

Press Release

(for immediate release)

Committee on Space Research (COSPAR)

Awards 2016

To be presented on 1 August during the 41st COSPAR Scientific Assembly

30 July – 7 August 2016, Istanbul, Turkey

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

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

Charles L. Bennett (USA), Department of Physics & Astronomy, Johns Hopkins University, Baltimore, MD, USA

Anatoly I. Grigoriev (Russia), Russian Academy of Sciences, Moscow, Russia

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

Lev Zelenyi (Russia), Space Research Institute, Russian Academy of Sciences, Moscow, Russia

- 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:

Gordon Greeley Shepherd (Canada), Centre for Research in Earth and Space Science (CRESS), York University, Toronto, Canada

- 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:

Fiona A. Harrison (USA), Physics & Astronomy Department, California Institute of Technology, Pasadena, CA, USA

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

David Halpern (USA), Jet Propulsion Laboratory, Pasadena, CA, USA

- 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:

Kohei Arai (Japan), Dept. of Information Science, Saga University, Saga, Japan

- 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:

Cheng FANG (China), School of Astronomy and Space Science, Nanjing University, Nanjing, China

- 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*

Aaron van Donkelaar (Canada)

Dept. of Physics and Atmospheric Science, Dalhousie University, Halifax, NS, Canada

for significant contributions to the study of air quality based on passive and active space sensor data with aerosol transport modeling.

- *COSPAR Scientific Commission B*

Alexander G. Hayes (USA)

Spacecraft Planetary Imaging Facility, Cornell University, Ithaca, NY, USA

for seminal studies of geological processes on planetary bodies and, therefore, for his contribution to our understanding of active solar system worlds

- *COSPAR Scientific Commission C*

Erdal Yiğit (USA/Germany)

Department of Physics and Astronomy, George Mason University, Fairfax, VA, USA

for significant contributions to the study of coupling between the lower and upper atmospheres of Earth and Mars by gravity waves

- *COSPAR Scientific Commission D*

Drew L. Turner (USA)

Space Sciences Department, The Aerospace Corporation, Los Angeles, CA, USA

for significant contributions to the study of relativistic electron dynamics in the Earth's radiation belts

- *COSPAR Scientific Commission E*

Lan Jian (USA/China)

University of Maryland, College Park and Heliophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD, USA

for her important contribution to the study of interplanetary coronal mass ejections and stream interaction regions through the solar cycle

- *COSPAR Scientific Commission F*

Satoshi Kodaira (Japan)

National Institute of Radiological Sciences for QST, Radiation Measurement Research Team, Chiba, Japan

for significant contributions to the study of the radiation environment in space and his service to the space research community

- *COSPAR Scientific Commission G*

Thomas Triller (Germany)

Physics Department, Universität Bayreuth, Bayreuth, Germany

for the important contribution in the preparation of the DCMIX3 experiment on the *ISS*

- *COSPAR Scientific Commission H*

Ewan D. Fitzsimons (United Kingdom)

UK Astronomy Technology Centre, Royal Observatory Edinburgh and Institute for Gravitational Research, School of Physics and Astronomy, University of Glasgow, United Kingdom

for his key role in the design, development, construction, and testing of the flight model interferometer for LISA Pathfinder and his significant contribution to the system definition and technology demonstration of the optical bench for the future LISA Mission

CITATIONS

- COSPAR Space Science Award:

Charles L. Bennett (USA)

Professor Charles L. Bennett is the Bloomberg Distinguished Professor in the Department of Physics & Astronomy at the Johns Hopkins University, in Baltimore, MD, USA. He is a Member of the U.S. National Academy of Sciences (NAS) and the American Academy of Arts and Sciences, as well as a Fellow of the American Association for the Advancement of Science and of the American Physical Society. He is the recipient of many awards including the Shaw Prize (2010), the Gruber Cosmology Prize, and the Henry Draper Medal of the NAS (2005).

Professor Bennett is awarded the COSPAR Space Science Award for his leadership of the Wilkinson Microwave Anisotropy Probe (WMAP), a space experiment that, through its precise measurements of the Cosmic Microwave Background revolutionized our understanding of the Universe. WMAP has determined robustly that of the three possible cosmological geometries, our Universe is flat to within 0.4%; that the Universe is 13.8 ± 0.1 billion years old; that only $4.6 \pm 0.1\%$ of the Universe is baryonic; that $24 \pm 1\%$ is dark matter, and $71 \pm 1\%$ is dark energy. WMAP confirmed the existence of the cosmic neutrino background; and discovered a tilt in the primordial scalar spectral index at the 5-sigma level, thereby constraining inflation models. Also noteworthy was Professor Bennett's essential contribution as Deputy Principal Investigator of the COBE mission, the Nobel Prize recognized experiment that paved the way for WMAP.

Anatoly I. Grigoriev (Russia)

Professor Anatoly Ivanovich Grigoriev has been the Senior Researcher of the Institute of Biomedical Problems (IBMP) in Moscow since 1973. From 1988 to 2008 he held the position of IBMP Director. Since 2001, he has been the IBMP Scientific Leader, combining this role with the responsibilities of Vice-President of the Russian Academy of Sciences since 2008. In addition, he is a member of the International Academy of Astronautics (Vice-President, 1993 - 2003) and the International Astronautical Federation (Vice-President, 2004 - 2008) as well as Co-Chair of the USSR/Russian-US Joint Working Group on Space Biology and Medicine since 1989 and Co-Chair of the ISS Multilateral Medical Policy Board from 2000. Professor Grigoriev is an uncontested Russian expert in space biology and medicine. For many years he was Chief Medical Officer of the Russian Space Agency responsible for health and medical safety of crews on board orbital stations *Salyut*, *MIR*, and *ISS*. In experiments on the ground and in space flights he developed countermeasures against the deleterious effects of microgravity and drew up protocols of medical care and rehabilitation in space flights. He is focused on research into mechanisms underlying the gravity effects on fluid-electrolyte metabolism, calcium metabolism, bones, and hormonal regulation. His theoretical and practical contributions to the medical care and countermeasures programs for long-duration space missions, as well as to major research projects in space life sciences, have won wide recognition. Professor Grigoriev has actively promoted collaboration within international scientific communities to the benefit of space life sciences and medical safety of manned missions.

- COSPAR International Cooperation Medal:

Lev Zelenyi (Russia)

Lev Zelenyi is a well-recognized leader in international space science in the field of solar-terrestrial physics. He began this science career as a theorist working on plasma physics and made important advances in understanding tearing instability and reconnection processes. His entire professional life is connected with the Space Research Institute which has been one of the very few centers of International Cooperation in the Soviet Union. As a theorist, Lev Zelenyi collaborated with various groups around the world, including the Max Planck Institute for Solar-Terrestrial Physics where he was a Humboldt fellow and University of California, Los Angeles, where he worked in the Space Simulation group led by Professor Ashour-Abdalla, who unfortunately very recently passed away. These collaborations led to several dozen international publications on various aspects of plasma physics and space physics. After the foundation of ISSI, Lev Zelenyi was actively involved in its various projects, as a team member, workshop participant, member of the Science Committee and member of the Board of Trustees. Largely thanks to his efforts, Russian scientists became very actively involved in ISSI international teams. Since 2003 he has been leading the joint Russian-French laboratory "Geoplasma" which resulted in the publication of over 60 joint papers. Lev served as COSPAR Bureau

member from 2006 to 2014 and for many years was a convener of numerous sessions on highlights of magnetospheric physics. He was one of the key players in the organization of the 40th COSPAR Assembly in Moscow in 2014. Lev was a scientific coordinator of a very successful Interball project involving physicists of 18 countries and which also became a part of the International Solar-Terrestrial Physics Program. Now Lev leads its successor, the Resonance mission, which will study wave-particle interaction in the Earth's inner magnetosphere. He is also now leading the Russian 2016-2025 Lunar Program and the Russian part of the ExoMars/ESA-RSA missions. His contribution to international cooperation in space is well-recognized. He was elected as a Foreign Member of the Bulgarian and Ukrainian Academies and was awarded the Officer Cross Medal from Poland and the IAA medal for achievements in space science.

- COSPAR William Nordberg Medal:

Gordon Greeley Shepherd (Canada)

Professor Gordon Shepherd has made many distinguished contributions to our understanding of the upper atmosphere through the development of clever instruments and scientific insights revolutionizing our view of its dynamics and chemistry.

Professor Shepherd is a pioneering scientist who has continuously developed instrumentation to measure key features of the upper atmosphere. He has done so since the beginning of the space age. He was a Principal Investigator for the Red Line Photometer on the ISIS-II satellite launched in 1971, Chair of the ISIS-II Experimenters group from 1974 to 1982, and Co-investigator for the Visual Airglow Instrument on the Atmosphere Explorer satellite in the mid 1970's. He later negotiated the collaboration between Canada and Sweden that led to the Ultra Violet Imager on the Viking satellite, for which he became Co-investigator, from 1980 to 1987. He was a Principal Investigator for the WINDII instrument on UARS which revolutionized our understanding of the middle atmosphere, starting with the recognition that tides had a much wider impact than previously thought. The instrument also measured the atomic oxygen airglow and atomic oxygen concentrations, leading to the discovery of vertical motions detected through changes in atomic oxygen emissions. Professor Shepherd and co-workers were able to scrutinize a vast range of atmospheric emissions, adding precious contributions to upper atmospheric features such as: geomagnetic storm enhancement of winds in the thermosphere, polar mesospheric clouds, a quasi-two-day wave in the middle atmosphere, a description of horizontal winds in the middle atmosphere including longitudinal variations, and the solar influence on airglow and atomic oxygen concentrations. Professor Shepherd has continued to innovate by creating clever instruments like SATI and SWIFT to measure mesospheric temperatures and winds from emissions in the thermal infrared and by leading PSMOS, the Planetary Scale Mesopause Observing System.

Professor Shepherd is one of the world's foremost scientists studying the physics of the Earth's middle and upper atmosphere. He not only understands deeply the workings of the Earth's middle and upper atmosphere, but he is also a superb innovator of sophisticated instruments that continually push the envelope.

- COSPAR Massey Award:

Fiona A. Harrison (USA)

Fiona Harrison is the leader of NASA's NuSTAR (Nuclear Spectroscopic Telescope Array) mission, launched in June 2012. As the first focusing telescope operating in the hard X-ray band, NUSTAR is a hundred times more sensitive than any previous spacecraft in the 15 - 79 KeV spectral band. This has opened a new window on the Universe.

Among the most impressive results of NUSTAR and of Professor Harrison's group are: 1) The first map of the Cas A supernova remnant in the radioactive line of Ti-44. The Ti-44 line was also detected by NUSTAR from the remnant of supernova 1987A in the Large Magellanic Cloud. 2) Due to the unprecedented angular and timing resolution, the NUSTAR team discovered emission from a magnetar - a neutron star with a magnetic field exceeding 10^{14} Gauss very near the center of the Milky Way. This is the first pulsar discovered in the vicinity of our central Black Hole. 3) The majority of scientists believed that ultra-luminous X-ray sources in other galaxies are the black holes having a mass exceeding 1000 solar masses. Such black holes are impossible to create as a result of stellar evolution. The group led by Fiona Harrison discovered that the well-known ULX in the star forming galaxy M82 is an X-ray pulsar of period 1.37 seconds, and is one of two stars in the binary with a period of three days. We know that pulsars are neutron stars having masses usually less than 2 solar masses. This source has, at a maximum, the X-ray luminosity exceeding a hundred times the Eddington critical luminosity, i.e. the radiation force on the surface of this accreting neutron star

exceeds a hundred times the gravitational attraction to the neutron star, an observation that has yet to find adequate theoretical explanation.

These and many other discoveries make Fiona Harrison one of the most active leaders of modern high energy astrophysics.

- COSPAR Distinguished Service Medal:

David Halpern (USA)

Dr. David Halpern's career demonstrates a high passion for and commitment to providing outstanding service to COSPAR for over a quarter century. He has held every elected position available in Scientific Commission A and in the Scientific Sub-commission of his specialty. As Main Symposium Organizer on many occasions, Dr. Halpern enabled young scientists, especially from developing countries, to acquire optimal visibility in presenting their scientific accomplishments. Because of his long and distinguished service in COSPAR leadership positions, he was invited to serve on the COSPAR Scientific Assembly Review Team. Dr. Halpern constantly strives to find ways to improve the programs and processes of COSPAR.

In addition to his strong commitment to community service, Dr. Halpern maintains an active and highly fruitful career as a Senior Research Scientist at JPL focusing on ocean-atmosphere-climate research. He is an elected Fellow in five highly recognized learned societies, including the International Academy of Astronautics, which has close ties with COSPAR. In addition to research activities and community service, Dr. Halpern's career has included teaching undergraduate and graduate courses and mentoring undergraduate and graduate students at the California Institute of Technology, University of California at Los Angeles, and University of Washington.

- COSPAR/ISRO Vikram Sarabhai Medal:

Kohei Arai (Japan)

Dr. Kohei Arai is one of the most active researchers in the field of Earth Remote Sensing in Japan. His research interests include radiative transfer equation, remote sensing data processing and analysis, and remote sensing systems. Dr. Arai has developed the Monte Carlo Ray Tracing Model for vicarious calibration and atmospheric correction for satellite data, created new methodology for identification and classification of sea ice types, ground cover targets using polarimetric synthetic aperture radar data, and created the missions for Japan's first Marine Observation Satellite MOS-1, followed by MOS-1b, Japanese Earth Resources Satellite, JERS-1 and Advanced Earth Observing Satellite ADEOS.

Dr. Arai has served as the Vice-Chair of COSPAR Commission A and the COSPAR Task Group on GEO. He was also selected by COSPAR as a member of the evaluation team for GEOSS and contributed significantly in evaluating GEOSS system from the viewpoints of health, energy and disaster monitoring from space. Furthermore, as an expert member from the Japan International Cooperation Agency, Dr. Arai has been contributing to space research groups activities in South East Asian countries.

Dr. Kohei Arai has published over 520 refereed journal papers. COSPAR and the Indian Space Research Organisation are truly honoured to award the COSPAR - Vikram Sarabhai Medal 2016 to Dr. Kohei Arai of Japan for his outstanding research contributions to satellite remote sensing.

- COSPAR/CAS Jeoujang Jaw Award:

Cheng FANG (China)

Professor FANG, Academician of the Chinese Academy of Sciences, pioneered the use of non-LTE theory and successfully established a series of semi-empirical atmospheric models of active solar phenomena, such as solar flares, sunspots, plages, prominences, microflares, Ellerman bombs, and so on. He and his colleagues developed innovative methods for the spectral diagnostics of non-thermal particles in solar flares and constructed a set of hydrodynamic models of solar flares. In addition, his distinguished contributions to the solar physics community include responsibility for the design and construction of two important solar instruments: the Solar Tower Telescope of Nanjing University and the Optical & Near-infrared Solar Eruptive Telescope. Both telescopes operated successfully and provided a great number of valuable observations. Being an active member of the scientific community, Professor Fang is strongly involved in the promotion of solar physics for future Chinese space programs.

For his significant contribution to solar physics, both in research and instrumentation, the 2016 Jeoujang Jaw Award is given to Professor FANG Cheng.

COSPAR TODAY

The Committee on Space Research (COSPAR) has both National Scientific Institutions and International Scientific Unions as members. Moreover, approximately 9000 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.

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.

A complete list 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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