

## **Astrobiology News August 2019: The Big Questions of Astrobiology**

Late last month, it was my pleasure to participate in the *Science for Seminaries*<sup>1</sup> retreat in Midway, Utah, which was organized by the AAAS Dialogue on Science, Ethics, and Religion (DoSER).<sup>2</sup> This retreat featured talks, panels, and one-on-one consultations that encouraged many fruitful discussions between scientists and religious scholars looking to integrate science into seminary programs. The DoSER organizers compiled an extensive list of resources from participants' suggestions, including one with which you're all familiar - the Clergy Letter Project. Another resource I encourage CLP members to explore is *Science & the Big Questions*, a web repository for reporting cutting-edge research and issues at the intersection of science, philosophy, and theology.<sup>3</sup>

The central goal of astrobiology, to find evidence of past or present life beyond Earth, certainly raises some of the biggest existential questions we might imagine! Although searches for life elsewhere often focus on life as we know it, some researchers are taking an alternate approach, considering how we might identify "life as we don't know it," which might be based on biochemistry different from life on Earth.<sup>4</sup>

So how do we go about finding "life as we don't know it?" The newly-formed Laboratory for Agnostic Biosignatures (LAB)<sup>5</sup> is focusing on several phenomena that don't pre-suppose characteristics particular to life on Earth. Specifically, they are investigating how the complexity of various chemicals, accumulation of particular elements or compounds, and evidence of the transfer of energy might point to the presence of life on worlds such as Saturn's moon, Titan, with its lakes of ethane and methane rather than water. LAB has begun conversations with the team working on the *Dragonfly* mission<sup>6</sup> to facilitate developing tools for detecting such "agnostic biosignatures" and strategies for interpreting them.

As you might imagine, developing tools and strategies to detect and interpret different types of biosignatures is an extremely multidisciplinary endeavor, requiring the expertise of biologists, chemists, computer scientists, mathematicians, and instrument engineers. All this gets to the heart of a very big question for which

there is no consensus answer - what is life? Scientific classifications are always open to change in light of new information. Given life's diversity on Earth, I suspect we're in for more than a few surprises as we search for it elsewhere!

Until next month,

Grace (gwolfchase@adlerplanetarium.org)

---

<sup>1</sup> <https://www.scienceforseminaries.org/retreat/>

<sup>2</sup> <https://www.aaas.org/programs/dialogue-science-ethics-and-religion>

<sup>3</sup> <https://scienceandthebigquestions.com/>

<sup>4</sup> <https://astrobiology.nasa.gov/news/agnostic-biosignatures-and-the-path-to-life-as-we-dont-know-it/>

<sup>5</sup> <https://www.agnosticbiosignatures.org/>

<sup>6</sup> I wrote about *Dragonfly* in last month's Astrobiology News – see the CLP Astrobiology News Archive.