

Highlights of the February Sky...

3rd

DAWN: A waning gibbous Moon is about $6\frac{1}{2}^\circ$ to the upper left of Spica in Virgo.

4th

Last Quarter Moon
12:38 pm EST

6th

DUSK: A waning crescent Moon and Antares in Scorpius are about 4° apart.

11th

New Moon
2:08 pm EST

18th

DUSK: A waxing crescent Moon and Mars are separated by $3\frac{1}{2}^\circ$.

19th

First Quarter Moon
1:49 pm EST

DUSK: The Moon is between the Hyades and Pleiades open clusters.

23rd

PM: A waxing gibbous Moon moves to within 4° of Pollux in Gemini.

24th

PM: The Moon is about 2° from the Beehive Cluster (M44) in Cancer.

25th

DAWN: Jupiter, Mercury, and Saturn form a wide triangle above the east-southeast horizon.

26th

PM: The nearly full Moon is about 7° to the left of Regulus in Leo.

27th

Full Moon
3:19 am EST

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ February 2021 ★ ★ ★

This Months KAS Events

General Meeting: Friday, February 5 @ 7:00 pm

Held on Zoom • [Click to Register](#) • See Page 14 for Details

Online Viewing: Saturday, February 6 @ 9:00 pm

Held on Zoom • [Click to Register](#) • See Page 13 for Details

Member Observing: Friday, February 12 @ 5:00 pm

February Freeze Out - Kalamazoo Nature Center - See Page 13 for Details

Introduction to Amateur Astronomy Series Continues

Held on Zoom • See Page 4 for Dates, Times & Topics

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★ ★ ★ www.kasonline.org ★ ★ ★

January Meeting Minutes

The first general meeting of 2021 for the Kalamazoo Astronomical Society was brought to order by President Richard Bell on January 8, 2021 at 7:10 pm EST. With over 70 members and guests attending via Zoom, we commenced the first activity of our 85th year! Kevin Jung, a longtime friend of our guest speaker was given the opportunity to introduce Dr. Ashley.

Dr. James W. Ashley is currently the Science Integration Engineer for the Mars InSight mission at the Jet Propulsion Laboratory in Pasadena, California. He grew up in the Grand Rapids area and was a former member of Grand Rapids Amateur Astronomical Association (former past-president). He is a graduate of Grand Valley State University and received his masters for Michigan State University. After working professionally in hydrology and geology he later earned his PhD at Arizona State University. Among the many achievements (that Kevin was able recount, and many that he didn't have time for) Dr. Ashley worked in the commercial drilling industry for a few years which gave him the background needed to head the research of an extra-terrestrial drilling mission on Mars.

Dr. Ashley opened his presentation with an announcement. The InSight team found out today that they were awarded a mission extension! Having completed their first two years on Mars they would be funded by Congress for an additional two years. The presentation started with him sharing images of Mars, including an overhead view of a dust devil on the surface (taken from the Mars Reconnaissance Orbiter) and a dust avalanche captured by an elevated camera of the InSight lander. InSight's primary mission to Mars is to explore the sub-surface of the planet. It uses a sweet of instruments gathering data to help scientists try to determine the overall structure of the planet. This mission was first attempted by Viking landers in the 1970s which failed. Due to too much noise generating wind, these landers were unable to take any meaningful seismic readings. Today, InSight is successfully collecting seismic data from the planet's surface and has been since its landing in 2018.

So, what is it that the InSight mission is trying to solve? The model that we have for our solar system's formation is



Dr. James Ashley, a Michigan native, gave a presentation on the Mars InSight lander on January 8th.

primarily a stellar formation model. Informed by HII regions and stellar birthplace nebula, where a proto stellar disc will accrete planets while the forming star in the center of the disc is in formation, so that the “stuff” that didn't make it into the stars formation become planets.

Trying to figure out the formation mechanism of planets and subsequently determine the materials that they form, scientists need to take clues from various branches of research. Study of proto-planetary accretion discs in newly forming systems shows that the material forming planetary systems appear to be homogenous. So, did all rocky planets form from the same material? Material taken from primitive meteorites that have fallen to Earth imply yes. The building blocks of the solar system appears to be primarily carbonaceous-chondrite material. Then over the next 4.568 billion years, this material is subjected to heating, melting and gravitational settling as a planet forms, cools and settles into the structure we see today.

Additionally, it has been noted that planetary formation tends to occur in conjunction with supernova events. Nucleosynthesis from supernova create heavy elements. These elements, incorporated into planetary matter, decay naturally and generate decay heat throughout the planet's structure. The decay products of these elements are available in abundance in the formation of planets. Also, as planet materials differentiate (heavy iron, platinum, silver and other elements, sink leaving behind lighter materials nearer to the surface) the interior changes, resulting in the formation of the core, mantle, and crust. By studying each of these stages of formation scientists have improved their models.

Before landers were sent to Mars, we only had Earth based seismology and geology to help us extrapolate what other planets structure could be. In the 1970s seismometers left on the Moon (and returned Moon rock samples) have helped us understand the formation of smaller bodies. Mars' size is in between that of Earth and the Moon. By sending seismometers in to listen to the interior of Mars, we are gaining understanding of a mid-sized structure further refining the models used to understand general planetary formation.

So, what do we know from studying each of these bodies? Well, Earth is still warm and active, having vulcanism and seismic activity due to plate tectonics. It has a combination of inner solid core and liquid outer core. It is suspected that this combination is required for forming a magnetic field. The Moon has cooled and is inactive except for cooling and subsequent shrinking. This relatively recent shrinking has resulted in the formation of thrust faults and wrinkle ridges. The Moon also has some remnant magnetism. This brings us to Mars. It is a relatively accessible planet that we can send landers to. Its size is right in-between that of Earth and the Moon. We know that it still has a warm interior and possible recent seismic activity. But we do not know the thickness of the core, mantle or crust. We also are unsure about its general structure.

The plan for the InSight lander is to take the vital signs of the planet, to determine its structure and temperature. It will collect data to evaluate the core size, composition, and state (is it liquid, solid or multiphase?). It will try to measure the thickness and structure of the Martian crust. Also answer the questions: “what is the mantle structure and composition?” and “how warm is the interior and at what rate is it losing heat?”

The InSight team will attempt to answer some of these questions by measuring the strength and frequency of seismic events. It will analyze the data to pinpoint where in the planet’s structure the seismic events originated. It will record the reactions to meteoroid impacts and also determine how the surface of Mars flexes due to tidal forces from its orbiting moon, Phobos. InSight is equipped to radio-measure spin rate and wobble of Mars. And finally, it is designed to take a temperature profile with depth and thermal properties of the ground.

The presentation then turned to mission timelines. Dr. Ashley discussed construction of the lander at Lockheed Martin but also talked about the international efforts with France and England for construction and functionality of the sensors. InSight was launched from Vandenburg Airforce Base (first west coast launch of a planetary mission). Another first was the use of Cube Sat guidance/communication satellites that monitored the lander and relayed descent and landing communications from a Mars orbit. He then shared images of the landing site taken by the lander and played audio of the seismometers while still on the platform recording our first broadcast of Martian wind. Dr. Ashley also shared images of the Mole showing it trying to climb back out of its intended hole during one of the most difficult challenges the InSight team has faced.

Dr. Ashley closed his presentation by presenting mission accomplishments to date, including recording 500+ small quakes (below magnitude 4) and no large Mars-quakes. He reported a relatively thin crust depth of 20 – 37 km. RISE tracking showed a large iron core of over half the planet’s diameter which is still molten. There have been no unambiguous meteoroid events. It was noted “Mole penetration remains challenged”. And to finish, Dr. Ashley took questions from the group, much of which involved discussions around Martian dust.

Presidents Report: Members were invited to show off any astronomy related gifts that they had received over the holiday. Richard shared a new pair of 10×50 Binoculars. Mike Sinclair received a copy of *The Last Stargazers: The Enduring Story of Astronomy’s Vanishing Explorers* (as highlighted in the last general meeting). Next, we received a series of announcements concerning the Remote Telescope. A Road Runner update: photograph from Mike Beno clearly shows our Remote Telescope mascot just outside the observatory in Arizona. Richard then shared that the flat-field screen for the CDK20 was ordered. And finally, he announced his intention to write and record a Remote Telescope training video so members don’t have to attend dedicated training sessions.

In general news, our membership in 2020 reached an all-time high of 191 (~300 members with families included)! Richard

reminded everyone to update their Member Profile for the website. Richard closed the President’s Report by introducing this year’s board members.

Observation Reports: Besides general griping about “A lot of clouds...” and “satellite photo-bombs...”, Aaron & McKenzie Roman reported completing the Astronomical League Lunar Observing Program together. In current events, a reminder was made for the Mercury/ Jupiter/ Saturn conjunction.

In conclusion Richard closed out the first general meeting of the year by reminding members of upcoming 2021 events including the *Introduction to Amateur Astronomy* lecture series and next month’s presentation on exoplanets. Don made a nice speech thanking Dr. Ashley and all scientists from JPL for keeping science in the forefront of our discussions. Rose (Dr. Ashley’s adorable young daughter) said hello to everybody and at 9:10 pm EST the meeting was adjourned.



The KAS Board met on January 10, 2021. It was held virtually via Zoom and was brought to order by Richard Bell at 5:02 pm EST. Other attending members were as follows: Jack Price, Don Stilwell, Aaron Roman, Joe Comiskey, Dave Garten, Kevin Jung, Scott Macfarlane and Pete Mumbower. Richard opened the board meeting with a reminder (for the benefit of the new and re-elected members) of board meeting rules and expectations. After which, Don Stilwell was asked to present the Treasurer’s Report. He noted the increased membership and renewed membership getting caught up. It was discussed by other members that the sale of a CCD camera (and other equipment) and donation by Henry Upjohn offset almost ¾ cost of the new flat screen purchased for the Remote Telescope. After a brief question and answer clarifying particulars of the Report, it was brought to the Board’s attention by Don that the names on the Advia account were not up to date. It was decided that Don, Jack and Aaron would meet the following day at the credit union to update the names on the account.

Next Richard presented upcoming events for January thru March, with a brief summary for each. Richard focused on *Introduction to Amateur Astronomy* lecture series noting that more than 200 registrations had been made to date! Richard also asked for a volunteer for the event to help answer questions. Other items discussed were upcoming general meetings, Online Viewing Sessions and the February Freeze Out. After a short absence, it was nice to see Joe’s return to meetings. Richard said he had some catching up to do concerning press releases.

In unfinished business Richard and Jack discussed use of a new online vendor for an updated line of KAS clothing. Jack said that he had sent a few requests to other local clubs for

recommendations but had not heard back from them. Richard wanted to show the Board a new KAS T-shirt/Sweatshirt design but didn't have it available at the time. He then briefly reviewed 2021 general meeting schedule noting that Rick Hedrick (PlaneWave President & CEO) in June and Troy Thrash (Air Zoo President & CEO) scheduled in September are not confirmed. There was some discussion if there would be any in-person meetings in April at KAMSC but there was no determination.

Richard then introduced one new business item. He presented the idea of purchasing the webinar version of Zoom for *Introduction to Amateur Astronomy* lecture series. The large number of potential participants is exciting, but a larger platform would be required. The Board discussed whether it was best to purchase one month or two noting that too many months would be cost prohibitive. In the end we agreed on purchasing one month to start and renew the certificate as required.

In other business, Pete Mumbower and Jack Price discussed if there was a benefit to using a different platform than PayPal for membership renewal. No determination was made.

There was no argument made to skipping a February board meeting. The next board meeting was agreed for Sunday, March 14th @ 5:00 pm EDT on Zoom. Richard closed the meeting 5:57 pm EST after which the board members all hung out and chatted for a few.

Respectfully submitted by Aaron Roman



If you've been a regular reader of *Prime Focus* for the past several years, you'll notice something is missing from this issue. There is no listing of star parties for 2021. Obviously, the pandemic has something to do with that. I received word that the 2021 Winter Star Party in the Florida Keys has been canceled. I have also received emails about the Texas Star Party and Illinois Dark Skies Star Party for this year planning to go forward. From the looks of their website, if TSP does happen, it'll be under strict conditions. The gathering in Illinois isn't until October, so it has a better chance of going forward. Hopefully life will start going back to normal sometime this summer. If you are anxious to attend a star party, you can always [peruse through the links](#) on our Astroweb Yellow Pages.

One event that has been successful despite the pandemic is the *Introduction to Amateur Astronomy* lecture series. While I may not be able to invite KAS members to setup binoculars or telescopes and share their knowledge with attendees, the series is pretty adaptable to a webinar format. The first installment was held on Saturday, January 23rd and nearly 500 astronomy enthusiasts from all over the world attended. And I do mean *all over the world*. Aside from attendees in numerous U.S. states and territories (including Hawaii and

Puerto Rico) and Canada (including one from the Yukon Territory), people from Belgium, Bolivia, Colombia, Chile, Germany, India, the Netherlands, Norway, the Philippines, and United Kingdom viewed Part 1: *Our Place Among the Infinities*. Current registration stands at over 800 (yes, *hundred*)!

Naturally, because I tend to have lousy luck, there was one dark cloud over my head early on. Lloyd Simons thankfully volunteered to moderate the chat and Q&A, but this somehow caused a Zoom glitch. When I started the talk, Zoom showed Lloyd as the speaker. Since he was muted, no one could hear me. People were pointing this out in the chat, but I don't look at that while lecturing as its distracting. His wife, Jessica, had to call me on the phone. Once I got word and stopped sharing my screen, the sound came right back on. I didn't have to change a thing! Most people seemed to be very understanding and patient, for which I am grateful. What cooks my goose is that we held a test webinar the night before and everything worked fine. UGH!!!

Please join us for Parts 2 & 3 this month. Learn all about them below...(we'll be sure to do a sound check)...



Introduction to *Amateur Astronomy*

The five-part lecture series that will help you become a star-hopping skymaster continues! [Please register](#) if you haven't done so already. Here are the topics for February:

Part 2 — February 6th:

Discovering the Night Sky

Is that a bright star or a planet? Where's the constellation Orion? Your first task as an amateur astronomer is to learn your way around the night sky. Learn how to find any star or constellation in the night sky with the use of a simple star map. We'll also look at several of the best books geared toward the novice stargazer and the many sophisticated planetarium programs for your home computer.

Part 3 — February 20th:

Binocular Basics

Every amateur astronomer, novice or advanced, should own at least one good pair of binoculars. They make an ideal first "telescope" because of their wide field of view, ease of use, portability, versatility, and low cost. Several types of binoculars are available, but which ones are best for astronomy? You'll be amazed at what you can see!

Time: 1:00 pm - 3:00 pm

Location: Online via Zoom



Please visit the *Introduction to Amateur Astronomy* [web page](#) for more information on the entire series.

KAS Member Observatories

Part 7: Roger Williams' Observatory

I began the hobby of astronomy a few years after arriving in Kalamazoo in 1966. A friend in my workplace had successfully built a Newtonian reflector, and his experience encouraged me to give it a try. At that time, kits for making mirrors were widely sold, and I ordered the parts for an 8-inch $f/7.5$ mirror. The grinding and polishing steps went well until the figuring was nearly done, at which time a gentle bump against a porcelain sink chipped a horrifying flake of Pyrex off the back of the mirror. Since the light was to reflect off the front side, I finished the mirror anyway and had it aluminized. Given its unfortunate history, the telescope built with this mirror worked reasonably well for a time, until relief of stress in the glass caused a bit of warping.

Now that the principle had been demonstrated, I had another try, this time with a 10-inch $f/6$ mirror and more care in the handling. Disasters were happily averted, and the resulting telescope (which still exists) gave years of service. I stored the tube in my garage and carried it outdoors for use, where there was a German equatorial mount on an iron pipe set in concrete.

As time passed, our trees closed in around the pier, and the mount was replaced with one made from bored-out 3-inch water pipe components (Optic-Craft Machining). It stood on



a 3-wheel dolly that allowed it to be moved out of the garage for each use. This mount included a clock drive (OK except for a very large periodic error). At this time, I also began getting interested in CCD astrophotography, initially with an SBIG ST-6 camera and later with the model ST-8E. This setup gave some enjoyable time with deep-sky imaging and variable star monitoring. Ironically, some of the most interesting work dealt with ways to compensate for the limitations of the clock drive.

Upon retirement from my workplace, I began to consider an upgrade in equipment. Since this would likely be the last major acquisition for my setup, I considered the largest telescope I could handle, one with no homemade components. The decision went to a 14-inch Celestron EdgeHD Schmidt-Cassegrain telescope on a Software Bisque Paramount MX equatorial mount. Because of the weight of the telescope, I anticipated considerable difficulty in lifting it high enough to attach to the mount.

The answer to this was a Pier-Tech Tri-Pier 2 portable adjustable-height pier. The telescope could be attached to the mount with the pier in the lowest position. An electrical motor would then raise the mount as much as 20 inches higher. This actually worked very well except for the fact that I had made a poor estimate of how much the passing years had subtracted from my strength, and setup of the mount was still challenging.

Also, the time that a photographic target remained free of the trees was a bit short for color photography with RGB filters. In the event that we happened to get two or more usable viewing nights in a row, a Telegizmos insulated telescope cover could be used to save setup time. A significant addition at this point was a Starizona Hyperstar lens and an SBIG STF-8300C color CCD camera. Operating at $f/2$ with the 14-inch Celestron telescope, this gave good deep-sky pictures with 60 stacked exposures of 1 minute each. This





setup worked well until the next stage of development.

The aforementioned next stage arrived somewhat unexpectedly. Various health-related problems led us to think about moving to a retirement community. This did not augur well for the astronomy hobby, since there are typically tight restrictions on what may be kept on the lots. Friendship Village was adding to an area of duplex homes, with reasonable yard space and limited light pollution. Best of all, they were willing to consider making available a patch of ground on the edge of the settled area that could hold a modest observatory building. A dome installation was liable to be considered an eyesore by this population, but a roll-off roof might be inconspicuous enough. In fact, The Tele-Station 2 from [Pier-Tech](#) was barely distinguishable from storage sheds already in use. It does not require a structure on which to roll off the roof, which in the open position rests on two cantilevered beams with a line of small wheels.

We moved into Friendship Village with the agreement that they would pour a 9' x 9' concrete slab of 6-inch thickness and assemble the prefabricated Tele-Station 2 onto it. Electricity was provided from a buried cable. The installation

is shown on page 5. Part of our agreement was that we would seek to make some time available to residents for visual use. We have had some success in this regard, but we need more attention to handicap accessibility.

After the first year of use, a surprise arose as a result of insufficient foresight. The management of Friendship Village decided to add a clubhouse, which would include the land currently occupied by the observatory. Our fears were relieved when we were informed that they were willing to move the observatory (approximately 100 yards). They poured a new slab, and the building (now assembled) was picked up in one piece and carried to the new location (see below).

Since we had not anchored the pier into the original concrete slab, moving the optical equipment was a reasonably simple job. The biggest challenge was moving the electrical service, which required a longer run to the new



location. Everything is now hooked up again, and the remaining problem is a water leak onto the floor, which has so far resisted our attempts at caulking. Up to this point, all of my astrophotography has been on solar and planetary targets. The deep-sky work has been hampered by inaccessibility of the construction site, but this is due to be finished in the spring. My hope is then to do a proper job of calibrating the alignment and trying narrow-band filters to see if light pollution can be removed as well as alleged. We also continue the effort to share our interest in astronomy. Many of the residents are interested in the subject, and the observatory is a unique asset for this kind of community.

Roger Williams (and his wife Molly) joined the KAS in 1998 and served on the Board (primarily as Secretary/ALCOR) from 2001 - 2020. Visit his [Astrophotography Gallery](#) to view his planetary and deep sky images.



85 YEARS OF LOOKING UP

A Brief History of the Kalamazoo Astronomical Society



The history of the Kalamazoo Astronomical Society can be traced to its origin in 1936. The group was founded by [Leonard James Ashby](#) as the Kalamazoo Amateur Astronomical Association (KAAA). Mr. Ashby also served as the organization's first president. Inaugural members included amateur astronomers from the community at-large and astronomy students from Kalamazoo College. Some of the earliest gatherings were held in Mr. Ashby's observatory built into the top of his garage at 437 Stone Street. Students in the K-College [astronomy class](#), taught by Professor John Hornbeck, also gathered for viewing at Ashby's observatory. Based upon a [newspaper clipping](#) in the *Kalamazoo Gazette*, we believe the first formal gathering of the KAAA was held in Mr. Ashby's home on September 30, 1936.

As noted, the KAAA consisted of young and old astronomy enthusiasts from the start. In addition to Mr. Ashby, some of the other prominent area amateur astronomers included Hans

section of the November 1939 issue of [Scientific American](#). Alfred M. Bryant was also the subject of at least two articles. We first learned of Mr. Bryant's name from Philip Steffey, who joined the KAAA in 1953 at the age of 14 and remained a member until 1960. He wrote an article in which he mentions first joining the KAAA. He described Mr. Bryant "as the patriarch of astronomy in the Kalamazoo area." This certainly seems to be the case from what was found in old newspapers.

The [first article](#) found on Mr. Bryant's telescope making efforts was in the *Detroit Free Press* from March 28, 1937 (page 10). It describes how he and his neighbor, Bliss Wheaton, learned to build telescopes. One paragraph reads as follows: "The city has an active Astronomers' Club with a score of enthusiastic members. An evening class in astronomy has drawn another eager group." Mr. Bryant would go on to become a prolific telescope builder. Several



& Lillian Baldauf, Alfred M. Bryant, Jim Hopkins, Leonard Hayden, Edgar Pashby, William Persons, James Sigler, Louis Stadler, and Dr. Lawrence N. Upjohn. Commercially built telescopes were fairly expensive at the time, so many of the members constructed their own instruments, using surplus optics or grinding their own mirrors.

At least two of our members received a fair amount of notoriety for their amateur telescope making efforts. The *Kalamazoo Gazette* [published an article](#) about Mr. Ashby's successful effort to grind a 10-inch primary mirror. Both he and his wife, Nona, were featured in *The Beginner's Corner*

of his telescopes were shown in an article written by Albert Ingalls in the [January 1943 issue](#) of the *Amateur Telescope Making Journal*.

In the early years, the Association met during the school year - from September through May. Eventually, meetings were held from March through December as more people outside of Kalamazoo College joined the group. Most meetings were held in member's homes, which was convenient for the small, close-knit group. Some meetings were held on the campus of Kalamazoo College and Western Michigan College (now known as WMU). The annual picnic was held

Sky & Telescope's "Amateur Astronomers" Section

Kalamazoo: On September 14th, at the regular meeting of the Kalamazoo Amateur Astronomy Association, William Persons will speak on "The Tides." The meeting is at the home of Dr. H. R. Cobb, 3319 Knox Avenue.

Sept. 1946, p. 10

Kalamazoo: Meeting in the Science Hall at Kalamazoo College, on November 9th, the Kalamazoo Amateur Astronomy Association will hear a talk by Dr. J. Hornbeck on "The Spectroscopy in Astronomy."

Nov. 1946, p. 8

Kalamazoo: At the home of Mr. and Mrs. D. C. Lawrence, 307 Woodward, Comstock, the Kalamazoo Amateur Astronomy Association will hear a talk by Alfred Bryant on "The Sun." The meeting is on Saturday, June 21st.

June 1947, p. 12

Kalamazoo: At the meeting of the Kalamazoo Amateur Astronomy Association on October 12th at the home of Dr. and Mrs. L. N. Upjohn, 1556 Long Road, Dr. Upjohn will speak on "Mira."

Oct. 1946, p. 8

Kalamazoo: Meeting at the science building at Western Michigan College, the Kalamazoo Amateur Astronomy Association will hear a talk by Dr. Paul Rood on "Control and Use of Atomic Energy." The meeting is on Saturday, May 24th.

May 1947, p. 7

Kalamazoo: A potluck dinner at Wolfe Lake, 12 miles west on Route M-43, is scheduled for the Kalamazoo Amateur Astronomy Association on September 13th. The history of the association will be given by Edgar Pashby; pictures will be shown; and there will be observing if weather permits.

Sept. 1947, p. 10

at Wolfe Lake for several years. Many of these gatherings are listed in *Sky & Telescope's* "Amateur Astronomers" section throughout the 1940s and 1950s. The [meeting agenda](#) was a brief presentation by one of the members on a topic of personal interest, followed by backyard telescope viewing.

In 1956, the KAAA affiliated itself with several other astronomy clubs in Michigan, Indiana, Ohio, and Kentucky, founding the Great Lakes Region of the Astronomical League. The function of the League was to connect members of the clubs within the region and to bridge the amateur groups with the universe of professional astronomy.

A new public library/museum was being planned in the mid-1950s. In 1957, KAAA President [Hans Baldauf](#) persuaded Alexis Praus, Director of the Kalamazoo Public Museum, that a planetarium would be an excellent addition to the new building. Praus agreed and asked Baldauf if the Association would be able to assist in raising funds for a planetarium in the facility. Through the Association, \$11,000 was raised. The Kalamazoo Foundation provided an additional \$24,000 to complete the planetarium. The planetarium opened its doors to the public on May 23, 1959. For the first few years of operation, members of the KAAA provided volunteer lecturers for the planetarium's public programs.

The first of three name changes for our group occurred during a meeting on February 20, 1960. The KAAA was generically known as the "Kalamazoo Astronomy Club" (KAC) for the remainder of the decade.

Toward the end of the 1960s, the membership of the group had grown older. Because meetings were held in member's homes, new members could become aware of the organization only by invitation or by reading whom to contact in *Sky & Telescope* magazine. As new members entered the group, the close ties that existed between the original Association members did not develop. The group was beginning to fray.

New, younger members entered the organization from time to time. Eventually, they took the torch from the original Association. In the autumn of 1968, KAC President Roger McPherson announced that the older members no longer

wanted to continue meeting and that the future of the organization was in the hands of its younger members.

One of the first changes was making the club more accessible to new members. Meetings shifted from member's homes to the Adventure House at the Kalamazoo Nature Center. Following the meetings, members would view the night sky from the Adventure House parking lot. A constitution was drafted for the operation of the group, which was then called the Kalamazoo Amateur Astronomical Society (KAAS). The KAC newsletter, *The Northern Lights*, was also rechristened *Prime Focus* and celebrated its 50th anniversary in 2020.

For a few years the Society met and observed at a clubhouse on E Avenue, provided by the Kalamazoo Nature Center. The clubhouse was set up with facilities for grinding telescope mirrors and overnight accommodations of observing. Unfortunately, the plumbing never worked properly and the club members misused the facility. After a few years it began to deteriorate.

Society members searched for a better meeting site. Mike Potter, then President of the KAAS, contacted Alexis Praus



KAS members outside the Hans Baldauf Planetarium at the Kalamazoo Public Museum in the spring of 1983.



We began holding general meetings in the presentation center at the Kalamazoo Area Math & Science Center in 1996. Several prominent professional and amateur astronomers have been guest speakers over the years.

at the Public Museum. The Society was welcomed to meet in the planetarium (now called the Hans Baldauf Planetarium after his death in November 1965). At the time, several Society members learned to operate the museum's new planetarium projector. Once again, the Society provided volunteer support for public shows at the planetarium.

The Society grew rapidly with the help from two astronomical events. Several members participated in an expedition to see a total eclipse of the Sun on March 7, 1970 from a football field in Alma, Georgia. At the meeting where members shared their results, Bill Nigg came to show the eclipse photographs he shot in North Carolina. The eclipse was one event. The other was the apparition of Comet Bennett. Several club members would drive in the early morning hours to an observatory Roger McPherson was building in his backyard. The comet provided several weeks of excitement which strengthened the interest of many Society members. During this period, the club name was shortened to the Kalamazoo Astronomical Society.

The growth phase lasted until 1976. At the August meeting more than 90 members and visitors jammed their way into the planetarium to hear about the Viking space probe's discoveries on the surface of Mars. Gradually, the Society declined as core members aged past college years and sought employment. Some found work in their area of interest. Some went away to school, some moved for employment, and some lost interest as new hobbies claimed their spare time.

Astronomical events in the early 1990s helped to start a new period of growth for the Society. Many members watched the partial phases of the July 11, 1991 solar eclipse. Several members traveled to Baja California to view the totally eclipsed Sun. Three years later an annular eclipse crossed Southwest Michigan. The whole Society became part of a major observing program which included the Kalamazoo Area Mathematics & Science Center (KAMSC), the Kalamazoo Public Museum Planetarium, fifteen area high schools, and amateur radio operators. Mike Sinclair and Eric Schreur were [named joint winners](#) of the 1996 Hans Baldauf

Award due to their work on the Northernmost Eclipse Graze Line Project.

Membership once again began to rise in the 60th year of the KAS. It also saw the end of an era. After 30+ years, the Society held its final meeting in the Hans Baldauf Planetarium at the Kalamazoo Public Museum on December 1, 1995. The museum closed its doors forever on December 23rd and reopened in a new building as the Kalamazoo Valley Museum in February 1996. The new KAS President, Mike Sinclair, moved us to into the Presentation Center at the Kalamazoo Area Math & Science Center. We now had to find monthly guest speakers instead of relying on the planetarium for entertainment. This, along with increased publicity, resulted in a dramatic increase in meeting attendance. Many prominent members of the professional and amateur astronomical community have given presentations at our monthly gatherings at KAMSC.

That same year, the new KAS Board decided to pursue non-profit status. Work began on a new constitution and bylaws. At the same time, several members began drawing up plans for an observatory at the Kalamazoo Nature Center. [Ground was broken](#) on October 16, 1996. Owl Observatory was [dedicated](#) on August 22, 1998. The final version of KAS [Articles of Incorporation](#) and [Bylaws](#) were finally approved by the KAS Board in February 1999. The KAS received incorporation status from the state of Michigan in April 1999.

Two bright comets also helped create a boom in membership. Comet Hyakutake graced the skies in March 1996. Many KAS members were featured in the local media. Over 600 people enjoyed the astronomical trifecta of a deep-partial lunar eclipse, Mars near opposition, and Comet Hale-Bopp on March 23, 1997. Hundreds more came out to the Nature Center for *CometWatch* in early April 1997.

A campaign to upgrade Owl Observatory began in 2000. Richard Bell led an effort to sell 1,000 pair of eclipse glasses for the December 25th partial solar eclipse. Matt Borton and his father Gordon installed a new roll-off system for the roof and built a custom telescope pier. Equipment and materials for this project were purchased with a \$3,700 donation from Consumers Concrete. Matt earned his Eagle Scout badge for his efforts. Over \$3,300 was raised to purchase a 12-inch Schmidt-Cassegrain, which was [installed](#) on June 7, 2001.

Thousands of people observed the Universe through the 12-inch SCT at [Astronomy Day](#) events between 2001 and 2004. An estimated 1,200 people observed Mars during its historic



Well over 700 members and guests viewed the Transit of Venus at Warren Dunes State Park on June 5, 2012.

opposition on August 27, 2003. Hundreds of students from the local colleges and universities have used the 12-inch SCT to complete class projects. Dr. John Miller, from WMU, used the 12-inch to measure the speed-of-light from distant quasars.

One of the most significant accomplishments of the KAS took place in February 2004. The KAS was FINALLY granted 501(c)(3) non-profit status from the IRS. Several small donations and grants were soon given by members and corporations. This money was used to purchase materials to enhance our outreach and educational activities. It would also lead to several grants for high-profile Astronomy Day speakers and the major fund-raising campaigns that would follow in the years ahead.

KAS members invited the public to Warren Dunes State Park for two special astronomical events in May and June 2012. The [partial solar eclipse](#) on May 20th was mostly clouded out, but the eclipsed Sun became visible through a gap in the clouds shortly before setting. This took place during an intense, but spectacular lightning storm that dazzled those that remained. Over 700 people (perhaps a thousand) returned to Warren Dunes on June 5th for the last [Transit of Venus](#) of our lifetime. Skies were crystal clear for the entirety of the transit, while being mostly clouded out further inland. Approximately 30 telescopes were setup to enjoy this rare planetary alignment.

The KAS received an amazing offer from member Mike Patton in January 2008: In return for technical advice and guidance with equipment for his new 20' x 20' roll-off roof observatory at Arizona Sky Village, near the small village of Portal, Mike would provide the KAS with space in that observatory for a telescope to be controlled remotely over the Internet. A strong majority of KAS members voted to begin the "Robotic Telescope Project" in December 2009. Our fund raiser, the largest in KAS history and led again by Richard Bell, began in September 2011 and officially concluded in November 2018. In all, over \$122,000 was raised - the majority of which was through member contributions. KAS members made two group trips to [install the Remote Telescope](#) in December 2016 and March 2017. Members were at last able to reserve time on the telescope



KAS members lift the PlaneWave CDK20 telescope onto the Paramount MEII on December 29, 2015.



KAS members assemble the Leonard James Ashby Telescope in Owl Observatory on September 8, 2019.

beginning in the spring of 2019. A special dedication ceremony was held on November 16, 2019 at Western Michigan University.

After nearly 18 years, the 12-inch SCT in Owl Observatory was sold and a second fund-raising campaign began – this time to seriously upgrade the facility. Thanks to the sale of eclipse shades for the August 2017 *Great American Eclipse*, donated telescopes, and generous contributions from members over \$41,000 was raised. A new pier, one that could support the weight of our new equipment, was constructed by KAS member Josh Taylor-Lehman. The initial equipment, a Meade 16-inch SCT and Astro-Physics 1600GTO German equatorial mount, were installed on September 8, 2019. Additional equipment, including a Tele Vue 4-inch refractor and eyepieces, were added in 2020. Thanks to the efforts of the observatory's original builder, Dave Garten, the roof was at last motorized – making the facility accessible to everyone. The new instrument was named the [Leonard James Ashby Telescope](#), in honor of our founder and first president.

Many long-term goals still remain. We're considering starting an astronomy expo, similar to the Northeast Astronomy Forum in New York, sometime in the 2020s. It would be called the "Great Lakes Astronomy Super Show" (GLASS). We would still like to obtain a piece of dark-sky property. At first this could be a place for members to go and observe, but eventually a larger observatory with a meeting space that could double as a classroom could be built there. We would also like to purchase a portable planetarium and increase our community outreach efforts. All these projects could be tied together in a comprehensive "Schoolyard Stargazer" program. These highly ambitious goals work toward the singular purpose of "promoting the exchange of information among those with a common interest in all areas of astronomy" and "to educate the public about astronomical discoveries and events." The future is bright indeed.

The original version of this article was written by Eric Schreur and appeared in the June 1995 issue of "Prime Focus." Numerous revisions and updates were made by Richard Bell.



Landing on Mars: A Trick Feat!

by **David Prosper**



The Perseverance rover and Ingenuity helicopter will land in Mars's Jezero crater on February 18, 2021, NASA's latest mission to explore the red planet. Landing on Mars is an incredibly difficult feat that has challenged engineers for decades: while missions like Curiosity have succeeded, its surface is littered with the wreckage of many failures as well. Why is landing on Mars so difficult?

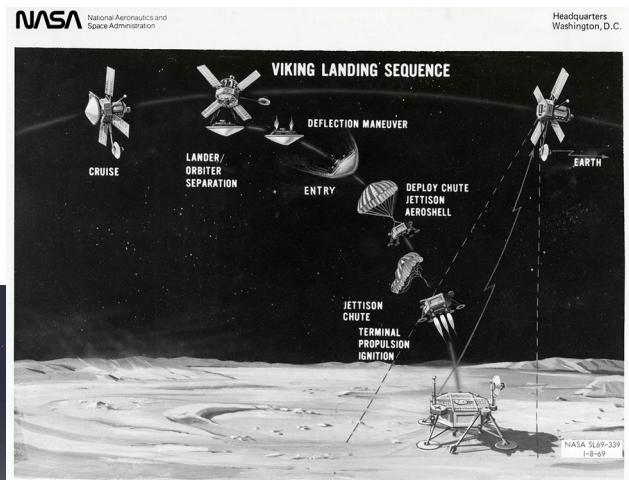
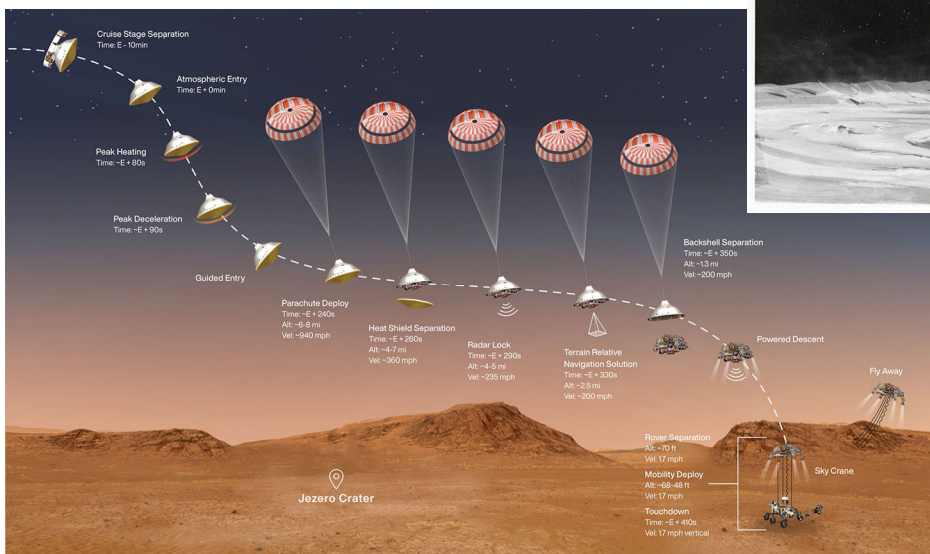
Mars presents a unique problem to potential landers as it possesses a relatively large mass and a thin, but not insubstantial, atmosphere. The atmosphere is thick enough that spacecraft are stuffed inside a streamlined aeroshell sporting a protective heat shield to prevent burning up upon entry - but that same atmosphere is not thick enough to rely on parachutes alone for a safe landing, since they can't catch sufficient air to slow down quickly enough. This is even worse for larger explorers like Perseverance, weighing in at 2,260 lbs. (1,025 kg). Fortunately, engineers have crafted some ingenious landing methods over the decades to allow their spacecraft to survive what is called Entry, Descent, and Landing (EDL).

The Viking landers touched down on Mars in 1976 using heat shields, parachutes, and retrorockets. Despite using large parachutes, the large Viking landers fired retrorockets at the end to land at a safe speed. This complex combination has been followed by almost every mission since, but subsequent missions have innovated in the landing segment. The 1997 Mars Pathfinder mission added airbags in conjunction with parachutes and retrorockets to safely bounce its way to a landing on the Martian surface. Then three sturdy "petals" ensured the lander was pushed into an upright position after landing on an ancient floodplain. The Opportunity and Spirit missions used a very similar method to place their rovers on the Martian surface in 2004. Phoenix

(2008) and Insight (2018) actually utilized Viking-style landings. The large and heavy Curiosity rover required extra power at the end to safely land the car-sized rover, and so the daring "Sky Crane" deployment system was successfully used in 2012. After an initial descent using a massive heat shield and parachute, powerful retrorockets finished slowing down the spacecraft to about 2 miles per hour. The Sky Crane then safely lowered the rover down to the Martian surface using a strong cable. Its job done, the Sky Crane then flew off and crash-landed a safe distance away. Having proved the efficacy of the Sky Crane system, NASA will use this same method to attempt a safe landing for Perseverance this month!

You can watch coverage of the Mars Perseverance landing starting at 11:00 AM PST (2:00 PM EST) on February 18th at [NASA Live](#). Touchdown is expected around 12:55 PM PST (3:55 PM EST). NASA has great resources about the Perseverance Rover and accompanying Ingenuity helicopter on the [Mars 2020 website](#). And of course, find out how we plan to land on many different worlds at [nasa.gov](#).

This article is distributed by NASA Night Sky Network. The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](#) to find local clubs, events, and more!



Illustrations of the Entry, Descent, and Landing (EDL) sequences for Viking in 1976, and Perseverance in 2021. Despite the wide gap between these missions in terms of technology, they both performed their landing maneuvers automatically, since our planets are too far apart to allow Earth-based engineers to control them in real time! (NASA/JPL/Caltech)

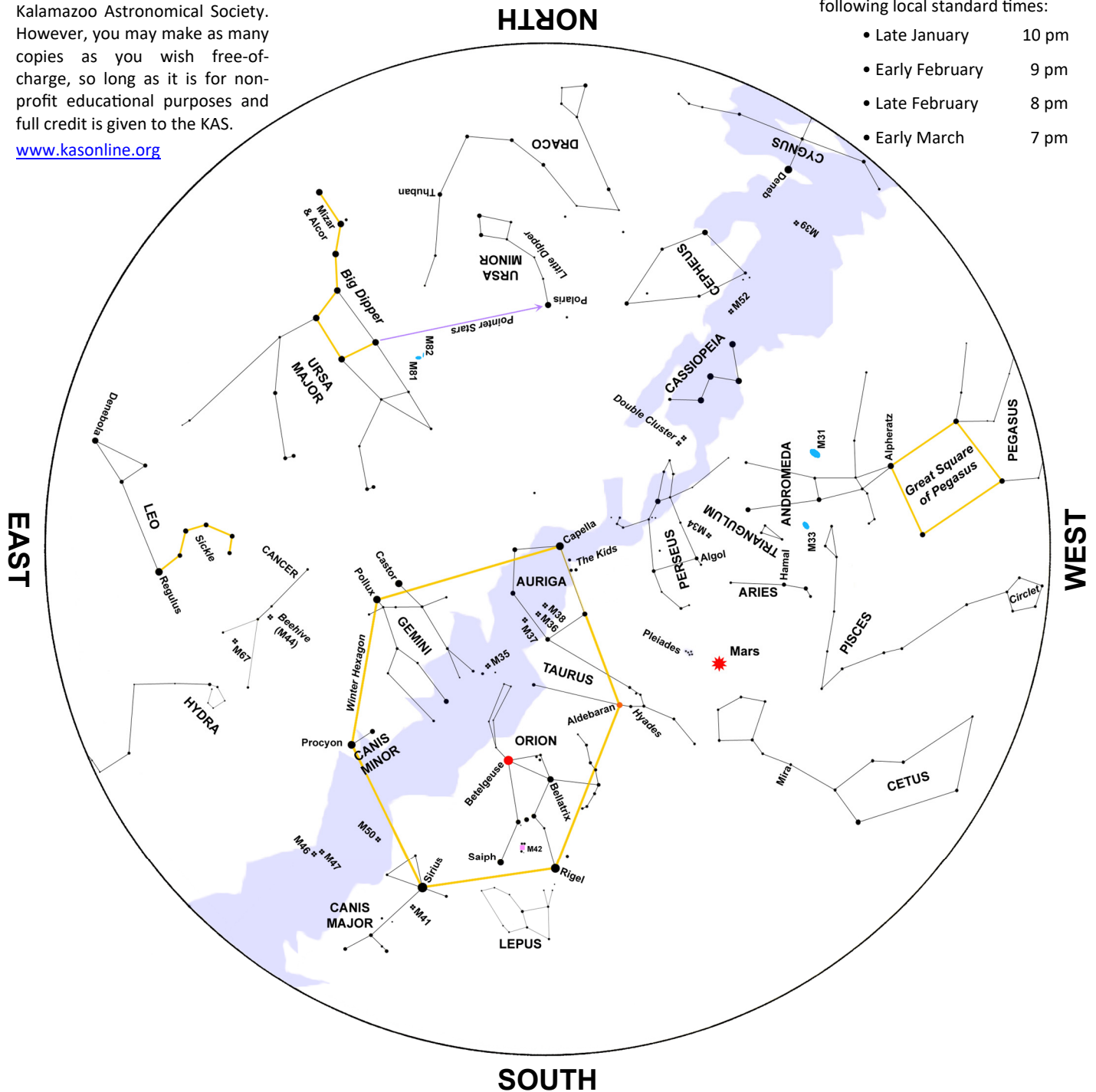
— February Night Sky —

This star map is property of the Kalamazoo Astronomical Society. However, you may make as many copies as you wish free-of-charge, so long as it is for non-profit educational purposes and full credit is given to the KAS.

www.kasonline.org

This map represents the sky at the following local standard times:

- Late January 10 pm
- Early February 9 pm
- Late February 8 pm
- Early March 7 pm



Get a preview of the summer sky before dawn on Feb. 6th. Antares, the red-orange supergiant star representing the heart of Scorpius, will be above the south-southeastern horizon. On that morning, you'll also find a waning crescent Moon $4\frac{1}{2}^\circ$ to the star's upper left. Both will look splendid together in 7×50 or 10×50 binoculars.

The Moon, now in a wide waxing crescent phase, will be 4° to the lower left of Mars after sunset on Feb. 18th. On Feb. 19th, the now first quarter Moon will be nestled between the Hyades and Pleiades.

A waxing gibbous Moon will be near the Beehive Cluster (M44) in Cancer on Feb. 24th, but the stars will be tough to spot -

even with binoculars - thanks to the Moon's overwhelming glare.

Get up before dawn on Feb. 25th and look low on ESE horizon. You'll spot Jupiter, Mercury, and Saturn in a wide triangle. Mercury will be at the triangle's apex. The triangle will hold its shape for the next several mornings.

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February Freeze Out



Winter nights can be ideal for observing. When it's actually clear during a winter night in Michigan, the sky can be unbelievably transparent. So why don't amateur astronomers turn out in droves to winter observing sessions? It's because it gets **REALLY, REALLY COLD** on a clear winter night! Now comes the time of year when the hardcore members of the KAS brave the frigid temperatures to enjoy the deep sky delights that most people probably miss because of the frigid conditions.

Friday, February 21st @ 7:00 pm

Kalamazoo Nature Center

Create a Member Profile

Learn about your fellow KAS members and let them learn about you on the [Member Profile page](#). Find members with similar interests, get advice on purchasing astronomical equipment, and much more. This is what the KAS is all about! Please create or update your KAS Member Profile at:

https://www.kasonline.org/profile_form.html



ONLINE VIEWING SESSION



Enjoy the wonders of the universe as seen through the "eyes" of the KAS Remote Telescope, located under the dark skies of southeastern Arizona. Attendees will view images of deep-sky objects captured with the system's CCD cameras in Arizona, transmitted to participant's computer, tablet, and smart phone screens in southwest Michigan and around the world. Images acquired during each session will be made available for download.

Saturday, February 6th (13th) @ 9:00 pm

Held on Zoom • [Click here to Register](#)

General Meeting Preview



Truth is Stranger than **SCIENCE FICTION**

presented by

Dr. Jessie Christiansen

Humankind speculated about the existence of planets orbiting other Suns for hundreds if not thousands of years before their existence was finally confirmed. During that time we invented and depicted many new and now iconic sci-fi worlds - mysterious planets with exotic landscapes, orbiting alien star systems. When our technology finally caught up with our imaginations, what we found was even more extraordinary than we had imagined. As science curator at the NASA Exoplanet Archive at Caltech, Dr. Christiansen will take you on a tour of some of the more fantastic exoplanet discoveries we have made, including some famous, fan-favorite fictional planets brought to life.

Friday, February 5 @ 7:00 pm

Held on Zoom • [Click here to Register](#)

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STAMP

