



Announcement 2022-04-07

2022 Swedish Foundations' Starting Grant awarded to

Agnese Bissi Senior lecturer
Division of Theoretical Physics
Uppsala University

Funded by: [Olle Engkvists Stiftelse](#)
Grant: Up to 15,500,000 SEK over 5-year period
Project title: *Integrating the Conformal Bootstrap*

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The Uppsala physicist exploring the riddle of quantum gravity

As a theoretical physicist, Agnese Bissi's foremost tools are a pen, paper and a laptop for modelling; to perform experiments would require technology so advanced it is yet to exist.

Bissi's project delves into the very fundamental of physics governing our world. Here, Albert Einstein's theory of general relativity is still the most accurate theory of gravity — elegantly relating space-time geometry to the momentum of the matter/energy in it. However, the theory's validity is purely classical and fails in accounting for quantum effects, which is what Bissi is looking to explore further by combining the techniques of the so called "conformal bootstrap" – i.e., analytical and numerical approaches – and integrability (models which can be mathematically solved given their large number of conserved quantities and thereby high degree of symmetry).

"Receiving this grant is very important for me", Bissi shares, "since it will allow me to pursue a very ambitious working idea that I have been elaborating and framing in recent years. In addition, it will spark new technology, results and ideas to enable me to compete for an ERC Consolidator grant in the near future."

Biography

Agnese Bissi arrived to Uppsala as a Wallenberg Academy Fellow in 2017. Bissi obtained her PhD degree from the Niels Bohr Institute at the University of Copenhagen and has previously held post-doctoral positions at the University of Oxford and at Harvard University.

Learn more about Agnese Bissi's research (external links):

[Profile page](#) at Uppsala University

[List of publications](#) (Google Scholar)

["Searching for symmetries to describe reality"](#) (interview, Knut och Alice Wallenbergs stiftelse, 2018)

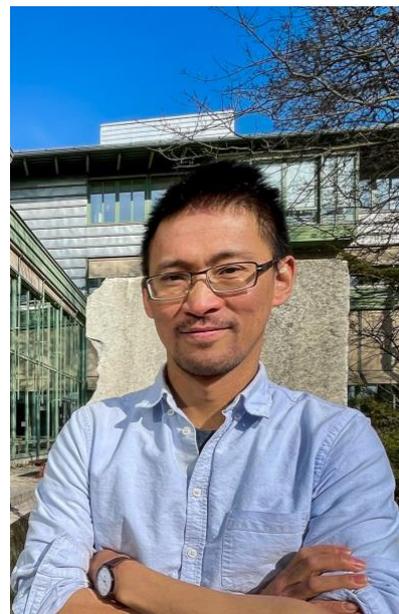
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2022 Swedish Foundations' Starting Grant awarded to

Wei-Li Hong Assistant professor / Baltic Sea Fellow,
Stockholm University
Department of Geological Sciences (IGV)

Funded by: Ragnar Söderbergs stiftelse
Grant: Up to 14,000,000 SEK over a 5-year period
Project title: *Silicate alteration in marine sediments:
rate, pathway, and significance*

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How does one of Earth's most common minerals neutralise CO₂?

Silicon-oxygen compounds are by far the most common mineral found in the Earth's crust and upper mantle. These so-called silicates have slowly and quietly been regulating the amounts of carbon dioxide on our planet for billions of years. Surprisingly, we do not know much about the chemistry behind it all — especially for silicates at the bottoms of our oceans, the largest pool of the minerals after that found in the Earth's crust.

With this project, Wei-Li Hong sets out to mimic harsh deep-sea conditions in the lab at Stockholm University — i.e. over hundreds of atmospheric pressures at sub-zero temperature — in order to study more closely how marine silicates aid in neutralising carbon dioxide.

Biography

Describing himself as "a geologist in the core and geochemist in the soul", Wei-Li Hong has via universities in Taiwan, USA, Norway and Sweden come to explore the chemical oceanography of a range of deep-sea sediments — from the North Pacific and Arctic Oceans to Barents Sea.

"This grant is definitely a step-up in my career, providing me the resources and freedom to study what I am genuinely interested in, which is a great privilege", Hong explains. "Particularly important – this is my topic of choice, primarily curiosity-driven and associated with high risks. I am grateful for the trust given by Ragnar Söderbergs stiftelse. This makes me more confident in pursuing a similar topic in the future."

Learn more about Wei-Li Hong's research (external links):

[Profile page](#) and [CV](#) (Stockholm University)