January 2024 HAD Meeting: New Orleans

Please note: All events (with the exception of Tuesday night's 40+E and Friends Reception) will take place in the Ernest N. Morial Convention Center.

HAD I: Astronomy During Epidemics and Pandemics (Special Session)

Sunday, January 7th 2:00–3:30 pm Room 215
Session 100
Session Chair: Jarita Holbrook

The COVID Pandemic stopped the world in 2020 and since then has reshaped how we work and interact with each other. Observatories closed, then changed to include remote observing; in parallel, departments moved online for all work activities and teaching. Early on astronomers became concerned about the long-term impact on the careers of astronomers that had care giving responsibilities[1] especially women. The number of AAS members that have died of COVID remains relatively low; however, of those that have had the disease some are suffering from Long-COVID which can be debilitating[2]. We are still learning how life has been for astronomers during COVID, but this is not our first pandemic. How have astronomers and observatories survived during previous epidemics and pandemics? Have the day-to-day lives of astronomers been preserved to draw comparisons to then and now? Or do we only have historical records related to the scientific successes and scientific advancements that occurred during earlier pandemics? This special session brings together those studying astronomers and the current pandemic, and those that study astronomers and historical pandemics and epidemics.

1 Venkatesan, A., Bertschinger, E., Norman, D., Tuttle, S. & Krafton, K. "The Fallout from COVID-19 on Astronomy's Most Vulnerable Groups". https://womeninastronomy.blogspot.com/2020/07/the-fallout-from-covid-19-on-astronomys.html (2020).
2 Blasdel, A. "The dark universe: can a scientist battling long Covid unlock the mysteries of the cosmos?" *The Guardian* (2023).

100.01 Astrophysicists and COVID Documentary

2:00 pm Jarita Holbrook[1,2]
[1]*University of Edinburgh, Edinburgh, United Kingdom,*
[2]*University of the Western Cape, Belliville, South Africa*

In the midst of the ASTROMOVES project to study the career decision-making of astrophysicists was the COVID-19 Pandemic. The Pandemic impacted the structure of the project, the timeline and the content. Most impacted was the data collection which shifted from in-person to online interviews. ASTROMOVES targeted gender and sexual diversity, thus 26% of the scientists interviewed identified as non-heterosexual and/or non-binary. Intersectional identities were targeted, as a result those interviewed are of African, Asian, European and Middle Eastern descent and include those with visible, and invisible disabilities. Those scientists interviewed spoke in detail of their disrupted lives and I adjusted the interview protocol to include questions about COVID. Analysis of the interviews revealed the following patterns: 1. Those that sheltered alone were more likely to report mental health issues, 2. Against other scientists' findings, the scientists interviewed that had their work the most disrupted were parents. Other scientists found women to be the most impacted. 3. Females were more precarious in terms of employment generally and during COVID they lost slightly more jobs than males and experienced the most hiring delays. By the end of 2021, only a few of the scientists had gotten COVID, but the numbers increased as in-person events resumed. A documentary film focused on Astrophysics and the COVID Pandemic was made from the interviews, thus film clips will be used to illustrate points. This project was funded by EU Horizon 2020.

100.02 Disability Justice, Astronomers, and the Ongoing COVID Pandemic

2:20 pm Sarah Tuttle[1], Karen Knierman[2], Alicia Aarnio[3], Allyson Bieryla[4], Mia Bovill[5], and Jacqueline Monkiewicz[6]

[1]University of Washington, Seattle, Seattle, WA, [2]Arizona State University, Mesa, AZ, [3]University of North Carolina, Greensboro, Greensboro, NC, [4]Center for Astrophysics | Harvard & Smithsonian, Cambridge, MA, [5]University of Maryland, College Park, MD, [6]Arizona State University, Tempe, AZ

What does it look like to show up to work and know you're courting chronic illness to do so? Although everyone at this current meeting is doing so across a broad spectrum of risk, some of us are doing so having already come up on the losing side at least once before.

The COVID-related shutdowns of 2020 and 2021 have changed both what our institutions and our field looks like. Some of us were home with children or elders, providing care and sometimes nominally education. Some of us found our productivity boosted. Many of us found ourselves shouldering emotional care work we were definitely not trained for. Some of us left the field, as our priorities got pushed beyond reconciliation. We are now in what perhaps we can call "late stage pandemic" - vaccines are available, but acknowledgement of some basic risks are heavily downplayed by those making policy decisions. What are the consequences of these societal choices on marginalized astronomers, especially those who are disabled? What can it look like to move forward?

100.03 Lick Observatory During the 1918 and 2020 Pandemics

2:40 pm Elinor Gates[1]

[1]Lick Observatory, Mount Hamilton, CA

Lick Observatory has navigated through two global pandemics: the Influenza outbreak in 1918 and the COVID-19 crisis in 2020. In both instances, the observatory's leadership faced critical decisions to safeguard the well-being of the community, encompassing astronomers, support personnel, and Mount Hamilton residents. This necessitated the development of protocols that adhered to stringent health and safety guidelines while ensuring the continuation of operations and data acquisition. We will describe the safety and operational strategies employed by W. W. Campbell in 1918 and C. Max in 2020, along with their respective teams. Additionally, we will examine how these policies impacted research, such as the 1918 Goldendale Solar Eclipse Expedition, the limitations to telescope operations in 2020, and the creation of home observing software for the Nickel and Shane Telescopes in 2020.

100.04 The 2021 AAS Demographics Survey Report on COVID

3:00 pm Lee Anne Willson[1], Joy Nichols[2], Derek Buzasi[3], Katy Rodriguez Wimberly[4], Eric Schlegel[5], Sabrina Stierwalt[6], Rachel Ivie[7], Douglas Leonard[8]

[1]Iowa State University, Ames, IA, [2]Center for Astrophysics | Harvard & Smithsonian, Cambridge, MA, [3]Florida Gulf Coast University, Fort Myers, FL, [4]University of California, Riverside, Irvine, CA, [5]University of Texas, San Antonio, San Antonio, TX, [6]Occidental College, Los Angeles, CA, [7]American Institute of Physics, College Park, MD, [8]San Diego State University, San Diego, CA

The AAS Demographics Survey circulated in Fall, 2021 and contained a number of questions concerning the impact of the pandemic on the professional life and education of AAS members. This presentation will summarize the responses received in the survey and the Demographics Committee's interpretation of the result.

WGPAH Annual Meeting (Splinter Session)

Sunday, January 7th 5:30 – 6:30 pm Room 219
Chair: Jennifer Bartlett

The annual meeting of the Working Group on the Preservation of Astronomical Heritage (WGPAH) is open to all interested participants although formal voting is restricted to officially appointed members. On behalf of the AAS, WGPAH develops and disseminates procedures, criteria, and priorities for identifying, designating, and preserving astronomical structures, instruments, and records so that they will continue to be available for astronomical and historical research, for the teaching of astronomy, and for outreach to the public.

AAS Opening Reception

Sunday, January 7th 7:00–8:30 PM Hall B-1/B-2

HAD II: AAS 125th Anniversary – Celebrating the History of AAS Divisions (Special Session)

Monday, January 8th 10:00–11:30 am Room 215
Session 119
Session Chair: Terry Oswalt

The rich 125-year history of the AAS will be celebrated next January at the 243rd meeting in New Orleans. The Historical Astronomy Division is responsible for advancing interest in the history of astronomy. As part of the AAS anniversary year, HAD proposes to bring together representatives from most, if not all, of the six AAS Divisions to contribute talks highlighting unique, historical events or milestones from their division histories.

119.01 The High Energy Astrophysics Division: The Last 25 (or so) Years
10:00 am Randall Smith[1]
[1]Smithsonian Astrophysical Observatory, Melrose, MA

HEAD was founded in 1969 as the field of sounding rocket and then satellite astronomy developed rapidly with a range of small instruments and satellites. Early discoveries included the first X-ray binaries, black hole candidates, and diffuse emission that might or might not be due to faint sources as cosmic distances. The field entered a second resurgence almost 25 years ago with the launch of two satellites: Chandra and XMM-Newton. These two flagships, along with a suite of explorers such as Swift and NuSTAR, created a whole new field, answering questions first asked in the 60s and 70s and generating far more. I will describe some of these achievements and the near-term future, as the newly-launched XRISM begins operations.

119.02 History of the Division for Planetary Sciences
10:15 am Tony Roman[1], Clark Chapman[2], Anita Cochran[3], Dale Cruikshank[4]
[1]Space Telescope Science Institute, Joppa, MD, [2]Southwest Research Inst. (retired), Nederland, CO, [3]University of Texas at Austin, Austin, TX, [4]NASA (retired), Anacortes, WA

A general history of the AAS Division for Planetary Sciences (DPS) will be presented. Motivations for the formation of the DPS and early organizational efforts will be discussed. There will be a review of some milestones in the history of the annual DPS meetings and a review of some major issues that the DPS has faced. There will also be some examination of the changes in gender balance in the DPS leadership history.

119.03 History of the Solar Physics Division

10:30 am Dale Gary[1]

[1]NJIT Center for Solar-Terrestrial Research, Berkeley Heights, NJ

The first 30 years of the history of the Solar Physics Division (SPD) of the American Astronomical Society was presented in an article by Jack Thomas written for the AAS Centennial Year (DeVorkin, D., ed., *The American Astronomical Society's First Century*, AIP: AAS, 1999, pp238-251). This talk continues that history by focusing on the ensuing 25 years up to the present. The SPD has continued to grow in membership, has added an early career prize (the Karen Harvey Prize), and has begun a tradition of holding the Triennial Earth-Sun Summit (TESS) meetings with the American Geophysical Union's Space Physics and Aeronomy section. The SPD celebrated its 50th year during the Covid-19 pandemic lockdown in August 2020, sandwiched between the two great North American eclipses of 2017 and 2024, which is coming later this year. As the demographics of the Division skew older, the SPD has recently made strides to become more relevant for students and early career scientists, promising a bright future.

119.04 History of the Division on Dynamical Astronomy

10:45 am Matthew S. Tiscareno[1], David F. Bartlett[2], Luke Dones[3], Nader Haghighipour[4], Alan W. Harris[5], Sethanne Howard[6], Seth A. Jacobson[7], Jack J. Lissauer[8], Alice B. Monet[9], William I. Newman[10], P. Kenneth Seidelmann[11]

[1]SETI Institute, Mountain View, CA, [2]University of Colorado, Boulder, CO, [3]Southwest Research Institute, Boulder, CO, [4]Planetary Science Institute, Honolulu, HI, [5]JPL (retired), La Canada, CA, [6]USNO/retired, Columbia, MD, [7]Michigan State University, East Lansing, MI, [8]NASA Ames Research Center, Moffett Field, CA, [9]USNO/retired, AAS Secretary, Albuquerque, NM, [10]UCLA, Los Angeles, CA, [11]University of Virginia, Charlottesville, VA

Since its founding and inaugural meeting in 1970, the AAS Division on Dynamical Astronomy has served as a home for astronomers who use orbital dynamics as the tools of their trade, whether they apply dynamical methods to galaxies, the solar system, exoplanets, or other subfields.

In the last decade, the DDA has re-focused itself to be a division of the future. We have added an early-career award (the Rubin Prize), adopted more inclusive procedures for awards and scholarships, and updated membership definitions to better include students. At our annual meeting we have instituted a mentorship program, a special session for discussing workforce issues, and a public talk for outreach, as well as adopting an approach to hybrid meetings that seeks to maximize the experience for both remote and in-person attendees. Most recently we passed a bylaw change to designate certain members of the DDA Committee as IDEA Action Coordinators in order to better lead the division membership into a proactive approach to inclusivity, diversity, equity, and accessibility.

In honor of the 125th anniversary of the American Astronomical Society, we will review the history of the DDA, giving particular attention to the last quarter-century.

119.05 History of the Historical Astronomy Division

11:00 am Kenneth Rumstay[1]

[1]Valdosta State University (Emeritus), Valdosta, GA

The Historical Astronomy Division traces its origin to conversations in the fall of 1978 between John Eddy, Owen Gingerich, and Ken Brecher, three astronomers with a keen interest in the rich history of our discipline. The latter organized a session on archaeoastronomy at the January 1979 meeting of the AAS in Mexico City. Approximately 200 people attended, and

more than eighty signed a petition to form a Division concerned with archaeoastronomy and with the history of astronomy in general. The newly formed Historical Astronomy Division held its first official meeting on January 12, 1981 in Albuquerque, in conjunction with the winter AAS meeting.

A history of the first two decades of HAD was prepared for the AAS Centennial volume by Katherine Bracher[1]; this, along with a 2019 article updating that history, are available on the HAD website (https://had.aas.org/). The name Historical Astronomy Division was chosen by the committee charged with forming the division, rather than "History of Astronomy Division", because (as the late Owen Gingerich recalled) they "wanted to include uses of historical evidence for modern astronomy as well as archaeoastronomy," in addition to the more traditional history of astronomy. With a membership encompassing both astronomers and historians, our Division continues to maintain this broad range of interests.

1 *The American Astronomical Society's First Century*, David H. DeVorkin, ed. (Washington, DC: The American Astronomical Society, 1999), pp. 277-286.

119.06 **History of the Laboratory Astrophysics Division**

11:15 am Steven Federman[1]

[1]*University of Toledo, Toledo, OH*

The Laboratory Astrophysics Division (LAD) recently celebrated its 10th anniversary. My presentation will describe the activities leading up to its formation. A crucial step in this process was the establishment of the Working Group on Laboratory Astrophysics (WGLA). The WGLA and LAD cosponsored Plenary talks, wrote white papers in support of Decadal Surveys, and cosponsored joint sessions with other units within the AAS and other Societies. Since its formation, LAD began awarding Prizes at all career levels. I will highlight these efforts in my overview. In a subsequent talk, Farid Salama will discuss how the efforts have influenced other organizations.

HAD Town Hall

Monday, January 8th 12:45–1:45 pm Room 215
Session 138
Session Chair: Ken Rumstay

The annual business meeting of the Historical Astronomy Division.

HAD III: Oral Presentations

Monday, January 8th 2:00–3:30 pm Room 215
Session 145
Session Chair: J. Allyn Smith

145.01 **Celestial Mechanics Leading up to the Division on Dynamical Astronomy**

2:00 pm P. Kenneth Seidelmann[1], Matthew S. Tiscareno[2], Alice B. Monet[3]

[1]*University of Virginia, Charlottesville, VA,* [2]*SETI Institute, Mountain View, CA,* [3]*US Naval Obs. (retired); AAS Secretary, Albuquerque, NM*

In 1900 Simon Newcomb established the astronomical system of constants and the ephemerides for the solar system bodies that would be used for the next 80 years. From 1900 to 1940 there was little activity in the field of celestial mechanics. About 1940 punch card equipment became available. Computers followed in the 1950s. Celestial mechanics books

appeared. Ephemerides based on numerical integrations were printed for the outer planets and the Earth.

In 1958 to 1965 Sputnik, Explorer, Vanguard, and Mercury satellites were launched with orbits calculated on computers. Graduate programs in celestial mechanics and dynamical Astronomy were established at Yale University and the University of Cincinnati.

In 1966 Dirk Brouwer died, leading to a change in the Astronomy Department at Yale University. Victor Szebehely went to the University of Texas, Tony Danby went to North Carolina State, Morris Davis went to the University of North Carolina, and Andre Deprit went to the Boeing Company. Celestial mechanics spread across the country.

In the 1960s space activities, radar observations, and the availability of computers opened the development of celestial mechanics. JPL and MIT we're developing solar system ephemerides by numerical integrations fit to optical observations and radar ranging measurements.

It was time for the Division on Dynamical Astronomy.

145.02 Celebrating a Decade of Achievements and Growing Impact of the Laboratory Astrophysics Division (LAD)

2:10 pm Farid Salama[1]
[1]*NASA Ames Research Center*

The Historical Astronomical Division (HAD) is hosting a special session about the history of the divisions. This is a timely event in the case of the Laboratory Astrophysics Division (LAD), the AAS division that was launched in 2012. Laboratory Astrophysics is a largely multidisciplinary discipline that has matured over the past decades and has demonstrated that it plays a key role in the evolution and the progress of astronomy in this new era of ground- and space telescopes equipped with higher sensitivity instruments that result in an abundance of new findings requiring new laboratory data. In addition to the role LAD plays in representing the laboratory astrophysics community and in facilitating an open dialog and close collaboration with the astronomy community, the division has shown a lasting impact. We'll discuss a few examples of the impact and growing influence of LAD in the field of Laboratory Astrophysics and its representation, both at the international (IAU, EAS) and national (ACS) levels.

145.03 From Big Towers to Big Mirrors: How the Solar Community got to DKIST

2:20 pm Kevin Reardon[1]
[1]*National Solar Observatory, Boulder, CO*

The evolution of ground-based solar telescopes over the past 60 years was not only the result of significant technological advancements, but also the product of important political and organizational developments over that same timeframe. The period begins with the construction of the McMath-Pierce and Dunn Solar Telescopes and closes with the commissioning of the four-meter Daniel K. Inouye Solar Telescope (DKIST). In the intervening years, the solar community supported the funding for several new ground-based solar facilities, but these were all eventually unsuccessful. There was a long-running effort to build a shared, pan-European solar telescope, which was also not funded in the end, but led to the construction of several smaller, national telescope in the Canary Islands. We will examine the political and funding environment that foiled several projects, but eventually resulted in the realization of the world's largest solar telescope.

Note: This paper was not presented, due to the author's absence.

145.04 **Who You Gonna Believe? Aristotle Or Your Own Eyes?**

2:30 pm George Latura[1]

[1]*Independent researcher, Trumbull, CT*

Platonist thinking managed to survive into the 12th century Chartrian mini-renaissance. Yet Aristotle would emerge as 'The Philosopher,' highest authority on natural philosophy.

This shift has reportedly received little academic attention, according to Hankins' paper on Antiplatonism in the Middle Ages: "The eclipse of Plato is particularly hard to understand." (Hankins, 1996). The elevation of Aristotle might have been influenced by his assessment of the nature of the Milky Way. Discussing the Galaxy not in On The Heavens, but in Meteorology, Aristotle declared that the Milky Circle was not a heavenly feature, but a sublunary atmospheric phenomenon. This contention dovetailed with medieval ecclesiastical concerns. Surviving texts by Martianus Capella and Macrobius depicted the Milky Way as the pagan heaven. Such heretical ideas had to be challenged: the Platonist scholar William of Conches narrowly missed being tried for heresy (Dutton, 2006). A more lasting solution would be provided by the elevation of Aristotle by Aquinas. The removal of the Milky Way from the heavens paralleled the eclipse of Plato by Aristotle. Who are you going to believe, Aristotle or your own eyes?

For centuries, this 'excruciating problem' - according to Galileo - persisted until the publication of Galileo's telescopic observations: "For the Galaxy is nothing else but a collection of innumerable stars heaped together. In whatever part of the Milky Way you point the spyglass, a vast crowd of stars immediately present themselves." (Sidereus Nuncius, 1610).

Illustrating the charged nature of this matter, Aristotle - like Galileo thousands of years later - ran afoul of religious authorities. In 322 BC, Aristotle was accused of impiety at Athens. "Diogenes Laertius claims (5.5) that the accusers of Aristotle were Demophilus and the hierophant Eurymedon, as was also reported in the biography of Aristotle by Hermippus. Some have ventured that, because a hierophant is the highest priest of the Eleusinian mysteries, Aristotle must have attacked these mysteries." (Natali, 2013). Before Aristotle could be brought to trial, he fled Athens and died soon after in exile. Was Aristotle's 'crime' in ancient pagan Athens (likely the removal of the Milky Way from the heavens) what made him useful to ecclesiastical authorities in medieval Europe?

Note: This paper was not presented, due to the author's absence.

145.05 **Analysis of an Anonymous Pre-Copernican Italian Astronomical Manuscript**

2:40 pm M. McSwain[1], Kevin Christopher Federico[1]

[1]*Lehigh University, Bethlehem, PA*

Lehigh Codex Nine is a pre-Copernican Italian astronomical manuscript written by an anonymous author in the medieval period. The manuscript, written in early Italian, contains astronomical as well as astrological and theological sections. Over the years, booksellers and owners have made various attempts to date the manuscript with estimates ranging from 1390-1500. In this talk we will discuss how we analyzed the data inside the manuscript to provide both a geographic location and date for the manuscript. We analyzed its three tables of New Moon times and compared them to NASA ephemerides to show that these tables indicate a date between 1380-1400. We also analyzed its two tables of daylight hours with the PyEphem package, written by Brandon Rhodes, to find that those data correspond to the years ca. 1125 and ca. 1392 respectively. The latitude and longitude are consistent with the towns of Genoa or Bologna in northern Italy. We postulate that this manuscript may be a compilation of notes

taken from various other historical texts, and we hope to be able to place this work into a more specific context in the future.

145.06 Discovery of Two Long-Lost Eruptions of the Recurrent Nova T CrB; in October 1217 AD by German Monks and in Christmastime 1787 by Francis Wollaston

2:50 pm Bradley Schaefer[1]
[1]Louisiana State University, Baton Rouge, Baton Rouge, LA

T Corona Borealis (T CrB) is the famous recurrent nova with intensely-studied events in 1866 and 1946, while a third eruption is expected imminently around 2024.4±0.3. This gives a recurrence time of 79 years. The average recurrence time should change only on a millions year timescale, so we have the strong expectation that T CrB has been erupting at ~79 year intervals far into the past. It is worthwhile to seek prior eruptions around the years 1787, 1708, and on back, with these novae events being the brightest 'Guest Stars' of each generation. With widespread searches, I have found two long-lost reports of T CrB eruptions, for the years 1787 and 1217. The 1787 eruption was reported by English Astronomer Francis Wollaston in his compilation of star positions. Wollaston specialized in astrometry for stars in Corona Borealis, and all his stars had measured astrometric positions taken on four occasions. In a private letter to W. Herschel, Wollaston tells of his measures of a V~7 star at the exact position of T CrB, as observed shortly before 28 December 1787. The 1217 eruption was reported in the Ursperger Chronicle (a typical monastic annals) from southern Germany, written in 1225 by the Abbott Burchard. Burchard tells about a transient star seen for "many days" in autumn of 1217 in the constellation of `Ariadne's Crown' (i.e., CrB). A bright transient lasting for "many days" can only be a nova, a comet, of a supernova. Burchard's event cannot be a supernova or some different nova, due to the lack of any bright remnant. The object cannot be a comet because Burchard explicitly called it "stella" (i..e, a point source) instead of any of the several medieval German terms for comet. Further, Burchard labeled it as a 'wonderful sign' ("signum mirabile") with very positive connotations, whereas comets are universally regarded as amongst the most evil and dangerous omens in the sky, and Burchard would never have called a comet as "signum mirabile". So Burchard gave his personal eye-witness report of an expected T CrB eruption in 1217.

145.07 Seventeenth and Eighteenth Century Jesuit Astronomy in Asia: A Regional Perspective

3:00 pm Douglas Wayne Orchiston[1,2], Shi Yunli[1], Darunee Lingling Orchiston[3]
[1]University of Science and Technology of China, Hefei, China, [2]Centre for Astrophysics, University of Southern Queensland, Australia, [3]Private researcher, Ban Chole, Mae Taeng, Thailand

The Jesuits are an order of Roman Catholics renowned for their interest in mathematics and astronomy. As we all know, during the seventeenth and eighteenth centuries Jesuit missionary astronomers were particularly active in China. But during the 1680s they also enjoyed a short-lived but very fruitful emergence in Siam (present-day Thailand).

After summarizing the key Chinese and Thai achievements, we will outline plans to expand our research collaboration and involve colleagues from India, Vietnam and the Philippines—where Jesuit astronomers also were active.

145.08 **Early Optical Telescopes in America**
3:10 pm Gordon Houston[1]
[1]retired, Houston, TX

The advent of the telescope in 1608 ushered in a new era in astronomical knowledge around the world. It was not until the middle of the 19th century in America, that telescopes began to become numerous at institutions and in private ownership. The manufacture of telescopes was an expensive proposition and the optical technology was in its infancy. The building of observatories to house them, their design and location, became more sophisticated. Many telescopes were owned by wealthy amateurs, larger ones by academic institutions and governmental agencies. It was in the late 19th Century that many aspects of telescopic equipment and observatories changed, leading into some of the greatest telescopes of their time in the early 20th Century. This presentation will highlight many of the most significant telescopes and observatories of that era.

Note: This paper was not presented, due to the author's absence.

145.09 **The New Sun: Technology and Innovation in 19th-Century Eclipse Studies**
3:20 pm Sarah Reynolds[1]
[1]University of Indianapolis, Indianapolis, IN

Mabel Loomis Todd's 1894 book, Total Eclipses of the Sun, presented for a general audience a far-reaching review of what her husband, astronomer David Todd, characterized as the first half-century of a "golden age of physical research upon the Sun." In addition to providing readers with a vivid and well-written description of the different elements witnessed in an eclipse, Todd's book offered insights into a scientific community at work and introduced readers to the rapidly-changing landscape of astronomy in an era of new techniques and technologies. In addition to discussing the history of the book itself, this talk will examine the scientific and technological innovations highlighted in Todd's work and how these contributed to a progressive vision of science in which a new Sun was being revealed out of its very obscuration.

HAD IV: iPoster Presentations

Monday, January 8th 5:30–6:30 pm Hall B-1/B-2
Session 163

163.01 **Mirroring the Past: Replicating Sir William Herschel's Six-Inch Speculum Mirror**
Edward Albin[1], David Lacko[2], Lauren Albin[3]
1American Public University, Charles Town, WV, [2]Deerlick Astronomy Village, Crawfordville, GA, [3]O Wayne Rollins Planetarium at Young Harris College, Young Harris, GA

This study embarks on the intricate journey of recreating a six-inch speculum mirror, reminiscent of the craftsmanship employed by Sir William Herschel for his renowned 7-foot telescope. Replicating speculum mirrors entails a multifaceted process riddled with challenges, encompassing material selection, casting, annealing, grinding, polishing, and figuring. The successful resolution of these challenges is pivotal in the pursuit of crafting an authentic replica, one that can enrich our understanding of the history of astronomy.

Historical authenticity took precedence in our investigation, necessitating the acquisition of comprehensive documentation regarding speculum mirrors and Herschel's pioneering techniques. Following Sir William Herschel's passing, all records of his telescope-making

exploits were entrusted to his sole heir, Sir John Herschel, and these documents now rest under the stewardship of the British Royal Astronomical Society. This treasure trove comprises a four-volume series titled "Experiments on the Construction of Specula," a 129-page treatise titled "On the Construction of Specula," and a 179-page manuscript named "Results of Experiments on the Construction of Mirrors." It is surmised that the delay and eventual abandonment of the publication of these documents was influenced by the growing preference for silver-coated glass mirrors.

In our replication endeavors, we assimilated this wealth of information into modern practices, preserving the historical essence of the speculum mirror-making process. Adhering to Herschel's ratio of 5 parts tin to 12 parts copper for small mirrors and to build expertise, we initially cast several two, three, and four-inch mirror blanks before undertaking a six-inch speculum mirror. Upon successful casting, our six-inch speculum mirror blank underwent a meticulous series of grinding processes, commencing with rough grinding to achieve an f/14 curve. Although the process is ongoing, significant strides are being made in fine grinding and precisely polishing the speculum to attain the desired figure.

Contemporary optical instruments have supplanted speculum mirrors with glass mirrors featuring aluminum or other reflective coatings, due to their heightened durability, reflectivity, and ease of manufacture. Nevertheless, speculum mirrors remain an indelible part of the historical fabric of astronomy and the evolution of telescopic observation. This replication project not only pays homage to this historical legacy but also establishes a tangible link to the pioneering work of Sir William Herschel.

163.02 Yerkes Observatory: Astronomy as Inspiration for Discovery and Expression

Amanda E Bauer[1], Amy Steele[1], Mallory Conlon[1], Adam McCulloch[1]
[1]*Yerkes Observatory, Williams Bay, WI*

Yerkes Observatory is known as the birthplace of modern astrophysics and remains the home to the world’s largest refracting telescope. Founded in 1897, Yerkes was run by the University of Chicago until 2020, when the non-profit Yerkes Future Foundation (YFF) assumed long-term stewardship for the Observatory, its telescopes and instrumentation, and the fifty acre Olmsted-designed landscape. YFF has raised a significant portion of its initial $30mm goal and has invested that in restoration, major construction work, and building a new team to create unique programming and research opportunities. In July 2023 Yerkes hosted its first astronomer-in-residence and four undergraduate interns who observed with the 24” reflecting telescope and began testing the magnitude depths of a sample of digitized glass plates taken from our 180,000 astronomical glass plate collection. Our mission is to ensure Yerkes continues to advance astronomy and to transform the Observatory and its grounds into a destination for science and discovery—an experience unlike any other where science, environment, culture, arts, and curiosity pollinate in novel and unique ways. We invite you to explore possibilities with us as we build on the extensive legacy of Yerkes Observatory with a rejuvenated set of research opportunities for astronomers and students.

163.03 One Man's Family: The Academic Descendants of Charles A. Young

Joseph S Tenn[1]
[1]*Sonoma State Univ., Rohnert Park, CA*

Are you an academic descendant of Charles Augustus Young? A B.A. graduate of Dartmouth College, Young was professor of astronomy at Princeton from 1877 to 1905. There he supervised five graduate students who earned astronomy-related doctorates. In academic genealogy terms, he had five children. Four of these left no academic descendants, but the other one was Henry Norris Russell, who had 11 academic children, 72 grandchildren, and,

according to a preliminary count, 262 great-grandchildren and 599 great-greats. The number of Young's academic descendants continues to grow. I intend to present the current number and compare the different generations. This exercise will be an example of what we can learn from information available in the Astronomy Genealogy Project (AstroGen: https://astrogen.aas.org).

163.04 Conquest and the Cosmos: Traces of Colonialism in Ground-Based Astronomy

Alessandra Valeria Lopez Menjivar[1], Rebecca Charbonneau[2]
[1]Williams College, Williamstown, MA, [2]National Radio Astronomy Observatory (NRAO), Charlottesville, VA

In New Mexico, mountain ranges separate the landscape, much like walls: to one side, there are military bases and laboratories, while on the other, there are bustling residential areas and schools. The occupancy of settlements from governments and institutions in populated areas is not unique to this space. Previous historical studies have shown the impact of colonial settlements in New Mexico continues to impact the state, and the reasons are not exclusive to its nuclear history; it includes scientific facilities in the area. Thus, by drawing on previous research, oral histories, and archival collections, this paper proposes scientific colonialism as an alternative to referring to New Mexico's colonial legacy.

This talk will focus on the history of scientific colonialism in New Mexico. I will argue that there is no such thing as a true terra nullius (no man's land). Instead, I suggest that remote locations subject to colonialism have complex histories that affect and are affected by our scientific infrastructures, including telescopes. My case studies include places often deemed as terra nullius in astronomy—like Chile and New Mexico—to understand the cases where the telescope-siting process was successful and, simultaneously, the instances where they were not. Ultimately, I examine the past successes, failures, and in-betweens of ground-based observatory siting to inform the optimal development of upcoming initiatives, such as the next Generation Very Large Array (ngVLA).

163.05 The Great Astronomy Debate of 1995: The Distance Scale to Gamma-Ray Bursts

Robert Nemiroff[1], Jerry Bonnell[2]
[1]Michigan Technological Univ., Houghton, MI, [2]NASA's GSFC, Greenbelt, MD

In 1995, on the precise 75th Anniversary of Astronomy's Great Debate on the Scale of the Universe between Shapley and Curtis, a similar debate was held on the Distance Scale to Gamma-Ray Bursts. The 1995 debate was held in the same auditorium in Washington DC as the earlier Shapley-Curtis Debate. At the time of the 1995 debate, the GRB community was nearly equally divided between a galactic and cosmological distance scale. How the debate came together, what was said, who attended, and how the great GRB distance scale controversy was eventually resolved is reviewed.

163.06 Allies in a Historic Observatory's Preservation: Role of a Friends Organization

Michael Svec[1]
[1]Furman University, Greenville, SC

The Friends of the University of Illinois Observatory is an advisory committee to the university and department of Astronomy committed to the preservation of the historic Observatory and to enhancing its educational and cultural value so that visitors can connect to the natural world through human eyes and senses. The Friends provide a model of collaboration and cooperating between alumni, students, and the university. The Observatory, dating to 1896, is a National Historic Landmark significant for the development of photoelectric photometry and is still in use as an educational facility. The Friends is made up

of mostly alumni who provide a consistency of interest, effort, advocacy, and an archive of knowledge that help sustain the physical building and its instruments. Activities include publishing a newsletter, supporting dissemination information on the history and significance of the Observatory, preserving historic instruments, and coordinating their display, annual meetings, and working with outside supporting organizations such as International Dark Sky Association and the Antique Telescope Society. The 10-year collaboration has resulted in renovation of the telescope and dome, a $500,000 grant from the National Park Service, additional $500,000 deferred maintenance funding, expanded exhibit and classroom space, and efforts to address light pollution. The Friends provide a model for supporting and sustaining historic scientific structures and enabling them to support the educational mission of the university.

LeRoy E. Doggett Prize Lecture

Monday, January 8th 7:00–8:00 pm Great Hall A
Session 184

Note: There will be a pre-lecture reception for HAD members and invited guests from 6:00 until 7:00 pm in the back of Hall B. Following the lecture, there will be a post-lecture dessert reception in Hall B from 8:00 until 8:45 pm.

7:00 pm "It All Began with Tebbutt! The Peripatetic Path from New Zealand to New Orleans"
Wayne Orchiston[1,2]
1University of Science and Technology of China (Hefei), [2]Centre for Astrophysics, University of Southern Queensland (Toowoomba, Australia).

As a schoolboy in rural New Zealand I read about John Tebbutt (1834–1916), an Australian amateur astronomer who built an international reputation in positional astronomy. In 1959, after moving to Sydney, I discovered that Tebbutt's Windsor Observatory was still largely extant, and that an invaluable collection of archival material was housed in the Mitchell Library. Thus began a study that resulted in many research papers and ultimately in a Springer book about Tebbutt.

In this lecture I will show how these Tebbutt studies led me to also research the histories of Australian, New Zealand and South African astronomy; how a peripatetic career that took me through Australia and New Zealand and on to Thailand would lead to research on Asian astronomical history; how IAU initiatives prompted me to investigate the early development of radio astronomy in Australia, France, India, Japan and New Zealand, as well as the 1769, 1874 and 1882 transits of Venus; and how launching the Journal of Astronomical History and Heritage and also the world's first part-time off-campus PhD university program in history of astronomy would broaden my research horizons and bring me honours I never dreamed of—including the HAD 2019 Donald E. Osterbrock Book Prize and the 2024 Le Roy E. Doggett Prize for Historical Astronomy. It all began with Tebbutt!

HAD V: Oral Presentations

Tuesday, January 9th 10:00–11:30 am Room 215
Session 216
Session Chair: Susana Deustua

216.01 What Makes a 'Good' Cosmic Distance Indicator?
10:00 am Abigail Holmes[1]
[1]*University of Notre Dame, Notre Dame, IN*

Astronomer Paul W. Hodge catalogs 27 distance indicators in his 1981 review of the extragalactic distance scale. Of these, fewer than ten are used to measure cosmic distance with any regularity today. The standards for what makes a distance indicator useful, trustworthy, reliable, or simply 'good' have evolved over time, together with theory, models, technology, methodology, and the rise of 'precision cosmology.' Do standard candles need to have a theoretical or physical basis, for example, or is empirical evidence of standardness enough? And is it better to have a small sample of size of precise indicators, or a large (but less pure) sample? I trace the evolution of these standards and map out the rise of a successful indicator, type Ia supernovae, and an indicator that can now only be found in the publications of the past, H II region diameters. To do so, I use published articles, talks, monographs, and observing proposals. This historical exploration is particularly relevant now, when the Hubble tension is calling into question the strength of even our best indicators.

216.02 A Camera Well-Travelled: Preserving André Lallemand's Legacy
10:10 am Samantha Thompson[1]
[1]*Smithsonian Institution, Washington, DC*

In 1962, French scientist André Lallemand delivered his *caméra électronique* from Paris to California's Lick Observatory, where astronomers used the newly developed electronographic device to study the faint features, not just the brightness, of celestial objects. Sixty years later, the staff of the Lick Observatory sent that camera to Washington, DC to be accessioned into the collection of the National Air and Space Museum. This glass-bodied camera, a meter across and a meter tall, represents the start of an era in astronomy when a community of astronomers and physicists attempted to employ new photoelectronic techniques to develop more efficient cameras for improved observations of two-dimensional objects, in distinction to point source electronic amplification. In this talk, I will examine the development of Lallemand's camera and discuss the process of acquiring the fragile object into the Museum's collection.

Note: In the author's absence, this paper was presented by Rebecca Charbonneau.

216.03 Mixed Signals: Cold War Communication with Extraterrestrial Intelligence
10:20 am Rebecca Charbonneau[1]
[1]*The National Radio Astronomy Observatory, Charlottesville, VA*

This talk is a brief summary of my forthcoming book on the history of radio astronomy and the search for/communication with extraterrestrial intelligence (SETI/CETI). The book, titled Mixed Signals, explores the intertwined history of communication, science, and warfare during the Cold War era. Focusing on the development of radio astronomy and CETI, the book delves into the challenges and successes of scientific collaboration between the United States and the Soviet Union. Amid the geopolitical tensions of the time, radio astronomers worked together, overcoming political barriers to pursue scientific goals. The book explores the role of CETI in promoting international cooperation yet also addresses the co-optation of radio

astronomy and CETI by militaries and governments, shedding light on the complex relationship between science and politics. Ultimately, the book uncovers the paradoxical nature of scientific communication during the Cold War, where astronomers aimed to communicate with extraterrestrials while struggling to bridge the communication gap between their own nations.

216.04 Origins of the Term Chirp Mass in Gravitational Wave Astronomy

10:30 am Calla Bassett[1], Daniel Kennefick[2]
[1]University of Arkansas, Fayetteville, AR, [2]University of Arkansas, Fayetteville, Fayetteville, AR

The term chirp mass refers to a combination of masses in a compact object binary that determines the 'chirp' of the signal. This term was popularized by a paper, known as the "Last Three Minutes" paper, published by Curt Cutler *et al.* in 1993, but all researchers involved with the paper deny coining the term. Other notable papers by Bernard Schutz and Robert Forward and David Berman that predate the Cutler paper talk about the concept of chirp mass but don't use the term. The earliest known paper that uses the term is a conference paper from 1988 by Peter Kafka. Kafka has had a surprising amount of influence on the field of gravitational wave astronomy, and is potentially the originator of the term 'chirp mass'.

216.05 Celebrating the 150th Anniversary of the 1874 Transit of Venus

10:40 am Wayne Orchiston[1]
[1]University of Science and Technology of China, Hefei, China, and Centre for Astrophysics, University of Southern Queensland, Toowoomba, Australia

During the eighteenth and nineteenth centuries one of the most pressing challenges facing astronomers was to determine the scale of the Solar System. This could be attempted in several ways, and one that impressed was by observing transits of Venus from different sites around the Earth. Many nations mounted transit expeditions, mainly to Eastern Asia, Australia and New Zealand, in order to observe the December 1874 transit.

With the hindsight of 150 years, I will very briefly review these expeditions and their results, discuss recently published research about these expeditions, and highlight potential areas of future research.

216.06 Dr. Sahar Said Allam: A Memoriam

10:50 am Douglas Tucker[1]
[1]Fermilab, Batavia, IL

In this short talk, we memorialize the scientific life of AAS member Dr. Sahar Said Allam (1964-2022), an alumna of Cairo University and the National Research Institute of Astronomy & Geophysics (NRIAG). Her scientific career took her to the Universität Potsdam (Germany), New Mexico State University (USA), the Space Telescope Science Institute (USA), and the Fermi National Accelerator Laboratory (Fermilab; USA), as well as to astronomical observatories in New Mexico, Arizona, Hawaii, Chile, and Australia. Among other projects, she worked on the Sloan Digital Sky Survey (SDSS) and the Dark Energy Survey (DES), achieving the coveted "Builders" status on both these projects. She was the discoverer of the (at the time) brightest known Lyman Break Galaxy, the strongly lensed "8 O'Clock Arc", and played an important role in the discovery of the optical counterpart to the gravitational wave event GW170817. During her final illness, she began work as a Data Preview 0 ("DP0") Delegate for the Vera C. Rubin Legacy Survey of Space & Time (LSST) and was even the

Principal Investigator on a successful observing proposal submitted posthumously. The asteroid "135979 Allam" is named after her.

216.07 NASA's Universe of Learning's Diaries of the Cosmos: Exploring the People and History Behind the Science

11:00 AM Rutuparna Das[1], Eleanor Carver-Horner[2], Nina Wattenberg[3], Maria McEachern[1], Kimberly Arcand[1], Kathleen Lestition[1], April Jubett[1], Timothy Rhue II[4], Varoujan Gorjian[5], Colleen Manning[6], Denise Smith[7], Emma Marcucci[4], Gordon Squires[8], Travis Schirner[9]
[1]Center for Astrophysics | Harvard & Smithsonian, CAMBRIDGE, MA, [2]Barnard College, New York, NY, [3]Smith College, Northampton, MA, [4]Space Telescope Science Institute, Baltimore, MD, [5]Jet Propulsion Laboratory, Pasadena, CA, [6]Goodman Research Group, Inc., Cambridge, MA, [7]STScI, Crofton, MD, [8]Caltech/IPAC, Pasadena, CA, [9]NASA-JPL, Burbank, CA

The NASA's Universe of Learning (NASA's UoL) project creates and delivers science-driven, audience-driven resources and experiences designed to engage learners of all ages and backgrounds in exploring the universe for themselves. The competitively-selected project represents a unique partnership between the Space Telescope Science Institute, Caltech/IPAC, NASA Jet Propulsion Laboratory, and the Smithsonian Astrophysical Observatory, and is part of the NASA Science Mission Directorate Science Activation program. Project objectives include increasing learners' understanding of the process of science, increasing the role of NASA subject matter experts as partners, and increasing the diversity of participants reached through intentional, inclusive programming.

To these ends, NASA's UoL is developing a series of audio stories of discovery linked with various UoL content themes and NASA missions/initiatives. Each installment explores a particular discovery, showcasing both the science and the scientists, and interviews a contemporary scientist in the same field. The project pays special attention to the lived experiences of scientists, and to the process of science followed throughout. Each installment also invites learners to interact with the science themselves, and encourages development of their identities as science learners.

When choosing whom to highlight, this project intentionally showcases the stories and voices of scientists from a variety of backgrounds – particularly women and underrepresented minorities – in an effort to encourage a diverse group of learners to "see themselves" reflected in the world of science. Projects currently in development showcase, among others, Henrietta Swan Leavitt and the characterization of Cepheid variables, various scientists and the development of stellar classification, and Jocelyn Bell Burnell and the discovery of pulsars. Collaboration with historians at the Center for Astrophysics | Harvard & Smithsonian have added much depth and richness to these stories.

Formative user testing has documented participant gains in interest, knowledge, and personal connections to science and scientists, and has highlighted possible ways of better engaging particular underrepresented groups. Participants were particularly fascinated by connections between the historical world of astronomy and what it is today. We will also present on summative evaluations post-release.

This presentation is based on work performed as part of the NASA's Universe of Learning project and is supported by NASA under cooperative agreement award number NNX16AC65A.

216.08 Monetizing the Sky

11:10 am Thomas Hockey[1]
[1]*University of Northern Iowa, Cedar Falls, IA*

Can one profit from a celestial phenomenon visible to the naked eye? The event itself is free.

The answer is a qualified "yes." The total solar eclipse of August 2017 demonstrated that specialists can derive income from eclipse merchandise and tourism. However, what about the rest of us?

How people make money is an unavoidable aspect of social history and one that, in fact, provides deep insight into an era.

To better answer our question, we need to go all the way back to a similar, continent-spanning total eclipse, at a time when nearly all business was local business: 7 August 1869. Then we see much greater imagination on the part of entrepreneurs.

I will provide examples. For instance, at a time when solar physicists—then the term would have been anachronistic—went to great lengths to mount elaborate eclipse-path expeditions, local towns vied for their visit—and the dollars they would spread within the community. To lure them, city fathers offered municipal services such as the guardianship of police, carpenters, and local transportation.

Branding was effectively used: At least one product adopted an eclipse as its registered trademark. More straightforward was pay-to-look telescope time. Seemingly unique to 1869, I find no other record of a corporation founded specifically to use an eclipse to raise money on behalf of a Not-for-Profit and then dissolved after fourth contact.

Among cash-generating schemes were those that are not considered reputable. Others have appeared at every total eclipse of the Sun since 1869. And will again in April 2024.

40+E and Friends Reception

Tuesday, January 9th 6:30–7:30 PM Hilton Riverside New Orleans Hotel River Room

Final note: For those who qualify, the 40+ E Lounge (Room 213) will be available from 8:00 AM until 5:00 PM each day of the meeting.