

Astrobiology News January 2016: Highlights from the Adler Planetarium

Those of you who “miss” Pluto may be interested to know that evidence for a real ninth planet in our Solar System was announced in a Caltech press release on January 20th!¹ On the same day, the Adler Planetarium announced a new show based on this discovery.² Of course, Pluto hasn’t gone anywhere – it was simply reclassified to dwarf planet status 10 years ago by the International Astronomical Union because it is not massive enough to clear its orbit of other objects.³ At an estimated 10 times the mass of the Earth, the proposed new planet fits all the criteria to be considered a “true planet”. About 20 times further from the Sun on average than Neptune, it would take more than 10,000 years to complete one full orbit about the Sun!

Let’s be clear about one thing – the new planet has not yet been observed; rather, its properties have been theoretically predicted from the orbits of objects in the Kuiper Belt, a disc-shaped region of icy bodies beyond the orbit of Neptune.⁴ Without going into the intricate details of orbital mechanics, suffice it to say that there are six parameters necessary to fully describe an orbit and six Kuiper Belt Objects (KBOs) show similarities between some of these parameters that have an extremely low probability (0.007 percent) of being random. The Caltech researchers (Konstantin Batygin and Mike Brown) showed that the proposed planet could not only explain these alignments, it could also account for peculiarities in the orbits of other KBOs. The planet Neptune’s existence was also predicted mathematically prior to it being observed in 1846.⁵

The search is now on to find “Planet Nine” as Batygin and Brown continue to refine their simulations and learn more about the planet’s orbit and influence on the outer reaches of the Solar System. This discovery may actually make our Solar System more similar to exoplanetary systems. The most common planets orbiting other stars (exoplanets) have masses between those of Earth and the planets Uranus and Neptune, a range not represented in our Solar System, until now. Additionally,

¹ <http://m.caltech.edu/news/caltech-researchers-find-evidence-real-ninth-planet-49523>

² <http://www.adlerplanetarium.org/wp-content/uploads/Adler-Planetarium-Announces-New-Sky-Show1.pdf?e5bf72>

³ http://missionscience.nasa.gov/nasascience/what_is_a_planet.html

⁴ <http://solarsystem.nasa.gov/planets/kbos>

⁵ See, for e.g., <http://coolcosmos.ipac.caltech.edu/ask/146--When-was-Neptune-discovered->

exoplanets can be found on orbits both extremely close and very distant from their stars, so the remoteness of the new planet is not unprecedented. The Adler Planetarium's new show is being developed in collaboration with Mike Brown and his team at Caltech. It will open on May 28th, 2016, so be sure to come see it if you live nearby or visit Chicago!

On another topic, we will once again celebrate Evolution "Weekend" at the Adler Planetarium (aka "Clergy Day"), although this year it will not be a public event. Through a Lilly Endowment funded program at the University of Chicago Divinity School, on Monday, February 8th we will host a dozen early-career clergy identified as significant leaders in their constituencies. Named *The Chicago Commons Project*⁶, the goal of this particular session is to equip the cohort with an understanding of religion and science that will empower them to speak intelligently and faithfully in public. Their Adler experience will include interactions with scientists, historians of science, and a special demonstration of citizen science with *Zooniverse*⁷. I think this program will dovetail nicely with Michael's 2016 focus! The hope is that this group will become ambassadors for "exploring ways to engage in complex discussions in a civil manner".

Until next month,

Grace

Grace Wolf-Chase, Ph.D. (gwolfchase@adlerplanetarium.org)

⁶ <http://divinity.uchicago.edu/chicago-commons-project-0>

⁷ <https://www.zooniverse.org/>