



James Lovelock, [CH](#), [CBE](#), [FRS](#) (born 26 July 1919) is an independent scientist, environmentalist and futurologist who lives in Devon, England. He is best known for proposing the [Gaia hypothesis](#), which postulates that the [biosphere](#) is a self-regulating entity with the capacity to keep our planet healthy by controlling the chemical and physical environment.

// **Biography**

James Ephraim Lovelock was born in Letchworth Garden City in Hertfordshire, England, but moved to London where he was, by his own account, an unhappy pupil at Strand School. ^[1] He studied chemistry at the University of Manchester, before taking up a Medical Research Council post at the Institute for Medical Research in London.

^[2]

His student status enabled temporary deferment of military service during the Second World War, but he registered as a conscientious objector.

^[3]

He later abandoned this position in the light of Nazi atrocities and tried to enlist for war service, but was told that his medical research was too valuable for this to be considered.

In 1948 Lovelock received a Ph.D. degree in medicine at the London School of Hygiene and Tropical Medicine. Within the United States he has conducted research at Yale, Baylor College of Medicine, and Harvard University. ^[2]

Career

A lifelong inventor, Lovelock has created and developed many scientific instruments, some of which were designed for NASA in its program of planetary exploration. It was while working as a consultant for NASA that Lovelock developed the Gaia Hypothesis, for which he is most widely known.



In early 1961, Lovelock was engaged by NASA to develop sensitive instruments for the analysis of extraterrestrial atmospheres and planetary surfaces. The Viking program, that visited Mars in the late 1970s, was motivated in part to determine whether Mars supported life, and many of the sensors and experiments that were ultimately deployed aimed to resolve this issue. During work on a precursor of this program, Lovelock became interested in the composition of the Martian atmosphere, reasoning that many life forms on Mars would be obliged to make use of it (and, thus, alter it). However, the atmosphere was found to be in a stable condition close to its chemical equilibrium, with very little oxygen, methane, or hydrogen, but with an overwhelming abundance of carbon dioxide. To Lovelock, the stark contrast between the Martian atmosphere and chemically dynamic mixture of that of our Earth's biosphere was strongly indicative of the absence of life on the planet. ^[4] However, when they were finally launched to Mars, the Viking probes still searched (unsuccessfully) for extant life there.

Lovelock invented the electron capture detector, which ultimately assisted in discoveries about the persistence of CFCs and their role in stratospheric ozone depletion.^{[5][6][7]} After studying the operation of the Earth's sulfur cycle,

[8]

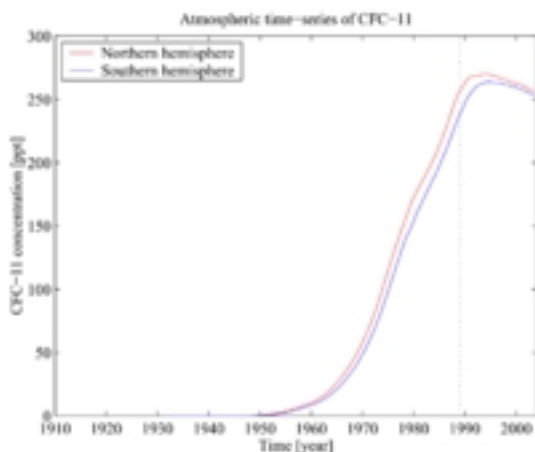
Lovelock and his colleagues developed the CLAW hypothesis as a possible example of biological control of the Earth's climate.

[9]

Lovelock was elected a Fellow of the Royal Society in 1974. He served as the president of the Marine Biological Association (MBA) from 1986 to 1990, and has been a Honorary Visiting Fellow of Green Templeton College, Oxford (formerly Green College, Oxford) since 1994. He has been awarded a number of prestigious prizes including the Tswett Medal (1975), an ACS chromatography award (1980), the WMO Norbert Gerbier Prize (1988), the Dr A.H. Heineken Prize for the Environment (1990) and the RGS Discovery Lifetime award (2001). In 2006 he received the Wollaston Medal, the Geological Society's highest Award, whose previous recipients include Charles Darwin [3]. He became a [CBE](#) in 1990, and a [Companion of Honour](#) in 2003.

An independent scientist, inventor, and author, Lovelock works out of a barn-turned-laboratory on the Devon/Cornwall border.

CFCs



Reconstructed time-series of atmospheric concentrations of CFC-11. [10] Main article: [Free radical halogenation](#)

After the development of his electron capture detector, in the late 1960s, Lovelock was the first to detect the widespread presence of CFCs in the atmosphere.^[5] He found a concentration of 60 parts per trillion of CFC-11 over Ireland and, in a partially self-funded research expedition in 1972, went on to measure the concentration of CFC-11 from the northern hemisphere to the Antarctic aboard the research vessel RRS *Shackleton*.

[6]

[11]

He found the gas in each of the 50 air samples that he collected but, not realising that the breakdown of CFCs in the stratosphere would release chlorine that posed a threat to the ozone layer, concluded that the level of CFCs constituted "no conceivable hazard".

[11]

He has since stated that he meant "no conceivable toxic hazard".

However, the experiment did provide the first useful data on the ubiquitous presence of CFCs in the atmosphere. The damage caused to the ozone layer by the photolysis of CFCs was later discovered by Sherwood Rowland and Mario Molina. After hearing a lecture on the subject of Lovelock's results,^[12] they embarked on research that resulted in the first published paper that suggested a link between stratospheric CFCs and ozone depletion in 1974, and later shared the 1995 Nobel Prize in Chemistry for their work. ^[13]

Gaia

First formulated by Lovelock during the 1960s as a result of work for NASA concerned with detecting life on Mars, ^[14] the Gaia hypothesis proposes that living and non-living parts of the earth form a [complex interacting system](#) that can be thought of as a single organism. ^{[15] [16]}

Named after the Greek goddess

[Gaia](#)

at the suggestion of novelist

[William Golding](#)

^[11]

the hypothesis postulates that the

[biosphere](#)

has a regulatory effect on the Earth's environment that acts to sustain life.

While the Gaia hypothesis was readily accepted by many in the [environmentalist](#) community, it has not been widely accepted within the scientific community. Among its more famous critics are the evolutionary biologists Richard Dawkins, Ford Doolittle, and Stephen Jay Gould — notable, given the diversity of this trio's views on other scientific matters. These (and other) critics have questioned how natural selection operating on individual organisms can lead to the evolution of planetary-scale

[homeostasis](#)

^[17]

Lovelock has responded to these criticisms with models such as Daisyworld, that illustrate how individual-level effects can translate to planetary homeostasis, under the right circumstances.

Nuclear power

Lovelock has become concerned about the threat of [global warming](#) from the [greenhouse effect](#). In 2004

he caused a media sensation when he broke with many fellow environmentalists by pronouncing that "only nuclear power can now halt global warming". In his view, nuclear energy is the only realistic alternative to fossil fuels that has the capacity to both fulfill the large scale energy needs of humankind while also reducing greenhouse emissions. He is an open member of Environmentalists for Nuclear Energy.

In 2005, against the backdrop of renewed UK government interest in nuclear power, Lovelock again publicly announced his support for nuclear energy, stating, "I am a Green, and I entreat my friends in the movement to drop their wrongheaded objection to nuclear energy". [\[18\]](#) Although these interventions in the public debate on nuclear power are recent, his views on it are longstanding. In his 1988 book *The Ages of Gaia* he states:

"I have never regarded nuclear radiation or nuclear power as anything other than a normal and inevitable part of the environment. Our prokaryotic forebears evolved on a planet-sized lump of fallout from a star-sized nuclear explosion, a supernova that synthesised the elements that go to make our planet and ourselves." [\[11\]](#)

In [The Revenge of Gaia](#) [\[19\]](#) (2006), where he puts forward the concept of [sustainable retreat](#) , Lovelock writes:

"A television interviewer once asked me, 'But what about nuclear waste? Will it not poison the whole biosphere and persist for millions of years?' I knew this to be a nightmare fantasy wholly without substance in the real world... One of the striking things about places heavily contaminated by radioactive nuclides is the richness of their wildlife. This is true of the land around Chernobyl, the bomb test sites of the Pacific, and areas near the United States' Savannah River nuclear weapons plant of the Second World War. Wild plants and animals do not perceive radiation as dangerous, and any slight reduction it may cause in their lifespans is far less a hazard than is the presence of people and their pets... I find it sad, but all too human, that there are vast bureaucracies concerned about nuclear waste, huge organisations devoted to decommissioning power stations, but nothing comparable to deal with that truly malign waste, carbon dioxide."

Climate and mass human mortality



Ocean Pipes proposal

In September 2007, Lovelock and Chris Rapley proposed the construction of ocean pumps comprising pipes "100 to 200 metres long, 10 metres in diameter and with a one-way flap valve at the lower end for pumping by wave movement" to pump water up from below the thermocline to "fertilize algae in the surface waters and encourage them to bloom". [24] The intention of this scheme is to accelerate the transfer of carbon dioxide from the atmosphere to the ocean by increasing primary production and enhancing the export of organic carbon (as marine snow) to the deep ocean. At the time the authors noted that the idea "may fail, perhaps on engineering or economic grounds", and that "the impact on ocean acidification will need to be taken into account". A scheme similar to that proposed by Lovelock and Rapley is already being independently developed by a commercial company.

[25]

The proposal attracted widespread media attention, [26] [27] [28] [29] although also criticism. [30] [31]

[32]

Commenting on the proposal, Corinne Le Quéré, a University of East Anglia researcher, said "It doesn't make sense. There is absolutely no evidence that geoengineering options work or even go in the right direction. I'm astonished that they published this. Before any geoengineering is put to work a massive amount of research is needed – research which will take 20 to 30 years".

[26]

Other researchers have claimed that "this scheme would bring water with high natural

p
CO

2
levels (associated with the nutrients) back to the surface, potentially causing exhalation of CO

2

"

[\[32\]](#)

Books

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Portraits of Lovelock

The [National Portrait Gallery](#) collection has two photographic portraits of James Lovelock by [Nick Sinclair](#) (1993) and [Paul Tozer](#) (1994).

[\[33\]](#)

The archive of the Royal Society of Arts has a 2009 image taken by [Anne-Katrin Purkiss](#)

[\[34\]](#)

Lovelock agreed to sit for sculptor

[Jon Edgar](#)

in Devon during 2007, as part of The Environment Triptych (2008)

[\[35\]](#)

along with heads of

[Mary Midgley](#)

and

[Richard Mabey](#)

. A bronze head

[\[36\]](#)

is in the collection of the sitter and the terracotta is in the archive of the artist.

See also

- Gaia Symphony

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External links

- [James Lovelock's personal website](#)
- [James Lovelock index page by Environmentalists For Nuclear Energy](#)
- ["Why Gaia is wreaking revenge on our abuse of the environment": Article about Lovelock published in the 'Independent'](#)
- ["Nuclear power is the only green solution": Lovelock article published in the 'Independent'](#)
- [Friends of James Lovelock](#)
- [Biography of James Lovelock](#)
- [BBC Radio interview transcript from Belief series in 2003](#)

- [Spin Profiles page examining Lovelock's history](#)
- [The Political Economy of Very Large Space Projects](#)

Interviews

- [Lovelock: 'We can't save the planet'](#) BBC Sci Tech News, 30 March 2010
- [\[4\]](#) BBC Hardtalk - Stephen Sackur asks him if humanity is likely to heed his final warning on the fate of the planet. 18 August 2009
- [Dr. Lovelock Lectures on The Vanishing Face of Gaia](#) Presented by Corporate Knights Magazine, 26 May 2009
- [Audio: James Lovelock in conversation on the BBC World Service discussion show *The Forum*](#)
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- [RSA Vision webcast - James Lovelock in conversation with Tim Radford *the Vanishing Face of Gaia*](#),
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- [One last chance to save mankind](#) *New Scientist*, 23 January 2009.
- [Enjoy life while you can](#) , Decca Aitkenhead, *The Guardian*, 1 March 2008.
- Audio interview from *Ideas:How to think about science*, Canadian Broadcasting Corporation, 2 January 2008.
- *Portraits Parlés* by Ariane Laroux : Interview and portrait of Jim Lovelock, éditions of L'Age d'homme (2008)
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Book reviews

- [Goodbye to All That](#) , Tim Flannery reviews *The Vanishing Face of Gaia* in *The Monthly*, June 2009.