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ADV Studio VI

Urban Futures Part 2

DIGITALCITY: The Space In-Between

GSAPP Architecture

Advanced Studio Spring 2013

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We do not isolate ourselves from the social world of the dominant culture but neither do we simply acquiesce to its powers. Rather, from inside the dominant culture we create not only alternative subcultures but, more important, new collective networks of expression. Communication is productive, not only of economic values but also of subjectivity, and thus communication is central to biopolitical production. From Multitude,

Michael Hardt and Antonio Negri

If Architecture is a form of knowledge and the materialization of concept, then how does architecture materialize in the space in-between ... *neither dominant nor marginal, neither center nor periphery, neither capitalistic nor slavocratic?*

What is the conceptual ground for architecture given the complexity of the processes of cultural exchanges resulted in “particular distortions”, permanent maladjustment, and the aformal?

How can architecture materialize in the space-time gaps between classes and masses?

## RESEARCH

“New collective networks of expression” not only characterizes the recent revolts by groups of disenfranchised peoples (the Arab Spring and the Occupy movement facilitated in part through social media networks such as Twitter/Facebook and easy access to mobile telecommunications), what Hardt and Negri dub the “multitude”, but it also describes new processes by which social and cultural communities are formed, new political structures emerge, and spatial relationships reconceptualized in through time giving way to “new collective spaces of expression.” Furthermore, the “new collective spaces of expression” --- the result of the collapse of space-time and place through time-sharing social practices --- are transforming the traditional city and resulting in new forms of urbanism as a “space of flows.”

The logic of spatial processes does not upend the city but rather provides a reflexive lens by which to critique the flows of information, capital, markets, technology, interaction, flows of images, sounds, and symbols, as well the power structures and political systems embedded in urban morphologies. At the global scale, the “space of flows” and globalization, beginning in the early 1990’s, gave rise to global networks, link cities, and global capitals hierarchically organizing cities relative to dominance in terms of advanced services, producer centers, and markets. The effect is blurring of architecture and landscape within urbanism as well as social, cultural, and political power structures.

In Brazil the growing debate over the past eight years on the use of new technologies for enhancing public policies led to the formation of the Brazilian Digital Cultural Forum launched by the Ministry of Culture in partnership with the National Network of Education and Research. This serves as a platform for the implementation of free and open source software (FOSS) within the federal public administration, the support for the creation of digital studios in communities, and discussions of the role of digital tools in the democratization of communication and culture.

According to musician / artist Gilberto Gil, head of the 1960’s Tropicalia counterculture movement, “The issue here is that the use of digital technology changes behaviors. The common use of the Internet and free software creates fantastic possibilities for democratizing access to information and knowledge to maximize the potential of products and services, to expand the values that form our common texts, and there-fore, our culture, and also to enhance cultural production, creating new forms of art.”

However, the simple existence of available technologies and the possibility of creating networks are not enough to guarantee desirable public policies for culture or any other area. This democratization depends, among other factors, on a political involvement on implementing technological infrastructure and regulatory frameworks that will allow and support this production and circulation. Additionally, Evgeny Morozov warns against what he calls the “net illusions”, by which he refers to the emancipatory promises presented by the Internet, without a critical regard. For modernization and industrialization did not begin in Brazil until near the middle of the twentieth century and as Brazil catches up economically and culturally in the twenty-first century as the largest national economy in Latin America, member of the BRICs (Brazil Russia India China South Africa) economic alliance, the 2014 World Cup host country, as well as 2016 Summer Olympic Games, the country remains a condition of “classes and masses” marked by great wealth disparities and the myth of racial democracy with the richest 10% of Brazilians receiving 42.7% of the nation’s income, while the poorest 10% receive less than 1.2%.

The studio will use advanced computational methods and parametric modeling to research, analyze, and translate the “new collective spaces of expression,” “space of flows” and topological conditions of the transforming urbanism and rapid adaptation to the new global economy and cultural landscape underway in Rio de Janeiro. The preliminary research will engage the new types of relations and exchanges through data-mining of archival and live data via time-sharing social practices, social media, and social networks that collapse virtual topology upon urban topography in order to allow for improvisation and adaptive responses to the space-time gaps between the “classes and masses” to create an increasingly complex heterogeneous in-betweeness that is Brazil.

## HYPOTHESIS: DigitalCity

How might we as architects, agents of material translations of the visible and invisible contexts imagine the future of the city? What tools do we have at our disposal to analyze and translate the complexity of this particular cultural landscape and topological condition? Can advanced computational methods and parametric modeling enable us to understand the complexities, transformations, and new types of relations and exchanges, development and subsistence, forms of solidarity and of resistance being produced as the city confronts rapidly adaptation to the global restructuring of urban life?

## SITE: Rio de Janeiro

According to Silviano Santiago in *Latin American Discourse: The Space In-Between*, “The major contribution of Latin America to Western culture is to be found in its systematic destruction of the concepts of unity and purity; these two concepts lose the precise contours of their meaning, they lose their crushing weight, their sign of cultural superiority, and do so to such an extent that the contaminating labor of Latin Americans affirms itself as it becomes more and more effective. Latin America establishes its place on the map of Western civilization by actively and destructively diverting the European norm and resignifying preestablished and immutable elements that were exported to the New World by the Europeans.”

The resignification establishes new ambiguous and liminal relationships that in fact become mutable, multi-contingent, and always in a state of in-betweenness. These states of in-betweenness are the heterogeneous context of sets of relations and converging territories of present day Brazil and Rio de Janeiro.

While a Brazilian identity emerged by the end of the eighteenth century, it was fragile given the size of the colony and a lack of physical infrastructure to allow for more rapid social and economic integration. Colonial Brazil was a country of ‘classes and masses.’ The small white elite presided over a large and marginal population of Afro-Brazilians and indigenous peoples, forcibly transported from their homeland. Large estates dominated, and the country remained deeply rural well into the nineteenth century. Through the process of miscegenation, a mixed raced population emerged with the intermarriage of white settlers and African women and slaves were convinced that their place was in the natural order of things given the mixing of the races.

Following the abolition of slavery in 1888, stasis at the institutional and political levels resulted in very little industrialization to rapidly move forward during the period following independence in 1822 until the 1930’s. Beginning in 1930, for the first time since the founding of Brazil, the agrarian aristocracy lost its grip on power and would never regain its previous preeminence in national affairs. 1930 marked the beginning of a long a tortured process of modernization and industrialization. These changes did not go unchallenged by the traditional oligarchs who fought to preserve their influence and autonomy. Nonetheless, by the middle of the 1930’s Getulio Vargas who governed Brazil in different guises for eighteen years: as provisional president from 1930 to 1934, as indirectly elected chief executive from 1934 to 1937, as a “soft” dictator from 1937 to 1945, and as the directly elected president from 1951 until his suicide in 1954, brought about a number of changes which resulted in the rise of urban workers and the new middle class. Symbolic of these changes was Brazil’s first Ministry of Labor, Industry, and Commerce and the Ministry of Education and Health designed by Oscar Niemeyer, Lucio Costa, and Affonso Reidy with consultation by LeCorbusier in 1937 - 1943.

And although “Modern” was a relative term, for as Lincoln Gordon writes in *Brazil’s Second Chance: En Route toward the First World* (2001), “Almost 70 percent of the population still lived in rural areas in 1940, two thirds of the adults were illiterate, and the rudimentary conditions of communications and transport left large regions in isolation”, modern public architecture was the materialization of modernization, identity, and social / political evolution in Brazil from the 1930s to the 1960s. Yet political uncertainty (1964 revolution followed by military dictatorship) over several decades would not see sustained modernization and transition to begin to take hold until the election of Fernando Henrique Cardoso in 1995 followed by Brazil’s economic coming of age during the administration of Luiz Inácio Lula da Silva from 2003 to 2009.

While political stability and economic success since 2001 has allowed Brazil to claim its external identity, internally there still remain gaps between ‘classes and masses’. A recent research study on the role of

mobile phones in the slums (favelas) of Rio de Janeiro investigated the power structures of how mobile phones influence social interactions and values among favela residents. The study points out that Brazil is in a unique position as it has both high-income and low-income residents living in very close proximity. Despite this income distribution, there are about 203 million cell phones in Brazil (as of December 2010), making Brazil the fifth largest country worldwide in terms of cell phone absolute numbers, with a 104 percent cell phone penetration rate (Teleco, 2011). Predictions are that by 2015, at least of Brazil's population, or 100 million people, will have mobile phones with internet access. However, favela residents live off-the-grid in Brazil; they do not pay taxes and do not receive social services like electricity, water, or landline phone services. Because the government does not provide infrastructure for the residents, a "parallel" market has sprung up in which favela residents appropriate services from higher-income neighborhoods and redirect them to the favelas.

Because favela residents are precluded from corporately legitimized cell phone ownership, they have developed sometimes illegal or other relatively easy means (such as by second hand or pre-paid devices) for procuring phones while avoiding the cost of service plans and subverting service providers. According to the study "The clearest example of illegal procurement is the existence of the parallel market: not one interviewee purchased a phone in a store. Phones were either received as presents, or purchased from someone in the favela." Despite the high phone penetration rate (104%), most favela residents share phones among friends and family members. The study participants all indicated that obtaining mobile phones legally was very difficult due to three main barriers: finances, comfort with technology, and difficulty of ownership.

Site : Rio de Janeiro (Lapa)

**PROGRAM:** Mediatheque

While the City of Rio de Janeiro has launched initiatives such as the Rio Operations Center (in collaboration with IBM, December 2011) to integrate data and processes from various urban systems for real-time visualization, monitoring and analysis, into a operations center; internet cafés (Lan Houses) sprinkle the favelas; and municipal knowledge squares emerge in a few underserved neighborhoods, the materialization of a collective space for discourse, exhibition, and research regarding digital tools, information, and culture does not yet exist. The previous gathering of the Brazilian Digital Culture Forum in 2010 was held at the Cinemateca Brasileira, in São Paulo.

Hence, the studio will design a new space for the Brazilian Digital Culture Forum in Rio. The 30,000 SM program will include:

Library and Lecture Hall

Digital Archive

Labs for Computers and Digital Media Production

Studios for Music and Film

Media Theater

Exhibition Spaces and Multipurpose Room

Administrative Areas

Restaurant and Cafe

Open Air terrace

## WORKSHOPS

A series of in studio workshops will be conducted during the first part of the course to introduce advanced computational tools and to refine parametric techniques using scripting, Rhino® and Grasshopper®. These workshops will be in coordination with the preliminary research section of the studio. The digital tools are here intended as an interactive mapping exercise that creates relationships between sets of data and information. The wide availability of data on different platforms makes a wide choice of sets of data available. The representation of this network will be used to reveal analogies and synchronisms. More than an end in itself, new iterations of the network and its representation will serve as a base to keep exploring, both for the student alone and with other audience by serving as a provoking communication tool. The goal of the workshops and the research is three-fold: to make the invisible visible; to evidence the counter-intuitive, and to assert the conjunctive relationships [...and therefore] between hypothesis, experiment and conclusion.

### Workshop program

Over the course of the first four weeks students will research archival and live data through various platforms and data sources. We will be utilizing census data as well as open source API's (Application Programming Interface) during the course of this semester in order to gain access to streaming social media. The purpose of the workshops are for students to gain an understanding of the workings behind these interfaces.

These interfaces consist of a set of rules and code that allows various software platforms to communicate with each other. An API is an interface between two software packages , facilitating their interaction.

This will be the introduction to accessing geometry through digital means. Understanding geometry as data is key to utilizing the information for design. Conditional statements will be introduced and are important when comparing and sorting through our data sets. This will lead into understanding how mathematics is key to creating the logic needed for any idea.

Students are expected to complete a series of tutorials that complement the workshops. These tutorials have assignments which need to be completed as part of the coursework.

The studio this semester introduces a live component. We will make use of Processing and custom components to gather streaming data from open source databases. Students should not be worried about learning how to program, templates and help will be provided. It is more important for students to explore and discover the potential of data so that it may be used in conjunction with Topological modeling that is geometry as data.

The following tutorials and primers **must** be read ahead of the workshops:

*Download and read Andy Payne's Grasshopper Primer. The primer can be found at <http://www.liftarchitects.com/journal/2009/3/25/the-grasshopper-primer-second-edition.html>*

### Rhino Primer Mandatory Chapters:

- 1 Getting Started
- 2 The Interface
- 3 Grasshopper Objects
- 4 Persistent Data Management

## 6 Data Stream Matching

### 8.1 Lists & Data Management 9 Vector Basics

The following is not necessary but highly recommended.

*Download and read “Essential Mathematics for computational Design”*

<http://download.rhino3d.com/en/Rhino/4.0/EssentialMathematicsSecondEdition/>

#### **Week 01 - Algorithms and Sketching Data**

The first tutorial runs through advanced principles at the core of parametrics and algorithmic computation. Advanced experimentation and exploration can be achieved quite easily as long as you know the foundations of any given piece of software. The tutorial starts with the core and works its way out. The fundamentals surrounding this core are arrays, lists or tables of raw data, coupled with mathematics.

This will leave students with a greater understanding of the potential embedded in the framework of this software and the potential mathematical operations you as a designer can perform on this data.

**Assignments:** There are assignments in this tutorial that will be due the following Monday.

#### **Week 02 - Data Sources and API's**

**Seminar:** Covering different examples of data sources.

- Look at an example of data - chart the data via excel, quick discussion
- Talk about some examples - data visualizations that would utilize objects, arrays, and functions.
- A look into the new found correlation between data that has been gathered and visualized.
- Twitter, Pachube, NYT, Facebook, Flickr, LastFM, Pandora, Google Weather, Yahoo,

Examples of mashups - Just Landed

**Tutorial:** Pulling data from external sources. Saving the data into xml format and importing that information into different programs.

#### **Path and List Management and Custom Components**

Data can be over whelming when the data reach lengths in the thousands. Management of a list is important in order to setup your definitions. Understanding how to match data structures will be important when working in pairs. The concept of clusters and groups will be introduced in order to simplify the sharing of your definitions and data with your partner.

#### **Week 03 - Between Rhino + Grasshopper + more**

These two software platforms allow for users to jump in and out of automatic and manual generation of mapping. Students will need to switch between these two modes over the duration of any project. The hand of the designer will always be required to intervene during the design process.

We will be exploring interoperability between software packages such as ArcGIS and 3D Studio. Extracting topological information from GIS and color and light information from 3D Studio.

Follow the tutorials of the deployment category under the following website. <http://modelab.nu/?cat=5>

#### **Week 04 - Exporting and Animation**

Towards the end of any project there is a need to work across various digital programs. This workshop will deal with baking of definitions and exporting of geometry and data to other programs such as 3D studio, XML format and vector based graphics packages such as CAD and Illustrator. A tutorial dealing with animation and rendering of the exported geometry will be given.

#### **RECOMMENDED VISUAL STUDIES ELECTIVES**

Search: Advanced Algorithm

Parametric Realizations

#### **FABRICATION**

##### **McMaster End-Mills Costs:**

1	1ea	<a href="#">8886A642</a>	Ball-End Coated Three Flute Carbide End Mill 1/2" Mill Dia, 1/2" Shank Dia, 4" O'all Length, TICN	\$67.60 each
2	1ea	<a href="#">8886A572</a>	Ball-End Coated Three Flute Carbide End Mill 1/4" Mill Dia, 1/4" Shank Dia, 4" O'all Length, TICN	\$31.00 each

##### **Milling Safety Course:**

<http://www.arch.columbia.edu/labs/fablab/general-information>

*The Lab is open to all GSAPP students who have completed the online safety course, attended a L.A.B.S. orientation, and received a safety sticker for their ID. These students may come to the lab during any of the monitored hours, no appointment is required. Only GSAPP coursework may be done in the Lab.*

*In order to have access to the CNC equipment students must attend a Fabrication Tutorial Session and complete a basic tutorial assignment during lab hours. The tutorial session will include detailed information about the CNC software and hardware, and the assignment will require students to apply their new fabrication knowledge. If you have already attended a session in a previous semester and completed the project, that will suffice.*

#### **TRAVEL**

The studio will travel to Studio-X Rio de Janeiro from March 9 through March 16, 2013 for fieldwork, site reconnaissance, and meetings with our local partners and collaborators. Additionally, in coordination with X-Week 2013 the studio will hold a special series of symposia and workshops presentations. All students should confirm travel and visa requirements as soon as possible.

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## **Technology**

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