Bottom-Up Parametric Building Design

Flows of Movement
Any site for an architectural project requires the knowledge of the flows of movement: how do pedestrians get from one place to another, what hierarchy do the roads present to the city, and what is the contribution of the public transportation to the city and in particular to the site.

Social Divisibility
A city is not merely the collection of roads and means of transportation, a city is used and designed for its users. The social divisibility is given and can be used in positive manner to estimate the interaction of different social groups in any given place. While different from the neighborhood start their journey, continue use the same place as a transportation hub, cotton have a particular point of interest, and business must cater to the different needs of the city’s inhabitants. The flows of movement desseminate among these make up the interesting design of social integration and social collaboration.

Energy Efficiency
In these modern times the emphasis in many architectural designs lies in the energy efficiency of the building, and how that sometimes even contributes to the city environment. Energy efficiency can be viewed in many ways, using wind energy or solar energy to gain power, using wind to create a natural ventilation, creating rain to use elsewhere, using environmentally friendly materials, using energy reducing building components, etc.

Wind Pressure Performance
A building has a big influence on the wind flow and the turbulence zones around it. Modern business areas deal with a lot of negative influence of the wind upon the pedestrian area, which leads to people to spend more time as possible in these public areas. A building design can use this form and can be used to determine the placement of turbulence zones directly around the building to use this knowledge in a polar way. It becomes possible with several design tools to create a desired urban environment for pedestrians in summer time, when wind brings cold air to the streets, and in summer time, when the air can bring much needed ventilation.

MSC3: Pressure Based Facade Component
MSC4: Pressure Based Building Dveisig
Facade Component
In my MSC3 I have designed an adaptive facade component that uses pressure differences, created by the wind force upon the building and the temperature differences between inside and outside, to filter carbon dioxide and nitrogen oxides from the desired oxygen and to change the temperature of the indoor climate. This research has been extended to areas with a high rate of turbulence. The facade component is designed to work throughout the year to create a minimum amount of turbulence zones around the building and to act as a system for natural ventilation on the building scale.

Reducing Turbulence Zones
A minimum of turbulence around the building is desired for people’s comfort and safety. The facade component aims to create a less turbulent environment by adding turbulence to the entire body of the building and adjusting wind to strategic points to maximize the influence on each wind direction. Entropy zones and walking routes around the building turn into more pedestrian friendly environments.

Maximizing Pressure Difference
The shape of the facade is established to maximize pressure differences upon the facade to use the facade components to their full capability. The obtained shape mimics the natural air currents downstream when hitting straight upon the facade. These cause the amount of turbulence on the ground floor. Something that is seen here in Deft at the VM building, which constantly creates turbulence on walls and roofs. The air entering through the facade components is distributed around the building before entering the individual function. The further in air is in the middle of the building where the heated air rises up to the main openings in the building. These two openings decrease even more the amount of air traveling to the ground floor and accelerate the air passing through them. The acceleration of air implies a decrease in pressure and this makes the function of air is drawn out of the stream.

Wind Velocity to Pressure Difference
With the increasing wind speed being directed linked to the decreasing in pressure, it is seen that there is only a limit to the amount of overpressure on the building. This when wind speeds decrease to 0, while this doesn’t go for the amount of suction, as the wind speed cannot decrease to infinity.

Social Interaction
Another theme determining the architecture of the building is the social interaction that is obtained by the placement of functions throughout the building. The social interaction is achieved by the different groups using various functions in the building, which also functions as a transportation hub to the city. The users are varying from residents to commuters and from employees to visitors. Time-sharing Levels
The amount of social interaction has different gratification according to the functions placed at various heights with peaks on the first few floors and the shopping mall with focal point from the 14th floor up. The interior architecture is focused on its place in the natural ventilation scheme and the different functions defined for the building. Functions are not merely flanked by elevators, but mainly by the spatial division organization that links different floors together and allows for social interaction. The placement of individual functions is determined by its connection to other functions, its need for delight and the speed of its travel.