Astrobiology News June 2019:
Highlights from the American Astronomical Society Meeting

I'm just back from the 234th meeting of the American Astronomical Society (AAS) in St. Louis, so I thought I'd share a few highlights related to astrobiology. Joshua Winn of Princeton University gave a wonderful talk on transiting exoplanets[1], including discoveries from NASA's *Kepler* missions and NASA's *Transiting Exoplanet Survey Satellite* (TESS)[2]. Two unusual exoplanetary systems highlighted were Kepler-89, where one exoplanet eclipsed another during a transit, and Kepler-36, which hosts an Earth-sized exoplanet and Neptune-sized exoplanet sharing essentially the same orbit about their star! Although Kepler's missions are now over, TESS's survey began in July 2018, and it has already identified more than 500 exoplanet candidates, which are being confirmed through a world-wide effort with ground-based telescopes.

A particular interesting feature of AAS meetings are daily press conferences. The first of these on June 10th included Edward Schwietermann of the University of California at Riverside[3], who presented results of a study that suggest habitable environments for advanced life might be narrower than previously thought[4]. In a nutshell, the researchers used computer models to study atmospheric climate and photochemistry on different types of planets. They found that exoplanets too far from their host stars (but still in the traditional "habitable zone," where liquid water might be present) build up too much carbon dioxide, far beyond levels known to be toxic to human and animal life on Earth. On the other hand, the type and intensity of ultraviolet radiation close to cool, dim stars like TRAPPIST-1[5] can lead to deadly concentrations of carbon monoxide.

Finally, the research my colleagues and I have been conducting, which was made possible by tens of thousands of citizen scientists who participated in the *Milky Way Project* on the *Zooniverse*[6] platform, also attracted some media attention[7]. In short, a serendipitous discovery by citizen scientists has led to the identification of many hitherto unknown star-forming regions that may tell us a lot about environments similar to the one that gave birth to our Solar System. Please check out my press conference, *Why Do Massive (and Not-So-Massive) Stars Form in the Milky Way?*, which can be accessed on the AAS media archive under

"Even More Sun & More Milky Way,"[8] or directly on YouTube[9] - I'm the 3rd speaker in the 11 am session on June 12th.

Until next month,

Grace (gwolfchase@adlerplanetarium.org)

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[1]Transiting exoplanets have orbits that pass across their stars as seen from Earth. The "transit method" of detecting and characterizing exoplanets has been very prolific!
[2] See http://theclergyletterproject.org/Resources/Astrobiology.html, April 2018.
[3] https://aas.org/media-press/archived-aas-press-conference-webcasts
[4] https://news.ucr.edu/articles/2019/06/10/new-study-dramatically-narrows-search-advanced-life-universe
[5] See http://theclergyletterproject.org/Resources/Astrobiology.html, March & May 2017.
[6] https://www.zooniverse.org/
[7] https://daily.zooniverse.org/2019/06/17/milky-way-project-new-yellowballs-catalog/
[8] https://aas.org/media-press/archived-aas-press-conference-webcasts
[9] https://www.youtube.com/watch?v=W55Zst_ruGA&feature=youtu.be