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Press Release

(for immediate release)

Committee on Space Research (COSPAR)

Awards 2018

To be presented on 15 July during the 42nd COSPAR Scientific Assembly

14 - 22 July 2018, Pasadena, CA, USA

See below for complete citations and a brief description of COSPAR.

- COSPAR Space Science Award for outstanding contributions to space science:

Jean-Pierre Bibring (France), Institut d'Astrophysique Spatiale, Univ. Paris Sud XI, Orsay, France

Bruce T. Tsurutani (USA), Astrophysics and Space Sciences Section, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA

- COSPAR International Cooperation Medal for distinguished contributions to space science and work that has contributed significantly to the promotion of international scientific cooperation:

Stas Barabash (Sweden), Swedish Institute of Space Physics, Kiruna, Sweden

- COSPAR William Nordberg Medal commemorating the late William Nordberg and for distinguished contributions to the application of space science in a field covered by COSPAR:

Christoph Reigber (Germany), Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Potsdam, Germany

- COSPAR Harrie Massey Award honoring the memory of Sir Harrie Massey, FRS, for outstanding contributions to the development of space research in which a leadership role is of particular importance:

John Zarnecki (United Kingdom), The Open University, Milton Keynes, United Kingdom

- COSPAR Distinguished Service Medal recognizing extraordinary services rendered to COSPAR over many years.

Mariano Méndez (Netherlands), Kapteyn Astronomical Institute, University of Groningen, Groningen, Netherlands

Scientific Program/abstract submission: <https://www.cospar-assembly.org>



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July 14 - 22, 2018 Pasadena, California, USA www.cospar2018.org

- Vikram Sarabhai Medal (a joint award of COSPAR and the Indian Space Research Organization) honoring Vikram Sarabhai, one of the architects of modern India, for outstanding contributions to space research in developing countries:

Qiugang Zong (China), School of Earth and Space Science, Institute of Space Physics and Applied Technology, Center for Space Science Exploration, Peking University, Beijing, China

- Jeoujang Jaw Award (a joint award of COSPAR and the Chinese Academy of Sciences) recognizing scientists who have made distinguished pioneering contributions to promoting space research, establishing new space science research branches and founding new exploration programs:

Sergey Krikalev (Russia), Roscosmos State Corporation for Space Activities, Moscow, Russia

- Yakov B. Zeldovich Medals (a joint award of COSPAR and the Russian Academy of Sciences) conferred on young scientists for excellence and achievements, honoring the distinguished astrophysicist Yakov B. Zeldovich. One medal is awarded for each COSPAR Scientific Commission:

- *COSPAR Scientific Commission A*

Benjamin Hamlington (USA)

Ocean, Earth, and Atmospheric Sciences Department, Old Dominion University, Norfolk, Virginia, USA

for major contributions to deciphering the natural and anthropogenic components of global sea-level rise.

- *COSPAR Scientific Commission B*

Shunichi Kamata (Japan)

Creative Research Institution, Hokkaido University, Sapporo, Japan

for profound insights in the field of interior structure and thermal state of the Moon and icy satellites, as well as for his broad involvement in space research of the Solar System

- *COSPAR Scientific Commission C*

Loren C. Chang (Taiwan, China/USA)

Institute of Space Science, National Central University, Taiwan, China

for major contributions to studies on vertical coupling of the atmosphere and the ionosphere by modeling and observations

- *COSPAR Scientific Commission D*

Remya Bhanu (India)

Indian Institute of Geomagnetism, Mumbai, India

for major contributions to generation of mirror mode and electromagnetic ion cyclotron waves in the magnetosphere and understanding of radiation belt dynamics

- *COSPAR Scientific Commission E*

Volodymyr Savchenko (Switzerland/Ukraine)

ISDC, Department of Astronomy, University of Geneva, Switzerland

for his outstanding contribution to the discovery of the association between the short gamma-ray burst and the coalescing binary neutron stars, as astonishingly shown by GW170817

- *COSPAR Scientific Commission F*

Amir Alexander Bahadori (USA)

Dept. of Mechanical and Nuclear Engineering, Kansas State University, USA

for his important contributions to the development of a radiation monitoring system based on the Timepix read-out chip technology for future crewed missions

- *COSPAR Scientific Commission G*

Taishi Yano (Japan)

Department of Mechanical Engineering, Yokohama National University, Japan

for his contribution to conducting and processing the microgravity experiments on the thermocapillary convection in the Japanese Experiment Module (Kibo) on board the ISS

- *COSPAR Scientific Commission H*

Frederico Francisco (Portugal)

Centro de Fisica do Porto, Universidade do Porto, Portugal

for his outstanding contribution to the characterisation of the reflective component of the thermal effects on the anomalous acceleration of the Pioneer spacecraft and for its use in modeling nongravitational accelerations on Cassini's gravitational experiment

CITATIONS

- COSPAR Space Science Award:

Jean-Pierre Bibring (France)

What are the processes that paved the history of terrestrial planets? What has modelled their present uniqueness, primarily that of the Earth? How has life emerged on Earth? Has life emerged elsewhere? Throughout his career, Jean-Pierre Bibring has addressed these questions, building the relevant instruments and placing them on board a variety of space missions primarily aimed at Mars, and unravelling the history of the planet from his pioneering diagnostic measurements. In particular, Jean-Pierre Bibring has developed Spectro imagers operating in the infrared, embarked in a wide series of space missions, Russian, European, American and Japanese. Of prime importance is the OMEGA investigation he still leads, on board the ESA Mars Express mission: for the first time, high-resolution imaging and spectroscopic capabilities were coupled in one instrument, enabling a global coverage at sub kilometre resolution, with the composition in each pixel characterized, both of surface and of atmosphere. One of the key OMEGA discoveries is that of minerals resulting from the aqueous alteration of the surface of Mars, in a sequence going from phyllosilicates (clays) to sulfates, recording the evolution with time of the Mars environment and revealing the role played by water. A critical outcome is the indication that Mars might have harboured "habitable" conditions in its very ancient past, soon after the planet formed. In addition, Jean-Pierre Bibring is one of the two Philae Lead Scientists, responsible for the overall operations and scientific activity, coordinating 10 PI investigations. Landing on a totally unknown object, with very limited means to cope with (and to react to) the actual situation, and yet achieving the pioneering in situ characterization of the most pristine solar system material: Philae undoubtedly constitutes one of the most challenging and seminal space ventures ever undertaken.

Coupling instrumental experience to a conceptual approach, Jean-Pierre Bibring has made major discoveries in planetary and solar system science. In addition, given his strong implication in future asteroid and Mars missions, he has a great potential for future discoveries. He is a worthy recipient of the COSPAR Space Science Award.

Bruce T. Tsurutani (USA)

Dr. Bruce T. Tsurutani has played a leading role in Space Weather research. In the 1980s Tsurutani and colleagues established that there were two primary solar and interplanetary causes of magnetic storms: coronal mass ejections (CMEs) associated with solar flares, and corotating interaction regions (CIRs) caused by high speed streams associated with coronal holes. He discovered that the portion of the storm after the CIR, named a high-intensity long-duration continuous AE activity (HILDCAA) interval, if averaged over 4 days, injects more energy into the magnetosphere than do CMEs. This is due to the southward components of interplanetary Alfvén waves. Earlier in the 1970s, Tsurutani and OGO-5 colleagues established that a magnetospheric electromagnetic plasma wave called chorus was associated with substorm-injected anisotropic ~10 to 100 keV electron clouds, experimentally verifying a landmark theory of magnetospheric wave generation by plasma instabilities. In micro-scale plasma physics, Tsurutani with colleagues recently discovered that chorus is coherent, breaking a well-established paradigm. Wave coherency calculations indicate that the wave-particle scattering is ~1,000

times faster than previously imagined. Using ground magnetometer data, Tsurutani and colleagues identified the magnitude and proposed interplanetary cause of the September 1-2, 1859 Carrington magnetic storm, the largest in recorded history. Tsurutani also discovered that during magnetic storms, prompt penetration electric fields (PPEFs) from the solar wind lift up the dayside F region in the equatorial ionosphere by $E \times B$ convection increasing the total electron content (TEC), causing a “dayside ionospheric super fountain effect”. This may have strong consequences for enhanced low-Earth orbiter satellite drag. Tsurutani and colleagues have shown that another magnetospheric wave called electromagnetic ion cyclotron (EMIC) wave can be generated by solar wind pressure pulses, with the waves causing the precipitation of the relativistic electrons. Their energy deposition deep into the atmosphere is speculated to cause atmospheric wind changes. All of these space weather and nonlinear wave accomplishments and more make Dr. Tsurutani a most deserving recipient of the 2018 COSPAR Space Science Award.

- COSPAR International Cooperation Medal:

Stas Barabash (Sweden)

Professor Stas Barabash has been a major contributor to experimental space physics, as evidenced by the number of missions for which he has been or is principal or co-principal investigator for plasma and energetic neutral particle instruments. An example is the Particle Environment Package (PEP) on the next Jupiter mission (JUICE) where the consortium of scientists includes forty-two persons from twenty different institutions in Europe, North America, and Japan. Furthermore, over the course of his career Professor Barabash has had joint projects and collaborated with most major space agencies including ESA, JAXA, NASA, ROSCOSMOS, ISRO, and CNSA. Stas Barabash’s extensive experience of successful cooperation with a large number of well-established experimental space physics groups in terms of technical development as well as in data analysis, involving among others a large number of students, makes him a worthy recipient of COSPAR’s International Cooperation Medal.

- COSPAR William Nordberg Medal:

Christoph Reigber (Germany)

The era of space geodesy is characterized by several individuals of either great scientific or technical potential, of visionary foresight for necessary new developments, or of unique leadership capabilities for the execution or coordination of scientific projects or large programs. One of the individuals from the early space geodetic science scene who possesses a good portion of all those three qualities is, without question, Christoph Reigber. The major scientific contributions of Christoph Reigber have been in furthering the detailed and accurate modeling of the Earth’s gravity field and its time variability, by pushing forward new methodologies, the precise MW tracking of various remote sensing missions and the realization of a new class of active LEO satellites for monitoring the geopotential fields. As a by-product he helped to deliver high quality temperature distributions in the lower atmosphere for climate studies.

Christoph Reigber was involved in several important satellite missions. He was e.g. Co-Principal Investigator for the development of the PRARE (Precise Range and Range-rate positioning system) and Project manager for the PRARE flights on METEOR and ERS-2. He initiated the German geopotential mission CHAMP (Challenging Mini-satellite Payload) and was leading the CHAMP Mission Phases A to C/D until launch in 2000. Afterwards he acted as project director for the CHAMP Mission Exploitation Phase (till 2005). From 1997 to 2007 Christoph Reigber was the Co-Principal investigator of the US-German twin satellite mission GRACE (Gravity Recovery and Climate Experiment) and coordinated the European GRACE science team. These highly successful satellite-to-satellite tracking missions opened the door for a new space geodetic technique, namely the monitoring of mass motions in the geosphere from space. During the last decades Christoph Reigber also chaired a considerable number of panels, committees and international services with emphasis on satellite geodesy and geodynamics, among them the joint IAG/COSPAR commission CSTG. His distinguished contributions to the application of space science make Professor Reigber a well-deserving recipient of the 2018 Nordberg Medal.

- COSPAR Massey Award:

John Zarnecki (United Kingdom)

Professor Zarnecki has been involved in space research for over 30 years. He has been part of the instrument teams – often as Principal Investigator – for many groundbreaking, novel instruments, as well as the associated analysis and interpretation of the resulting data. Professor Zarnecki is part of the team responsible for the Huygens lander that touched down on Titan, Saturn’s largest moon. At a distance of 1.5 billion kilometres from Earth, Huygens holds the world record for a long-distance landing,

and Professor Zarnecki's penetrometer was the first instrument to take readings on Titan's surface. Typical of his ability to communicate with the general public, Professor Zarnecki quipped that this surface was like "crème brûlée". At the start of his career, Professor Zarnecki's focus was on X-ray astronomy, establishing that supernova remnants were an important source of cosmic X-rays. His work at British Aerospace led to the production of the Faint Object Camera, Europe's contribution to the Hubble Space Telescope that became the longest-serving camera in space in 2002. He led the Dust Impact Detection System team for the Giotto encounter with Comet Halley and later with Comet Grigg-Skjellerup. Professor Zarnecki's instrumental developments are now being used for the European Space Agency's ExoMars programme. Professor Zarnecki has given long and distinguished service both to the European and – more recently – to the UK Space Agencies. Professor Zarnecki served as part of ESA's Senior Review Committee, charged with selecting the scientific themes that would form the basis for the L2 and L3 launches in 2028 and 2034, respectively. He has chaired the Solar System Exploration Working Group, a tribute to his wide ranging interests in the science of our Solar System. He is now Chair of ESA's SSAC (Space Science Advisory Committee), ESA's top Science Advisory Committee.

John Zarnecki has over many years been a mover, shaker and innovator in Space Science, and is a worthy recipient of the Massey Medal.

- COSPAR Distinguished Service Medal:

Mariano Méndez (Netherlands)

The COSPAR capacity building workshops have developed over the past eight years under the leadership of Professor Mariano Mendez into one of the flagship activities of COSPAR. Professor Mendez has chaired the Panel on Capacity Building since July 2010, after having served as vice-chair in charge of astrophysics from 2006 to 2010. The panel, created in 2001 by Professor Peter Wilmore, has organised 37 capacity building workshops in Africa, Asia, Latin America, and Eastern Europe. Professor Mendez taught in the first of these workshops in 2001 in Brazil. Since then he has lectured in about a dozen and, more importantly, has significantly expanded the activities of the Panel. Approximately 1500 students from more than 50 countries have attended the workshops, 27 of which have been organized since 2010 and at a present rate of about three workshops per year. Initially, the workshops covered almost exclusively topics in astrophysics from space. Under Professor Mendez the workshops have expanded to topics of Earth surface and Earth atmosphere, Earth ionosphere, small solar-system bodies, space weather, solar physics, crystallography from space, and small satellites, covering all areas of science addressed by COSPAR.

During the period in question, the associated Fellowship Program has also developed greatly, offering, in the past ten years, the opportunity to about 50 students who participated in one of the capacity building workshops the possibility of carrying out six week visits to institutes in developed countries to complete the research project initiated during a workshop. In addition to his important role in the capacity building program, Professor Mendez also represented COSPAR on the IAU Commission for Education in Astronomy and at IAU Schools for Young Astronomers, has contributed to the scientific program of COSPAR Commission E, and served as Associate Editor of Space Research Today, COSPAR's information bulletin, all in addition to a very productive research career.

Professor Mariano Mendez is a worthy recipient of the Distinguished Service Medal which recognizes his extraordinary services rendered to COSPAR over many years.

- COSPAR/ISRO Vikram Sarabhai Medal:

Qiugang Zong (China)

Dr. Qiugang ZONG is an internationally recognized expert in the Chinese Double Star Program and ESA Cluster Project, both aimed at the study of Earth's magnetosphere, using multiple spacecraft. He is well-known on the national and international stage as a leader in the study of wave – particle interaction in Earth's inner magnetosphere, as well as the dynamics of the magnetospheric cusp, magnetic reconnection structures and the magnetospheric response to solar wind discontinuities.

Dr. Zong has made important contributions to the understanding on how the large relativistic electron fluxes appear in near Earth space and how they evolve. These relativistic electrons are known as 'killer' electrons as they are the prime threat to spacecraft. Using the Cluster and Double star data, Dr. Zong has found that when interplanetary shocks interact with Earth's magnetosphere, killer electrons are accelerated primarily by poloidal mode ultra-low frequency (ULF) waves.

Dr. Zong has obtained “Outstanding Scientist Award” from European Space Agency, 2010; European Space Agency Special Cluster Award, 2005; NASA – Cluster Science Team, Group Achievement Award, 2004; Chinese National Awards for the Promotion of Advanced Science and Technology, 2001.

Dr. Zong has authored or co-authored 185 peer refereed papers. COSPAR and the Indian Space Research Organisation are truly honoured to award the Vikram Sarabhai Medal 2018 to Dr. Qiugang ZONG of China for his outstanding contributions to the understanding of space physics.

- COSPAR/CAS Jeoujang Jaw Award:

Sergey Krikalev (Russia)

Sergey Krikalev is a cosmonaut, now the Executive Director of human spaceflight programs of the State Space Corporation, Russia. He is a truly legendary man, having spent 803 days in space, including eight EVA's. As a Hero of the Soviet Union and Russia, Krikalev has won many awards, both at home and abroad, for his long space flights aboard the MIR space station, the International Space Station, and Space Shuttle missions as well.

During his space flights Krikalev was actively involved in space science experiments, such as ultraviolet observations of stars of early spectral class, the PKE-Nefedov experiment on plasma crystals forming spontaneously under microgravity conditions, and identification of circular superficial wave systems. Furthermore, based on his unique experience in space flight, Krikalev reformed the management of human space flight training programs in Russia, introduced open competition in the selection of cosmonaut candidates, and committed to the training of new cosmonauts.

For his distinguished contributions to human activities in space research, COSPAR and the Chinese Academy of Sciences are honored to present the Jeoujang Jaw award to Mr. Krikalev.

COSPAR TODAY

The Committee on Space Research (COSPAR) has both National Scientific Institutions and International Scientific Unions as members. Moreover, approximately 10000 scientists actively engaged in space research are COSPAR Associates. Companies and organizations interested in supporting COSPAR activities may also become Associated Supporters of the Committee.

COSPAR acts mainly as an entity which:

- is responsible for organizing biennial Scientific Assemblies with strong contributions from most countries engaged in space research. These meetings allow the presentation of the latest scientific results, the exchange of knowledge and also the discussion of space research problems. Over several decades providing this service has brought recognition to the COSPAR Scientific Assembly as the premier forum for presenting the most important results in space research in all disciplines and as the focal point for truly international space science. In this regard it should be observed that COSPAR has played a central role in the development of new space disciplines such as life sciences or fundamental physics, by facilitating the interaction between scientists in emergent space fields and senior space researchers,
- provides the means for rapid publication of results in its journals *Advances in Space Research (ASR)* and *Life Sciences in Space Research (LSSR)*,
- strives to promote the use of space science for the benefit of all and for its adoption by developing countries and new space-faring nations, in particular through a series of Capacity Building Workshops which teach very practical skills enabling researchers to participate in international space research programs,
- organizes, on a regional scale, scientific exchange and public outreach on specific research topics, in the framework of Symposia and Colloquia,
- advises, as required, the UN and other intergovernmental organizations on space research matters or on the assessment of scientific issues in which space can play a role, for example the Group on Earth Observations (GEO), in which COSPAR is a Participating Organization,
- commissions and prepares comprehensive scientific roadmaps on important topics to allow space agencies and other entities to base decisions affecting their programs and future research on the best available science,
- prepares scientific and technical standards related to space research,
- promotes, on an international level, research in space, much of which has grown into large international collaborative programs in the mainstream of scientific research.

COSPAR's objectives are to promote on an international level scientific research in space, with emphasis on the exchange of results, information and opinions, and to provide a forum, open to all scientists, for the discussion of problems that may affect scientific space research. These objectives are achieved through the organization of Scientific Assemblies, publications and other means.

The International Council for Science (ICSU) established COSPAR during an international meeting in London in 1958. COSPAR's first Space Science Symposium was organized in Nice in January 1960. COSPAR is an interdisciplinary entity that ignores political considerations and views all questions solely from the scientific standpoint.

Complete lists of previous award recipients may be found at:

<https://cosparhq.cnes.fr/awards>

Further information on COSPAR is available at:

<https://cosparhq.cnes.fr/>

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