PARAMETRIC MODELLING WORKSHOP
RHINOCEROS / GRASSHOPPER LEVEL ONE / TWO

CONTACT

Instructor ANASTASIA GLOBA

PhD candidate [Victoria University of Wellington, NZ], M.Arch [DIA Dessau, Germany 2010], Architect [MGTU, Russia, 2007]

Globalnaya@gmail.com

http://parametric-modelling.tumblr.com/

http://parametric-design.blogspot.co.nz/
WORKSHOP FORMAT

Target Audience: Architectural and design students (second year or higher), architects, landscape designers, interior designers, urban designers and building scientists;

NO PRIOR KNOWLEDGE OF GRASSHOPPER AND RHINOCEROS IS REQUIRED.

HOWEVER, THE WORKSHOP FORMAT IS SUFFICIENTLY FLEXIBLE THAT THOSE WITH EXPERIENCE IN VISUAL PROGRAMMING SHOULD FIND IT REWARDING.

Duration: 2 Days

Capacity: 15-30 attendees

Format: Intense design workshop, online assignments submission, participation certificates (for those who have accomplished all practical assignments)

Infrastructure: Prepared GH files, prepared tutorials on topics covered,

Outline and objectives: The course offers an introduction to algorithmic computational design with Grasshopper for Rhinoceros. It aims to demonstrate the fundamentals and advantages of using parametric modelling as well as provide supervised tutorials of practical implementation of visual programming in architectural design.¹

TO PARTICIPATE IN THIS PARAMETRIC MODELLING WORKSHOP YOU HAVE REGISTER. TO CONFIRM DATES AND REGISTER PLEASE EMAIL YOU DETAILS TO GLOBALNAYA@GMAIL.COM.

¹ http://www.simplyrhino.co.uk/rhinotraining/grasshopper%20level%20one.html
WORKSHOP SCHEDULE

DAY 1

9:15 am    Final registration / working station set-up
9:30 am    Introduction to parametric design with Grasshopper
10:00 am   First Practical tutorial: Grasshopper Interface and basic components
12:30 – 1: 20 pm    Lunch break
1:30 pm    Second Practical Tutorial: “Twisting Tower”
2:30 pm    First Assignment introduction “Interactive Parametric Facade”
3:00 pm    First practical assignment: Design task development. [online submission + online questionnaire]
5:30 pm    End of the practical session

DAY 2

9:15 am    Working station set-up;
9:30 am    Advanced parametric design with Grasshopper
10:00 am   Third Practical Tutorial: Advanced generative components
12:30 – 1: 20 pm    Lunch break
1:30 pm    Fourth Practical Tutorial: “Voronoi 3D Cell Structure” + Sections, Area Text Tags
2:30 pm    Second Assignment introduction “Urban Pavilion” (Responsive structure);
3:00 pm    Second practical assignment: Design task development. [online submission + online questionnaire]
5:30 pm    Bonus Tutorial: Animations with Grasshopper.
5:45 pm    End of the workshop;

School of Architecture and Design
Victoria University of Wellington
DETAILED SCHEDULE: DAY 1

PARAMETRIC MODELLING WORKSHOP
Rhinoceros / Grasshopper
Level One
Day 1
1) INTRODUCTION TO PARAMETRIC DESIGN WITH GRASSHOPPER [lecture 30 min]

2) FIRST PRACTICAL TUTORIAL: GRASSHOPPER INTERFACE AND BASIC COMPONENTS [2.5 hour session (supervised)]

3) SECOND PRACTICAL TUTORIAL: “TWISTING TOWER” [1 hour session (supervised)]

4) FIRST ASSIGNMENT “INTERACTIVE PARAMETRIC FACADE” [2.5 hour practical session]

**Design Task:**

- Site: FREE
- Limitations: 10m/10m/5m max
- Function: FREE + Responsive [Facade changes when environment changes]
- Material – N/A

- Design task development - sketching [10 min]
- Describe your design idea using 2-3 keywords for each category.
  - Geometry [Keywords example: circles, triangulation, spiral]
  - Abstract Metaphors [Keywords example: smooth, airy, cloud etc.]

- Participants have to accomplish and submit the first assignment [online submission via email (to Globalnaya@gmail.com)]. The first assignment should be submitted before 9:00 am on the next day.

- After each submission participants will be asked to answer a short questionnaire
List of topics covered in the tutorials [Workshop Day 1]):

Link existing geometry to Grasshopper / Bake generated geometry back to Rhino

Manipulating parameters / Understand Math functions:

- Number sliders
- Domains
- Operators

Sets:

- Series
- Cull Pattern (Larger than/True and False) Lists
- List item
  - Index
  - Flatten
  - Shift List

XYZ Points

Curves:

- Curve extrusion
- Loft Curves
- Primitives: circle / polygon/ rectangle
- Divide Curve
- Offset Curve
- Fillet Curve
- Pipe
- Morph Curves

Surfaces:

- Planar surface (Create Planar Surface from Curves)
- Extrude
- Explode Plane/Surface
- Divide Surface

3D primitives: cone / sphere / box

Vector functions:

- Grids
- Vectors
- Populate 2D points

Bitmap import / set-up

Move / Rotate Geometry

Graph Mapper

Preview / Colour
DETAILED SCHEDULE: DAY 2

PARAMETRIC MODELLING WORKSHOP
RHINOCEROS / GRASSHOPPER
LEVEL TWO
DAY 2
1) ADVANCED PARAMETRIC DESIGN WITH GRASSHOPPER + DIGITAL FABRICATION [lecture 30 min]

2) THIRD PRACTICAL TUTORIAL: ADVANCED GENERATIVE COMPONENTS [2.5 hour session (supervised)]

3) FOURTH PRACTICAL TUTORIAL: “VORONOI 3D CELL STRUCTURE” [1 hour session (supervised)]

4) SECOND ASSIGNMENT INTRODUCTION “URBAN PAVILION” (Structure responsive to human behaviour) [2.5 hour practical session]

Design Task:

- Site: FREE
- Limitations: RESPONSIVE STRUCTURE (Structure responsive to human behaviour / movement / amount of people, etc…)
- Function: URBAN PAVILION
- Material – N/A

- Design task development - sketching [10 min]
- Describe your initial design idea using 2-3 keywords for each category.
  - Geometry [Keywords example: circles, triangulation, spiral]
  - Abstract Metaphors [Keywords example: smooth, airy, cloud etc.]
- Participants have to accomplish and submit the first assignment [online submission + online questionnaire] Note that the second assignment should be submitted before 10:00 pm on the same day.

5) BONUS TUTORIAL: “ANIMATIONS WITH GRASSHOPPER”

6) End of the workshop

- Registered participants, who have accomplished and submitted all practical assignments will be given certificates (via email)
List of topics covered in the tutorials [Workshop Day 2]):

Distance (Points/Curves (Find the closest point on a curve))
Expressions (F(x)/Sin/Cos/Division…)
Cull pattern (True, False)
Dispatch (Distance Condition)
Sets/Lists:
- Split list
- Jitter (Randomise Values in the List)
- Min/Max
- Graft Tree (add an extra branch for every data item)
- Randomise
- Random Reduce

Curves:
- Distance extrude
- Curve from points
- Morphing Curves
- Evaluate Curve
- Offset
- Loft Curves
- Generate Polygons
- Area

Graph Mapper

Triangulation:
- 2D Metaballs, 3D Metaballs + Orthogonal
- 2D Voronoi, 3D Voronoi
- Delaunay

Surfaces:
- Planar Surface
- Explode
- Edge Curves
- Sections
- Project Geometry on a Plane / Surface

Curve Gradient / Surface Gradient

Text Tag
EXPECTED OUTPUTS

Assignment 1

- Rhino file named, REGISTRATION NUMBER_1.3DM (for example 09_1.3dm)
- Grasshopper file named, REGISTRATION NUMBER_1.GH (for example 09_1.gh or 09_1.ghx)
- Outcome model render/print screen ("1024 × 768" pixels min, JPG) REGISTRATION NUMBER_1_01.JPG ((for example 09_1_01.jpg)
- Questionnaire 1 (answered)
- Optional: Sketch ((for example 09_1_02.jpg)

Assignment 2

- Rhino file named, REGISTRATION NUMBER_2
- Grasshopper file named, REGISTRATION NUMBER_2
- Outcome model render/print screen ("1024 × 768" pixels min) REGISTRATION NUMBER_2_01
- Questionnaire 2 (answered)
- Optional: Sketch