



**Institute of Philosophy and Sociology of the Polish Academy of Sciences  
announces  
a competition for the position  
PhD-scholarship  
in the project  
“Semantics Out of The Grey Box: How Can Representational Mechanisms of The  
Brain Provide Semantic Properties of Structural Representations?”  
(2020/39/O/HS1/02239)  
led by dr hab. Marcin Miłkowski, prof. IFiS PAN**

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**Project financed by the National Science Center - Poland,  
as part of the "PRELUDIUM BIS 2" competition**

Projected start of project: **October 1<sup>st</sup>, 2021**  
Number of scholarships: **1**

Scholarship in the amount of PLN 5000,00/ month (tax-free) up to the mid-term assessment and PLN 6000,00/ month (tax-free) after the mid-term assessment for a total period of 48 months.

The scholarship will be awarded by means of a competition, the rules of which are set out in Annex 2 to the Regulations on granting funds for the implementation of tasks financed by the National Science Center in the field of research projects as an attachment to the resolution of the National Council Science Center No. 95/2020 of September 14, 2020. The PI of the project will be the PhD supervisor. In the event of resignation of the selected candidate, the right to indicate the next candidate from the list of ranking is reserved.

**The potential doctoral candidate must:**

- hold university degrees with outstanding academic track records in philosophy and must be formally entitled to doctoral studies (PhD) in philosophy;
- be well-versed with current philosophy of mind and language, in particular as semantics of mental representations is concerned;
- provide a study plan that addresses the research tasks below and reflects scholarly acquaintance with contemporary debates.

In addition to the scientific qualifications, the ability to work in an autonomous and structured manner, openness to interdisciplinary work and a high level of communicative competence and teamwork are required. Active participation in the events of the scientific group led by the PI is expected.

Candidates interested in participating in the competition are invited to submit the following documents (in English):

- a) Cover letter;
- b) a CV containing a list of publications, presentations at conferences and other scientific achievements;
- c) Concise description of your planned research (not more than 1500 words plus references) that addresses how the research tasks (see below) are to be implemented in detail;
- d) Scan of the Master's diploma;
- e) Sample of writing (e.g., report, article, master's thesis chapter; the same may be in English or Polish)

### **Information about the project**

The objective of the project is to develop a comprehensive account of semantic properties of structural representations, as underpinned by representational mechanisms in neural systems. While defenders of structural representations have focused on arguing that they are genuinely representational and pervasive in cognition, there has been less stress on how these representations are processed cognitively, on the semantic features they (might) possess, and in what way. Most studies have focused on denotative capacities of structural representations, whose contents could play not only descriptive but also directive roles, but the crucial question is whether they could provide meaning properties that could underlie intensional phenomena, which can lead to referential opacity. In order to address this issue, the project will provide an account of such features as synonymy, meaning identity under substitution, and compositionality, which are crucial in understanding how semantics of both elementary and complex structural representations may be implemented in neural systems, as well as in artificial cognitive systems.

The research will rely on the notion of a representational mechanism proposed by Milkowski, which will be then appropriately developed further. Representational vehicles will be assumed to be parts of organized causal structures, or mechanisms responsible for representational phenomena. These vehicles play computational roles as well as instantiating semantic properties. In general, they allow a representational mechanism to refer to a target entity (if it exists) and to provide satisfaction conditions, or content. In the case of structural representation, these vehicles stand in a structural resemblance relationship to a target and the structure of the vehicle also specifies its satisfaction condition.

Against this background, new questions will be asked. In particular: how do complex structural representations such as multimodal representations of perceptual objects attain their satisfaction conditions? This question is all the more important because multimodal representations may rely on unimodal structural representations that have to become bound to a single target in some way. How do complex representations function as representations-as, i.e., how can they lead to referential opacity?

Moreover, assuming that current computational cognitive neuroscience frames structural representations in terms of high-dimensional vectors in (spiking) neural networks, it is unclear how these vectors are combined, compared, and operated upon in accordance to their representational functions.

In particular, the research plan is as follows:

1. Specify the notions of predication and denotation, meaning identity for basic structural representations, in contrast to symbolic representations.
2. Specify the notion of synonymy and meaning comparison across multimodal and unimodal structural representation, required for error detection posited by the theory of representational mechanisms.
3. Study the differences between receptor-like and structural representation, in terms of their semantic properties and compositionality.
4. Provide the account of compositional structural representations for artificial neural networks, studying the relationship between their syntactical and semantic properties.

5. Explore biological plausibility of the account as applied to the study of the neural systems.
6. Study other operations on structural representation, such as providing compressed pointers and enabling inferential operations, both deductive and non-deductive.

The successful candidate will be registered as PhD student at the Graduate School for Social Research (GSSR).

Applications should be sent by **July 15<sup>th</sup>, 2021** in electronic form to the address: [mmilkows@ifispan.edu.pl](mailto:mmilkows@ifispan.edu.pl) with a note in the title "**Competition – Semantics Out of The Grey Box**".

The competition will take place in one stage. The recruitment commission will make an assessment of the candidates on the basis of submitted documents. In particular, the competence to undertake research will be assessed by judging the degree to which the research plan shows scholarly competence in philosophy of mind and language as well as addresses the questions asked in the project effectively (70% of the evaluation). The publication record will constitute 30% of the evaluation score.

The contest will be resolved no later than **July 20<sup>th</sup>, 2021**, and the recruitment results will be published at <http://www.ifispan.pl/category/oferty-pracy/konkursy/>

Please attach the following clause to your cover letter:

**Consent to the processing of personal data**

I consent to the processing of my personal data (name, phone number, e-mail address, photo and other information contained in the application documents) by the Institute of Philosophy and Sociology of the Polish Academy of Sciences, based in Warsaw, ul. Nowy Świat 72 for recruitment purposes.

.....  
Signature of the candidate

Please also read the Information regarding the processing of personal data:

**Information regarding the processing of personal data**

1. The administrator of personal data processed as part of the recruitment process is the Institute of Philosophy and Sociology of the Polish Academy of Sciences, ul. Nowy Świat 72, 00-330 Warsaw.
2. Contact with the personal data protection officer is possible at: Institute of Philosophy and Sociology of the Polish Academy of Sciences, ul. Nowy Świat 72, 00-330 Warsaw, e-mail: [iod@ifispan.waw.pl](mailto:iod@ifispan.waw.pl).
3. Personal data (and contact details - if provided) will be processed for the purpose of conducting the current recruitment procedure on the basis of expressed consent (art.6 par.1 lit.a RODO).
4. The data subject has the right to withdraw consent at any time without affecting the lawfulness of the processing that was carried out on the basis of consent before its withdrawal. Withdrawal of consent takes place by sending a message to the e-mail address: [Konkurs@ifispan.waw.pl](mailto:Konkurs@ifispan.waw.pl).
5. Personal data will not be transferred to third parties and international organizations.
6. The data collected in the recruitment process will be stored for no more than 6 months from the deadline for submitting documents.
7. The data subject has the right to access their personal data, request their rectification or deletion. Submitting a request to delete data is tantamount to resignation from participation in the recruitment process conducted by IFiS PAN. In addition, she has the right to request

- restriction of processing in the cases specified in art. 18 GDPR.
8. The data subject has the right to lodge a complaint with the President of the Office for Personal Data Protection for unlawful processing of his personal data. This office will be competent to consider the complaint, but the right to lodge a complaint relates only to the lawfulness of personal data processing, and not to the recruitment process.
  9. Providing the data contained in the recruitment documents is not mandatory, however, it is a prerequisite for participation in the recruitment process.

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