FLOW

In the table below, the serial numbers of A works are in black boldface, like **6** in the 1957 box (upright for mathematical papers) or like *10* for the 1966 box (italic for general papers; biographical items, like *14* in 1976, are displayed as *14*). Joint papers with main collaborators are distinguished with the name and a colour code: **Hirzebruch**, **Singer**, **Bott**, **Segal** and **Hitchin** (Hodge , 1954 and 1955, has been displayed in superscript). Collaborations reduced to a single paper, like 26 with Todd (1960), are distinguished like 26^{To}, where the superscript code is explained at the bottom of the table. A case like 39^{Sh} (1964) means that 39 is a paper with **Bott** and Sh=Shapiro, and that the latter appears only once in CW. The colour of superscripts D, G, M and Su (Donelly, Gårding, Manton, Sutcliffe) indicates that they appear twice, and P (Patodi), that he appears four times (he may be ranked as one of the main collaborators). Finally, ‖, ‖, | and // mean transition to CW 2, 3, 4 and 6, respectively.

	1952	1953	1954	1955
	1		3^{Hodge}	**2**, 4^{Hodge}
1956 5	**1957** 6 7	**1958** 8 9	**1959** ‖ 24 25 Hirzebruch	**1960** 26^{To}
1961 27 28 29 30 34 35 Hirzebruch	**1962** 31 32 33 36 37 38 Hirzebruch	**1963** ‖ 56 Singer	**1964** 39^{Sh} 40 ‖ 57 Bott	**1965** 41 ‖ 58
1966 *10* 42^A 43 44 ‖ 60 61 Bott	**1967** 45 ‖ 59 62 ‖ 84 Bott	**1968** 46 ‖ 63 64 65 66 Bott Singer Segal	**1969** *11* 47^{Ta} 48 49 ‖ 69 70 71 Segal Singer	**1970** 50 53 ‖ 72 73 74 ‖ 85^G Hirzebruch Bott
1971 51 ‖ 67 68 75 Segal Singer	**1972** 52^{Du}	**1973** 77 ‖ 79^P 80^P 86^G Bott Singer	**1974** *12* ‖ 54^{Sm} 78	**1975** ‖ 81^P 82^P 87 88 Singer
1976 *13* *14* 15 ‖ 76^R ‖ 83^P 89 Singer	**1977** 16 ‖ 55 ‖ 90^{Sch} $91*$ ‖ 94^H 95^W Singer	**1978** *17* // 96^{DM} 97^H 98 102^J Hitchin Singer	**1979** 99	**1980** 100 103
1981 101 **104** 106 Bott	**1982** *18* 92^D **105** 111 113 114 Singer Bott	**1983** 93^D 107 108^{Pr} Singer	**1984** *19 20 21 22a* 109 110 112 117 119 120 121 Bott Singer	**1985** *23* // **115 116** *122* 123 124 Hitchin
1986 *22b* *128*	**1987** 118 127	**1988** 126 131 *134 145* Hitchin	**1989** 132 138 141^M Segal	**1990** *129* 130 135 136 137 139^{Je}
1991 140	**1992**	**1993** 142^M 147 148	**1994** 143 149 *154*	**1995** *144* 150
1996 133 *152*	**1997**	**1998** *146* 151 155 156	**1999** *157*	**2000** 159 161
2001 *153* 163 164 165 169^{MV}	**2002** *158* *160* 166^{Su} 168^{Bi} 170^{Wi}	**2003** 167^{Su} 171^{Be}	**2004** *125 162* 172^{Ho} 173 Segal	

A Adams · Be Berndt · Bi Bielawski · D Donnelly · Du Dupont · DM Drinfeld-Manin
J Jones · Je Jeffrey · G Gårding · H Hitchin · Ho Hopkins · M Manton · MV Maldacena-Vafa · P Patodi · P Pressley · R Rees · Sch Schmid · Sh Shapiro · Sm Smith
Su Sutcliffe · Ta Tall · To Todd · W Ward · Wi Witten · * unpublished

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OUTSTANDING WORKS WITH MAIN COLLABORATORS

HIRZEBRUCH

9 papers, making about 170 pages. Concentrated in the period 1959-1962.

24 *Riemann-Roch theorems for differentiable manifolds.*
25 *Quelques théorèmes de non-plongement pour les variétés differentiables.*
27 *Bott periodicity and the parallelizability of the spheres.*
28 *Vector bundles and homogeneous spaces.*
36 *Analytic cycles on complex manifolds.*
37 *The Riemann-Roch theorem for analytic embeddings.*

SINGER

The most sustained collaboration, from 1963 to 1984; 15 papers, making about 345 pages; for 7 of these (about 175 pages) he is the only coauthor.

56 *The index of elliptic operators on compact manifolds* [cf. poster 2]
64, 66, 67, 68 *The index of elliptic operators* [~ 135 pages; cf. Segal 65 below]
81, 82, 83 (w. Patodi) *Spectral asymmetry and Riemannian geometry* [~ 145]
92 (w. Donelly) *Geometry and analysis of Shimizu L-functions.*
93 (w. Donelly) *Eta invariants, signature defects of cusps and values of L-functions*
120 *Dirac operators coupled to vector potentials.*

BOTT

The most productive collaboration, sustained in the period 1964-1983; 12 papers, making about 475 pages; for 8 of these (about 255 pages) he is the only coauthor.

39 (w. Shapiro) *Clifford modules.*
40 *On the periodicity theorem for complex vector bundles.*
57 *The index problem for manifolds with boundary*
62, 63 *A Lefschetz fixed-point formula for elliptic complexes* [~ 75 pages]
79 (w. Patodi) *On the heat equation and the index theorem.*
85, 85 (w. Gårding) *Lacunas for hyperbolic differential operators with constant coefficients* [~ 140 pages]
105 *The Yang-Mills equations over Riemann surfaces* [~ 90 pages]
109 *The moment map and equivariant cohomology.*

SEGAL

4 papers, scattered from 1968 to 2004, making about 100 pages.

49 *Equivariant K-theory and completion.*
65 *The index of elliptic operators* [cf. Singer 64, 66, 67, 68 above]
173 *Twisted K-theory*

HITCHIN

6 papers, making about 340 pages; for 3 of these (about 150 pages) he is the only coauthor. Hitchin is the latest main collaboration, 1977-1988.

96 (w. Drinfeld and Manin) *Construction of instantons.*
   [The celebrated Atiyah-Hitchin-Drinfeld-Manin construction!]
97 (w. Singer) *Self-duality in four dimensional Riemannian geometry.*
126 *Geometry and dynamics of magnetic monopoles* [~ 130 pages]

> Collaboration with Raoul [1926-2005] has been one of the great personal and mathematical pleasures of my life. Our work together undoubtedly reflects, and in turn enhances, our long friendship, emphasizing that mathematics is still a human activity, and has not yet been reduced to a computer program.
> [MFA, *A Personal History*]

OTHER COLLABORATIONS

HODGE: 4, *Integrals of the second kind on an algebraic variety*.
TODD: 26, *On complex Stiefel manifolds*.
ADAMS: 42, *K-theory and the Hopf invariant*.
TALL: 47, *Group representations, λ-rings and the J-homomorphism*.
DUPONT: 52, *Vector fields with finite singularities*.
SMITH: 54, *Compact Lie groups and the stable homotopy of spheres*.
REES: 76, *Vector bundles on projective 3-space*.
SCHMID: 90, *A geometric construction of the discrete series for ss Lie groups*.
WARD: 95, *Instantons and algebraic geometry* .
JONES: 102, *Topological aspects of Yang-Mills theory* .
PRESSLEY: 108, *Convexity and loop groups*.
JEFFREY: 139, *Topological Lagrangians and cohomology*.
MANTON: 142 *Geometry and kinematics of two skyrmions*.
SUTCLIFFE: 166, *The geometry of point particles*.
   167, *Polyhedra in Physics*.
BIELAWSKI: 168, *Nahm's equations, configuration spaces and flag manifolds*.
MALDACENA & VAFA: 169, *An M-theory flop as a large N duality*.
WITTEN: 170, *M-theory dynamics on a manifold of G_2-holonomy*. [106 p.]
BERNDT: 171, *Projective planes, Severi varieties and spheres*. [28 p.]
HOPKINS: 172, *A variant of K-Theory: $K_{\pm}$* . [10 p.]

ATIYAH'S STUDENTS

Professor Atiyah has had about 50 students. To name a few: Simon Donaldson, Nigel Hitchin, Francis Kirwan, Peter Kronheimer, George Lusztig, Graeme Segal, … . Simon Donaldson was awarded the Fields medal in 1986 (Berkeley ICM).

CURRENT RESEARCH

Michael Atiyah is fully active in research and many other commitments. Currently, for example, he is cooperating with the distinguished neurophysilogist S. Zeki in studies of the human brain, particularly when it carries out mathematical tasks. He also keeps writing general essays on the nature of mathematics and its relation to science in general, and fundamental physics in particular.

Sources for posters 6 and 7

[1] M. F. Atiyah: *Collected Works*. Oxford Science Publications, Clarendon Press, Oxford, 1988 (Volumes 1-5) and 2004 (Volume 6).