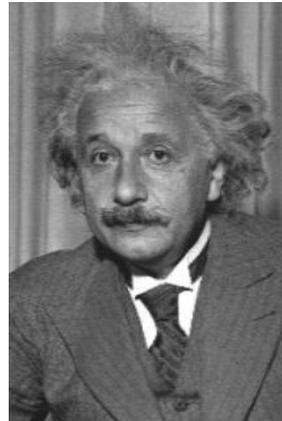


# The Einstein-Cartan- Evans Theory

History and Key Persons

# Outline

- Einstein



- Cartan



- Evans



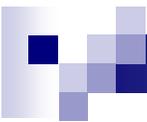
- Short History ECE-Theory

# Élie-Joseph Cartan



- ... was a French Mathematician (1869 - 1951)
- ... held posts at Montpellier, Lyon, and (1912–40) the Sorbonne,
- ... becoming one of the most original mathematicians of his time
- ... greatly developed the theory of Lie groups and contributed to the theory of subalgebras.
- ... founded the subject of analysis on differentiable manifolds, which is essential to modern fundamental physical theories.
- ... defined the connection and symmetric Riemann space
- ... Cartan was largely responsible for the modern abstract coordinate-free approach to geometry.
- ... although a profound theorist, Cartan was also able to explain difficult concepts to the ordinary student.

from <http://www.biography.com/search/article.do?id=9239799>



# Élie-Joseph Cartan

- born April 9, 1869, Dolomieu, France, died May 6, 1951, Paris
- in 1894 became a lecturer at the University of Montpellier, (→ studied structure of continuous groups introduced by Sophus Lie)
- examined theories of equivalence and their relation to the theory of integral invariants, mechanics, and the general theory of relativity.
- in 1896 at the University of Lyon: working on linear associative algebra, developing general theorems based on the work of Benjamin Pierce at Harvard, exhibiting a subalgebra of Ferdinand Georg Frobenius.
- in 1912: professor at the Sorbonne,
- in 1913 discovering the spinors, complex vectors that are used to transform three-dimensional rotations into two-dim. representations.
- in 1931 member of the Academy of Sciences in France
- in 1947 a Fellow of the Royal Society of London.
- His works include:
  - 1925: “The Geometry of Riemann Spaces”
  - 1935: “The Theory of Continuous Groups and Generalized Spaces”

# Myron Wyn Evans



- born in 1950 (a Welsh chemist), more than 700 publications
- earned a B.Sc. and a Ph.D. in Chemistry / Univ. of Wales Aberystwyth.
- 1978: awarded the Harrison Memorial Prize by The Royal Society of Chemistry
- 1979: awarded the Meldola Medal Prize by The Royal Society of Chemistry and a Junior Research Fellow at Wolfson College, Oxford, Fellow of the University of Wales,
- SERC Advanced Fellow at the University of Wales Aberystwyth,
- researcher at IBM Kingston, New York,
- visiting scientist at Cornell Theory Center.
- he served briefly on the faculty of the Department of Physics at the University of North Carolina at Charlotte but resigned.
- spring of 2003: Einstein Cartan Evans (ECE) field theory
- then over a hundred scientific papers collected into a multi - volume monograph: M. W. Evans, "Generally Covariant Unified Field Theory" (Abramis, 2005 onwards), three volumes published to date ([www.aias.us](http://www.aias.us) and [www.atomicprecision.com](http://www.atomicprecision.com)).
- 2005: Appointed by Queen Elizabeth II to the British Civil List (science)

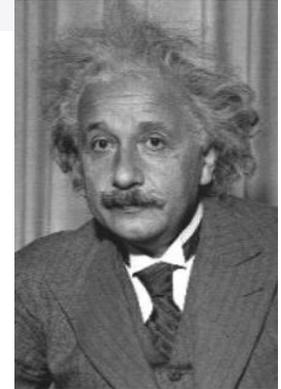
# Albert Einstein



- "Anyone who has never made a mistake has never tried anything new." - Albert Einstein
- Great spirits have always encountered violent opposition from mediocre minds.

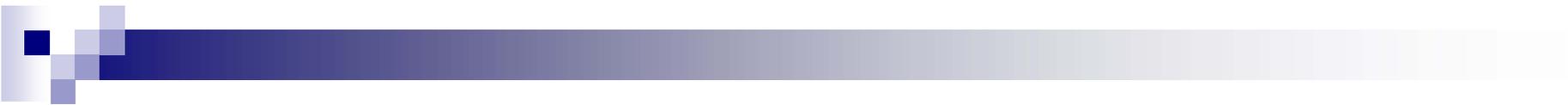
from <http://www-history.mcs.st-andrews.ac.uk/history/Quotations/Einstein.html>

# Albert Einstein (1)



- ... was a German--born theoretical physicist widely regarded as one of the greatest physicists of all time for his many contributions.
- ... he formulated the special and general theories of relativity.
- ... in addition, he made significant advancements to quantum theory and statistical mechanics.
- ... best known for the Theory of Relativity (and specifically mass-energy equivalence,  $E=mc^2$ ),
- ... he was awarded the 1921 Nobel Prize for Physics for his 1905 (his "wonderful year" or "miraculous year") explanation of the photoelectric effect and "for his services to Theoretical Physics".

from [http://en.wikipedia.org/wiki/Albert\\_Einstein](http://en.wikipedia.org/wiki/Albert_Einstein)



# Albert Einstein (2)

- born in Ulm on March 14, 1879
- as the first child of Hermann and Pauline Einstein,.
- in November 1881 Albert's sister Maria was born.
- in Munich: elementary school and Luitpold grammar school.
- left school aged fifteen without any degree and followed his family to Milan.
- 1895 to 1896: school in Aarau (Switzerland, A-levels)
- in July 1900 finished his studies in Zurich (diploma of a subject teacher for mathematics / physics)
- Bern: work at the Patent Office. In his leisure time he worked in the area of theoretical physics.
- in 1905: publication of several of his important scientific works.
  - dealing with the special theory of relativity
  - the most famous formula in the world " $E = m \cdot c^2$ ".



# Albert Einstein (3)

- in 1903 marriage with his college mate Mileva Maric.
  - in 1904 his first son, Hans Albert, was born
  - in 1910 his second son Eduard followed
  - in 1909 he became professor of theoretical physics at the University of Zurich, followed by a professorship in Prague and then again in Zurich
  - in 1914 Einstein was called to Berlin to work there scientifically.
  - in 1919 After separation from his wife Mileva he married his cousin Elsa Löwenthal.
  - from 1909 to 1916 Albert Einstein worked on a generalisation of the special theory of relativity, the general theory of relativity.
  - in 1919 this theory was proven right in an experiment (deflection of light by the sun's gravitational field)
- Einstein became famous over night.



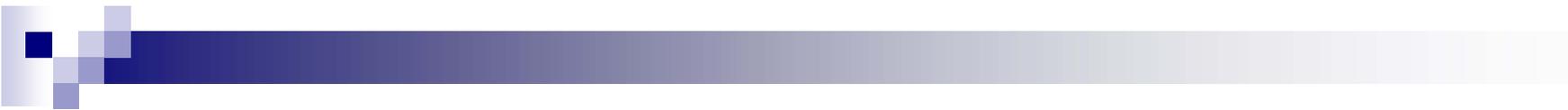
# Albert Einstein (4)

- in December 1932 he left Germany and never again entered German ground (→ political situation in Nazi Germany)
- from 1933 Einstein and his family lived in Princeton, USA.
- working at the "Institute for Advanced Study"
- in December 1936 Einstein's wife Elsa died.
- in 1939 World War II broke out.
  - → fear that Germany was working on atomic bombs
  - → letter to Franklin D. Roosevelt, the president of the United States of America, to tell him about the possibility of atomic weapons.
- in 1946 he proposed a world government in which he saw the only way to achieve continuous peace.
- the last years of his life in Princeton: working on a new theory, the unified field theory, which however was not successful.
- Albert Einstein died on April 18, 1955.



# A Short History of ECE-Theory (1)

- ECE – Einstein – Cartan – Evans
- based on the theory of relativity
  - suggestion of G. F. Fitzgerald of Trinity College Dublin followed by the mathematical development of H. A. Lorentz of Leiden
  - theory and the vector electrodynamical equations of Oliver Heaviside
  - In 1905: A. Einstein postulated the principles of special relativity
  - 1906 to 1915: Einstein and Hilbert extended the theory of special relativity to the theory of general relativity for gravitation.
  - In 1916 published: Einstein Hilbert field equation, (restricted to gravitational theory)
- in the early twenties, Cartan suggested to Einstein that the electromagnetic field be his torsion form within a scalar proportionality factor  
→ but not brought to a final result



# A Short History of ECE-Theory (2)

- in 1992 M. W. Evans inferred the spin field of electromagnetism from the inverse Faraday effect by a circularly polarized electromagnetic field ("O(3) electrodynamics").
- spring of 2003, Einstein Cartan Evans (ECE) field theory, which is based directly on Cartan (or differential) geometry.
- 2003: The equations of quantum mechanics and general relativity were unified
  - the equations of the weak and strong fields were also unified with those of gravitation and electromagnetism,
  - the Dirac equation derived from the ECE wave equation.
  - through the use of the tetrad postulate of Cartan geometry, →leading to the ECE Lemma and wave equation.
- thereafter: over a hundred scientific papers collected into a multi - volume monograph: M. W. Evans, "Generally Covariant Unified Field Theory" (Abramis, 2005 onwards), three volumes published to date ([www.aias.us](http://www.aias.us)).