



Master 2 internship topic
AAU-Cresson Laboratory – ENSA Grenoble

Title	Generative AI for urban resilience
Duration	5 - 6 months
Supervisor	Abdelkader BEN SACI email : bensaci.a@grenoble.archi.fr
Context	<p>This internship is part of the GenAI-SA – Generative Artificial Intelligence for Sustainable Urban Ambiances project [link], developed within an interdisciplinary research program involving the AAU-CRESSON and the LIG Laboratories.</p> <p>The project explores the application of generative AI to the creation of optimal and high-performance urban morphologies, taking into account energy efficiency and human well-being criteria.</p>
Objectives of the Internship	<p>The internship aims to design, train, and evaluate a generative AI model based on a corpus of building morphology data.</p> <p>In the first phase, the candidate will compare two generative learning approaches: training from scratch and fine-tuning a pretrained model. The intern will analyze the generalization and reconstruction capabilities of each model, while providing a critical assessment of the model currently used in the laboratory. If relevant, the candidate may also propose an alternative generative model deemed more suitable to the project's objectives.</p> <p>In the second phase, the internship will focus on developing a conditional learning strategy that integrates physical and spatial constraints of urban ambiances, in order to guide the generation process toward urban morphologies optimized for performance.</p>
Expected Results and Impacts	<p>This internship will contribute, on the one hand, to the validation of a learning method capable of representing both the fineness of architectural details and the complexity of spatial relationships within the built environment. On the other hand, it will accelerate the development of a generative AI model dedicated to the production of urban morphologies with high environmental performance.</p> <p>Beyond offering a technically relevant solution, the internship will also strengthen the synergy between architectural and urban modeling and machine learning, providing evidence of the potential of generative AI as a tool to support the energy transition of cities.</p>
Internship Framework	<p>The internship will take place at the AAU-CRESSON Laboratory (Architectural and Urban Ambiances, UMR CNRS 1563, École Nationale Supérieure d'Architecture de Grenoble), renowned for its research on the relationships between the built environment, sensory perception, and environmental performance. The laboratory provides a multidisciplinary environment fostering exchanges between engineering sciences and human and social sciences.</p> <p>The intern will work in close collaboration with researchers specializing in ambiance modeling, building physics, and urban form generation. This experience will provide an opportunity to engage with social, ecological, and digital challenges, and to develop skills in the processing and modeling of complex morphological datasets.</p> <p>The work carried out during the internship may lead to a scientific communication or publication as part of the GenAI-SA project.</p>

