DOCTORAT *HONORIS CAUSA*

Acord núm. 204/2007 del Consell de Govern, pel qual s'aprova la concessió del doctorat *Honoris Causa* al Professor Sir Michael Atiyah.

- Document aprovat per la Comissió Permanent del dia 3/12/2007.
- Document aprovat pel Consell de Govern del dia 17/12/2007.

DOCUMENT CG 14/12 2007

PROPOSTA D'ACORD DEL CONSELL DE GOVERN PER A CONCEDIR EL DOCTORAT *HONORIS CAUSA* PER LA UNIVERSITAT POLITÈCNICA DE CATALUNYA, AL PROFESSOR SIR MICHAEL ATIYAH

ANTECEDENTS:

1. El professor Sir Michael Atiyah ha estat guardonat, entre d'altres distincions, amb la Medalla Fields (1966), atorgada per la Unió Matemàtica Internacional, i el Premi Abel (2004), atorgat per l'Acadèmia de Ciències de Noruega, ambdues reconegudes com un Premi Nobel de les Matemàtiques. També ha estat un dels impulsors més decisius de la Societat Matemàtica Europea.

2. En relació amb Catalunya i Barcelona, i més concretament, amb la UPC, el professor Sir Michael Atiyah ha estat president del Comitè Científic del 3r Congrés Europeu de Matemàtiques celebrat a Barcelona l'any 2000.

3. El prestigi internacional del professor Sir Michael Atiyah el fa un candidat idoni com a primer doctor *honoris causa* per la UPC en un àrea en la qual la nostra Universitat compta amb una comunitat nombrosa i amb un gran prestigi i reconeixement internacionals.

4. El rector ha rebut una proposta formal per a investir el professor Sir Michael Atiyah com a doctor *honoris causa* per la Universitat Politècnica de Catalunya, signada pel degà de la Facultat de Matemàtiques i Estadística, el director del departament de Matemàtica Aplicada I, el director del departament de Matemàtica Aplicada II, el director del departament de Matemàtica Aplicada III, el director del departament de Matemàtica Aplicada IV, i el director del departament d'Estadística i Investigació Operativa.
S'acompanya com a annex núm. 1 i 2, la proposta esmentada i el *curriculum vitae* del professor Atiyah respectivament.

Per tot això, el Consell de Govern

ACORDA:

Únic.- Aprovar la concessió de doctorat *honoris causa* per la Universitat Politècnica de Catalunya, al professor Sir Michael Atiyah.

Secretaria General
3 de desembre de 2007

Facultat de Matemàtiques i Estadística

UNIVERSITAT POLITÈCNICA DE CATALUNYA

Antoni Giró
Rector
Rectorat de la UPC

Barcelona, 21 de novembre de 2007

Benvolgut rector,

El motiu d'aquest escrit és proposar formalment el Professor Sir Michael Atiyah per ser investit Doctor Honoris Causa per la UPC.

Sir Michael Atiyah és considerat un dels matemàtics més rellevants de tot el segle xx. Entre moltes altres distincions, ha estat guardonat amb la Medalla Fields (1966), atorgada per la Unió Matemàtica Internacional, i el Premi Abel (2004), atorgat per l'Acadèmica de Ciències de Noruega, ambdues reconegudes com un Premi Nobel de les matemàtiques. També fou l'impulsor més decisiu de la Societat Matemàtica Europea.

En relació a Catalunya i Barcelona, i més concretament en relació a la UPC, va ser president del Comitè Científic del 3r Congrés Europeu de Matemàtiques celebrat a Barcelona l'any 2000, del qual, en qualitat de president de la Societat Catalana de Matemàtiques (Institut d'Estudis Catalans), Sebastià Xambó fou president dels comitès executiu i organitzador.

El prestigi internacional de Sir Michael Atiyah el fa un candidat idoni com a primer doctor honoris causa per la UPC en una àrea en la qual la nostra universitat compta amb una comunitat nombrosa i amb un gran prestigi i reconeixement internacionals.

Agraint el teu interès i recolzament, quedem a la teva disposició per a qualsevol aclariment.

Amadeu Delshams
Director del DMA1

Josep M. Brunat
Director del DMA2

Josep Rodellar
Director del DMA3

Josep Fàbrega
Director del DMA4

Xavier Tort
Director del DEIO

Sebastià Xambó
Degà de l'FME

Michael Francis Atiyah

Born: 22 April 1929 in London, England

Click the picture above
to see seven larger pictures

Show birthplace location

Michael Atiyah's father was Lebanese and his mother was Scottish. His school education was partly in Cairo, at Victoria College, and partly in Manchester at Manchester Grammar School. After leaving school he did his military service, which was compulsory at the time, then entered Trinity College, Cambridge.

After graduating with his BA, Atiyah continued to undertake research at Cambridge obtaining his doctorate. He was then made a fellow of Trinity College, Cambridge in 1954. Atiyah spent the year 1955 as a Commonwealth Fellow at the Institute for Advanced Study in Princeton. Returning to Cambridge, he was a college lecturer from 1957 and a Fellow of Pembroke College from 1958. He remained at Cambridge until 1961 when he moved to a readership at the University of Oxford where he became a Fellow of St Catherine's College.

Atiyah was soon to fill the highly prestigious Savilian Chair of Geometry at Oxford from 1963, holding this chair until 1969 when he was appointed professor of mathematics at the Institute for Advanced Study in Princeton. After three years in Princeton, Atiyah returned to England, becoming a Royal Society Research Professor at Oxford. He was also elected a Fellow of St Catherine's College, Oxford.

Oxford was to remain Atiyah's base until 1990 when he became Master of Trinity College, Cambridge and Director of the newly opened Isaac Newton Institute for Mathematical Sciences in Cambridge.

Atiyah showed how the study of vector bundles on spaces could be regarded as the study of cohomology theory, called K-theory. Grothendieck also contributed substantially to the development of K-theory. In [4] Atiyah's early mathematical work is described as follows:-

Michael Atiyah has contributed to a wide range of topics in mathematics centring around the interaction between geometry and analysis. His first major contribution (in collaboration with F Hirzebruch) was the development of a new and powerful technique in topology (K-theory) which led to the solution of many outstanding difficult problems. Subsequently (in collaboration with I M Singer) he established an important theorem dealing with the number of solutions of elliptic differential equations. This 'index theorem' had antecedents in algebraic geometry and led to important new links between differential geometry, topology and analysis. Combined with considerations of symmetry it led (jointly with Raoul Bott) to a new and refined 'fixed point theorem' with wide applicability.

For these early achievements Atiyah was awarded a Fields Medal at the International Congress at Moscow in 1966. An address concerning Atiyah's contributions was given at the Congress by Henri Cartan, see [5]. The *K*-theory and the index theorem are studied in Atiyah's book *K-theory* (1967, reprinted 1989) and his joint work with G B Segal *The Index of Elliptic Operators* **I-V** in the *Annals of Mathematics,* volumes 88 and 93 (1968, 1971). Atiyah also described his work on the index theorem in *The index of elliptic operators* given as an American Mathematical Society Colloquium Lecture in 1973.

The ideas which led to Atiyah being awarded a Fields Medal were later seen to be relevant to gauge theories of elementary particles. Again we quote [4]:-

The index theorem could be interpreted in terms of quantum theory and has proved a useful tool for theoretical physicists. Beyond these linear problems, gauge theories involved deep and interesting nonlinear differential equations. In particular, the Yang-Mills equations have turned out to be particularly fruitful for mathematicians. Atiyah initiated much of the early work in this field and his student Simon Donaldson went on to make spectacular use of these ideas in 4-dimensional geometry. More recently Atiyah has been influential in stressing the role of topology in quantum field theory and in bringing the work of theoretical physicists, notably E Witten, to the attention of the mathematical community.

The theories of superspace and supergravity and the string theory of fundamental particles, which involves the theory of Riemann surfaces in novel and unexpected ways, were all areas of theoretical physics which developed using the ideas which Atiyah was introducing.

Atiyah has received many honours during his career, in addition to the Fields Medal referred to above, and it is impossible to list more than a few here. He was elected a Fellow of the Royal Society of London in 1962 at the age of 32. He received the Royal Medal of the Society in 1968 and its Copley Medal in 1988. He gave the Royal Society's Bakerian Lecture on *Global geometry* in 1975 and was President of the Royal Society from 1990 to 1995.

Among the prizes that he has received are the Feltrinelli Prize from the Accademia Nazionale dei Lincei in 1981, the King Faisal International Prize for Science in 1987, the Benjamin Franklin Medal and the Nehru Medal.

Atiyah was the American Mathematical Society Colloquium Lecturer in 1973. He was President of the London Mathematical Society in 1974-76 receiving its De Morgan Medal in 1980. Atiyah was knighted in 1983 and made a member of the Order of Merit in 1992. In 2004 he and Isadore Singer were awarded the Neils Abel prize of £480 000 for their work on the Atiyah-Singer Index Theorem.

He has been elected a foreign member of many national academies including those of the United States, Sweden, Germany, France, Ireland, India, Australia, China, Russia and the Ukraine. Many universities have awarded him an honorary degree including Bonn, Warwick, Durham, St Andrews, Dublin, Chicago, Edinburgh, Cambridge, Essex, London, Sussex, Ghent, Reading, Helsinki, Leicester, Rutgers, Salamanca, Montreal, Waterloo, Wales, Queen's-Kingston, Keele, Birmingham, Lebanon and the Open University.

Article by: *J J O'Connor* and *E F Robertson*

List of References (9 books/articles)

Mathematicians born in the same country

Honours awarded to Michael Atiyah
(Click below for those honoured in this way)

LMS Berwick Prize winner	1961
Fellow of the Royal Society	1962
Savilian Geometry Professor	1963
Speaker at International Congress	1966
Fields Medal	1966
Royal Society Royal Medal	1968
AMS Colloquium Lecturer	1973
Royal Society Bakerian lecturer	1975
London Maths Society President	1974 - 1976
Honorary Fellow of the Edinburgh Maths Society	1979
LMS De Morgan Medal	1980
Fellow of the Royal Society of Edinburgh	1985
Royal Society Copley Medal	1988
AMS Gibbs Lecturer	1991
Hedrick lecturer	1993
President of the Royal Society	1990-1995
British Mathematical Colloquium Plenary speaker	2000
Abel Prize	2004

Cross-references in MacTutor

1.

Other Web sites

1. Encyclopaedia Britannica
2. Abel Prize Committee (The Atiyah-Singer Index theorem --pdf)
3. Mathematical Genealogy Project

School of Mathematics and Statistics
University of St Andrews, Scotland