

Lisa Kaltenegger

Associate Professor, Cornell University, Founding Director, Carl Sagan Institute

Education

Ph.D. , Astrophysics, Karl Franzens University, Austria
M.S., Physics and Engineering, Graz University, Austria
B.S., Astrophysics, Karl Franzens University, Austria

Areas of Interest

Rocky planets and super-Earths atmospheres in the habitable zone
Spectral fingerprint of exoplanets detected with next generation telescopes

Dr. Kaltenegger is known for her studies of the atmospheres of extrasolar planets, especially Earth-like ones and is a pioneer in the study of the Earth as an astronomical object evolving in time. She studied the change in the Earth's spectral fingerprint as a comparison with the evolutionary stages of Earthlike exoplanets to generate an "Alien ID Chart" pointing out that as biology and geology change the Earth through the ages, its appearance to a telescope observing it from distant stars would also change. She also investigated the ability of future telescopes like the James Webb Space Telescope to detect evidence of life using spectral biomarkers and generated the first spectra of Earth seen as a transiting exoplanet in 2009 concluding that it will be a hard problem for JWST and bigger future telescopes are needed to find signatures of life on many planets. In 2010 she explored whether we could observe geological activity, that is very important for habitability, on exoplanets, finding that about 10 times Pinatubo eruptions could be detected around the closest exoplanets, showing us if other planets are similar to our own Earth. 2011 she led a team to model the spectral fingerprint of Gliese 581 d, one of the first small Radial Velocity planets to be discovered in the habitable zone of its star. In 2013 she was part of the team announcing the discovery of the first two potentially habitable Kepler planets, with radii smaller than 2 Earth radii in the habitable zone of their stars, Kepler 62e and Kepler 62F and investigated whether or not these planets could still be habitable and how their spectra would look like if they were water worlds.

She served four years on the Executive Council of NASA's Exoplanet Exploration Program Analysis Group (Exo-PAG) and is and is part of the Transiting Exoplanet Survey Satellite (TESS) and FGS/NIRISS science team. She is the founder of the Carl Sagan Institute at Cornell University and she is its current Director.

Previously, she held a joint position at the Max Planck Institute for Astronomy in Heidelberg where she was the Emmy Noether Research Group Leader for the "Super-Earths and Life" group, and at the Harvard Smithsonian Center for Astrophysics in Boston. She was appointed Lecturer in 2008 at Harvard University and 2011 at University of Heidelberg.