

Project title: **Synaptic communication in neuronal microcircuits**

Project leader: **JONAS Peter M.**

Project number: **Z 312-B27**

Review

1. Use of the funds provided

- Have the funds provided by the Wittgenstein prize been used efficiently?

Comments

It is apparent from the scientific output that the funds provided by the Wittgenstein prize have been used very efficiently. There are 17 publications with acknowledgement of FWF funding, of which 15 appear to be in journals with a very high reputation and impact. While it is problematic to judge science by metrics, this is an extraordinary accomplishment indicating that the funders got an exceptional output for the funds invested.

2. Scientific success within the scope of the Wittgenstein Prize

- How did the funds of the Wittgenstein Prize contribute to the prizewinner's impact on international research?
- Did the prize promote the development of the of the specific field of research?
- Did the research break new ground in science?
- Did the research develop new hypotheses or methods?
- What other results could be achieved?
- To what extent could the Austrian research be established within the international scientific community?

Comments

The prizewinner already had an excellent international reputation before the award was made, underscored by the ability to publish his research finding in the most prestigious journals. The Wittgenstein prize has enabled the prizewinner to develop and establish novel techniques and to work on research questions that may otherwise be difficult to get funded as they considered too risky. The research was important in answering questions on the relation of structural changes and functional properties at synapses, and on how synaptic properties generate higher network computations, and generated methodological advancements that will also be enhancing the toolkit of other researchers worldwide. In the journals in which the prizewinner publishes, basically every paper describes research that breaks new grounds in science, and this is also the case here. Largely due to the use of newly developed methods (including "octuple" recordings), the prizewinner was able to falsify previous views and identify novel neuronal functions that have not been possible to detect with previously available technology. Some of the research has also become textbook knowledge. Also, the prizewinner is using a large spectrum of sophisticated techniques which frequently complement each other which can only be done if the research group (based on overall funding) is sufficiently large. In summary, the prizewinner developed new hypotheses and methods which allowed him and his collaborators to move the frontiers in the field in the funding period. Moreover, the prizewinner has collaborators not only inside Austria but also outside of Austria, and former students and postdocs hold faculty position abroad. The research funded by the Wittgenstein prize that also had significant impact internationally.

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3. Unique opportunities of development which evolved within the scope of the Wittgenstein prize

- Did the Prize help the researcher to make use of new opportunities which would have been impossible otherwise? (e.g. unconventional topics, intensified research in fields that were new to the prizewinner)
- Did the researcher exploit the opportunities successfully? In which way?
- How did the Wittgenstein Prize and the research carried out increase the prizewinner's international reputation?
- Did the Wittgenstein Prize have an influence on the academic staff working in the project (academic career, personal career planning)?

Comments

The Wittgenstein prize provided Professor Jonas with opportunities that he otherwise likely would not have had. The scientific environment at ISTA was apparently also very conducive for starting important collaborations, e.g., in the area on super-resolution light microscopy and in the area of computational modeling, with the result that the Jonas group has now also published a purely theoretical paper. It appears that all the projects described in the final report resulted in publications in major journals, with the exception described by the prizewinner that "our behavioral experiments remain preliminary", referring to the goal to bridge our understanding of synaptic phenomena with behavioral output, which is a major challenge in neuroscience. As pointed out previously, the Wittgenstein prize and the research carried out resulted in a considerable number of papers published in excellent journals, and the newly developed methods and the results obtained have underscored and also increased the scientific reputation of the prizewinner. Awarding of a named professorship in the grant period is an indicator of his international reputation, as are prizes such as the Schroedinger Award, and the Peter Seeburg prize for Integrative Neuroscience. It is also recognized internationally that since his arrival at ISTA Professor Jonas has assembled a cluster of neuroscience researchers which rivals similar groups and departments at international top institutions. Finally, the Wittgenstein prize had a significant impact on the careers of junior scientists. As Professor Jonas mentioned in his final report, many of his former graduate students and postdoctoral trainees now hold faculty positions on three continents, and some of them were first authors of papers reporting research funded by the Wittgenstein award. Especially publications in top journals as first author – indicating excellent research training and future potential – play a very important role in faculty hiring, and the large number of excellent papers as result of the Wittgenstein prize thus mean that the funding had a large positive influence on the career of multiple junior scientists.

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4. Additional effects

- Did the research institute support the research of the prizewinner? To what extent?
- What was the impact of the Wittgenstein Prize on the research institute?
- Did the prize help to intensify the researcher's publication activities?
- What kind of meetings or conferences were organized?
- Were the research outcomes in the course of the Wittgenstein prize presented to a broader public?
- How promising are the follow-up activities envisaged?

Comments

It appears that the research institute (ISTA) provided support for the research of the prizewinner. While this is not mentioned specifically, I assume that his salary is paid by the institute. It is mentioned in the report that equipment costs are usually also provided by the institute. The institute apparently also paid for visits by other scientists giving seminars. The publication activity of Professor Jonas was already high before the prize. As he points out that the Wittgenstein prize grant does not overlap with other grants, it is clear that the scientific productivity of the Jonas group was significantly enhanced by the Wittgenstein prize. In the final report, three symposia at meetings (twice at a International Winter Neuroscience Conference in Soelden, once at the annual meeting of the Society for Neuroscience in Washington, DC) and a biennial meeting of the Austrian Neuroscience Association in Klosterneuburg are mentioned as facilitated by the award. Moreover, apparently 24 presentations at international meetings were facilitated by the award. Professor Jonas is involved in a variety of outreach activities, including the "Wissensdurst" Festival and other talks to the general public, as well as activities involving industrial representatives and politicians. Moreover, several press releases were prepared on published papers. Thus, it appears that the results of the funded research were adequately presented to a broader public. It is expected that future research coming from the Jonas lab will be strongly influenced by the results obtained and by the novel methods developed by the research funded by the Wittgenstein prize. The award is thus an investment that will provide benefits long after the end of the funding period.