

## Combined Audio Tour Script:

**Narrator 1 (woman):** Welcome to the Bingham Gallery. *Roots of Knowledge* is a stained-glass mural depicting the progress of human knowledge. *Roots of Knowledge* was created by Holdman Studios for Utah Valley University and unveiled in November 2016 to celebrate the school's 75<sup>th</sup> anniversary. The windows remain a permanent showpiece at the Fulton Library, to help us learn from the past and to inspire optimism for the future.

**Narrator 2 (man):** Spanning nearly 200 feet, *Roots of Knowledge* is composed of 80 windows with approximately 43,000 pieces of glass. Details, such as text and portraits, were carefully painted by studio artists. However, *Roots of Knowledge* is more than just glass. You can find authentic artifacts scattered through the windows, including fossils, gemstones, ancient coins, computer chips, a war medal, and even a shard of the Berlin Wall. The exhibit begins and ends with two towering trees. The tree on the left, or south side of the gallery, is the Tree of Knowledge. Its roots extend through all the bottom panels until reaching the Tree of Hope for Humanity, at the opposite end. Branches from the Tree of Hope for Humanity reach backward, through the top panels, connecting the events of today with the events of the past. The roots and branches represent the two constants humanity clings to: the knowledge we gain and the hope we have for the future.

**Narrator 1:** *Roots of Knowledge* is organized as a series of 26 columns portraying prominent people, places, and events from different time periods.

**Narrator 2:** All of the top windows showcase different records and forms of the written word. The lower windows depict the contributions of different cultures and civilizations throughout history.

**Narrator 1:** As you explore the exhibit, you'll view the windows one column at a time, moving from left to right, with each column arranged alphabetically by a letter, from A to Z.

**Narrator 2:** If you would like to learn more about specific items in a panel, visit the virtual tour on the *Roots of Knowledge* website, where you can explore the exhibit window by window and item by item. As you go through this audio introduction, feel free to pause at any time before continuing on your journey. Let's begin with the first column on the far left, or south end of the gallery, where you will see the large bristlecone pine, or the Tree of Knowledge.

**Narrator 1:** Following each column introduction, you will hear interviews of artists at Holdman Studios, with insight, stories, and details about the meaning of this one-of-a-kind artwork – and what they hoped to achieve.

**Narrator 2:** Column A, Ex Uno Plures. This column shows the genesis of life on earth and begins our journey with the Tree of Knowledge, a 5,000-year-old bristlecone pine found in California's White Mountains. The roots represent the growth and sharing of knowledge through the ages. Above the tree a diagram represents how nature is organized by the laws of math and physics.

**Narrator 1:** Tom Holdman, head of Holdman Studios, explains why these windows contain the symbolic imagery of the tree you find in the first column.

**Tom:** Hello, I am Tom Holdman. As I get into the groove of speaking without stuttering, here we go, practicing. Many people have asked, how did you come up with this - or where did this idea originate? One day I was on a school bench, and I was observing people as they walked by in a hurry, or else, they were looking on their smart phone. As they were looking on their smart phone or else hurrying to their next appointment, I thought to myself how can you not feel small and insignificant in this world? And with the technology, which is out there, how it has made the world such a smaller place, but also is it hard to the person or the individual or you to feel how important you are in the fabric of humanity. And I thought, is there a way that you can show intimate moments of time on a grand scale and how the individual made an impact? And I thought, if you could show that history or an inspired history of the capability that everybody has to contribute to this earth in a large scale.

**Narrator 1:** Directing artist, Cameron Oscarson.

**Cameron:** So yes, I kind of was with Tom from the infancy of this project, early on, like others have said. We had a pretty small artists crew, a group of people kind of getting started on this project. And it's kind of interesting because the whole location and space kind of evolved over time. It wasn't originally going to be even in the space that it's in. We originally had thought about that northeast corner of the library and were pitching ideas for that wall there. And then it kind of became too small and too cramped in that space to really enjoy viewing that window in that spot and thinking about how people are going to come in and out and go through, traipsing through the library and disturbing everything. It kind of didn't make a lot of sense. And so, we ended up in that wing which was really great, and we had even originally thought we would just take up that smaller lower wall. And then Tom kept saying, well we've got to do those side columns because they are just amazing and cool, and it would be awesome to do in glass. So, we ended up doing that. And then just happenstance we counted each column and it ended up being 26 columns, which was perfect because we labeled each column alphabetically A through Z. And that was kind of nice. But it just kind of fell into place, little things like that.

**Tom:** As we were researching back into the ages, and then we were looking back at these trees, and living things, the Tree of Knowledge, it struck me. And then, researching the oldest living things on the earth, and that is when the bristlecone pine tree appeared. Here is a tree that is over 5,000 years old, and it still is alive, it still lives day by day, week by week, month by month, years, hundreds of years goes by. And yet it lives in a harsh environment, but yet it still grows at a slow rate. And I knew that was the icon of the origins or else, knowledge has always existed. As we take roots and then dig into those, we can build upon those roots and then make other roots along with making fruit, which can be borne in our own lifetime.

**Narrator 1:** Column B, Origins.

**Narrator 2:** In the middle of this column, resting inside a Copernican model, is the planet our human family calls home. The logarithmic spiral signifies the continuous expansion of the universe. The first signs of animal life appear in the lowest panel of this column, both as painted glass and as authentic artifacts, such as gemstones. On the far right, is a painted dinosaur fossil. Beside it is a large ammonite fossil with a shell that shows a naturally occurring logarithmic spiral.

**Narrator 1:** Nick Lawyer, one of the studio artists, relates what can potentially go wrong with the process.

**Nick:** So, when we got to Column B, I was helping to paint some of the sky, the space scene, and I was working late one night at the studio and one of the other employees was there with me, watching. I was loading some pieces—some painted pieces—into the kiln. I had a bunch set out on a table, and this other employee happened to be eating a burrito, and he leaned over a little too far and a big glob of refried beans fell from his burrito onto one of the painted pieces of glass. So, I wiped off the beans the best I could and tried, with a brush, to feather out the paint that was on there so that it could be repainted easily, fired them and fixed the paint the next day, and now I can't even tell where the beans were, because the evidence is erased!

**Narrator 2:** Column C, *The Kindling of a Flame*. The central focus of this column is the Tree of Life, where the saga of the human family begins. Placed throughout these windows are images illustrating the dawn of man, whether that imagery is aesthetic, religious, or scientific. The top window chronicles the first methods humans used to leave records. Petroglyphs form the earliest links in this evolutionary chain of ideas.

**Tom:** In a lot of the panels, we show the DNA strand, and if you look at this column, all of the cherry blossoms there arcs around and then make a DNA chain. And that woman is holding a torch above and this panel is called “The Kindling of a Flame,” and so you will notice a small campfire there being lit, and how we show that as we move on up, holding that light higher, and then sharing that light won't diminish your light at all but add light to the earth.

**Narrator 1:** Column D, *Seeds of Civilization*.

**Narrator 2:** In the middle panel, the sunrise behind the pyramids signals the dawn of civilization. The Neolithic Revolution introduced farming to supplement hunting and gathering, thereby feeding, and nourishing a growing population. Thanks to agriculture, people could focus on other areas that define civilization, such as building monuments, fortifying settlements, exploring seas, and developing languages.

**Nick:** One of the challenges that we had was part of the painting process. The glass that we used for the water in front of the pyramids was a special kind of antique glass, hand-blown glass from Germany. It's called flash glass; it's got a layer of color on one side and then the rest of it is just clear or white glass. So, if you carve through the colored layer, then you expose that clear glass and create these white highlights. So that's how we got all the whitecaps in the turbulent water. Unfortunately, oftentimes in the kiln those pieces will break because it gets really thin in spots if it's been carved. If you look on the back of the window, so if you go outside of *Roots of*

*Knowledge* and look at the back of this particular window, you will see all those indentations where it was carved through the layer of blue. There was one morning when I came back into the studio to check on the pieces of glass that had been fired in the kiln through the night, and I noticed that one of the plugs in the airhole that's supposed to allow cool air in was not plugged and had allowed glass to cool too quickly on that side. So, when I opened the kiln, I saw that that piece right there in the corner had shattered. If you look in the middle window, there in Column D, in front of the Phoenician warship, there are several pieces in the water that used to be one piece. I tried to save as many pieces from the original as I could but had to add a few extras because they were lost. Sometimes we do make mistakes, and problems are caused by negligence. Sometimes it just happens because the glass decides it wants to break.

**Narrator 2: Column E, Nobly Dare.** As the Tower of Babel reaches into the red sky, it points to the key to understanding ancient languages, the Rosetta Stone, and the Code of Hammurabi. Until now, stone has been the universal writing surface. In the bottom window, an Egyptian papyrus maker introduces a new material to preserve the written word.

**Cameron:** So, with the paint, you have these different chemicals and minerals all combined together, but on a basic level just crushed up glass, finely powdered glass, and we can mix it with different things. For instance, we can mix it with water and a sticky substance that we can airbrush onto a piece of glass. And then when it's dry, we can take it and wipe away or do a subtractive painting, where you're wiping away the highlights and leaving the shadows. Also, we can mix it with different types of oil. And before it's fired, it's like a glaze in ceramics, you don't really see the true color that it will be once it's fired. So, you do have to have some experience there knowing what type of paint you're using, and how thick you're putting it on, and how it will be affected in that fire or that kiln, which goes up to 1200 degrees and melts that paint into the glass permanently. Specifically, in Column E, I remember one aspect to the sky that, it's a very fiery sky, and we're getting these really vibrant reds and things. And I remember firing some pieces and we pulled them out of the kiln, and they had these weird halo-kind of stains around the edge, and we couldn't figure out what it was. And we finally realized it was the wax that we were putting the pieces of glass onto, a sheet of glass so that we could lift it up and put it in a window and look at it without actually putting the glass together like a stained-glass window. And so that was really frustrating and had to go back and kind of acid-etch. The only way you can remove that paint once it's fired is with acid or sandblasting or something really aggressive. But we had to kind of feather that in and fix that. I just remember that being really frustrating. The more you fire a piece the riskier it gets as well, and you risk losing your vivid colors. You risk overfiring it or - all these different variables that go into it can just be catastrophic if you're not careful.

**Narrator 1: Column F, To Move a Mountain.**

**Narrator 2:** Alexander the Great at the Battle of Issus has been recreated in mosaic style at the bottom of the column, made up of more than 2,400 individual pieces of glass. Above the mosaic are the Hanging Gardens of Babylon, a majestic marriage of architecture and horticulture, making it a wonder of the ancient world. The sophistication of ancient minds is represented in the top panel by Confucius, who continues to influence philosophical thought.

**Narrator 1:** Designer Trevor Petersen describes how great works of art from around the world were recreated in stained glass for *Roots of Knowledge*.

**Trevor:** In Column F, we have recreated a famous mosaic of Alexander the Great. One of the things that makes *Roots of Knowledge* so unique is that a lot of famous works of art, iconic works of art, are recreated in the medium of stained glass, so that applies to famous frescoes, mosaics, tapestries, photographs. Here's a case of an ancient mosaic that was preserved at Pompeii of Alexander the Great, the great Macedonian king. If you look at the original mosaic, the legs from Bucephalus the horse, they are missing, and so we kind of recreated that to make it look the way it originally did. And that's kind of a nice little detail of *Roots of Knowledge*, is to show things not just the way they look now, but also the way they originally looked too, to depict things accurately. So, there are a lot of things depicted in the windows that no longer exist that a lot of research and study was done to make sure that things were depicted accurately, authentically. And that's the case with this mosaic of Alexander the Great. And you can see all of these little intricate pieces of glass that were placed together to make sure that we have a really good-looking composition. There's really no paint in that mosaic recreation, it's all intricate pieces of glass to recreate that mosaic of tile that exists at Pompeii.

**Narrator 2:** Column G, He Who Teaches, Learns. Civilizations developed ways to express their philosophies, transfer their knowledge, and immortalize their faith. This was done by building large monuments, as seen in the middle panel: the blue Ishtar Gate, the Pyramid of the Moon, and the Pillar of Ashoka. Cultural information has been shared orally for generations to pass on significant details, such as folklore and history, as characterized above by the shaman at the campfire.

**Nick:** Throughout the windows there are a number of plants, specific plants that are somehow connected to the environment in which they are pictured. We've included many plants, flowers, trees, and fruits, and things to help tell the story of the history of humanity. For example, the Cedars of Lebanon are shown here in Column G, the big tree over on the left toward the bottom behind Buddha. The Cedars of Lebanon are significant historically because they are mentioned in the Epic of Gilgamesh and the Old Testament, and it's still a national symbol of Lebanon. Also shown is a castor bean plant and ironwood, and, toward the top, some eucalyptus leaves. Throughout the windows you'll notice, particularly at the top and the bottom of each column, there are plants growing out of the roots. At the very beginning of *Roots of Knowledge*, we start with the Tree of Knowledge; then those roots course through all the windows and different plants spring up from those roots.

**Narrator 1:** Column H, The Examined Life.

**Narrator 2:** These windows convey the ancient wisdom of Greek philosophy, Chinese Taoism, and Varanasi medicine. Dominating this column is a recreation of *The School of Athens*, a fresco painted by the Renaissance artist Raphael to honor the Ancient Greeks. Among these eminent philosophers are Plato, Aristotle, and Archimedes: individuals who inspired the thinkers of Raphael's own time.

**Narrator 1:** Gayle Holdman, collaborator and wife of Tom Holdman, talks about a clever way the studio paid tribute to great artists in the past.

**Gayle:** We did decide to include iconic pieces of painted visual artwork throughout the *Roots of Knowledge* as a nod to their contributions as visual artists, as we are. The first is *The School of Athens*, by Raphael. And as we thought about Raphael and how he created this painting, we realized that he didn't know at the time what the faces of all of these particular gentlemen within that scene looked like, these philosophers and these scholars. So, he chose to use the faces of his artistic contemporaries. Artists such as Leonardo da Vinci and Michelangelo found their faces on these individuals from the past. And that was how Raphael chose to do it. So, as an additional nod to Raphael's art and the way he did it, we decided to do something similar. At this point in our progress on these windows, we had the most people working on this project than we had had before. And so, we decided that it would be festive to include the faces of our artistic contemporaries on those individuals within that picture. So, if you've seen *The School of Athens* in person you will recognize much of it, but as you get closer, you might think, "now wait a minute, that isn't the face that I saw." Because all of the individuals that were working on the project with us somehow, or most of them anyway, we were able to find a spot for their face in there and do two things: validate and acknowledge and give gratitude to those who were sharing their gifts and talents and abilities with us, but then also give that extra nod to Raphael and how he chose to go about his artwork.

**Narrator 2:** Column I, *Instructed by Reason*. This column showcases Classical antiquity such as the orator Cicero addressing an audience in the middle panel, and the Lighthouse of Alexandria which lights the way for ships approaching the city of learning. Below, the mathematician Thales presents his theorem on a scroll. Performing arts are emphasized by the Chinese dancer, musical instruments, and the theater masks, surrounding the stage. Consistent with the prevailing theme, a Mesoamerican stone relief in the top panel depicts what some archaeologists believe is a World Tree.

**Gayle:** In Panel I, you have Cicero and the Roman Senate, and this is based on a piece by Cesare Maccari. And Cicero was speaking to the Roman Senate and sharing. Now if you look at the original piece, which he was surrounded by Roman senators who looked and dressed a lot like him, you'll see that in our piece he is not surrounded by that same thing. He is surrounded by individuals who are actually from all over the world. And so, the point is now that as Cicero has this opportunity to stand and speak in the Senate, we all in the world should have the opportunity to be able to stand and speak and share the things that we feel are important. If you look over to the far right of that image, you'll notice that one particular gentleman has gotten up from the bench where he was sitting, and he is now standing behind it and offering his seat to you, the viewer, so that you have the opportunity to come in and become a part of this world discussion, and to remember that you have not only the right but the responsibility and the opportunity to share your voice and the things that you learn in this life.

**Narrator 1:** Column J, *By Their Fruits*.

**Narrator 2:** *Roots of Knowledge* now reaches what is sometimes called the Meridian of Time, because of the arrival of Jesus of Nazareth and the founding of Christianity. During this period, the Roman Empire reached the height of its dominion. However, the empire's vastness would also be a factor behind its undoing. In the background, scenes of destruction, such as the burning of the Library of Alexandria and the Fall of Rome, suggest the future looks ominous for the pursuit of knowledge.

**Nick:** Throughout *Roots of Knowledge*, we've included artifacts, objects that aren't actually glass, painted or otherwise, that have been embedded or leaded into the windows. For example, at the bottom of Column J, there is a gameboard shown, and in that game board, which is a little like the popular game Mancala, you'll see some seashells and coins. Those coins and seashells are real. The seashells were actually brought back from the Holy Land by my grandfather. He'd been over there on vacation, seeing some of the sights over there, and brought back some pottery, rocks, and seashells from the Sea of Galilee. So, we included a few of them here in this window. Many of the artifacts, the coins and gemstones and things, were procured by Tom or collected by others or donated. There are about twenty real coins, many gemstones. There's a Purple Heart medal, a collectible spoon from the Chicago World Fair, there's a real five-dollar bank note from 1777, a credit card. There's a fragment of the Berlin Wall. There are real fossils of both dinosaurs and plants, a piece of meteorite, as well as Moldavite, a diamond - two diamonds, actually. Before *Roots of Knowledge*, Tom had been including little bits of agate in his windows to continue the tradition started by Solomon in the Old Testament. He would include agate in his great temple. Tom would do the same - find pieces of agate that were sliced and polished, translucent like glass. So, he did that here in *Roots of Knowledge*.

**Narrator 2:** Column K, *The Ink of the Scholar*. The Dark Ages are symbolized here with a nighttime scene. While this period is often identified as a bleak period in European history, enlightened individuals were still hard at work. This was the case for the Islamic world, as it entered a golden age, sparked by the Quran, the open book in the top panel. The Byzantine Empire reached a high point as well, as evidenced by Hagia Sophia in the middle panel. Floating lanterns and explosive fireworks in China also hint that light was still to be found. In the bottom panel, the Venerable Bede sits at his desk to record unfolding events of his day.

**Gayle:** And so light in the darkness is one of the themes that we want to share. And I had a particular experience right about this time in the creation of the windows. I mentioned that Tom had that huge idea, and at this point it had been many years in the process of this. And we were running out of time in order to get it done by the 75th anniversary of Utah Valley University, and there was a lot of pressure. There was a pressure on all of us as artists and designers, but particularly pressure on Tom and I as the business owners and even pressure on our family as we tried to get this done in time. It was a very difficult moment in my life, and I remember there was just a day when I felt extremely overwhelmed with the whole process. And I had a thought come into my mind with such perfect clarity. It seared into my soul, and I knew without question that these windows were being created to ultimately share the truth of three things. And those three concepts - that you're known, you're valuable, and you're loved - that was enough to help me personally get up off my floor of desperation and feel like that was a purpose and a mission that was worth any sacrifice and any effort.

Narrator 1: Column L, The Light Shineth in Darkness.

Narrator 2: The rising sun behind the mountains heralds a new dawn, as civilization transitions from the Dark Ages to the High Middle Ages and the Renaissance. Thanks to tireless scribes and monks, knowledge was kept alive during this period in the form of illuminated manuscripts, such as the Book of Kells, as depicted in the top window. In the bottom panel, the Chinese invent movable type, a milestone in the spread of knowledge.

Nick: The illuminated manuscripts at the top of Column L were exciting for me to design. I've always been a huge fan of all things medieval, the history of the British Isles and things like that, knights in shining armor. And it was really fun to design a window with bits and pieces from several different cultures around that time, to make it look like it was all on one page of illuminated manuscript. This kind of artwork from the Middle Ages lends itself to stained glass. The very name emphasizes that concept, the illumination, the light, because the pages were done with so much color and brilliance. They believed that the more beautiful the artwork was, the more spiritual power they had. They were expressing their faith through their artistry.

Narrator 1: Column M, Towering Ambitions. Wars and disasters were characteristic of the medieval era, but in spite of such obstacles, humanity endured. The gothic cathedral, and the scenes unfolding inside of it, exemplify the efforts to edify civilization. In front of the Rose Window of Notre Dame are a pair of early opera singers. Located at the top, between the spires, we see Scheherazade entertaining the king with her tales of *One Thousand and One Arabian Nights*, an example of storytelling in the Middle Ages. In the bottom panel, King John stamps the Magna Carta. To the right, Scottish nobles draft the Declaration of Arbroath, while on the opposite side, resilient children dance to keep their spirits up during these trying times.

Nick: For the cathedral scene in Column M, I thought it would be nice to have a cathedral as the backdrop that lended itself to an effective canvas. Something we could put all kinds of stuff on. We could display figures inside, we could put inscriptions and sculpture, statues. We show the interior of the cathedral, and we show what's behind it. We used some of the flying buttresses, the structure there as a framing device to show portraits. In the bottom window of Column M, there's a scene that I felt particularly strongly about: the scene of knights on the right, which shows King Robert the Bruce and his council drafting the Declaration of Arbroath. I felt that it was an important document to show, and, though the Magna Carta was also important and a very famous document, I feel strongly that the Declaration of Arbroath, while less known about, was an important steppingstone which eventually led toward our own Declaration of Independence in the United States. We already had the Magna Carta in the design, and Tom felt strongly that we needed that front and center, and I obliged, but felt like I needed to fight for this thing. And so, I had a private meeting with Tom, and I was very nervous and stressed out. And had to fight and got a little bit emotional because of what this event means to me and also to history. In this meeting with Tom, I had to make my case and I really felt a lot of emotion and was worried that I wouldn't be able to convey my arguments accurately. But eventually I got the scene in there, and I'm pleased with how it ended up.

Narrator 1: Column N, Rebirth.

**Narrator 2:** Knowledge and wisdom, lost after the fall of Rome, were rediscovered during the Renaissance. The top panel gives us a peek into the studio of a Renaissance man with sketches by Leonardo Da Vinci and a bust of Lorenzo de' Medici. Geniuses in the bottom panel, such as Gutenberg with his printing press and Michelangelo, chipping away at David, sculpted history. In the middle panel, cultures were developing in other parts of the world, as indicated by the Forbidden City in China and Machu Picchu atop the Andes.

**Cameron:** 'N' was one of my favorite columns, actually, for many reasons. I really looked towards the High Renaissance as kind of, you know, that was it, that was where the artists were really, to me, inspired and really using their minds. So, it was nice to see the artwork that was coming out throughout that period in time when we're working on Column N. we wanted to show a famous piece of Michelangelo and obviously the David is one of those pieces that anybody can recognize from anywhere in the world. The thought occurred that hey, we can show Michelangelo in the process of creating this piece of artwork that's become so iconic throughout the world. I really enjoyed showing that process, I guess, where an artist is in the action of creating his artwork, not necessarily just showing that final product but the mind and the creative tendencies in an artist, and how much passion they put into their work. Because everything that we've done-we did up to that point and even further was a work of passion. And I feel like maybe it speaks to me on a very personal level, and maybe that's why I like this column so much. Also, and this is kind of in retrospect, but apparently, I'd referred to the Ghiberti 'Doors of Paradise' quite frequently throughout the shop. People tend to think of me as a Ghiberti fan, which I am. But what strikes me the most about the Ghiberti doors was that he was commissioned to do these doors and he spent twenty-five years of his life creating this set of doors. And then upon completion of that, they asked him to do another set. So, I remember learning about that and I just thought, man, that guy is nuts, you know! He'd spent his entire life working on these bronze doors. And in retrospect now I've worked on a project you know, that takes over a decade at a time to complete and to work through and I think wow, I'm kind of one of these obsessed people, you know, and I continue to strive to do the best I can within the stained-glass medium.

**Narrator 2:** Column O, All the World's a Stage. This scene portrays the dynamic Age of Exploration. Topping the column is a world map, which was included in the first modern atlas. The windows beneath display a tropical harbor with a fleet of ships, laden with goods and treasure from around the globe. The 1500s brought civilizations together, doing both harm and good, but undoubtedly shaping the fate of humanity. The two figures in the forefront of the bottom panel demonstrate this interaction. Shown are the Spanish missionary Bartolomé de las Casas, protector of the Indians, and Enriquillo, a chieftain on Hispaniola.

**Gayle:** I'll share one of my favorite elements too. So, when you only have so many square feet to represent a ridiculous amount of information, you do start to layer meaning upon meaning, which I'm sure has been discussed quite a bit. So, I'm going to point out one of those moments here which I personally really enjoy. So, in the middle panel towards the top of that section you see this strip of portraits, and this is the Age of Exploration, and so all of these individuals are a lot of the people who were making that happen. They were either funding it or part of the

exploratory efforts. Anyway, all of these people coming together to find out more about the earth at large and what the different areas looked like and how you could get to them. And so, as you look at it, it's designed in a way with coloring and with detail, and it looks like perhaps you're looking at an old piece of parchment that's torn on the bottom or maybe it's a tapestry that's a little bit frayed along the bottom. But nothing in this window exists just because it's attractive or interesting. There is always another meaning there to fit something else in. So, if you go with me to the bottom area of that tapestry on the right-hand side, and if that little point, we're looking at the lead line now right above the frayed edge of that little point, where Gibraltar, the southern tip of modern-day Spain, and then you follow that torn or frayed-edge look all the way across over to the left side where it bumps into that mountain. And that's where actually the eastern coast of the new world, or modern-day Massachusetts, that fray or that tear is actually a topographical map of the ocean floor between those two locations – Gibraltar and Massachusetts. And I find that fascinating, because at first glance you would never have any idea about that. And right in the middle of it is, it represents the mid-Atlantic Ridge. And it's also interesting to note that a woman, back in the day, Marie Tharp, was responsible, were one of the two responsible for coming up with the technology to be able to get that image of what it looks like. She was a geologist and an oceanographic cartographer, and she put her best efforts, even at a time where she wasn't always allowed to participate at the same level as the men were, but she had gifts and skills and she took her place in the grand scheme of things and shared her gifts. And we now know that that is what it looks like and why we were able to include that image and hide it in such a way that it's festive, but when you look deeper, as in all things, you find out more, but certainly in the *Roots of Knowledge* you find out more.

**Narrator 1:** Column P, Upon the Shoulders of Giants.

**Narrator 2:** The 17<sup>th</sup> century saw the scientific revolution, and baroque art movements. Galileo with his telescope, shown at the top of the stairs in front of the Taj Mahal, and Sir Isaac Newton, represented by the apples in the top panel, laid the foundation for modern science. In the bottom panel, Vermeer paints the Girl with the Pearl Earring, while being serenaded by the music of Johann Sebastian Bach.

**Nick:** In Column P, you'll notice that bright red carpet in the scene. That's German antique glass. We chose it because of its vibrant color. The antique process allows for that brilliant color to show through, and the red actually has certain minerals, metals in it, like particles of gold. We tried as much as we could to use the natural colors of the glass without painting. If you look in this window, you'll see some of the most colorful spots throughout the column are actually raw glass with no paint, such as the carpet as mentioned before, and in the sky and the trees in the background. All the figures have been painted, and you'll see it mutes the color just slightly, because it's really hard to get the color just right with just the paint. The natural glass just has such a dynamic quality to it. So, we tried to utilize that as much as possible. Sometimes we would just add a little bit of paint here and there to add some shadow. And obviously many of the details needed to be painted in, such as the text and the faces of the figures.

**Narrator 2:** Column Q, Sapere Aude! (Dare to Know!). This column embodies the Enlightenment of the 1700s. The bottom window is occupied by great philosophers and statesmen, such as the American Founding Fathers, who dared to challenge conventional thought. In the center panel, aviation is born with the flight by the Montgolfier brothers in a hot air balloon. Gulliver's Travels by Jonathon Swift, and the architecture of St. Petersburg epitomize the enlightened thinking of the age. As shown in the top scene, Diderot's encyclopedia, Handel's Messiah, and Independence Hall are also highlights of this Age of Reason.

**Trevor:** We have the Founding Fathers here in Column Q and we acknowledge a lot of their accomplishments because these men had to go through quite a bit to create this republic that would introduce a lot of these liberties that we sometimes take for granted once in a while. And it's fun to go through all the details and discover all the little things that they were able to do as well, because there were many, there's just sort of a treasure trove of stories behind all of these different objects that you have in Column Q. Whether it's Benjamin Franklin with his bifocals and his kite for electrical experiments, whether it's Washington being handed the Bastille key from his surrogate son Lafayette, or it's Thomas Jefferson holding two things in his hands – a quill and a blueprint for the University of Virginia. In his own words, Thomas Jefferson said that a man cannot be ignorant and free. They understood that freedom and education go hand in hand. When you see Thomas Jefferson's grave at Monticello. It says in the epitaph that he was the author of the Declaration of Independence and the Founder of UVA. There is no mention of his presidency, that he was governor, no mention of the Louisiana Purchase, even though those were very important accomplishments. What he wanted people to acknowledge was that he was the founder of an institute of higher education and the author of a document that guarantees that people can have their liberty, because they knew that you cannot have a free people who are uneducated. You have to be educated; you have to be knowledgeable if you're going to maintain your freedom.

**Narrator 1:** Column R, A Heart Untainted.

**Narrator 2:** The dawn of the modern era has arrived, as freedom movements shape nations and the last corners of the map are drawn. Documents displayed in the top window, such as the U.S. Constitution and the Napoleonic Code, define the evolving governments of the Americas and Europe. The lower window portrays Sacagawea leading Lewis and Clark into the wilderness to survey the land, study flora and fauna, and learn from the indigenous people.

**Narrator 1:** Many of the artists who worked on *Roots of Knowledge* were young and getting involved with stained glass for the first time with this project. Dallin Orr, one of those, shares his experience.

**Dallin:** I first joined the *Roots of Knowledge* project as an intern on the project actually, and I was a student at UVU in the Honors Program and I had several classes with Professor Wayne Hanewicz, and he approached me because he knew of my interest in art and history and philosophy. And he approached me with this kinda opportunity to be an intern on the Roots of Knowledge project. And so, when I first came to the studio it was just a very small team, it was just Cameron, Nick and Tom essentially working on the *Roots of Knowledge*. And Nick and

Cameron were working on Column C at the time, and I was just cutting out glass, and I first started to paint the glass on Column D. So, Holdman Studio has a sister studio in Mexico that we used to help create these windows. And the studio in Mexico was responsible a lot for Columns R and S, and I had the unique opportunity to travel to Mexico and stay there for several weeks and train artists there to paint on the glass. And so, with these panels, with these details and the scenery here, I was able to work with the artists there and get to know them. It was a really cool unique opportunity for me personally to spend several weeks there and get to know them and to train people to paint. You learn by teaching as well, so it was a very cool and unique experience for me to live there for a while. I even contracted a parasite from the food there during my first week, and that was miserable!

**Narrator 2:** Column S, *Beauty is Truth, Truth Beauty*. “It is a truth universally acknowledged” that Jane Austen’s novels are some of the most beloved stories in literature. In the upper panels, we see Austen surrounded by other influencers of the Romantic period, such as Beethoven, Pushkin, Emerson, and Mary Shelley. While many dreamed of a simpler way of life, others continued to push forward. In the bottom panel, a steam engine cuts across the land, blazing the trail for the Industrial Revolution.

**Nick:** Column S portrays the Romantic Movement in art and philosophy, Jane Austen being one of the key figures. I thought it would be appropriate to represent some of her works, but to take up less space we had to get a little bit creative, and so I thought maybe we could show illustrations from her novels on her clothing. So, her skirt that comes down from the top window into the middle is portrayed to look like toile fabric, and in the fabric, you see little illustrations, little scenes from her books. One thing that I love about this column is that it includes details that are connected in ways that you would not expect. For example, there is a volcano in the background, Mount Tambora, which caused what's known as "the year without a summer," which eventually influenced Mary Shelley and her writing of *Frankenstein*.

**Narrator 1:** Column T, *Unbounded Nations*.

**Narrator 2:** The mid-1800s brought rapid progress to the world, as featured in the Great Exhibition of 1851 in London. Here, people from all nations showcased their inventions, ideas, and cultures. Above the Crystal Palace, the top panel displays key scientific breakthroughs. In the open book, Charles Darwin’s *Origin of Species* fills the left page, and Gregor Mendel’s work in genetics occupies the right. Meanwhile, the Emancipation Proclamation opens the door for major sociopolitical transformations.

**Trevor:** So, there's a lot of running themes and common motifs in a lot of the columns in the windows. Not just the roots that run through every column, but there's a lot of repetitive imagery, a lot of similar compositions. For example, there's a lot of parallels between Column M and Column T. You have a very similar composition. In Column T you have this enormous cathedral of glass, the Crystal Palace, and it's a lot like the cathedral in Column M, in the Middle Ages. You have other images that are very similar, too. You have birds flying through the air. You have these African masks hanging on the pillars. You have a British monarch. You have all these exhibitions of all these different groups of people from all over the world. And it's just meant to

show how we have all these similarities across time, how people kind of reinvent ideas, but also, they kind of resurrect things that maybe aren't as new as we sometimes give them credit for. That perhaps we just forget about things and then we just kind of recreate them in a different way, and how knowledge is very consistent across time. It just kind of takes on different shapes and forms sometimes.

**Narrator 2:** Column U, *On Wings of Passion*. The Technological Revolution, arriving in the late 1800s, generated a wave of visionary achievement. In the top panel, Thomas Edison receives light from Van Gogh's "Starry Night." Nikola Tesla generates illumination that is both literal and figurative, and the writings of Mark Twain and Roger Kipling spring to life. In the middle panel, the Wright Brothers' airplane soars between the Sagrada Familia and the Eiffel Tower, while on the right Louis Pasteur, Marie Curie, and Guglielmo Marconi experiment inside the singer house. Below, automobiles and telephones are introduced in the busy street scene where a paperboy announces the mornings headlines.

**Trevor:** So, as these windows are being produced, there was a real push to get them done by a deadline. And they were sort of behind schedule and we had to get some of these windows done, sometimes within just a few days, maybe a few weeks. We had a lot of visionary themes that we wanted to incorporate into this column to show the Second Industrial Revolution, to show a lot of the great innovations and the visionary themes of that time, and how people were putting a lot of thought into some really big ideas. And you see that in the top window. You have a lot of these visionary people, a lot of big thinkers from that time: Thomas Edison, Tesla, Emily Dickinson, Kipling, etc. And we recreated a lot of famous works of art, such as Van Gogh's "Starry Night" and other paintings. But we also made some of these pieces of glass ourselves. There's that big swirly piece that Thomas Edison is holding. It kind of represents the invention of the light bulb and has these beautiful colors that we had to incorporate ourselves into the glass, and we made that in our own shops.

**Narrator 1:** Column V, *Nothin' But Blue Skies*.

**Narrator 2:** At the top of this column, historical figures and events, such as Albert Einstein and the discovery of King Tut's tomb, are displayed inside squares and rectangles inspired by a Piet Mondrian painting. Below is a bustling city in the early 1900s with several notable people, including Helen Keller, Louis Armstrong, and Emmeline Pankhurst, a British suffragette.

**Gayle:** So, in Panel V, "Nothin' But Blue Skies," down in the bottom right corner is a particular image that's important to me, and you notice Emmeline Pankhurst is standing with the Votes for Women sign, because she was so instrumental in women's suffrage and women's right to vote. And we knew that she would need to be surrounded by suffragettes, and so you think about the contribution of both men and women in this life, and how we are different for purposes, to be able to complement one another. And so, in this case, we were thinking about women and how they had influenced our lives for good. So ultimately, as individuals and as the first artists to begin on the *Roots of Knowledge*, Tom and myself and Cameron, we thought about how much our mothers have affected our lives, and what an incredible influence for good each of them has been on us as a person and as an artist. And so, included from the left to the right going back

over to where Emmeline is, from the left it is Cameron's mom, in the middle is Tom's mom, and then to the right it's my own mother. And so, this is just a nod of gratitude to all mothers and certainly to all women on the planet who are willing to support great causes and the great individuals that they love.

**Narrator 2:** Column W, *Worth the Fighting For*. Through the 1930s and 1940s, the world community was tested through a series of disasters and conflicts. In the top window, we see a reporter's desk surrounded by maps, newspaper clippings, and photographs related to these tumultuous times. Shining above the cityscape, Art Deco rays of light signify the triumphant spirit of a free society. The scene below captures a celebration with everyone from returning soldiers to world leaders.

**Nick:** Column W portrays a time where there was a lot going on all over the world, lots of advancements in technology and in society, civil rights, lots of wars, lots of world events. And I remember talking with Trevor, we were trying to figure out a scene that would help us to portray all of these things going on at this time. And we thought, well, what about a news reporter, or a journalist? That would give us a perfect venue, a space to put all of these newspapers, newspaper clippings and photographs, maps, and artifacts from all over the world to show the war and advancements around the world and the books that were being written. And I've always been a huge fan of Indiana Jones, and so this scene kind of felt reminiscent of that for me, with the typewriter and all of the maps and the hat hanging on the coat rack. One of the things that's so compelling about this scene is the importance of a news reporter at this time of history. The spread of knowledge was so important for people on one side of the world to learn about what was happening elsewhere to get involved in these huge events.

**Narrator 1:** Column X, *Breaking Barriers*.

**Narrator 2:** The post-World War II years brought new pursuits. Many of these endeavors are displayed in the top window, where a suburban home, built for the average family in the 1950s, chronicles the passage of time. Humankind pushes the boundaries of "the possible" in the lower panels. Space exploration is represented in the middle panel with the Apollo 11 rocket, launching into the night sky. The crowd scene below shows the advancement of human rights and civil liberties with key individuals in front of the Berlin Wall, including Rosa Parks and Oscar Romero, holding a banner featuring a quote by Dr. Martin Luther King, Jr., and Ronald Reagan shaking hands with Mikhail Gorbachev.

**Tom:** How do you end this scene with so many wonderful events and scenes and the past? How do you still talk about the past and explain what can happen in the future? And that is where X Y and Z came to tell that story. Or to inspire them, look at what has been done. This journey is for you as well, this is your journey. And then we chose to use iconic buildings and architecture in existence and also make our own or combine our own into the whole. One of the most prominent buildings in the here has yet to be finished. All of the origins of this building started long ago and that's this one colorful one which actually extends out of the middle panel into the upper panel with all of those little rectangles of the like red and blue and green and yellow. It stands next to the tallest building on earth currently but much taller. And as you look closer, there are letters on

there and it is the DNA sequencing. And so, how much potential does humanity have, and it is endless. And then we show that by showing our DNA with what is embedded in our DNA is greatness.

**Narrator 2:** Column Y, *Places You'll Go*. The windows in this column move into the modern era, and a little bit beyond, with projections of the possible future. Rising above the cityscape is a multicolored building that has no limit. Upon closer examination, however, this structure represents something microscopic, a genome. This illustrates a prevailing theme throughout *Roots of Knowledge* – that big ideas are formed by tiny components. Another example of this concept below is a storyteller reading to a group of children, in effect perpetuating the spread of knowledge.

**Gayle:** Tom asked me if I could kind of summarize in a simplistic type of quote the design concepts and the thought behind why we started this in the first place. So, you notice up in the very top right-hand corner there's a branch coming out, and President Holland's hand is pointing right to it. And it says, "Firmly rooted in the knowledge of ourselves and those before, lives an indefatigable hope branching out for the benefit of those who come after." And that was kind of pulling together the roots-and-branches concept, the knowledge and the hope that they represent, and how really, to understand yourself you have to understand where you came from. You have to understand about the best of your culture and oftentimes the worst of your culture, so that you can take with you that which is of great value and be able to figure out how to resolve the problems that maybe weren't solved in the past. And come out a better person than you would have before. And in my own process of doing that, I've realized that any time I make those efforts, I do have just this almost desperate need to do so not only for myself but for those that come after me. To try to make of the world a better place than maybe each of us found it. I think that's our gift to be able to learn from the past and take that which is good and work through and try to solve that which was lesser. So that's what that quote is.

**Narrator 1:** Column Z, *Hope for Humanity*.

**Narrator 2:** As *Roots of Knowledge* comes to an end, roots from the Tree of Knowledge connect to the Tree of Hope for Humanity. The torch forming this tree symbolizes the transfer of knowledge and wisdom to illuminate tomorrow. Its branches reach back through the top panels, linking the past, present, and future.

**Gayle:** So, you'll notice that in Panel Z the final individuals that are shown is an older couple bidding farewell in a way to another group of individuals that are going on through what would look like through the panes and continuing on into the future. And the point there was to show how each of us have our lives and as we gather this information, we get the resources of knowledge and experience and opportunities that we take the time and the chance to share of that with the next generation. To those who may not have had those experiences or those opportunities or that knowledge yet to be able to pass that on to the next generation because they then will become that generation that shares. And so, you'll notice the individuals that are heading out of the scene, they're not in current modern-day fashion. We chose instead to put them in iconic cultural fashion as a reminder of what, what a gift it is and what a responsibility

we have to take the very best of our heritage and where we come from and take that with us and don't ever forget those stones put in place for our lives and our experience, for each of our cultures. So, take the best of it with us and that's why we represented that in that way. And then you'll notice that we have one final quote on the bag of the young woman about to walk out of the image. And on her bag, it says, "It's your road and yours alone. Others may walk it with you, but no one can walk it for you." And that's kind of our parting shot as a message for these windows, is a reminder that there is no one else on this planet who is just like you. You're the only one. We each have individual gifts and talents and I believe a purpose and a mission in life to be able to share of those gifts and talents. And so, one of my favorite things about stained glass, I think one of its most beautiful characteristics and at the same time one of its most defining characteristics is that it is made up of all sorts of different pieces of glass. There are different shapes and different sizes, different colors. They're located in different parts of the window. But every single piece is crucial. It's not just kind of needed, it's crucial to the whole, and it doesn't matter if it's big or small, purple or yellow, it's needed there. And so, if we can remember that like that, we are pieces of a much larger picture on this planet, and that each of us has so much good to add. And so to remember that, you will hopefully have many people who walk your path with you, but no one will ever walk it for you. And we need you! You are so needed and the gifts that you have to share and the mission that you have is one that no one else can accomplish but you. So, we finish the window with hope for humanity in general and hope for the individual in particular, that they would remember their vast potential and be willing to do what it takes to step forward and share that with the rest.

**Narrator 2:** The torch has been passed to you. It is now in your hands to continue this legacy and contribute in your own way to the world we live in.

**Narrator 1:** We hope you enjoy your experience and are inspired by the stories from the artists behind the creation of this luminous artwork. Thank you for visiting *Roots of Knowledge*, and please come again.