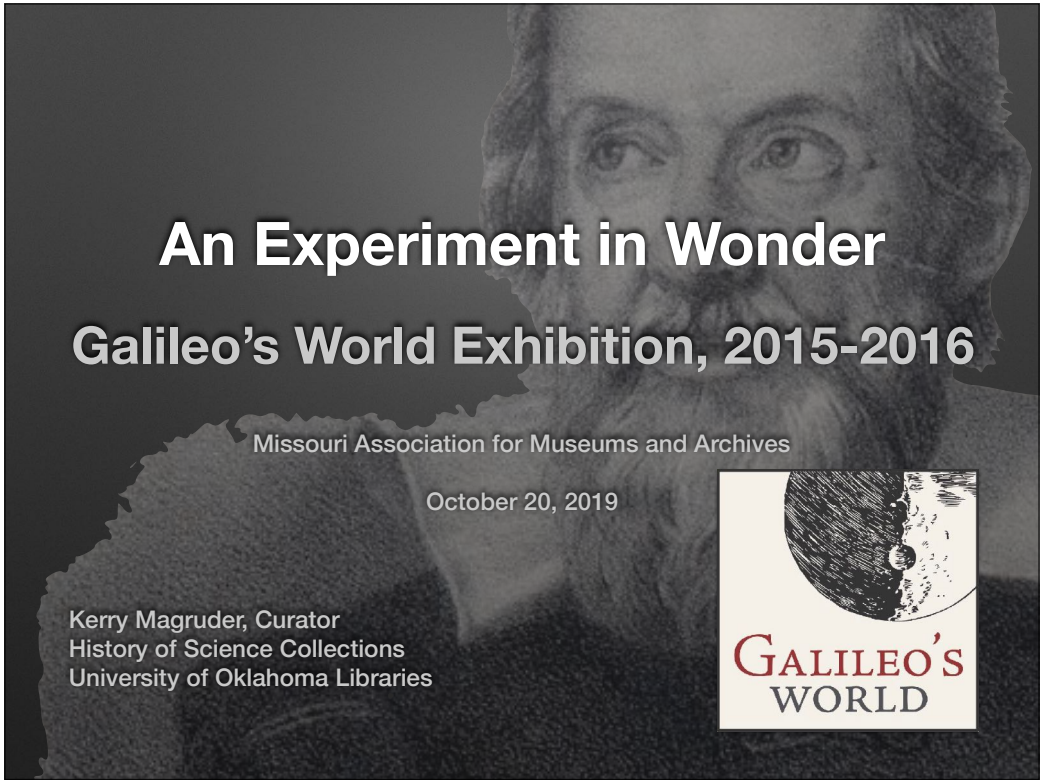

Thank you for inviting me to tell you the story of a Galileo's World exhibition in 2015-2016. It was truly an Experiment in Wonder, both for our visitors and for us. We had never done anything like it before.

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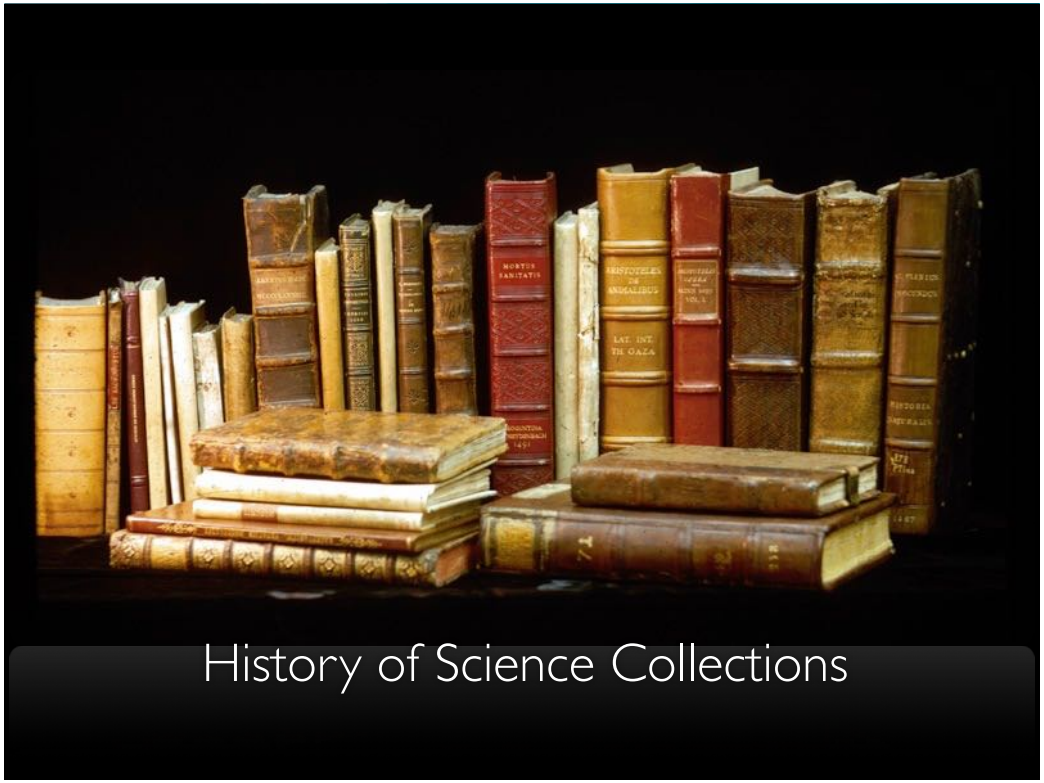
Research universities are often best known for their athletic programs. But among historians of science around the world,



the University of Oklahoma is known for the History of Science Collections.

The History of Science Collections began in 1949 with an initial gift of rare books by Everette Lee DeGolyer, an alumnus of the OU geology school. -- In 1954, Duane Roller became the first curator and professor of the history of science. When he retired in 1990, a separate Department for the History of Science had been created. -- Marilyn Ogilvie, a specialist on women in science, became curator in 1991. Under her direction the Collections grew to 94,000 volumes before her retirement in 2008.

the University of Oklahoma is known for the History of Science Collections. We now hold about 100,000 volumes, preserved in two climate-controlled vaults. We have 11 faculty members in an academic Dept of the HSCI, and offer both graduate and undergraduate degrees in the history of science.

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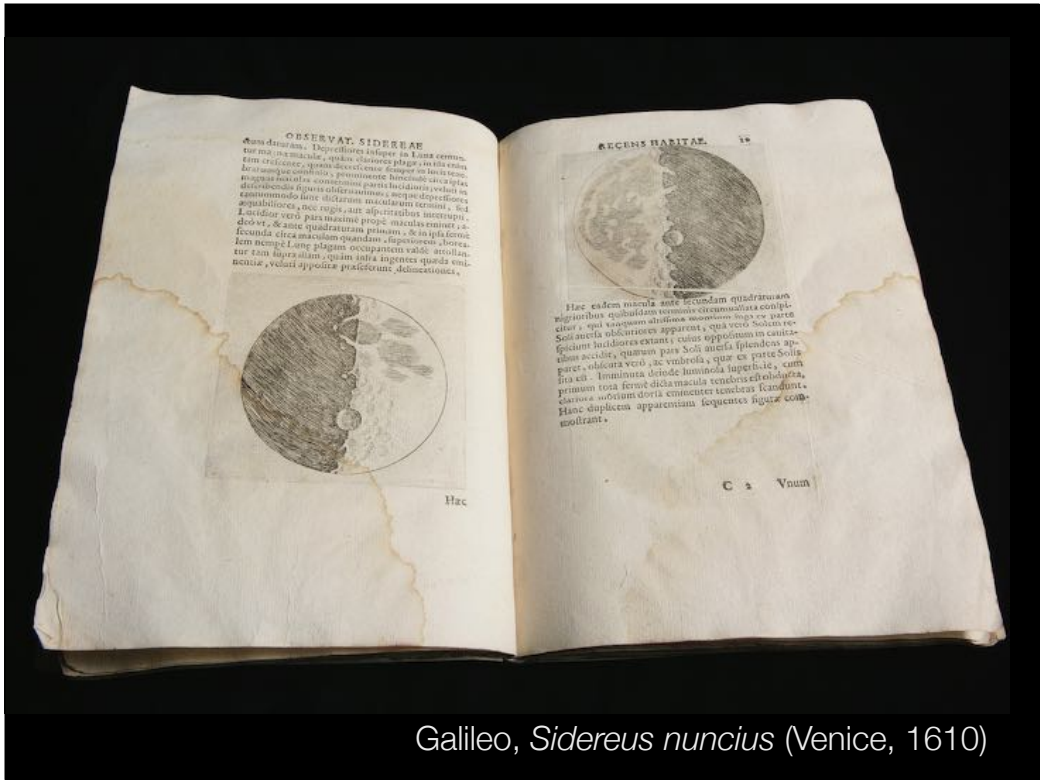
To support the academic program, holdings are broad, spanning the entire printed record of science in all subject areas, geographical regions and chronological periods.

We collect and preserve these rare books in order to make them available to students and scholars for teaching and research. The reading room is a research laboratory in the history of science, and not only for specialist scholars.



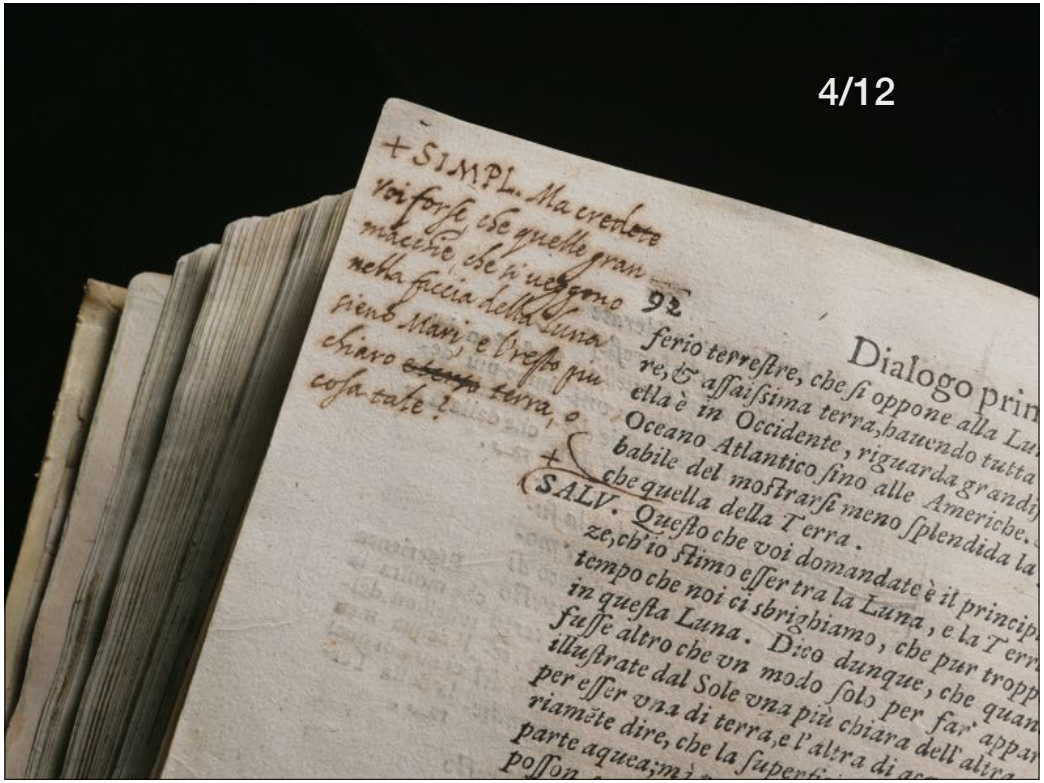
Galileo, *Sidereus nuncius* (Venice, 1610)

This is Galileo's Starry Messenger, the first published report of observations made with a telescope. It made Galileo an international celebrity almost overnight. Galileo discovered four satellites of Jupiter and mountains on the Moon.

The OU copy was inscribed by Galileo in the lower right corner. It is the only copy extant with Galileo's handwriting. But this is just one of Galileo's books. Very few libraries in the world contain more than 3 or 4 Galileo first editions; OU has all 12.

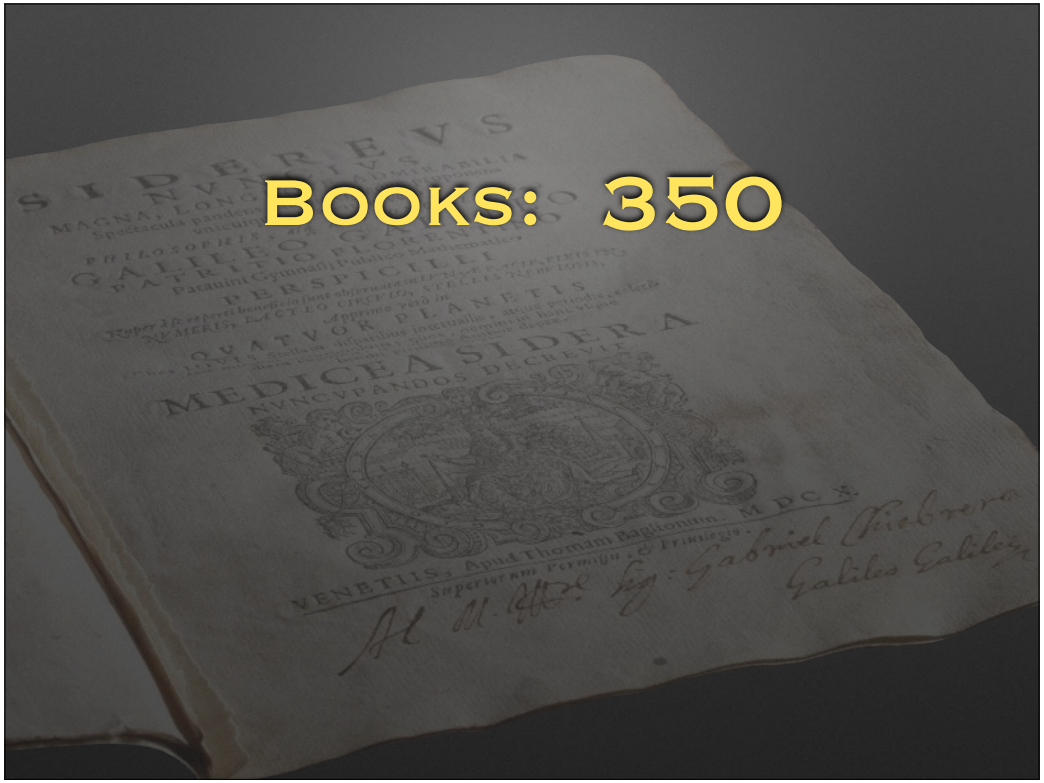
Galileo, *Dialogo* (Florence, 1632)

This is Galileo's Dialogue on the Two Chief Systems of the World, the book for which he was put on trial.

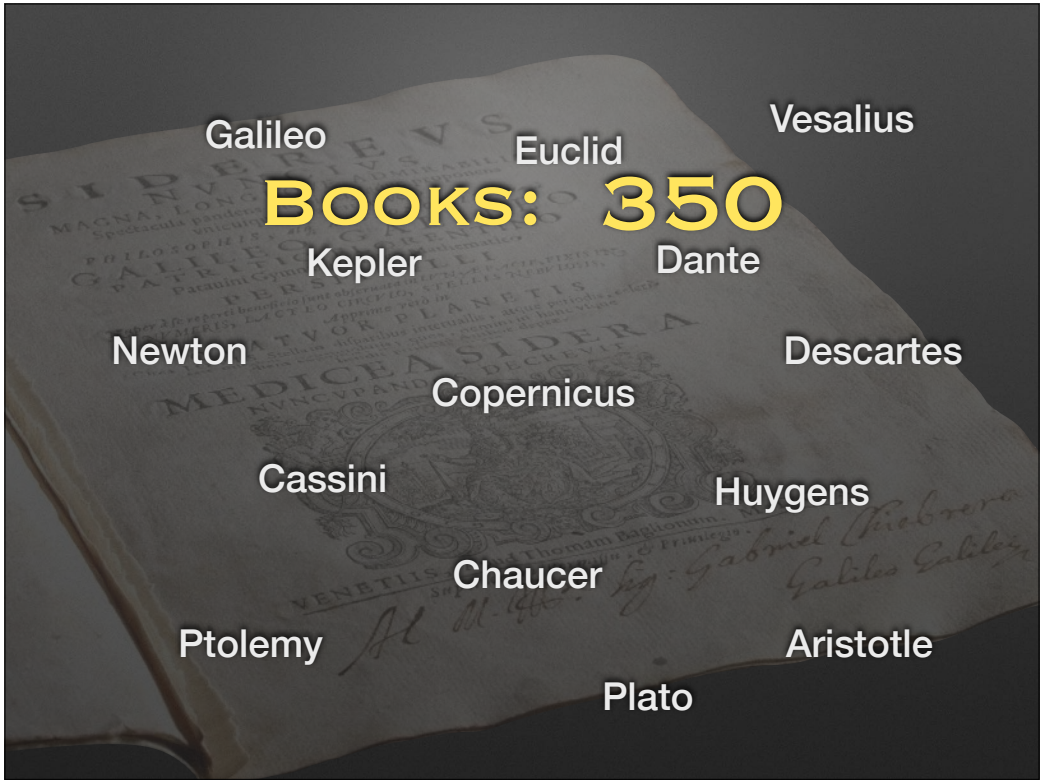


The OU copy again contains Galileo's handwriting.

• Of the 12 Galileo first editions, 4 of the OU copies contain Galileo's handwriting.



The Galileo's World exhibition featured 350 rare books on display, selected from the vaults of the History of Science Collections and other special collections.



The exhibit included dozens of first editions, by Galileo and others… Every book on display was an original; none were facsimiles. Each book belongs to OU; none were on loan from other institutions.

———————-

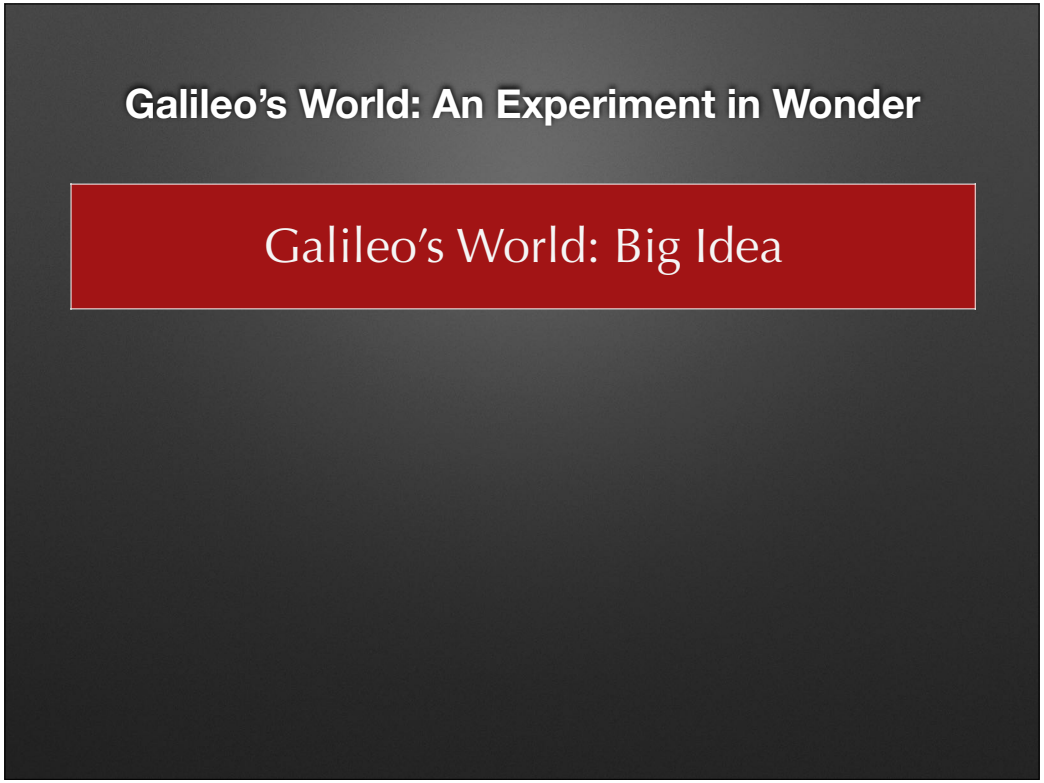
All rare books were purchased with private funds over the course of 7 decades; no tuition money or taxpayer dollars were involved.

But the 350 books were not dusty tomes sealed up in cases to be admired as treasures. Our goal was not to show the rarest and most valuable works we hold. • Rather, each book was selected for display because it told a story.

———-

[The exhibition was about bringing those *stories* alive. Through stories, every book and every object on display connected Galileo's World with some part of our world today.]

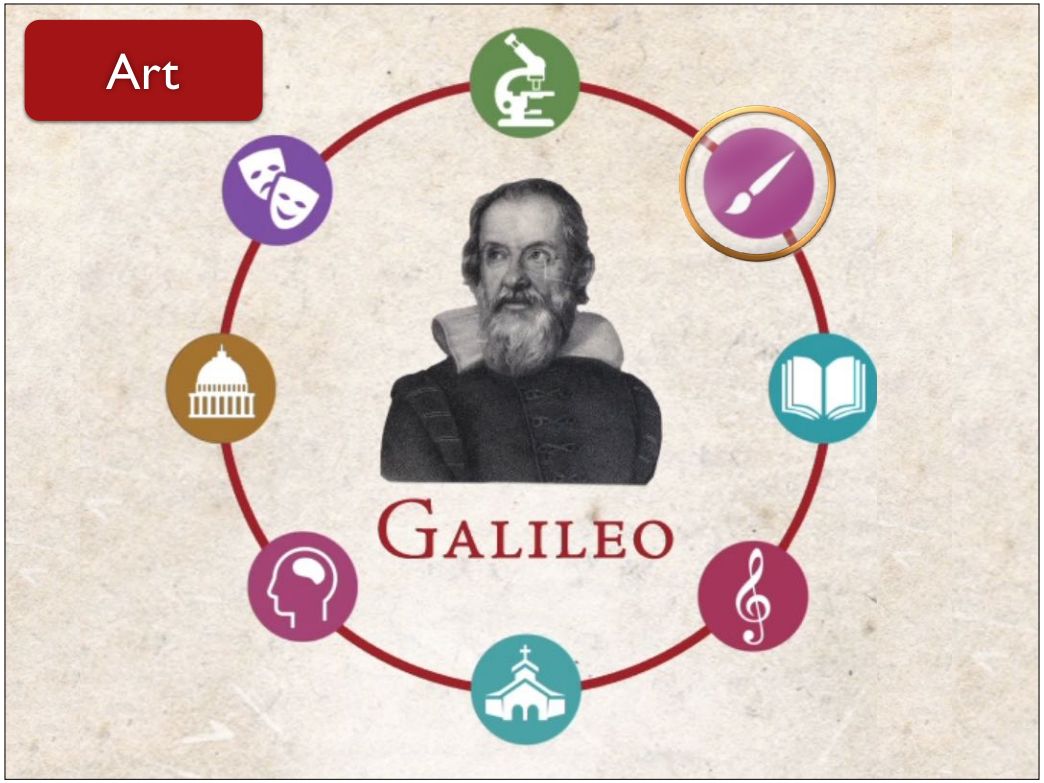
So today: First we will look at the Big Idea behind the Galileo's World exhibition. Then we'll take a virtual tour to gain a better sense of what took place. After that, we'll look behind the scenes, to see how it was actually brought about. And finally, we'll consider whether we met our goal of making it a participatory exhibit. 4 mins



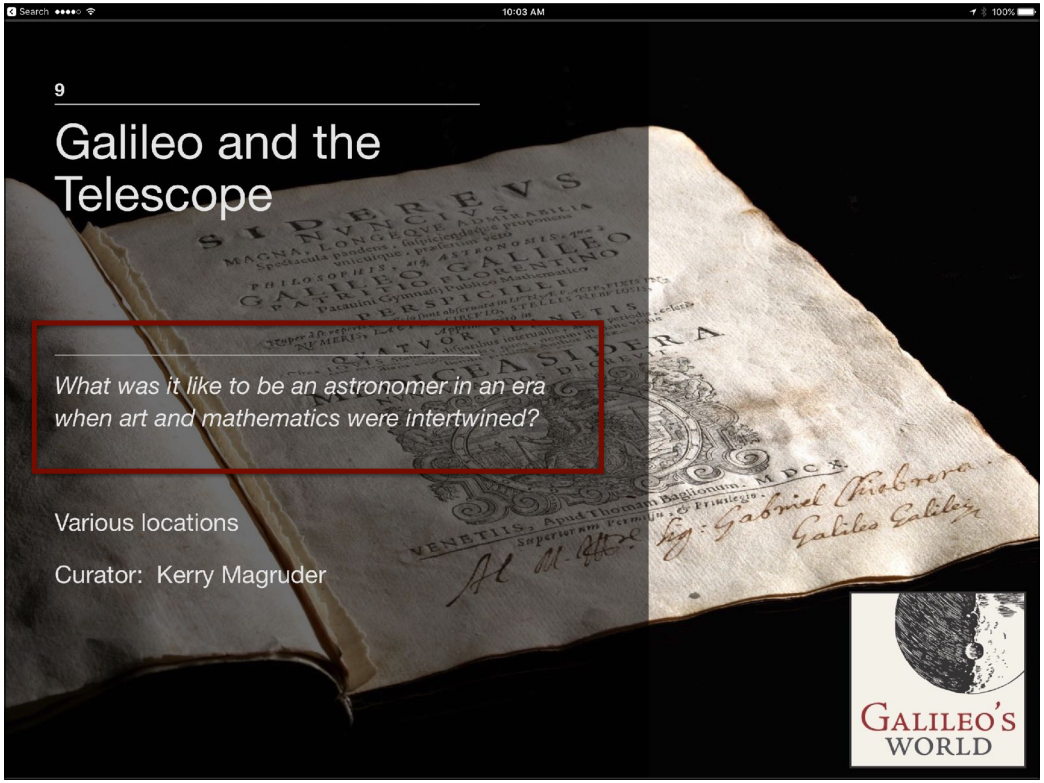
So let's start with the Big Idea.

The Big Idea of the Galileo's World exhibit was connections.

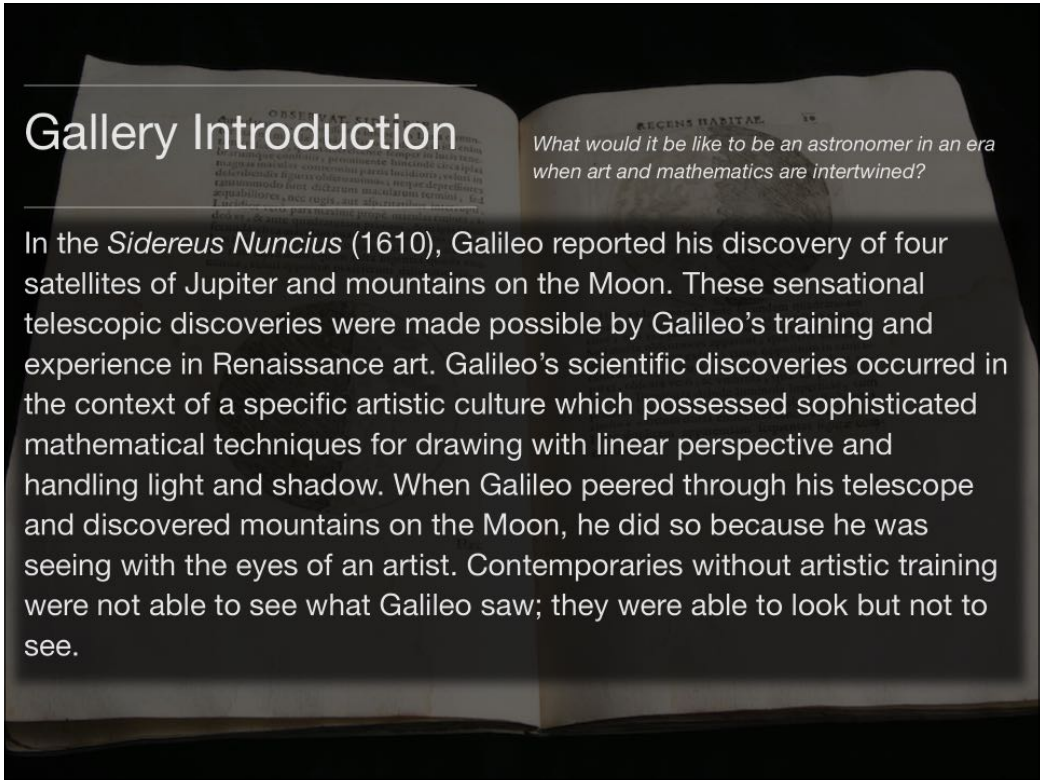
- First, connections between disciplines as shown in this circle of subject areas. How did the connections between disciplines, back then, create conditions for creative discovery and innovation?
- Second, connections between Galileo's world 400 years ago, and our world today. How can we recreate those interdisciplinary connections in our university and world?
- You can watch our introductory video from the website (Play video).



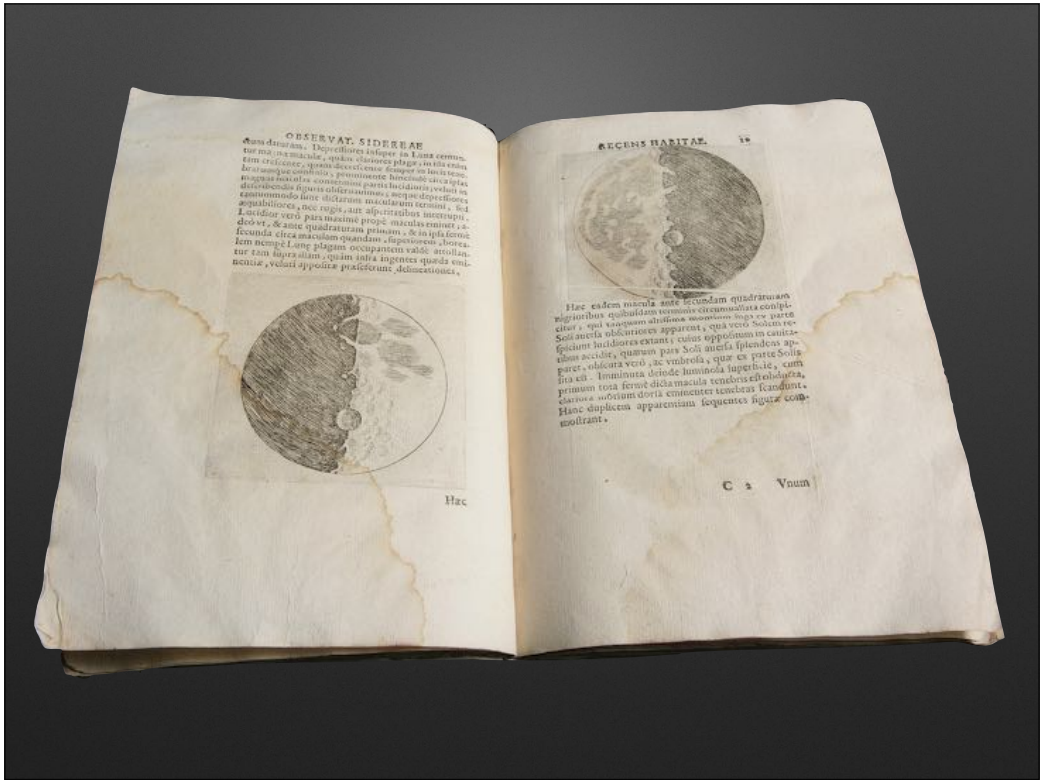
Let’s look at two examples of connections between disciplines as shown in this circle of subject areas. First, some connections between art and science in Galileo’s world.



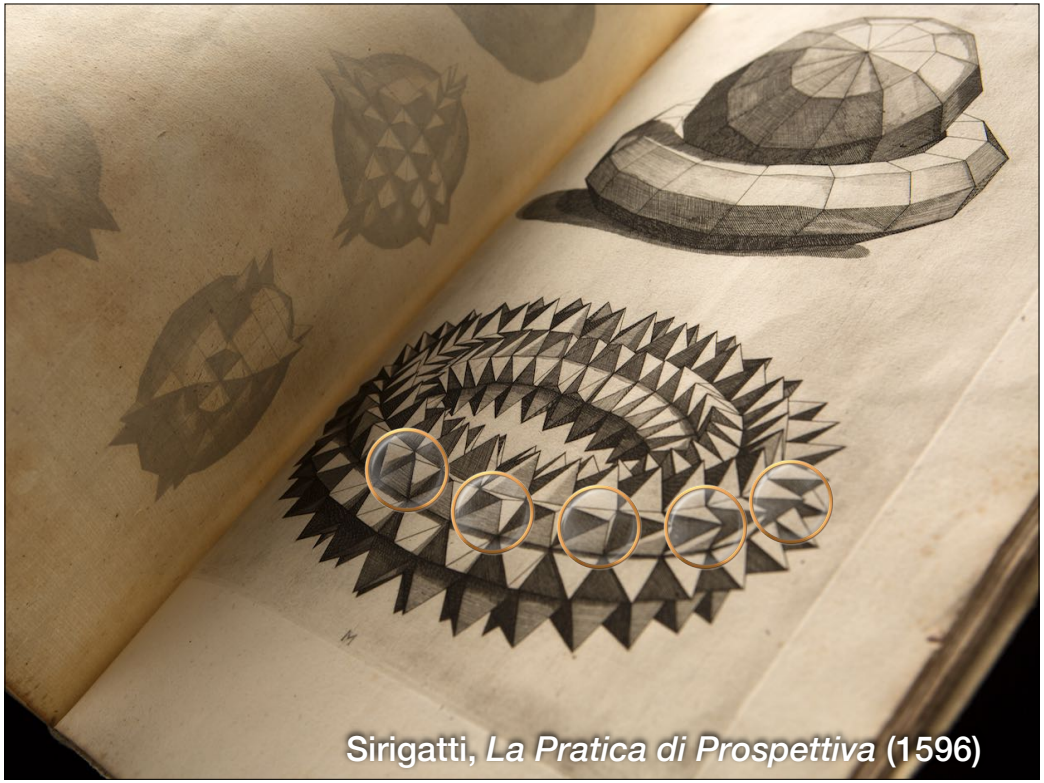
The Galileo and the Telescope gallery was on physical display in various locations during the course of the exhibition. This is a screenshot from the iPad exhibit guide, • with the reflection prompt: “What was it like to be an astronomer in an era when art and mathematics were intertwined?”



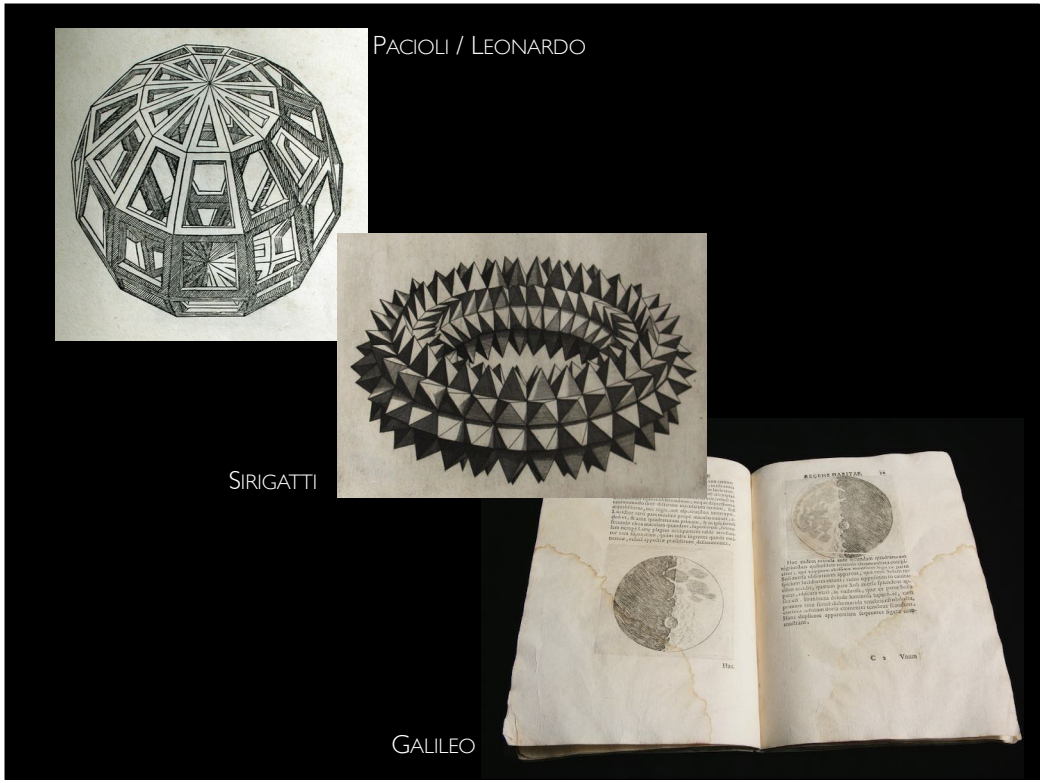
For this gallery, the introduction presents some bold theses: "In the Sidereus Nuncius (or Starry Messenger), Galileo reported his discovery of four satellites of Jupiter and mountains on the Moon. These sensational telescopic discoveries were made possible by Galileo's training and experience in Renaissance art. Galileo's scientific discoveries occurred in the context of a specific artistic culture which possessed sophisticated mathematical techniques for drawing with linear perspective and handling light and shadow. When Galileo peered through his telescope and discovered mountains on the Moon, he did so because he was seeing with the eyes of an artist. Contemporaries without artistic training were not able to see what Galileo saw; they were able to look but not to see."

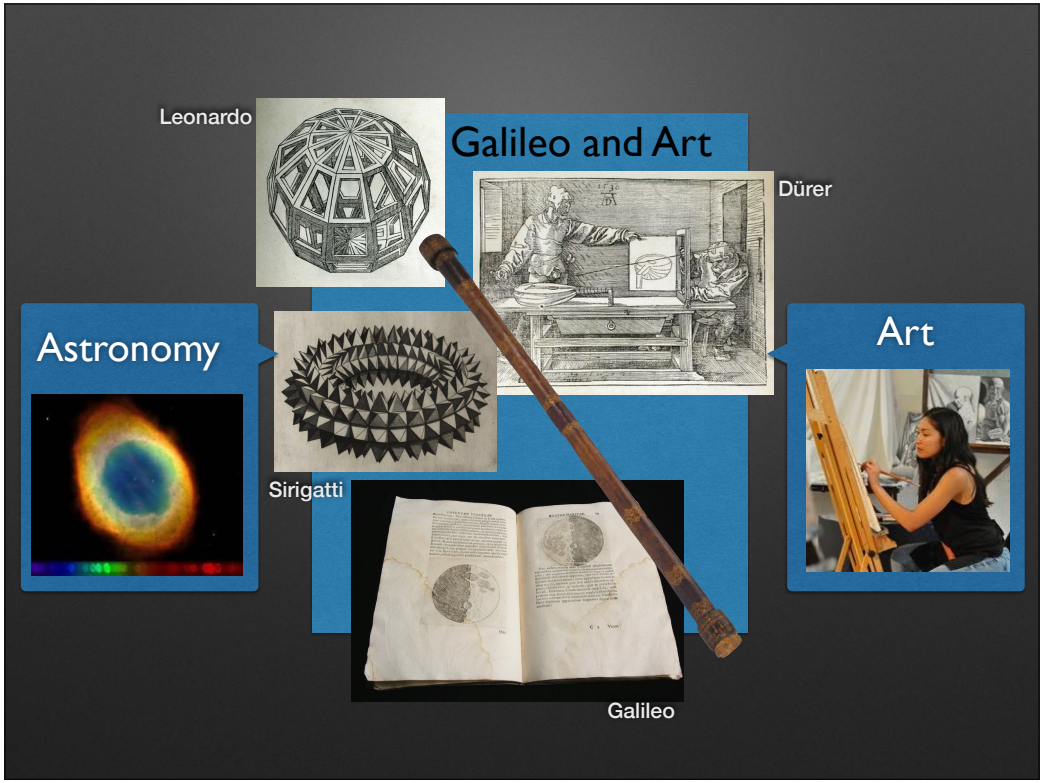


Because telescopes at that time were of such poor quality, Galileo's discoveries were made not by optics but by the artistic training of his eyes.



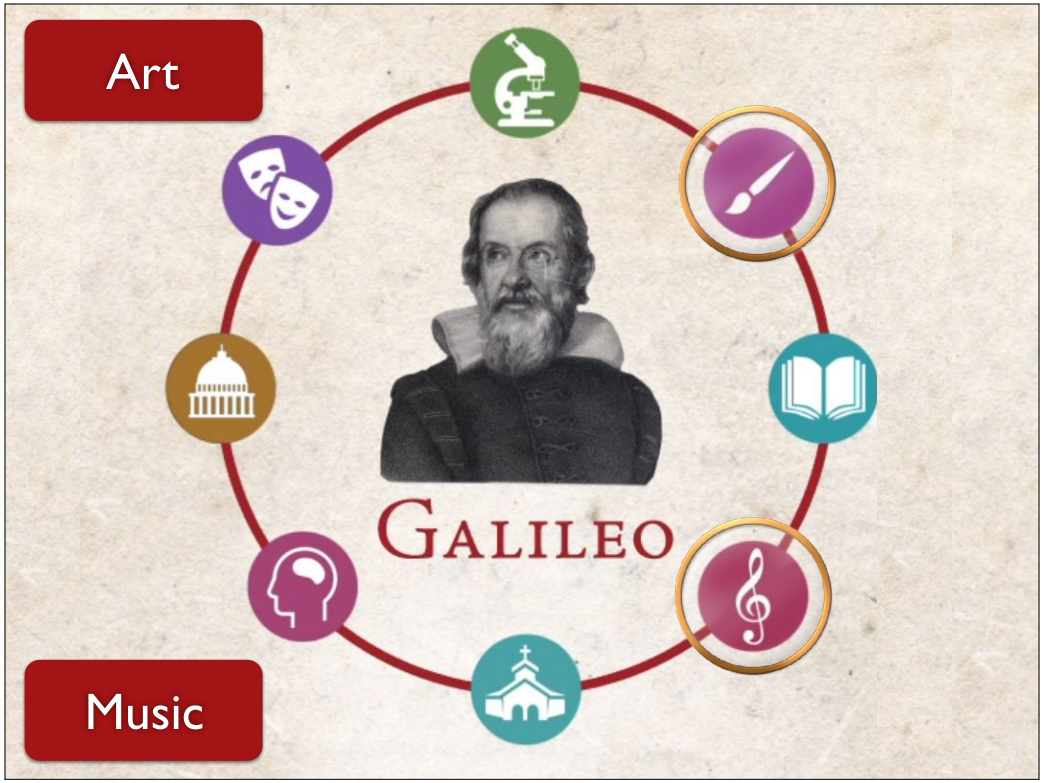
As a young man, Galileo was trained in perspective drawing. He worked his way through this manual by Sirigatti, recreating each of its drawings. Careful study, and replication, • of the spikes on this ring and the shadows they cast, prepared Galileo's eyes to interpret the shadows cast on the Moon by mountains and other topographical features. Imagine each spike is the same lunar mountain observed at different times under different angles of light.


PACIOLI / LEONARDO
SIRIGATTI
GALILEO

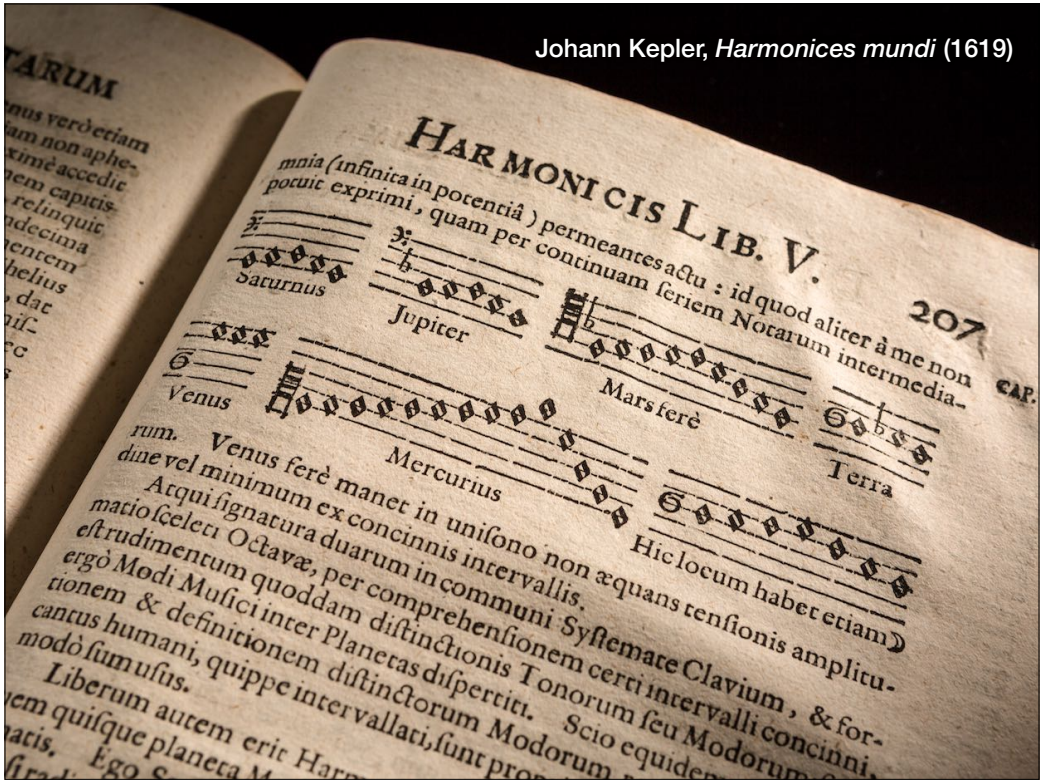


So the revolutionary astronomical discoveries of Galileo grew out of modes of inquiry and practice initially developed in art for perspective drawing. An artistic sequence of linear perspective drawing – from Leonardo, to Sirigatti, to Galileo – is the background for the story that Galileo made his telescopic discoveries as much through art as through optics.

•Art and astronomy were profoundly connected then, and in the experience of many students, still are.



For a second example, let's look at connections between music and science in Galileo's world.



Johann Kepler, *Harmonices mundi* (1619)

An astonishing example of music guiding astronomical inquiry is Kepler's Harmony of the Universe, which contains the laws of the motion of the heavens, including his harmonic law, written in musical notation. In this work Kepler was thinking musically. He regarded this work primarily as a contribution to music theory.

Kepler achieved a synthesis of his new astronomy with recent polyphonic musical theory. Kepler demonstrated that the motions of the planets consist of precisely the same harmonic ratios as the latest tuning of musical scales. The beauty of music provided the context for what we call his “third law.”

72 HARMONICIS LIB. III.

CAP. XIV.

Hoc pacto in noſtris XIV. ſpeciebus reperiuntur interſperſæ aliæ X. quaternis primis locis coincidentes cum prioribus, aut etiam quinis; ubi verò incipiunt differre, præmiſſa eſt particula, *vel*,

τοῦ & πενταπλ. triplicabitur Numerus, & fient 72. ſpecies. Omne enim ſceleton Octavæ ex omnibus 24. habet & tertiam & quartam concordantem cum primâ, & quintam & ſextam. Si ergò hæ partes cantus potiſſimùm circa quartam & ſextam occupentur, tunc ſtatuunt infimo loco Diateſſaron: Sin circa tertiam & ſextam, Diateſſaron eſt

in medio, ſin denique circa tertiam & quintam, Diateſſaron eſt loco ſupremo.

Hæc autem non ideò dico, quod neceſſaria ſit tam minuta conciſio, cùm ſciam, plerumq; miſceri ternas formas in uno cantu: ſed ut ex hoc numero poſſit judicium ferri de diſcriminibo Tonorum, quæ Moderni tradunt; quæ partim talia ſunt, vt mihi videantur illorum toſtatui poſſe, quoſ ſunt omninò cantiones, cætera unius Toni. At ſi obſervamus hæc principia, numerus Tonorum utcunq; magnus, finitus tamen eſt. In ſummâ, Toni realibus diſtincti meris & diſcriminibus, non reſpectu altitudinis vocis in Organo, ſed in ipſâ etiam humana voce, quæ principium naturalis Syſtematis à quacunq; voce altâ vel profundâ facere poteſt, ſunt vel 5. tantùm, vel 14. vel 24. vel 72.

Cum his principijs meis ſic ego concilio Tonos octo vulgares, quos Eccleſiaſticos dicunt; erantq; veteribus, opinione quorundam,

I. Dorius I. Hypodorius

Adam primus Homo. *Noe ſecundus.*

Hæ ſunt duæ ſpecies Cantus mollis, ex ſpecie octavæ, quæ eſt mihi Prima inter XIV. Nec video aliam differentiam, quàm in altitudine meræ, quàm primus habet majorem, ſecundus minorem: niſi velis illos per cauſam ultimam diſtinguere, quòd primus quidem obſervet hoc ſceleton, ſecundus hoc:

Tertius vulgaris Phrygius Quartus vulgaris Hypophrygius.

Tertius Abraham. *Quatuor Evangeliſtæ.*

Nihil

HARMONICIS LIB. III. 73

CAP. XV.

Nihil manifeſtius quàm hos duos Generis duri pertinere ad noſtram ſpeciem XI. & ſcribendos ex *e*, eſtq; rurſum vix ullum diſcrimen aliud quàm * altitudinis, niſi hæc illis veſtis accomodare ſceleta ſeorſim.

Quintus vulgaris Lydius. Sextus vulgaris Hypolydius

Quinq; libri Moſis *Sex hydriæ poſitæ*

Et hi ſimiliter manifeſtiſſimè ſcribendi ſunt ex *f* ſunteq; generis mollis, diſtinguunturq; altitudine vel ſceleris huſce, ex noſtra XIII.

Septimus vulgaris Mixolydius. Octavus vulgaris Hypomixolydius

Septem artes liberales *Et octo ſunt partes.*

Eſſi apparet conſilium inventorum, quòd Primum & Secundum ex *d.* ſcribere voluerint, Tertium & Quartum ex *e.* Quintum & Sextum ex *f.* Septimum & Octavum ex *G.* certumtamen eſt ex ijs quæ ſupra diſputavimus, etiam hos generis Duricum Primo & Secundo ex eadem clavi *G.* ſcribi debere, quibus ex noſtrâ ſpecie II. competunt hæc ſceleta.

Hac igitur applicatione vulgarium octo Tonorum ad meas ſpecies Octavæ I. XI. XIII. II. ego multò evidentius diſcrimen oſtendere poſſum inter hos Tonos, quàm Muſici noſtri, quia comma contemnunt. Qui enim ex *G.* ſcribuntur, omnes quatuor habent conſonantias legitimas, tertiæ, quartæ, quintæ, & ſextæ cum primâ. Qui verò ex *F.* & *e.* conſonantijs utuntur adulterinis, infrà quartâ majori *e a.* & *f bb.* & quintâ majori *e bb.* & *f cc.*

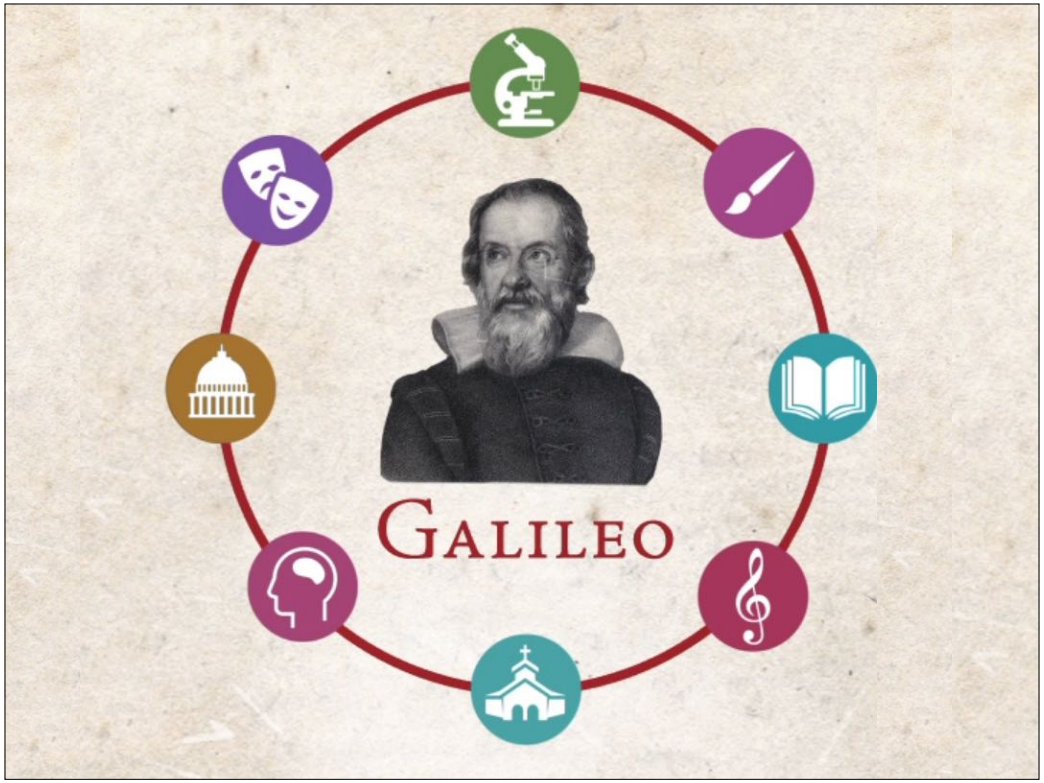
Quid igitur cum reliquis decem ſpeciebus, inquies? cùm omnes uſitati Toni redigantur ad quatuor? Nimirum ad hoc ſerviunt, ut ſciant Muſici, ſi Syſtemata principalis Octavæ ex *G.* deſcriptæ, temperemus ut natura ſuadet; tunc nequaquàm ita facilè & variè tranſponi poſſe cantum ſine mutatione ſinceritatis ſuæ, ut ipſi habent in uſu. Liberum igitur illis eſt, vel rejicere omnes reſiduas 10., & cum ijs etiam tranſpoſitiones ſuas: vel fateri, quòd plures Formæ Melodiarum, plures nempe Modi vel Toni poſſint exiſtere, ijq; differentes ab his poſitis, alij

K magis

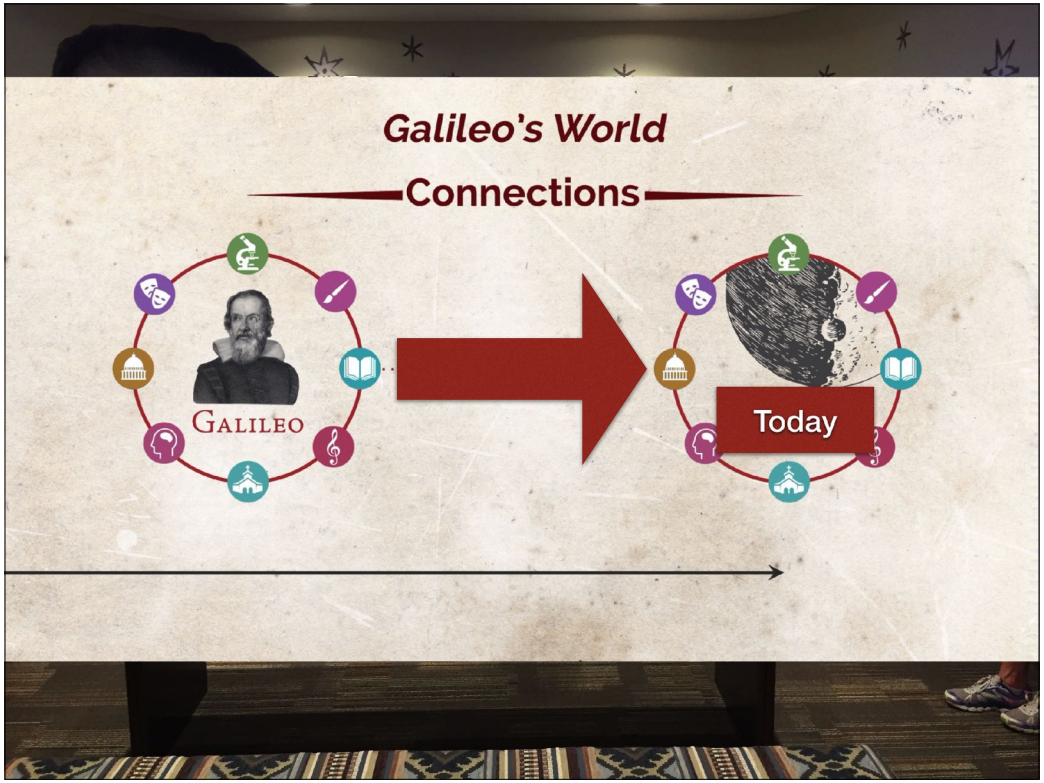
Jonathan Annis, an OU graduate student in music composition, composed a suite for harp, flute and oboe entirely based upon musical themes from Kepler's book. Jonathan arranged the themes, but they're all from Kepler's musical description of the universe as a cosmic dance. Here's a 15-second clip: •[listen 15 secs]

So Kepler's musical mode of thinking led him to formulate his harmonic law that still governs the motions of planets, stars and galaxies.

[This kind of interdisciplinarity, or connections between subject areas at a profound, creative, heuristic level, is what the history of science and the Galileo's World exhibition were all about.]



So a whole circle of different subject areas, some of which are symbolized here, reflect the interconnectedness of science and culture which characterized Galileo's World.

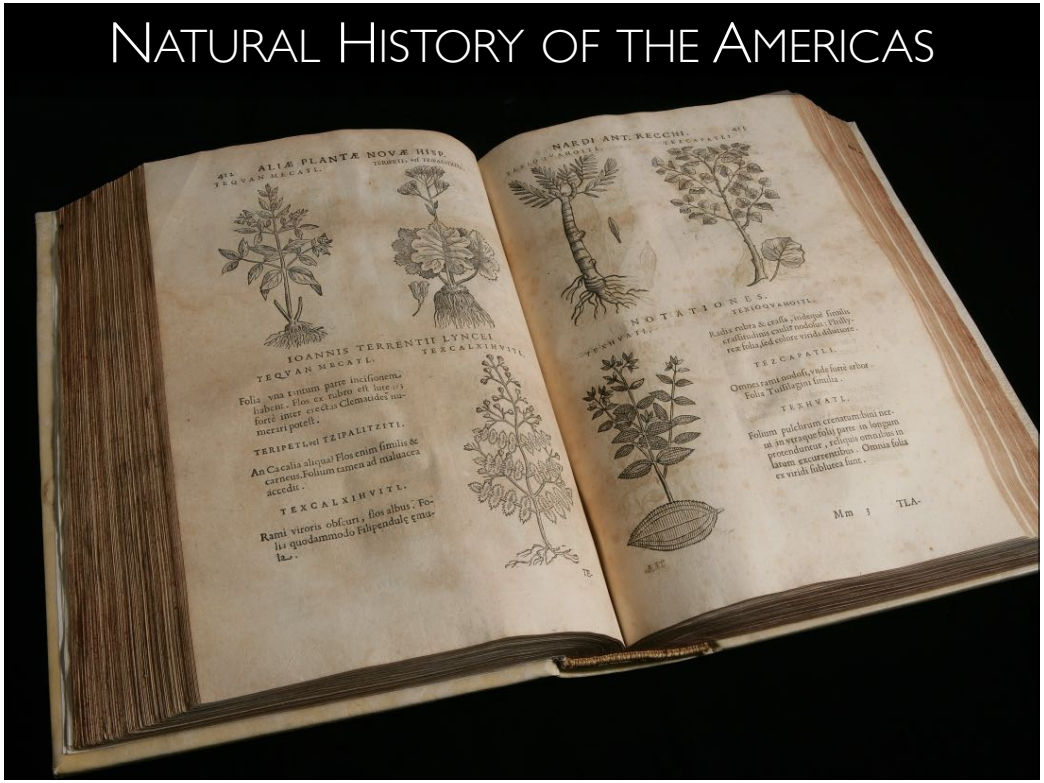


But how does Galileo's World connect to our own day? Let's glance at three more quick stories to suggest how the exhibit made connections beyond Galileo's World 400 years ago in Tuscany, to larger and wider worlds.

First, consider this book, bound and cased in a typical Asian style.

We've all heard of Shrek. But instead of this big green guy, *Johann* Schreck was a friend of Galileo's who assisted him during his telescopic discoveries. Soon afterward, Schreck went to China, where he wrote this work on engineering in Chinese. How many of our Asian students know Galileo had a friend in China?

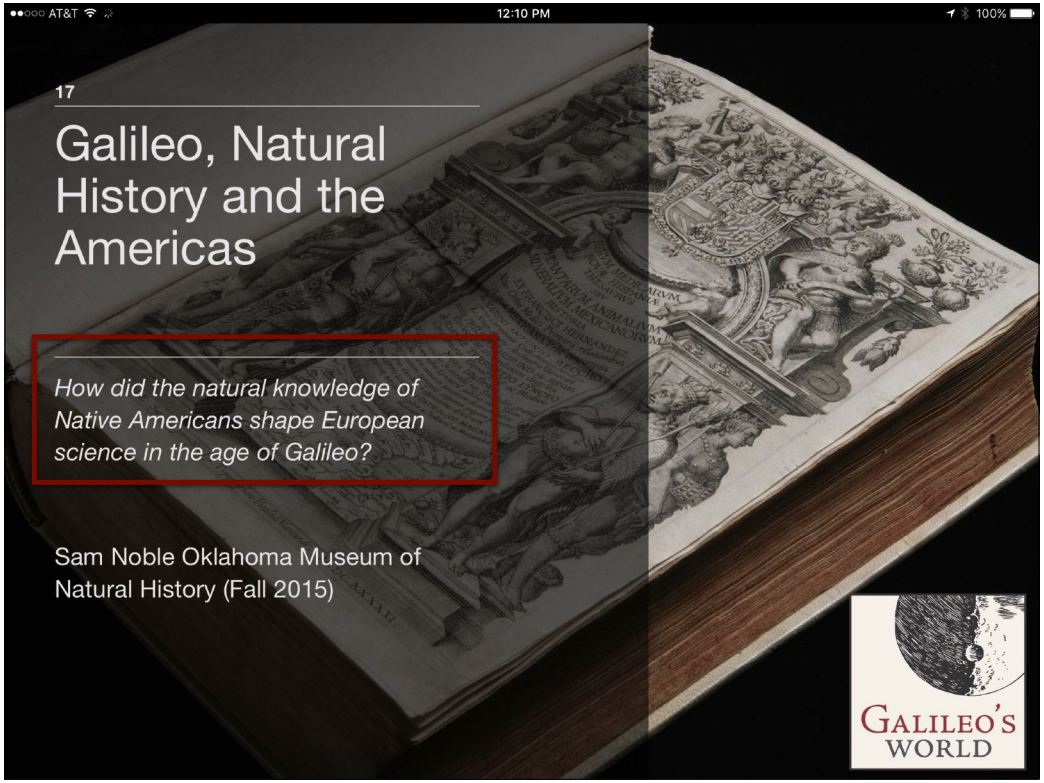
A gallery was devoted to Galileo and China: How did European and Chinese astronomers collaborate in the world of Galileo?



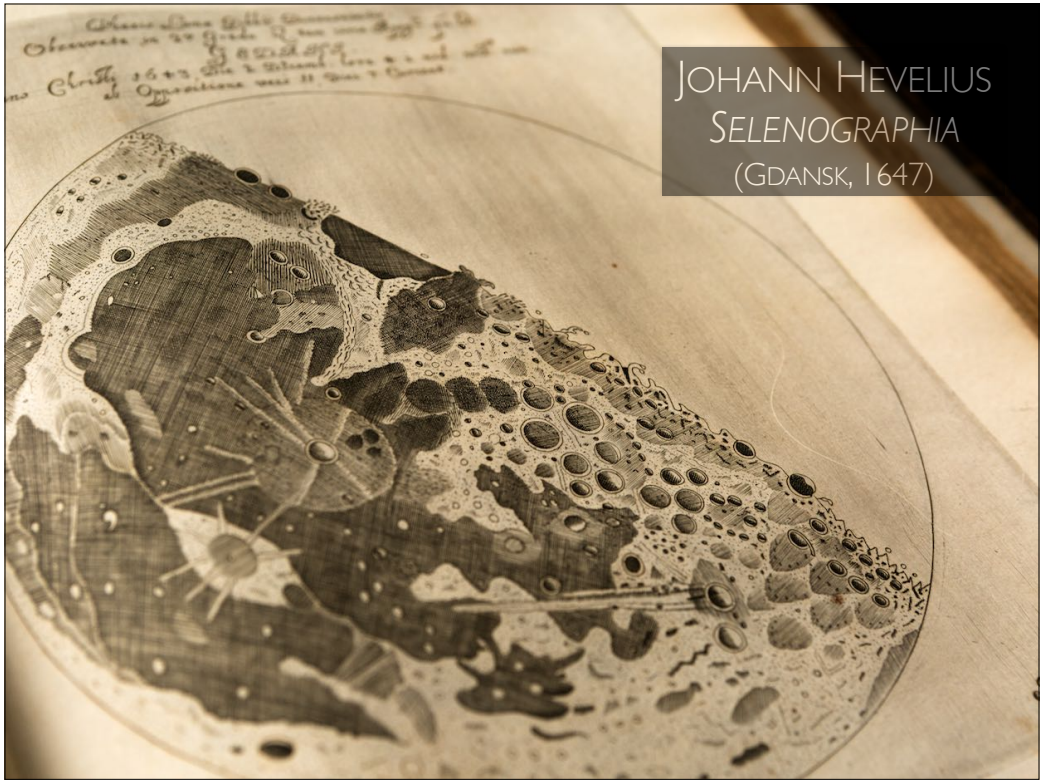
Here's a second example. This book, by Francisco Hernandez, is the most important early natural history of the Americas. Hernandez spent a decade with the Aztecs in central Mexico.

- Galileo and his colleagues in the Academy of the Lynx worked to publish it, and it finally appeared in 1651.

During the fall semester of 2015, the Sam Noble Natural History Museum hosted a joint exhibition on the natural history of the Americas.



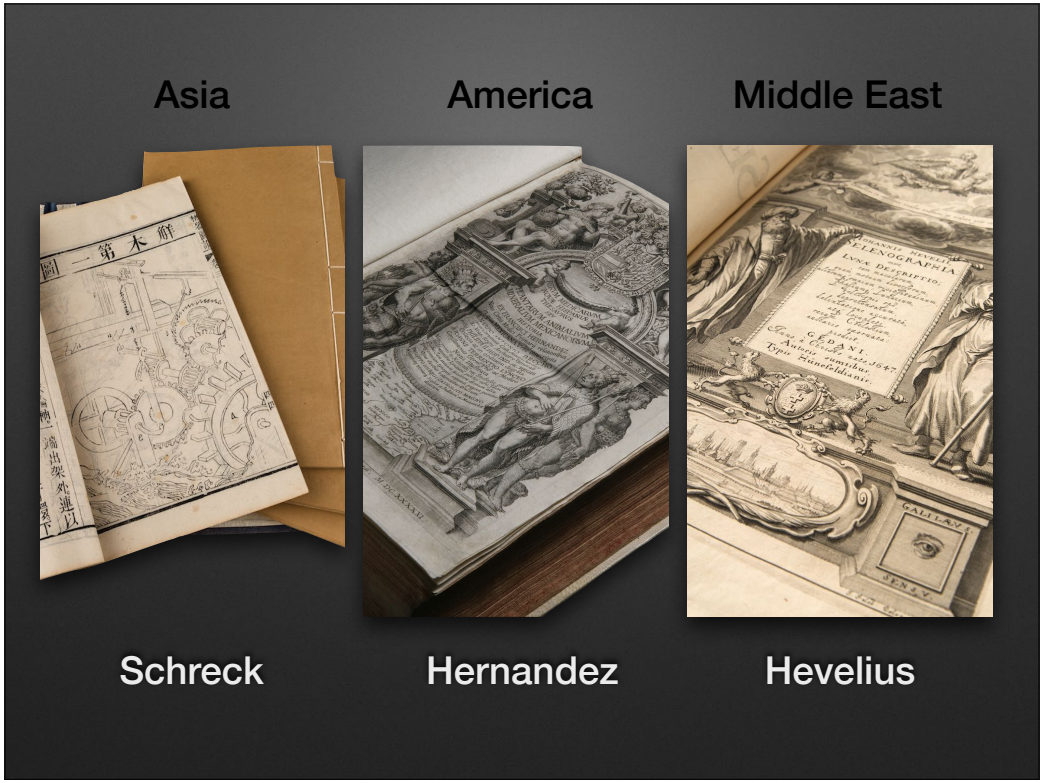
That exhibit explored how the scientific and medical knowledge of Native Americans transformed European science in the age of Galileo. (Pause) The story of Hernandez brings together the Americas and the world of Galileo. How many of our Native American and Hispanic students appreciate that Aztec science and medicine was so important to Galileo and his generation?



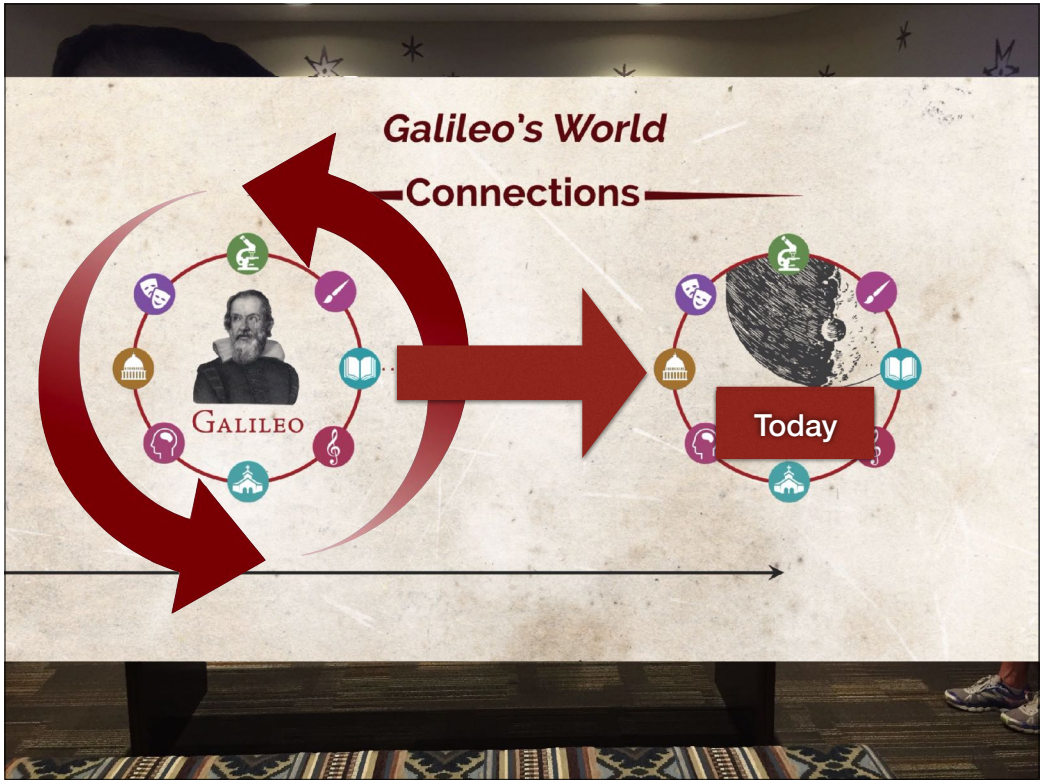
Consider a third story: Johann Hevelius was the leading European telescopic observer in the mid-17th century. This massive book was the first comprehensive lunar atlas. It accurately mapped the Moon within 40 years of Galileo's telescopic discoveries.

On the frontispiece, Hevelius portrays Ibn al-Haytham, a leading medieval Islamic astronomer and optical theorist.

On the right, holding a telescope, is Galileo. Who would have guessed that one of the most impressive works of the scientific revolution would portray Galileo in Middle Eastern dress as a tribute to Islamic science?



So with just three quick stories we've seen that Galileo's world connected Asia, America and the Middle East. If Galileo's world brought worlds together in the past, are there lessons we may learn from connections like these that apply to universities?



So the theme of Galileo's world was Connections.

- We connected the circle of subject areas, and
- we connected the World of Galileo with other worlds, including the World of OU. (15 mins)

So that's the Big Idea. Now let's take a virtual tour of the Galileo's World exhibit.

(Passport cards on their seats).
Galileo's World was an exhibition without walls. It appeared over the course of the 2015-2016 academic year in 20 galleries in 7 locations across the 3 OU campuses of Norman, Oklahoma City, and Tulsa. We collaborated with each partner to create a joint-exhibit specific to each location.

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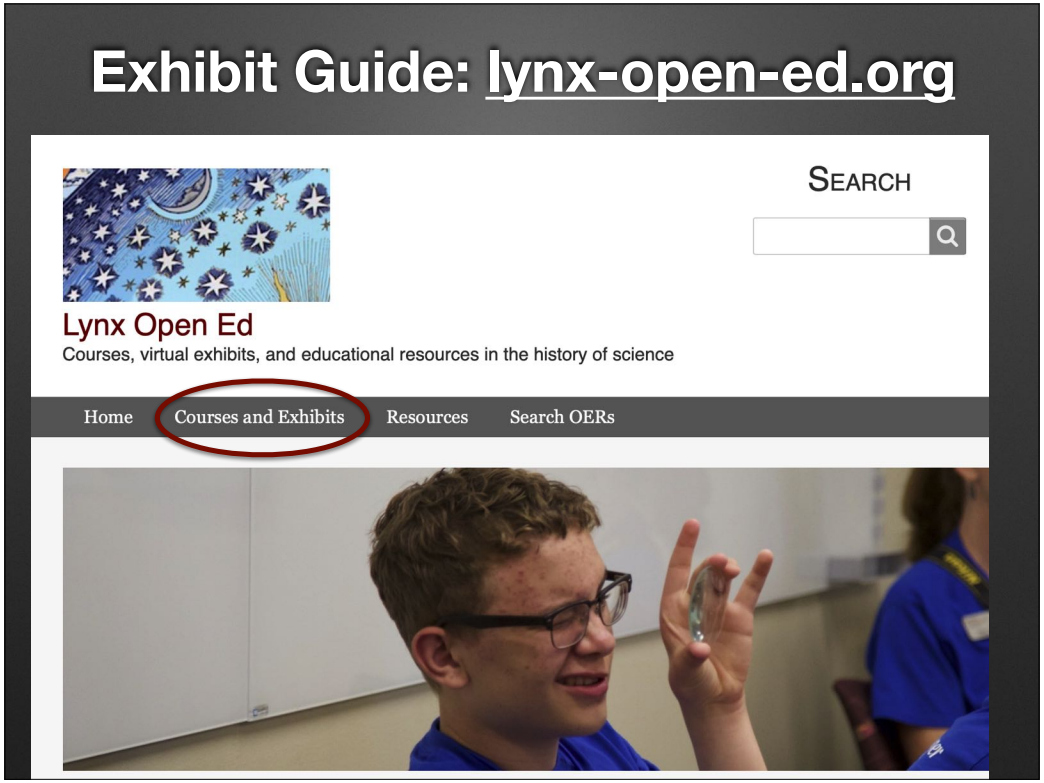
The 7 locations were the Bizzell Memorial Library, National Weather Center, Sam Noble Museum, Headington Hall, Fred Jones Jr. Museum of Art, the Bird library on the OU Health Sciences campus, and the Schusterman Library on the OU Tulsa campus.



To dive deeper, go to the lynx-open-ed.org website, and pull down the Courses and Exhibits menu to select Galileo's World. This takes you to an Exhibit Guide of more than 1,000 pages

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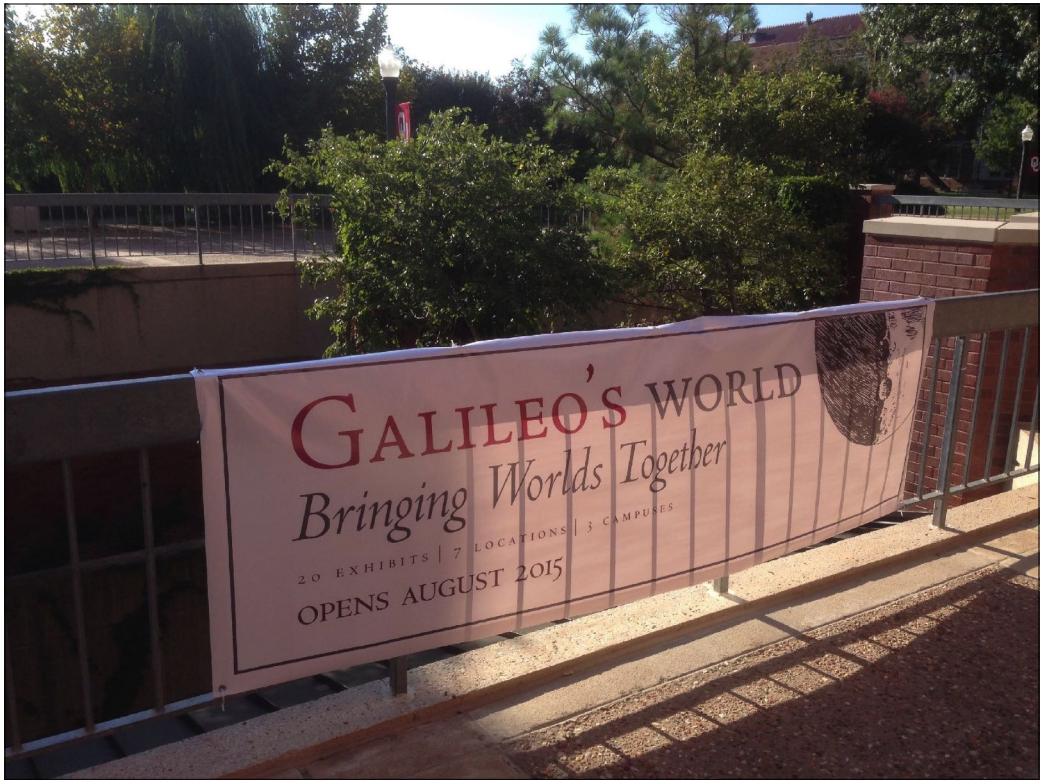
[designed for educators, group leaders and individual study. It contains information about every book on display in each of the 20 galleries. An earlier version of the Exhibit Guide is available for iPads from the Apple Book Store.]

Let’s start our virtual tour at Bizzell Memorial Library, in the heart of the OU campus in Norman.



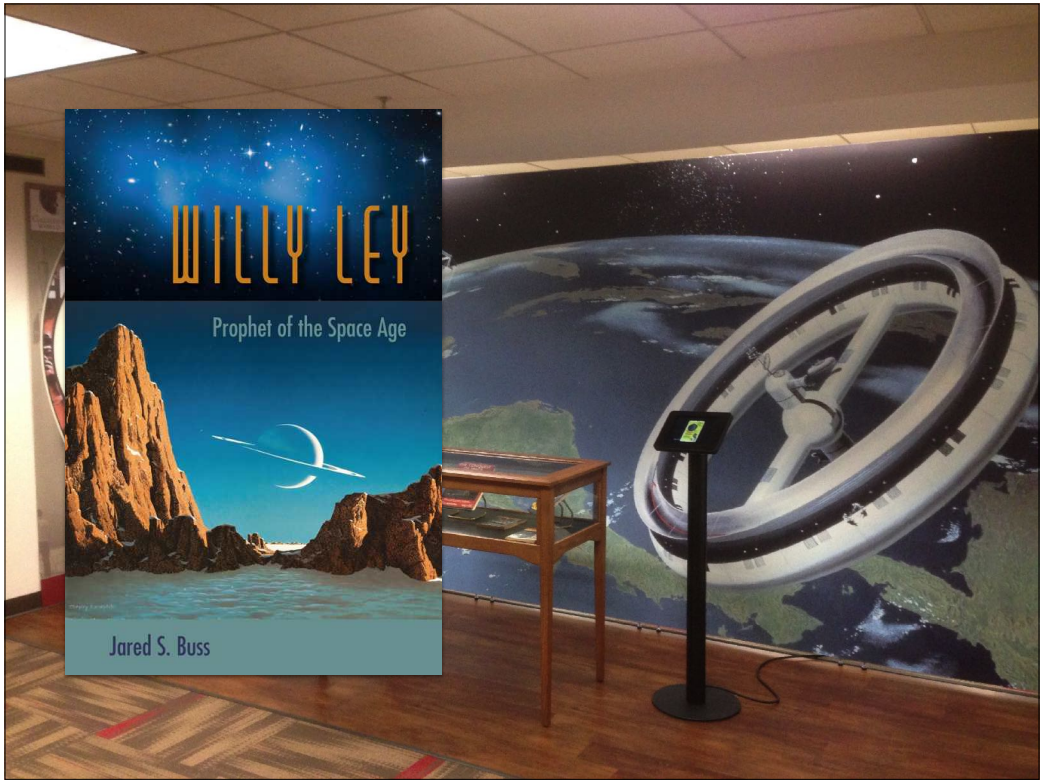
A sign welcomes us to Galileo’s World as we walk toward the west entrance.

The Main floor contained a number of spaces with the overall theme of Galileo Today.

What does Galileo mean today? More on the Tower of Pisa later.

There was a reading nook,

and a technology square for accessing digital resources.

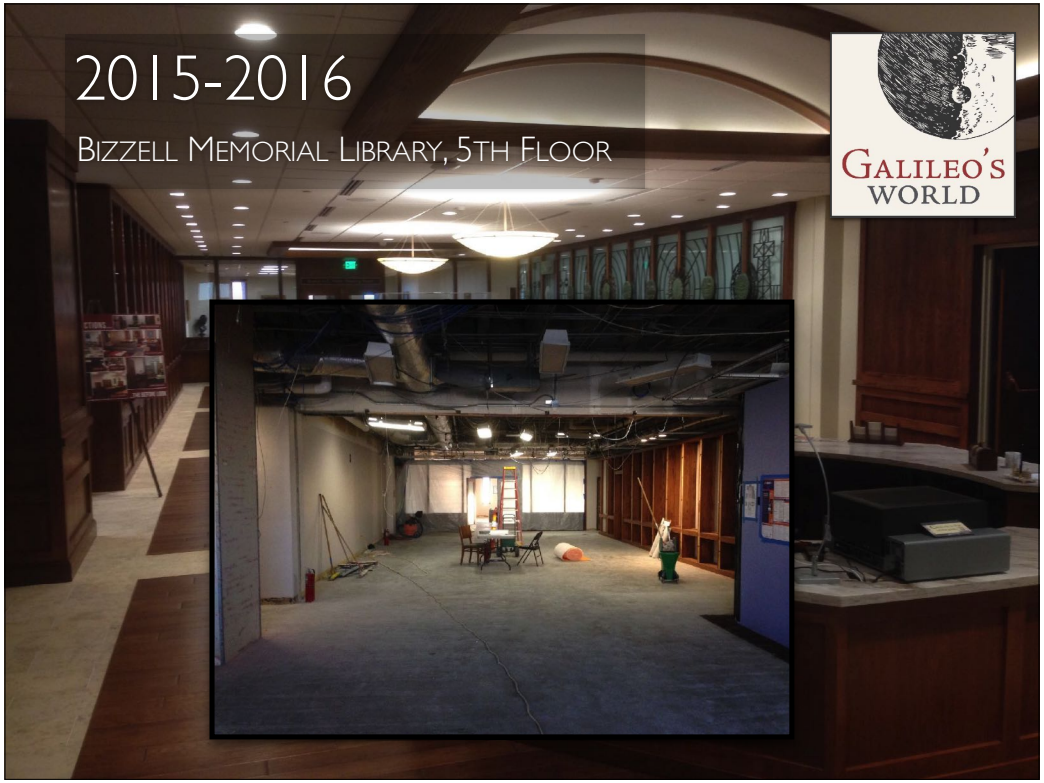


Four bays like this one comprised A Quest for Other Worlds, an exhibit featuring the art of Chesney Bonestall and the books of Willy Ley,

• curated by Jared Buss, then a history of science graduate student, who has since published his dissertation as a book.


The Dawn of the Space Age
LIVE ON, UNIVERSITY

The elevators advertised that the main Library exhibit was upstairs.



Stepping off the elevator onto the 5th floor, one enters the lobby of the History of Science Collections,

• newly renovated for the exhibit.

Turning to the right, visitors might begin with a brief video in the theater.

- Before the renovation, this was my office! (pause) But it's much better used as public space, and I'm thrilled that we have something to offer everyone, regardless of age.

From the theater, we get a first glimpse into the northeast exhibit hall.

• This space used to be another curator office.

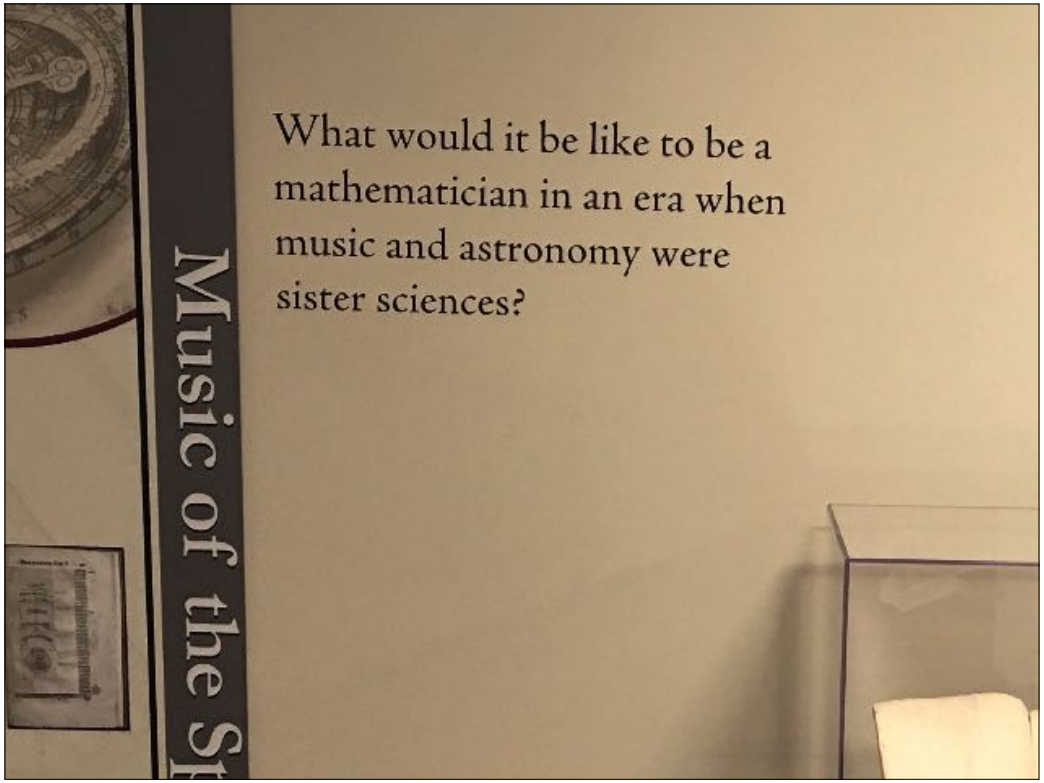
Moving through the exhibit entrance, the south side of the floor was renovated to create the main exhibition hall.

We transformed offices and administrative spaces into a place for public engagement.

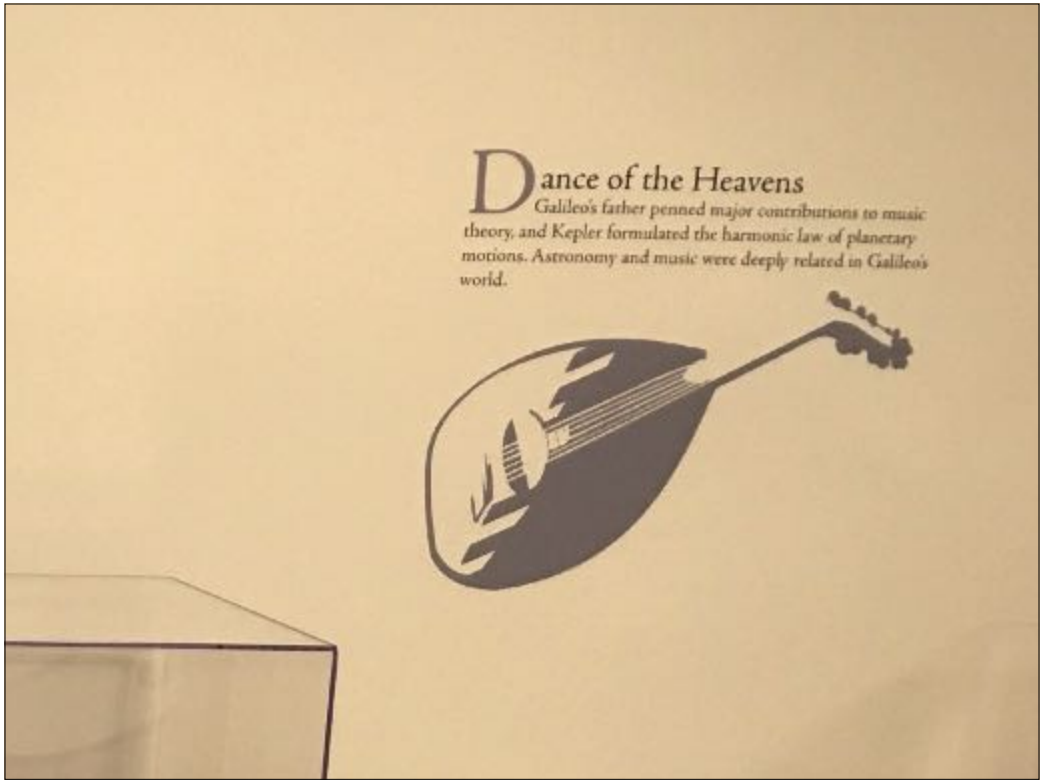
Here the construction workers are bringing sheetrock through the 5th floor windows. We must have been crazy to be doing the renovation simultaneously with the exhibit preparation.

The renovation, completed barely in time for Galileo’s World, was something new for us, since the History of Science Collections had never before enjoyed sufficient space to support exhibitions.

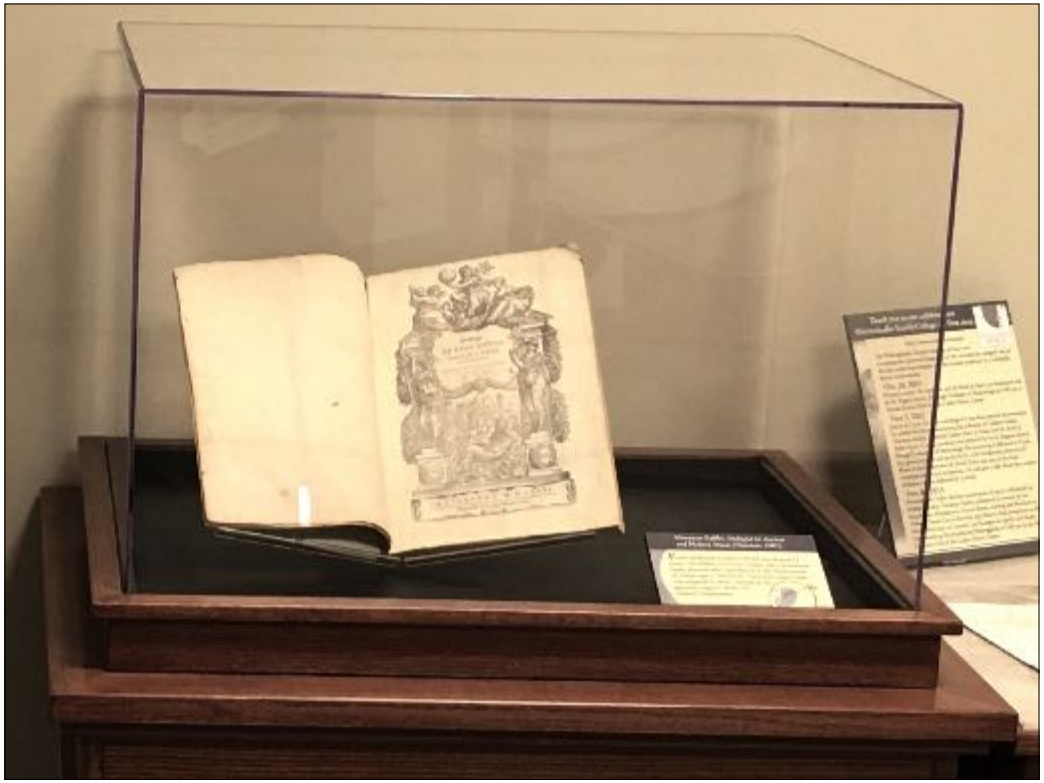
Music of the Spheres was the first gallery visitors encountered in the 5th floor exhibit hall.



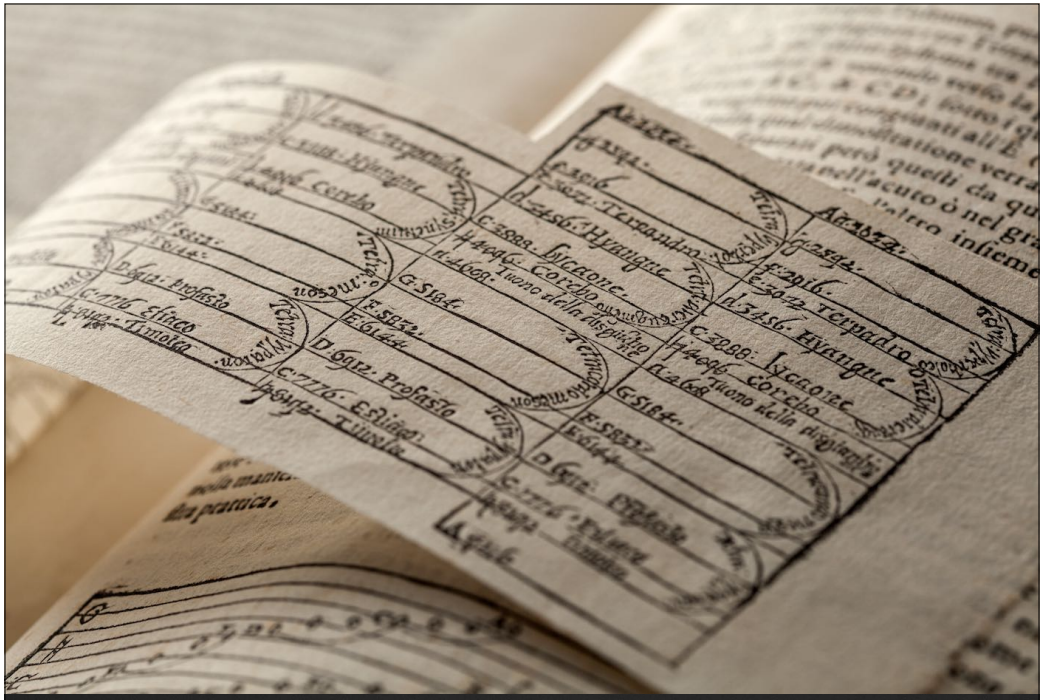
Each gallery displayed a prompt for reflection: What was it like to be a mathematician in an era when music and astronomy were sister sciences?



The first section of the Music of the Spheres gallery was Dance of the Heavens. A wall graphic read: "Galileo's father penned major contributions to music theory, and Kepler formulated the harmonic law of planetary motions. Astronomy and music were deeply related in Galileo's world."

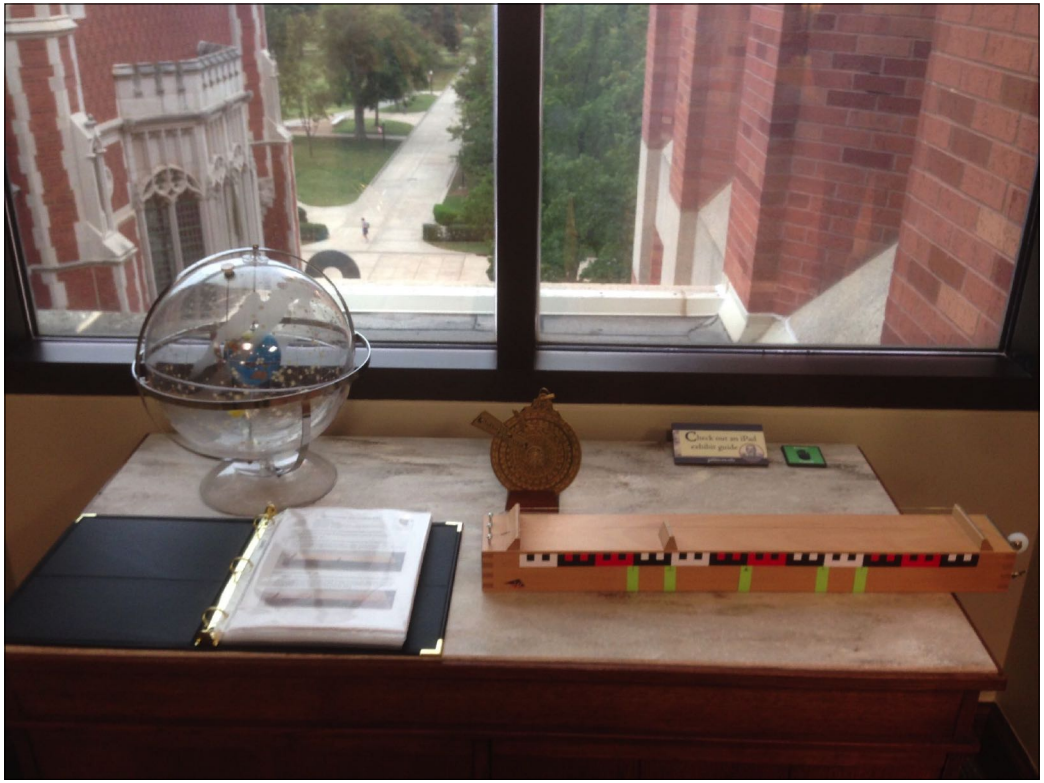


The first book encountered here was a book on music theory by Galileo's father. Galileo's father Vincenzo was a leading composer of music for the lute.



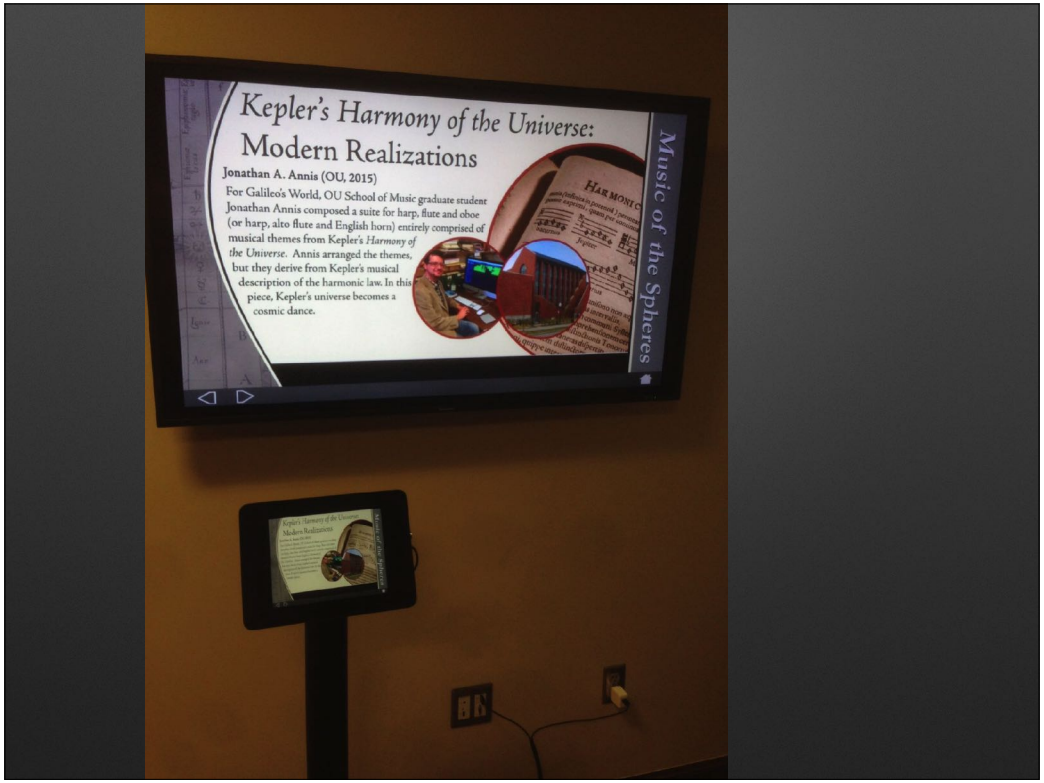
Vincenzo Galilei, *Dialogo* on Ancient and Modern Music (1581)

This work profoundly influenced the birth of Italian opera. Galileo also played the lute, and gave public lectures on the acoustics of the lute. Galileo quoted his father's book in his later works.

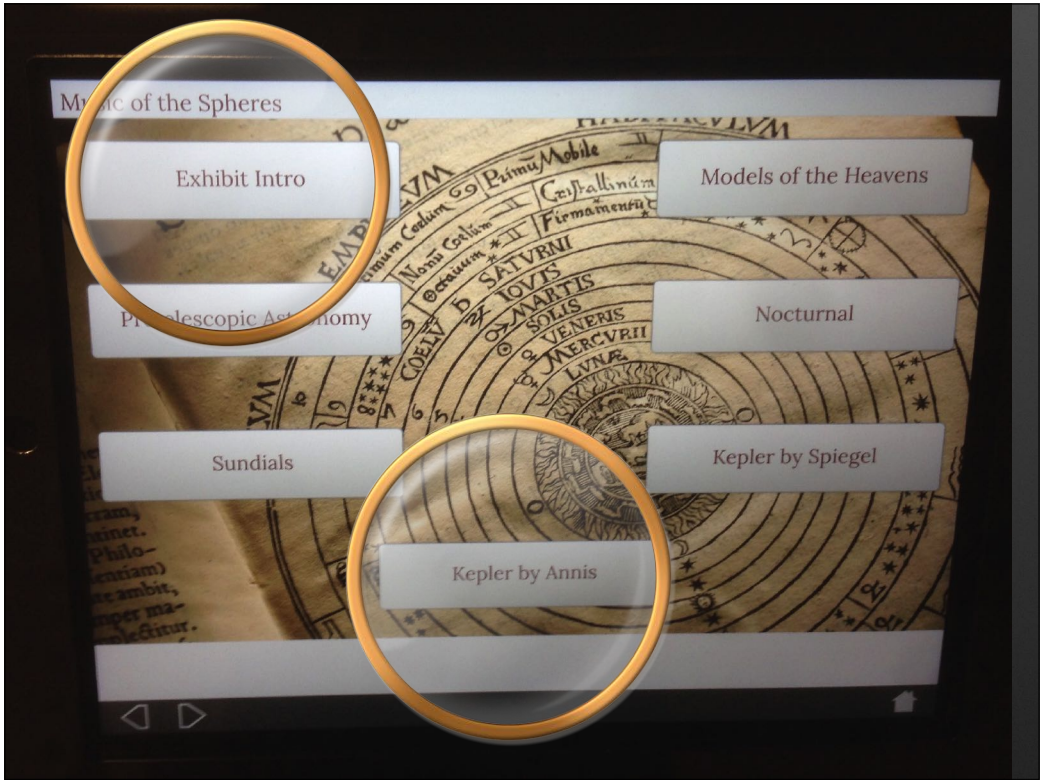


Each gallery included activity stations, like this one, which featured a duochord, celestial globe and star clock.

With the duochord, students could explore the relations between music and mathematics.



And each gallery had a video monitor controlled by an iPad kiosk.



Among the various videos available at each gallery was an Exhibit Intro, providing an overview of the gallery.

Each Exhibit Intro video was conceived as an imaginative letter to Galileo from his daughter. I haven't been able to persuade my own daughters yet to address me as Most Illustrious Lord Father.

“How I long to see you again. I hope you will visit me soon…”

“here in my convent of San Matteo.” Sarah Lemke, then a freshman dramaturgy student, portrayed Galileo’s daughter, Sister Maria Celeste. Each video letter was set in a different location on campus. For a scavenger hunt, we had a prize for anyone who could identify them all.

All of the stand-up activities from every gallery were gathered together in the Ogilvie Exploration Room, for learners of any age…

———————————

http://lynx-open-ed.org/node/153

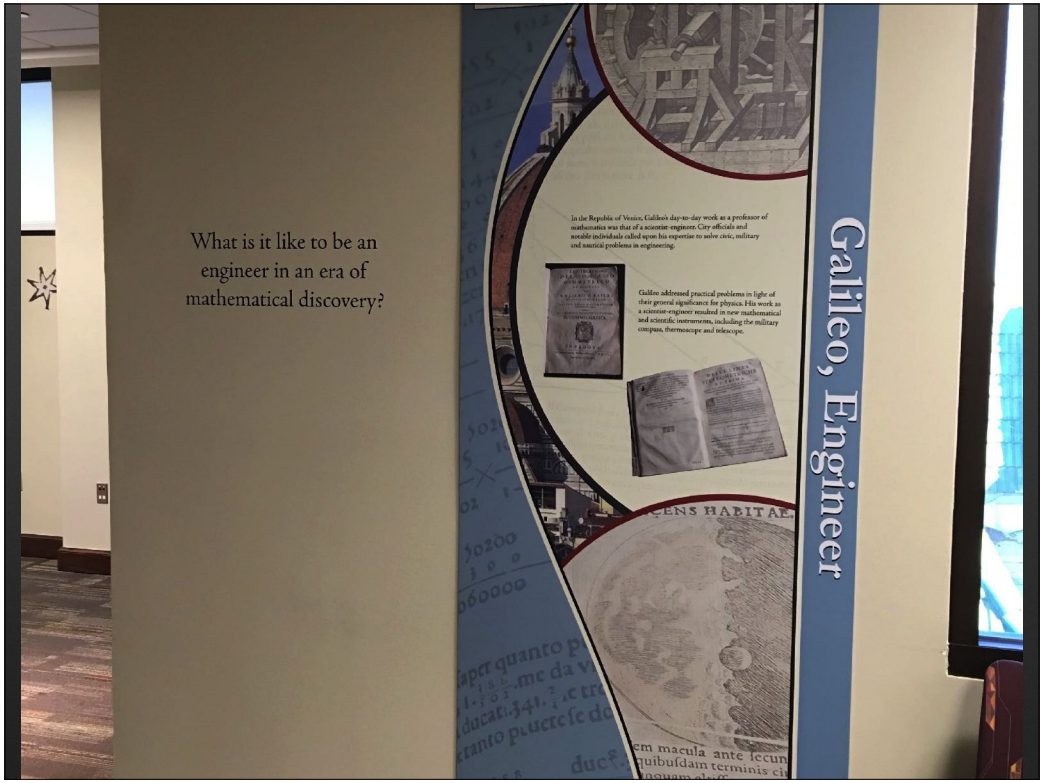
How do library exhibits differ from science museums and art museums or other exhibitions? The "Discovery Pathway" is one way of thinking about the distinctive potential of a participatory exhibit in special collections. The “Discovery Pathway” supplements the learning modes of a museum with the added modalities of library and special collections research. Visitors to the exhibit from each target audience experience interactive and participatory galleries as in a modern musuem, but in some cases may also be “drawn in” by incremental and progressive opportunities for research uniquely afforded by special collections, emphasizing the interpretation of primary sources. These three stages may lead a visitor on a journey of discovery from one to the other like breadcrumbs through a forest -- from any gallery with its reflection prompt and Discovery Station; to activities and sources in the Exploration Room; and finally to research in the Roller Reading Room and/or the online digital library. To the extent that some visitors connect all three phases of the Discovery Pathway, the exhibit will be realizing the potential offered by research university special collections.

both kids and adults.

Visiting groups might complete customized versions of the activities in the classroom.

In the consultation room, we connected individual students with physical and digital resources related to the exhibit.

The exhibit became a front-end to undergraduate research. As a result of the exhibit, we saw much greater use of materials in the Roller Reading Room. All of these spaces also received a facelift during renovation.



The second gallery on the 5th floor was devoted to Galileo as an engineer.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Galileo Engineer
What is it like to be an engineer in an era of mathematical discovery?
Bizzell Memorial Library
5th floor special collections
Curator: Kerry Magruder
GALILEO'S WORLD

The Engineer gallery included three sections.

- Again, there’s an activity table and a video monitor.
- Not shown are a couple cases in the middle of the floor.

One activity here was recreating Galileo’s telescope from two different shapes of lenses.

The Museo Galileo in Florence provided a replica of Galileo's engineering compass, which we displayed here alongside Galileo's own copy of the manual, his first and rarest book.

The Museo Galileo also provided a replica of Galileo's thermoscope, an ancestor to the thermometer.

And a replica of Galileo's telescope.

• The Questar, a modern quality hand-crafted telescope, was provided courtesy of Astronomics.

The Museo Galileo also provided replicas of Galileo's microscope and of a polyhedral sundial.

After Galileo Engineer, the next gallery was devoted to Galileo and China, already mentioned.


Search
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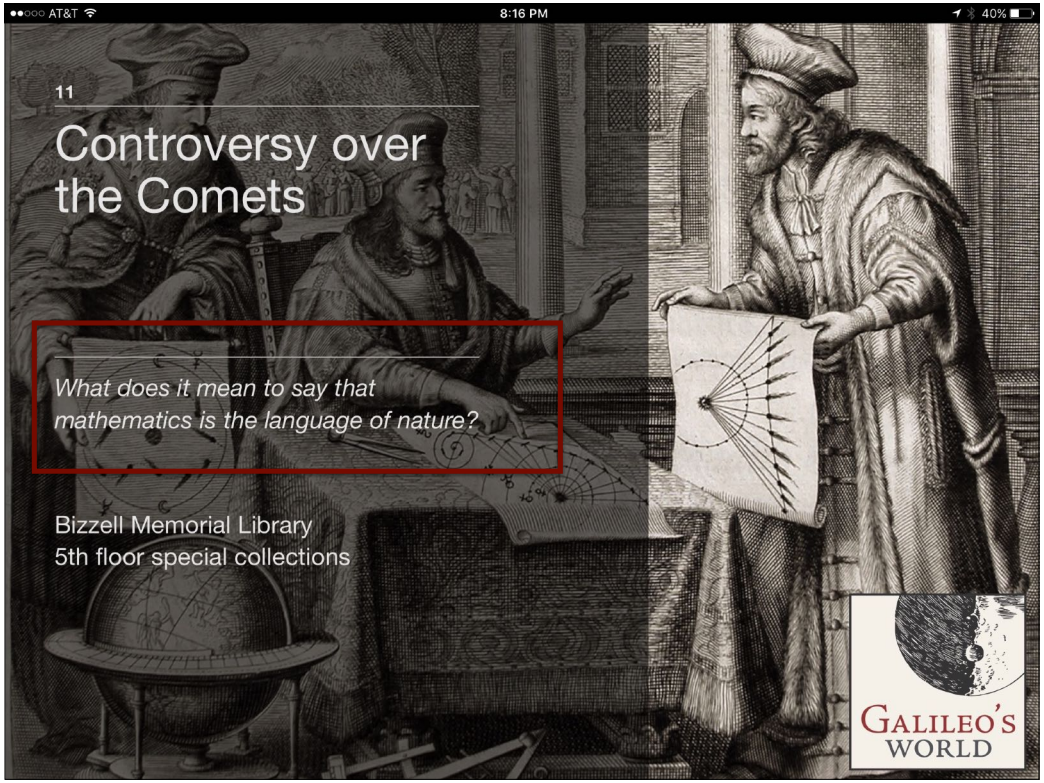
Galileo and China
How did European and Chinese astronomers collaborate in the world of Galileo?
Bizzell Memorial Library
5th floor special collections
Curator: Kerry Magruder
GALILEO'S WORLD

Then “The Controversy over the Comets,” which explored the question: What does it mean to say that mathematics is the language of nature?



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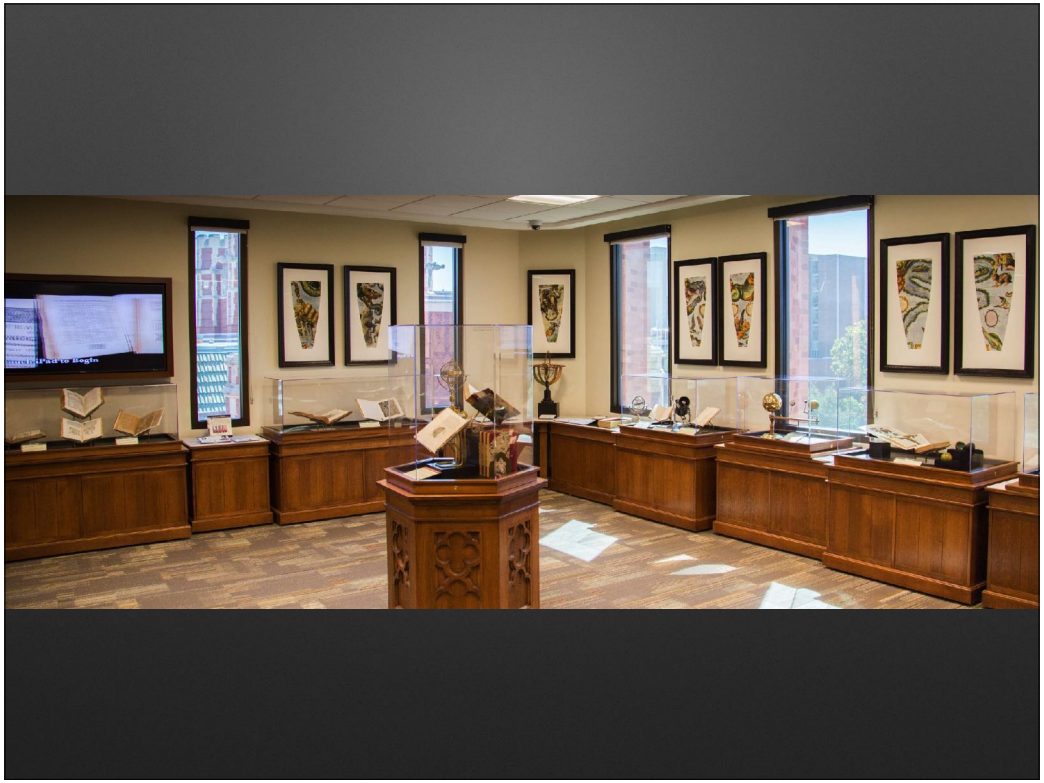
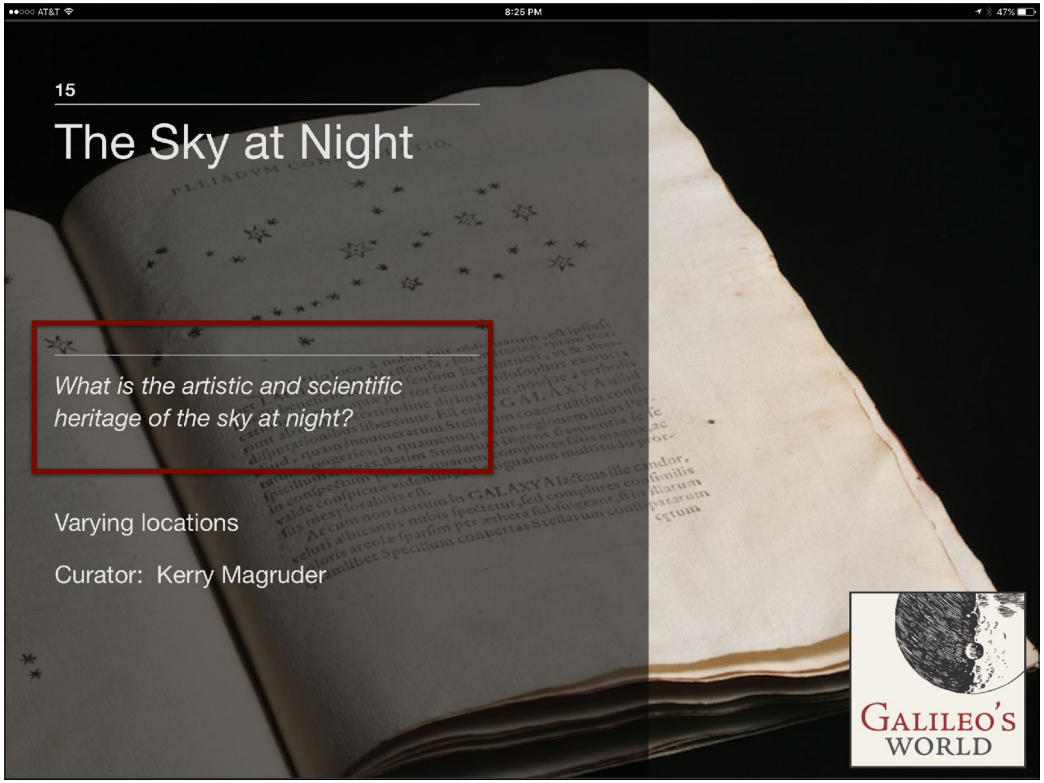
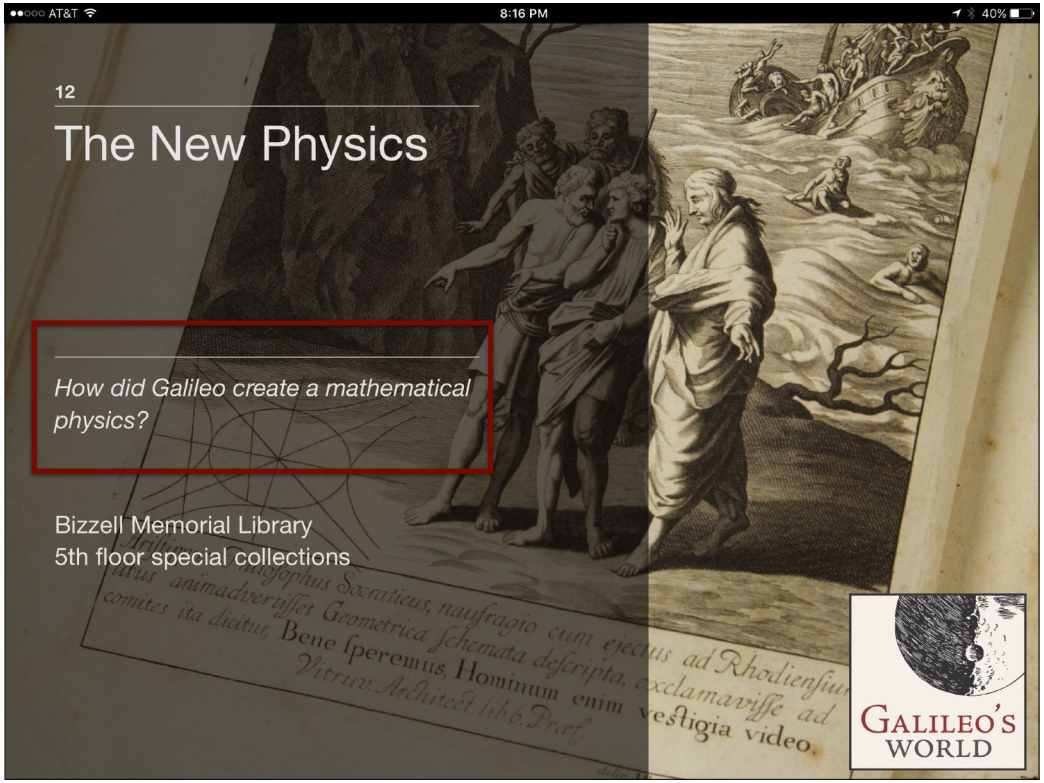


In The Sky at Night gallery

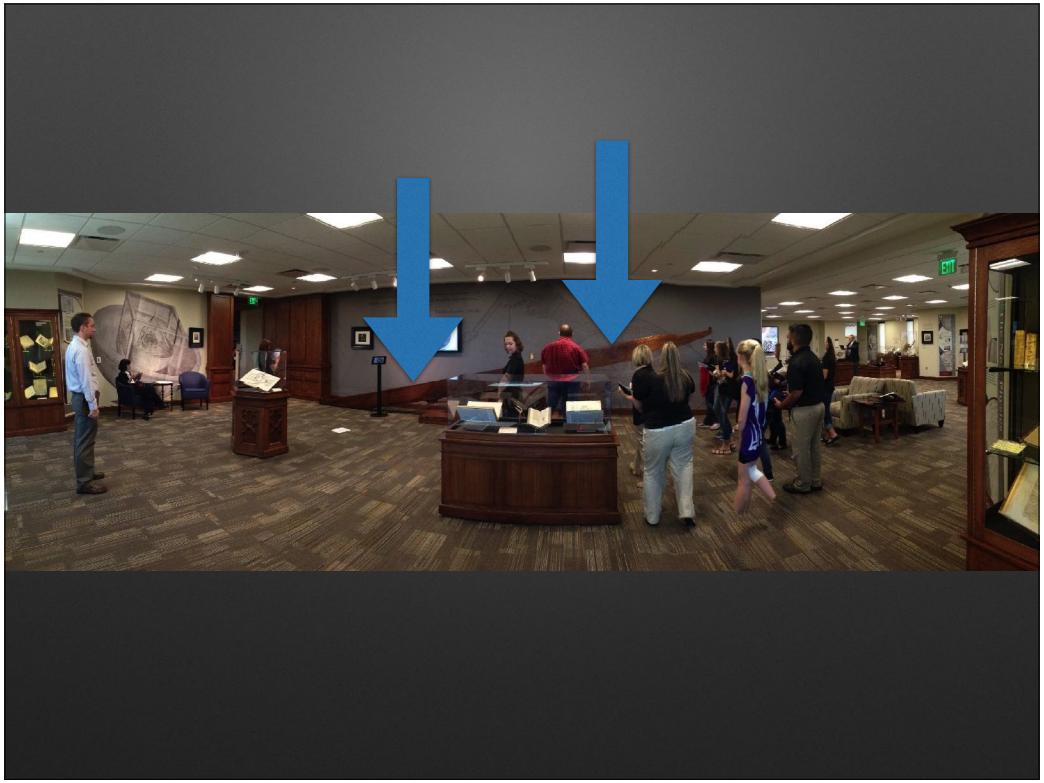


the reflection prompt was: What is the artistic and scientific heritage of the sky at night?

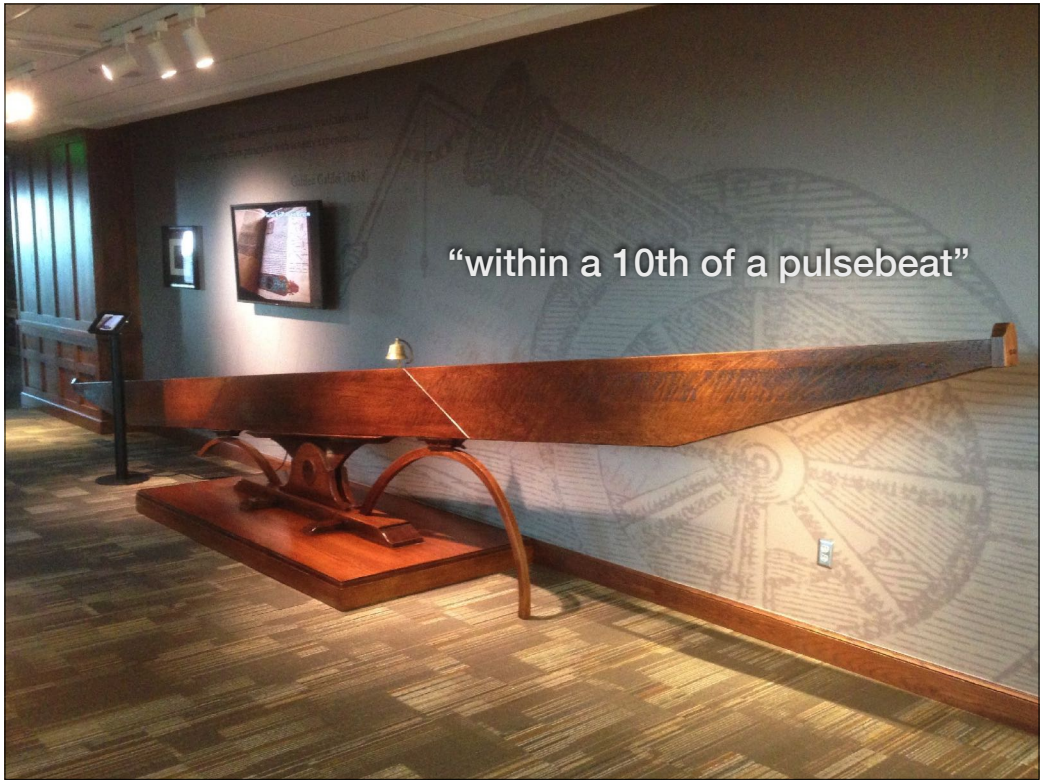
In various places, wall graphics reinforced visual aspects of the books on display.



The New Physics gallery explored: How did Galileo create a mathematical physics?



In addition to books, the New Physics gallery featured our functioning replica of Galileo’s inclined plane, along the far wall.

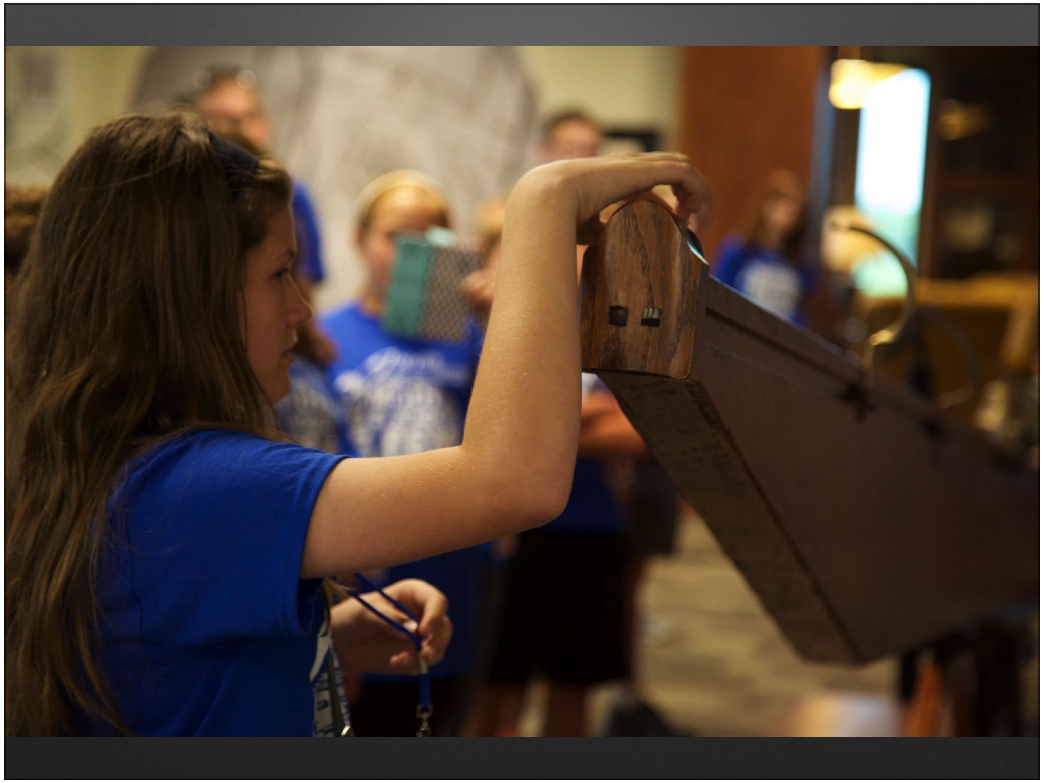


When Galileo conducted his inclined plane experiments to experimentally demonstrate the law of free fall, he measured the times of the balls to • “within a 10th of a pulsebeat.” Friends who were not musicians, were not able to successfully replicate the experiment.

— — — —

It’s still difficult to replicate today, even with a stopwatch! So Galileo’s science was made possible because of his experience in music even on the level of basic sensory perception.

Visiting students may try their hand with Galileo’s experiments using the inclined plane.



The plane is now being transferred to the Physics Department, where it will continue to be used in outreach.

Finally, the last gallery on the 5th floor was The Galileo Affair, • which inquired: “What went wrong? Does the Galileo Affair represent an inevitable conflict between science and religion?”

To host this gallery, we renovated a room, just off the exhibit hall, that holds the Bizzell Bible Collection.

Books for The Galileo Affair were displayed in the middle tier of shelves,

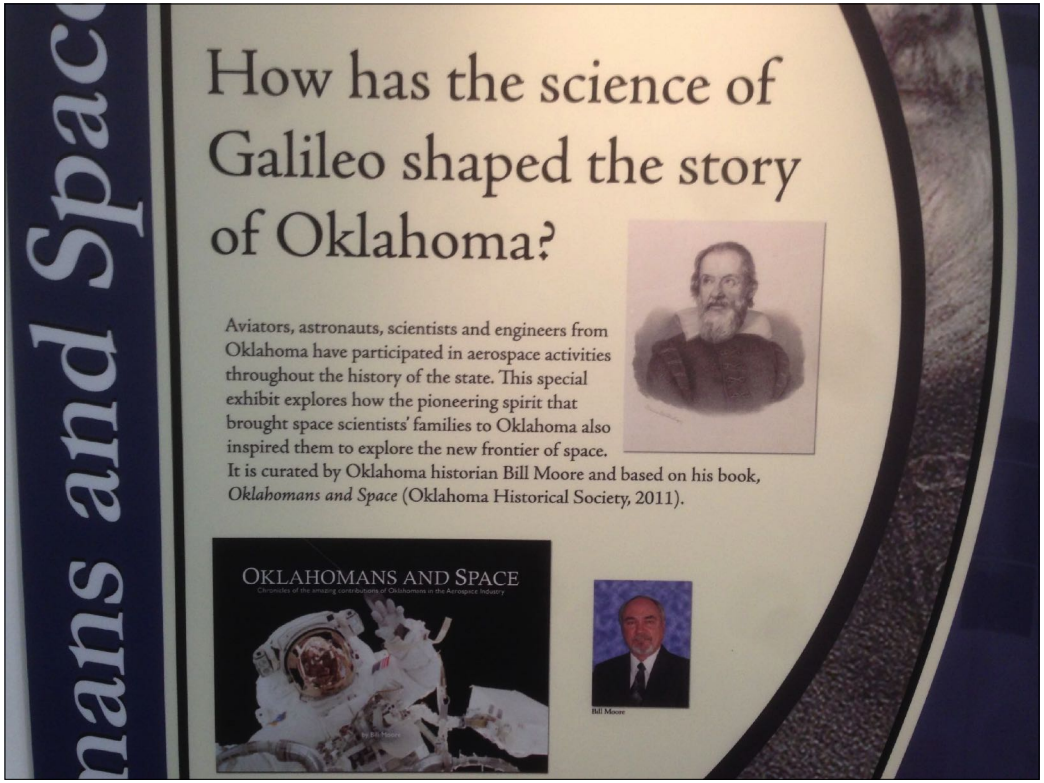
• between the volumes of the Bible Collection, above and below.

On the south end of campus, at the National Weather Center,

more rare books were on display than at any other location outside the library.


Galileo and Experimentation

The first gallery to open at the NWC was Oklahomans and Space, curated by Bill Moore.



In this graphics-only exhibit, Bill explored how Oklahomans have participated in aerospace activities throughout the history of the state.

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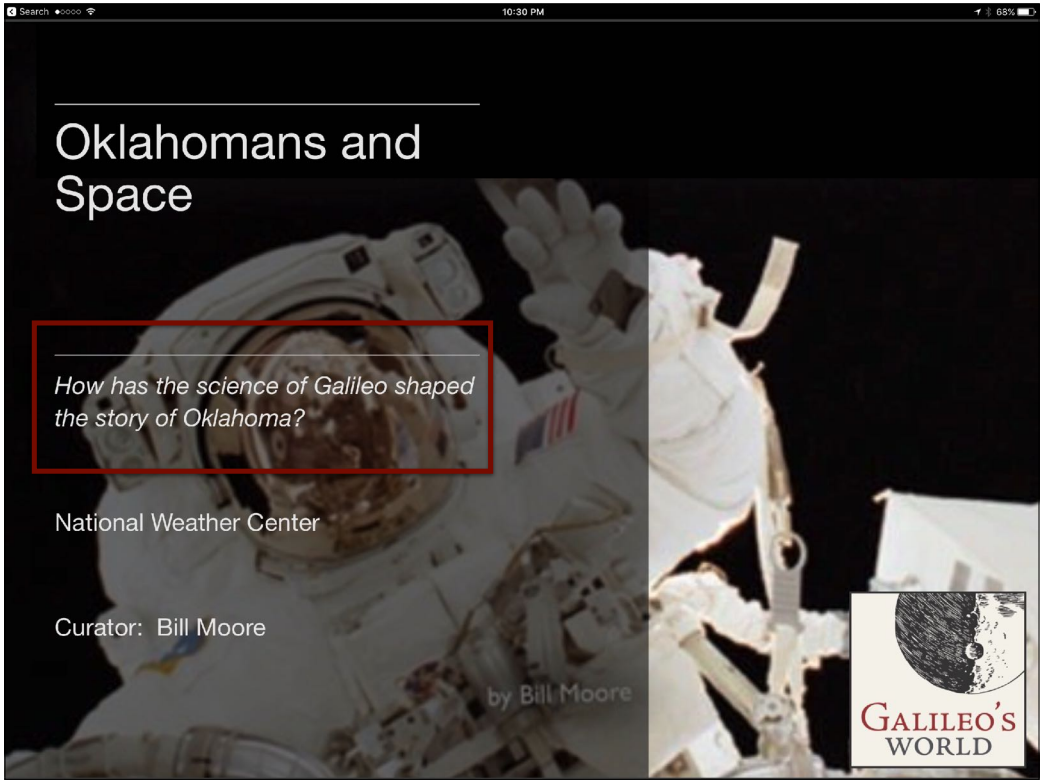
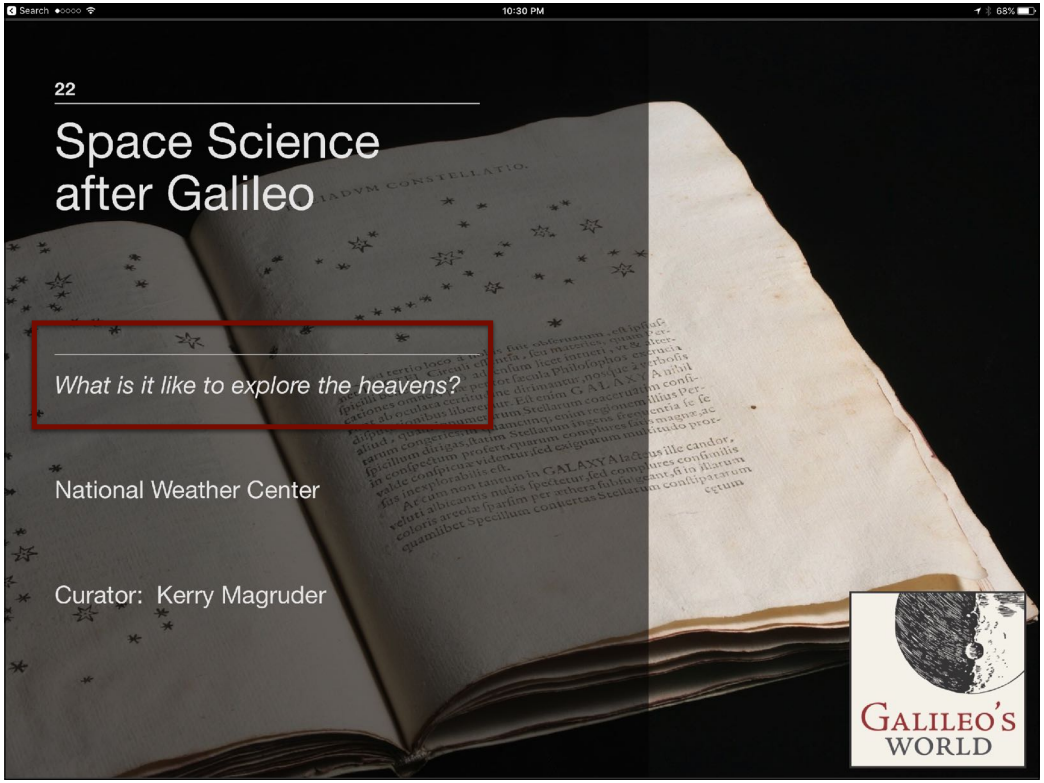
The pioneering spirit that brought people to Oklahoma also inspired space scientists to explore the new frontier of space. It is based on Bill's book, Oklahomans and Space (Oklahoma Historical Society, 2011).

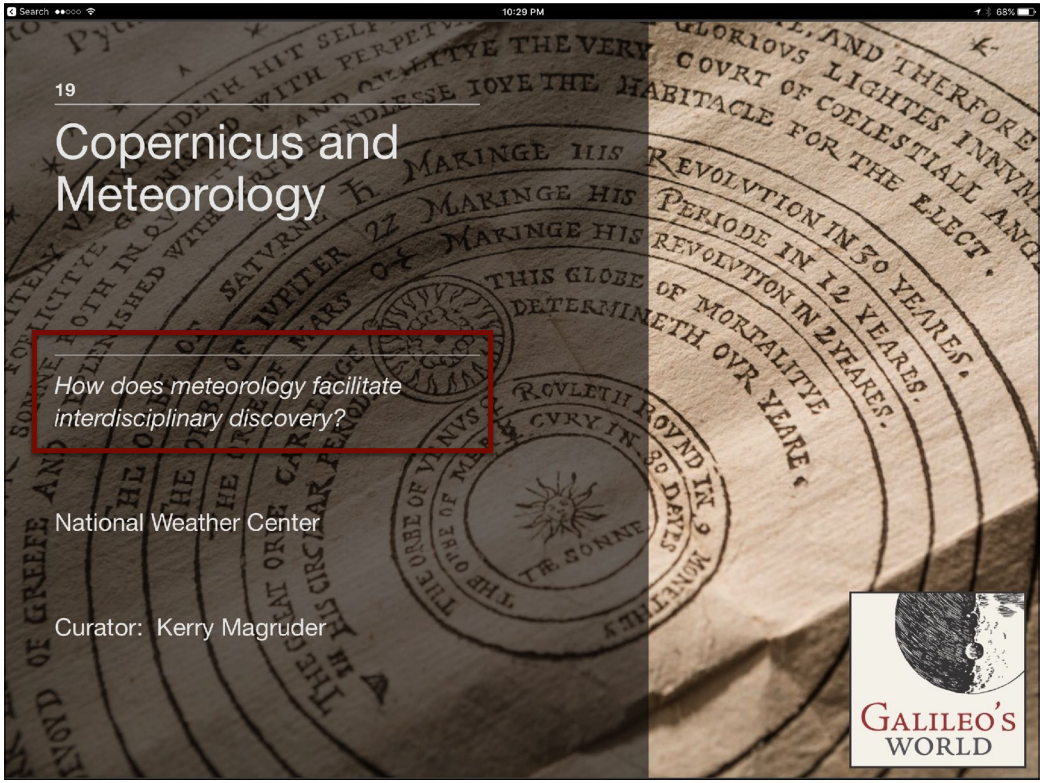


Oklahomans and Space: How has the science of Galileo shaped the story of Oklahoma?

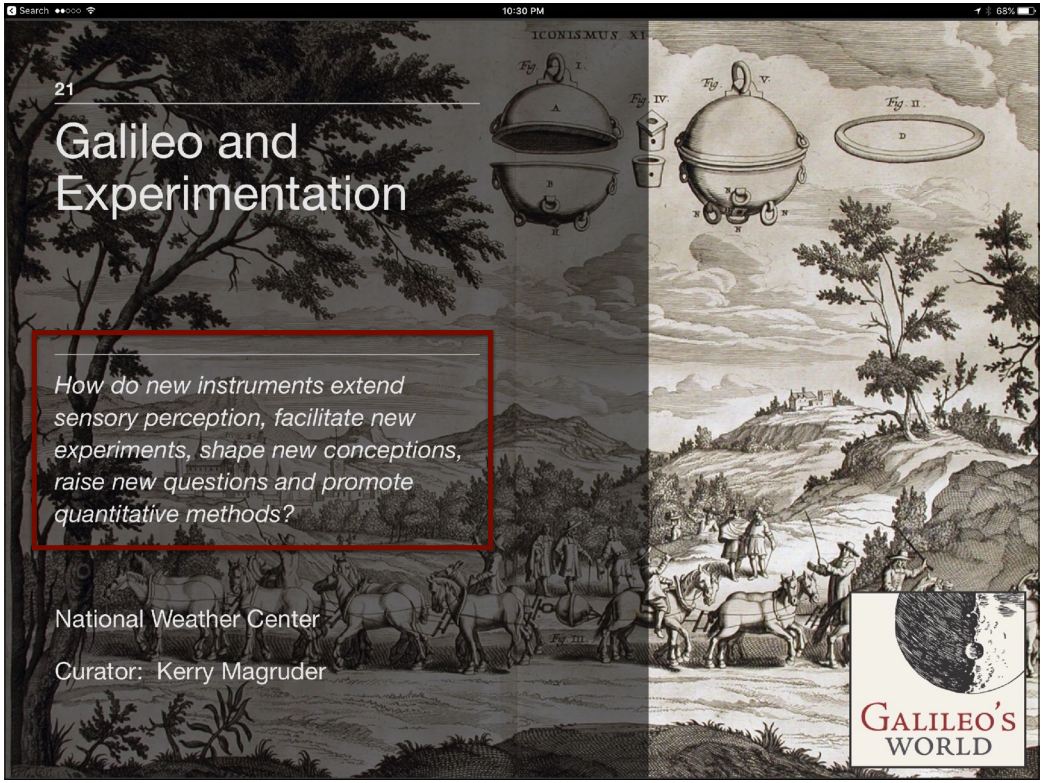
Another gallery there was Space Science after Galileo. This is the section on Planets.
[Each gallery at the National Weather Center supported some aspect of their atmospheric and aerospace mission.]



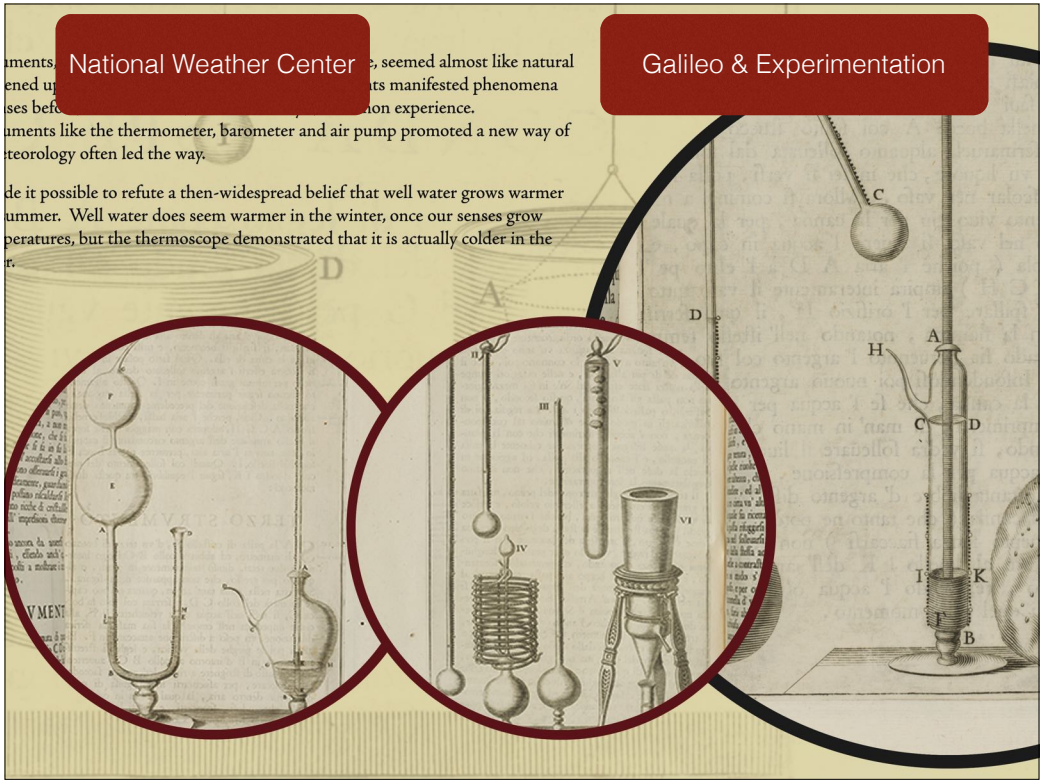
And here's the corresponding page from the iPad version of the Exhibit Guide, with its prompt for reflection: What is it like to explore the heavens?



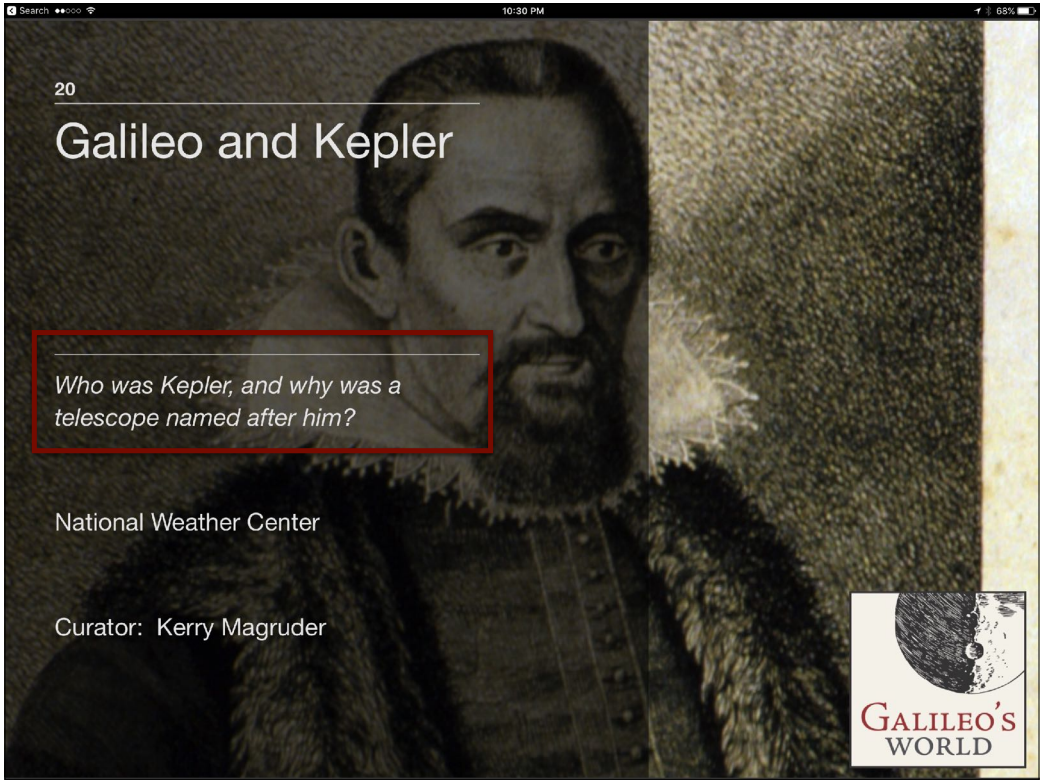
A Copernicus and Meteorology gallery explored: How does meteorology facilitate interdisciplinary discovery?



And Galileo and Experimentation: How do new instruments extend sensory perception, facilitate new experiments, shape new conceptions, raise new questions and promote quantitative research?



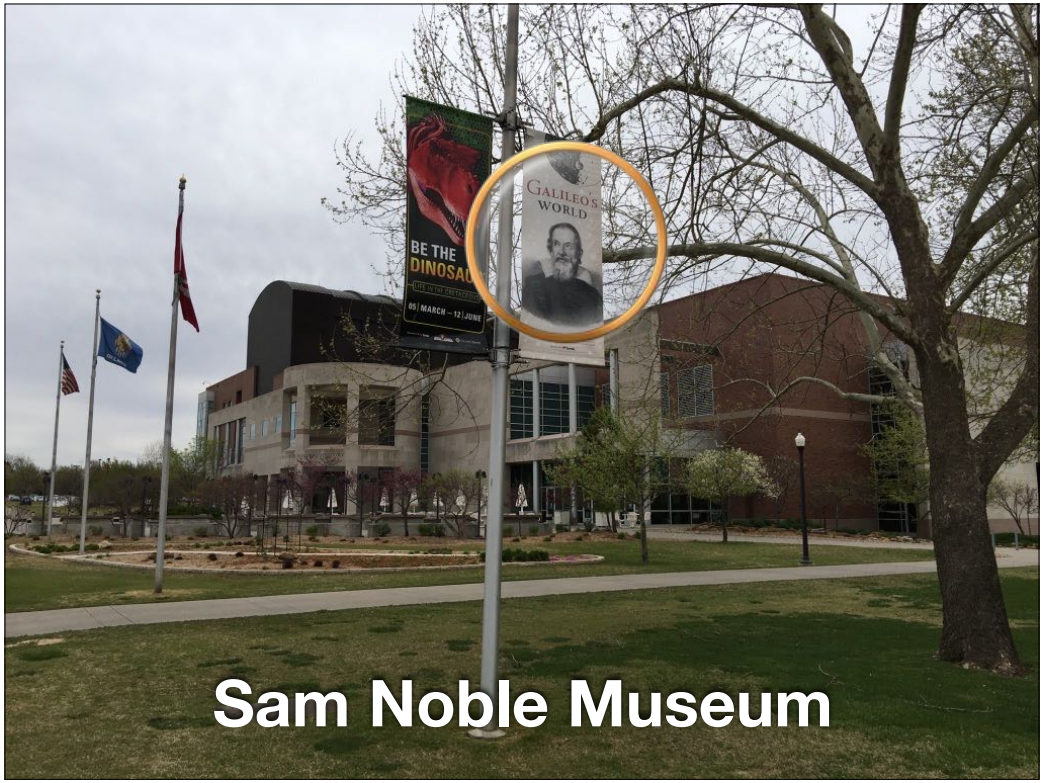
Innovative scientific instruments, from Galileo's telescope to his thermoscope, seemed almost like natural magic in the ways they opened up new worlds of discovery.



And Galileo and Kepler: Who was Kepler, and why was a telescope named after him?

JPL/NASA speakers series

Because of their interest in planetary atmospheres, the National Weather Center sponsored a monthly lecture series featuring NASA scientists from the Jet Propulsion Laboratory. Many months it was standing room only.



We mentioned earlier that the Sam Noble Natural History Museum

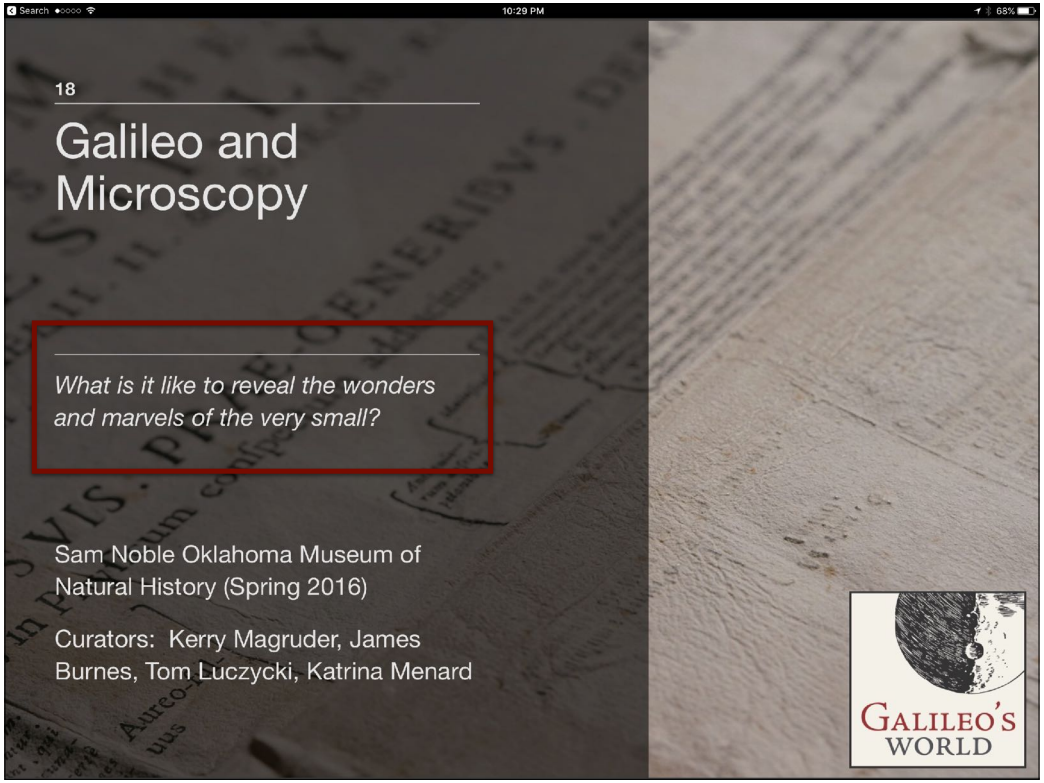
hosted an exhibit on Galileo and the Natural History of the Americas, juxtaposing rare books with specimens from their collections.

The natural history investigations in which Galileo participated were carried out by the Academy of the Lynx, and we told the story of that academy here as well.


"For when the sun draws up some vapors here, or warms a plant there, it draws these and warms this as if it had nothing else to do. Even in ripening a bunch of grapes, or perhaps just a single grape, it applies itself so effectively that it could not do more even if the goal of all its affairs were just the ripening of this one grape."
—GALILEO, 1597
GROWING A MUSEUM: HERBS & GARDENS

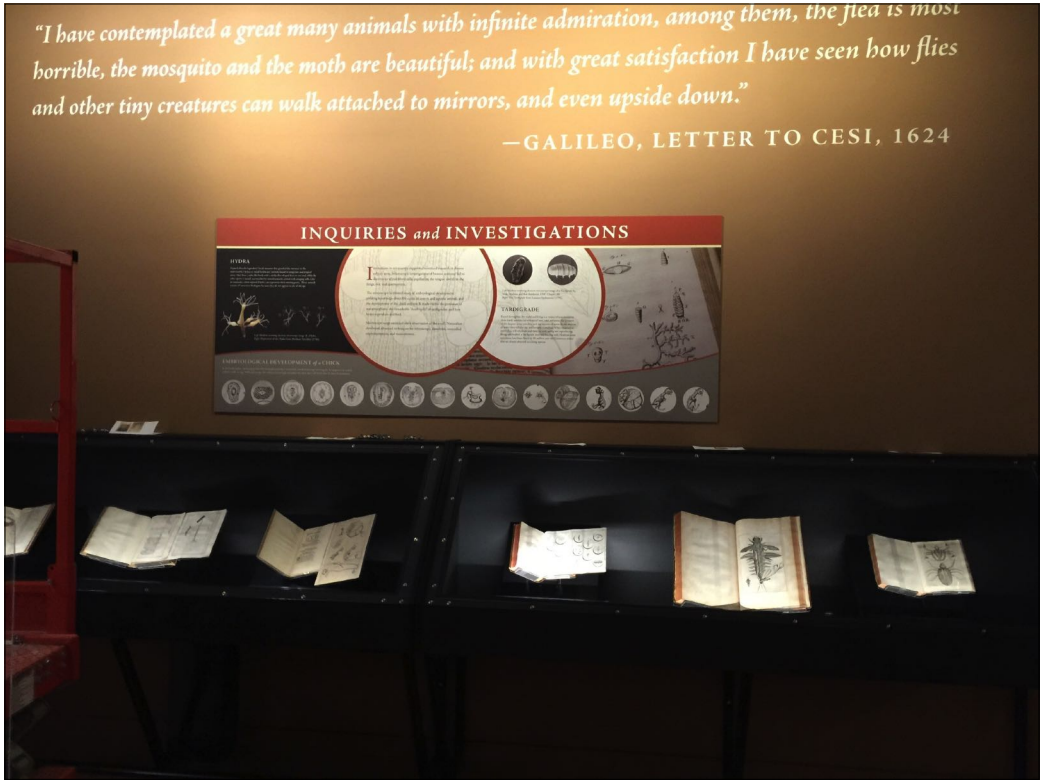

"In the last few days, when I was in the house of His Excellency the Marquis Cesi, I saw the pictures of 500 Indian plants, and I was expected to affirm either that this or that one was a fiction (denying that such plants were to be found in the world)..., yet neither I nor anyone else present knew their qualities, virtues and effects."
—GALILEO TO PIERO DINI IN ROME, MAY 21, 1611
OLD SCIENCE, NEW DISCOVERIES

During the spring semester, they hosted a second exhibit which explored Galileo and Microscopy.

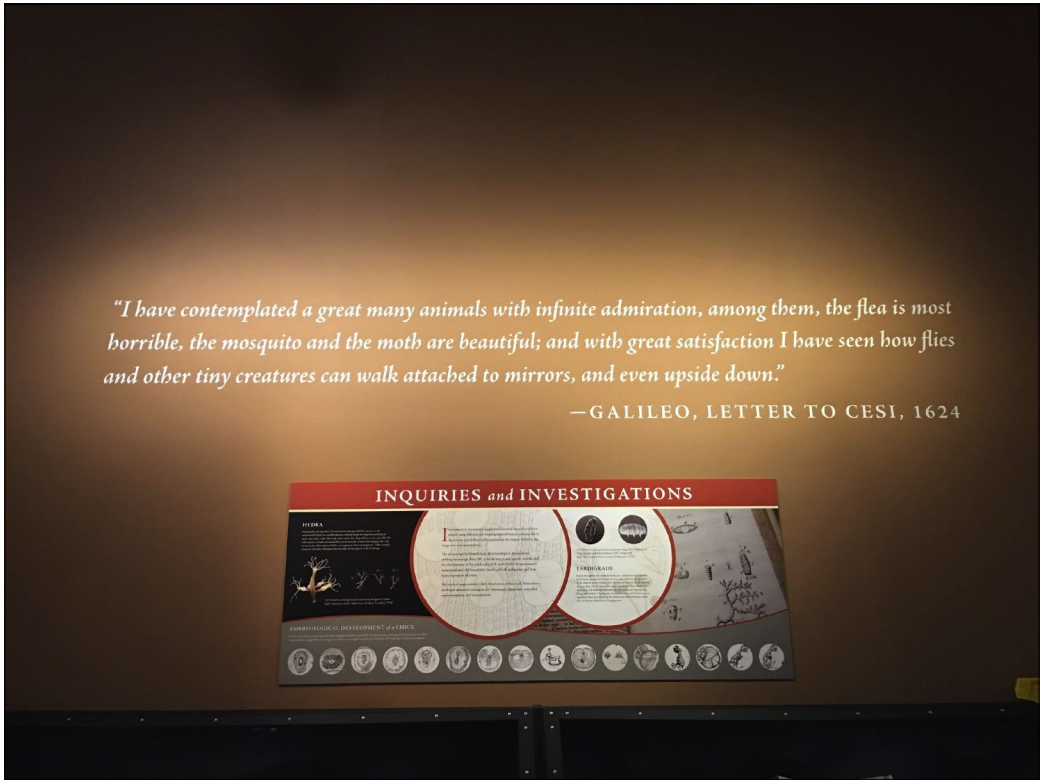


The Galileo and Microscopy exhibit explored “What is it like to reveal the wonders and marvels of the very small?”

The Apiarium, shown here, was the first published report of observations made with a microscope. It was produced by Galileo's friends using a microscope he devised. • This is one of only 4 extant printed copies, the only one outside Italy today.



Galileo wrote his friend and patron, Prince Federigo Cesi, “I have contemplated a great many animals with infinite admiration, among them, the flea is most horrible, the mosquito and the moth are beautiful; and with great satisfaction I have seen how flies and other tiny creatures can walk attached to mirrors, and even upside down.”



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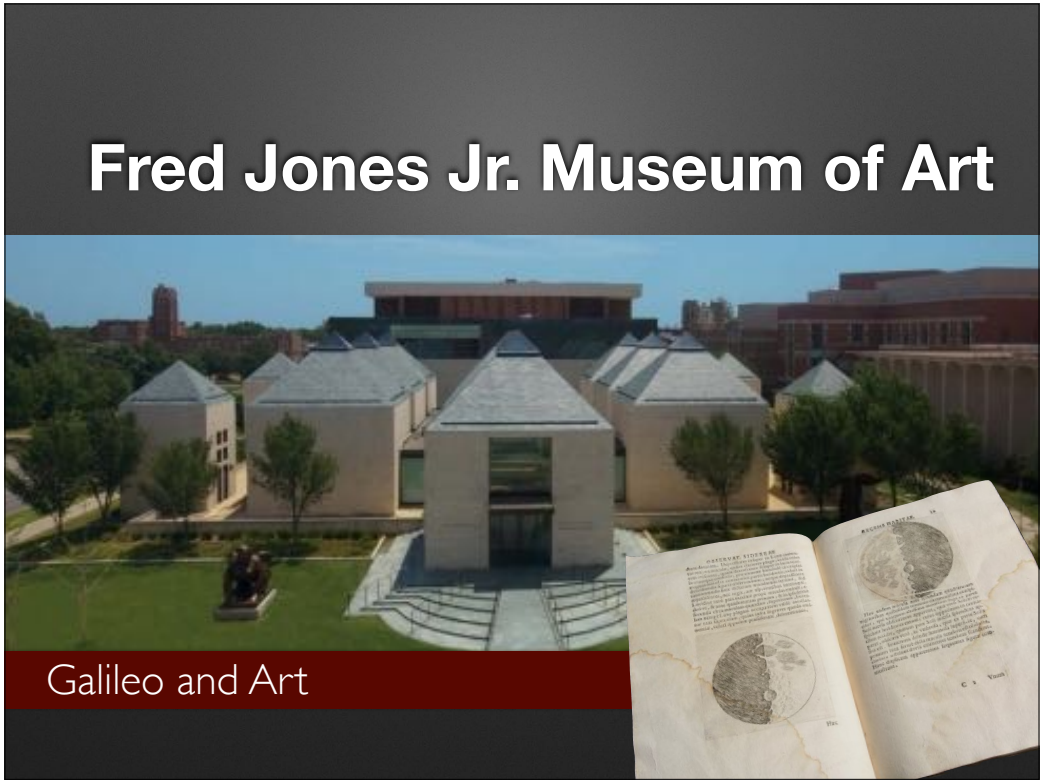
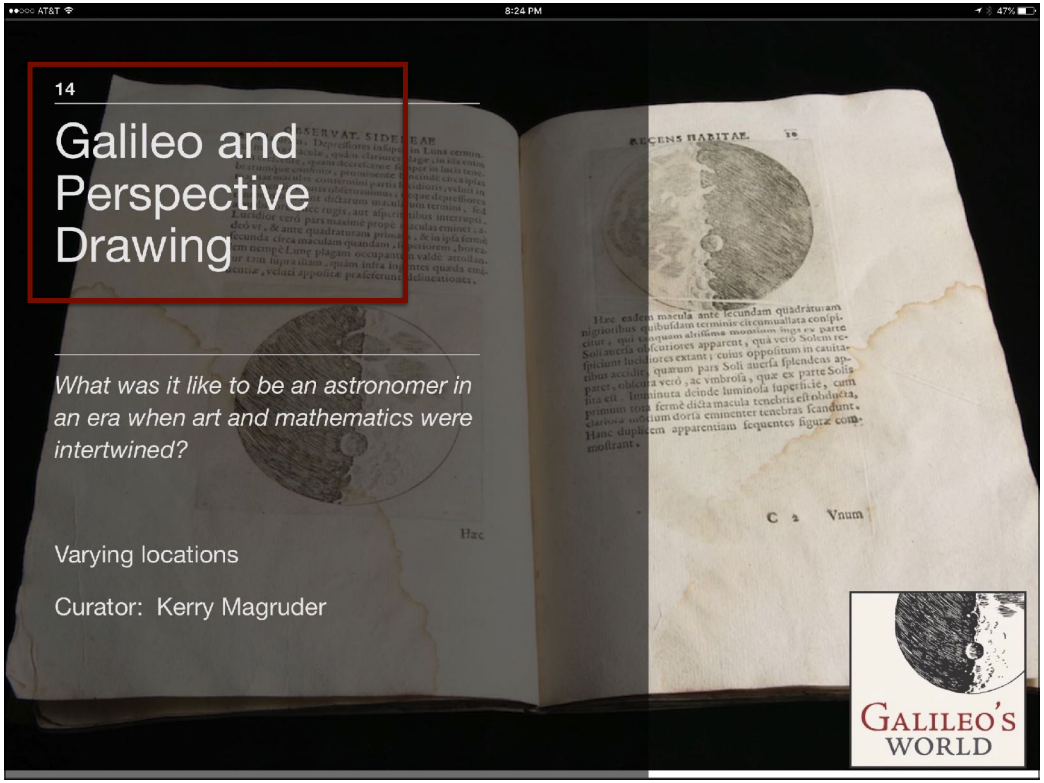


A few blocks north, the Fred Jones Jr. Museum of Art hosted a number of books

related to art and the telescope.

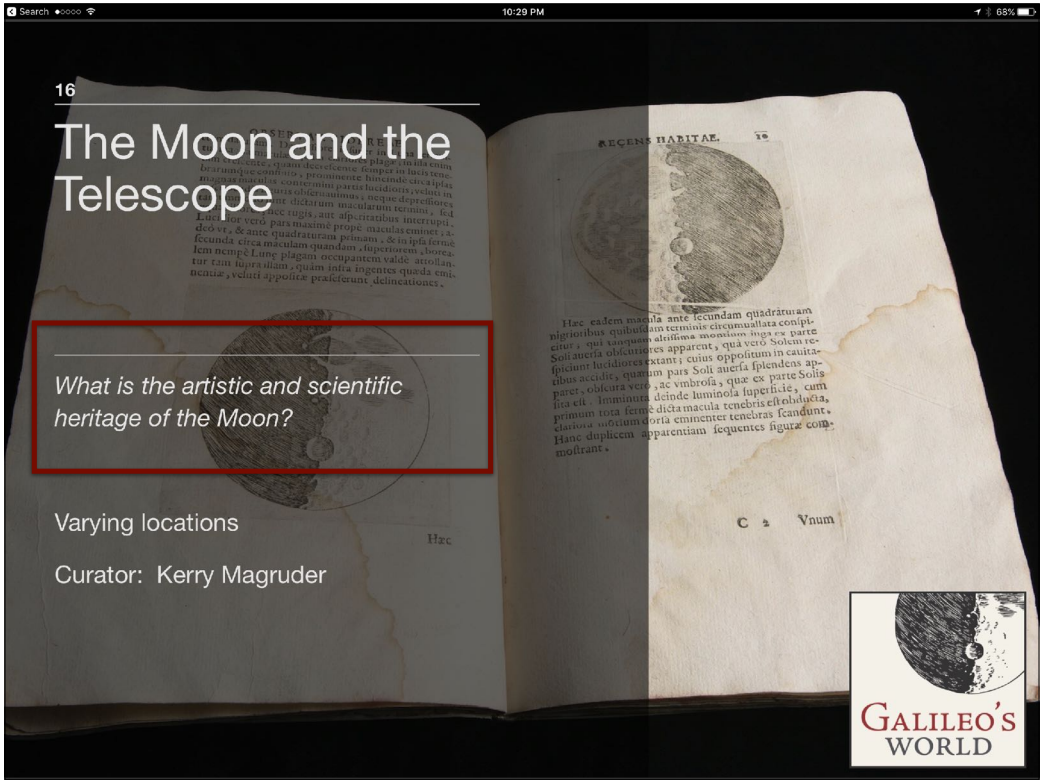
juxtaposed alongside relevant selections from their own holdings.



One emphasis at the Fred Jones was Galileo and Perspective Drawing,

devoted to exploring: "What was it like to be an astronomer in an era when art and mathematics were intertwined?"

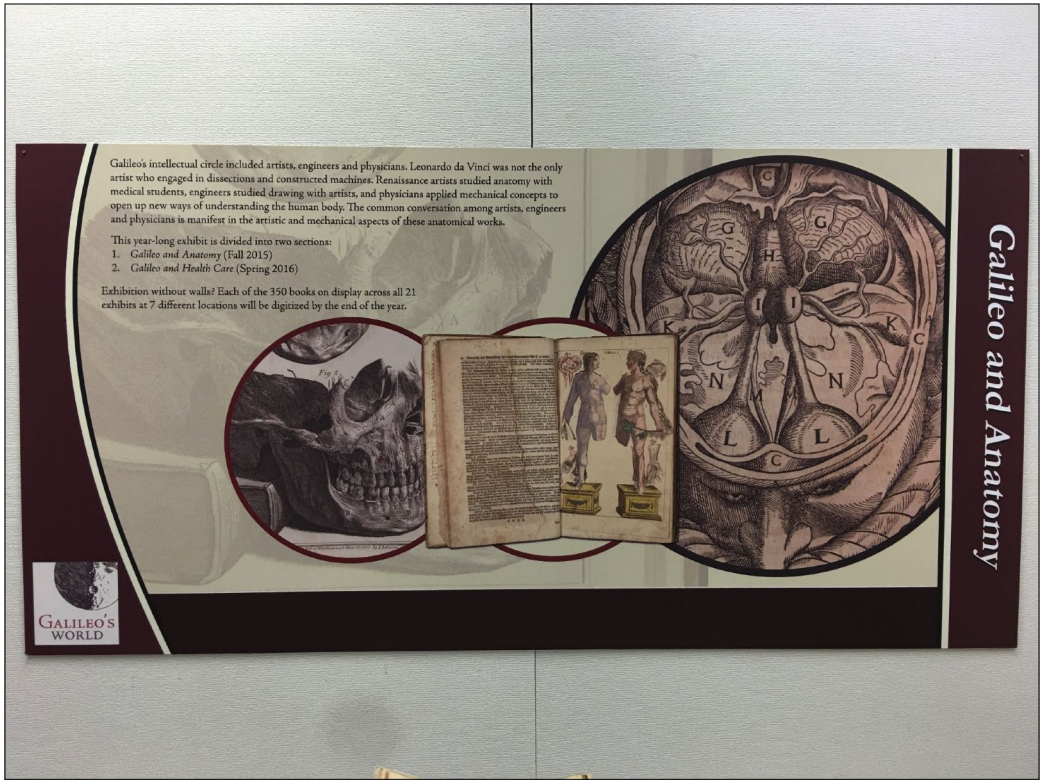
Another gallery there was The Moon and the Telescope:



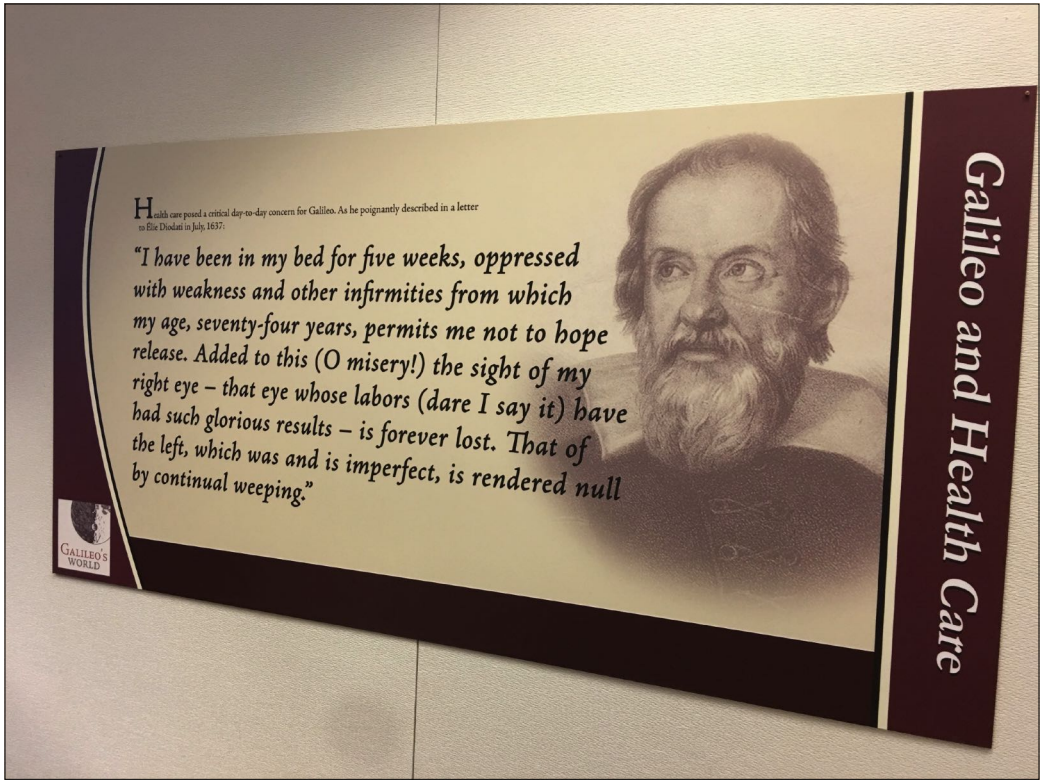
which explored: What is the artistic and scientific heritage of the Moon?

The Bird Library on the Health Sciences Campus, in Oklahoma City,

hosted an exhibit on Galileo and the Health Sciences.

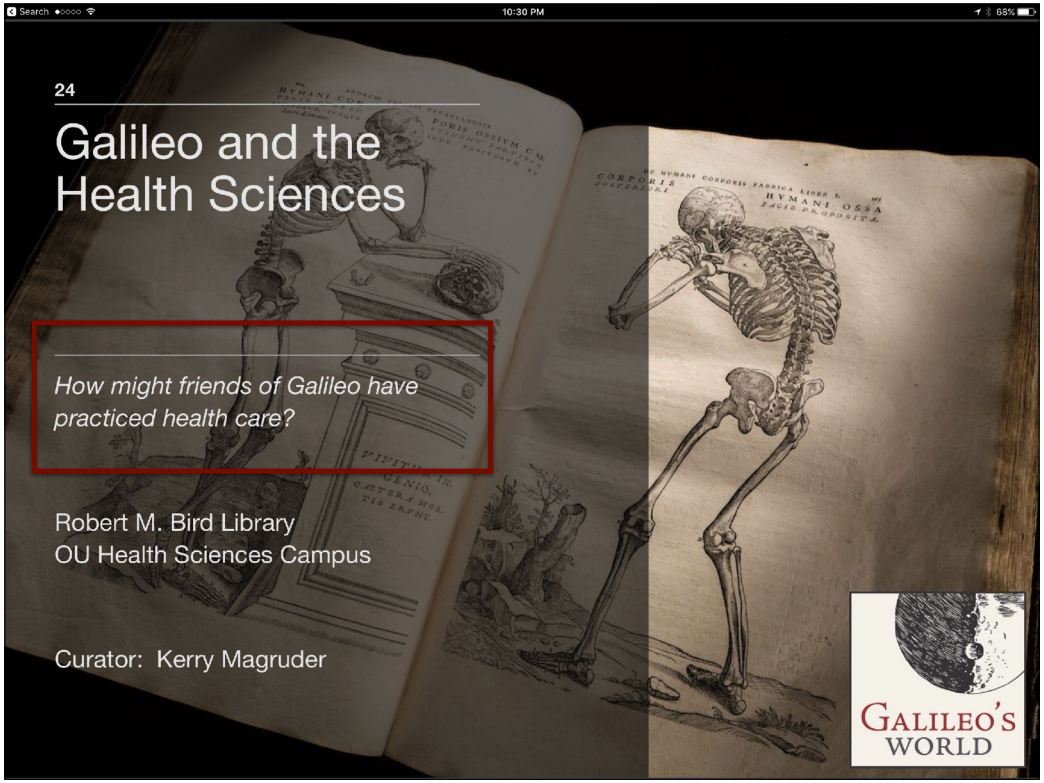


Books there comprised two galleries: Galileo and Anatomy in the Fall



; replaced by Galileo and Health Care in the spring. Galileo poignantly wrote:

Books there comprised two galleries: Galileo and Anatomy in the Fall; replaced by Galileo and Health Care in the spring.



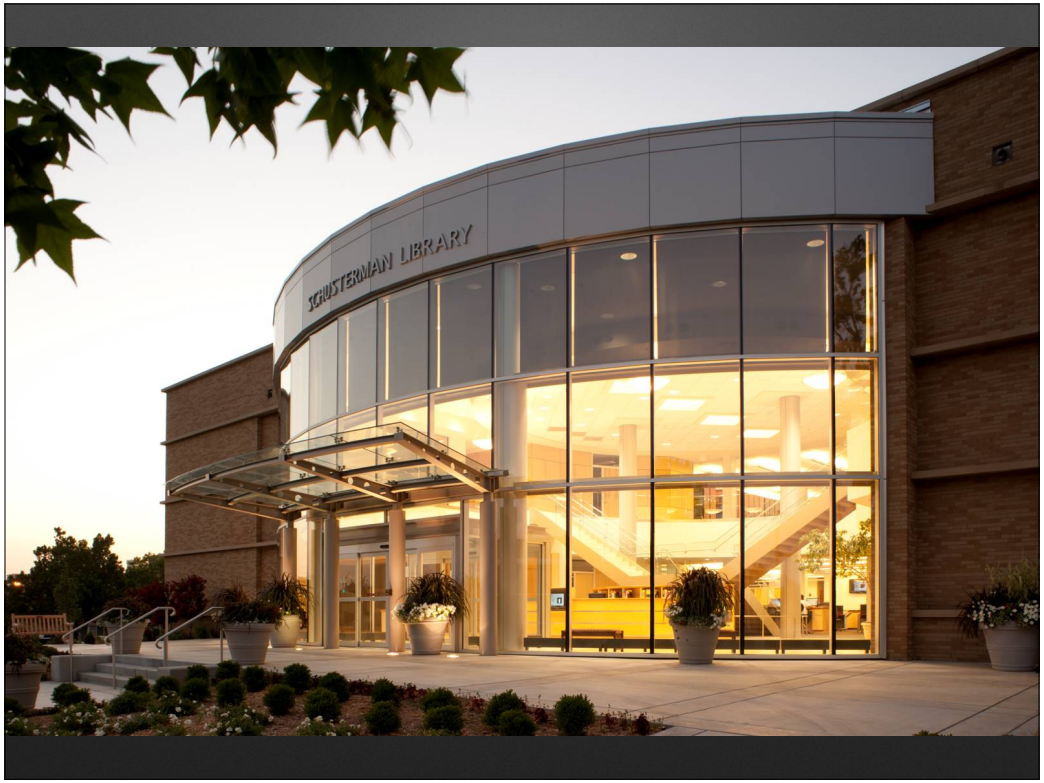
The prompt explored: How might friends of Galileo have practiced health care?

Galileo himself was professionally trained in medicine, and moved in medical circles all of his adult life.

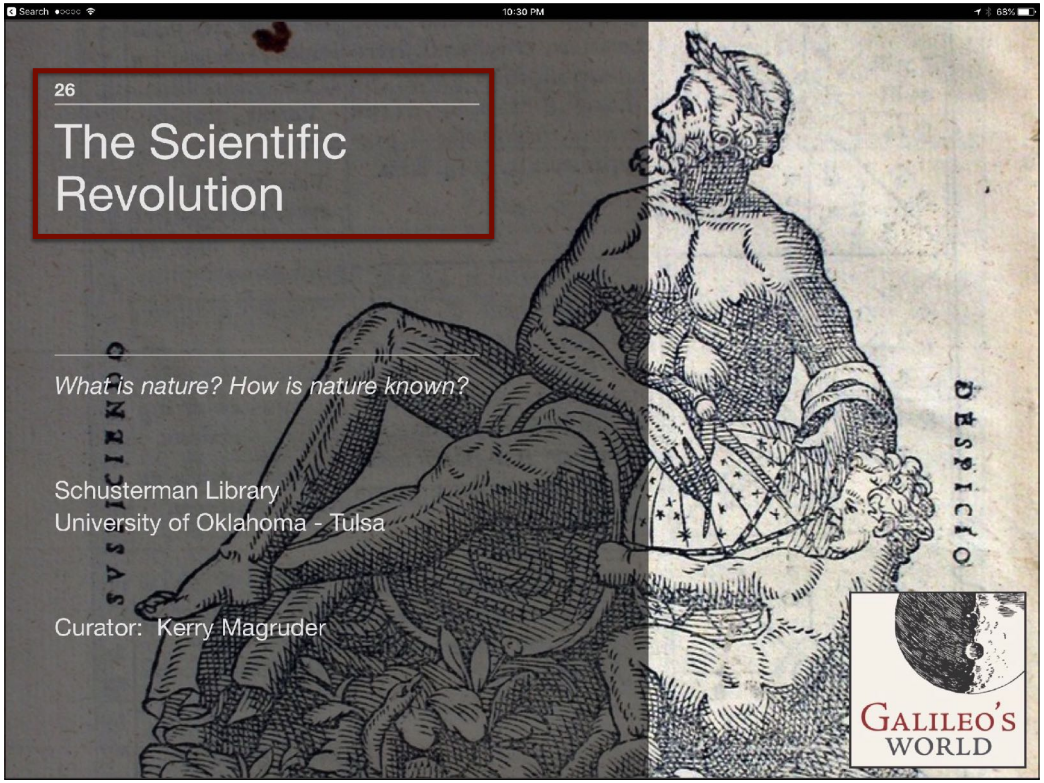

Galileo and the Health Sciences
a friend of
ctice health care?


GALILEO'S
WORLD


GALILEO'S WORLD
How might a friend of Galileo's practice health care?
Galileo and the Health Sciences
LIBRARIES
LIVE ON, UNIVERSITY



Finally, at the Schusterman Library at the University of Oklahoma Tulsa campus



hosted an exhibit on the Scientific Revolution.

More than 360 people turned out for their opening reception, which featured storytelling and crafts and other activities.

Their exhibition hall lies just off to the left from the main entrance.

During the course of the exhibition they sponsored reading groups and several major special events.

School groups made frequent visits.

At the opening reception local amateur astronomers put on a skywatch.

which is why we had designated one of the oldest historic star atlases for display in this gallery, along with a dozen other treasures.

So that's a brief virtual tour of the Galileo's World exhibit. 30 mins
Now let's go behind the scenes to see how it came about.

The key figure behind Galileo's World was Rick Luce, who came to OU in August, 2012 • with a mandate to redefine a modern research university library

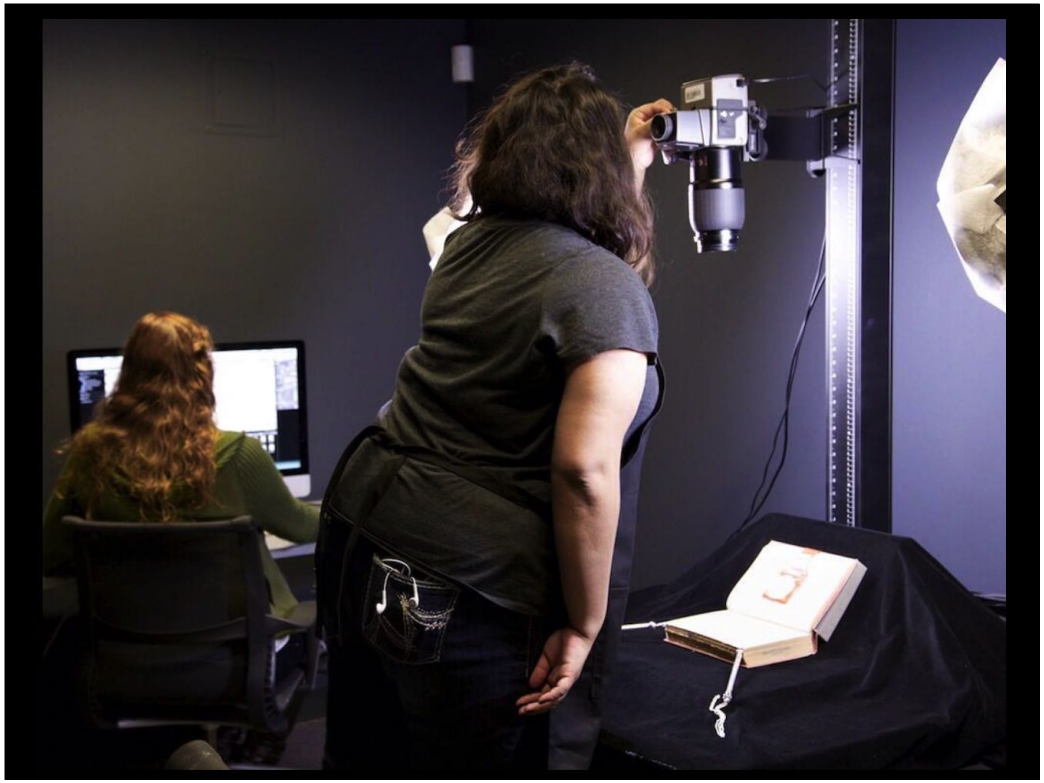
- as the intellectual commons of the university. So Dean Luce asked me to come up with an exhibit idea that would show the library in action as the intellectual commons of OU.

As a special collection, we could demonstrate an intellectual commons in two complementary ways: First, a physical exhibition, and second, virtually through open access digitization.

First, to create a physical intellectual commons, I literally started with a map of campus, and then sketched story ideas that would connect every building and program with the world of Galileo. The Library as an intellectual commons, facilitates connections just like the culture of Renaissance Tuscany. So with an exhibit on Galileo we might spark a common conversation across the entire university, bringing the many worlds of OU together.

We chose the stories before we chose the books, not the other way around. If we had started with the books, then figured out the stories, and then looked at the map, our partners might not have found the idea of collaboration with us very compelling. Instead of thinking of the exhibit as showing what cool things we had, we put ourselves in the position of our potential partners and asked, how can we help *them* tell *their* stories? So books came last in this sequence. We left out dozens that I would have included were I intent on simply showing off our Galileo collection.

And second, we would create a virtual intellectual commons. With the exhibit, we wanted to show that open access provides a basis for collaborations that otherwise could never take place. So every work displayed in Galileo's World was [also digitized to support research by anyone, anywhere, anytime. Each book was]
digitized in high resolution and placed in the public domain. Promoting open access was the most important strategic goal of the Exhibition.

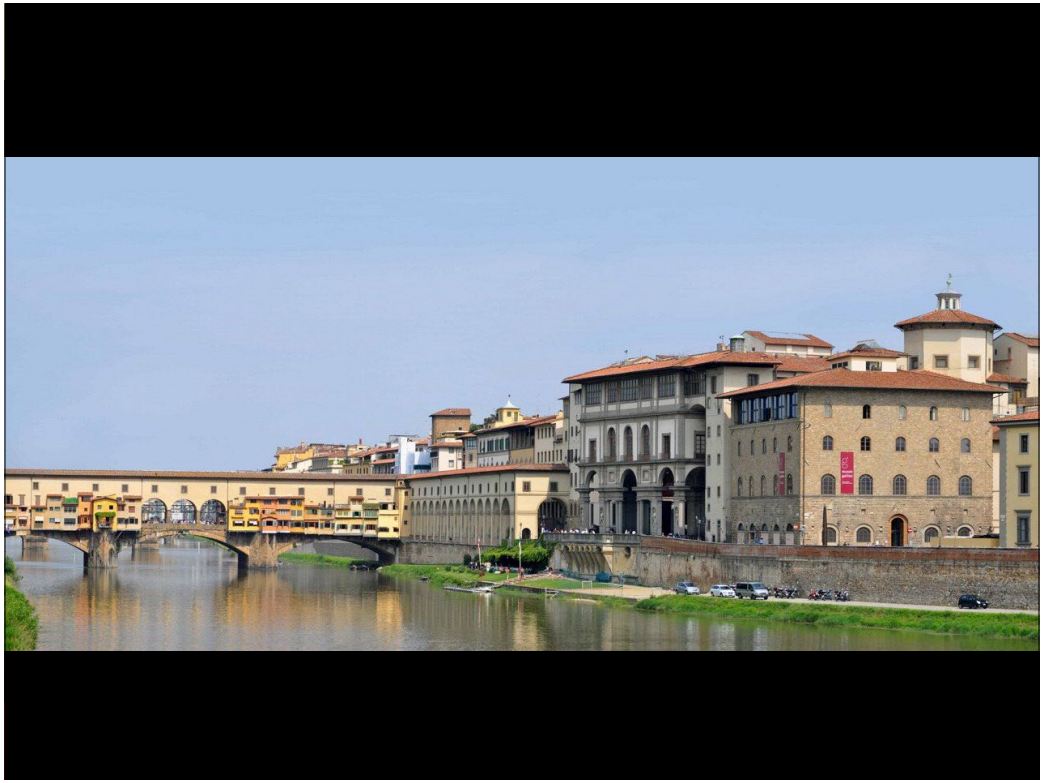


The libraries’ state of the art Digitization Lab

The Museo Galileo in Florence is an example of how the exhibit and open access were mutually reinforcing. The Museo Galileo is the leading research institute in the world devoted to Galileo. • Their GalileoTheka digital library, then in development, has become the richest resource for online research related to Galileo. • Dean Luce immediately sent me to the Museo Galileo with a digital scan of the Apiarium, the rarest work in the history of microscopy. We offered the scan as an example of our new open access policy, and therefore as the beginning of a collaborative partnership whereby we would participate for years to come in the Museo Galileo's digital library.

The Museo Galileo responded by lending us for the physical exhibit the instrument replicas, and nearly 40 high resolution video tutorials, just as one would see if visiting the Galileo museum in Florence.

One of the great highlights of the exhibition year for me was when Paolo Galluzzi, director of the Museo Galileo, chose to unveil the new Galileotheka digital library not in Florence or Berlin, but in Norman at our Galileo's World symposium.



Global partnerships like these provide unparalleled opportunities for researchers at a university like OU. Galileo's World itself was a global event, garnering international attention, as a result of our vision of the library as an open commons.

A second person who made Galileo's World happen is Joe Castiglione, Athletic Director.

• Joe encouraged us to make it accessible for all students! (including those who would not even recognize the name of Galileo)

Out of the 350 original rare books on display, 3 were purchased with the assistance of the OU Athletics Department: [a manuscript in 2012, Sirigatti's work on perspective drawing in 2013, and Vincenzo Galilei's treatise on music theory in 2014].
If you remember Joe's generosity, I hope you can root for the Sooners at least once this season. They're playing West Virginia as we speak.

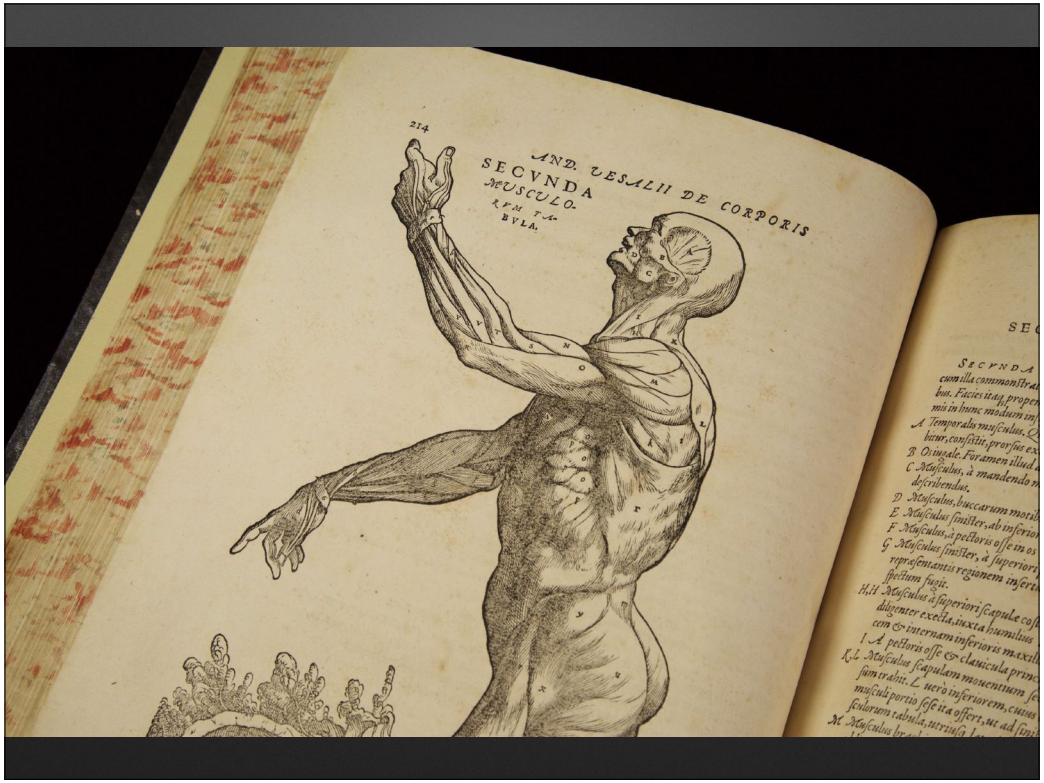
By the way, during the Sooner's recent desperate bowl games, tweets like these may have been overlooked among the general despair, confusion and sorrow, but (read).

Headington Hall is the home base for OU Athletics.

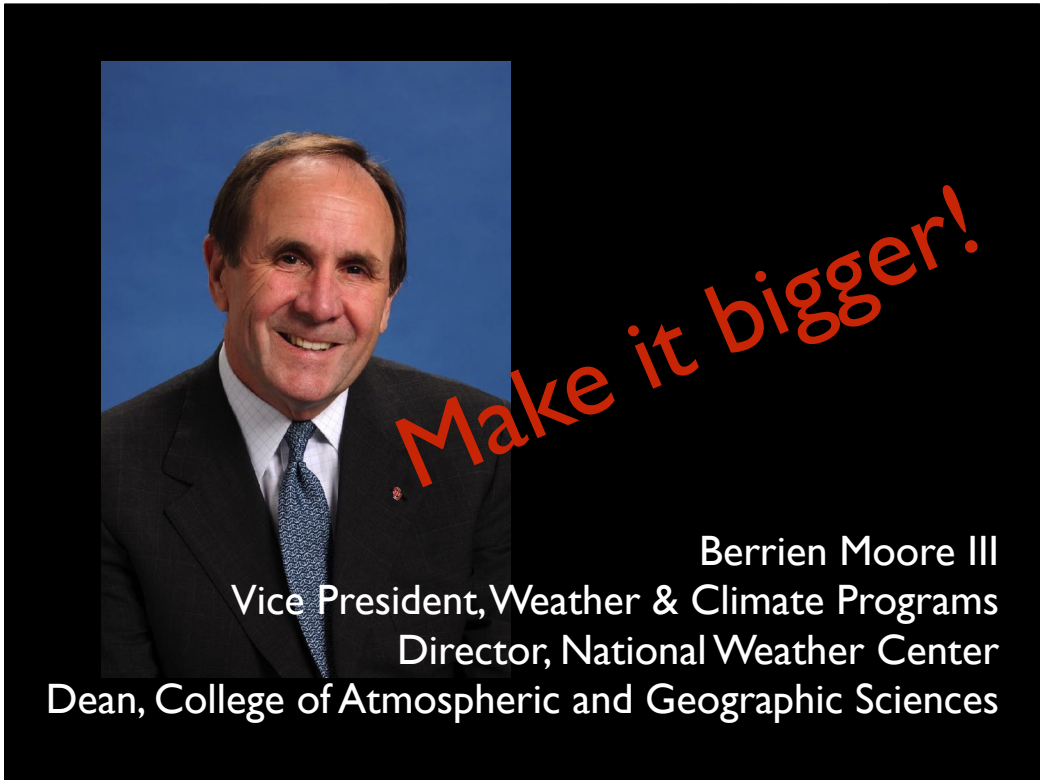
The beautiful lobby lies just inside the main entrance.

So to thank the Sooners we created a little gallery on sports right inside the lobby.

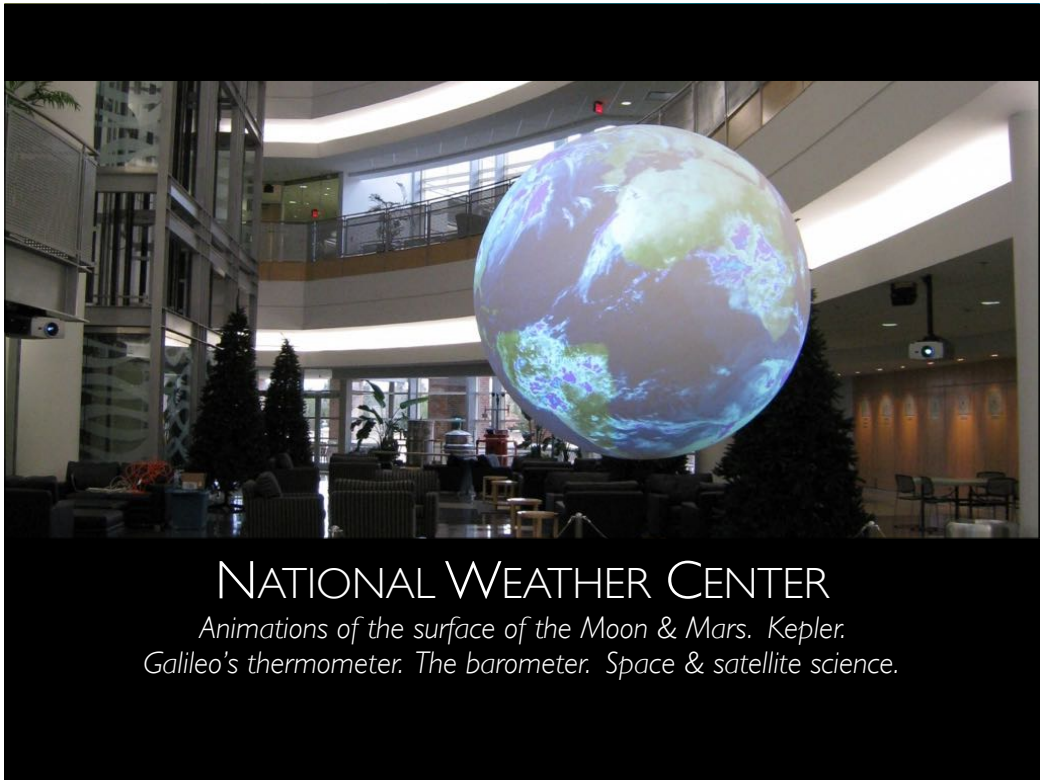
Its purpose was to explore: What would Coach Galileo say?



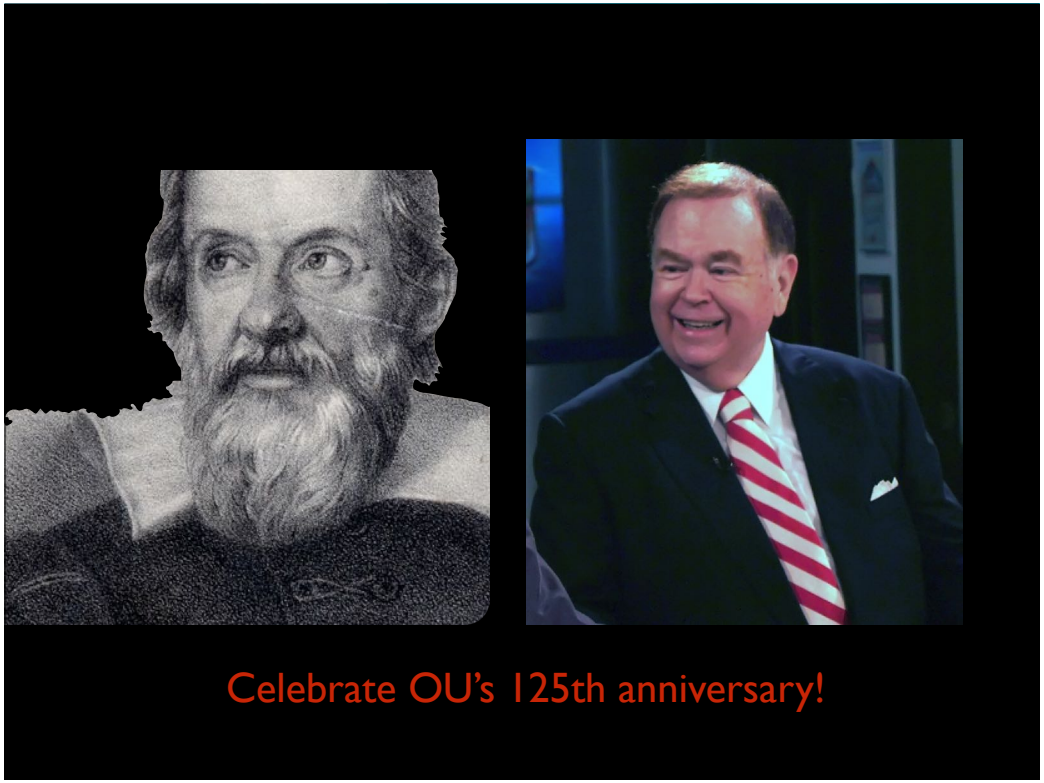
Many athletes can strike the Heisman pose at the drop of a hat. We held a contest for the best imitation of the muscle men in this anatomical work by Vesalius.



A third person who made Galileo's World happen is Berrien Moore, director of the National Weather Center. When in late 2013 he heard our plans for the exhibition, his advice was emphatically, • make it bigger!



Dean Moore backed up those words by offering to host a joint-exhibition at the National Weather Center, a central partner in OU's research enterprise. He encouraged us to ask the art and natural history museums to do the same. Thus began a lengthy series of conversations with potential partners who became excited about joining the Galileo's World conversation.

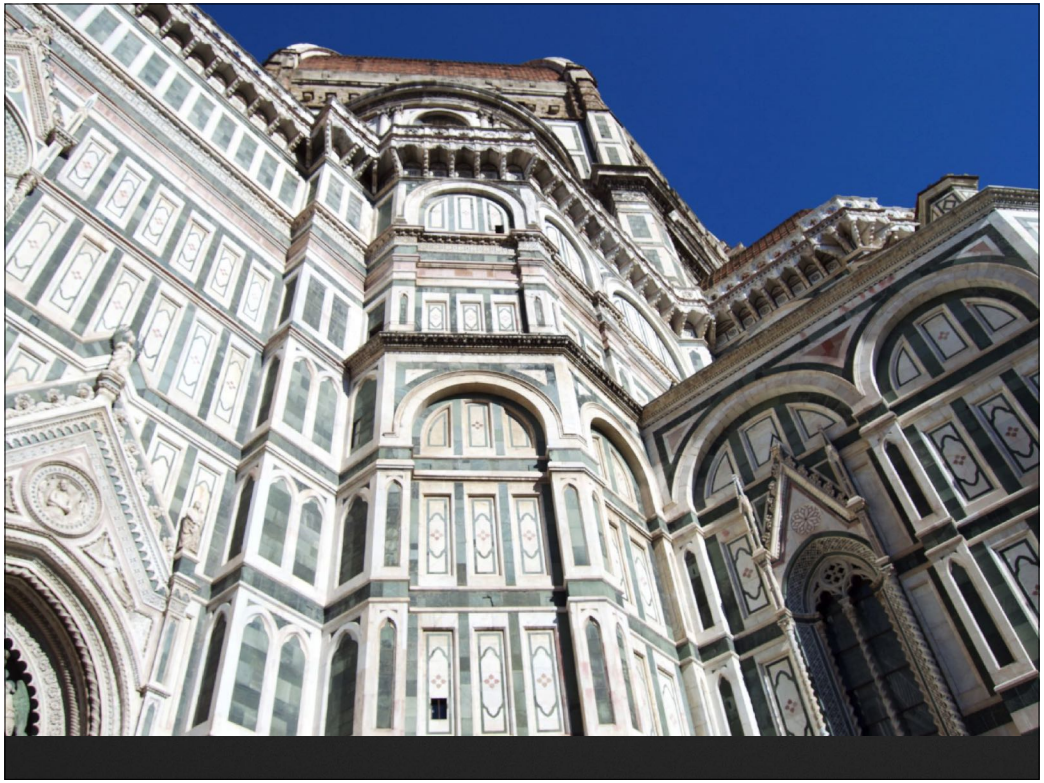


Then President Boren weighed in, urging that the Galileo's World exhibition become part of the • celebrations of the 125th anniversary of the university! So this, in a nutshell, is how Galileo's World became a campus-wide event, [bringing together of the world of Galileo and the world of OU, a conversation on the meaning of interdisciplinary connections for a modern research university.]

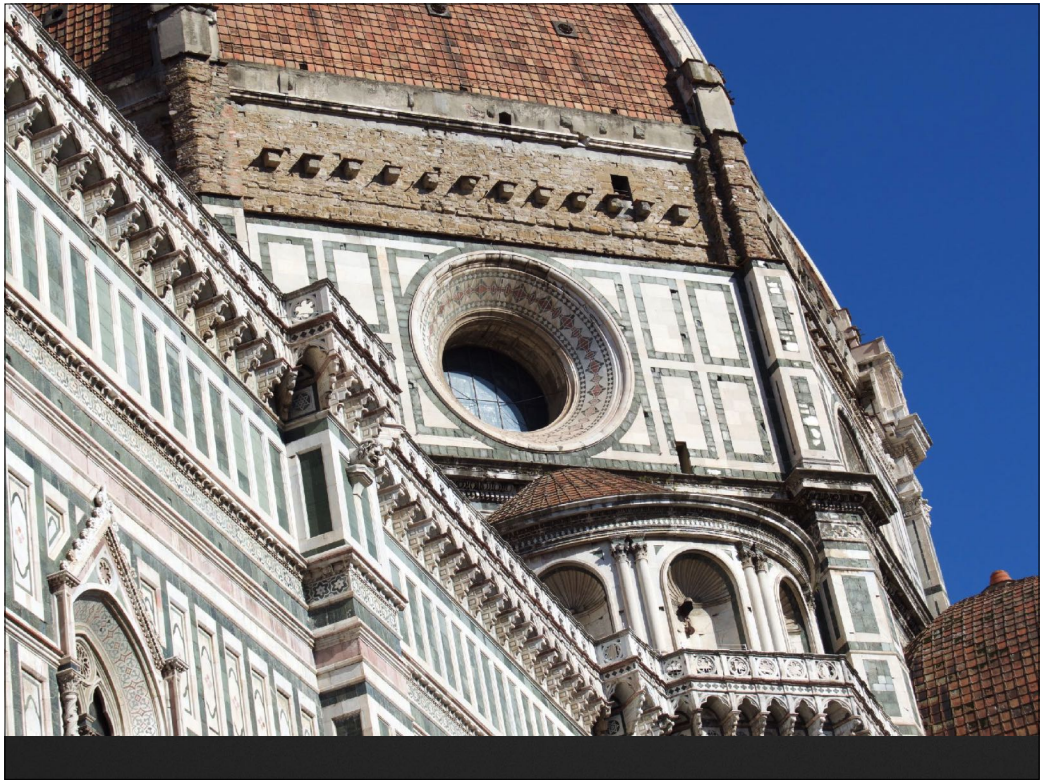
The clock was ticking: with the exhibit now linked to OU's anniversary, it would have to open in Fall of 2015. So in January of that year, recklessly late, we hired David Davis, a gifted and fearless exhibit designer who did not shrink back from pursuing this exciting but crazy project with us.

Here's David at work a year later, installing books at the Health Sciences center.

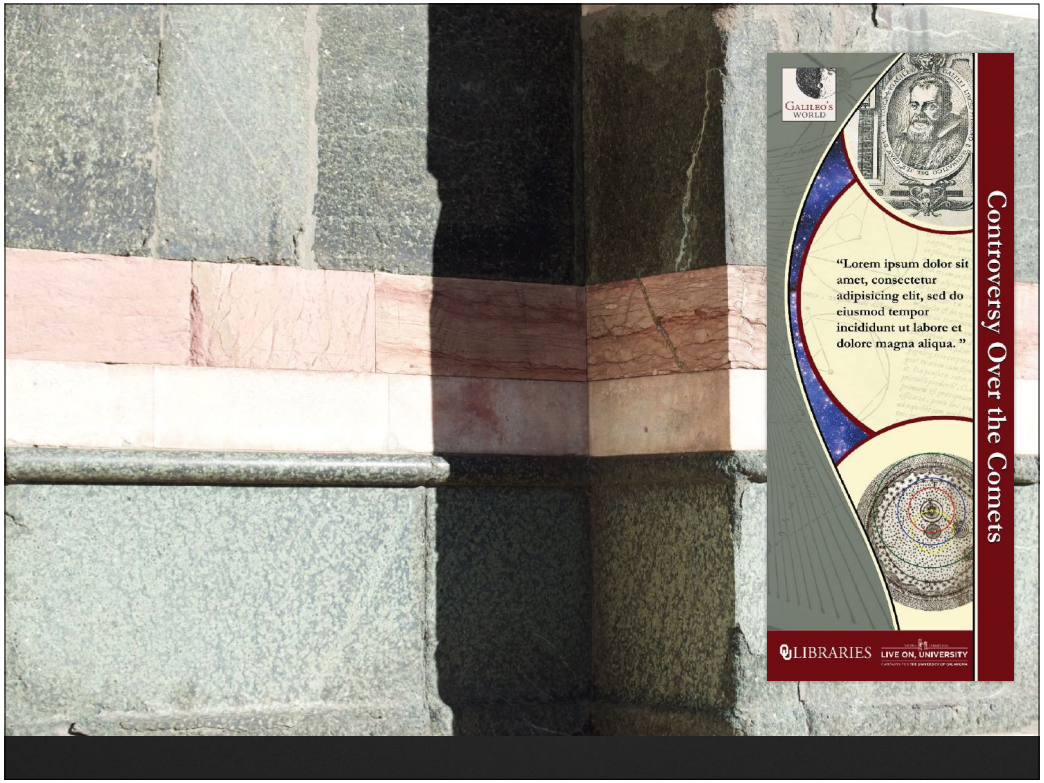
Yet back to January, when it was all just a crazy idea but with a countdown of 9 months to open. Dean Luce immediately sent the two of us to Florence again to gain further information and inspiration for the hard work to come [implementing the vision].



David is a multi-talented Renaissance man: he is a gifted architect of exhibit spaces,



He is also a content co-curator, and a creative museum educator.

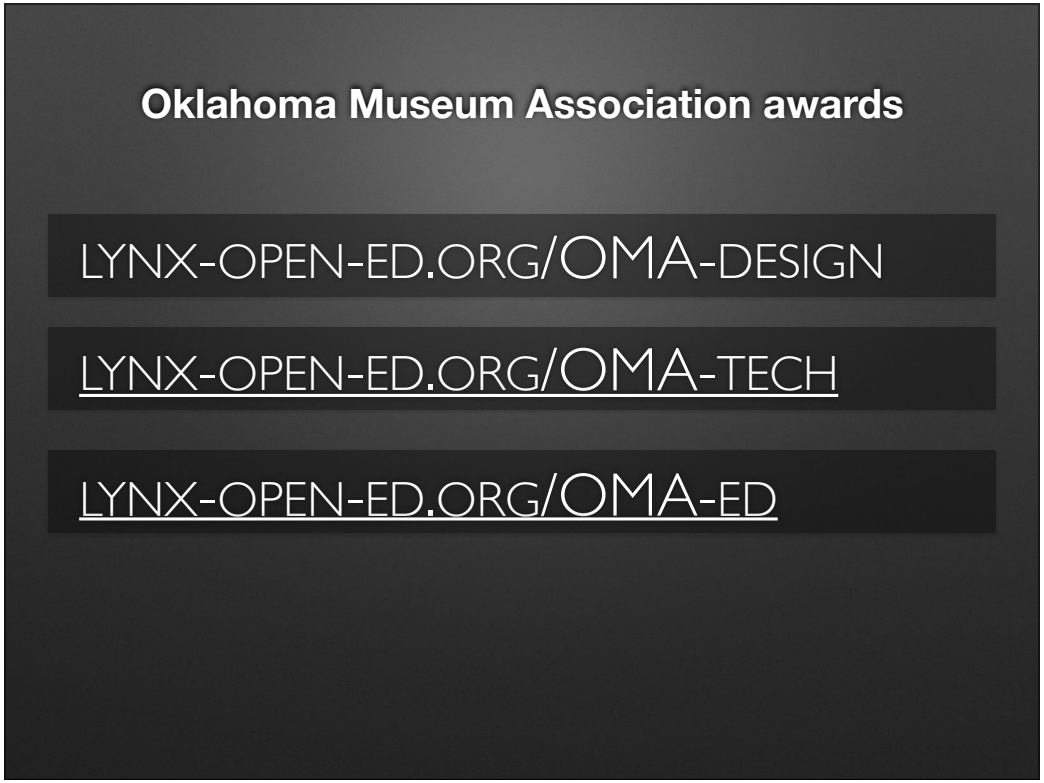


David developed all the graphical themes and ensured an aesthetic coherence across locations.

We clicked immediately. Working with David was a dream. Do any of you know David?

I’m pleased to say David has been hard at work the past year helping to launch another exciting and wonderful challenge, the OKPop Museum in Tulsa.
[This architect’s rendering is from their website. We’ll all want to keep an eye on that new contribution to the museum cultural landscape.]

And finally, I want to mention the staff and student workers of the History of Science Collections, particularly my colleagues Dr. Melissa Rickman and Dr. JoAnn Palmeri. • During the simultaneous renovation and exhibit preparation, although the floor was almost entirely off limits for construction, they somehow kept a makeshift reading room open for researchers.



In early summer 2016, David Davis and Kerry Magruder wrote three short, one-page reports about Galileo's World as part of the successful application process for three awards from the Oklahoma Museum Association on Exhibit design, technology, and educational outreach.

So that's how it came about, behind the scenes. 37 mins

• Finally, was Galileo's World a Participatory exhibit?

NO BUILDS

In addition to opening receptions for each location and gallery, events included numerous class tours with curatorial presentations;

- three presidential dream courses, each allocated a substantial budget to bring in external speakers;
- three additional undergraduate classes based on Galileo's World; (taught by Jared Buss, Brent Purkaple, and one OSLEP guest professor)
- A monthly OU speakers series at the Sam Noble; and
- We've already mentioned the monthly NASA/JPL speaker series at the National Weather Center….

and an all-day Galileo's World Symposium at the Sam Noble featuring internationally recognized speakers, including the Director of the Museo Galileo and the Director of the Vatican Observatory.

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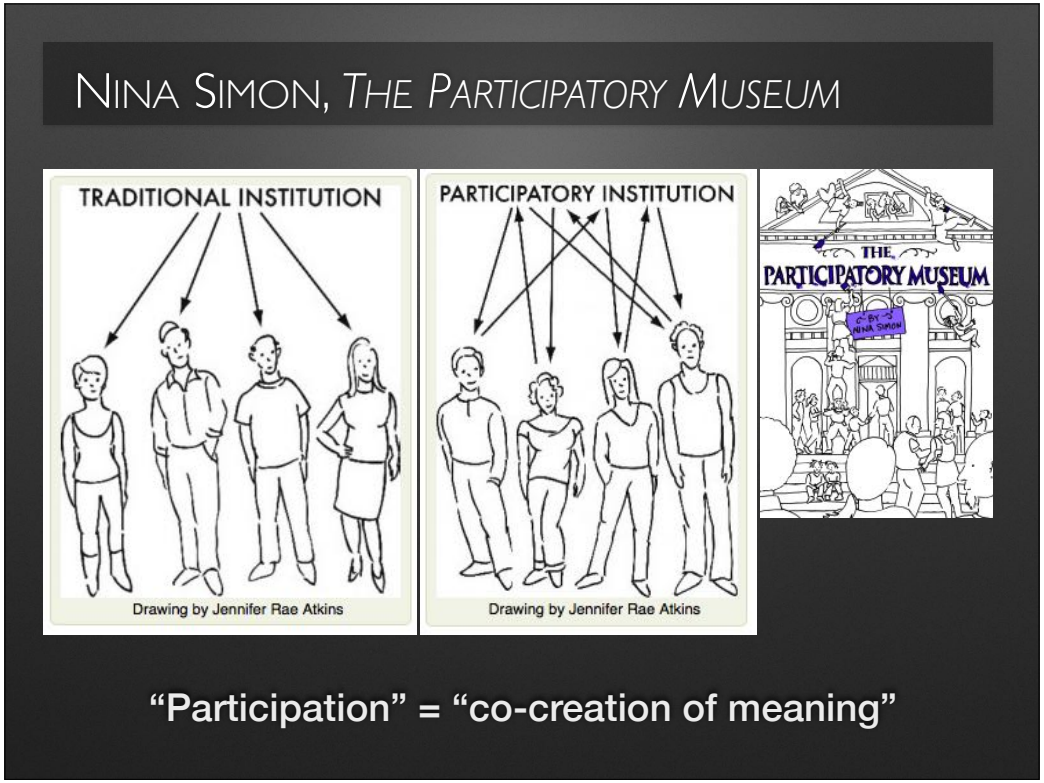
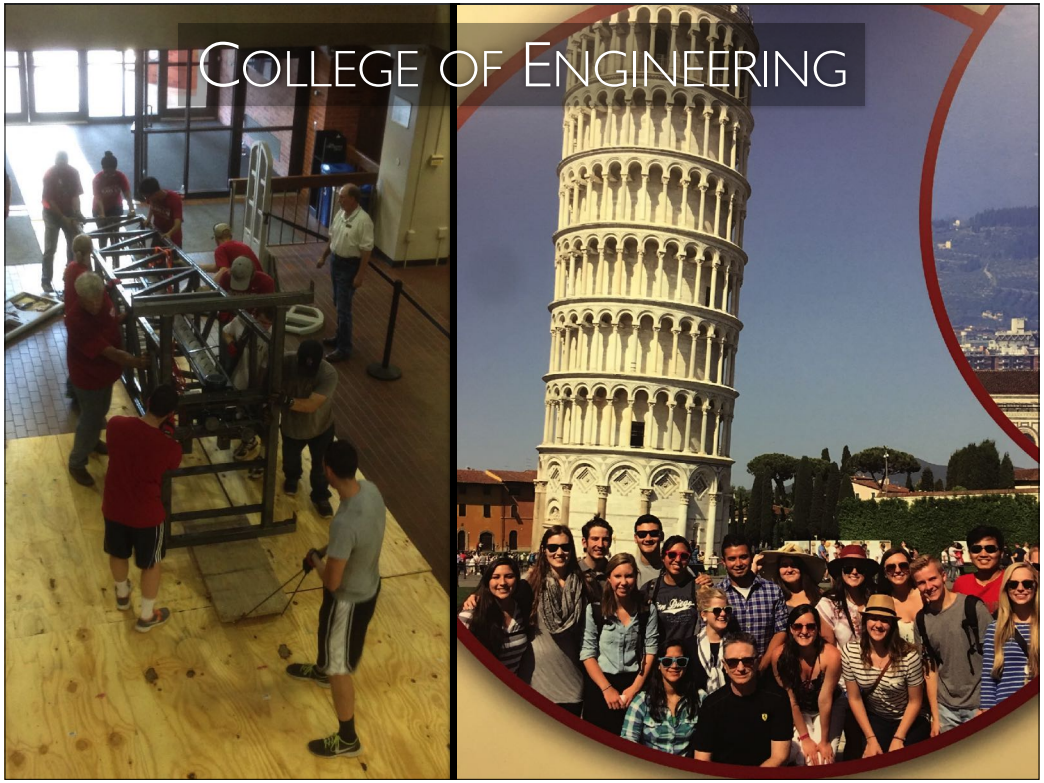
Not shown: Nick Wilding, who arrived later in the day.



These events were all well attended. But participation is more than top-down programming.

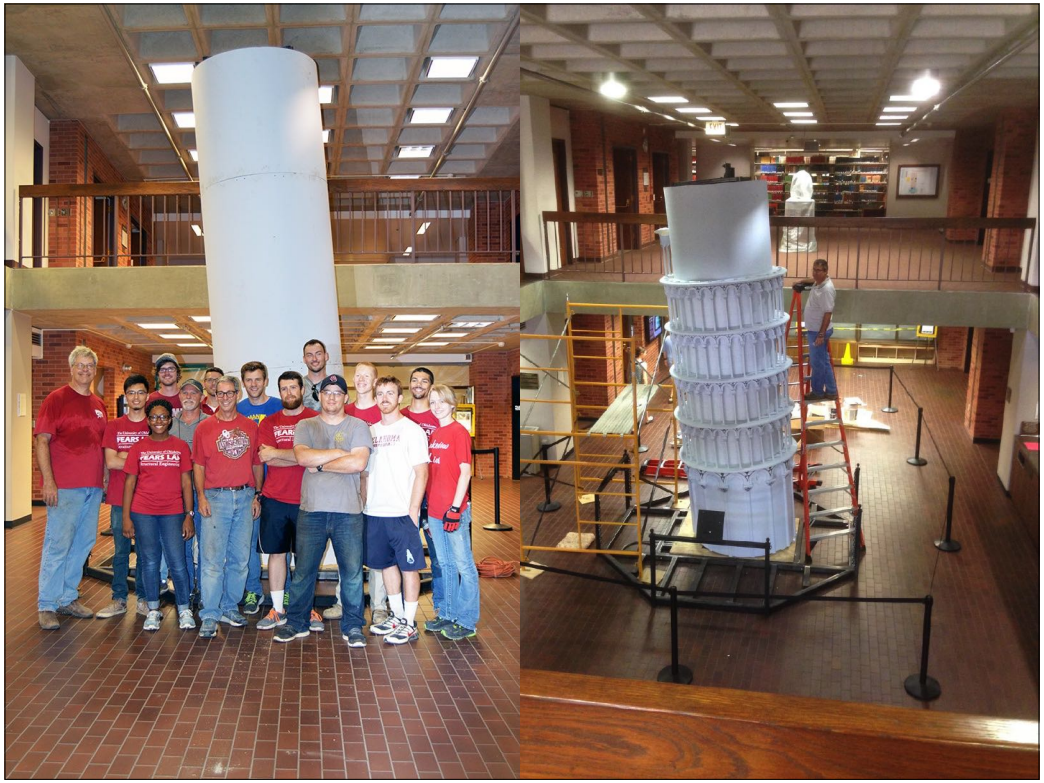
- Did we succeed in facilitating conversation and participation? Inspired by Nina Simon, we defined
- participation as the "co-creation of meaning." By this measure, several colleges, schools and departments surprised us by the level of their participation.

http://lynx-open-ed.org/participatory



A prime example of such participation is how the College of Engineering sent more than 20 students to Pisa to study the Leaning Tower.

• When they returned, they created a 1/10th scale model



for display in the main lobby of the Library.


Project Operate Tools Window Help
STEEL SPHERE FALL TIME:
(354 grams)
1.11
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(<0.030 is within experimental tolerance)
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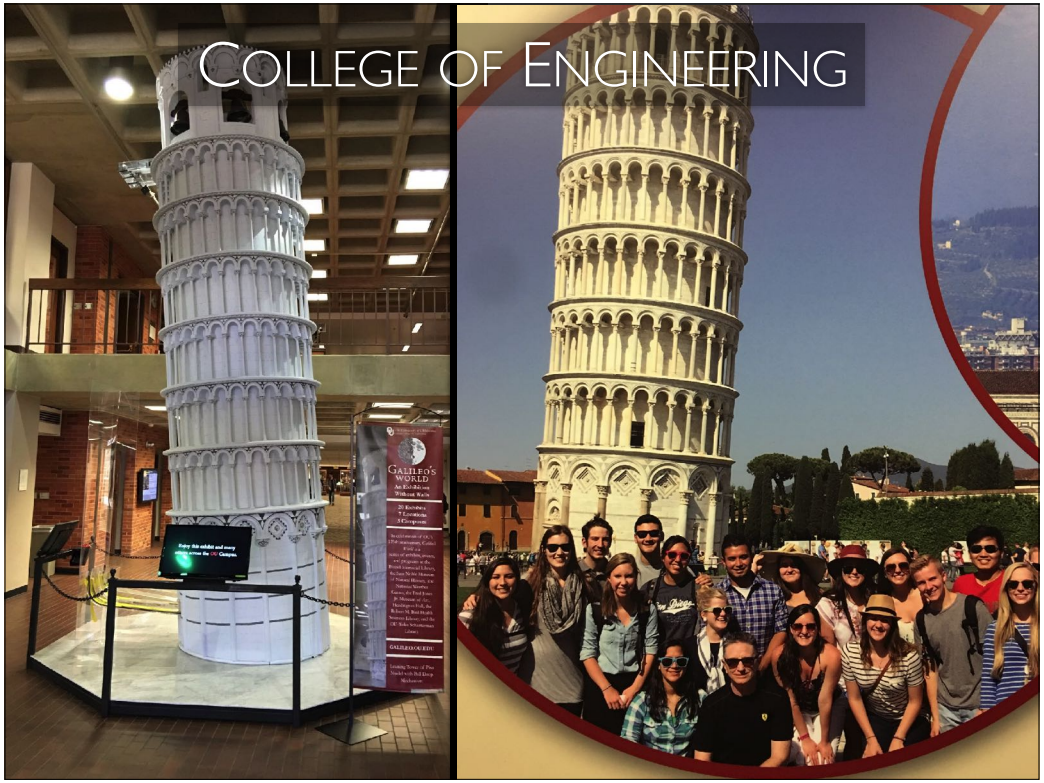
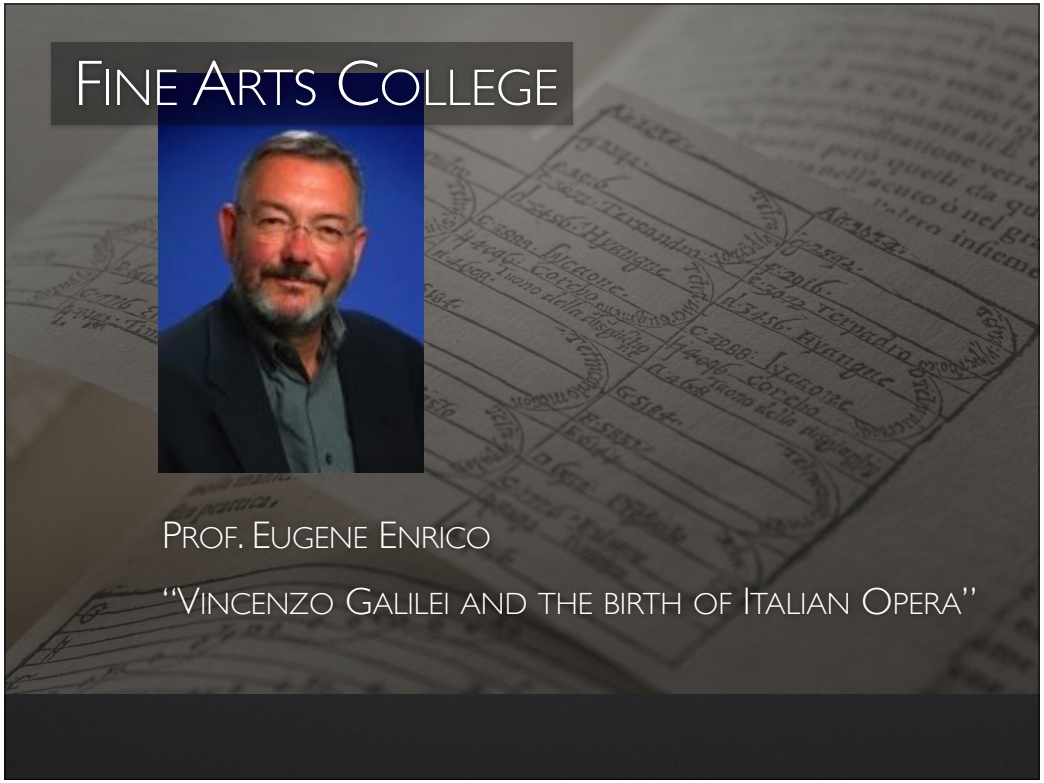


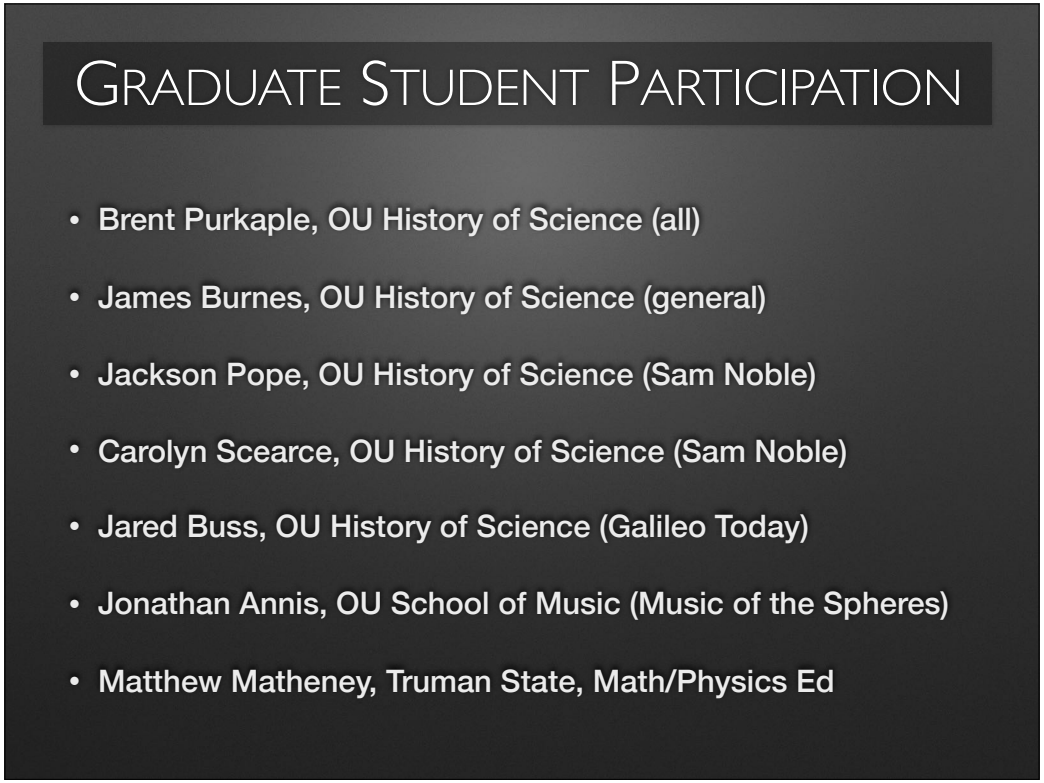
So our vision of the exhibition was intended to start a conversation across campus in which various Departments would participate.



The Fine Arts College participated as well. OU Prof Gene Enrico, a Vincenzo Galilei scholar, presented a public lecture on the significance of Galileo's father: Vincenzo Galilei and the Birth of Italian Opera.

The following week, the School of Music presented an opera by Monteverdi that was directly influenced by Galileo's father. In decades to come, whenever these students think of Galileo's World, the first thing they will remember will be their musical production.

In February, the school of drama presented the world premiere of a new play on Galileo's trial by James Reston, entitled Galileo's Torch. Reston spent time on campus the previous semester, refining the script through interaction with students in a screenwriting class. So both the screenwriting students and the drama students will remember Galileo's World as the occasion for this creative experience.



To me, it was most gratifying to witness the participation of graduate students. 7 graduate students were critical to the success of the exhibition: [(read names)]. Matthew Matheney, a masters student in physics and mathematics education at Truman State University, came to Norman for a summer internship to help us prepare educational materials for the exhibit. The other six graduate students each participated in the co-creation of knowledge to a degree that counted as co-curatorship for at least one gallery. In the interest of time, I'll highlight just the first two.

Brent Purkaple is a graduate student in the history of science.

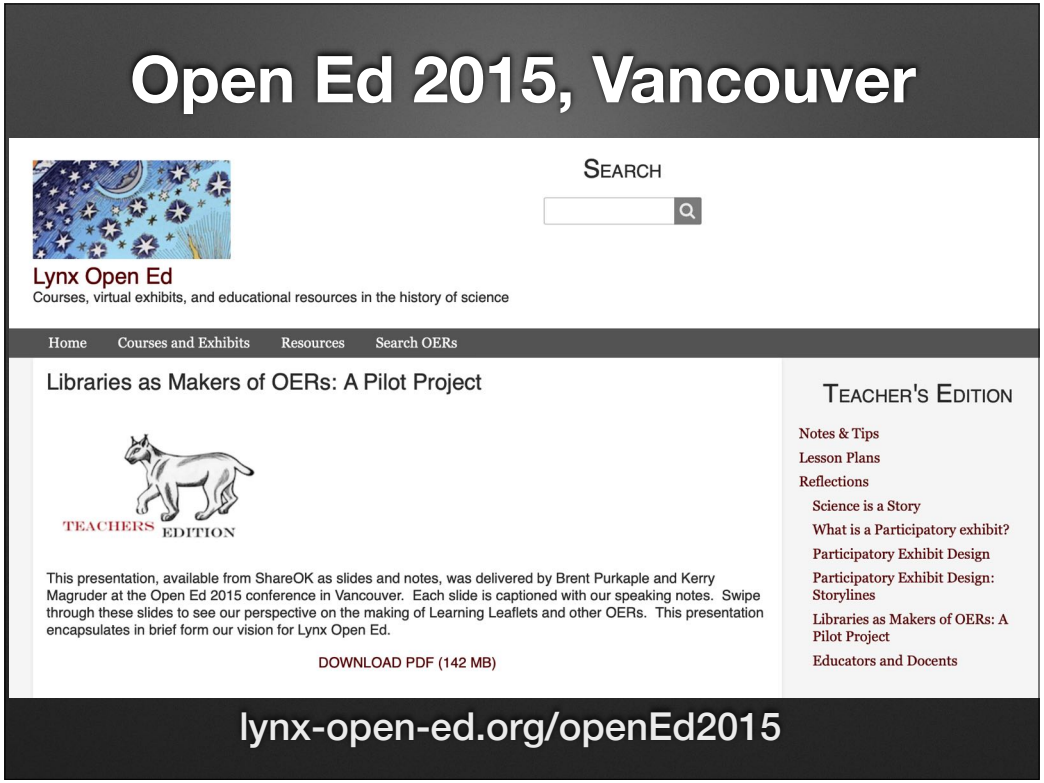
• Without Brent there would have been no exhibition. Brent served as my research assistant, and was a co-curator of the entire project, from start to finish.

• Brent and I presented our strategy on educational outreach in a co-presentation at the 2015 Open Ed conference in Vancouver, entitled “Libraries as Makers of Open Educational Resources.”

After the exhibit opened, Brent led our efforts in K12 education outreach,

taking Galileo’s World activities from the Exhibit Hall to area elementary and middle school classrooms

and to after-school programs at area public libraries.



For more on our educational outreach, download our Vancouver presentation from Lynx Open Ed, the educational website we created together.

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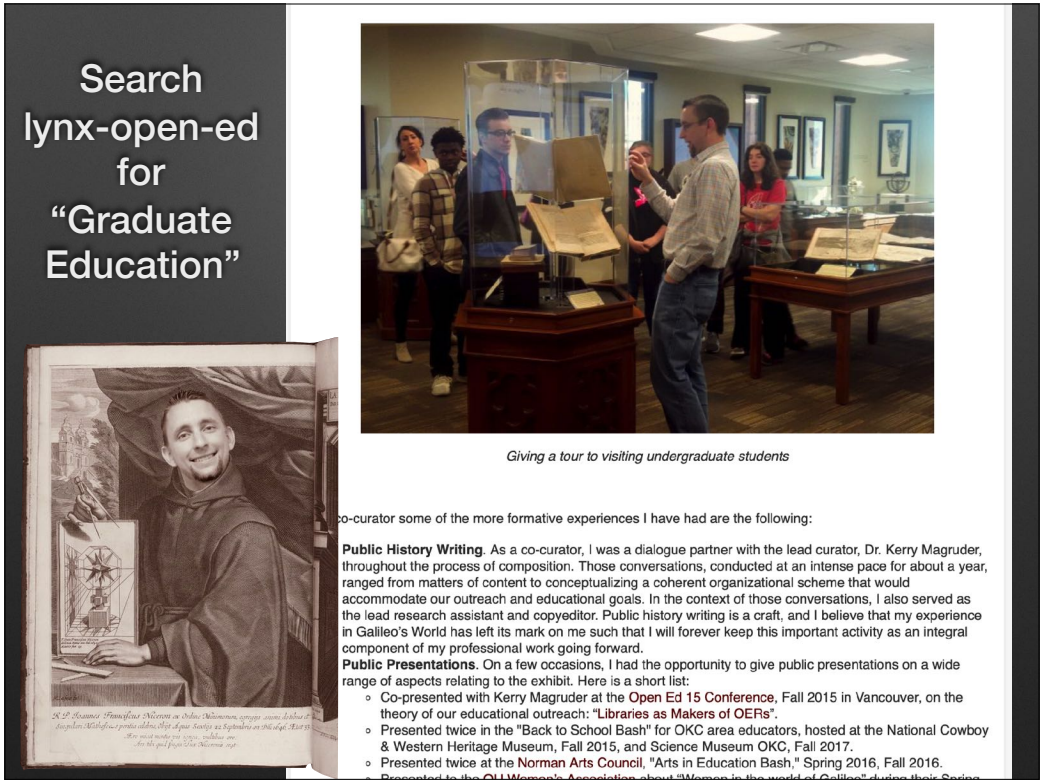
Each of these OERs are “small pieces meaningfully joined,” designed to be useful in a variety of teaching situations and adaptable to support lessons in multiple subject areas and age levels. They are not lesson plans in themselves, but the raw materials we use in working with educators which may be customized for any particular setting. They are distributed without copyright, so that educators and others may adapt them to their own purposes (under a Creative Commons license, cc-by-nc).



At Lynx Open Ed, search for “Graduate Education” and you’ll find a blog post in which Brent wrote about his experience with Galileo’s World.

• This is a slightly altered frontispiece from one of the books that was on display. It is central to Brent’s dissertation, which explores the role of optical illusions in early modern Jesuit science. I especially appreciate Brent’s assertion, as explained in the blog post, that his experience in educational outreach helped him develop his dissertation topic. Brent now lives in Oregon and will complete his PhD sometime this academic year.

This is James Burnes, then. James was a GA in the History of Science who assisted both me and David Davis. James helped to curate and install the exhibit in multiple locations.

And James Burnes, now. After Galileo's World opened, the Library created a full-time staff position for James on the exhibits team. He is now our director of exhibits, and expects to complete his dissertation sometime this coming spring. Between exhibits and introducing his young son to Muppets • and Peabody and Sherman, James is busy, but he devotes Saturdays to writing.

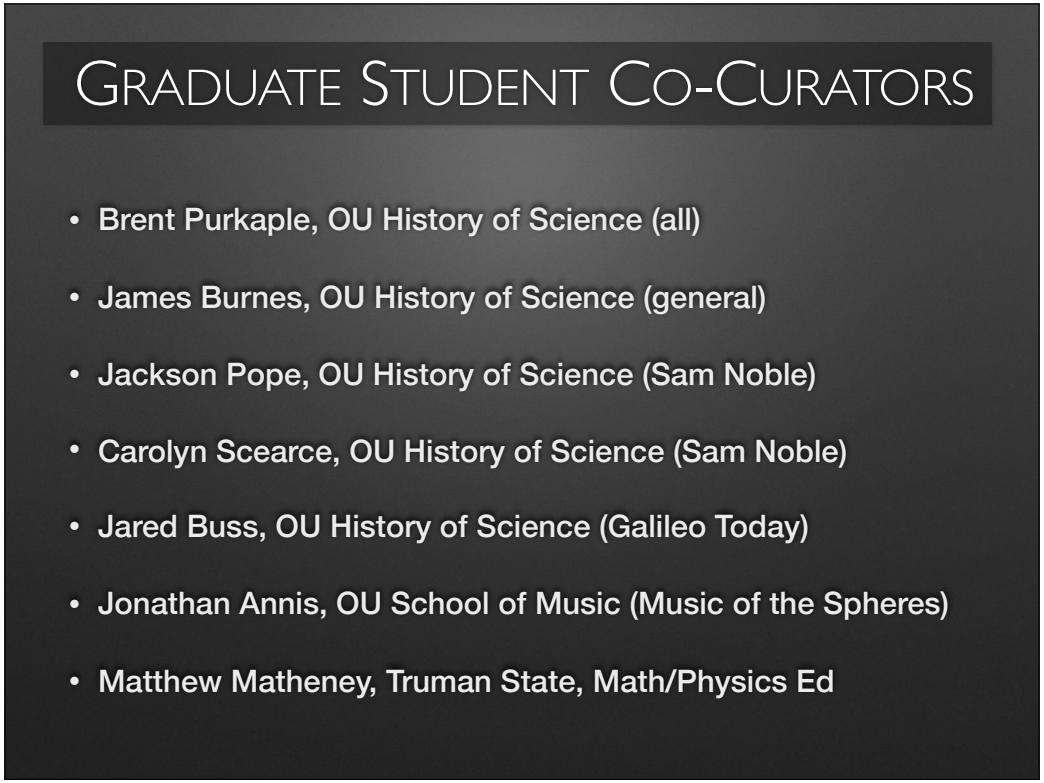
James told me that today he would be working on a chapter related to Albert Koch, shown here (in the white trousers) in the Mammoth Ravine in the Panorama

• of the Monumental Grandeur of the Mississippi held at the St. Louis Art Museum.

Perhaps at this very moment James is writing his interpretation of Missouri's Mighty Mastodon

• or whale bones which Koch reconstructed as a mighty sea serpent.

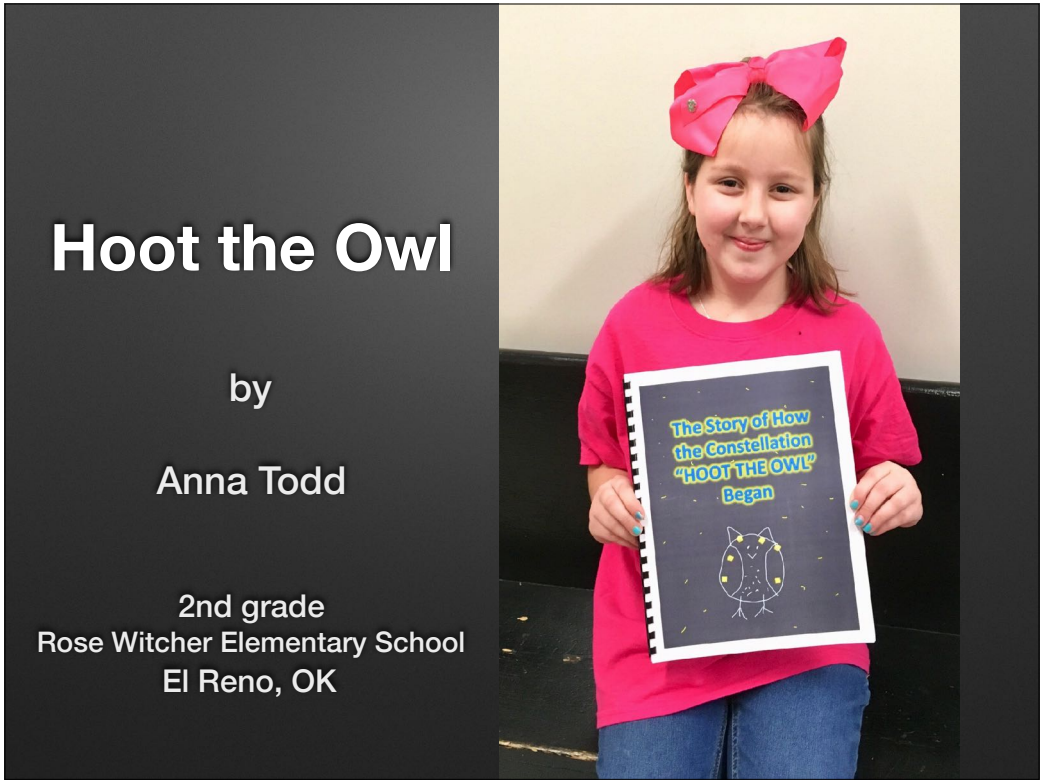
[James tells me that Koch also borrowed Native American artifacts from William Clark for display in his own museum in St. Louis. Following Clark's death, Koch took his collection to Europe where they were sold along with his sea serpent and his Missourium (which is now correctly mounted and on display at the London Natural History Museum).]



I could say much more about each of these amazing graduate students. Their participation, I believe, proved meaningful to them in light of their own research interests and career goals.

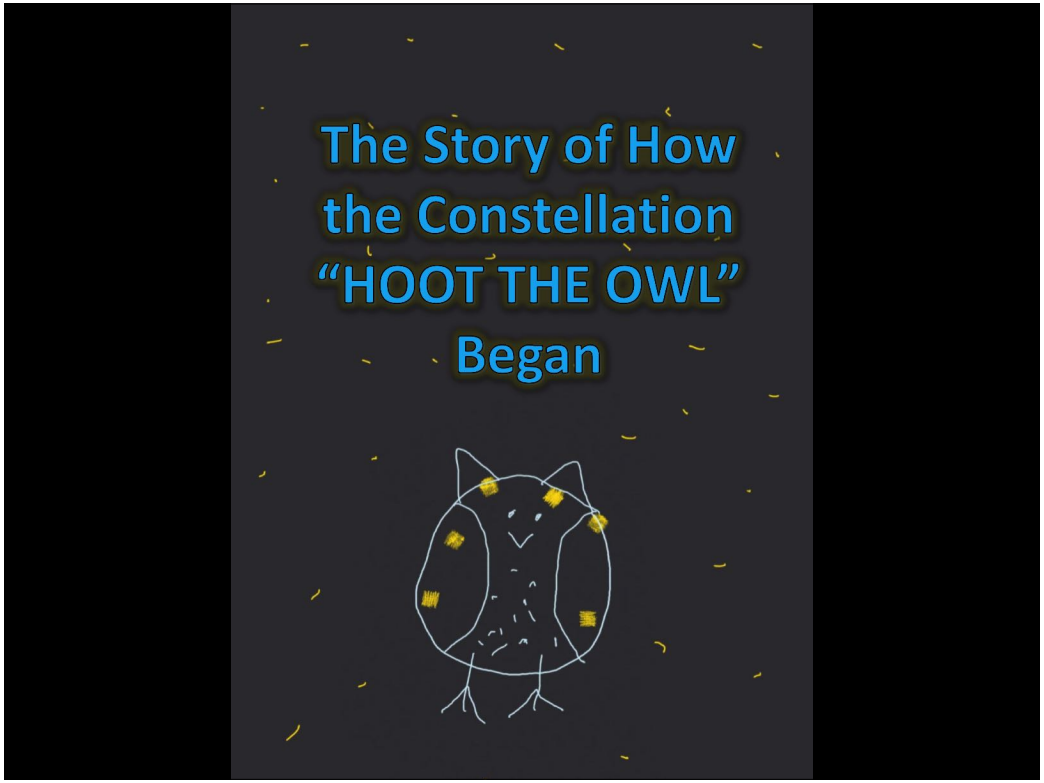
Let's close with an example of K12 participation we owe to Stacey Stevenson. Special thanks to Stacey and the other students of Mission to Planet Earth, led by Dorinda Risenhoover. This photo was taken during an educator's workshop for training in Galileo's World activities.

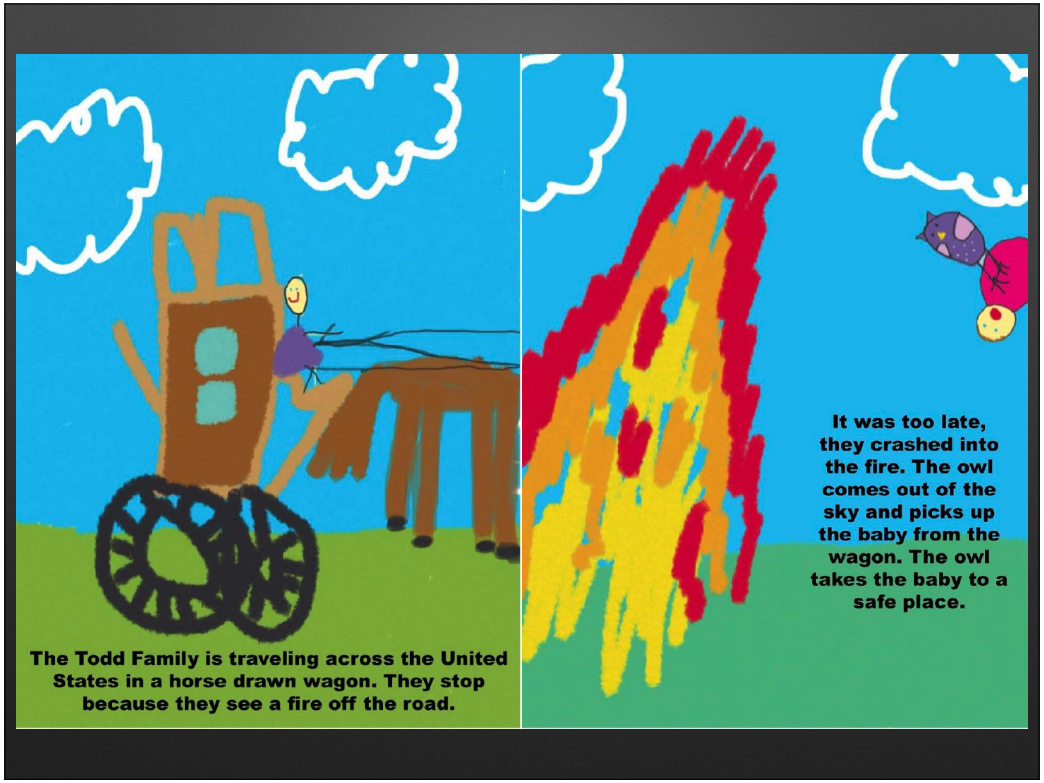
Stacey was then tutoring Anna Todd, who wrote her own constellation story.

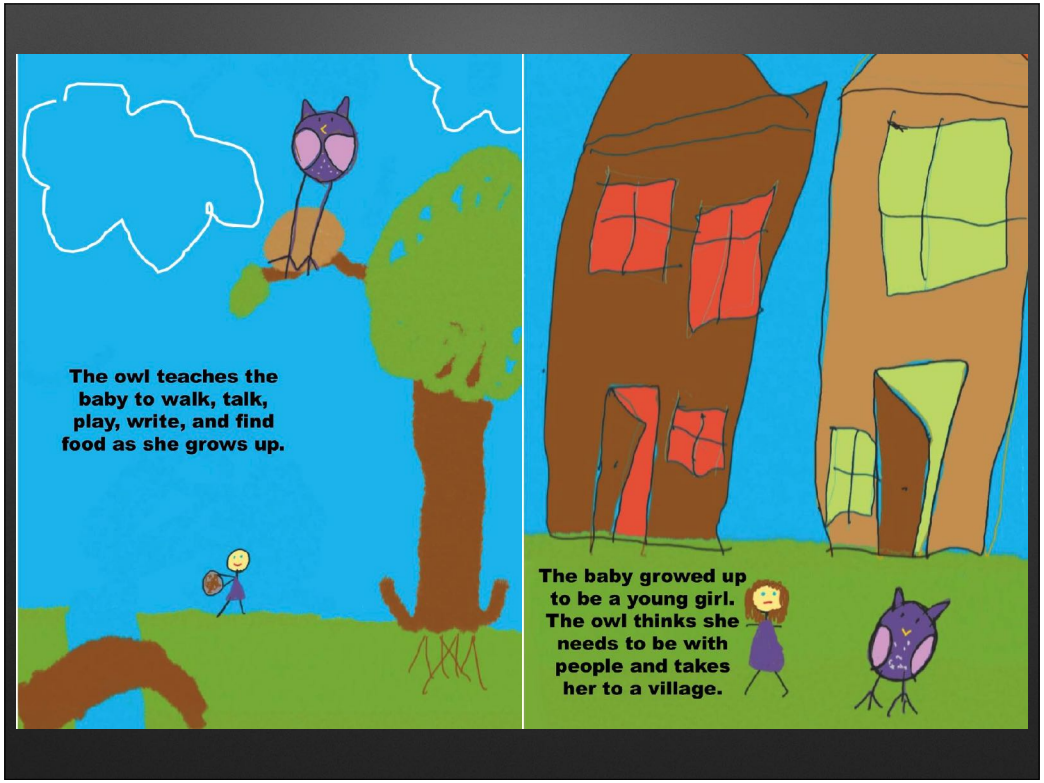


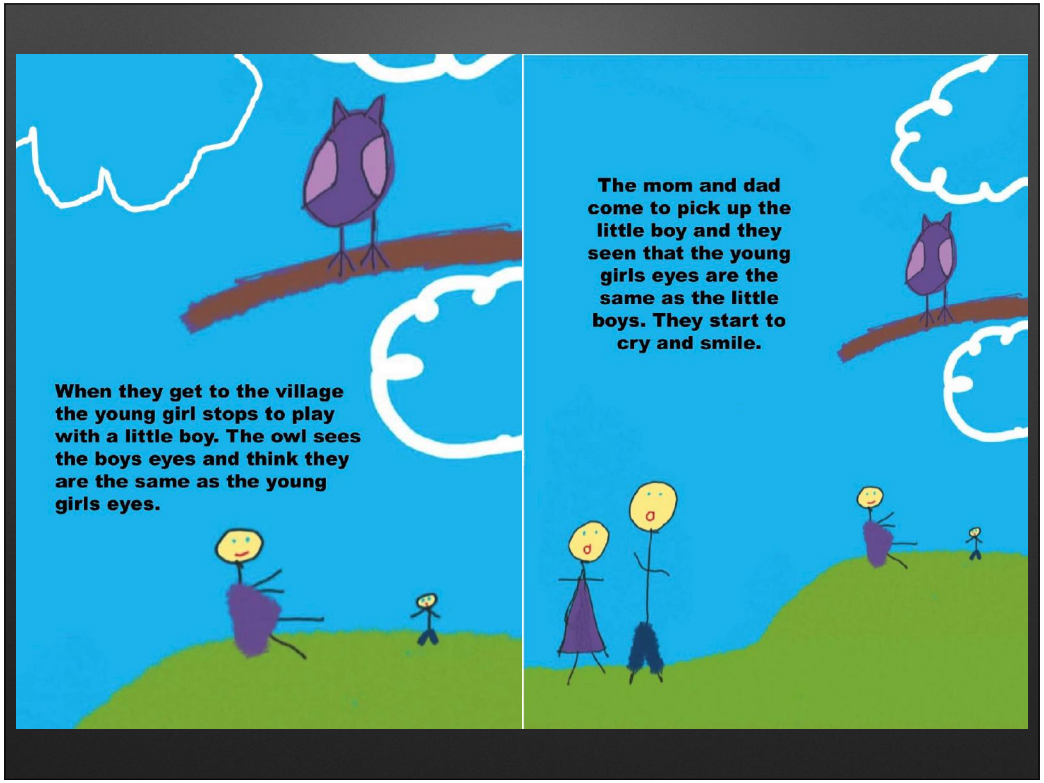
Anna was a 2nd grade student at Rose Witcher Elementary School in El Reno, Oklahoma. Anna became so interested in constellation stories that she learned to read in order to study the stars. Then she created her own constellation, Hoot the Owl. And then she wrote a book to tell its story. With her permission, as well as permission from Stacy and from her teacher and parents, I'd like to share Anna's story with you now, just the way she wrote and illustrated it herself.

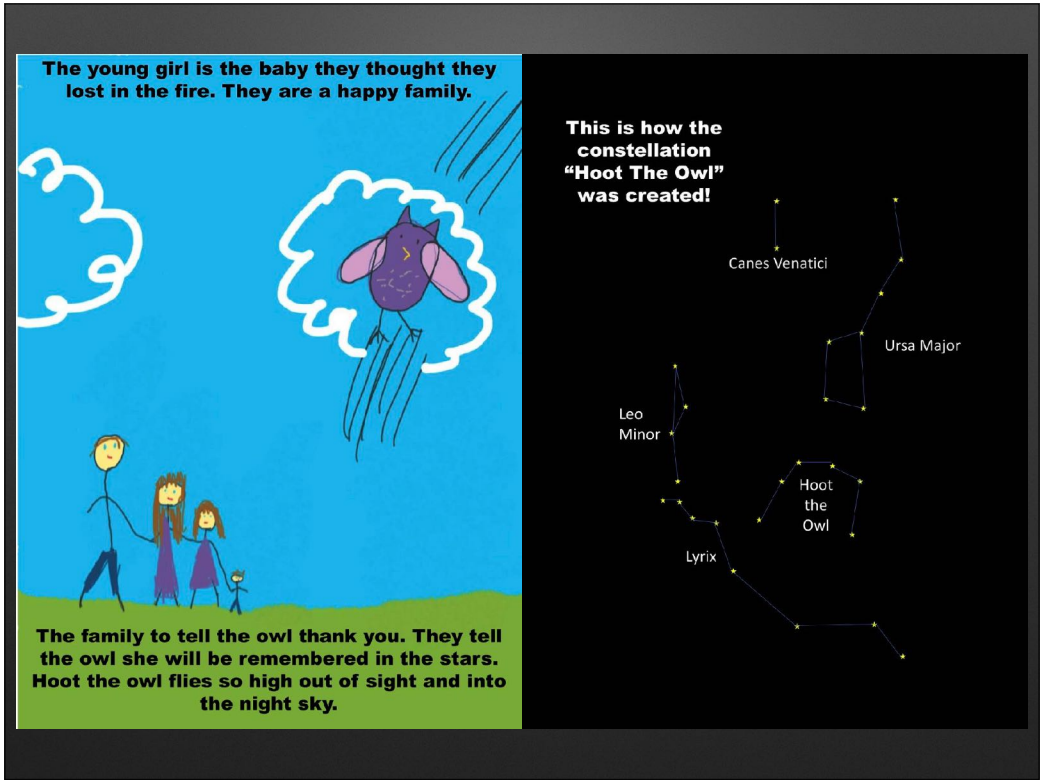
http://lynx-open-ed.org/AnnaTodd
http://lynx-open-ed.org/hoot


The Story of How
the Constellation
“HOOT THE OWL”
Began


The Todd Family is traveling across the United States in a horse drawn wagon. They stop because they see a fire off the road.
It was too late, they crashed into the fire. The owl comes out of the sky and picks up the baby from the wagon. The owl takes the baby to a safe place.

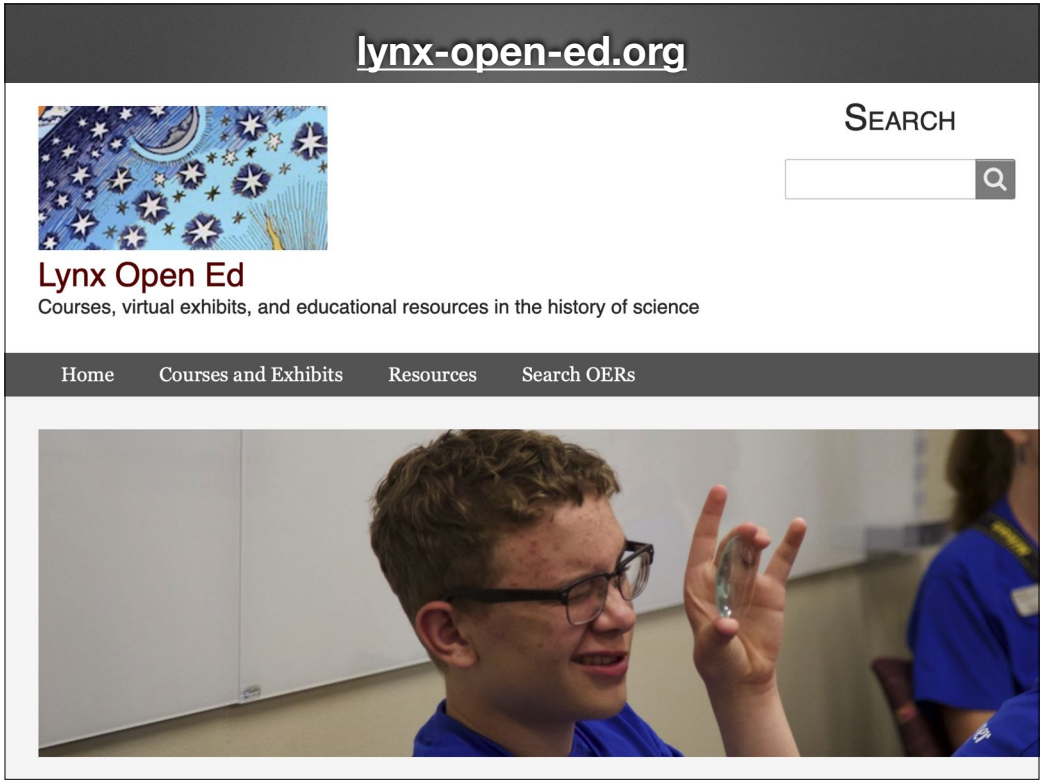

The owl teaches the baby to walk, talk, play, write, and find food as she grows up.
The baby growed up to be a young girl. The owl thinks she needs to be with people and takes her to a village.


When they get to the village the young girl stops to play with a little boy. The owl sees the boys eyes and think they are the same as the young girls eyes.
The mom and dad come to pick up the little boy and they seen that the young girls eyes are the same as the little boys. They start to cry and smile.


The young girl is the baby they thought they lost in the fire. They are a happy family.
The family to tell the owl thank you. They tell the owl she will be remembered in the stars. Hoot the owl flies so high out of sight and into the night sky.
This is how the constellation "Hoot The Owl" was created!
Canes Venatici
Ursa Major
Leo Minor
Hoot the Owl
Lyrix

What is your favorite constellation story? Maybe, like me, it will be Hoot the Owl.

Working with Stacey, Anna fell in love with the stars. That is what motivated Anna to learn to read. Anna's unanticipated participation is my favorite outcome of Galileo's World. She and Stacy represent what all of our exhibits can mean for educators and their students.



Remember, you can download Hoot the Owl, and explore everything about Galileo's World, at Lynx Open Ed dot org. You can also download a PDF of this presentation from the front page.

Does Galileo's World connect with your world? Perhaps in these ways? Perhaps others? Thank you.
46 mins.