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ABSTRACT

The study analyzes the records of 833 persons who received North Atlantic Treaty Organization (NATO) Postdoctoral Fellowships from 1959 through 1981. To assess the program's long-term effects, the study focuses on information about the current career status of fellowship recipients and compares them with two similar groups: National Science Foundation Postdoctoral Fellows from the same period, and persons to whom the NATO Fellowship was offered but who declined it. Following a description of the programs and the study methodology, results are reported in the areas of: personal characteristics, involvement in prior NSF programs, degree institutions, fields of science, institutions chosen by NATO Fellows, employment of NATO Fellows after tenure, current employment, reasons for NATO Awardees declining the Fellowship, research support following the Fellowship, tenure-track progression, prizes, and memberships in national academies. The study found that all three groups experienced roughly equivalent success in obtaining later research support and employment at research universities. Biological scientists were the leading recipients of both NATO and NSF postdoctoral awards, followed by chemists and physicists. Appendices examine multiple awardees and characteristics of NATO and NSF Postdoctoral Fellowship Awardees. (JDD)

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Report 88-130

December 1988

CAREER PROGRESSION OF NATO POSTDOCTORAL FELLOWS

A Report by
NSF's Program Evaluation Staff

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CAREER PROGRESSION OF NATO POSTDOCTORAL FELLOWS

I. Summary of Findings

This study analyzes in detail the records of 833 persons who received NATO Postdoctoral Fellowships from the program's inception in 1959 through 1981. It focuses primarily on information about their current career status and compares them with two similar groups to provide the basis for an assessment of the program's long term effects. The two groups are: NSF Postdoctoral Fellows from the same period, and persons to whom the NATO Fellowship was offered, but who declined it for various reasons.

The review shows that:

- All three groups enjoyed roughly equivalent success in obtaining later research support and employment at research universities;
- On average, members of all three groups were promoted from Assistant Professor to Associate Professor in less than 6 years (a year sooner than the generally accepted promotion period);
- Significant percentages of each group had previously received graduate school support from NSF (NATO Fellows 18%, NSF Fellows 26%, NATO Awardees who declined 14%);
- Biological scientists were the leading recipients of both NATO and NSF Postdoctoral Awards (22.17% and 23.9%, respectively), followed by chemists (14.5% and 19.0%) and physicists (15.8% and 14.9%).

Of the NATO Fellows:

- 24% received their bachelor's degree from predominantly undergraduate institutions;
- 63% received their doctoral degree from one of 15 major research universities;
- 24% chose to study at three universities (Cambridge, Oxford, and London);
- At least 511 are now employed in academia, of whom 41 are employed at predominantly undergraduate institutions.

Individuals who declined NATO Postdoctoral Fellowship offers:

- o subsequently received 9% more support than those who accepted;
- o They also received more NIH support than either NATO Fellows or NSF Fellows, probably because a higher proportion are biological scientists.

II. Origin of the Study

A postdoctoral program funded by the North Atlantic Treaty Organization (NATO) has been administered at the request of the Department of State by the National Science Foundation (NSF) since 1959. The sole review of this program was conducted in 1987 by an External Peer Oversight Committee for the Directorate for Science and Engineering Education. That committee pointed out that there was an "... absence of records on the current career status of former Fellows ... which would contribute substantially to any solid assessment of the Program's long term influence ...". Their report prompted the Division of Research and Career Development (RCD/CEE) to ask the Program Evaluation Staff (PES) to gather and analyze long-term data about careers of NATO Fellows.

III. Descriptions of NATO and NSF Postdoctoral Fellowship Programs

NATO funds approximately 50 postdoctoral fellowships each year for citizens or nationals of the United States to study at non-profit scientific institutions in countries that are members of NATO. The program has as its prime purpose to promote the progress of science and closer collaboration among the scientists of various nations. Until recently the awards were not restricted to NATO countries but could be used in countries cooperating with NATO.

This program is administered by the NSF. Applicants are evaluated by review panels based on their demonstrated scientific competence, potential for continued professional growth and potential for furthering international collaboration in science.

NATO Postdoctoral Fellowships are limited to 12 months tenure but until recently NATO Fellows could make a new application for a second fellowship while on tenure. There are no renewals or extensions but a new application recommended by the selection panel in competition with all other applicants can result in a second or third Fellowship.

The NSF Postdoctoral Fellowship program, which existed under three names from 1959 to 1981, also made opportunities available to young scientists who had demonstrated special aptitude for advanced training. NSF Postdoctoral Fellows could study in any non-profit United States or foreign institution of higher education, in government laboratories or national laboratories. This program was funded through the regular NSF appropriation and generally provided for 130 fellowships per year. The program was administered by the NSF with the National Academy of Science/ National Research Council providing support by handling the receipt of applications and by managing the review panels. Selection of the Fellows and all administration of the program after selection was done by NSF.

NSF Postdoctoral Fellowships were for 12 months but tenure was available for up to 24 months if justification was adequate. Generally tenure did not exceed 15 months. NSF Postdoctoral Fellowships were not renewable per se but the process of reapplication was generally easier than in the NATO Postdoctoral Program.

The only significant distinction between the two programs was that NATO Fellows could not study in the United States. Otherwise, stipends, dependency allowances and special allowances were comparable. Actually 1,167 NSF Fellows (37%) studied overseas.

Initially the NATO Postdoctoral Fellowships were open to all applicants who had "earned a doctoral degree or had research training and experience equivalent to that represented by the doctoral degree." In 1965 program eligibility was limited to persons within five years of having received the doctoral degree. The NSF Postdoctoral program did not have a time restriction until 1975, when it was redirected to become the Energy Postdoctoral Fellowship Program and subsequently the National Needs Fellowship Program, but in fact most of the Fellows fell within the five-year threshold.

IV. Methods

A. Initial Databases

Three data bases were initially developed:

- o NATO Postdoctoral Fellows 1959-87 = 1104 Fellows;
- o NSF Postdoctoral Fellows 1959-81 = 3141 Fellows;
- o NATO Postdoctoral Awardees who declined 1959-86 = 271 Declines.

The initial data bases were obtained from the NAS/NRC. They proved to be incomplete due primarily to different requirements for data at different times, e.g., Social Security Numbers were not required until 1964. An attempt was made to complete the records using the original application records stored in the Federal Records Center. This improved the records somewhat but the original application records prior to 1974 have been destroyed. Other sources such as NSF Principal Investigator and Reviewer files, American Men and Women in Science and membership directories of the various disciplinary societies were also used to improve the data bases.

A review of the data bases showed evidence of considerable overlap in the population of awardees: *

- o 82 NATO Postdoctoral Fellows had also been NSF Postdoctoral Fellows;
- o 3 NATO Postdoctoral Fellows had NSF Postdoctoral Fellowships and had also declined a NATO Fellowship;
- o 48 NSF Postdoctoral Fellows had declined NATO Postdoctoral Fellowships;
- o 103 NSF Postdoctoral Fellows had 2 NSF Postdoctoral Fellowships.

This overlap suggested that the quality of the NATO Postdoctoral Fellows is comparable to that of the NSF Fellows. However, to insure that this overlap did not affect the overall results of the evaluation, duplicates within a database were eliminated. The duplicates across databases were retained, i.e., the records for the second fellowship received by the above 103 NSF Fellows were deleted, but the records for 3 NSF Postdoctoral Fellows who had NATO Postdoctoral Fellowship and had also declined a NATO Fellowship were retained in the respective data bases.

* See Appendix 1

B. Formulation of the Study Databases

Individual records were expanded to include the following information:

- Sources of research support, obtained from:

  NSF electronic data base of awarded, declined and pending proposals for 1972-1988

  NIH electronic data base "Consolidated Grant Applicant File 1938-88"

  NATO listing of principal investigators for NATO Advanced Study Institutes, NATO Advanced Research Workshops and NATO Collaborative Research Grants 1982-87;

- Membership in the National Academy of Science, National Academy of Engineering or Institute of Medicine;

- Research Prizes;

- In the case of those NATO Postdoctoral Fellowship awardees who chose to decline the fellowship, the reason given for declining;

- Initial employment of the Fellow after completing the Fellowship tenure (installation and job title);

- Current employment of the Fellow and the current job title.

Prior to a detailed analysis of the data, the later NATO selectees were dropped so that the databases would cover an equal timeframe, 1959-81. (The initial databases covering varying time periods are shown in Appendix 2).

V. Results

A. Personal Characteristics

	NATO		NSF		DECL	
Total	833		3141		236	
Male	748	(90%)	2869	(91%)	210	(89%)
Female	85	(10%)	272	(9%)	26	(11%)
Race						
White	118		455		36	
Unknown	709		2672		199	
Asian	1		8		0	
Black	0		4		0	
Hispanic	3		1		1	
Native American	1		1		0	
Marital Status:						
Married	547		1859		138	
Single	246		894		85	
Unknown	40		388		13	

B. Involvement in Prior NSF Programs

NSF Graduate Fellows	46	(6%)	361	(11%)	10	(4%)
NSF Cooperative Grad Fellows	88	(11%)	424	(13%)	22	(9%)
NSF Graduate Trainees	12	(1%)	18	(1%)	1	(0%)

C. Bachelor's Degree Institutions

Of those Fellows whose bachelor's degree institution could be identified, about 30% received their degrees from one of the following 12 universities (no institution had more than 7% from any of the groups).

	NATO	NSF	DECL
Harvard U.	33	156	17
Mass. Inst. of Tech.	31	133	12
U. Cal./Berkeley	30	98	6
Cornell U.	21	84	8
Columbia U.	20	60	8
Princeton U.	20	56	5
Cal. Inst. of Tech.	18	83	6
Michigan U.	16	51	4
Chicago U.	15	85	1
Rice U.	15	31	0
Stanford U.	12	55	4
U. Cal./Los Angeles	11	50	4

24% of the Fellows received their bachelor's degree from predominantly undergraduate institutions (no institution had more than 2% from any of the groups). The following is a listing of the leading 'source' institutions.

	NATO	NSF	DECL
Reed College	13	14	2
SUNY - Brooklyn	8	27	2
Haverford College	8	14	1
Amherst College	7	20	0
Oberlin College	7	37	1
Pomona College	7	14	3
Swarthmore College	7	37	4
Williams College	4	14	0
Carleton College	3	21	1

D. Institution of Highest Degree

Of those Fellows whose institution of highest degree could be identified, 63% received their degree from one of 15 universities (no institution had more than 8% from any of the groups). The leading institutions were:

	NATO	NSF	DECL
U. Cal./Berkeley	67	94	11
Harvard U.	58	111	20
Princeton U.	43	54	5
Stanford	36	65	17
Mass. Inst. of Tech	35	66	15
U. of Chicago	27	59	8
U. of Michigan	24	34	3
Yale U.	23	35	9
Cal. Inst. of Tech.	21	38	5
U. of Wisconsin	20	54	10
U. of Illinois	18	47	10
Columbia U.	17	44	4
Cornell U.	16	40	6
U. Cal./Los Angeles	15	34	5
U. Cal./San Diego	11	16	5
Iowa State U.	11	11	2

E. Fields of Science

	NATO		NSF		DECL	
	Nr.	%	Nr.	%	Nr.	%
Astronomy	24	2.9	42	1.3	0	0
Biochemistry	45	5.4	230	7.0	13	5.6
Biological Sciences	184	22.1	752	23.9	76	32.5
Chemistry	121	14.5	598	19.0	32	13.7
Earth Sciences	41	5.0	120	4.0	9	3.8
Engineering	78	9.4	170	5.4	20	8.5
Math Sciences	76	9.1	281	8.9	7	3.0
Medical Sciences	49	5.9	200	6.4	22	9.4
Physics	132	15.8	468	14.9	40	17.1
Social Sciences	63	7.6	235	7.5	15	6.4
Other	20	2.4	45	1.4	2	0

F. Institutions Chosen by NATO Fellows

Since 1959 almost 50% of the NATO Fellows have chosen to take their postdoctoral tenure at English-speaking institutions or laboratories. Twenty-four percent of the NATO Fellows have attended 3 institutions - Cambridge U., London U., and Oxford U. The following is a list of some of the more frequently attended foreign institutions:

	Nr.	%		Nr.	%
Cambridge U.	92	11	Copenhagen U.	22	3
Oxford U.	64	8	Paris U.	22	3
London U.	46	6	Swiss Federal Inst.	19	2
Oslo U.	23	3	CERN/Switzerland	19	2

G. Employment of NATO Fellows after Tenure

Of the 433 Fellows for whom we have final reports (52%), 356 found their first post-tenure employment in academic institutions. 273 Fellows were employed in the usual academic tenure track as Assistant, Associate or full Professor. The remainder (83) held various other academic appointments as Postdoctorals, Research Associates, Lecturers, etc. 23 Fellows took employment in industry, 17 Fellows went to work for the Government, 28 remained overseas to complete research projects begun on their tenure. Another 9 Fellows returned to other research institutions such as the Smithsonian Institution and the Woods Hole Oceanographic Institute.

Of the 356 Fellows first employed in academic institutions, 31 were employed by predominantly undergraduate institutions. Four institutions employed 10 or more Fellows (U. Cal./Berkeley, U. of Minnesota, U. of Illinois and U. of Wisconsin).

H. Current Employment of NATO Fellows

Five hundred and eleven NATO Fellows are currently employed in academic institutions. Forty one are in predominantly undergraduate institutions. Of the 356 Fellows who were initially employed in academia, 200 remained at their original post-tenure institution. Additionally, 155 Fellows whose initial employment data could not be obtained are now employed in academia institutions. The following is a list of major institutions employing 10 or more NATO Fellows:

U. Cal./Berkeley	U. of Minnesota
U. Cal./Los Angeles	Mass. Inst. of Tech.
U. of Colorado	Princeton University
Cornell University	U. of Washington
U. of Illinois	U. of Wisconsin
U. of Maryland	

I. Reasons for NATO Awardees Declining the Fellowship

Of the 96 NATO Postdoctoral Awardees who gave reasons for declining their fellowships, the most significant reason was to accept another fellowship. They generally didn't go into details but evidence is sufficient to conclude that the other fellowships offered more money, longer tenure and/or more prestige in their particular field of science. The following are some of the reasons offered:

Other fellowship	34	Postdoctoral appts.	5
Employment	18	Funding insufficient	2
Family problems	3		

J. Research Support Following the Fellowship

One measure of career success is the ability to obtain research support. The following is an analysis of each group's research support following their postdoctoral tenure:

SOURCE OF SUPPORT:	NATO	NSF	DECL
All Sources	41%	43%	50%
NSF	30%	35%	32%
NIH	16%	17%	31%
NATO (See Below)	3%	2%	1%
Substantial NSF Support	** 4%	9%	5%
Substantial NIH Support	**10%	11%	19%

** Substantial support from NSF equates to 5 or more awards. Substantial support from NIH equates to 5 or more years.

NATO SUPPORT:

	NATO	NSF	DECL
Collaborative Research	22	49	2
NATO Advanced Study Institute	1	2	1
Advanced Research Workshop	0	5	1

For the most part the three groups received comparable research support. The most significant difference is that NATO Declinees have received 9% more research support than the NATO Postdoctoral Fellows. This is explained by the higher percentage of NATO declinees being in the biological and medical sciences and the higher support from NIH (31%). Generally speaking one can conclude that the quality of the NATO Postdoctoral Fellow is comparable to the NSF Postdoctoral Fellow.

K. Tenure - track progression

Another measure of career success is progression within the academic community, i.e., time to progress from Assistant Professor to Professor. The American Association of University Professors recommends a probation period of seven years for promotion of Assistant Professor to Associate Professor. This is a generally accepted standard.

Members of all three groups were promoted to Associate Professor at a faster rate than is generally recommended. (The data in this area is rather minimal and was for the most part extracted from American Men & Women in Science).

NATO Postdoctoral Fellows

The analysis is based on 30% of the database. The average time span from Assistant Professor to Professor was 9.8 years with the spread varying from 2-20 years. Assistant Professor to Associate Professor was 5.6 years with the spread varying from 2-13 years. Associate Professor to Professor was 5.7 years with the spread varying from 1-14 years.

NSF Postdoctoral Fellows

The analysis is taken from the sample of the NSF Postdoctoral file and is based on 36% of that sample. The average time span from Assistant Professor to Professor was 9.6 years with the spread varying from 5-15 years. Assistant Professor to Associate Professor was 6.1 years with the spread varying from 3-12 years. Associate Professor to Professor was 7 years.

NATO Awardees Who Declined

The analysis is based on 26% of the database. The average time span from Assistant Professor to Professor was 10.5 years with the spread varying from 3-22 years. Assistant Professor to Associate Professor was 5.9 years with the spread varying from 3-20 years. Associate Professor to Professor was 7 years with the spread varying from 4-11 years.

Of the 511 NATO Fellows currently in academic institutions, 232 are full Professors, 45%.

L. Prizes

Generally speaking the availability of information on research prizes received by the comparison groups was not sufficient to draw any conclusions.

The following are some of the prizes received by NATO Fellows:

Norman Medal - American Society Chemical Engineers
Waterman Prize - National Science Foundation
Fields Medal - International Congress of Mathematics
Pure Chemistry Award - American Chemical Society
Meisinger Award - American Meteorology Society
Charney Award - American Meteorology Society
F. O. Lawrence Award - Department of Energy
Marlow Medal - American Chemical Society

M. Membership in the National Academies

Membership in the National academies recognizes a scientist's or engineer's standing in the scientific community. The three comparison groups are well represented in the various academies. Although the NATO Fellows have the lowest percentage of representation of the three comparison groups the numbers are insufficient to support conclusions regarding relative quality.

	NATO		NSF		DECL	
National Acad of Science	7	1%	50	2%	4	2%
National Acad of Engineering	4		12		1	
Institute of Medicine	0		2		0	
National Academies of Science & Engineering	1		5		0	

MULTIPLE AWARDEES WITHIN THREE DATABASES

Appendix 1

82 NATO Postdoctoral Fellows had also been NSF Postdoctoral Fellows

7 NATO Postdoctoral Fellows had 2 NATO Postdoctoral Fellowships

4 NATO Postdoctoral Fellows had also declined NATO Postdoctoral Fellowships

3 NATO Postdoctoral Fellows had a NSF Postdoctoral Fellowship and had also declined a NATO Fellowship

1 NATO Postdoctoral Fellow had 2 NATO Postdoctoral Fellowships and a NSF Postdoctoral Fellowship

103 NSF Postdoctoral Fellows had 2 NSF Postdoctoral Fellowships

48 NSF Postdoctoral Fellows had declined NATO Postdoctoral Fellowships

2 NSF Postdoctoral Fellows had 2 NSF Postdoctoral Fellowships and had declined a NATO Postdoctoral Fellowship

1 NSF Postdoctoral Fellow had declined 2 NATO Postdoctoral Fellowships

2 NSF Postdoctoral Fellows had 3 NSF Postdoctoral Fellowships

5 NSF Postdoctoral Fellows had held 2 NSF Postdoctoral Fellowships and had declined a NATO Fellowship

1 NSF Postdoctoral Fellow had 3 NSF Postdoctoral Fellowships and had declined 2 NATO Postdoctoral Fellowships

1 individual had declined 2 NATO Postdoctoral Fellowships

90 Fellows applied for and were awarded NATO and NSF Postdoctoral Fellowships the same year. 41 accepted both fellowships while 49 accepted the NSF Postdoctoral Fellowship and declined the NATO Fellowship.

Fiscal Year	NATO & NSF Awarded	Accepted NATO & NSF	Accepted NSF Declined NATO
1959-64	66	32	34
1965-69	4	4	0
1970-74	0	0	0
1975-79	17	4	13
1980-81	3	1	2
Total	90	41	49

Fellowships in different programs in two successive years:

	NATO then NSF	NSF then NATO
1959-69	9	7
1970-81	2	1
Total	11	8

Renewals: Fellowships in the same program in two successive years:

	NATO	NSF
1958-69	7	58
1970-81	1	9
Total	8	67

CHARACTERISTICS OF NATO AND NSF POSTDOCTORAL FELLOWSHIP AWARDEES

Appendix 2

A. Demographic Characteristics of the Awardees

	NATO 1959-87		NSF 1959-81		DECL 1959-86	
Total	1112		3257		274	
Male	951		2869		237	
Female	152		272		34	
Unknown	9		116		3	
Race						
White	324		455		59	
Unknown	764		2672		207	
Asian	7		8		3	
Black	1		4		0	
Hispanic	6		1		1	
Native American	1		1		0	
Married	657		1859		152	
Single	401		894		105	
Unknown	46		388		14	

B. Involvement in Prior NSF Programs

NSF Graduate Fellows	66		361		12	
NSF Cooperative Grad Fellows	88		424		22	
NSF Graduate Trainees	12		18		1	
C. Research Support	391	35%	1335	43%	127	
NSF	293	27%	1089	35%	84	31%
NIH	137	12%	522	17%	73	27%
NATO	27	2%	65	2%	3	1%
NSF & NIH	47	4%	296	9%	31	11%
NSF & NATO	15	1%	44	1%	2	1%
NIH & NATO	7	1%	17	1%	0	0%
NSF, NIH, NATO	3	0%	16	1%	0	0%

D. Membership in Academies

National Acad of Science	7	50	4
National Acad of Engineering	4	12	1
Institute of Medicine	0	2	0
National Acad of Science & Engineering	1	5	

E. Prizes

	24	7 (Sample)	9

Sample - only 100 NSF Fellows were researched for Prizes

This study was designed and carried out by James Maher, assisted by Delores Williams, both of NSF's Program Evaluation Staff, Office of Budget and Control (OBAC). Dee Dee Burroughs (OBAC) was responsible for typing, layout and printing arrangements.

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