

covering one year, with a possibility of renewal. Approximately ten appointments will be made per year. The permanent staff of the Center includes fifty NRL scientists and technicians actively committed to rocket and satellite research programs. To support the additional research carried out by those appointed as visiting scientists, fifteen new permanent staff positions have been established under funds provided by the Office of Naval Research. Five of the new permanent staff members are physicists and astronomers; the remainder are engineers and technicians. The National Science Foundation's support to the Center will be adequate to provide for the costs of rockets, satellites, and the instrumental payloads for the research programs in which the visiting scientists are involved.

The NRL's work in rocket astronomy dates back to 1946, when the first use was made of V-2 rockets in the United States. Since that time, studies carried out at the Laboratory have dealt with the ultraviolet and x-ray regions of the solar spectrum, the ultraviolet fluxes of early-type stars, and the structure of the terrestrial atmosphere and its geocorona. The first astronomy experiments intended for satellite payloads also were designed at NRL in connection with the Vanguard program. The Center's rocket program is built around the Aerobee-Hi rocket, although other sounding rockets may also be used. A continuing small satellite program will instrument two or more launchings per year, and the Center will also compete for payload space in NASA-sponsored spacecraft. In the past, the Naval Research Laboratory has taken part in the Explorer VII and the Ranger I and II programs, and it is involved in NASA's Orbiting Solar Observatory (S-17) and Geophysical Observatories (EOGO and POGO).

The visiting scientists and permanent staff of the Hulburt Center have access to the many shop facilities and engineering services of the NRL as well as to expert consulting assistance from the various divisions of the Laboratory. Navy facilities at the White Sands and the Pacific missile ranges will be used for rocket launchings in the astronomy program, and fleet support will be available for experiments carried out at sea. In addition to their direct participation in rocket and satellite astronomy, the visiting scientists will have opportunities for contact with other NRL research programs ranging from radio astronomy to laboratory astrophysics. They will also be expected to participate in a regularly scheduled program of relevant scientific lectures and colloquia.

Applications for research appointments at the Center will be accepted from US citizens associated with academic institutions. Generally, graduate students will be considered only after having completed all requirements for the PhD degree, except thesis and examination on the thesis. With university approval, research carried out at the Center may be used in thesis preparation. Additional information can be obtained by writing to the E. O. Hulburt Center for Space Research, US Naval Research Laboratory, Washington 25, D. C.

Fulbright Grants

Overseas opportunities for university lecturing and advanced research assignments in physics under the Fulbright-Hays Act are still available in a dozen countries for the 1964-65 academic year, according to the Committee on International Exchange of Persons, which administers the Fulbright program.

All applicants must be United States citizens. For lecturing, at least one year of college or university teaching experience is required at the level for which application is made; for research, the applicant must either have received a doctoral degree at the time of application or have achieved recognized professional standing. In some cases, a knowledge of the language of the host country is a requirement for eligibility.

Applications for the awards listed below should be submitted by January 1, 1964. Those interested are advised to consult the Committee for detailed information on specific assignments, particularly with regard to the financial terms of the grants, which vary from country to country. Additional details and application forms can be obtained by writing to the Committee on International Exchange of Persons, Conference Board of Associated Research Councils, 2101 Constitution Avenue, N.W., Washington 25, D. C.

In addition to the specific lecturing and research opportunities listed, awards are also available for lecturing in a number of countries with which the United States does not have agreements for the use of foreign currencies for programs of educational exchange. These grants ordinarily cannot be announced in advance and are, therefore, generally filled by recruitment. Qualified individuals who are interested and who wish to indicate their availability for such overseas assignments may complete biographical data forms so that their names will be included in the Committee's *Register of Scholars*. Registration forms will be provided by the Committee upon request.

The regular open competition for 1965-66 awards will take place next year. Applications for lecturing and postdoctoral research assignments in Australia, New Zealand, and Latin America must be submitted between March 1 and April 15, 1964. The competition for awards involving appointments in Europe, the Near and Middle East, South and East Asia, and Africa will open on May 1; the probable closing date is August 1.

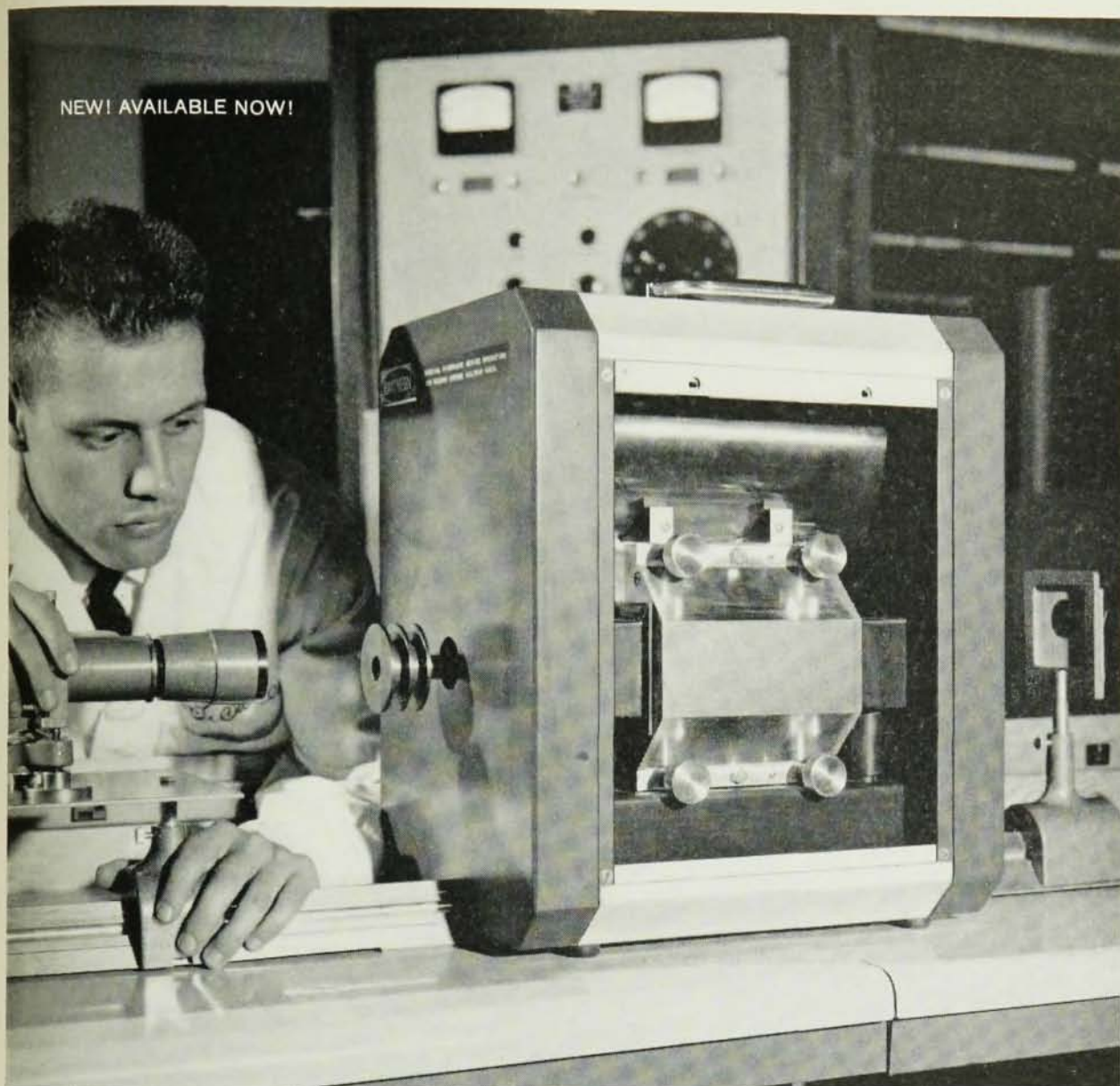
The current list of overseas assignments for 1964-65, for which awards have not yet been granted, is given below.

Grants for University Lecturing and Advanced Research Under the Fulbright-Hays Act (1964-65)

BRAZIL (Period of Award: March 1964-December 1964)

The São Carlos School of Engineering, University of São Paulo: Two lecturer-researchers in solid-state physics are requested to continue a five-year teaching and research program initiated with Fulbright assistance in 1963. The

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visiting professors will work with graduate students who have a good background in physics. Research in solid-state physics at São Paulo emphasizes ionic crystals, crystallography, magnetic resonance, organic crystals.

The University of Ceara: Lectureships in physics at the undergraduate level.

CHINA (Period of Award: September 1964–June 1965)

Provincial Cheng Kung University, Taiwan: A lectureship in theoretical physics, quantum mechanics, or solid-state physics for undergraduates.

FINLAND (Period of Award: September 1964–June 1965)

The Institute of Technology, Helsinki: A lectureship in neutron physics. The visiting professor should be a specialist in work with a Triga Mark 2 (FIR-1) reactor. Research programs would include nuclear magnetic resonance, pulsed neutron generator, coincidence spectroscopy, reactor with cold-neutron facility.

The University of Oulu: A lectureship in quantum mechanics and nuclear physics. A Finnish-speaking grantee is preferred. Lectures would be delivered to about ten undergraduates acquainted with elementary quantum mechanics and the theory of relativity.

University of Turku: (1) A lectureship in experimental physics (four hours of teaching per week to about twenty students). (2) A lectureship in x-ray crystallography (four hours of teaching per week to about twenty advanced and graduate students). The University has an Institute of Physics and the Wihuri Physical Laboratory for basic research and teaching in the fields of solid-state, low-temperature, and nuclear physics.

GHANA (Period of Award: September 1964–June 1965)

University College of Cape Coast: Lectureship in physics. Teaching will be at both the pre-university and the degree level. The laboratories are adequately equipped. It is hoped that a senior American scholar, experienced in research, will be able to assist in the development of the curriculum in this recently opened college.

University of Ghana, Department of Physics: A lecturer is requested to serve as the head of the Department. The subject of physics is very important for the future development of an industrialized Ghana. A senior scholar would be asked to supervise courses of instruction for the undergraduate program and to direct research.

University of Ghana, Institute of Education: The visiting lecturer will be asked to assist in the development of the Science Research Unit. Emphasis will be on new methods of teaching science and mathematics in the secondary and primary schools in the newly organized educational system. The grantee should have had several years experience in physics education, with demonstrated ability to plan research and supervise the operation of this program. The educational system is completely Ghanaian and thus cannot be considered a copy of either the American or British educational systems. The project will be developed in close cooperation with the existing schools and the Ministry of Education.

INDIA (Period of Award: July 1964–April 1965)

Requests, without indication of specialization desired, have been received from Bihar, Calcutta, Rajasthan, and Saugar Universities; in theoretical physics, from Gujarat and Lucknow Universities and from S. V. Vidyapeeth

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150A/150AR* Voltmeter	13 overlapping in 1x, 3x steps, 1 μV to 1 v.	2% full scale on all ranges.	After warmup, within 0.1 μV per day.	Greater than 4×10^{-18} watt.
Ammeter	15 overlapping in 1x, 3x steps, 10^{-10} to 10^{-3} amp.	3% full scale on all ranges.	After warmup, $\pm 2 \times 10^{-11}$ ampere per day.	
151/151R* 151RC†	11 linear, 1x, 3x steps, 0.1 mv to 10 v; 5 non-linear, 0.001 to 10 v; three decades each.	Linear $\pm 3\%$ full scale. Non-linear $\pm 10\%$ of input.	After warmup, below 10 μV per day.	10 ⁻¹⁷ watt.

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Secondary Training College; in geology and nuclear physics, from Banaras Hindu University.

IRAN (Period of Award: September 1964-June 1965)

Tehran University, CENTO Research Center: A lectureship in solid-state physics. The visiting scholar will be asked to advise on research methods. Little formal lecturing would be required.

KOREA (Period of Award: August 1964-July 1965 or February 1964-December 1965)

Yonsei University, College of Science Engineering, Seoul; and Seoul National University, College of Education: Lectureships in science education. Grantees skilled in the use of minimal or improvised laboratory equipment will be asked to train prospective secondary-school science teachers and to conduct seminars and workshops for in-service teachers.

NEPAL (Period of Award: July 1964-June 1965)

Tribhuban University and other institution of higher learning: A lectureship in science education.

PAKISTAN (Period of Award: September 1964-June 1965)

Universities of Karachi and Sind: Lectureships in electronics and theoretical physics.

Universities of Dacca and the Panjab: Lectureships in experimental nuclear physics.

SPAIN (Period of Award: January-June 1964 or October 1964-June 1965)

The University of Barcelona: A research scholar in experimental solid-state physics with experience in one of the following fields: lasers, transport phenomena, transport in the solid, surface phenomena in the solid, or magnetic phenomena in the solid. A knowledge of Spanish would be helpful, but is not essential.

TURKEY (Period of Award: September 1964-June 1965)

Istanbul Technical University: A lectureship in nuclear physics. The visiting professor would offer four hours of lectures and three hours of laboratory work per week to nuclear engineers at the senior undergraduate and graduate levels. The University has a nuclear physics laboratory and a good library in English. Only an associate or full professor may be accommodated.

UNITED ARAB REPUBLIC (Period of Award: September 1964-June 1965)

Cairo University: (1) A lectureship in applied electronics. The grantee would be asked to supervise the electronics laboratory and lecture 16 hours per week. (2) A lectureship in theoretical physics. The grantee would offer lectures in quantum theory, optics, the theory of electrons, and statistical mechanics.

Ein Shams University, Cairo: A lectureship in solid-state physics and electron microscopy. Four hours of lectures per week to senior undergraduate students.

National Research Center, Cairo: A lectureship in the physics of metals. The National Research Center is now erecting a laboratory unit in the physics of metals. The grantee would lecture two hours a week and advise on research programs in both theoretical and applied physics.

Womens' College, Ein Shams University, Cairo: A lectureship in theoretical, atomic, and nuclear physics. Four hours of lectures per week to undergraduates.