Italy Symposium on Magnetic Resonance in Biological and Material Science, Siena, Italy; 2nd Italian-Portuguese-Spanish meeting in Inorganic Chemistry, Algarve, Portugal; "Structure-Function Relationship in Peroxidases and Cytochromes P-450: from Genetics to Biophysical Characterizations and Chemical Modelling", Le Bischenberg, France
1993
Workshop on "Magnetic Spectroscopy on Bioinorganic Transition Metal Centers", Homburg, Germany; European Research Conference on "Chemistry of Metals in Biological Systems, Algarve, Portugal; VI International Conference on Bioinorganic Chemistry, La Jolla, U.S.A; NATO/EMBO/FEBS International Summer School on "Molecular and Cell Biology", Spetsai, Greece; 2nd Siena-Kyoto Symposium, Kyoto, Japan

1994

International Workshop on Iron-Sulphur Proteins, Kostanz, Germany; FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium; NATO Advanced Research Workshop on “Nuclear Magnetic Resonance of Paramagnetic Macromolecules”, Sintra, Portugal; Symposium on Molecular Modeling in Genetic and Protein Engineering, Sopron, Hungary

1995

Workshop on “Structural Characterization of Proteins by NMR, X-ray Diffraction, and Computational Methods, Ripa d’Orcia, Italy; European Research Conference on “Chemistry of Metals in Biological Systems”, San Miniato, Italy; FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium; 3rd Greeck-Italian-Spanish-Portuguese Meeting, Senigallia, Italy; International Workshop on “Peroxidase Biotechnology and Application”, Pushchino, Russia; International meeting on Copper in Biological Systems, Santa Severa, Italy

1996

FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium

1997

NATO Workshop on “Molecular Modeling and Dynamics of Bioinorganic Systems”, San Miniato, Italy; European Research Conference “Chemistry of Metals in Biological Systems”, Tomar, Portugal; Eigth International Conference on Bioinorganic Chemistry, Yokohama, Japan; 4th French-Greeck-Italian-Portoguese-Spanish Meeting in Inorganic Chemistry, Corfu, Greece; Workshop of European Science Foundation on “Molecular Recognition in Metalloproteins”, Sevilla, Spain; Vth International Symposium “Magnetic Field and Spin Effects in Chemistry and Related Phenomena” Jerusalem, Israel

1998

FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium; “Forth European Biological Inorganic Chemistry Conference, Seville, Spain; European Summer School “Structure of Metalloproteins” Oeiras, Portugal

1999

2nd International Workshop on “Structural Characterization of Proteins by NMR, X-Ray Diffraction and Computational Methods”, Verona, Italy; International Colloquium “Molecular Bioenergetics” Mauloff, Germany; 5th International Symposium on Applied Bioinorganic Chemistry, Corfu Greece; Symposium of the Inorganic Chemistry Division, American Chemical Society Annual Meeting, Anaheim, USA; Symposium of the Cellulose Chemistry Division, American Chemical Society Annual Meeting, Anaheim, USA; FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium; Ninth International Conference on Bioinorganic Chemistry, Minneapolis, USA; Gordon Conference on “Computational Aspects of Biomolecular NMR”, Barga, Italy.

2000

Gordon Conference “Metals in Biological Systems”, Ventura, CA, USA; FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium; 2nd International Conference on Superoxide Dismutase, Paris, France; International Conference on “Basic and Clinical Enzymology 2000”, Naples, Italy; First International Conference on Porphyrins and Phthalocyanines, Dijon, France; International Symposium on Advances in Bioinorganic Chemistry, Tata Institute, Mumbai, India.

2001

Frontiers of Biomolecular NMR, Ljubljana, Slovenia; 42nd Experimantal Nuclear Magnetic Resonance Conference (ENC), Orlando, USA; Tenth International Conference on Bioinorganic Chemistry, Florence, Italy; 3th International Workshop on Structural Characterisation of Proteins by NMR, X-Ray Diffraction and Computational Methods, San Vito di Cadore, Italy; XXXI National Congress of the Italian Society of Crystallography, Parma, Italy; CECAM/ESF Psi-k Workshop, Lyon, France.

2002

International School on Biophysical Characterization of Biological Molecules, Venezia, Italy; Symposium honoring Peter Kollman “Molecular Simulations in Structural Biology and Drug Discovery”, San Francisco, USA; IX DBMS - IBS Workshop “Metals in Biology”, Autrans (Grenoble), France; FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium; XX International Conference on Magnetic Resonance in Biological Systems (ICMRBS) Toronto, Canada.

2003

Conference of the Royal Australian Chemical Society, Melbourne, Australia; AsiaBIC, First Asian Bioinorganic Chemistry Conference, Okasaki, Japan; FEBS-ESF Advanced Course “Chemistry of Metals in Biological Systems”, Louvain-la Neuve, Belgium; Summer School on NMR Spectroscopy, Otocez, Slovenia; Meeting on Copper Proteins, Konstanz, Germany.

2004

7th European Biological Inorganic Chemistry Conference, Garmisch-Partenkirchen, Germany; Copper Homeostasis and its Disorders: Molecular and Cellular Aspects, Ischia, Italy; Genome Base Drug Discovery, Florence, Italy; XXXIV National Congress of Magnetic Resonance, Alghero, Italy; 4th International Workshop on Structural Characterisation of Proteins by NMR, X-Ray Diffraction and Computational Methods, San Vito di Cadore, Italy; Symposium “Chemistry and Biology - the transition between the two centuries”, Accademia dei Lincei, Roma, Italy; Second Asian Biological Inorganic Chemistry Conference, Goa, India; II SPINE Congress, London, UK.

2005

XXI International Conference on Magnetic Resonance in Biological Systems (ICMRBS) Hyderabad, India, EUROMAR 2005, Veldhoven, The Netherlands; ESF Conference “NMR in Molecular Biology”, Scania, Sweden; III SPINE Congress,

Montecatini, Italy, Third European Conference on Research Infrastructures, Nottingham, UK

2006

37th International Conference of Coordination Chemistry, Cape Town, South Africa, 3rd Asian Biological Inorganic Chemistry Conference (AsBIC-III) Nanjing University, Nanjing, China, 5th International Copper Meeting: Copper and Related Metals in Biology, Alghero, Italy, 1st European Chemistry Congress Budapest, Hungary, 8th European Biological Inorganic Chemistry Conference, Aviero, Portugal, 4thInternational Conference on Structural Genomics, Beijing, China

2007

Gordon Research Conference "Metals n Biology and Medicine", Ventura, CA, USA; Eureopean Symposium of the Protein Society, Stockholm, Sweden; EMBO Workshop on Intrinsically Unfolded Proteins, Budapest, Hungary; Mutant SOD1 and familial ALS: from the molecule to man, Milan, Italy; 16th Triennial International Conference of the International Society of Magnetic Resonance, ISMAR, Taiwan

2008

49th ENC, Asilomar, CA, USA; Gordon Research Conference "Environmental Bioinorganic Chemistry, Waterville, NH, USA; 4th International Conference on Metals and Genetics (ICMG 2008), Paris, France; XXIII ICMRBS, San Diego, CA, USA, 2nd EuCheMS Chemistry Congress, Turin, Italy; 5th International Conference on Structural Genomics (ICSG 2008), Oxford, UK; Workshop on "Intrinsically Unfolded Proteins and Complementary Methods in Structural Biology, EMBL-Hamburg, Germany

2009

Keystone Symposium: Frontiers of NMR in Biology, Santa Fe, NM, USA, Symposium on Advanced Biological Inorganic Chemistry (SABIC-2009), Tata Research Institute, Mumbai, India; International Symposium on Protein Structures, Nara Institute of Technology, Nara, Japan

2010

Proteine2010, Parma, Italy; EUROBIC10, Thessaloniki, Greece; 35th FEBS Congress, Goteborg, Sweden; XXIV ICMRBS, Cairns, Australia; ESF-EMBO Symposium on Molecular Perspectives on Protein-Protein Interactions, Sant Feliu de Guixols, Spain; Accademia dei Lincei Symposium "Protein Structure and Dynamics", Rome, Italy.

2011

EMBO Global Exchange Lecture Course " Structural and Biophysical Methods for Biological Macromolecules in Solution", Beijing, China; International Conference on Structural Genomics (ICSG 2011), Toronto, Canada; International Conference on Bioinorganic Chemistry, Vancouver, Canada; 13th Central European NMR Symposium &13th Central European Bruker Users, Eötvös Loránd University, Budapest, Hungary; Workshop on Metals in Biology, Goteborg, Sweden; 2011 Cold Spring Harbor Asia Conference on Protein Structure Based Drug Design, Suzhou,

China; Structure – & Computer– Aided Design Workshop: Bioactive Molecules & Materials, Athens, Greece.

2012

Breakthroughs in NMR of Structural Biology The 2nd Bio-NMR Annual User Meeting, Portorož, Slovenia; XXIV ICMRBS, Lyon, France, Plenary Lecture; EMBO Global Exchange Lecture Course, Hyderabad; The 3rd annual BioStruct conference 2012 Jægtvolden, Trøndelag; Advanced Mass Spectrometric and NMR Methods Athens, Greece; Copper in Biology 2012 Alghero, Italy; 3rd Annual East-NMR User Meeting Lasko, Slovenia

2013 CEITEC NMR meeting, Brno, Czech Republic; EUROMAR 2013, Crete, Greece; XXXIV Biennial Congress of the Royal Spanish Society of Chemistry, Santander, Spain; EMBO Members meeting, Heidelberg, Germany; XVIII Argentinian Congress of Physical and Inorganic Chemistry, Rosario, Argentina, XXXV German-Italian Magnetic Resonance Discussion Group Meeting, Munich, Germany; 4th International Symposium on Metallomics, Oviedo, Spain; 36th Annual Meeting of the Molecular Biology Society of Japan, Kobe, Japan

2014 EMBO Global Exchange Lecture Course, Sao Paulo, Brasil; RRR Workshop, Osaka and Kyoto, Japan; Annual Conference of the Indian Magnetic Resonance Society, Tizpur, India; IUPAP International Conference on Biological Physics (ICBP2014, Beijing, China; 9th International Copper Meeting, Copper2014, Vico Equense, Italy; 2014 FASEB Summer Research Conference "Trace Elements in Biology and Medicine", Steamboat Spring, USA; EUROBIC12, Zurich, Switzerland; AsBIC-7 (Plenary Lecture), Queensland, Australia.

2015 Plenary Lecture, ISMAR, Shangai, China.

She has actively participated at many national meetings and advanced schools.

She has been invited to present seminars at the following institutions:

1982

Washington State University, Pulmann, USA

1985

Tsinghua University, Beijing, China

1986

University of Saarland, Homburg, Germany

1987

University of California at Davis, USA; University of Lausanne, Switzerland; University of Basel, Switzerland; University of Padua, Italy; University of Valencia, Spain; University of Barcelona, Spain

1988
Scripps Clinics, San Diego, USA; University of California at S. Francisco, USA; University of Minnesota, Minneapolis, USA; University of New Mexico, Albuquerque, USA; Massachussetts Institute of Technology, Cambridge, USA
1989
University of California at Davis, USA; University of California at San Diego,USA; Stanford University, USA
1990
University of British Columbia, Vancouver, Canada; Kyoto University, Japan; Nagoya University, Japan
1991
Pennsylvania State University, USA; The University of Arizona, Tucson , USA; Columbia University, New York, USA
1992
University of Pisa, Italy
1993
Nagoya University, Japan; Tokyo Institute of Technology, Japan
1994
IBM Research Laboratories, Zurich, Switzerland
1996
University of Norwich, UK; University of Cambridge, UK
1997
University of Milan, Italy
2000
University of Naples, Italy; Centro de Investigaciones Biologicas (CSIC), Madrid, Spain.
2001
University of Catania, Italy; Florida State University, Tallahassee, USA
2002
Princeton University, USA
2003
Osaka University, Japan; Leiden University, The Netherlands
2004
Forschungsinstitut fuer Molekulare Pharmakologie (FMP) Berlin, Germany
2006
Peking University, Beijing, China
2008
UCSF, San Francisco, USA; UCLA, Los Angeles, USA
2009
University of Tokyo, Japan
2010
German Research School for Simulation Sciences, Julich, Germany; University of Sydney, Australia; University of Zurich, Switzeland

2011
ETH, Zurich, Switzerland; Nankai University, Tianjin, China
2013
Marburg University, Marburg, Germany; ETH Lugano, Switzarland