Life science and cognitive sciences largely rely on the concept of "communication" to describe and explain processes they study. Scientists talk about communication not only between humans and other animals, but also in reference to unicellular organisms, such as colonial algae or slime molds, or even between proteins within cells. This has even prompted some researchers to propose that "information" and "communication" are key concepts enabling the integration of evolutionary and developmental biology with cognitive sciences, an approach known as "Scale-Free Biology" proposed by Chris Fields and Michael Levin.

This project investigates whether scientists mean the same thing when they use the term "communication" to describe interactions between humans and interactions between cells.

Standard understanding of "communication" dates back to Claude Shannon's seminal work on mathematical theory of communication, more widely known as "information theory". Shannon has been working in a specific engineering context, focusing on radio, television, and telephony. His work was quickly adapted to biology, for example in the idea of the "genetic code" and remains in wide use to this day. However, the formal assumptions of information theory are not well-suited to describe biological processes. This raises significant doubts about how to interpret the use of this term in life science and cognitive sciences.

Philosophy of science can contribute to scientific discussions through the clarification of concepts special sciences employ, investigating implicit assumptions they make, and scrutinizing the practices of researchers. This project will approach the question of communication through the lens of *digital* philosophy of science, investigating a text corpus of articles from scientific journals in life science and cognitive sciences. The methodology of digital humanities, the use of computer-based tools for analysis of texts, allows for studying collections of texts that no person could read within a lifetime. Such large-scale studies can highlight common patterns of usage of words and indicate their meanings, in a generalizable and transparent way.

Results of this large-scale corpus study will then be analyzed in detail with standard philosophical approach of conceptual analysis. This will allow to answer detailed research question, which further highlight the role of "communication" and the implications of the use of the concept: What simplifications in the description of biological phenomena are necessary for the use of the term "communication"? Do signals on the scale of cells have a *meaning*, and does it emerge in the same way as in the case of human communication? Are there *symbols* within cells, or is it a sole domain of human language?

Finally, the results of this project primarily aim to explain what scientists have in mind when they say "communication". This may have significant impact on theoretical attempts, such as the recalled "Scale-Free Biology", which seek to integrate different subdisciplines of life science. Providing researchers with a well-defined, empirically grounded concept of "communication" may help them develop theories and provide grounds for their empirical validation.