

JULY
2019

BOARD OF VISITORS
SUMMER MEETING
— McDONALD OBSERVATORY —



PAST,
PRESENT
AND FUTURE.

Celebrating 80 Years of Discovery

AGENDA

Board of Visitors 2019 Summer Meeting McDONALD OBSERVATORY

Friday, July 26, 2019

3:00 p.m.

Registration Opens

Frank N. Bash Visitors Center Lobby

5:00 p.m.

“Through the Milky Way and Beyond”

by Keith Hawkins, Assistant Professor

Frank N. Bash Visitors Center Auditorium

5:30 p.m.

Registration Re-Opens

Tents near the Frank N. Bash Visitors Center

6:00 - 8:30 p.m.

Reception and Dinner

Tents near the Frank N. Bash Visitors Center

8:00 p.m.

Remarks

8:30 p.m.

Shuttle Service Begins

Shuttles will depart from the dinner tents

9:00 - 10:30 p.m.

Historical Tour and Telescope Viewing

View celestial objects through our research telescopes. Historical tour in Library on 82” telescope 1st floor

9:30 p.m.

Public Star Party

Frank N. Bash Visitors Center

Saturday, July 27, 2019

7:30 a.m.

Continental Breakfast

Tents near the Frank N. Bash Visitors Center

8:15 a.m.

Shuttle service begins to 107-inch Telescope

Shuttles will depart from the breakfast tents

9:00 a.m.

BOV Business Meeting led by Bobby McGee, BOV Chair

107” Dome Floor

9:45 a.m.

“Revolutions and Revelations” by College of Natural Sciences Dean, Dr. Paul Goldbart

10:00 a.m.

McDonald Observatory Director Report by Dr. Taft Armandroff

10:15 a.m.

Astronomy Department Chair Report by Dr. Shardha Jogee

10:30 a.m.

Coffee Break

ABOUT THE COVER: In 2019, the McDonald Observatory is celebrating its 80th anniversary. When it was dedicated on May 5, 1939, McDonald Observatory consisted of a single dome housing not only the world’s second-largest telescope, but also living quarters and offices. In the decades since, each generation has added successive new-generation telescopes that astronomers have used to make important discoveries about our solar system, our Milky Way galaxy and distant galaxies. *Pictured: Otto Struve 82”, Harlan J. Smith 107”, and Hobby-Eberly Telescope.*

11:00 a.m.

Science Talks commemorating Past, Present and Future

“Planets and McDonald Observatory”

Dr. William Cochran, *Research Professor*

“Stars and McDonald Observatory”

Dr. David Lambert, *Professor Emeritus, Isabel McCutcheon Harte Centennial Chair in Astronomy*

“Galaxies and McDonald Observatory”

Dr. Karl Gebhardt, *Herman and Joan Suit Professor of Astrophysics*

12:30 p.m.

Lunch

Shuttle will depart to the Frank N. Bash Visitors Center

2:00 - 3:00 p.m.

Science Discussion Groups commemorating Past, Present and Future *First Session*

Frank N. Bash Visitors Center

SDG 1: *“White Dwarfs and McDonald Observatory”*

Dr. Don Winget, *Harlan J. Smith Professor in Astronomy*

Frank N. Bash Visitors Center Auditorium

SDG 2: *“Supernovae and McDonald Observatory”*

Dr. J. Craig Wheeler, *Samuel T. and Fern Yanagisawa Regents Professorship in Astronomy Distinguished Teaching Professor*

Frank N. Bash Visitors Center Classroom

SDG 3: *“McDonald Instrumentation to Study Galaxies”*

Dr. Gary Hill, *Research Professor*

Frank N. Bash Visitors Center Exhibits Space

3:15 - 4:15 p.m.

Science Discussion Groups commemorating Past, Present and Future *Second Session*

Frank N. Bash Visitors Center

SDG 4: *“Geodesy at McDonald Observatory”*

Dr. Srinivas Bettadpur, *The FSX Professorship in Space Applications and Exploration Associate Professor, Cockrell School of Engineering*

Frank N. Bash Visitors Center Auditorium

SDG 5: *“McDonald Instrumentation to Study Stars”*

Dr. Phillip MacQueen, *Senior Research Scientist*

Frank N. Bash Visitors Center Classroom

SDG 6: *“McDonald Observatory: A Legacy of Education & Outreach”*

Katie Kizziar, *Assistant Director for Education and Outreach*

Frank N. Bash Visitors Center Exhibits Space

6:00 - 8:30 p.m.

Reception and Dinner

Tents near the Frank N. Bash Visitors Center

8:00 p.m.

Remarks

8:30 p.m.

Shuttle Service Begins

Shuttles will depart from the dinner tents

9:00 - 10:30 p.m.

Historical Tour and Telescope Viewing

View celestial objects through our research telescopes. Historical tour in Library on 82” telescope 1st floor

9:30 p.m.

Public Star Party

Frank N. Bash Visitors Center

PAST, PRESENT AND FUTURE.

Celebrating 80 Years of Discovery

When William Johnson McDonald died in 1926, his family was surprised to discover that the quiet banker from Paris, Texas, had bequeathed a large bulk of his fortune, more than \$1 million (equivalent to \$14 million in today's currency), to the regents of the University of Texas, "...for the purpose of ... an astronomical observatory to be kept and used with and as a part of the

University for the study and promotion of astronomical science." This was also an astonishment to the University, and former UT President Harry Yandell Benedict referred to the gift as "like lightning out of a clear sky."

This lightning out of a clear, dark and starry Texas sky, however, is where the story of the McDonald Observatory began. Mr. McDonald's gift from the past has led the Observatory to thousands of present-day discoveries, and a vast amount of future possibilities.

When it was dedicated on May 5, 1939, McDonald Observatory consisted of a single dome housing not only the world's second-largest telescope, but

also living quarters and offices. In the decades since, each generation has added successive new-generation telescopes that astronomers have used to make important discoveries about our solar system, our Milky Way galaxy and distant galaxies.



The Observatory's first large telescope, a reflector with an 82-inch mirror, discovered new moons of Uranus and Neptune and identified carbon

dioxide in the atmosphere of Mars and methane in the atmosphere of Titan, Saturn's largest moon. A 107-inch telescope funded by NASA was dedicated in 1968. It bounced laser light off of the moon, studied the outer planets before NASA sent probes to them, made major discoveries about stars in the Milky Way, and found planets orbiting other stars.

In the late 1990s, a UT-led consortium built the Hobby-Eberly Telescope (HET) at McDonald, which, with its 11-meter mirror, remains one of the world's largest. Last year, HET completed a massive upgrade enabling it to begin the HET Dark Energy Experiment (HETDEX), a study of the mysterious force speeding up the expansion of the

universe. The telescope also gained a new suite of instruments. VIRUS, the Visible Integral-field Replicable Unit Spectrograph, consists of 156 spectrographs that analyze light captured by HET and fed through 35,000 optical fibers, creating the world's most powerful instrument of its type for surveying large areas of sky. Another new instrument, the Habitable Zone Planet Finder, uses precision technology to search for planets around red dwarf stars.

McDonald Observatory continues to add new telescopes and undertake new partnerships. It is a founding member of the Giant Magellan Telescope project, which is now building the world's largest next-generation telescope in Chile. On site in West Texas, a partnership with the Las Cumbres Observatory Global Telescope Network has led to a 1-meter telescope currently in place and another to be completed soon.

Additionally, a new partnership with UT's Center for Space Research and NASA has led to the new McDonald Geodetic Observatory (MGO), currently under construction. It represents a continuation of five decades of "laser-ranging" research begun in 1969, when Apollo 11 astronauts left mirrors on the moon to be targeted with lasers from McDonald Observatory. The MGO, however, will focus on tracking changes in the Earth's shape, gravity and rotation.



A key factor in McDonald Observatory's success is that it enjoys the darkest night skies of any professional observatory in the continental United States. To maintain this precious resource for the future, the observatory works tirelessly with nearby communities and businesses to keep unnecessary light out of the sky, and is grateful to its partners in the Dark Skies Initiative.

The Observatory is also an internationally known leader in astronomy education and outreach, a mission that began with the will of

benefactor William Johnson McDonald, who stipulated an observatory for "the study and promotion of Astronomical Science." It welcomes tens of thousands of visitors per year to public star parties and tours, hosts school visits, and carries out

extensive teacher training programs. McDonald also produces the longest running nationally syndicated science radio program, "StarDate," heard daily on more than 300 stations across the United States.

We will never know if Mr. McDonald fathomed the discoveries that would come from his gift and many other donations from supporters like you. However, we remain grateful for the gifts that have helped create McDonald Observatory's history over the past 80 years, and we look forward to what your support can help us attain in the future.

Friday, July 26, 2019

5:00 - 6:00 p.m., Frank N. Bash Visitors Center Auditorium

SCIENCE TALK

PAST, PRESENT AND FUTURE

“Through the Milky Way and Beyond”

DR. KEITH HAWKINS, *ASSISTANT PROFESSOR*

Abstract: Over the last 80 years of McDonald Observatory and through much of human history, we have looked up at the milky band of stars that brighten the night sky. This Milky Way Galaxy represents an excellent laboratory for studying our theories for galaxy formation and evolution. With groundbreaking new data on the positions, motions, and chemical make-up for billions of stars now available, we have entered a new and exciting era in Astronomy. On the cutting edge of this revolution in Galactic Archaeological science, I will explore the current and future directions in the study of the Milky Way, the role of the observatories in this field, and finally discuss how what we are doing can be expanded to other nearby galaxies.



Dr. Keith Hawkins joined The University of Texas at Austin in the Fall of 2018 as an Assistant Professor of Astronomy. He received his B.S. in astrophysics with minors in Mathematics and African Studies from the Honors Tutorial College at Ohio University in 2013 and his Ph.D. in Astronomy at the Institute of Astronomy, University of Cambridge in the UK. His research interests are in galactic archaeology, with the goal of revealing the formation and evolution of our galaxy through detailed chemical and dynamical studies of individual stars.

Saturday, July 27, 2019

11:00 – 11:20 a.m., Harlan J. Smith Telescope Dome Floor

SCIENCE TALK

PAST, PRESENT AND FUTURE

“Planets and McDonald Observatory”

DR. WILLIAM COCHRAN, RESEARCH PROFESSOR

Abstract: McDonald Observatory has a long and proud history of research in planetary astronomy. In the pre-UT era, when McDonald was operated by the University of Chicago, the famous planetary astronomer Gerard Kuiper served two separate terms as Director of McDonald Observatory. In 1944, Kuiper used a spectrograph on the 82” telescope to discover that Saturn’s moon Titan had an atmosphere that contained methane. The first UT Director of McDonald Observatory, Harlan J. Smith, was one of the founders of the Division for Planetary Sciences of the American Astronomical Society. Smith negotiated a deal with NASA to build the 107” telescope. NASA wanted the telescope to be available for ground-based support of the major NASA program of solar system exploration that started in the 1960s and has carried through today.

The next generation of observational and computational facilities will enable new breakthroughs in planetary research at Texas. Researchers are already using the HET, Keck, Gemini and ALMA to study comets, exoplanets and newly forming planetary systems. The Giant Magellan Telescope (GMT) will allow us to image a large number of planetary systems and study their detailed architectures. The GMTNIRS instrument (Dan Jaffe, P.I.) on GMT will allow us to obtain spectra of these individual planets orbiting other stars and determine their atmospheric composition and assess their potential habitability.



Dr. William Cochran is a Research Professor with McDonald Observatory and the Department of Astronomy of The University of Texas at Austin. He holds a B.S. in physics from Duke University and a Ph.D. in Astrophysics from Princeton University. As he was finishing his Ph.D. work, he was recruited by Harlan Smith to join the McDonald Observatory planetary science group, spending many years studying the atmospheres of the planets in our solar system. He then became interested in searching for planets orbiting other stars, and started one of the first programs of high precision stellar radial velocity measurement. The McDonald Observatory exoplanet research group has discovered dozens of planets using the McDonald Observatory 107” Harlan J. Smith Telescope and the Hobby-Eberly Telescope. Cochran was a Co-Investigator on the NASA Kepler space mission, and is very active in the follow-on K2 mission.

Saturday, July 27, 2019

11:20 – 11:40 a.m., Harlan J. Smith Telescope Dome Floor

SCIENCE TALK

PAST, PRESENT AND FUTURE

“Stars and McDonald Observatory”

DAVID LAMBERT, *PROFESSOR EMERITUS*

Abstract: In this talk, Dr. David Lambert will cover 80 years of telescopic observations of stars at the McDonald Observatory from the Chicago years to the present. Highlights from photometry and spectroscopy will be placed in the context of the changing observational and theoretical panoramas describing understanding the formation and evolution of stars and the Galaxy. Challenges facing the next generations of Texas astronomers will be mentioned.



Dr. David Lambert's career spans more than four decades.

In this time Lambert has produced several hundred research articles related to his areas of focus, including examining the atmosphere and composition of stars to determine how they produce chemical elements and studying the chemical evolution of the universe. Lambert previously served as

Chair of the Department of Astronomy from 2002 to 2003 and as the Director of McDonald Observatory from 2003 to 2014. Lambert, a native of England, was first inspired to pursue astronomy by a prize he won in a 1956 competition as a grammar school student. Given the choice of any book from a local bookstore, he happened upon *Frontiers of Astronomy* by Fred Hoyle. That book began his lifelong captivation with astronomy, especially nucleosynthesis, the study of how elements are formed in stars. After completing his bachelor's and doctoral degrees at the University of Oxford, Lambert conducted postdoctoral work at Oxford and the California Institute of Technology. He joined the faculty of The University of Texas at Austin in 1969, attracted by the recently completed Harlan J. Smith Telescope at McDonald Observatory. Lambert remained at UT Austin, with occasional semesters abroad in India and other nations, until his retirement in 2016. Lambert's work has earned him numerous awards, including a Guggenheim Fellowship in 1981 and the Dannie Heinemann Prize in 1987. In 2007, he received the Henry Norris Russell Lectureship, the highest award offered by the American Astronomical Society.

Saturday, July 27, 2019

11:40 a.m. – 12:00 p.m., Harlan J. Smith Telescope Dome Floor

SCIENCE TALK

PAST, PRESENT AND FUTURE

“Galaxies and McDonald Observatory”

DR. KARL GEBHARDT, *HERMAN AND JOAN SUIT PROFESSOR OF ASTROPHYSICS*

Abstract: Over its lifetime, McDonald Observatory has been at the forefront of research in understanding the formation and evolution of galaxies. The cutting-edge instrumentation, large amount of observing time for individual researchers, and dark skies have allowed for world-leading insights into quantifying dark matter around nearby galaxies, determining how galaxies are organized, measuring black hole masses (in particular, the one black hole that has been imaged), and the expansion of the universe. Researchers are not coasting in terms of the scientific outlook for the telescopes, but instead are working on galaxy surveys that will guarantee a strong legacy into the future. This presentation will focus on these successes and the future impact from McDonald Observatory.



Dr. Karl Gebhardt is the Herman and Joan Suit Professor in Astrophysics and Hobby-Eberly Telescope Dark Energy Experiment (HETDEX) Project Scientist. He received his Ph.D. in Physics and Astronomy from Rutgers University. His research interests include modeling the dynamics and evolution of elliptical galaxies, detecting black holes, studies of adaptive optics, the kinematics of galaxy clusters, and the dynamics of globular clusters.

Saturday, July 27, 2019

2:00 - 3:00 p.m., Frank N. Bash Visitors Center Auditorium

SCIENCE DISCUSSION GROUPS

PAST, PRESENT AND FUTURE

“White Dwarfs and McDonald Observatory”

DR. DON WINGET, HARLAN J. SMITH PROFESSOR IN ASTRONOMY

Abstract: White Dwarf stars are the endpoint of the stellar life-cycle for more than 97 percent of all stars, representing the future of our own star: the Sun. At McDonald Observatory’s May 5, 1939, dedication, it was announced that, “One of the first tasks to be undertaken by the staff of the McDonald Observatory will be to investigate further the mysteries of the white dwarfs.” As we celebrate the Observatory’s 80th trip around the Sun, we will examine how McDonald leads the world in investigating white dwarfs and their mysteries along several avenues. These include telescopic observations, theoretical simulations, and most recently, the making of “star-stuff” using the most powerful X-ray source on Earth at Sandia National Laboratory, the Z-machine. In our discussion, we will examine how studies of these stars shed light on everything from the age of the universe, the formation and evolution of our galaxy and its stars, through the understanding of dark matter and dark energy in the universe.



Dr. Don Winget received a bachelor’s degree in physics from the University of Illinois, a master’s degree in physics from the University of Rochester, and a Ph.D. in physics and astronomy from Rochester, as well. Winget is the Harlan J. Smith Centennial Professor of Astronomy and a University Distinguished Teaching Professor. In 1982, during his first year at The University of Texas,

Don predicted and discovered a new class of pulsating variable stars. This was the first time in the 300-year-old field of pulsating variable stars that anyone had predicted a new class of pulsating variable stars before their discovery. In 1985, he made the first direct measurement of stellar evolution. In 1987, he developed a new method for measuring the age and assembly history of the Galaxy, currently the most accurate method for dating the stellar components of the galaxy. Winget co-founded, with Prof. R.E. Nather, the Whole Earth Telescope (WET), which uses a network of the major optical observatories around the planet working together to defeat dawn: the sun never rises on the Whole Earth Telescope. Last year, Don and his team were awarded a \$7M grant, a departmental first, from the National Nuclear Science Administration (NNSA) to create The Wootton Center for Astrophysical Plasma Properties (WCAPP), which will focus on atomic and radiation physics of matter in a wide range of temperatures and densities. Although motivated by astrophysics, the Center will also address problems of interest for stockpile stewardship, ICF, and HED physics.

Saturday, July 27, 2019

2:00 - 3:00 p.m., Frank N. Bash Visitors Center Classroom

SCIENCE DISCUSSION GROUPS

PAST, PRESENT AND FUTURE

“Supernovae and McDonald Observatory”

DR. J. CRAIG WHEELER, SAMUEL T. AND FERN YANAGISAWA REGENTS
PROFESSORSHIP IN ASTRONOMY DISTINGUISHED TEACHING PROFESSOR

Abstract: For much of the past 80 years, McDonald Observatory has been on the cutting edge of research on supernovae, using the 107” Harlan J. Smith telescope and the Hobby-Eberly Telescope complemented with theoretical research. This work served to delineate the principal supernova categories recognized today. We played a major role in revealing the turbulent thermonuclear burning that powers exploding white dwarfs as Type Ia supernovae. We were pioneers of supernova spectropolarimetry to reveal the three-dimensional nature of supernova explosions and have actively supported employment of this technology on the Giant Magellan Telescope. Texas played a significant role in elucidating the decades-old mystery of the supernova/gamma-ray burst connection. Students from the Texas group were on both teams that received the Nobel Prize for the discovery of the acceleration of the Universe. Most recently, we have initiated a program on the HET to follow up neutron star merger events discovered as gravitational wave sources by LIGO. The future will see the rate of discovery of transients increase dramatically with the operation of the Large Synoptic Survey Telescope. McDonald Observatory must play a major role in the continuing study of the transient Universe.



Dr. J. Craig Wheeler is the Samuel T. and Fern Yanagisawa Regents Professor of Astronomy, Distinguished Teaching Professor at The University of Texas at Austin. His research interests include supernovae, black holes, astrobiology, and the technological future of humanity. He has published over 350 scientific papers and co-authored a recent book, *Supernova Explosions*. He has also written a popular book on supernovae and gamma-ray bursts, *Cosmic Catastrophes*, two novels, and has edited six books. Wheeler has received many awards for his teaching, including the Regents Award, and is a popular science lecturer. He was a visiting fellow at the Joint Institute for Laboratory Astrophysics (JILA), the Japan Society for the Promotion of Science, the Cerro Tololo Interamerican Observatory, and a Fulbright Fellow in Italy. He has served on many agency advisory committees. He currently serves on the AAS Ebooks Board and on the Ethics Committee.

Saturday, July 27, 2019

2:00 - 3:00 p.m., Frank N. Bash Visitors Center Exhibits Space

SCIENCE DISCUSSION GROUPS

PAST, PRESENT AND FUTURE

“McDonald Instrumentation to Study Galaxies”

DR. GARY HILL, *RESEARCH PROFESSOR*

Abstract: In 80 years, McDonald Observatory has made many significant discoveries about the nature of galaxies, the structure of the universe, and cosmology. These scientific strides have been enabled by telescopes that are among the largest available, by exceedingly dark skies, and by instrumentation that has often been innovative and pushed the cutting edge.

This talk will review the scientific milestones in extragalactic astronomy for the Observatory in its first 80 years and how our instrument program has enabled the science. I will then discuss current initiatives and look forward to new scientific discoveries with instrumentation on the Giant Magellan Telescope (GMT).



Dr. Gary Hill started out as a physics student at Oxford University. After a summer at the University of Arizona Steward Observatory he decided to pursue his joint interests in astronomical instruments and observational astronomy, earning his Ph.D. at the University of Hawaii. Gary chose Hawaii due to the superb observing facilities and spent more than 100 nights observing at 14,000 feet on Mauna Kea. He joined The University of Texas as the W.J. McDonald Postdoctoral Fellow in 1988. His primary interests are cosmology and innovative instrumentation. Gary has been the Principal Investigator for several instruments at McDonald Observatory, including the Hobby-Eberly Telescope's (HET) first and second Low Resolution Spectrographs. He is the Principal Investigator of the Hobby-Eberly Telescope Dark Energy Experiment (HETDEX), which aims to understand the nature of dark energy that dominates the Universe, along with the innovative VIRUS spectrograph suite that will ultimately provide the data needed for the project. He also led the wide field upgrade of the HET and is Principal Investigator of the new VIRUS2 instrument for the Harlan J. Smith Telescope.

Saturday, July 27, 2019

3:15 - 4:15 p.m., Frank N. Bash Visitors Center Auditorium

SCIENCE DISCUSSION GROUPS

PAST, PRESENT AND FUTURE

“Geodesy at McDonald Observatory”

DR. SRINIVAS BETTADPUR, *THE FSX PROFESSORSHIP IN SPACE APPLICATIONS AND EXPLORATION ASSOCIATE PROFESSOR, COCKRELL SCHOOL OF ENGINEERING*

Abstract: A stable, well-defined terrestrial reference frame (TRF) is essential for measurement and interpretation of global change processes such as the sea-level rise, subsidence, and other mass flux variations. The TRF is also an essential element of the Positioning, Navigation, and Timing (PNT) infrastructure. The next generation TRF is defined using a global network of sites that are well positioned (to mm-precision) relative to the Earth’s crust, its center of mass, and to the celestial reference systems. The McDonald Geodetic Observatory (MGO), hosted at McDonald Observatory, is one such fundamental reference site. This conversation will describe the scientific motivation for the MGO, recent developments, and future plans.



Dr. Srinivas Bettadpur is a space geodesist, and studies the Earth’s variable gravity field, orientation and shape from a space-based vantage point. His interest in the mechanical Earth evolved when his early education in celestial mechanics, perturbation theories, and orbit determination merged with his growing fascination with the eternally moving Earth and its fluid components. His interest in this science and in engineering practices led to his current active involvement in architecture development for space missions and large-scale observation systems. He teaches orbital mechanics, space geodesy, and estimation. Bettadpur is a fellow of the International Association of Geodesy (IAG), and an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA). He received the NASA Exceptional Public Achievement Medal in 2018 and the European Geosciences Union Vening-Meinesz Medal in 2016. Bettadpur joined the tenured faculty ranks as an Associate Professor in the Aerospace Engineering and Engineering Mechanics Department at UT Austin in 2015. From 2010-2015, he held the title of Research Professor, prior to which he had been a Senior Research Scientist at the UT Center for Space Research. Bettadpur obtained his Ph.D. in Aerospace Engineering from The University of Texas at Austin in 1993. Prior to that, he obtained an MS from the University of Oklahoma in 1987, and an MTech from the Indian Institute of Technology Kanpur (India), both in Aerospace Engineering. He obtained his B.Eng. in Mechanical Engineering from the Punjab Engineering College in Chandigarh (India).

Saturday, July 27, 2019

3:15 - 4:15 p.m., Frank N. Bash Visitors Center Classroom

SCIENCE DISCUSSION GROUPS

PAST, PRESENT AND FUTURE

“McDonald Instrumentation to Study Stars”

DR. PHILLIP MACQUEEN, SENIOR RESEARCH SCIENTIST

Abstract: The goal of this discussion is to help its participants understand the basic principles and concepts in the McDonald Observatory instrumentation used to study the stars, with an emphasis on our workhorse instruments – the high-resolution spectrographs. A finished jig-saw puzzle can be very complex, but the individual pieces and rules for assembly are typically not. Instruments are somewhat the same in that they can appear quite daunting to understand, but break them down to their modules or building blocks, and assembly rules, and a good understanding can be had. Astronomy is heavily driven by the development of new technologies. With an understanding of the various building blocks, we will discuss McDonald’s significant technological contributions over the decades, and how the resulting McDonald instruments relate to future instruments such as the G-CLEF high resolution spectrograph Texas astronomers will use on GMT. We will also discuss what is it about the high-resolution spectrographs at McDonald that have allowed them to be used superbly for many significant contributions to knowledge. Examples include proving the Carbon-Nitrogen-Oxygen cycle of energy generation in stars, understanding how many types of atoms are built in stars, understanding how successive generations of stars have changed the chemical makeup of our galaxy, and understanding the population of stars around which the Kepler spacecraft found many thousands of planets.



Dr. Phillip MacQueen grew up under a very dark sky during the Apollo era, and has had a passion for astronomy and technology since that time. Phillip received his B.Sc.(Hons) in 1981 and his Ph.D. in 1986 from The University of Canterbury in Christchurch, New Zealand. He came to The University of Texas at Austin as a McDonald Postdoctoral Fellow in 1986, and he is presently a

Senior Research Scientist with McDonald Observatory. MacQueen designs and leads groups designing and building astronomical instruments and telescope upgrades, including their optical, electronic, mechanical, cryogenic, and software subsystems. He is currently working on completing the VIRUS spectrograph to specification, and will return soon to completing the upgrade of the HET High Resolution Spectrograph. Phillip is also a member of the McDonald Exoplanet Group with Drs. Bill Cochran and Mike Endl. MacQueen’s interests away from the observatory are centered upon outdoor activities including running, climbing, and backyard visual astronomy.

Saturday, July 27, 2019

3:15 - 4:15 p.m., Frank N. Bash Visitors Center Exhibits Space

SCIENCE DISCUSSION GROUPS

PAST, PRESENT AND FUTURE

“McDonald Observatory: A Legacy of Education & Outreach”

KATIE KIZZIAR, ASSISTANT DIRECTOR FOR EDUCATION AND OUTREACH

Abstract: The McDonald Observatory has welcomed public visitors to experience the wonders of the universe since before the telescope was dedicated. The Frank N. Bash Visitors Center now sees many thousands per year at star parties, tours, and educational programs. In this talk, Katie Kizziar will highlight the successful education and outreach programs of the past and present, while contemplating what the future might hold.



Katie Kizziar joined McDonald Observatory as the Assistant Director for Education and Outreach in the Fall of 2018. Prior to this, she was an Associate Director at Thinkery, Austin Children’s Museum, where she developed and managed public and educational programs, coordinated research partnerships, and managed grants and major contracts. She has worked

in various significant roles in education and outreach at UT Austin entities: Women in Engineering Program; Environmental Science Institute; and Center for Energy and Environmental Resources. She also served as Director of the Technology & Education Executive Council for Skillpoint Alliance, an intermediary non-profit organization focused on education and workforce development in Central Texas. Ms. Kizziar is a proud graduate of UT Austin, with a Bachelor of Science in Civil Engineering and a Master of Public Affairs from the LBJ School of Public Affairs.

RECOGNIZING LIFETIME GIVING

We are deeply grateful to all supporters of McDonald Observatory and the Department of Astronomy. Your support is critical in providing the resources we need to continue our mission of discovery. The following individuals are recognized for their cumulative, lifetime giving of \$100,000 or more.

\$500,000 or more

Abell-Hanger Foundation

Mr. Steven L. Adams

Ms. Anne Adkins

Mr. David G. Booth

The Convergence Institute

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Hillcrest Foundation	Mr. and Mrs. McHenry T. Tichenor, Jr.
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Mr. David R. and Mrs. Julie King	Mrs. Jonthy E. Williams
Mr. Michael R. Levy	Mrs. Genie and Dr. Francis H. Wright, Jr.
Mr. Joe R. Long	Mrs. Fern Yanagisawa

RECOGNIZING MILESTONES IN YEARS OF SERVICE

During the 80th Anniversary Celebrations, we'd like to recognize the following members who are celebrating 20 years or more of service on the Board of Visitors. A full list of service milestones will be printed for the Saturday morning business meeting.

41 YEARS

Mr. and Mrs. Houston H. Harte
Mrs. Carolyn H. Wildenthal
Mrs. Fern Yanagisawa

38 YEARS

Mrs. Anne Ponder Boyd

35 YEARS

Mr. and Mrs. Henry K. Allen, Jr.
Mr. and Mrs. John L. Cotton, Jr.
Mrs. Donna C. Pierce
Mr. and Mrs. Robert C. Vaughn

34 YEARS

Mrs. Barbara B. Lemmon

33 YEARS

Mr. and Mrs. Mark E. Bivins
Ms. Mary Rapstine Haynes
Mr. and Mrs. Pike Powers
Ms. Eliza Lovett Randall
Dr. and Mrs. Francis H. Wright, Jr.

32 YEARS

Mr. and Mrs. Joseph A. Cialone II

31 YEARS

Mr. and Mrs. James A. Kruger
Mr. and Mrs. Marshall T. Steves, Jr.
Mr. and Mrs. Ralph B. Thomas
Ms. Shirley Wozencraft and
Mr. R. Charles Goodwin

30 YEARS

Mr. and Mrs. Terry Bray
Mr. Winston P. Crowder
Mr. and Mrs. John S. Gianforte
Mr. William F. Guest

29 YEARS

Mr. and Mrs. Marshall J. Doke, Jr.

28 YEARS

Mr. and Mrs. George A. Finley III
The Honorable William P. Hobby

27 YEARS

Drs. Marion T. and Hans M. Mark
Mr. and Mrs. M. Bradford Moody

26 YEARS

Mr. Carl Ryan and Ms. Susan Davidoff
Dr. and Mrs. Bernard M. Seger
Ms. Karen G. Skelton

25 YEARS

Mr. and Mrs. F. Ford Smith, Jr.

24 YEARS

Mr. Rex G. Baker, III
Ms. Michelle K. Brock
Mr. and Mrs. James W. McCartney
Mr. and Mrs. Grant Roane III

23 YEARS

Dr. and Mrs. Mario R. Anzaldua
Mr. and Mrs. James T. Bryan, Jr.
Mr. Russell Johnson and
Ms. Debra Crosby

22 YEARS

Mr. Bruce Allen Blakemore
Mrs. Rebecca S. Gale
The Honorable and
Mrs. David E. Keltner
Mr. and Mrs. David R. King
Dr. Rasa Silenas and the
Honorable Bill C. White

20 YEARS

Ms. Carla Blumberg and
Ms. Barbara Neubert
Mr. and Mrs. Richard C. Evans
Mr. and Mrs. Robert C. Grable
Mr. and Mrs. William C. Nowlin, Jr.
Dr. and Mrs. Joseph and Sallie Tarride

OUR SPECIAL THANKS

to the Board of Visitors for providing more than 40 years of advocacy, philanthropy, and partnership. Your 2018-2019 gifts will advance the Giant Magellan Telescope, help build our astronomy research excellence endowment to support cutting-edge research in Texas, and shape the visitor experience with upgrades to the Frank N. Bash Visitors Center. If your experience during this meeting has inspired you and you would like to discuss a gift to one of our three key funding priorities, please call 512-471-6335 or email: kinch@astro.as.utexas.edu.

MARK YOUR CALENDAR!



2020
**FEB.
28-29**

**2020 Winter Meeting
February 28 – 29, 2020**

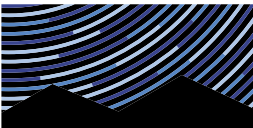
AT&T Conference Center
Austin, Texas



2020
**JUL.
10-11**

**2020 Summer Meeting
July 10-11, 2020**

McDonald Observatory
Fort Davis, Texas



McDonald Observatory
The University of Texas at Austin



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Department of Astronomy
College of Natural Sciences