

40th SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The
Next Steps (A4)
SETI I : SETI Science and Technology (1)

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INVITED PESEK LECTURE: EXPLORATION RATHER THAN SPECULATION – ASSEMBLING
THE PUZZLE OF POTENTIAL LIFE BEYOND EARTH

Abstract

Speculations about the existence of life beyond Earth are probably as old as mankind itself, but still there is no evidence – neither for its presence nor for its absence. Moreover, we neither know the necessary nor the sufficient conditions for life to emerge, sustain or evolve. The Drake equation famously quantifies our ignorance by writing the number of detectable civilizations as product of factors that get increasingly uncertain the further one goes to the right. As a result, the predictive power is poor, and it ultimately depends on the most uncertain factor. However, if we were able to derive a reasonable estimate, we would not need SETI experiments to tell us whether we are alone or not. What has changed substantially over human history is our ability to explore the Universe. Most significantly, radio transmission technology gives us the opportunity to communicate over interstellar distances, and we are now able to not only determine the population statistics of planets within the Milky Way, but even to find biosignatures in their atmospheres. By finding life beyond Earth, we will learn how frequently it emerges. By finding signals from intelligent extra-terrestrial civilizations, we will get unprecedented insight into our biological, technological, and societal evolution. The Drake equation is not such a useful means for assessing the chances of success of SETI, but instead it provides the framework for using observational data in advancing towards understanding the origins of our existence and our role in the cosmos, and maybe to get a glimpse of our future.