GENERATIVE DESIGN BY BIM APPROACH

1. Workshop Instructor Information

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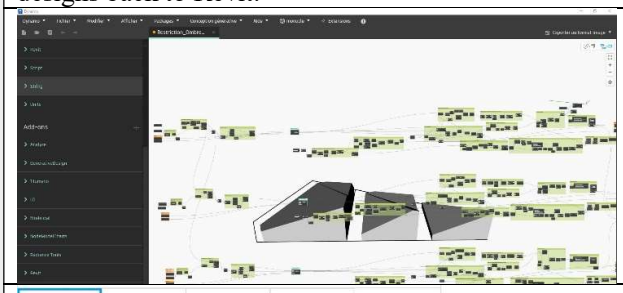
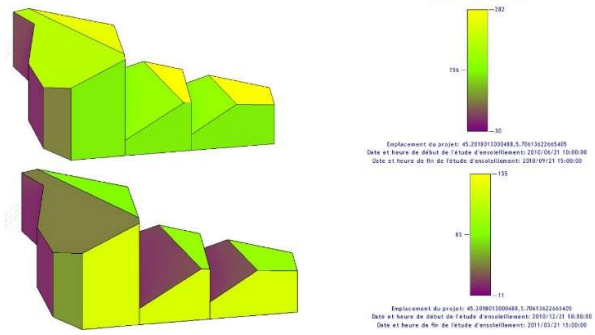
Short Biography (150 words max.)	**Laila Koubaa Turki**, Doctor of Science and Architectural Engineering from the University of Carthage, National School of Architecture and Urbanism of Tunisia. Worked on parametric design for urban fabric optimizing. Certified for AUTODESK Pro Revit. Expert in parametric modelling, BIM, visual programming and Generative design. Animated a workshop «Partage de connaissances» about Visual programming on Dynamo on the sidelines of the international conference "Séminaire de conception architecturale numérique SCAN'18" at the ENSA of Nantes, France. **Abdelkader Ben Saci**, Lecturer in Sciences and Techniques of Architecture at the National School of Architecture of Grenoble, Researcher at the Ambiances Architectures Urbanities laboratory, AAU-CRESSON team. Expert in architecture digital approaches: BIM, parametric modelling, energy performance, generative design and machine learning.
Head Shot	

2. Workshop Information

Length	4 hours online sessions • Day 1: 10-10-2022: 2 hours • Day 2: 11-10-2022: 2 hours

Short Abstract (250 words max.)	**Aims and objectives:** This workshop will give basic exposure to generative design on BIM environment. It gives hands-on experience on how to create visual scripts and run a generative design process. Revit, Dynamo and Project refinery will be used to study the volumetry of a building through an iterative process that generates outputs to satisfy certain constraints. The first step is to define inputs and variables depending on the ultimate goals. Then the last step is to select the optimal solution. The tools employed are Revit for BIM modelling and Dynamo for visual programming and Refinery for the Generative Design. Once the optimal solution has been determined, it is possible to import the results back into Revit environment to complete the BIM modelling study. **Program** • Presenting Revit and dynamo interface • Creating algorithm on Dynamo • Creating and running Generative design study on Refinery • Importing the optimized solution back to Revit • BIM study on Revit **Importance of workshop** • Day 1 will focus on Dynamo basics: How to create a model for generative design studies. We will begin by developing a common understanding of the mechanics of Dynamo, then move on to build a set of graphs together that will include some basic geometric applications and Revit integration. • Day 2 will focus on adding evaluators and generating design options. We will go over the fundamentals of optimization and how to frame a design problem in terms of goals and constraints in order to drive multi-objective optimization and evaluation in Refinery. We will explore the various ways our problem definition can affect the result of the optimization. We will export optimized solution on Revit for BIM study.
Handouts and Materials	Software: Autodesk Revit 2022 or education version
Learning Objectives	• Parametric modelling with Revit • BIM with Revit • Visual programming in Dynamo • Generative design on Refinery • Multi-objective optimization towards specific goals on Refinery

Sample Outcome	During this workshop participants will learn how to build geometry generators and evaluators using visual programming in Dynamo; how to use these generators and evaluators to drive multi-objective optimization towards specific goals on Refinery; and how to use Refinery's tools to evaluate the generated optimal solutions and integrate some of these designs back to Revit.  
Corresponding Conference Theme	**(C) Parametric Design and Digital Fabrication.**

3. Attendees Information

Who should attend this workshop?	15 participants Masters or PhD students in architecture
Prerequisites	• A computer to accomplish the recommended exercises • Need to install a trial of Autodesk Revit 2022 or education version, on the computer • Need basic knowledge about Revit.