

## PRESS RELEASE

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### SISSA secures 1.5 million euros from the European Research Council to study neural networks behind ChatGPT's success

Physicist Sebastian Goldt awarded with an ERC starting grant for his project "beyond2"



Trieste, 5 September 2024

Chatbots like ChatGPT were unthinkable a few years ago. Now they are part of our everyday life. However, we still don't know why they work so well and how good these techniques can become in the future. With his project "beyond2", SISSA physicist Sebastian Goldt hopes to discover the fundamental theoretical principles that allow neural networks to achieve that kind of performance and learn something about the structure of language in the process. Thanks to the European Research Council, he will have 1.5 million Euros over the next five years to pursue his dream.



Sebastian Goldt joined SISSA in 2020 as an assistant professor in the newly created Data Science group. He has now been awarded with a Starting grant from the European Research Council (ERC) worth 1.5 million euros, which will help him grow his own team. “When I first got the news, I was incredibly happy about this recognition and excited about the opportunities that come with it”, Goldt commented. “Now I’m looking forward to welcoming the new group members that I will be able to hire thanks to the ERC funding and to all the cool science we will do together.”

Goldt’s project “beyond2” will study neural networks, the key technology behind tools like facial recognition on smartphones, or chatbots like ChatGPT. These networks “learn” by processing vast amounts of data, but they work like “black boxes”: “while they are effective in practice, we don’t really understand how they make decisions or what patterns they pick up from data,” Goldt explained. “We will study what and how neural networks actually learn from their data, which could ultimately help improve these technologies. But that’s not all: neural networks are also a powerful model of how the brain processes information. Thus, part of the project will focus on neuroscientific questions, and in particular we will look at how interactions between individual nerve cells in the brain help it achieve its tasks.”

This project is the result of Goldt’s talent and a relatively short but brilliant career: he grew up in Germany and studied physics at the University of Cambridge. Before coming to Trieste, he completed his doctorate in Stuttgart and worked as a postdoc at the Institute for Theoretical Physics (IPhT) and Ecole normale supérieure in Paris. As he stated, “this project was also shaped by the many discussions I’ve had with my colleagues here in Trieste and abroad over the past few years, and I think the grant is also a nice reflection of the stimulating scientific environment that we have here at SISSA.”

“beyond2” is one of 494 awarded Starting Grants, out of 3474 proposals submitted (14.2% success rate), announced today by the European Research Grant, for a total value of almost 780 million euros. This is the 31st grant from the European Research Council that SISSA is hosting. It is a very high number compared to the limited size of the faculty of the School, thus making SISSA one of top host-institutions.

Iliana Ivanova, European Commissioner for Innovation, Research, Culture, Education and Youth, stated: “The European Commission is proud to support the curiosity and passion of our early-career talent under our Horizon Europe programme. The new ERC Starting Grants winners aim to deepen our

understanding of the world. Their creativity is vital to finding solutions to some of the most pressing societal challenges. In this call, I am happy to see one of the highest shares of female grantees to date, a trend that I hope will continue. Congratulations to all!”

## **About the ERC**

The ERC, set up by the European Union in 2007, is the premier European funding organisation for excellent frontier research. It funds creative researchers of any nationality and age, to run projects based across Europe. The ERC offers four core grant schemes: Starting Grants, Consolidator Grants, Advanced Grants and Synergy Grants. With its additional Proof of Concept Grant scheme, the ERC helps grantees to bridge the gap between their pioneering research and early phases of its commercialisation.

Starting Grants support cutting-edge research in a wide range of fields, from life sciences and physics to social sciences and humanities. They help researchers at the beginning of their careers to launch their own projects, form their teams and pursue their most promising ideas.

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