

*Filed 4<sup>th</sup> Nov  
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JOHN SIMON GUGGENHEIM MEMORIAL FOUNDATION

551 FIFTH AVENUE • NEW YORK • N • Y •

APPLICATIONS and accompanying documents must reach the Secretary of the Foundation not later than October 15 of each year. They are desired, for the convenience of the Committee of Selection, as early as possible.

In what field of learning, or of art, does your project lie?.....

Concise statement of project.....

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PERSONAL HISTORY:

Name in full.....

Present address.....

Telephone.....

A permanent address.....

Present occupation.....

Place of birth..... Date of birth.....

If not a native-born American citizen, date and place of naturalization.....

Single, Married, Widowed, Divorced.....

Name and address of wife or husband.....

Name and address of nearest kin, if unmarried.....

Ages of children, if any.....

Have you any constitutional disorder or physical disability?.....

With this application please submit a small recent photograph.

**EDUCATION:**

1. Give a summary of your education in the following form:

	Name of Institution	Period of Study (give dates)	Degrees, Diplomas, Certificates (give dates)
Academic: College			
University			
Technical			
Professional			
Musical			
Artistic			
Special Study			

2. Give a list of the scholarships or fellowships you have previously held or now hold, stating in each case the places and periods of tenure, the studies pursued during your incumbency, and amounts of the stipends:.....

.....

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.....

3. State what foreign languages you have studied, and whether you are able to consult works on your subject in these languages. Estimate your proficiency in reading, writing and speaking each of them:.....

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**ACCOMPLISHMENTS:**

1. Positions held (professional, teaching, scientific, administrative, business):

Name of Institution or Organization	Title of Position	Years of Tenure (give dates)	Compensation

2. Of what learned, scientific or artistic societies are you a member?.....  
 .....  
 .....

3. Submit a full account of the advanced work, research, or creative work you have already done, giving dates, subjects, and names of your principal teachers in these subjects. What are your present attainments in your proposed field of study?

4. Submit a *list* of your publications with exact titles, names of publishers, and dates and places of publication.  
 (Please submit two copies of each statement requested under items 3 and 4, above. Please do not submit copies of publications or manuscripts.)

**PLANS FOR WORK:**

Submit a statement giving detailed plans for the work you would pursue during your tenure of a Fellowship. This statement should include, *inter alia*: a description of the project, including its character and scope, and the significance of its presumable contribution to knowledge, or to art; the present state of the project, time of commencement, progress to date, and expectation as to completion; the place or places where the work would be carried on, and the authorities, if any, with whom it would be done; your expectation as to publication of the results of your work; and your ultimate purpose as a scholar or artist. *This statement should be complete and carefully prepared.* (Please submit one more copy of PLANS FOR WORK than the number of your references.)

If awarded a Fellowship—

When would you wish to commence the study proposed?.....

What is your estimate of its probable duration?.....

**REFERENCES:**

Submit a list of references from whom further confidential information may be obtained concerning your qualifications and from whom expert opinion may be obtained as to the value and practicability of your proposed studies.

Name of Reference	Position	Address

If you have applied or expect to apply elsewhere for any fellowship or scholarship for the same period, state the facts regarding such applications:.....

If you apply elsewhere for any fellowship or scholarship after presenting this application, please notify the Foundation immediately.

SIGNATURE.....

PLACE AND DATE OF MAILING.....

**SUGGESTIONS CONCERNING APPLICATIONS**

1. If convenient, please type application and additional material.
2. Use paper the size of this sheet, 8½" x 11", if possible, for writing all documents submitted.
3. Every page or document submitted must bear the applicant's name plainly written.
4. Whenever the space provided in this form is not suitable for an applicant to present fully the facts of his or her case, it is requested that they be stated in a separate document.
5. Only one copy of the application form should be submitted to the Foundation by the applicant; the other may be retained by him for his own files.
6. It is suggested that applications and accompanying documents be sent by registered mail, addressed to the John Simon Guggenheim Memorial Foundation, 551 Fifth Avenue, New York, N. Y.
7. If you do not get a receipt for your application within a reasonable time, please notify the Foundation.

X

Statement concerning the present status:

Early in 1938 I came to New York with the intention of returning to the Clarendon Lab., Oxford, in Sept. of that year. Prof. Lönndeman, ~~Ferri~~ who is in charge of the Cl. Lab., offered me a university lectureship with the understanding that I would spend 6 months of the year at Oxford and be free to spend 6 months every year in America. After the conclusion of the Munich agreement I decided not to accept this offer and to remain in the United States.

January  
In ~~March~~ ~~Febr.~~ 1939, after the discovery of the fission of uranium by Hahn and Strassmann, it occurred to me that a nuclear chain reaction might be possible if neutrons were emitted in the fission of uranium, and I asked for the permission to work at the Physics Dept. of Columbia Univ. on this subject. A similar line of work was independently and at the same time started at Columbia by Fermi. Since March 1939 I have been associated with the Physics Department of Columbia as a guest research worker.

Since October 1939 various applications have been made to the appropriate authorities with the view of obtaining the facilities necessary for carrying out a number of experiments which have been separately ~~made~~ or jointly devised by Professor Fermi and by myself. I am assuming that <sup>we</sup> shall obtain the facilities which are required up to July 1941, and that part of my experimental program can be carried out within this framework.

I am further assuming that if I am granted a fellowship by the Guggenheim Foundation it will be possible to obtain from other sources <sup>the</sup> facilities which are required for the actual performance of the proposed experiments <sup>(which I propose to carry out)</sup> for a period of one year, beginning with September 1, 1941.

Plans for Work:

In order to find out whether or not a nuclear chain reaction can be maintained by means of thermal neutrons or by means of fast neutrons in a system which contains uranium a number of nuclear constants have to be measured and the balance of neutron emission and absorption has to be studied.

I have carried out certain measurements in this field since March 1939, and it is hoped that other measurements can be carried out until July 1941. Since it is not possible to foresee with certainty just how far my program of work will have progressed by July 1941, the experiments outlined below have to be considered as tentative proposals subject to change following the outcome of the experiments performed between now and July 1, 1941.

1. It is proposed to measure the number of fast neutrons emitted by uranium for one thermal neutron absorbed by uranium by using a spherically symmetrical arrangement with a neutron source in the center. ~~in particular it is proposed to use a~~

A spherical shell of paraffine wax forms the boundary of the arrangement, and this paraffine shell is sufficiently thick to prevent the escape of an appreciable number of neutrons from the system. There is a spherical core of carbon enclosed by the paraffine shell, and within this sphere of carbon a spherical shell between  $r = r_1$  and  $r = r_2$  is left free from carbon; this shell may be left empty or may be filled with uranium. This uranium shell can be shielded from thermal neutrons by inserting thin spherical cadmium shells at  $r = r_1$  and  $r = r_2$ .

Measurements will be carried out in four different set-ups:

- A. In the absence of both the cadmium and uranium layers.
- B. In the presence of the cadmium layers but without the uranium layer.
- C. In the presence of both the cadmium layers and the uranium.
- D. In the presence of the uranium layer without the cadmium layers.

From measurements carried out in these four cases the value in which we are interested can be deduced with considerable accuracy.

Account of Research Work done:

Leo Szilard  
420 West 116th Street  
New York City

In 1921 I found <sup>a</sup> the relationship between the second law of thermodynamics and the statistical laws applying to the deviations from the mean values of fluctuating thermal quantities. A paper giving my results was accepted as a dissertation by the University of Berlin, the examiner being Professor M. v. Laue.

In the subsequent years I worked experimentally on anomalous dispersion and polarization of X-rays in collaboration with H. Mark at the Kaiser Wilhelm Institut, Berlin-Dahlem. In 1925 I found that the second law of thermo-dynamic remains valid in a system in which there is external intervention by some intelligent being or a machine which possesses something like a "memory", provided that this being or machine produces a certain small amount of entropy, the value of which I have calculated for every intervention in which an act of memory is involved. A paper describing these results was accepted as "Habilitationsschrift" by the University of Berlin.

In the summer of 1934, working as a guest of St. Bartholomeus' Hospital, London, I found, jointly with Dr. Chalmers of that hospital, a method for separating radioactive iodine from ordinary iodine with which it is isotopic and from which it is formed by neutron bombardment. This method was based on a principle which can be applied to many elements and which has since been applied to a number of them. During the same period I discovered, in collaboration with Dr. Chalmers, that neutrons are emitted from beryllium under the action of gamma-rays from radium. We showed that a strong source of photo-neutrons can thus be obtained, which subsequently proved to be an important tool, particularly in the study of the fission of uranium.

In December 1934, still working as a guest of St. Bartholomeus' Hospital, London, I found, in collaboration with Dr. Chalmers, a radioactive period of indium of about 4 ~~days~~ hours, which behaved in an anomalous way, and we raised the question whether a new phenomenon is involved in the production of this activity. I further investigated this phenomenon at the Clarendon Laboratory at Oxford, England, and found increasing evidence for the view that this period of indium has to be considered as the first known case of isomerism among the artificial radioactive elements, and that it is due to an excited stable isotope of indium. In order to obtain conclusive evidence Dr. Goldhaber and I decided to collaborate on this problem, Goldhaber and Hill attempting to produce the same element in a different way at the Cavendish Laboratory, Cambridge. For obtaining the final proof we communicated our results to S. W. Barnes at the University of Rochester, who attempted to produce the same element by proton bombardment of indium. The results of these investigations were then simultaneously published in the Physical Review in 1939.

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Jointly with Fermi and Anderson I have subsequently studied the balance of neutron emission and absorption in uranium. Our results were published in Physical Review, 1939.

FELLOWSHIP APPLICATION FORM

*M from folder "Persons"*  
*folded 4 at 11:00*  
*reference Department, 2/2/40*

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