

Stargazing Centaurs: The Astronomy of Harry Potter

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Editor's Introduction

Kristine Larsen, a devoted teacher of astronomy, enjoys finding connections between astronomy and fantasy stories (and music). She has led popular workshops at ASP meeting discussing the astronomy of the *Lord of the Rings* and other works by Tolkien and the astronomy of the Harry Potter books. We asked her to share some of her Harry Potter discoveries and teaching techniques with our readers.

Like many of my generation, I devoured the works of J.R.R. Tolkien in high school and college. However, I suspect that unlike many of my peers, I not only memorized the Elvish genealogies and had a hand-drawn map of Middle-earth on my bedroom wall, I also had a notebook where I carefully listed all the astronomical references I could find in Tolkien's works. Fast-forward twenty-plus years, and a different generation finds themselves immersed in another fantastical world of wizards, mythical creatures, unlikely heroes, and deathly villains. I'm referring of course to J.K. Rowling's widely popular *Harry Potter* series. Composed of seven thick tomes published between 1997–2007, Rowling's works have shattered publication records worldwide and the seven films so-far released have made over a quarter of a billion dollars each in U.S. ticket sales alone. Although the pure literary value of her works has been debated by academics, no one can argue with the claim that Rowling turned a generation of children into readers,



Participation certificate handed out at Venus-Jupiter public observing sessions.

despite the distractions of video games, television, and texting.

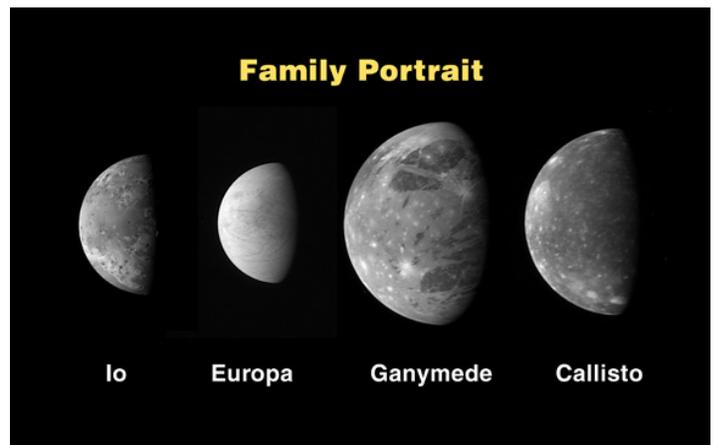
Like the works of Tolkien, there are very obvious astronomical references throughout the Potter novels. From Hogwarts astronomy teacher Aurora Sinistra to students Luna Lovegood and Draco Malfoy, to the Death Eater Bellatrix LeStrange and witch Merope Gaunt (mother of Harry's archenemy, Lord Voldemort), astronomical names are common in the Potter-verse. Indeed, in the Black family alone we find names such as Sirius, Alphard, Cygnus, Cassiopeia, Orion, Pollux, and Regulus. But the astronomy does not end here!

In *Harry Potter and the Order of the Phoenix* Harry, Ron, and Hermione are required to write an essay on

the characteristics of the Galilean moons of Jupiter (as noted in Andrew Fraknoi's *Astronomy Beat* article "Astronomy in Popular Culture Quiz 2010") and Rowling gets the astronomy right. As an exasperated Hermione explains to Ron, "Jupiter's biggest moon is Ganymede" and "it's Io that's got the volcanoes" (295). One of the culminating events of the Hogwarts curriculum each June is the O.W.L.s exam (Ordinary Wizard Levels), which includes both a written astronomy exam and a practicum involving observing the night sky with a telescope. Readers follow along as Harry carefully plots the positions of various celestial objects on his star map, including the planet Venus, which he locates and views through his telescope near midnight. More than one astronomically-minded reader had initially thought "View Venus near midnight? Impossible!" However, as astronomer Kevin Kriscuinas pointed out in a letter to *Sky and Telescope*, it is possible in particular years for Venus to remain above the horizon that late at night in England. The fact that an astronomer took the time to figure out if Rowling's scenario was astronomically possible speaks volumes to the power of the *Potter* series.

However, as is the case with many works of science fiction and fantasy, Rowling's astronomy is far from perfect. For example, one of the objects Harry and friends supposedly view during their June lab exam is Orion, which noted astronomy educator Jay Pasachoff pointed out in a letter to *Sky and Telescope* is clearly impossible. In *Harry Potter and the Prisoner of Azkaban*, werewolf Lupin notes that he was suspiciously ill at the times of full moon, but the dates of his "episodes" did not follow a 29.5 day cycle.

But even when Rowling's astronomy is bad, I have found that the ability of her work to interest young people in astronomy is oh-so-good. In October 2009, Central Connecticut State University's Elihu Burritt Library hosted the National Library of Medicine's traveling exhibit "Harry Potter's World: Renaissance Science, Magic, and Medicine" (<http://www.nlm.nih.gov/exhibition/harrypottersworld>). In conjunction, I offered a variety of free public events, including three showings of a special Harry Potter-themed planetarium show I had written, five nights of public observation sessions of Jupiter and its moons, and two afternoons of Harry Potter-based hands-on astronomy activities. Since that time I have offered these hands-on



The four Galilean moons of Jupiter (JPL/NASA)

activities to middle school students attending Saturday morning science workshops at CCSU and other venues, and the students have been delighted to learn just how much astronomy is in their favorite alternate universe. I will describe four of these activities here.

One of my favorite free online astronomical resources for public outreach is the Uncle Al Sky Wheel. By simply adding two stars — Alphard in Hydra and Bellatrix in Orion — it becomes a Harry Potter Starfinder, and a fun astronomical activity is to match up the astronomical names in Sirius Black's family genealogy with actual stars and constellations (see <http://www.ccsu.edu/astronomy/hpstarfinder.html> for directions). Potter fans can also see for themselves that Orion is not visible near midnight in June, unless Hogwarts has some magic far beyond our astronomical understanding!

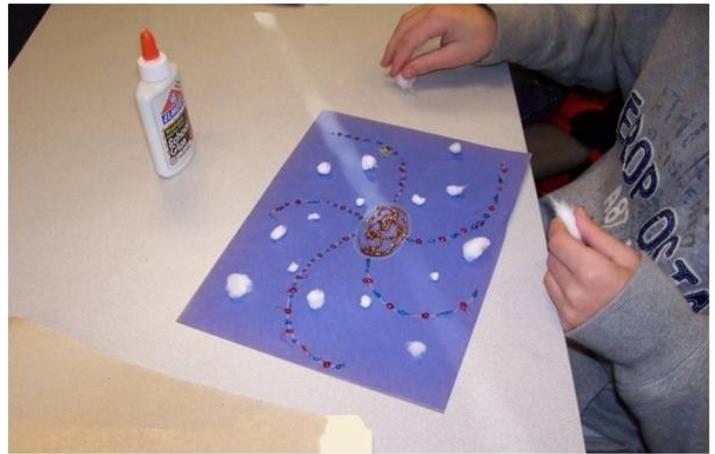
My Harry Potter astronomy activities are always introduced by references from the novels. For example, in *Harry Potter and the Prisoner of Azkaban* (50) Harry is shopping in the wizarding shops of Diagon Alley and is tempted to buy a "perfect, moving model of the galaxy in a large glass ball, which would have meant he never had to take another Astronomy lesson." While I suspect Rowling actually meant *solar system* instead of galaxy, it is a perfect quotation to motivate an activity in which children make a model of the galaxy using simple materials such as glitter and cotton balls, all the while learning the structure and composition of the galaxy.

Since the Hogwarts gang had to write an essay on the Galilean moons of Jupiter, an activity which allows children to make a scale model of the Earth-Moon

system and compare it to the Jupiter-Galilean Moons system makes perfect sense. As I like to pride myself as being the queen of “cheap and easy” when it comes to outreach activities, the planets and moons are scaled construction paper cut-outs, and the correct distances between the various bodies achieved by means of pre-cut lengths of string.

Finally, one of my favorite quotations from the Potter novels is a grumbled observation from Hagrid, teacher of the Care of Magical Creatures class at Hogwarts. He warns to never “try an’ get a straight answer out of a centaur. Ruddy stargazers. Not interested in anythin’ closer’n the moon” (*Harry Potter and the Sorcerer’s Stone*, 254). Children are fascinated to learn that there are real two stargazing centaurs, Centaurus and Sagittarius, and that the center of our galaxy is located in one of them. After telling children the story of Sagittarius, I have them connect the dots on a white stars-on-black paper picture of the constellation and have them use stickers to add the locations of several Messier objects in the constellation. (First I describe the objects and show beautiful telescopic pictures of them).

Sometimes one’s most creative ideas go crashing down in flames, thanks to the vagaries of Hollywood. November 2008 was originally slated to be the release of the film version of *Harry Potter and the Half-Blood Prince*, and I thought it would be a perfect tie-in to the Potter-verse to host sidewalk observing sessions of the November 30/December 1, 2008 Venus-Jupiter conjunction at local movie theaters running the film. I reasoned that given the appearance of Venus and Jupiter in the Hogwarts curriculum, and numerous references to planetary conjunctions, Potter fans would



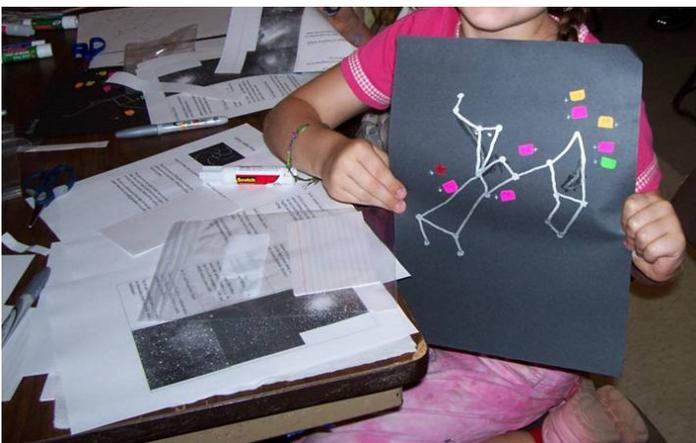
Cheap and easy model of the Milky Way using colored glitter glue. Shredded cotton balls represent globular clusters.

be delighted to follow in the footsteps of their idol and view these objects in a telescope with their own eyes. Unfortunately the movie’s release was changed to July 2009, but I still managed to connect Hogwarts to our public observing sessions of the conjunction on campus, handing out O.W.L.s Astronomy certificates to young people who visited our observatory to view Venus and Jupiter.

As C. René James noted, Rowling’s works provide a “vast new avenue for astronomy outreach.” Thanks to Rowling’s fantasy series, young people around the world are reading. The ball is now in our court to turn this reading into astronomical learning. So embrace your inner centaur, fellow stargazers, and get started!

About the Author

Kristine Larsen is Professor of Physics and Astronomy at Central Connecticut State University. The author of two popular-level books, *Cosmology 101* and *Stephen Hawking: A Biography*, she has published and presented on astronomical motifs in the works of J.R.R. Tolkien, women in the history of astronomy, and science outreach and pedagogy. A past recipient of CCSU’s Excellence in Teaching Award, her latest interest is the connection between zombie films and the public’s perceptions of science and scientists.



A stargazing centaur - aka Sagittarius - with notable Messier objects.

Resources for Further Information

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