
SECOND ANNOUNCEMENT

International Conference “Colombia in the International Year of Light”

June 16 - 19, 2015
Bogotá & Medellín, Colombia



Dear Colleagues,

The International Conference *Colombia in the International Year of Light* (IYL-ColConf2015) will be held in Bogotá, Colombia on 16-17 June 2015, and Medellín, Colombia on 18-19 June 2015. IYLColConf2015 is expected to bring together 500-600 scientists, other professionals, and students engaged to research, development and applications of science and technology of light.

You are invited to attend this conference and take part in the discussions about the “state of the art” in this field, in company of world-renowned scientists.

Organizers and promoters of this conference include: The Universidad de los Andes (University of the Andes), Bogotá; the Universidad Nacional de Colombia (National University of Colombia), Bogotá and Medellín; the Universidad de Antioquia (University of Antioquia), Medellín; the Academia Colombiana de Ciencias Exactas, Físicas y Naturales (Colombian Academy of Exact, Physical and Natural Sciences); Colombian research groups working on topics related to optical sciences, and academic programs at the undergraduate and graduate levels.

We are honored to host IYLColConf2015 in Bogotá and Medellín, two of the main cities of Colombia, in June 2015.

We look forward to seeing you there.

Sincerely yours,

On behalf of the Executive Committee,

Prof. Jorge Mahecha.

Institute of Physics, Universidad de Antioquia.

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Prof. Jorge Mahecha, Institute of Physics, Universidad de Antioquia, Medellín, Colombia

Do not hesitate to contact the organizers at enrique.forero@accefyn.org.co

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Prof. Freddy Pérez, Centro de Ciencia Básica, Universidad Pontificia Bolivariana, Medellín, Colombia

General Information and Deadlines

Scope and Program

UNESCO describes the importance of the International Year of Light as follows: “... the UN has recognized the importance of raising global awareness about how light-based technologies promote sustainable development and provide solutions to global challenges in energy, education, agriculture and health. Light plays a vital role in our daily lives and is an imperative cross-cutting discipline of science in the 21st century. It has revolutionized medicine, opened up international communication via the Internet, and continues to be central to linking cultural, economic and political aspects of the global society.”

IYLColConf2015 is an important event in Colombia, taking place as part of the *International Year of Light and Light-based Technologies* (IYL 2015). IYLColConf2015 brings together about 500-600 participants from many countries and backgrounds.

The scientific program will consist of invited Plenary Lectures, and Public Lectures aimed at a broader audience. Plenary Lectures are of general interest to all participants, which are expected to be professionals of different disciplines, and students. The conference language will be English. However, the Public Lectures, will have simultaneous translation. More detailed information about the topics of the lectures can be found on the IYLColConf2015 Central website, hosted by CERN,

<http://indico.cern.ch/e/iyl2015colombiaconf>

Conference Date and Venue

Sessions in Bogotá

The session on 16th June 2015 will be held in the Leon de Greiff Lecture Hall of the Universidad Nacional de Colombia, Bogotá, with 1000 seats.

The session on 17th June 2015 will be held at the Auditorium Mario Laserna of the Universidad de Los Andes, Bogotá, with 500 seats. The venue is in a privileged location, in the heart of Bogotá's historical center.

The conference dinner will take place at a restaurant to be announced.

Bogotá City

Bogotá is the largest city of Colombia of about 8 million residents, located at 2600 meters height in the Andes mountains at the center of Colombia. It is a city with the greatest wealth of monuments. Bogotá preserves an artistic and cultural legacy in the form of churches, museums and colonial houses. The most

outstanding buildings in the city are located near Simon Bolivar square, consisting in the Cathedral, Capitolium and many others.

Weather in Bogotá

The average daytime high temperature in June is 19°C. The average nighttime low temperature is 9°C.

Sessions in Medellín

The sessions on 18-19th June 2015 will be held at the Auditorium of Parque Explora and the main Auditorium of RutaN building. The venue is in a privileged location, in the main Medellín City cultural facilities. It is also near Universidad de Antioquia and Universidad Nacional de Colombia, Medellín.

Medellín City

Is a large city of Colombia, of about 4 million residents, located at 1500 meters above sea level in the Andes mountains near the north west corner of Colombia. It is a modern and dynamic city which preserves an artistic and cultural legacy in the form of churches, museums and colonial houses. The most outstanding touristic places in the city are located near the city's downtown, mainly around de Botero Museum area.

Weather in Medellín

The highest temperature in June is 27°C, and the lowest is 17°C.

Organization

IYLColConf2015 is organized by the local committees of Bogotá and Medellín. Those committees are organizing the International Year of Light activities during 2015. The following websites describe some of those activities,

<http://iyl.uniandes.edu.co/>

and <http://antioquiail2015.weebly.com/>

The national organization and coordination of the conference is centered in the Academia Colombiana de Ciencias Exactas, Físicas y Naturales.

The organization of the conference is divided as follows:

Bogotá: Academia Colombiana de Ciencias Exactas, Físicas y Naturales, Universidad de los Andes and Universidad Nacional de Colombia.

Medellín: Academia Colombiana de Ciencias Exactas, Físicas y Naturales, and a local committee created to promote the IYL 2015, which was named “AGENDA celebración IYL 2015 año internacional de la luz, medellín / antioquia”, which receives support from many local academic, cultural and government institutions.

Deadlines

Registration: 15/06/2015

Hotel reservation: 1/06/2015

Manuscript Submission by Invited Speakers: 15/06/2015

IYLColConf2015 Homepage and Contact

<http://indico.cern.ch/e/iyl2015colombiaconf>

Contact

Colombian Academy of Exact, Physical and Natural Sciences

Name: Dr. Enrique Forero

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For information also contact:

Name: Marcela Macías/Vivian A. Pérez

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Registration and Support Policy

All participants, including invited speakers and chairpersons, are required to register for IYLColConf2015 through the web registration system available on the conference website section “Registration & Accommodation”. The registration service is available from first March 2015.

In case of difficulty with the registration website, please contact

marcela@accefyn.org.co,

viviana.perez@accefyn.org.co,

jorge.mahecha@udea.edu.co

Registration includes:

The Regular Participant registration includes access to the lecture halls and public lectures, coffee and beverage breaks, identification badge, a printed conference program and open access to the texts of Lectures.

All participants should inform organizers if they cannot attend the lectures, to be able to accept new registrations at the conference venue. This is of great importance for the Public Lectures.

Conference Fee

Attendance to the Conference is 100% free of charge.

Further Information

On-site Registration and Information Desk

In Bogotá, the registration desk at the Conference Center in Universidad de los Andes will be open on Monday 15th June from 14:00 to 18:00 and during the conference from 8:30 to 18:00.

In Medellín, the registration desk at the Conference Center in Ruta N will be open on Wednesday 17th June from 14:00 to 18:00 and during the conference from 8:30 to 18:00.

Lunch and Dinner

There are plenty of restaurants nearby, for which a food map will be available.

Processing and Handling of Personal Data

Personal data of the conference participants collected by the local organizers will be used only for statistical purposes and for mailings concerning announcements of IYLColConf2015.

Visas

Participants coming from most countries do not require a Visa to enter Colombia. However, all participants from abroad are advised to check whether they need a visa or not. Further information regarding these requirements as well as other Visa issues (if applicable) can be found through the Colombian Embassies or Consulates, and by following the links:

http://www.cancilleria.gov.co/sites/default/files/atencion_ciudadano/cuadro_visas03022015.pdf

http://www.cancilleria.gov.co/tramites_servicios/visas

Letters of invitation

Letters of invitation for speakers and other participants can be sent upon request by marcela@accefyn.org.co / viviana.perez@accefyn.org.co. Requests should be made as soon as possible

Please note that such an invitation letter does not imply any obligation, financial or otherwise, by IYLColConf2015.

Scientific Program

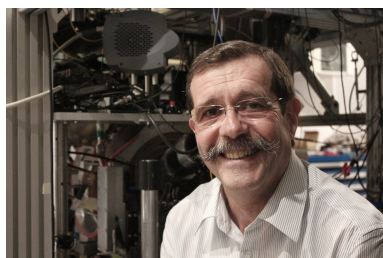
Please read the First Announcement of IYLColConf2015, which explains the request by the United Nations to celebrate the IYL, the nature of this conference, its scope, the expected audience and academic level of the conference,

<http://indico.cern.ch/event/357191/material/paper/0.pdf>

The scientific program will consist of Plenary Lectures (1 hour, including discussion). Plenary Lectures are of general interest to all participants, but will be delivered by using specialized language.

Public Lectures will be given, in Bogotá and Medellín. These talks will take place on the evenings. The lectures are open to conference participants, accompanying persons and the general public. These lectures will be given using, when possible, non-specialized language.

List of Invited Speakers (tentative titles)



Alain Aspect, Institut d'Optique Graduate School, Palaiseau, France. A professor at the Institut d'Optique graduate school and at École Polytechnique, in the university Paris-Saclay. He is a member of several academies, in France and abroad (USA, Austria, England). Among the many awards he has received, one can cite the CNRS gold medal in 2005, the Wolf prize in Physics in 2010, the UNESCO Niels Bohr Gold medals and the Albert Einstein medal in 2012, the Balzan prize in quantum information in 2014.

Alain Aspect is a physicist known for his experiments illuminating the most intriguing properties of quantum mechanics: wave-particle duality for a single particle, entanglement of two particles. His Bell's inequalities tests with pairs of entangled photons have contributed to settle a debate between Albert Einstein and Niels Bohr, started in 1935. With his collaborators, he has also given a

striking demonstration of wave-particle duality for a single photon, and realized the celebrated Wheeler's delayed choice experiment. After his contribution to the development of laser cooling of atoms, with Claude Cohen-Tannoudji, he has switched to atoms, which he uses to revisit landmarks in quantum optics and as quantum simulators of difficult condensed matter problems.

Plenary talk: *The atomic Hong-Ou-Mandel effect: a new evidence of atomic entanglement.*

Public Forum: *From Einstein's intuition to quantum bits: a new quantum age.*



Professor **Suzanne Fery-Forgues** is a research director at CNRS, the French National Center for Scientific Research. She is a photochemist, specialized in the fluorescence of organic compounds. After a PhD thesis on drug phototoxicity and a post-doctoral position in London working on photodynamic therapy, she entered CNRS in Paris where she first worked on fluorescent probes for the detection of ions of biological relevance. Then she went on to spend most of her career in Toulouse. She pioneered research on fluorescent organic non-doped nanoparticles. During the last three years, she has been responsible for a European project aimed at developing a new optical device for tumor diagnosis.

ITAV (Advanced Technology Institute in Life sciences, CNRS USR 3505) is a research laboratory located on a site totally devoted to research and treatment of cancer. It promotes scientific exchange and original research. Selected teams are hosted for the duration of projects. They find in one location an interdisciplinary environment, a pool of technological resources and a gateway to business.

The **SPCMIB** (Synthesis and Physico-Chemistry of Molecules of Biological Interest, CNRS UMR 5068) laboratory is situated on the campus of Toulouse University. Its pluridisciplinary research programs encompass the field of chemistry in relationship with health, in particular the development of compounds usable for therapy (drugs) and diagnosis (probes for bio-analysis and imaging).

Plenary talk: *Fluorescent organic nanoparticles as a new tool for in vivo bio-imaging.*



Professor **Jean-Pierre Galaup**. *CNRS, Laboratoire Aimé Cotton, Orsay, France*. Fields of expertise: Molecular spectroscopy. Vibrational spectroscopy. Hole-burning spectroscopy. Molecular doped polymers and xerogels. High temperature hole-burning. Photon echo spectroscopy. Spectro-temporal holography. Dynamics of vibrational excitations. Optical tweezers. Current research: Holographic optical tweezers for complete 3D control of microscopic objects. IR photon echoes on small molecules trapped in cryogenic matrices. Molecular doped

polymers and sol-gels for optical memories and information technology. Current research: Holographic optical tweezers for complete 3D control of microscopic objects. IR photon echoes on small molecules trapped in cryogenic matrices. Molecular doped polymers and sol-gels for optical memories and information technology. Complementary information: Co-chair and Chair of International Conferences. Regular referee in several scientific journals, guest Editor at the *Revista Cubana de Física*.



The **Aimé Cotton Laboratory** was created in 1927 by Aimé Cotton, a French physicist well known for his works on magnetism and magneto-optics interactions. The laboratory has been translated to Orsay and associated to the Paris-11 University in 1967. The present director is Jean-François Roch and the laboratory include about 120 people (researchers, academic teachers, engi-

neers, technicians, administrative and students) distributed among the following main research fields organized in 3 poles: 1 - Atoms, Light and Applications (3 teams); 2 - Cold matter: Interactions, Correlations, Complexity (4 teams); 3 - Photons, Materials and Interfaces (7 teams). Main achievements are in the following research fields: cold atoms and cold molecules (experiments and theory), photo-detachment microscopy, laser guiding of atoms, laser trapping of single objects, technology of high resolution and ultra-stable single mode lasers, atomic and molecular processors in solids for optical storage and quantum manipulations, and development of devices for blind persons.

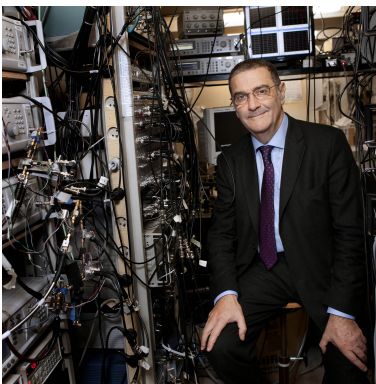
Plenary talk: *Optical tweezers*.



Paulo Sérgio Soares Guimarães. Professor of physics at Universidade Federal de Minas Gerais, Belo Horizonte, Brazil. Graduated in Physics at Universidade Federal de Minas Gerais in 1979, obtaining the MSc degree in Physics in 1982 at the same university. Pursued doctoral studies at the University of Nottingham in the UK, where he obtained the PhD degree in 1986. Post-doctorate at the University of California at Santa Barbara, 1992-1993. Became a lecturer at Universidade Federal de Minas Gerais in 1988. He was visiting professor at University of Sheffield, UK, in 2004-2005. Has experience in Condensed Matter Physics, specially the optical and electronic transport properties of semiconductor materials and devices. His research interests are photonic crystals, microcavities, semiconductor quantum dots and infrared photodetectors. Has supervised 4 post-doctorates, 8 PhD thesis and 12 MSc dissertations. He coordinates the Laboratory of Semiconductor Physics at Universidade Federal de Minas Gerais and is currently the Head of the Post-Graduate Program on Physics at this same university.

Laboratory of Semiconductor Physics: The laboratory conducts research on the optical and electrical transport properties of semiconductor materials and devices. There is also a line of investigation on organic semiconductors and on carbon based low dimensional materials, including graphene. The Laboratory has facilities for studies under femtoseconds pulsed lasers, photoluminescence and micro-photoluminescence, high magnetic fields up to 17 T, high precision optical and electrical measurements and low temperatures, down to the millikelvin range.

Plenary talk: *Quantum dots and photonic crystals.*



Serge Haroche was born in 1944 in Casablanca. He graduated from École normale supérieure (ENS), receiving his doctorate from Paris VI University in 1971 (thesis advisor: Claude Cohen-Tannoudji). After a post-doctoral visit to Stanford University in the laboratory of Arthur Schawlow (1972-73), he became full professor at Paris VI University in 1975, a position he held until 2001, when he was appointed Professor at Collège de France (Holder of the chair in quantum physics and Director since 2012).

He has been Maître de Conférence at École Polytechnique (1974-1984), visiting professor at Harvard (1981), part time professor at Yale University (1984-1993), member of Institut Universitaire de France (1991-2000)

and chairman of the ENS Department of Physics (1994-2000). His research has mostly taken place in laboratoire Kastler Brossel at ENS, where he now works with a team of senior coworkers, postdocs and graduate students.

Serge Haroche has received many prizes and awards, including the CNRS Gold Medal (2009) and the Nobel Prize in Physics (2012) with David J. Wineland.

The ENS Cavity QED group has been, since the early 1980's, a pioneer of the field of Cavity Quantum Electrodynamics, the domain of quantum optics which studies the behavior of atoms confined by metallic boundaries in a limited region of space, to test fundamental aspects of quantum physics such as state superposition, entanglement, complementarity and decoherence. Some of these experiments are actual realizations in the laboratory of the “thought experiments” imagined by the founding fathers of quantum mechanics.

In 2006, the team has developed a super-high-Q cavity able to store photons between mirrors for times longer than a tenth of a second. Trapping light quanta in this cavity has allowed the team to detect repeatedly and non-destructively the same field, to project it into states with definite photon numbers (so called Fock states) and to observe the quantum jumps of light due to the loss or gain of a single photon in the cavity (2007). This constitutes a completely new way to look at light. Whereas photons are usually destroyed upon measurement, they can now be counted and counted again in the cavity as one would do with marbles in a box. This non-destructive detection method has led Serge Haroche and his team to develop novel ways to generate and reconstruct non-classical states of radiation trapped in a cavity called Schrödinger cat state of light, and to investigate in details their decoherence, the phenomenon essential to explain the transition from quantum to classical (2008). The ENS team has recently pushed these experiments further by demonstrating a quantum feedback procedure achieving the preparation of predetermined non-classical state of a field trapped in a cavity and counteracting the effects of decoherence on these states (2011).

Plenary talk: *Experiments in Cavity QED: controlling photons in a box and raising Schrödinger cats of light.*

Public talk: *Celebrating the International Year of Light: how NMR and the Laser have changed our lives.*



Alejandro Mira-Agudelo is professor of physics at University of Antioquia, Medellin, Colombia. Physicist at the University of Antioquia (2002), Master in Physics at the University of Antioquia (2004), PhD in Vision Science at the University of Murcia - Spain (2011). Professor at the Institute of Physics of the University of Antioquia since 2004. Fellow Colciencias for doctoral studies abroad. At the beginning of his graduate studies, he worked on issues of diffractive optics and optical speckle. His doctoral thesis was addressed to issues of Visual Optics, wavefront sensors and proactive measures. Currently he is collaborating with Optics and Photonics Group UdeA on Encryption Optics and develops online Visual Optics, currently working in the areas of visual quality measures and presbyopia. Accompanied by Professor John Fredy Barrera, he received the Award for University Research Antioquia in 2014. He has presented contributions in more than 20 scientific events, participated in the publication of 14 scientific papers and has contributed to the development of 11 research projects, three of them as principal investigator.

The **Optics and Photonics research group (GOF)** is a research team of 5 professors and several graduate and undergraduate students of the Universidad de Antioquia. It was established in 1972 by professor Dr. Peter Barlai, and since then it has done contributions to physics, science and technology. In the last 10 years GOF has received 15 awards (5 from foreign institutions). Recently, the research interests of GOF are in the areas of optical encryption, nonlinear optics, optical information processing, visual optics, and diffraction optics.

Plenary talk: *How we see the world?*



Professor **John Henry Reina** is a physicist. He was born on a remote beach of the south pacific coast of Colombia. He is a former Universidad del Valle undergraduate, place where he also obtained a M.S. as a Mazda Foundation Fellow in theoretical physics. After this, he worked for a couple of years as a lecturer at UniValle, before he went to read for a D.Phil. at the Clarendon Laboratory & Centre for Quantum Computation of the University of Oxford, UK, where he worked at the interface between solid-state and quantum optics based nanostructures for the processing of quantum information. He earned his PhD in early 2002, and then he took an offer of a three

years joint research fellowship between the Physics and the Materials Departments at Oxford to work as a theoretician in the Oxford-Cambridge collaborative “Nanoelectronics at the Quantum Edge” UK macroproject for the advancement of quantum technologies. He was in charge of conducting research on quantum computing with artificial and organic molecules, and of modeling decoherence phenomena in such nanosystems. In 2005, he returned to Cali, Colombia, where he was offered a permanent position at the Physics Department of Universidad del Valle. Since then, he created the research group **Quantum Technologies, Information, and Complexity QuanTIC**, and has been the advisor of over 20 students at both the undergraduate and graduate levels. He is interested in quantum entanglement, complexity, decoherence and their connection to macroscopicity.

More recently, and during the past three years, he has been the coordinator of a macroproject for the creation of a **centre for research and innovation in bioinformatics and photonics CIBioFi**, an initiative that became successful and has been recently funded by the Colombian General Royalties System. Prof. Reina is currently the scientific director of CIBioFi. As a member of such centre (and as head of QuanTIC) he works on the quantum control of molecules and photons for the processing of quantum information. His group is currently in the process of building two laboratories for performing basic research on quantum information, and ultrafast molecular spectroscopy.

Plenary talk: *Photons for tomorrow: from quantum computers to precision agriculture.*



Professor **Ana Maria Rey** obtained her bachelor’s degree in physics in 1999 from the Universidad de los Andes in Bogotá, Colombia. She pursued her graduate studies at the University of Maryland, College Park, receiving a Ph.D. in 2004. Her doctoral thesis, “Ultracold Bosonic Atoms Loaded in Optical Lattices,” was recognized by the American Physical Society (APS) with the Atomic, Molecular, and Optical Physics Outstanding Doctoral Thesis Award in 2005. Rey served as a postdoctoral researcher at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, from 2004 to 2005.

She then joined the Institute of Theoretical, Molecular and Optical Physics at the Harvard-Smithsonian Center for Astrophysics as a Postdoctoral Fellow from 2005 to 2008. She joined JILA, NIST and the University of Colorado Boulder faculty in 2008. She is currently a JILA fellow and an associate research professor in the

Department of Physics.

Rey's research interests are in the scientific interface between atomic, molecular and optical physics, condensed matter physics and quantum information science. She wants to develop theoretical models to study and probe quantum magnetism in ultra-cold gases. Her work includes the original proposal to explore $SU(N)$ orbital magnetism with alkaline earth atoms, and possible realizations of topological phases with them. In the last five years Rey received the Hispanic Engineer National Achievement Award, a MacArthur Foundation Fellowship, the Presidential Early Career Award for Scientists and Engineers, the APS Maria Goeppert Mayer Award, the Museum of Science and Industry's Early Career National Hispanic Scientist of the Year Award and an APS Fellowship.

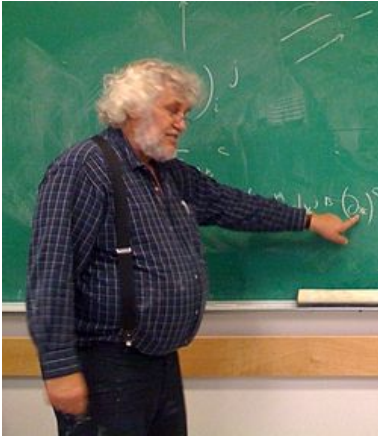
Plenary talk: *New perspectives on quantum simulation with ultra-cold matter.*



Boris A. Rodríguez is Professor of physics at Universidad de Antioquia, Medellín, Colombia. Grew up in Bogotá and educated in public schools. He finished undergraduate studies in physics at the Universidad Nacional de Colombia where he did a thesis on field theory under the direction of professor Alicia Guerrero de Mesa. He completed his master's and doctoral studies under the direction of Professor Augusto Gonzalez at the Universidad Nacional and the Universidad de Antioquia, in the area of quantum theory of finite systems applied to solid

state systems. Since joining as a professor at the Universidad de Antioquia, he has been linked to the Group of Atomic and Molecular Physics and has participated in several research projects, he has directed research of about 50 undergraduate and graduate students and has managed to publish several scientific papers. Today, in addition to his interest in the foundations of quantum theory, leads the group of **Fundamentals and Teaching of Physics and Dynamical Systems.**

Plenary talk: *Single photon polarization: the quantum nature of light.*



William G. Unruh is professor of Physics and Astronomy, University of British Columbia, Vancouver, Canada, and Fellow and founding Director of **Cosmology and Gravity Program**, Canadian Institute for Advanced Research, Toronto, Canada. BSc (Hon) – Univ of Manitoba 1967, MSc – Princeton U 1969. PhD Princeton U 1971. NSERC post doctoral Fellow– Birkbeck College, London UK (with R. Penrose) 1971-72. Miller Fellow, U Berkeley 1973-74. Asst. Prof McMaster U 1974-76. Asst-Full Prof, Univ of BC 1976-present. Director Cosmology and Gravity Program, Canadian Institute for Advanced Research

1986-96. Fellow CIFAR– 1986-present. Visiting Professor, Utrecht U, Netherlands 2008. Distinguished Research Chair, Perimeter Institute 2009 present. Variety of honours, including Fellow APS, Foreign Honorary Member-American Institute for Arts and Science, Fellow Royal Society of Canada, Fellow Royal Society of London.

Interested in the overlap between gravity and quantum mechanics, especially in early universe, in gravity wave detection, and around black holes. Discovered acceleration radiation (an accelerated detector sees the vacuum state as a thermal state with temperature proportional to acceleration). Also showed that black hole thermal radiation (Hawking radiation) not limited to gravitational black holes, but also exists in other horizons (Dumb holes).

Plenary talk: *Physics, analogs, and black holes.*

Public Forum: *What is Quantum Entanglement and why is it important?*

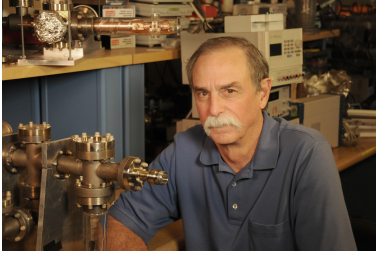


Since August 2012, **Alejandra Valencia** is an assistant professor in the Physics department at Universidad de los Andes in Bogotá, Colombia, where she leads the **Group of Experimental Quantum Optics**. A. Valencia did her undergraduate studies in physics at this university, later, in 2002, she received her Master of Science degree, and in 2005, her doctorate in applied physics,

both from the University of Maryland, USA. During her M.Sc and PhD, A. Valencia worked on the implementation of a distant clock synchronization protocol based on entangled photon pairs. Since 2006, A. Valencia worked as a postdoctoral researcher in Spain and Italy focusing primarily on the generation of heralded single photons. From 2010 until 2012, Alejandra participated in the development of activities to bring photonics, the science of light, to non-specialized public. Currently, her research focused on the generation, characterization and application

of light sources that range from single photons to high power lasers.

Plenary talk: *Experimental quantum optics at Universidad de los Andes*.



Professor **David Wineland** received a BA degree from the University of California, Berkeley in 1965 and a Ph.D. from Harvard University in 1970. He has been a member of the Time and Frequency Division of NIST (National Institute of Standards and Technology) in Boulder, Colorado since 1975, where he is a group leader and NIST Fellow. Starting with graduate school, a long-term goal of

his work has been to increase the precision of atomic spectroscopy, the measurement of the frequencies of atoms' characteristic vibrations. This led to experiments incorporating precise control of atomic energy levels and motion. These capabilities enable measurements whose precision is limited only by the constraints of quantum mechanics and provide demonstrations of the basic building blocks of a quantum computer. David Wineland received many prizes and awards, including the Nobel Prize in Physics (2012) with Serge Haroche, for “ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems”.

The **Ion Storage Group** is part of the Time and Frequency Division of NIST. A primary activity of the group's research is to develop high accuracy frequency standards and atomic clocks. An important development towards this goal was the group's demonstration of laser cooling. Cooling atoms to temperatures of around one milli-Kelvin and below is important to suppress uncertainty due to Einstein's relativistic time-dilation. Currently, the most accurate clocks are based on oscillations at optical frequencies in atoms and ions. Extensions of laser cooling led to experiments in which the group demonstrated the first deterministic logic gates in a scalable system of ion quantum bits, in which the logic gates must act on quantum superposition states of bits. Laser cooling also enabled the investigation of exotic states of matter such as liquid and crystalline plasmas.

Plenary talk: *Single-atom optical clocks*.

Public talk: *Quantum computers and Schrödinger's cat*.

Final Conference Program

The following is the tentative program. See the IYLColConf2015 website for the final titles and abstracts of the talks. The final Conference Program will be delivered to participants at the registration desk.

BOGOTÁ

Talks on Tuesday 16th June at León de Greiff Auditorium (Universidad Nacional)

Time	Introduction by:	Activity	Speaker
8:00-9:00		Registration	
9:00-10:00	Prof. Enrique Forero	Opening ceremony	Rector Ignacio Mantilla and Presidency Chair
10:00-10:30		Coffee break	
10:30-11:30	Prof. Diógenes Campos	Plenary Lecture The atomic Hong-Ou-Mandel effect: a new evidence of atomic entanglement	Prof. Alain Aspect
11:30-12:30	Prof. Jaime Rodriguez	Plenary Lecture Optical tweezers	Prof. Jean-Pierre Galaup
12:30-14:00		Lunch	
14:00-15:00	Prof. Karen Fonseca	Plenary Lecture Single photon polarization: the quantum nature of light	Prof. Boris Rodríguez
15:00-16:00	Prof. Humberto Rodríguez	Plenary Lecture Quantum dots and photonic crystals	Prof. Paulo Soares-Guimarães
16:00-16:30		Coffee break	
16:30-17:30	Prof. Enrique Forero	Plenary Lecture Experiments in Cavity QED: controlling photons in a box and raising Schrödinger cats of light	Prof. Serge Haroche
17:30-18:30	Prof. Jean-Pierre Galaup	Discussion panel On: Concept of photon	All speakers

BOGOTÁ

Talks on Wednesday 17th June at Mario Laserna Auditorium (Univ. de los Andes)

Time	Introduction by:	Activity	Speaker
8:00-8:30		Arrival	
8:30-8:45	Prof. Silvia Restrepo	Opening ceremony	Dr. Pablo Navas (President of Universidad de los Andes) and Presidency chair
8:45-9:30	Prof. Yenny Hernández	Plenary Lecture Fluorescent organic nanoparticles as a new tool for <i>in vivo</i> bio-imaging	Prof. Suzanne Fery-Forgues
9:30-10:00		Coffee break	
10:00-10:45	Prof. Alejandra Valencia	Plenary Lecture Physics, analogs, and black holes	Prof. William G. Unruh
10:45-11:30	Prof. Alejandra Valencia	Plenary Lecture Ultra-cold matter	Prof. Ana María Rey
11:30-14:00		Lunch	
14:00-15:00	Prof. Enrique Forero	Plenary Lecture Optical clocks	Prof. David Wineland
15:00-15:30		Coffee break	
15:30-16:00	Prof. Yenny Hernández	Plenary Lecture Experimental quantum optics at Universidad de los Andes	Prof. Alejandra Valencia
16:00-16:30	Prof. Yenny Hernández	Discussion panel On: Concept of photon	All speakers
16:30-16:45		Closing remarks	Prof. Silvia Restrepo (Vice-president of Research of Universidad de los Andes)

PARALLEL ACTIVITIES IN BOGOTÁ

Tuesday 16 10:30-11:30	Activity at: CEIBA Introduction by: Prof. Silvia Restrepo	Public talk Large quantum computers and Schrödinger's cat	Prof. David Wineland
Wednesday 17 9:00-10:00	Activity at: CEIBA Introduction by: Prof. Jairo Roa	Public talk Optical tweezers	Prof. Jean-Pierre Galaup
Wednesday 17 11:30-12:30	Activity at: Optics Lab. Introduction by: Prof. Alejandra Valencia	Public talk Large quantum computers and Schrödinger's cat	Prof. David Wineland
Wednesday 17 11:30-12:30	Activity at: Luis Angel Arango Library Introduction by: Prof. Eduardo Posada	Public talk Celebrating the International Year of Light: how NMR and the Laser have changed our lives?	Prof. Serge Haroche
Wednesday 17 14:30-15:30	Activity at: CEIBA Introduction by: Prof. Alejandra Valencia	Public talk Celebrating the International Year of Light: how NMR and the Laser have changed our lives?	Prof. Serge Haroche

MEDELLÍN

Talks on Thursday 18th June at Parque Explora Auditorium

Time	Introduction by:	Activity	Speaker
8:00-8:30		Registration	
8:30-9:00	Prof. Enrique Forero	Opening ceremony	Rector Mauricio Alviar and Presidency Chair
9:00-10:00	Prof. Jorge Mahecha	Plenary Lecture Experiments in Cavity QED: controlling photons in a box and raising Schrödinger cats of light	Prof. Serge Haroche
10:00-10:30		Coffee break	
10:30-11:30	Prof. Edgar Rueda	Plenary Lecture The atomic Hong-Ou-Mandel effect: a new evidence of atomic entanglement	Prof. Alain Aspect
11:30-12:30	Prof. Esteban Silva	Plenary Lecture (in Spanish) Single photon polarization: the quantum nature of light	Prof. Boris Rodríguez
12:30-14:30		Lunch	
14:30-15:30	Prof. Jorge Mahecha	Plenary Lecture (in Spanish) Ultracold matter	Prof. Ana María Rey
15:30-16:00		Coffee break	
16:00-17:00	Prof. Esteban Silva	Plenary Lecture Physics, analogs, and black holes	Prof. William G. Unruh
17:00-18:00		Break	

MEDELLÍN

Talks on Friday 19th June at Parque Explora Auditorium

Time	Introduction by:	Activity	Speaker
8:00-9:00	Prof. Jorge Mahecha	Plenary Lecture (in Spanish) Photons for tomorrow: from quantum computers to precision agriculture	Prof. John Henry Reina
9:00-10:00	Prof. Enrique Forero	Plenary Lecture Optical clocks	Prof. David Wineland
10:00-10:30		Coffee break	
10:30-11:30	Prof. Freddy Pérez	Plenary Lecture (in Spanish) Optical tweezers	Prof. Jean-Pierre Galaup
11:30-12:30	Prof. Edgar Rueda	Plenary Lecture (in Spanish) How we see the world?	Prof. Alejandro Mira
12:30-14:30		Lunch	
14:30-15:30	Dr. Carlos Molina	Plenary Lecture Photonic crystals	Prof. Paulo Soares Guimarães
15:30-16:00		Coffee break	
16:00-17:00	Prof. Jorge García	Plenary Lecture Fluorescent organic nanoparticles as a new tool for in vivo bio-imaging	Prof. Suzanne Fery-Forgues
17:00-18:00		Break	

PARALLEL ACTIVITIES IN MEDELLÍN

Thursday 18 14:30-14:30	Activity at: UPB Introduction by: Prof. Freddy Pérez	Public talk Celebrating the International Year of Light: how NMR and the Laser have changed our lives?	Prof. Serge Haroche Prof. Jean-Pierre Galaup
Thursday 18 16:00-17:00	Activity at: Optics Lab. U Nacional Introduction by: Prof. Jorge García	Public talk Fluorescent organic nanoparticles	Prof. Alain Aspect Prof. Suzanne Fery-Forgues
Thursday 18 18:00-20:00	Activity at: “Ciencia en Bicicleta” Introduction by: Dr. Andrés Ruíz	Public talk Celebrating the International Year of Light: how NMR and the Laser have changed our lives?	Prof. Serge Haroche
Friday 19 14:30-15:30	Activity at: Instituto Jorge Robledo Introduction by: Prof. Jorge Cossio	Public talk Large quantum computers and Schrödinger’s cat	Prof. David Wineland Prof. Ana María Rey
Friday 19 16:00-17:00	Activity at: “Coloquio de Astronomía del Planetario” Introduction by: Dr. Carlos Molina	Public talk Quantum entanglement & black holes	Prof. Alain Aspect Prof. William G. Unruh
Friday 19 18:00-20:00	Activity at: “Ciencia en Bicicleta” Introduction by: Dr. Andrés Ruíz	Public talk Large quantum computers and Schrödinger’s cat	Prof. David Wineland

Conference proceedings and communication

The memory of the event will be published in a magazine format. It will contain essential and brief information, seeking to be useful, clear and innovative (program, data of speakers, titles and summaries of talks; some pages taken from the presentations, with illustrations and reference list; descriptions of public talks; lists of speakers and participants; etc.).

Some talks will be transmitted via streaming and will be published later in a video channel, where they can replicate on other websites.

The memoirs will be accessible via the Internet after the event, along with videos, presentations and other materials.

Travel and Transportation

Travel to Bogotá

Car shuttle from Bogotá's airport: A car shuttle will be organized to transport the conference participants, especially the Invited Speakers, from Bogotá's airport to the hotel. An email with further instructions will be sent to all registered participants coming from abroad, with instructions on the time schedule.

Similarly, transportation from Medellín's airport, located 40 km from the city, will be offered to the Invited Speakers, and other participants from abroad.

Transportation in the city

Hotels and Accommodations

The participants will be accommodated in hotels of their choice. Local organizers will recommend hotels that offer discounts for participants in this event.

Miscellaneous

Excursions activities

The organizers of IYLColConf2015 were not capable of organizing tourist activities. However, it is suggested to interested persons to contact in their hotels for help and suggestions.

Insurance

Participants are advised to make their own arrangements regarding travel insurance and medical assistance during the conference. Neither the IYLColConf2015 organization nor the conference organizers are able to accept any liability whatsoever for damage or injury to persons. Participants are strongly advised to purchase appropriate health and travel insurance before leaving home.

The IYLColConf2015 organization will not accept liability for the loss or theft of your belongings which are your responsibility. You are strongly advised to take care of your personal belongings e.g. laptops, cameras, etc.

Credit Cards

Credit cards such as VISA and MasterCard are commonly accepted in hotels, restaurants and shops.

Currency Exchange

It is advised to exchange currency at banks and certified currency exchange offices only.

Internet service

Participants and accompanying persons will have internet access during the conference.

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