

Decadal Survey on Astronomy and Astrophysics 2020 (Astro2020)

Committee

Fiona A. Harrison

Co-Chair

FIONA A. HARRISON (NAS) is the Benjamin M. Rosen Professor of Physics and the Kent and Joyce Kresa Leadership Chair of the Division of Physics, Mathematics and Astronomy at the California Institute of Technology, Pasadena. Dr. Harrison's primary research interests are in experimental and observational high-energy astrophysics. She is the principal investigator of NASA's Nuclear Spectroscopic Telescope Array (NuSTAR), for which she received the NASA Outstanding Public Leadership Medal in 2013. In 2015, she was awarded the Bruno Rossi Prize of the High Energy Astrophysics Division of the American Astronomical Society, and in 2016 she won the Harrie Massey Award from the Committee on Space Research. She was elected to the American Academy of Arts and Sciences and the National Academy of Sciences in 2014. Dr. Harrison is past chair of the Division of Astrophysics of the American Physical Society, and chair-elect of the High Energy Astrophysics Division of the American Astronomical Society. Dr. Harrison served as chair of the Academies' Space Studies Board, is a member of the James Webb Space Telescope Independent Review Board, and chaired the Academies' Committee on an Assessment of the Astrophysics Focused Telescope Assets (AFTA) Mission Concepts. She was a member of the committee on Decadal Survey on Astronomy and Astrophysics 2010.

Robert C. Kennicutt, Jr.

Co-Chair

ROBERT C. KENNICUTT, JR. (NAS) is a professor at the Steward Observatory at the University of Arizona and in the Department of Physics and Astronomy at Texas A&M University. His research interests are primarily in observational extragalactic astronomy and cosmology. Dr. Kennicutt has over forty years of experience in various capacities including serving as: Plumian Professor of Astronomy and Experimental Philosophy and as Director of the Institute of Astronomy, and head of the school of physical sciences at the University of Cambridge; as Editor-in-Chief of The Astrophysical Journal; and as Professor/Astronomer and Deputy Head of the Department of Astronomy at the University of Arizona. He has won numerous awards such as the Gruber Cosmology Prize, and the Dannie Heinman Prize in Astrophysics at the American Institute of Physics. He received his Ph.D. in astronomy from the University of Washington. He was elected to the National Academy of Sciences in 2006 and to the American Academy of Arts and Sciences in 2001 and was elected a fellow of the Royal Society of London (FRS) in 2011. Dr. Kennicutt has served on various committees at the National Academies including the Committee on Decadal Survey on Astronomy and Astrophysics 2010, the Committee on Astronomy and Astrophysics, and the Task Group on Space Astronomy and Astrophysics.

Julianne Dalcanton

Member

JULIANNE DALCANTON is professor and chair of astronomy at the University of Washington. Her research interests include the origin and evolution of galaxies and their use as probes of fundamental physics. Dalcanton is also the principal investigator of a large Hubble Space Telescope Multi-Cycle Treasury, has served as the vice chair of the Space Telescope Science Institute Council, a member of the Collaboration Council of the Sloan Digital Sky Survey (SDSS), the chair of the SDSS Galaxy Working Group, and as a member of the Association of Universities for Research in Astronomy (AURA) nominating committee. Prior to joining her current institution, she was a postdoctoral fellow at the Observatories of the Carnegie Institution of Washington. Dalcanton is the recipient of numerous awards, including - the Alfred P. Sloan Research Fellowship, a National Science Foundation CAREER Award for beginning faculty, a NASA Hubble Postdoctoral Fellowship, a Wyckoff Faculty Fellowship through the College of Arts and Sciences at the University of Washington, the Mohler Prize from University of Michigan, and the Beatrice Tinsley Prize from the American Astronomical Society. She received her Ph.D. in astrophysical sciences from Princeton University. Dalcanton served on Academies' the Astro2010 Decadal Survey Panel on the Galactic Neighborhood.

Tim de Zeeuw

Member

TIM DE ZEEUW is a professor of astronomy at Leiden University. He also holds a senior visiting position at the Max Planck Institute for Extraterrestrial Physics. His research interests include the formation, structure, and dynamics of galaxies, including the Milky Way. De Zeeuw has previously served as director general of the European Southern Observatory, and as director of the Leiden Observatory and of the Netherlands Research School for Astronomy. He has led the development of the European science vision for astronomy. Prior to joining Leiden University, he was a senior research fellow at the California Institute of Technology, a long-term member of the Institute for Advanced Study, and a teaching and research assistant at Leiden University. He has received numerous awards, including the Royal Astronomical Society Group Award for the Spectrographic Areal Unit for Research on Optical Nebulae (SAURON) Team and the Brouwer Award of the Dynamical Division of the American Astronomical Society. De Zeeuw is a member of the Royal Netherlands Academy of Arts and Sciences, the European Astronomical Society, the AAS, and the International Astronomical Union. He received his Ph.D. in astronomy from the University of Leiden.

Andrew S. Driesman

Member

ANDREW S. DRIESMAN is a member of the principal professional staff in the Space Sector of the Johns Hopkins University Applied Physics Laboratory (JHU APL). His background and experience is in program management, organizational management, systems engineering, integration, and architecting of complex spacecraft for both scientific and military use. Driesman is currently the program manager for NASA's Parker Solar Probe mission. Prior to starting his current role, he served in various positions including - technical director of the Joint Polar Satellite System at the National Oceanic and Atmospheric Administration (NOAA), and supervisor for the Space Systems Applications Group at JHU APL. Previously, Driesman served as the lead engineer for developing both Solar Terrestrial Relations Observatory (STEREO) spacecrafts, from conceptual design through on-orbit operations. Additional experience includes system engineering for military satellite systems, board-level analog designs for Space Shuttle payloads, board and subsystem-level design for balloon and sounding rocket payloads, and systems-level design for missile payloads and satellites. Driesman is the recipient of numerous awards, including the NASA Individual Achievement Award in 2008, the NASA Exceptional Public Service Medal for Outstanding System Engineering Leadership Award. He received a M.S. in technical management from Johns Hopkins University. He has not previously served on an Academies' committee.

Jonathan J. Fortney

Member

JONATHAN J. FORTNEY is the director of the Other World Laboratory at the University of California, Santa Cruz. He is also professor of astronomy and astrophysics. Prior to joining UC Santa Cruz, Fortney was a Spitzer Fellow with NASA Ames Research Center and a principal investigator at the SETI Institute. He also held a postdoctoral fellowship with the National Research Council at NASA Ames Research Center. Fortney's research interests include the interiors and atmospheres of planets in and out of the solar system, atmospheres and spectra of rocky and gas giant exoplanets, super Earth and giant planet thermal evolution, planetary interiors, exoplanet characterization through transit photometry and direct imaging, and the formation of giant planets. He has received numerous fellowships and awards including the Urey Prize in the Division of Planetary Sciences with the American Astronomical Society, the 2010 Alfred P. Sloan Fellowship, the NASA Early Career Fellowship in Planetary Sciences, and as a National Academy of Sciences Kavli Fellow. Fortney received his Ph.D. in planetary science from the University of Arizona. He has not previously served on an Academies' committee.

Gabriela Gonzalez

Member

GABRIELA GONZÁLEZ (NAS) is professor of physics and Astronomy at Louisiana State University (LSU). She is also the former spokesperson of the Laser Interferometer Gravitational-Wave Observatory (LIGO) Collaboration in the department of physics and astronomy. She is a leader of the LIGO collaboration to detect gravitational waves that successfully observed a signal on September 15, 2015, generated by the collision of a binary system of black holes. Prior to joining LSU, González was an assistant professor at the Pennsylvania State University. She has received numerous honors and awards including, most recently, the Southeastern Universities Research Association (SURA) Distinguished Scientist Award and the Dickinson College John Glover Award Medal. González received her Ph.D. in physics from Syracuse University. González has served on the Academies' Board on Higher Education and the Workforce, and the Astro2010 Decadal Survey's Panel on Particle Astrophysics and Gravitation.

Jordan A. Goodman

Member

JORDAN A. GOODMAN is a Distinguished University Professor of Physics at the University of Maryland. His research interests include particle astrophysics, which includes the study of cosmic radiation to better understand the properties in space that produce those particles, blending both the elements of high energy physics and astrophysics. Goodman has served in various capacities at the University of Maryland, including former chair of the Physics Department. He is the principal investigator and has been the U.S. Spokesperson of the High-Altitude Water Cherenkov (HAWC) Gamma Ray Observatory. Goodman is the recipient of numerous awards, including the 2017 Yodh Prize for Astroparticle Physics Commission of IUPAP, the 2016 Breakthrough Prize in fundamental physics, and the University of Maryland President's Medal in 2009. He received his Ph.D. in physics from the University of Maryland. He has not previously served on an Academies' committee.

Marc P. Kamionkowski

Member

MARC P. KAMIONKOWSKI (NAS) is the William R. Kenan, Jr. Professor of Physics and Astronomy at Johns Hopkins University. He is a theoretical physicist who specializes in cosmology, with contributions in dark matter, dark energy, the cosmic microwave background, the early Universe, physical cosmology, along with other areas of astrophysics. Kamionkowski is also the chief editor for Astrophysics and a cosmology editor for Physics Reports. He is a fellow of the American Physical Society, the American Association for the Advancement of Science, the International Society for General Relativity and Gravitation, and the American Academy of Arts and Sciences. Kamionkowski has received numerous awards and honors, including the Helen B. Warner Prize, the E. O. Lawrence Award for Physics, a Simons Investigator Award, and the Dannie Heineman Prize for Astrophysics. He earned a Ph.D. in physics from the University of Chicago. Kamionkowski previously served on the Academies' Astro2010 Panel on Cosmology and Fundamental Physics, the Panel on Theory and Computation in Astronomy and Astrophysics, and the Fifteenth Annual Symposium on Frontiers of Science.

Bruce Macintosh

Member

BRUCE A. MACINTOSH is a professor of physics at Stanford University. His research focuses on the detection of extrasolar planets through direct imaging, and on development of adaptive optics and astronomical instrumentation for ground and space-based telescopes. Macintosh is a co-discoverer of four planets orbiting the star HR 8799 and is the principal investigator of the Gemini Planet Imager, an advanced adaptive optics planet-finder for the Gemini South Telescope. Together with the HR8799 team he received the 2009 Newcomb Cleveland Prize from the American Association for the Advancement of Science. He received his Ph.D. in astronomy at University of California, Los Angeles. Macintosh has served on the Academies' Astro2010 Panel on Optical and Infrared Astronomy from the Ground, the Committee on Astronomy and Astrophysics, the Committee on Exoplanet Science Strategy, and the Committee on the Review of Progress Toward the Decadal Survey Vision in New Worlds, New Horizons in Astronomy and Astrophysics.

Jacobus M. Oschmann

Member

JACOBUS M. OSCHMANN is the 2019 president of the International Society for Optics and Photonics (SPIE). He retired from Ball Aerospace where he had served as the vice president and general manager of Civil Space. Oschmann is known for his significant contributions to the field of optical sciences, in optical design and technology development, along with his contributions and management on space and earth science instrumentation. He previously worked for the Association of Universities for Research in Astronomy (AURA) serving as Project Manager and Chief Engineer for the Gemini Observatory during its construction and early operations and then as the Project Manager for the conceptual design of the Daniel K Inouye Solar Telescope. He has held various positions within SPIE, including on the Board of Directors, as past chair of SPIE Conference Optical, Infrared and Millimeter Space Telescopes and SPIE Conference on Ground-based and Airborne Telescopes. Oschmann currently serves on the NASA Advisory Subcommittee for Technology, Innovation and, Engineering and is chairing the first Atacama Large Millimeter Array (ALMA) Visiting Committee. He has also served on numerous review committees for NASA, National Science Foundation, and AURA and the European Southern Observatory. These included oversight and/or reviews for the JWST, the Large Synoptic Survey Telescope (LSST), National Solar Observatory (DKIST, NISP), Thirty Meter Telescope (TMT), Giant Magellan Telescope (GMT), ALMA and Europe's EELT project pre-design work (OWL). He established the Jacobus and Michelle Oschmann Scholarship in Optical Sciences and Business Leadership at University of Arizona. Oschmann received an M.S. in optical sciences, and an M.S. in business administration from University of Arizona. He has not previously served on an Academies' committee.

Rachel A. Osten

Member

RACHEL A. OSTEN is a multi-wavelength stellar astronomer at the Space Telescope Science Institute and the deputy mission head for the Hubble Space Telescope. Her research interests include stellar coronae, stellar flares, multi-wavelength observations of flares, stellar radio emission, and flare modelling. Prior to joining the Space Telescope Science Institute, she was a Hubble Fellow at the University of Maryland and NASA Goddard Space Flight Center, and a Jansky Fellow at the National Radio Astronomy Observatory. Osten is a member of the American Astronomical Society, the International Astronomical Union, and the Atacama Large Millimeter/submillimeter Array (ALMA) North American Science Advisory Committee. She received her Ph.D. from the University of Colorado, Boulder. She has not previously served on an Academies' committee.

Lyman A. Page, Jr.

Member

LYMAN A. PAGE, JR. (NAS) is the James S. McDonnell Distinguished University Professor in Physics at Princeton University. His primary research is on measurements of the cosmic microwave background (CMB) from ground-based, balloon-borne, and satellite platforms with High-electron mobility transistor (HEMT) amplifiers, superconductor-insulator-superconductor (SIS) mixers, and bolometers. Page's team first established the existence of a characteristic angular scale in the data, indicating the universe is spatially flat. He is one of the original co-investigators on the Wilkinson Microwave Anisotropy Probe satellite, whose first-year results provided precision measurements of the universe. Page was also the founding director of the Atacama Cosmology Telescope project. He received a Ph.D. in physics from the Massachusetts Institute of Technology. Page has served on the Academies' Board on Physics and Astronomy, and the Astro2010 Decadal Survey Panel on Radio, Millimeter, and Submillimeter from the Ground.

Eliot Quataert

Member

ELIOT QUATAERT (NAS) is professor of astrophysical sciences and Charles A. Young Professor of Astronomy at Princeton University. He was previously a professor of astronomy and physics and the director of the Theoretical Astrophysics Center at the University of California at Berkeley. Quataert is an astrophysics theorist who works on a wide range of problems, including stars and black holes, plasma astrophysics, and how galaxies form. He has received a number of national awards for his research, including the Warner Prize of the AAS, the Packard Fellowship, a Simons Investigator award from the Simons Foundation, and membership in the American Academy of Arts and Sciences. Quataert received his Ph.D. in astronomy from Harvard University. He has served on the Academies' Space Studies Board, the Astro2010 Decadal Survey Panel on Stars and Stellar Evolution, the Plasma Science Committee, and the Committee on Plasma 2010: An Assessment of and Outlook for Plasma and Fusion Science.

Wanda A. Sigur

Member

WANDA A. SIGUR (NAE) is an independent consultant for both emerging space exploration companies and traditional aerospace industry companies on strategic planning and program management. She retired from Lockheed Martin as vice president and general manager of the Civil Space business where she had executive responsibility for national space programs relating to human space flight and space science missions, including planetary, solar, astrophysical, and Earth remote sensing for civil government agencies. These major programs included the Orion Multi-purpose Crew Vehicle, Hubble and Spitzer space telescopes, GOES-R weather satellites, Juno, GRAIL, MAVEN, Mars Reconnaissance Orbiter, Mars Odyssey, InSight, OSIRIS-REx planetary missions, and the company's nuclear space power programs. She received an M.B.A. from Tulane University. She is a member of the Academy of Medicine, Engineering and Science of Texas (TAMEST). She has served on the Academies' Space Technology Industry-Government-University Roundtable (STIGUR).

Rachel Somerville

Member

RACHEL SOMERVILLE is a group leader at the Center for Computational Astrophysics at the Flatiron Institute. She also holds the George A. and Margaret M. Downsbrough Chair in Astrophysics and is a Distinguished Professor at Rutgers University. Her research interests include, galaxy formation and evolution, active galactic nuclei, cosmology and large-scale structure. Somerville was previously an assistant professor at the University of Michigan, was a senior group leader at the Max Planck Institute for Astronomy, and held a joint appointment at John Hopkins University and the Space Telescope Science Institute. She earned the 2013 Dannie Heinemann Prize for Astrophysics and a 2014 Simons Investigator Award. Somerville received her Ph.D. in physics from the University of California, Santa Cruz. She has not previously served on an Academies' committee.

Keivan G. Stassun

Member

KEIVAN G. STASSUN is the Stevenson Endowed professor of Physics and Astronomy at Vanderbilt University. He is also the founding director of the Vanderbilt Initiative in Data-intensive Astrophysics (VIDA). His research focuses on the formation of stars and planetary systems, which increasingly involves approaches at the interface of astronomy, physics, computer science, and informatics. Stassun currently serves as the general councilor of the American Physical Society and served for eight years as chair of the American Astronomical Society's Committee on the Status of Minorities. He's known for his leadership and distinction as a scientist and as an innovator in broadening the participation of underrepresented minorities in STEM fields. Stassun received the 2018 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. He earned a Ph.D. in astronomy from the University of Wisconsin at Madison.

Jean L. Turner

Member

JEAN L. TURNER is the professor of physics and astronomy at the University of California at Los Angeles (UCLA). Her research interests include studying gaseous environments of young super star clusters in local galaxies. Prior to joining UCLA, she worked at the Harvard-Smithsonian Center for Astrophysics, and was a visiting scientist at the California Institute of Technology, the Space Telescope Science Institute, and the Joint ALMA Observatory. Turner is a fellow of the American Association for the Advancement of Science. She received her Ph.D. in astronomy from the University of California at Berkeley. Turner served on the Academies' Astro2010 Panel on Radio, Millimeter, and Submillimeter from the Ground, and the Committee on Astronomy and Astrophysics.

Pieter van Dokkum

Member

PIETER VAN DOKKUM is the Sol Goldman Professor of Astronomy and divisional director of physical sciences and engineering at Yale University. His research interests include stars and stellar populations to the most distant galaxies, along with astronomical instrumentation and telescopes. Prior to joining Yale University, van Dokkum was a Spitzer Fellow and Hubble Fellow at the California Institute of Technology. He has received numerous awards, including the Marc Aaronson Memorial Prize, the National Science Foundation CAREER Award, and the Pastoor Schmeitz Prize. He received his Ph.D. from the University of Groningen. He has not previously served on an Academies' committee.

Ellen G. Zweibel

Member

ELLEN G. ZWEIBEL (NAS) is the W. L. Kraushaar Professor of Astronomy and Physics at the University of Wisconsin at Madison. She is also the Vilas Distinguished Achievement professor and past director of the Center for Magnetic Self-Organization. Her research interests and expertise include theoretical astrophysics with a specialty in plasma astrophysics. Prior to joining the University of Wisconsin Madison, she was a faculty member at the University of Colorado. Zweibel received numerous awards including being elected as a fellow of the American Physical Society and the American Physical Society's Maxwell Prize for Plasma Physics. She received her Ph.D. in astrophysical sciences from Princeton University. Zweibel has served on the Academies' Space Studies Board, the Committee on Burning Plasma Assessment, the Panel on Solar Astronomy, and the Committee on Astronomy and Astrophysics.