Can we differentiate neural signatures of creative idea generation and evaluation? Do individuals evaluate their own ideas and those of others differently? Does language differentially affect idea generation and evaluation in bilinguals?

The project goal. Creativity is one of the most essential and sought after human skills. Creative solutions challenge ordinary thinking and pave the way for human innovation and progress. To be considered creative, a solution must be novel (unusual, unique) and useful (relevant, applicable). For instance, you could seal an envelope with a few drops of *honey*. By contrast, if a solution is novel but has no value, it is inadequate or even stupid: for instance, "I could seal an envelope with a few drops of *oil"*. Evaluating a solution as being useful or not is therefore critical when engaging creativity. It is surprising that we know so little about what happens when we spot a creative solution amongst ordinary ones. Neuroscientific research has focused on what happens when we come up with creative ideas and not so much on what happens when we evaluate them. In this project, we set out to identify the brain signatures associated with *both* creative idea generation *and* evaluation, and we investigate the dynamic relationship between them. Because our world is largely bilingual, we further examine idea generation and evaluation in bilinguals to see if the language in which we think about a creative solution (the native or the second language) makes a significant difference for creative performance. These research aims will be tackled by a dedicated, interdisciplinary, and international team of researchers assembled specifically for this project.

Description of the research. We have designed six experiments. First, we will develop 300 mini-problems to solve (e.g. *To fix a wobbly table, I can use [...]*) and ask participants to come up with ordinary and creative solutions to these problems. Second, we will record EEG in participants reading mini-problems with ordinary, creative, or nonsensical solutions to identify brain signatures of creative idea evaluation. Third, we will record EEG when participants generate their single most creative solution to mini-problems, immediately followed by an alternate solution to that problem (produced by a group of individuals in the first experiment), to study the relationship between idea generation and idea evaluation. Fourth, participants will first generate multiple creative solutions to problems and then be presented with solutions that were either generated by them earlier or other solutions from the first experiment, testing for the first time the neural basis of self- vs. other-idea evaluation. Finally, in two experiments inspired from the two last experiments above, we will test if the language in which participants generate and evaluate creative solutions language (native Polish and second language English) influences creative production and, critically, creative evaluation in bilingual individuals.

Reasons for attempting this research. Because the ability to evaluate a creative solution is just as important as the ability to generate one, we need to better understand what happens when individuals perceive an idea as being creative or not and how idea generation interacts with idea evaluation. Further, because many problems of the world today require international, multi-lingual effort, it is timely to uncover possible effects of the language in which problems are solved on the creative process. Understanding of the relationship between idea generation and evaluation is very important given the key value of creativity in today's society and exploring the influence of language on the creative process is equally important given the explosion of problems at the scale of the planet (climate change, banking systems, diplomatic ties and negotiations, etc.).

Substantial results expected. Our project will break new ground by unravelling, for the first time, the interplay between creative idea generation and evaluation, in the native and the second language. We expect our findings to have strong impact in the fast-expanding field of neuroscience of creativity. We believe that our project may also have important implications for everyday life in the future. Understanding creative problem-solving is crucial in today's world, where complex and rapidly evolving challenges—such as pollution or global health crises—demand innovative and adaptable solutions. Understanding the role of language(s) in this process could lead to strategic advice and even policy making in international contexts where multilingualism is fast becoming the norm.