Application No. 945/22

PI1 Name: Jonathan Natanian

***Basic Science statement***

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

From several aspects, the proposed project’s values highly correlate with the ones of basic science; it offers an exploratory, open ended research process, which seeks to add new knowledge to the field of solar design as well as to reinforce the connection between environmental design and engineering. By putting the analytical approach at the center, rather than the application of it in practice, this project will result in a new computational foundation for future solar-driven research, development, and design.

Firstly, the proposed research can be regarded as one which brings two fields together – architectural design and environmental engineering – which are currently not fully integrated despite new computational technologies which allow these two fields to effectively interact. The proposed project will conceptualize on the possible link between these two fields in the context of solar driven design with the aim to bring new innovative ideas to fore, highlight important findings or principals on the interrelations between design and engineering which will serve as a new foundation for holistic development of both fields in the context of the built environment.

Secondly, the project’s plan expresses the exploratory nature of it: it is associated with investigating the possibility of bringing different research methods together - geometrical generation, environmental analysis, and optimization modules - rather than to offer a final solution where these methods will interact ‘under the hood’. Moreover, the numerical results are not the focus of the research path taken here, the project is rather open-ended and puts the actual approach at the center, under the belief that it can pave the way for new scientific channels and paths which will be derived from it in the future. The project is focusing on generating knowledge rather than on the application of it in practice.

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 which can be later taken forward to develop spatial interventions. This project seeks to investigate new metrics, weigh them, and then use them in an inventive way which was not explored before. Therefore, although our previous research experience as well as preliminary studies and results give us great confident that our goals for this project will be reached, we are certainly pushing the boundaries of solar driven design towards unknown territories, driven by pure curiosity and an ambition to innovate and pave the way for future research and/or application in practice.