

J. Marvin Herndon Curriculum Vitae

J. Marvin Herndon (b. 1944) is an American interdisciplinary scientist, who earned his BA degree in physics in 1970 from the University of California, San Diego and his Ph.D. degree in nuclear chemistry in 1974 from Texas A&M University. J. Marvin Herndon was a post-doctoral apprentice to Hans E. Suess and Harold C. Urey in geochemistry and cosmochemistry at the University of California, San Diego. He is the President and CEO of Transdyne Corporation in San Diego, California.

Profiled in 2003 in [Current Biography](#), along with Chief Justice of the U. S. Supreme Court, William H. Rehnquist, White House chief of staff, Andrew H. Card, Jr., film director and screenwriter, Sofia Coppola and thirteen others, dubbed a “maverick geophysicist” by *The Washington Post* [*The Washington Post*, March 24, 2003, Page A06], and armed with a unique knowledge of the nature of science and the ways to make important discoveries, passed down through generations of master scientists, J. Marvin Herndon’s professional life, as a technologist and as a scientist, has been a step-by-step logical progression of understanding and discovery, uncovering and posing corrections to deep-rooted mistakes in geophysics, in astrophysics, and in science management. His website is [NuclearPlanet.com](#). Some of his more important publications are described below.

Geoengineering Publications

Aluminum poisoning of humanity and Earth’s biota by clandestine geoengineering activity: implications for India: J. Marvin Herndon describes evidence of clandestine geoengineering activity that has occurred for at least 15 years, and which has escalated sharply in the last two years. The geoengineering activity via tanker-jet aircraft emplaces a non-natural, toxic substance into the Earth’s atmosphere which with rainwater liberates highly mobile aluminum. He further presents evidence that the toxic substance is coal combustion fly ash. Clandestine dispersal of coal fly ash and the resulting liberation of highly mobile aluminum, Herndon posits, is an underlying cause of the widespread and pronounced increase in neurological diseases and as well as the currently widespread and increasing debilitation of Earth’s biota. [J. M. Herndon (2016) Aluminum poisoning of humanity and Earth’s biota by clandestine geoengineering activity: implications for India. *Current Science*, 108(13), 2173-2177.] ([pdf](#))

Obtaining evidence of coal fly ash content in weather modification (geoengineering) through analyses of post-aerosol-spraying rainwater and solid substances: Using forensic chemical methodologies, J. Marvin Herndon discovered and published evidence that the main aerosolized component is coal combustion fly ash, a toxic nightmare. One of the methodologies used involves comparison of elements dissolved in rainwater, presumably leached from the aerosol particulates, with laboratory data on the water-leachate of European coal fly ash samples. He describes that methodology so that others can utilize and extend it. Another of the methodologies involves direct comparison of elements analyzed in solid substances with corresponding elements analyzed in coal fly ash samples. He also describe that methodology, indicates some potential materials of interest, and points out possible limitations. [Herndon, J. M. (2016) Obtaining evidence of coal fly ash content in weather modification (geoengineering) through analyses of post-aerosol-spraying rainwater and solid substances. *Indian Journal of Scientific Research and Technology*, 4(1), 30-36.] ([pdf](#))

Adverse agricultural consequences of weather modification: J. Marvin Herndon discloses the methodology for inhibiting rainfall, the evidence of coal combustion fly ash utilization, the adverse consequences on agriculture, and the adverse health implications on biota, including humans. The harm to agriculture comes primarily from aluminum addition to soil, changing soil pH and changing historic weather patterns. Aluminum in a chemically mobile form, not only harms plants, but is toxic to most biota, including humans. The micron and submicron particulates are used for weather modification contain heavy metals and radioactive elements which pose potentially grave human health threats including, but not limited to, cardiovascular disease, diabetes, respiratory diseases and reduced male fertility. Understanding that methodology and its adverse consequences by the agricultural community is crucial to identify and

stop covert operations aimed at damaging the agricultural economy of a sovereign nation. [Herndon, J. M. (2016) Adverse agricultural consequences of weather modification. *AGRIVITA Journal of Agricultural Science*, 28(3), 213-221. ([doi](#))

Human and environmental dangers posed by ongoing global tropospheric aerosolized particulates for weather modification: J. Marvin Herndon presents three independent lines of evidence that toxic coal fly ash is the main substance used for tropospheric geoengineering. The ability of coal fly ash to release aluminum in a chemically mobile form upon exposure to water or body moisture has potentially grave human and environmental consequences over a broad spectrum, including implications for neurological diseases and biota debilitation. The ability of coal fly ash to release heavy metals and radioactive elements upon exposure to body moisture has potentially grave human health implications including cancer, cardiovascular disease, diabetes, respiratory diseases, reduced male fertility, and stroke. The fibrous mesh data admit the possibility of environmentally disastrous formation of methylmercury and ozone-depleting chlorinated-fluorinated hydrocarbons in jet exhaust. Geophysical implications include atmospheric warming and rainfall retardation. [Herndon, J. M. (2016) Human and environmental dangers posed by ongoing global tropospheric aerosolized particulates for weather modification. *Frontiers in Public Health* ([pdf](#)) Unwarranted retraction caused by disinformation agents; currently in dispute; see ongoing [correspondence](#).]

An indication of intentional efforts to cause global warming and glacier melting: On or about February 14, 2016, an oily-ashy substance was accidentally released by an aircraft and fell on seven residences and vehicles in Harrison Township, Michigan (USA). J. Marvin Herndon analyzed the “air-drop material” and showed that it resembles natural cryoconite – windblown dust made up of soot, rock particles and microbes found on glaciers – that absorb sunlight and melt themselves into glaciers. That similarity and the similarity of the air-drop distribution patterns with the patterns of cryoconite holes on glaciers led Herndon to posit that the air-drop material is synthetic cryoconite, or proto-cryoconite, whose purpose is to melt glacial ice. That explanation is consistent with the now near-daily, near-global spraying of a particulate substance, evidenced as coal fly ash, into the troposphere which has the effect of causing global warming. [J. Marvin Herndon (2017) An indication of intentional efforts to cause global warming and glacier melting, *Journal of Geography, Environment and Earth Science International*, 9(1), 1-11; *Article no.JGEESI.30834*.] ([pdf](#))

Further evidence of coal fly ash utilization in tropospheric geoengineering: Implications on human and environmental health: We disclose a fourth independent line of evidence, based on the co-precipitation technique, pointing to coal fly ash as the material utilized in tropospheric geoengineering, and described some of the adverse environmental and public health risks associated with its persistent application. During a snow storm, the fluffy snow traps geoengineering-aerosol-particulates and brings them down with the snow. The results of the ICP-MS analytical measurements of the snow-melt particulates we tested are consistent with three independent lines of evidence that coal fly ash is the main aerosolized particulate used for tropospheric geoengineering. Coal fly ash tropospheric geoengineering inhibits rainfall to change weather/climate which disrupts habitats, including arable habitats. Long periods of artificially induced drought can wreak economic disaster on farmers, and shift the delicate balance in nature, weakening natural defenses and giving a boost to aggressive pathogens. Coal fly ash when exposed to water or body fluids can release a host of toxic chemicals including neuro-toxic aluminum in a chemically mobile form and carcinogens such as arsenic, hexavalent chromium, and the radioactive elements, uranium, thorium and their daughter products. The only safe geoengineering is no geoengineering at all. [J. Marvin Herndon and Mark Whiteside, MD. (2017) Further evidence of coal fly ash utilization in tropospheric geoengineering: Implications on human and environmental health. *Journal of Geography, Environment and Earth Science International*, 9(1), 1-8; *Article no.JGEESI.31417*] ([pdf](#))

Evidence of variable Earth-heat production, global non-anthropogenic climate change, and geoengineered global warming and polar melting: Climate models evaluated by the IPCC are based on the assumptions that: (1) Heat derived from the Sun is constant; (2) Heat derived from within the Earth is constant; and, (3) Anthropogenic contributions to atmospheric warming stem mainly from heat retention by CO₂ and other greenhouse gases. Geophysical evidence of variable earthquake activity and geological evidence of variable submarine volcanism presented here indicate that heat added to the oceans is variable. The increasing occurrences of earthquakes of magnitudes ≥ 6 and ≥ 7 during 1973-2015 indicate volcanic activity is increasing and therefore Earth-heat, as well as volcanic CO₂ additions, is increasing. Moreover, increased heat additions to the ocean act to decrease seawater solubility of CO₂, ultimately releasing additional CO₂ to the atmosphere. Furthermore, increasing submarine volcanic activity implies increasing ocean acidification, but data are insufficient to make quantitative estimates. The validity of IPCC evaluations and assessments depends critically upon due consideration being given to all processes that potentially affect Earth's heat balance. In addition to the geological and geophysical processes discussed, the scientific community, including IPCC scientists, has turned a blind eye to ongoing tropospheric geoengineering that in recent years has been occurring on a near-daily, near-global basis. Tropospheric aerosolized particulates, evidenced as coal fly ash, inhibit rainfall, heat the atmosphere, and cause global warming. Evidence obtained from an accidental air-drop release indicates efforts to melt glacial ice and enhance global warming. By ignoring ongoing tropospheric geoengineering, IPCC assessments are compromised, as is the moral authority of the United Nations. [J. Marvin Herndon, (2017) Evidence of variable Earth-heat production, global non-anthropogenic climate change, and

geoengineered global warming and polar melting. *Journal of Geography, Environment and Earth Science International*, 10(1), 1-16; *Article no.JGEESI.32220*] ([pdf](#)).

Earth Science Publications

Composition of Earth's inner core: On the basis of data discovered in the 1960's, J. Marvin Herndon deduced the composition of the inner core as being fully-crystallized nickel silicide, not partially-crystallized nickel-iron metal as proposed by Francis Birch in 1940. [Herndon, J. M. (1979) The nickel silicide inner core of the Earth. *Proceedings of the Royal Society of London*, **A368**, 495-500].

Enstatite chondritic composition of Earth's lower mantle and core: By fundamental ratios of mass, J. Marvin Herndon showed that the core and lower mantle of the Earth are chemically analogous to the two main components of the Abee enstatite chondrite. This provides evidence that the deep interior of the Earth is indeed like an enstatite chondrite meteorite and it means that one can estimate the abundances of the elements in the Earth's core and lower mantle from measured abundances in corresponding parts of the Abee meteorite [Herndon, J. M. (1980) The chemical composition of the interior shells of the Earth. *Proceedings of the Royal Society of London*, **A372**, 149-154]; Herndon, J. M. (2005) Scientific basis of knowledge on Earth's composition. *Current Science*, **88**, 1034-1037; Herndon, J. M. (2011) Geodynamic basis of heat transport in the Earth. *Current Science*, **101**, 1440-1450.

Terracentric nuclear fission georeactor: background, basis, feasibility, structure, evidence and geophysical implications: Review of eight conditions met solely by Herndon's georeactor, geomagnetic field generation within the georeactor and evidence from helium and antineutrino measurements. Geophysical implications include georeactor origin of the geomagnetic field, geomagnetic reversals from intense solar outbursts and severe Earth trauma, as well as georeactor heat contributions to global dynamics. [Herndon, J. M. (2014) Terracentric nuclear fission georeactor: background, basis, feasibility, structure, evidence and geophysical implications. *Current Science*, **106**(4), 528-541.

Feasibility of a geocentric nuclear fission georeactor: With an understanding that the Earth's core contains uranium, J. Marvin Herndon applied Fermi's nuclear reactor theory to demonstrate the feasibility of a natural nuclear fission reactor at the center of the Earth, called the georeactor. Unlike other major, natural, Earth energy sources, which might change only gradually, the georeactor is capable of variable energy output including stopping (because of fission product accumulation) and re-starting again (as the light fission products migrate radially outward and uranium settles downward). Variable deep-Earth energy production may have important, not yet appreciated, implications on geomagnetic field variability and on planetary change [Herndon, J. M. (1993) Feasibility of a nuclear fission reactor at the center of the Earth as the energy source for the geomagnetic field. *Journal of Geomagnetism and Geoelectricity*, **45**, 423-437; Herndon, J. M. (1994) Planetary and protostellar nuclear fission: Implications for planetary change, stellar ignition and dark matter. *Proceedings of the Royal Society of London*, **A455**, 453-461].

Georeactor as the source of deep-Earth helium observed in oceanic basalt: Daniel F. Hollenbach and J. Marvin Herndon demonstrated, from numerical simulations made at Oak Ridge National Laboratory, that a deep-Earth nuclear fission reactor will produce both light-helium, ^3He , and heavy-helium, ^4He , precisely within the range of values observed from deep-source lavas. The helium found in oceanic lavas, first observed over three decades ago, is evidence that a planetary-scale, natural nuclear fission reactor operates at the center of the Earth [Hollenbach, D. F. and Herndon, J. M. (2001) Deep-earth reactor: nuclear fission, helium, and the geomagnetic field. *Proceedings of the National Academy of Sciences USA*, **98**, 11085-11090; Herndon, J. M. (2003) Nuclear georeactor origin of oceanic basalt $^3\text{He}/^4\text{He}$, evidence, and implications. *Proceedings of the National Academy of Sciences USA*, **100**, 3047-3050].

Helium evidence of eventual georeactor demise: J. Marvin Herndon demonstrated, from numerical simulations made at Oak Ridge National Laboratory, that a deep-Earth nuclear fission reactor, the georeactor, will produce sufficient helium with precisely the range of ratios as observed from deep-source oceanic basalt lavas. Moreover, the ratio of

$^3\text{He}/^4\text{He}$ increases over the lifetime of the georeactor. The high ratios observed in Icelandic and Hawaiian basalts suggest that the end of the georeactor lifetime is approaching, perhaps within the next billion years, perhaps much sooner; the time-frame is not yet known. Presumably, soon thereafter the geomagnetic field will begin its final collapse [Herndon, J. M. (2003) Nuclear georeactor origin of oceanic basalt $^3\text{He}/^4\text{He}$, evidence, and implications. *Proceedings of the National Academy of Sciences USA*, **100**, 3047-3050].

Origin of the geomagnetic field: J. Marvin Herndon set forth a fundamentally new concept related to the generation of Earth's geomagnetic field. Previously, he had considered the nuclear reactor at the center of the Earth, the georeactor, only as the energy source for the dynamo mechanism which generates the geomagnetic field that is thought to arise from convective motions of an electrically conducting fluid in a rotating body. Since 1939, the operant fluid has been thought to be the Earth's fluid iron-alloy core. He suggested instead that the operant fluid may be contained within the georeactor as the fluid fission product and radioactive decay product sub-shell surrounding the actinide sub-core. He thus extended the georeactor concept by suggesting that the georeactor is both the energy source and the dynamo mechanism for generating the geomagnetic field. He pointed out the reasons why long-term, sustained convection appears more feasible within the georeactor sub-shell than within the Earth's fluid core [Herndon, J. M. (2007) Nuclear georeactor generation of the earth's geomagnetic field. *Current Science*, **93**, 1485-1457].

Physical impossibility of Earth-core convection: Since 1939 convection has been assumed to occur in the Earth's fluid core. J. Marvin Herndon realized that, because of compression, the matter at the base of the fluid core is too dense to float to the top as a result of thermal expansion. Moreover, heat loss from the top of the core is inhibited as the core is wrapped in a thermally insulating blanket, the mantle. Thermal convection under those circumstances is physically impossible. Herndon also discovered that the Rayleigh Number, often used to justify convection, is inappropriate for both the core and the mantle, as the Rayleigh Number was derived for an incompressible fluid, a fluid of constant density except as modified by thermal expansion at the bottom. [Herndon, J. M. (2009) Uniqueness of Herndon's georeactor: Energy source and production mechanism for Earth's magnetic field. [arXiv:0903.4622](https://arxiv.org/abs/0903.4622); Herndon, J. M. (2011) Geodynamic basis of heat transport in the Earth. *Current Science*, **101**, 1440-1450].

Earth formation by condensation and in-falling from within a giant gaseous protoplanet: From observations of matter, J. Marvin Herndon deduced the basis and reasons for understanding planetary formation in the Solar System mainly as the consequence of "raining out" from within giant gaseous protoplanets, leading to initial Earth formation as a gas giant Jupiter-like planet, a concept consistent with observations of close-to-star gas giant exoplanets in other planetary systems [Herndon, J. M. (2006) Solar System processes underlying planetary formation, geodynamics, and the georeactor. *Earth, Moon and Planets*, **99**, 53-99].

New indivisible geoscience paradigm: From our planet's early formation as a Jupiter-like gas giant, J. Marvin Herndon has deduced: (1) Earth's internal composition and highly-reduced oxidation state; (2) Powerful new internal energy sources, protoplanetary energy of compression and georeactor nuclear fission energy; (3) Georeactor geomagnetic field generation; (4) Decompression-driven geodynamics that accounts for the myriad observations attributed to plate tectonics without requiring mantle convection, and; (5) Fold-mountain formation that does not necessarily involve plate collisions. [J. M. Herndon (2011) New Indivisible Geoscience Paradigm. [arXiv:1107.2149](https://arxiv.org/abs/1107.2149); Herndon, J. M. (2011) Geodynamic basis of heat transport in the Earth. *Current Science*, **101**, 1440-1450].

Whole-Earth Decompression Dynamics: J. Marvin Herndon set forth the principles of Whole-Earth Decompression Dynamics which unifies elements of plate tectonics theory and Earth expansion theory into a uniquely new self-consistent vision of global geodynamics, obviating the assumption of mantle convection [Herndon, J. M. (2005) Whole-Earth decompression dynamics. *Current Science*, **89**, 1937-1941; Herndon described, as one of the consequences of Whole-Earth Decompression Dynamics, an unrecognized, different energy source for driving geodynamics, the stored energy of protoplanetary compression augmented by georeactor nuclear fission energy, and proposed a new

mechanism for transporting heat within the Earth, called Mantle Decompression Thermal-Tsunami, which emplaces heat and pressure at the base of the crust, producing volcanoes and causing earthquakes [Herndon, J. M. (2006) Energy for geodynamics: Mantle decompression thermal-tsunami. *Current Science*, **90**, 1605-1606].

Origin of mountains and primary Initiation of submarine canyons: From our planet's early formation as a Jupiter-like gas giant and resulting changes in surface curvature, J. Marvin Herndon has deduced a new concept for the formation of mountains characterized by folding that does not necessarily require continent collisions. [J. M. Herndon (2012) Origin of mountains and primary initiation of submarine canyons: the consequences of Earth's early formation as a Jupiter-like gas giant. *Current Science*, **102**, 1370-1372].

Origin of fjords: Fjords occur in different parts of the world suggesting a common origin. Although being the subject of debate for more than a century, a common origin has not yet been disclosed. J. Marvin Herndon proposes that the primary origin of fjords, like submarine canyons, occur as a consequence of decompression-driven Earth surface curvature changes, and suggests that glaciation, rather than being the primary agent of fjord formation, as widely assumed, instead is the principal agent of fjord preservation. J. Marvin Herndon (2016) New concept for the origin of fjords and submarine canyons: Consequence of Whole-Earth Decompression Dynamics, *Journal of Geography, Environment and Earth Science International*, **7**(4), 1-10.

Fictitious supercontinent cycles: Descriptions of phenomena, events, or processes made on the basis of problematic paradigms can be unreasonably complex (e.g. epicycles) or simply wrong (e.g. ultraviolet catastrophe). Supercontinent cycles, also called Wilson cycles, are, as J. Marvin Herndon asserts, artificial constructs, like epicycles. Herndon provides the basis for that assertion and describes published considerations from a fundamentally different, new, indivisible geoscience paradigm which obviate the necessity for assuming supercontinent cycles. [J. Marvin Herndon (2012) Fictitious Supercontinent Cycles, *Journal of Geography, Environment and Earth Science International*, **7**(1), 1-7.

Earth core precipitates at core-mantle-boundary: J. Marvin Herndon predicted low-density, high-temperature Earth core precipitates [CaS and MgS] floating atop the fluid core at the core-mantle boundary. These are an expected consequence of the enstatite-chondrite-alloy-like core, originally containing some calcium and some magnesium dissolved in the iron alloy and are responsible for the seismic "roughness" observed there [Herndon, J. M. (1993) Feasibility of a nuclear fission reactor at the center of the Earth as the energy source for the geomagnetic field. *Journal of Geomagnetism and Geoelectricity*, **45**, 423-437; Herndon, J. M. (1996) Sub-structure of the inner core of the earth. *Proceedings of the National Academy of Sciences USA*, **93**, 646-648; Herndon, J. M. (2005) Scientific basis of knowledge on Earth's composition. *Current Science*, **88**, 1034-1037; Herndon, J. M. (2011) Geodynamic basis of heat transport in the Earth. *Current Science*, **101**, 1440-1450].

Physical impossibility of Earth-mantle convection: Since the 1931 convection has been assumed to occur in the Earth's mantle. J. Marvin Herndon has discovered that, because of compression, the matter the base of the mantle is too dense to float to the top as a result of thermal expansion. The mantle is not devoid of viscous losses, as evidenced by earthquakes to depths of 660 km. Convection is physically impossible under those circumstances. Herndon also discovered that the Rayleigh Number, often used to justify convection, is inappropriate for the mantle, as the Rayleigh Number was derived for an incompressible fluid, a fluid of constant density. [Herndon, J. M. (2009) Uniqueness of Herndon's georeactor: Energy source and production mechanism for Earth's magnetic field. [arXiv:0903.4622](https://arxiv.org/abs/0903.4622); Herndon, J. M. (2011) Geodynamic basis of heat transport in the Earth. *Current Science*, **101**, 1440-1450].

Enhanced prognosis for abiotic natural gas and petroleum: J. Marvin Herndon pointed out that the prognosis for vast natural resources from abiotic natural gas and petroleum resources, which depends critically on the nature and circumstances of Earth formation, has for decades been considered solely within the framework of the now-discredited,

'standard model of solar system formation'. Within the context of recent advances related to the formation of Earth, initially as a Jupiter-like gas giant, that prognosis is greatly enhanced for several reasons [Herndon, J. M. (2006) Enhanced prognosis for abiotic natural gas and petroleum resources. *Current Science*, **91**, 596-598].

Geological basis for petroleum and natural gas deposits: The geology of planet Earth according to Herndon's Whole-Earth Decompression Dynamics (WEDD) is primarily the consequence of two processes: **(1)** The progressive formation of surface cracks to increase surface area in response to decompression-increased planetary volume, and; **(2)** The progressive adjustment of surface curvature in response to decompression-increased planetary volume. Crustal fragmentation, called rifting, provides all of the crucial components for petroleum-deposit formation: basin, reservoir, source, and seal. Rifting causes the formation of deep basins, as presently occurring in the Afar triangle of Northeastern Africa. Augmented by georeactor heat channeled upwards from deep within the Earth, uplift from sub-surface swelling can sequester sea-flooded lands to form halite evaporite deposits, can lead to dome formation, and can make elevated land susceptible to erosion processes, thus providing sedimentary material for reservoir rock in-filling of basins. Moreover, crustal fragmentation potentially exposes deep basins to sources of abiotic mantle methane and, although still controversial, methane-derived hydrocarbons..[Herndon, J. M. (2010) Impact of recent discoveries on petroleum and natural gas exploration: emphasis on India. *Current Science*, **98**, 772-779; Herndon, J. M. (2016) New concept on the origin of petroleum and natural gas deposits. *Journal of Petroleum Exploration and Production Technology*, DOI 10.1007/s13202-016-0271-5].

Potentially Significant Source of Error in Magnetic Paleolatitude Determinations: Magnetic paleolatitude measurements, as J. Marvin Herndon has shown, may be subject significant errors if the magnetization was emplaced when the Earth's radius was smaller than at present. Moreover, paleo-pole calculations are meaningless for such a circumstance [J. M. Herndon (2011) Potentially significant source of error in magnetic paleolatitude determinations. *Current Science*, **101**, 277-278].

Planetary Science Publications

New, indivisible planetary science paradigm: J. Marvin Herndon presents a new, indivisible planetary science paradigm, a wholly self-consistent vision of the nature of matter in the Solar System, and dynamics and energy sources of planets which differs profoundly from the half-century old, popular, but problematic paradigm. This is a new foundation from which much development is possible. The differences between the inner planets are primarily the consequence of different degrees of protoplanetary compression. The internal composition of Mercury is calculated by analogy with Earth. The rationale is provided for Mars potentially having a greater subsurface water reservoir capacity than before realized. [Herndon, J. M. (2013) New indivisible planetary science paradigm. *Current Science*, 2013, 105(4), 450-460.

Origin of planetary magnetic fields: Currently active internally generated magnetic fields have been detected in six planets (Mercury, Earth, Jupiter, Saturn, Uranus, and Neptune) and in one satellite, Jupiter's moon Ganymede. Magnetized surface areas of Mars and the Moon indicate the former existence of internally generated magnetic fields in those bodies. Based upon the commonality of matter in the Solar System and common operating environments, J. Marvin Herndon suggested that planetary and satellite magnetic fields arise from the same georeactor-type assemblage which he suggested powers and provides the operant fluid for generating by dynamo action the Earth's magnetic field [Herndon, J. M. (2009) Nature of Planetary Matter and Magnetic Field Generation in the Solar System. *Current Science*, **96**, 1033-1039].

Elucidation of planetary formation processes: J. Marvin Herndon showed that only three processes, operant during the formation of the Solar System, are responsible for the diversity of matter in the Solar System and are directly responsible for planetary internal-structures, including planetocentric nuclear fission reactors, and for dynamical

processes, including and especially, geodynamics [Herndon, J. M. (2006) Solar System processes underlying planetary formation, geodynamics, and the georeactor. *Earth, Moon and Planets*, **99**, 53-99].

Nuclear fission reactors as energy sources for gas giant planets: With knowledge of the ancient remains of the natural nuclear reactors discovered at Oklo in the Republic of Gabon in Africa in 1972, J. Marvin Herndon demonstrated the feasibility of planetocentric nuclear fission reactors as energy sources for the gas giant outer planets [Herndon, J. M. (1992) Nuclear fission reactors as energy sources for the giant outer planets. *Naturwissenschaften* **79**, 7-14].

Origin of ordinary chondrite meteorites: J. Marvin Herndon discovered a fundamental relationship using published whole-rock chondrite molar Mg/Fe and Si/Fe ratios. This relationship admits the possibility that ordinary chondrite meteorites are derived from two components: one is a relatively undifferentiated, primitive component, oxidized like the C1 or C1 carbonaceous chondrites; the other is a somewhat differentiated, planetary component, with oxidation state like the highly reduced enstatite chondrites. Such a picture would seem to explain for the ordinary chondrites, their major element compositions, their intermediate states of oxidation, and their ubiquitous deficiencies of refractory siderophile elements. Herndon suggested that the planetary component of ordinary chondrite formation consists of planet Mercury's missing complement of elements [Herndon, J. M. (2004) Ordinary chondrite formation from two components: Implied connection to planet Mercury. [arXiv:astro-ph/0405298](https://arxiv.org/abs/astro-ph/0405298); Herndon, J. M. (2004) Mercury's protoplanetary mass. [arXiv:astro-ph/0410009](https://arxiv.org/abs/astro-ph/0410009); Herndon, J. M. (2004) Total mass of ordinary chondrite material originally present in the Solar System. [arXiv:astro-ph/0410242](https://arxiv.org/abs/astro-ph/0410242); Herndon, J. M. (2007) Discovery of fundamental mass ratio relationships of whole-rock chondritic major elements: Implications on ordinary chondrite formation and on planet Mercury's composition. *Current Science*, **93**, 394-399].

Hydrogen Geysers Explanation for Recent Volatile Activity on Mercury: J. Marvin Herndon showed that Mercury's origin by condensing at high pressures and high temperatures would lead to incorporation of vast quantities of hydrogen in Mercury's core which would be released upon solidification producing the observed pits and reducing an iron compound to iron metal yielding the highly-reflective material observed. [J. M. Herndon (2012) Hydrogen Geysers: Explanation for observed evidence of geologically recent volatile-related activity on Mercury's surface. *Current Science*, **103**, 361-362].

Astrophysics Publications

Stellar ignition by nuclear fission: Thermonuclear fusion reactions, thought to power the Sun and other stars, require temperatures on the order of one million degrees Celsius for ignition. Since the mid-1930s the assumption has been that such temperatures were obtained during the in-fall of dust and gas during star formation, but there are problems. In 1994, J. Marvin Herndon suggested that stellar fusion reactions may, in fact, be ignited by a central nuclear fission reactor in the same manner that a fusion bomb is triggered by a fission bomb. Rather than stars automatically igniting during formation, non-ignition may occur in absence of actinide elements, leading to the possibility of dark stars, dark matter, particularly surrounding luminous galaxies [Herndon, J. M. (1994) Planetary and protostellar nuclear fission: Implications for planetary change, stellar ignition and dark matter. *Proceedings of the Royal Society of London*, **A455**, 453-461.

Origin of diverse luminous galaxy structures: J. Marvin Herndon has suggested that the diverse luminous galaxy structures can be understood in a logical and causally related manner if heavy element synthesis is related to galactic jets which jet heavy nuclear matter from the galactic core into the galaxy of dark stars where it seeds the dark stars it encounters with fissionable elements turning dark stars into luminous stars [Herndon, J. M. (2006) Thermonuclear ignition of dark galaxies. [arXiv:astro-ph/0604307](https://arxiv.org/abs/astro-ph/0604307); Herndon, J. M., (2009) New concept for internal heat production in hot Jupiter exo-planets, thermonuclear ignition of dark galaxies, and the basis for galactic luminous star distributions. *Current Science*, **96**, 1453-1456.

Planetary interfacial thermonuclear fusion: J. Marvin Herndon has suggested that hot Jupiter exoplanets, which have densities less than Jupiter, may derive much of their internal heat production from interfacial thermonuclear fusion ignited by nuclear fission [Herndon, J. M. (2006) New concept for internal heat production in hot Jupiter exoplanets. arXiv:astro-ph/0612603; New concept for internal heat production in hot Jupiter exo-planets, thermonuclear ignition of dark galaxies, and the basis for galactic luminous star distributions. Current Science, 96, 1453-1456.

Evidence against planetary migration: J. Marvin Herndon has presented evidence against the astrophysical concept of planetary migration based upon evidence that Earth was at one time a close-to-Sun gas giant similar to Jupiter in mass and composition [Herndon, J. M. (2006) Evidence contrary to the existing exoplanet migration concept. arXiv:astro-ph/0612726,