

53rd IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) –  
The Next Steps (A4)  
Interactive Presentations - 53rd IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL  
INTELLIGENCE (SETI) – The Next Steps (IP)

Author: Ms. Julia DeMarines  
University of California, Berkeley, United States

DETECTING EARTH'S TECHNOSIGNATURE: UPDATES FROM THE MOONBOUNCE PROJECT

**Abstract**

‘Are we alone?’ is a fundamental human question that astrobiologists aim to answer. Given the ambiguities of observing biosignatures with current and proposed methods of exoplanetary atmospheric spectroscopy (i.e. JWST, HabEx, and LUVOIR), we may never unambiguously detect life in the Universe remotely [1]. However, observing signs of complexity such as technology (technosignatures) from an exoplanet, would be an unambiguous detection of intelligent, communicating life beyond Earth, as natural radio emissions are not modulated. Furthermore, radio and optical SETI observations are currently the only scientifically available tool to determine extraterrestrial life unequivocally. But what are Earth’s technosignatures and how do we detect them? In the visible, near infrared, and radio spectrum there are multiple ways to examine our technosignature.

Here, we observe Earth’s technosignature in the radio spectrum, via lunar reflections (moonbounce), and compare our reflected signal power to previous studies of similar aim. The results of this study are threefold. First, we empirically measure Earth’s technosignature in frequency ranges where television broadcasts are common to understand how detectable we are. Second, we measure how our technosignature has changed over time by comparing the received power of our signals with those published in previous moonbounce studies. Third, we verify that Breakthrough Listen’s SETI search algorithms are able to catch signs of our own technosignature. Taken together, the results of this study informs future SETI searches on how a technosignature may change over time, improving our ability to detect life in the Universe.