

Juan Perez-Mercader is a physicist born near the Rio Tinto in Southern Spain. His professional research interests are in the theoretical, phenomenological, experimental and technological aspects of problems at the common frontiers between Physics, Chemistry, Biology, Planetary science, Computing and Engineering. He has published in Theoretical Elementary Particle Physics, Cosmology, Astrophysics, Planetology, Applied Condensed Matter Physics, Non-equilibrium Physics, Experimental and Theoretical General Relativity and currently works and publishes in the areas of Biology, Theoretical and Experimental Chemistry, Systems Chemistry, Polymer Science, Polymer Self-Organization, Computer Science, Engineering and Non-Equilibrium Physics and Self-assembly.

He received his undergraduate degree from the Universidad de Sevilla, his M. Sc. in Mathematics and Physics from Trinity College, Dublin and his Ph. D. from City College of New York. After returning to Spain in 1984, he joined Spain's National Research Council (CSIC), where he was Profesor de Investigación and was on special leave with Harvard from 2010 until his retirement from CSIC in 2017. In 1998, in Association with the NASA Astrobiology Institute, he conceived and founded Spain's Centro de Astrobiología (CAB), a Joint Institute between Spain's INTA and CSIC, and was CAB's Founding Director. During his tenure as Director, CAB and its 12 laboratories, have become a world-class transdisciplinary research institution, employing more than 200 scientists and engineers that, among many other things, contributes to NASA's Mars Science Laboratory (MSL/Curiosity), the NASA 2020 Mars Mission, Perseverance and the European Space Agency 2020 ExoMars. He is credited with the sentence "Life as a Consequence of the Evolution of the Universe" and was the architect of Spain's participation in NASA's Mars Exploration Program with infrastructure (Curiosity's High Gain Antenna, HGA) and instrumentation (Curiosity's Rover's Environmental Monitoring Station suite, REMS) on board Curiosity which arrived on Mars in August 2012. Evolved, Legacy versions of these contributions are now also on the surface of Mars on board Mars 2020 and Perseverance.

He joined Harvard University in 2010 as a Senior Research Fellow in the Department of Earth and Planetary Sciences and as a member of the Harvard Origins of Life Initiative where he leads an ambitious project on the "Top-down ex-novo Synthesis of life". The objective of this project is the chemical realization of a set of equations whose solutions under certain conditions are known to describe the basic collective features of "simple" living systems. He and his group have created small-molecule systems which avoid biochemistry and boot-up from a homogeneous 1-pot chemical reactor to generate simple terran life mimics. To date, using small molecules these systems make their own self-assembled containers and their own parts, they handle information using the same chemistry, self-reproduce and display competition and a primitive form of selection.

Prior to joining Harvard University, he used the Renormalization Group to predict proton decay in Grand Unified Theories (GUTs) and described the fractal and hierarchical structure of the Universe at large scales. He has worked in Quantum Gravity, Superstrings and Wormholes and tested Einstein's General Relativity by detecting and measuring the Lense-Thirring effect (also known as the gravito-magnetic effect). His work on Supersymmetry and Supergravity in the 1980's provided constraints for extensions of the Standard Model in Particle Physics. He has also described the evolution of Quasi-species in RNA viruses. He has done pioneering work on pattern formation and collective behavior in noisy reaction-diffusion systems and co-authored new ideas and instrumentation for the detection of Signs of Life in arbitrary environments.

He has authored over 150 research papers published in top journals and five books, including a

best-selling popular science book in Spanish. He currently holds 9 patents: 2 in Biotechnology (2004 and 2012), 1 in microfluidics, another on noisy electrochemistry and 5 in Chemical Computing (2017- 2019). An Elected Member of the International Academy of Astronautics and of the European Academy of Sciences and Arts, he is the recipient of many honors and distinctions. Among these are one of the 1996 Gravity Research Foundation Prizes, the European Physical Society Lecturer for the 2005 Celebrations in Bern of Einstein's 1905 and the NASA Public Service Medal (NASA's highest honor to a non-NASA employee) in 2004 and in 2013, NASA's Group's Achievement Award for exceptional achievement on Curiosity's REMS. Since 2008, he has been an External Faculty at the Santa Fe Institute in New Mexico. There are several public schools and institutions in Spain that bear his name.