Application No. 945/22

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***Basic Science statement***

***Solar urban districts: A holistic generative cross-climatic method for solar-driven environmental design of dense urban fabrics***

The values of the proposed project closely align with those of basic science: it offers an exploratory, open-ended research process that seeks to add new knowledge to the field of solar design and to reinforce the connection between environmental design and engineering. By focusing on an analytical approach rather than its practical application, this project will provide a new computational foundation for future solar-driven research, development, and design.

First, the proposed research combines the two fields of architectural design and environmental engineering, which currently are not fully integrated despite new computational technologies that allow them to interact effectively. The proposed project will conceptualize the possible link between these two fields in the context of solar-driven design, with the aim being to propose innovative ideas and to highlight important findings or principles that elucidate the interrelations between design and engineering and thereby serve as a new foundation for the holistic development of both fields in the context of the built environment.

Next, the project’s plan reflects its exploratory nature: it envisions investigating the combination of various research methods—geometrical generation, environmental analysis, and optimization modules—rather than offering a final solution where these methods interact “behind the scenes.” Moreover, the numerical results are not the focus of the research; instead, the project is open-ended and puts the actual approach at the center, guided by the belief that such an approach should open new scientific channels to exploit in the future. The project thus focuses on generating knowledge rather than on the practical application thereof.

Eventually, the use, the proposed project does, of optimization for architectural design based on environmental performance objectives is closely aligned with the goals of basic research to develop a predictive approach that can later serve to develop spatial interventions. The project seeks to investigate new metrics, weight them, and then use them in an inventive way that has yet to be explored. Therefore, although our previous research and preliminary studies and results give us confidence that the project goals will be reached, we are certainly pushing the boundaries of solar-driven design into unknown territory, driven by pure curiosity and an ambition to innovate and pave the way for future research and/or practical applications.