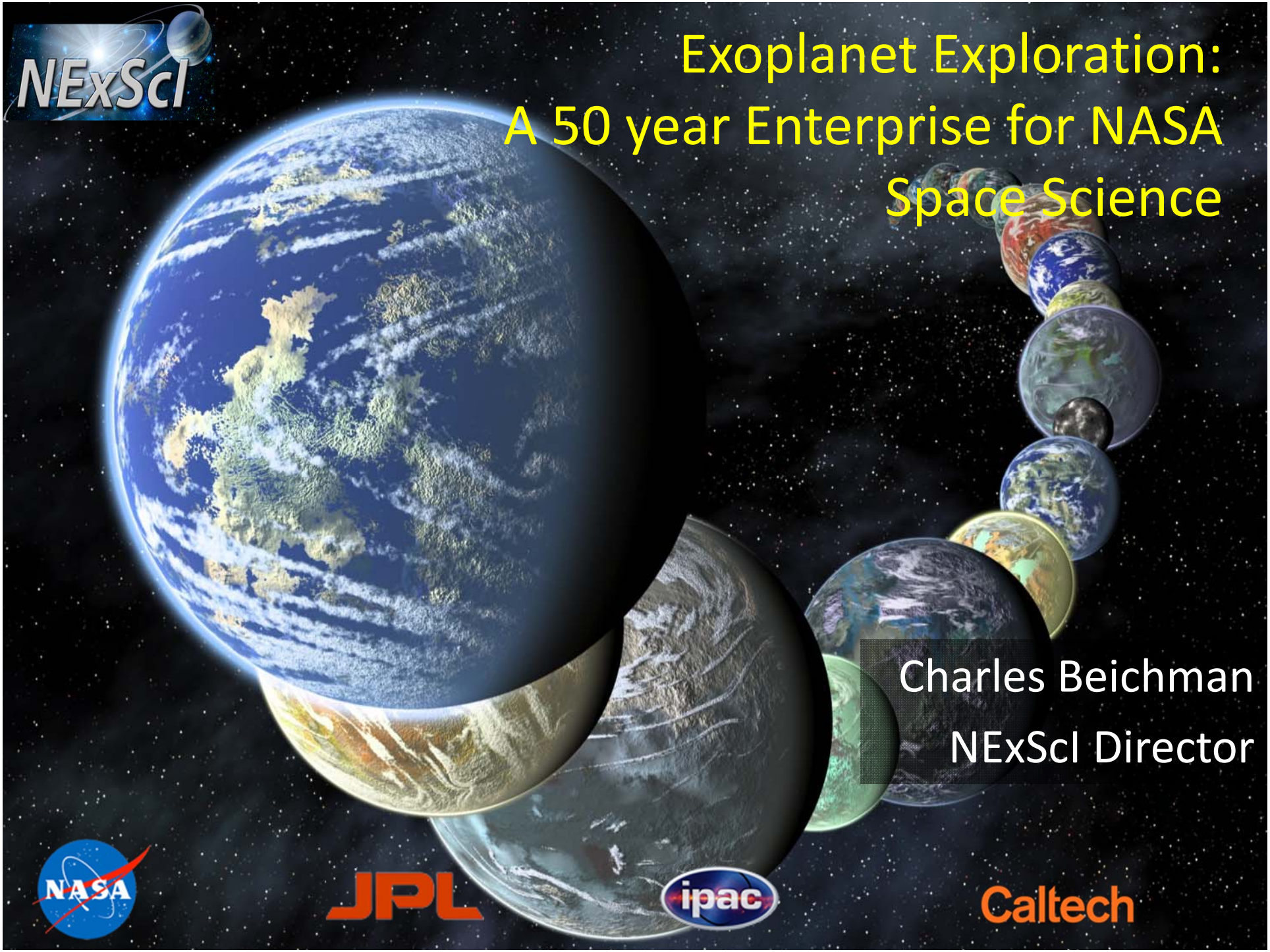
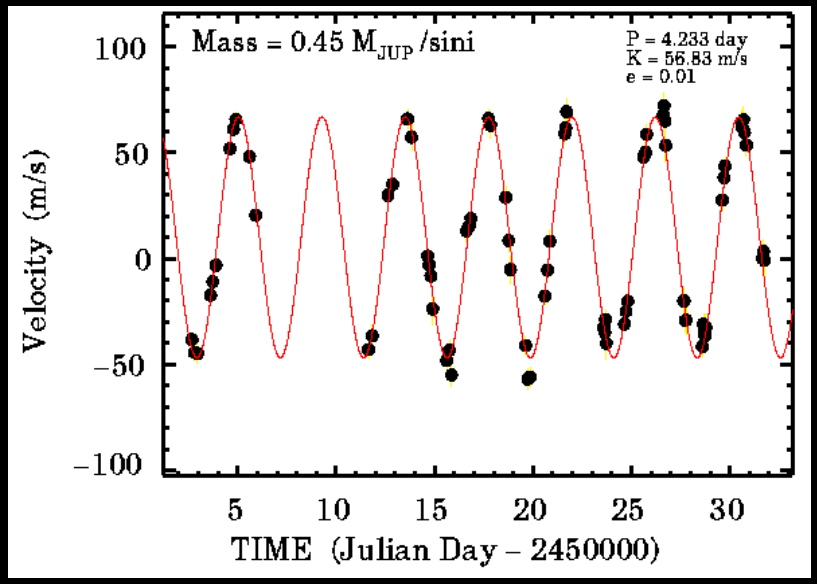
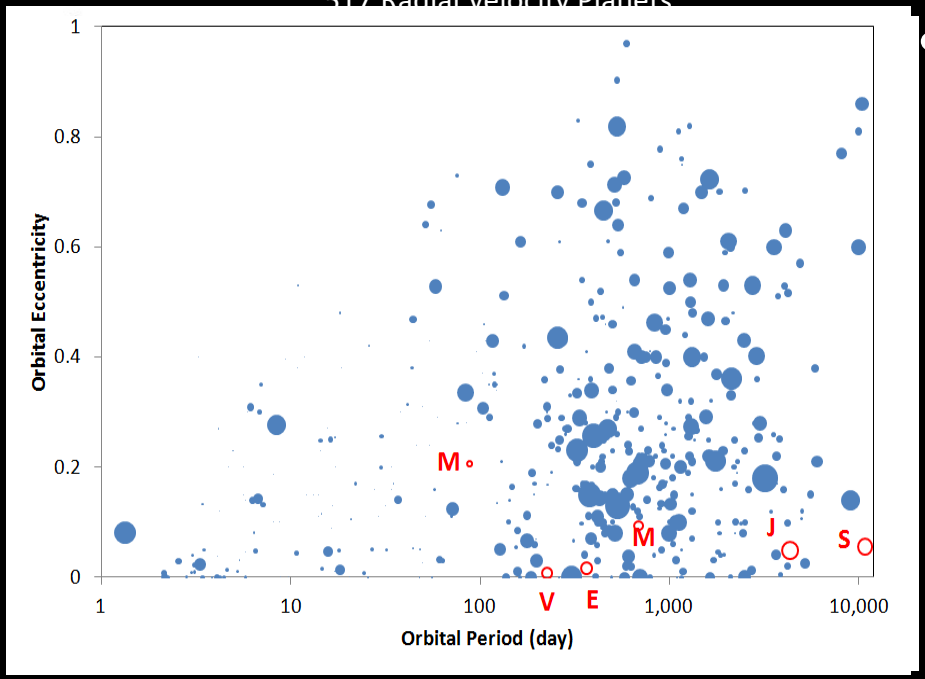

NExScI
Exoplanet Exploration:
A 50 year Enterprise for NASA
Space Science
Charles Beichman
NExScI Director
NASA
JPL
ipac
Caltech

Mayor, M. Queloz, D. 1995, Nature, 378, 355



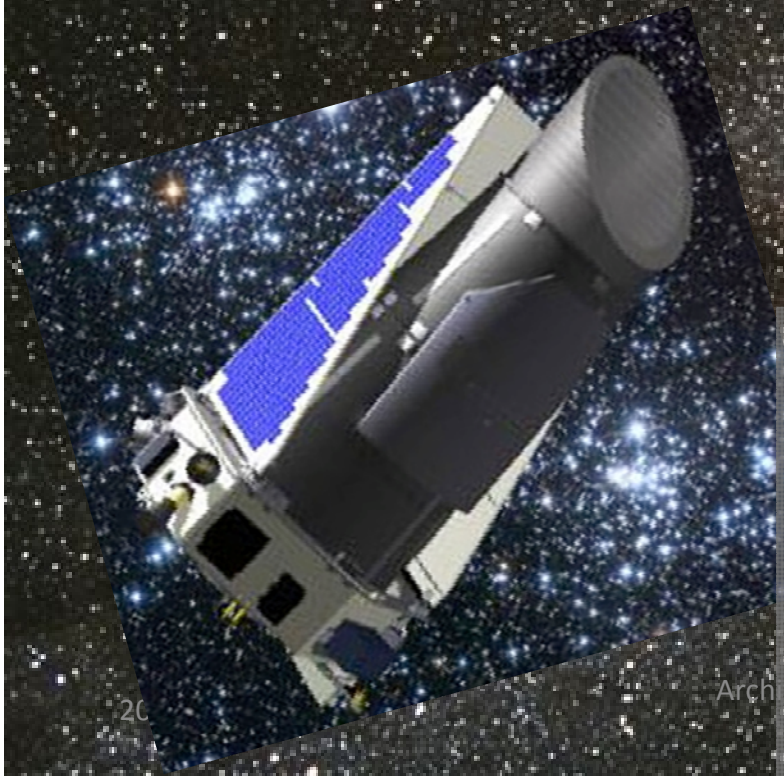
517 Radial Velocity Planets

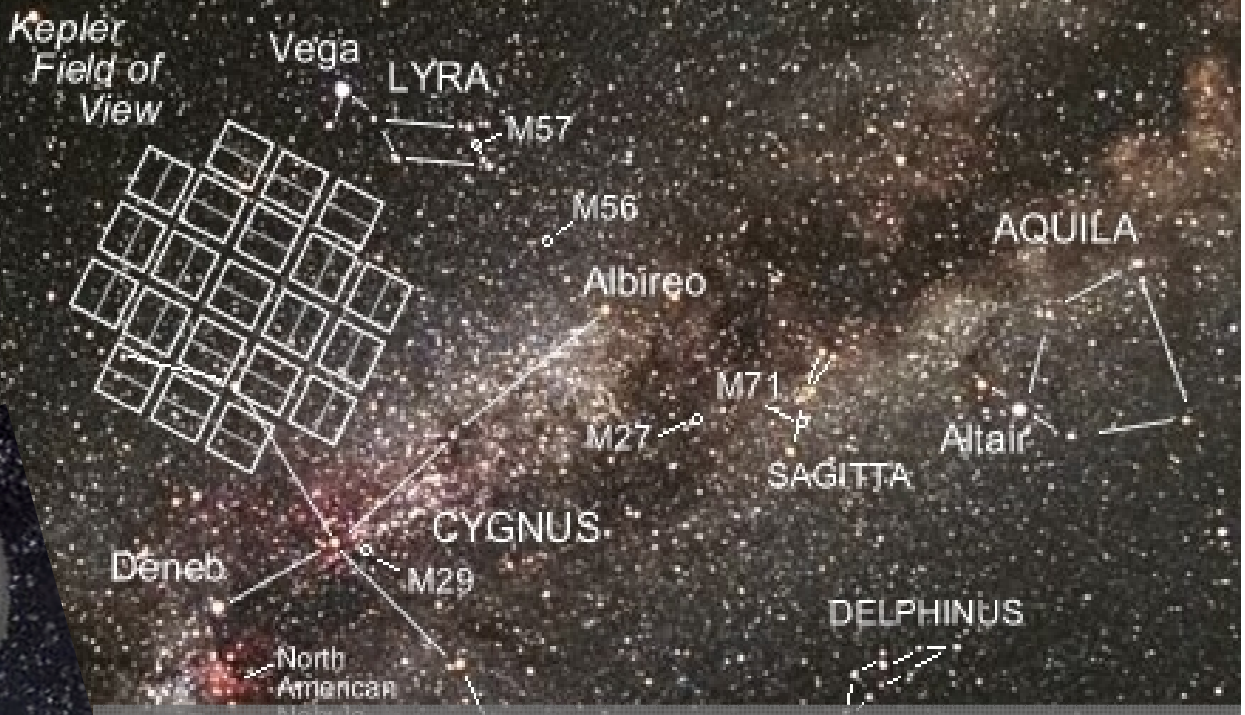


1995-2005: The Exoplanet Floodgates Open

- 1995: "Annus Mirabilis:" A 0.5 M_{Jup} companion in a 4.2 day (!) orbit around 51 Peg
- Over 500 RV planets reveal surprising architectures
- A 1.1 $M_{\oplus}$ "Hot Earth" orbits α Cen B in 3.2 days (Maybe)

2005-2015: The Decade of Transits

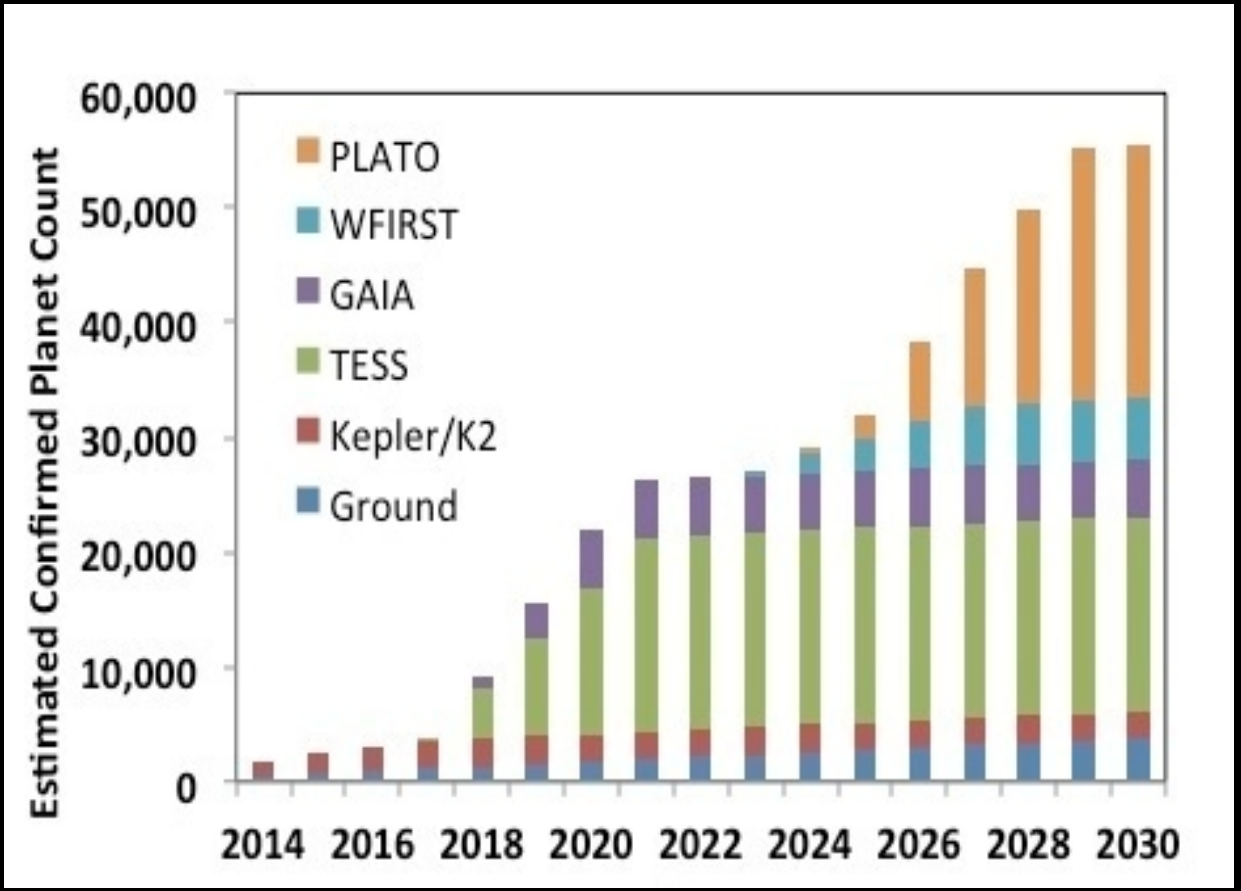




- First ground-based transits from RV follow-up (2004)
- Ground-based surveys
- NASA launches Kepler to survey 150,000 stars (2009)

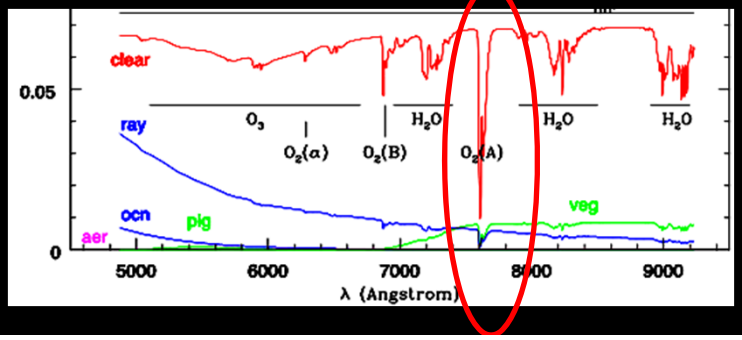
1832 Confirmed Planets in Exoplanet Archive as of May 2, 2015

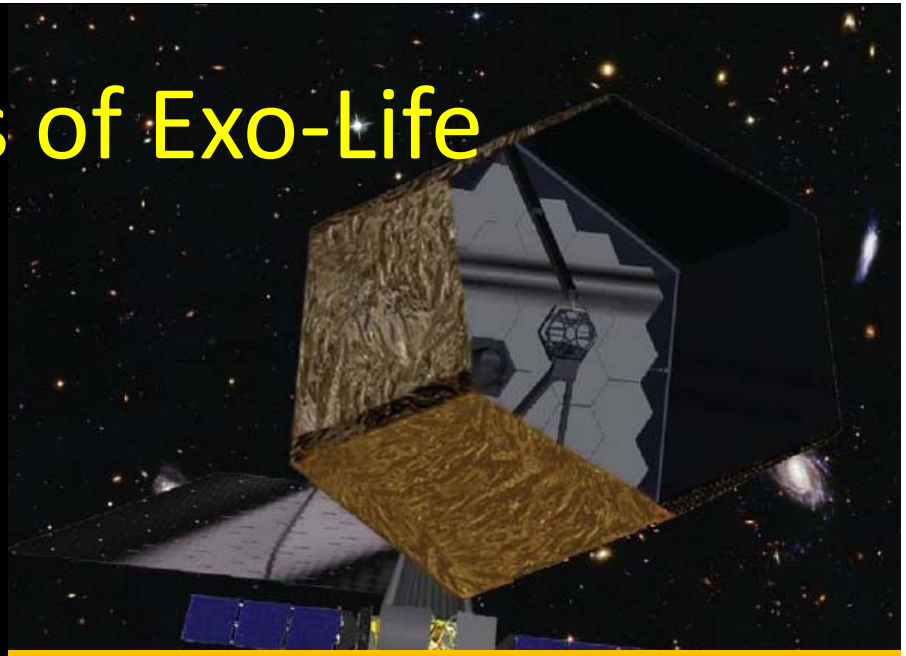
Continuing Growth of Exoplanets



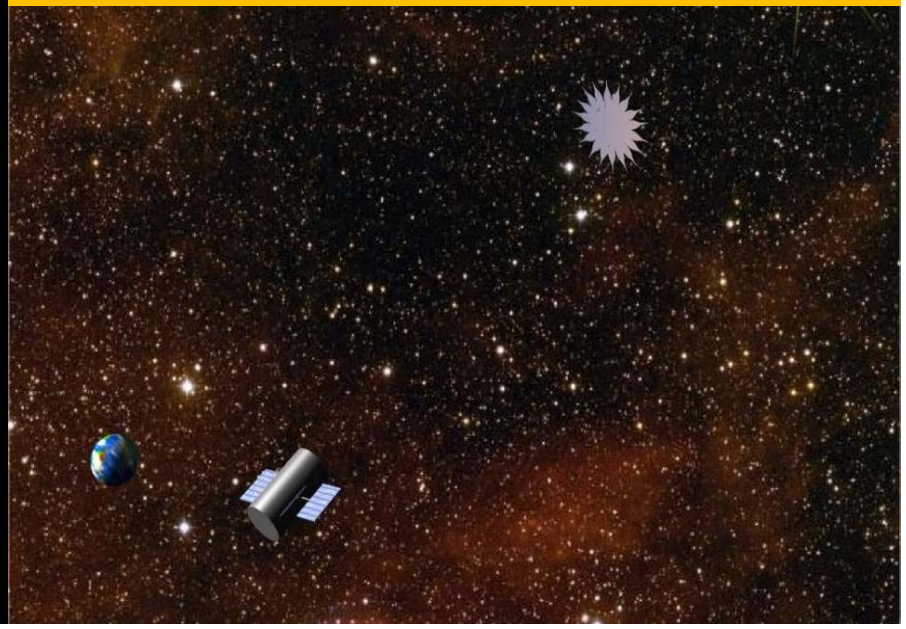
2030-2040: First Signs of Exo-Life

- 2020 Decadal Report recommended downselect between 16 m UVOIR telescope with internal coronagraph and 4 m monolith with starshade
- New Worlds Explorer (6m monolith w. starshade) was launched in 2035





NWE finds photosynthetic life on 3 of 10 HZ planets



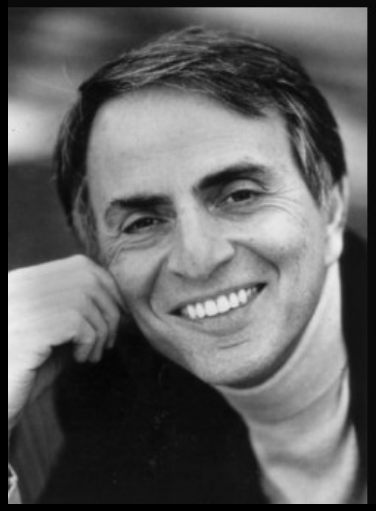
2045: Life in Our Own and Intelligent Life In Another Planetary Systems

Mars colonists find non-DNA life in 2 km deep aquifer

First SETI signal from a Life Finder target star

Sagan Fellows Critical to Past, Present and Future of Exoplanet Research

- Since first class in 1999 there have been 65 Michelson/Sagan fellows pursuing all aspects of exoplanet research
- Your contributions have helped make many of the discoveries now behind us and, more importantly, will lead to many of the exciting developments still to come



Somewhere, something incredible is waiting to be known.

(Carl Sagan)