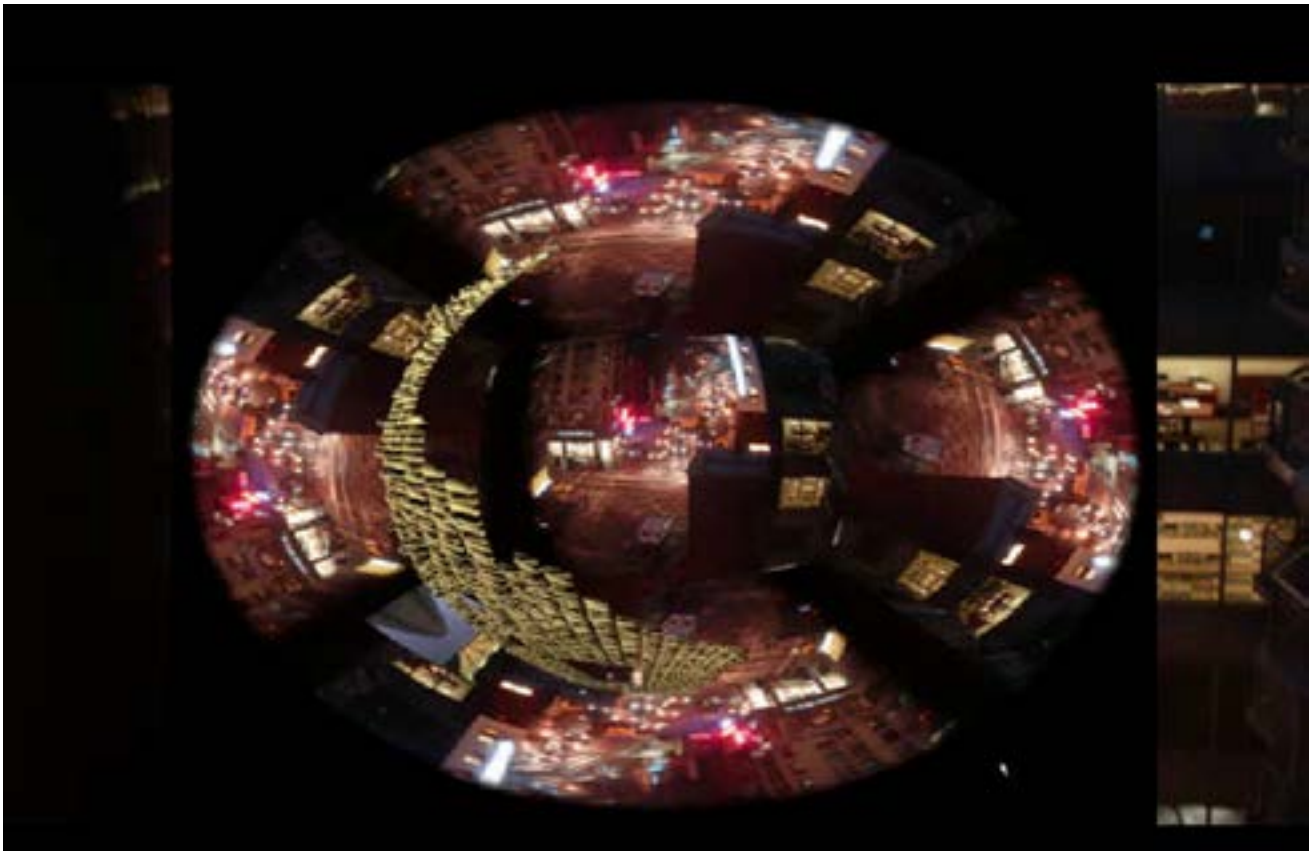
Jean-Marc Gauthier

PORTFOLIO OF INTERACTIVE DESIGNS 2003-2014

Online portfolio at http://www.tinkering.net



This spherical projection of the 3D map of Mahattan illustrates the shift from a static map of the city to a dynamic searching behaviour.

PROLOGUE

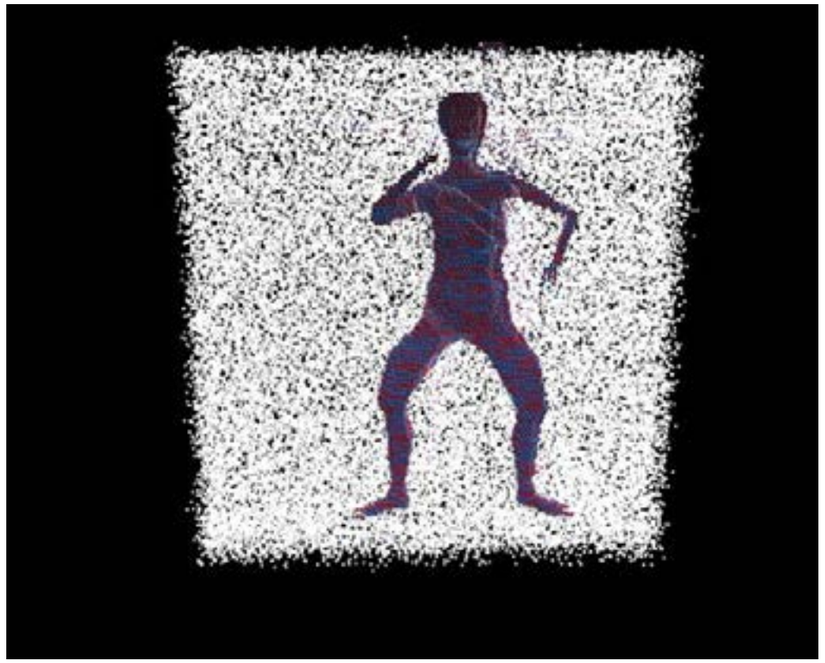
I have found ways to express myself as a writer, moviemaker, photographer, and architect but still felt the need to communicate ideas that did not fit into any of these domains. New possibilities for expression emerge in the design of virtual spaces. Designing virtual spaces helps me convey ideas in ways that cannot be expressed the same way in writing, movies, photographs, architecture or other visual art. Surrealist artists from the 1920s (Man Ray, Marcel Duchamp, Louis Bunuel) felt that movies could tackle situations or emotions that could not be depicted in writing or in the traditional visual arts of their times. For similar reasons, topics covered in this book stretch beyond the strict domain of virtual spaces. They relate to larger concepts like the fu-ture of cinema, the place of virtual spaces in tangible public spaces, defining new experiences for the viewer of a virtual space, or developing new types of associations between several media that may involve both the virtual and real.

“The beauty of nature lies in detail; the message, in generality. Optimal ap-preciation demands both, and I know no better tactic than the illustration of exciting principals by well-chosen particulars.” (From Stephen Jay Gould. Wonderful Life: The Burgess Shale and the Nature of History. New York: W. W. Norton & Company, 1989.)

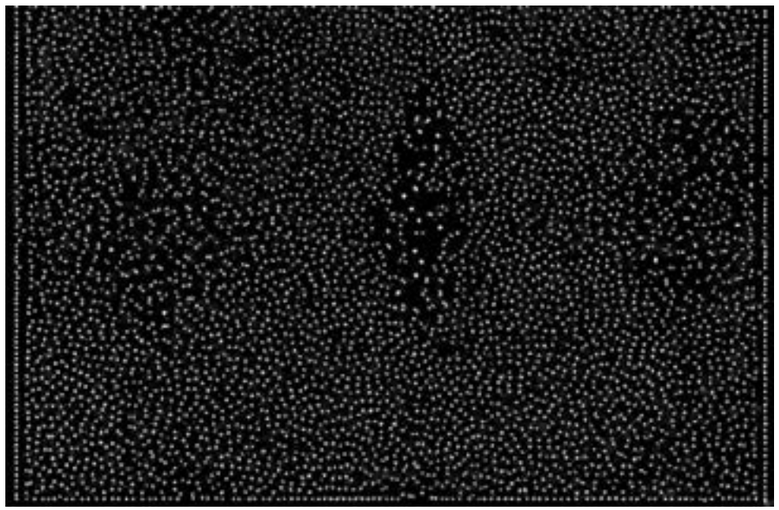
Gould’s ideas about how to describe the living environment of some of our planet’s first animals can be a source of inspiration for someone who at-tempts to design virtual worlds. Like in Gould’s first sentence, the designer’s special attention to details conveys a sense of beauty to the viewer; but the vision of virtual spaces needs to be much broader.

The goal of a virtual space designer has become more and more about the imitation of living systems so other people can identify, evaluate, play, and create. Mapping internal states, mental desires, and perceptions seems to be the final frontier of virtual spaces and raises exciting issues of representation.

Can we explain how to represent our dreams? How can the autonomous agents that you created represent their dreams? Whose dreams are they —yours or theirs?



Top image, *Primitive Ballet*, animation, 2011, Jean-Marc Gauthier
Bottom image, Dust, 3D animation transferred to film 35mm, for Melvin Motti’s installation *“From Dust to Dust”*. 2010 Jean-Marc Gauthier



CROSSWALK Jean-Marc Gauthier

Building a 3D map with dynamic behaviours = a street simulator from a pedestrian perspective
This immersive environment is available for people with low vision who need special training in order to cross the street safely.

Video at http://vimeo.com/78089762

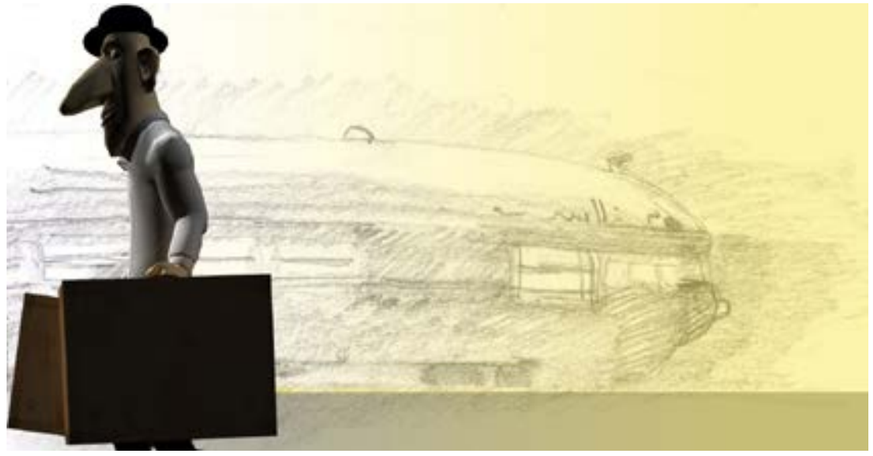
Jean-Marc Gauthier designed and produced “Crosswalk”, a virtual 3D environment that recreates the spatial experience of a pedestrian crossing a street intersection.

BE CITY Jean-Marc Gauthier

More at http://www.tinkering.net/BeCity.
Video at http://vimeo.com/89406706

The story of “Be City” is developped across several devices: desktop, smartphone and tablet. Visual assets and scripts are created only once regardless of the device. Visuals and animations are displayed and play back differently according to the choices of the viewer or of the story..

“Be City” is an experimental concept project that aims to present complex subjects like anthropology, archaeology and linguistics in the form of interactive animations that are accessible by a large audience. One of the goals of the “Be City” project is to build a visionary technological platform for transmedia, to test new ideas about storytelling and to create a new online community.

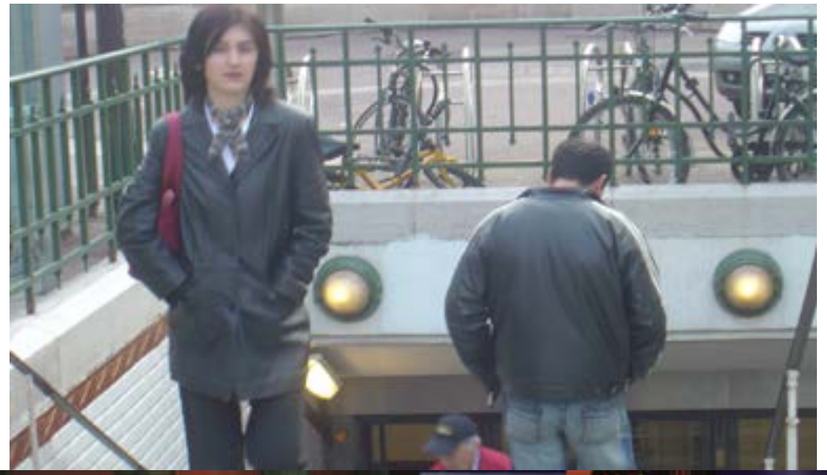


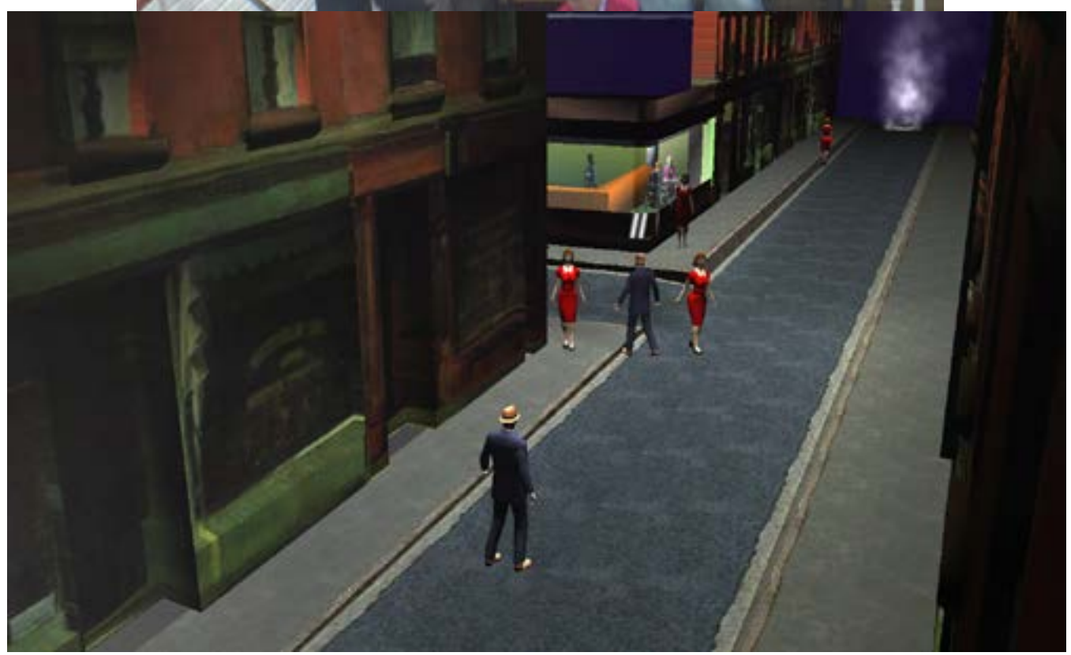
NIGHTHAWKS Jean-Marc Gauthier

Festival Premier Contact, Issy les Moulineaux, France.
Video at http://vimeo.com/78163542

Research on viewer's experience and storytelling inside a virtual world.
Credits: Design and code - Jean-Marc Gauthier. 3D characters - Miro Kirov and Jean-Marc Gauthier. Immersive display integration - Jean-Marc Gauthier and Fabien Barati. On-site technical assistance - Fabien Barati.
Sponsor: Le Cube
Venues: File 2005, Machinima Festival, American Museum of Moving Image

(Images include a shot of the subway entrance in front of the installation and frames from the actual project.)





What they wrote:

Claire Leroux, journalist,

Male and female virtual characters interact together. Although their dialogues oscillate between banality and cruelty, they walk around the scene without the need for a linear narration. **We are in some kind of fantastic documentary, in a virtual video documentary: inside a virtual universe with characters walking around.** One of them is the camera. Each character has an autonomous behavior and they constantly avoid each other. The camera is the only social component of the scene by greeting characters and looking for certain kinds of situations. The camera has distinctive behaviors and the styles of Hitchcock in Rear Window, Kubrick. L'Avventura by Antonioni. Jean-Marc Gauthier wants to create an im-mersive experience. He invites the viewer to browse around the scene and to be immersed
in another time.

For his installation, JMG is directly inspired by the aesthetic and choices of the painter, Edward Hopper. Choosing a realist painter from the forties as the main theme of a real time 3D world may be surprising. JMG explains this anachronism by the style, the aesthetic and the expression of the city – the installation is designed for a garden in the heart of a city – JMG says "I am inspired by the universe of Hopper and by the position of the viewer in his paintings. He gives the feeling that we are outside the painting look-ing at it at a distance and at the same time introduces us to some very intimate scenes. This is what I tried to recreate in Nighthawks. This installation is creating an extension to Hopper's paintings."

Recreating an old New York street with the same buildings that Hopper painted in the forties is an archeological work similar to the sets of Eyes Wide Shut from Stanley Kubrick. Aside from the need to anchor the project in the history of United States, this installation revives a style of architecture that gradually disappears from the city. This architecture is still very present in movies and novels: it's part of the city's collective memory.

VIRTUAL ARCHEOLOGY IN APHRODISIAS

Jean-Marc Gauthier

Research on viewer's experience and storytelling inside a virtual world.
Credits: Joint collaboration between ITP, Tisch School of the Arts and Institute of Fine Arts, Classics Department, NYU. Principal Investigator - Jean-Marc Gauthier. Co-author - Christo-pher Ratte. Collaborators on the Aphrodisias Project: Haluk Goksel, Zach Rosen and Philip Stinson.
Sponsor: Funding for the research is provided, in part, by NYU's CDCF 2002-2004 grant.
Venue: Institute of Fine arts, NYU, NYC

(Images include views of the virtual Agora during different times of the day.)

What they wrote:

Christopher Ratte, co-director of the Aphrodisias excavations

"Virtual Archeology at Aph-rodisias is an architectural model of the agora at Aphrodisias that is populated by a number of self-de-termined virtual characters."

"The installation differs from a conventional walk-though in the use of artificial intelligence to deter-mine the movements of the figures and the camera, rather than pro-gramming them to follow set paths. **The result is a closer ap-proximation of a real spatial experience."**

3D MAP FOR SMART PHONES Jean-Marc Gauthier

3D spherical display to navigate inside a 3D map of Manhattan (NY, USA) without the need to scroll the map. The backgrounds are made of personal pictures stored on the phone.

Video at http://vimeo.com/78144659

Question: “Show me Bryant Park”.
Answer: three interactive steps to show the answer on the interactive 3D map.

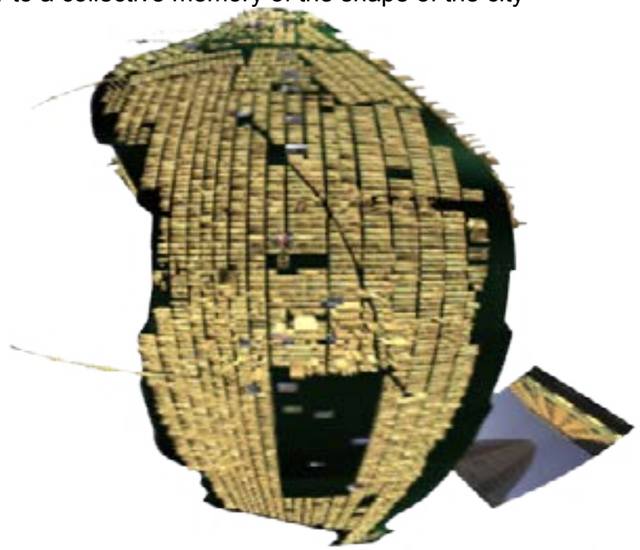
1. Refer to a collective memory of the shape of the city

2. Reduce the urban complexity

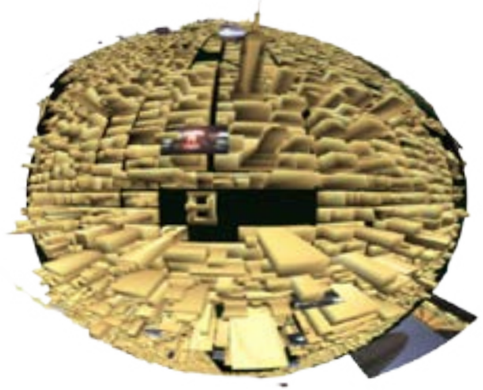
3. Deliver a personal interactive experience

Examples of spherical mapping of Manhattan displayed on the screen of a smart phone

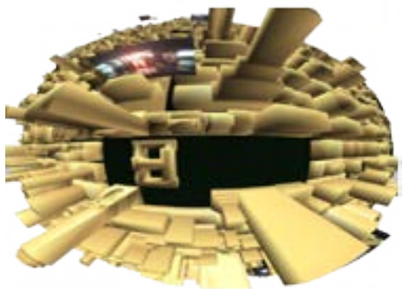
1. Refer to a collective memory of the shape of the city



2. Reduce the urban complexity



3. A personal interactive experience

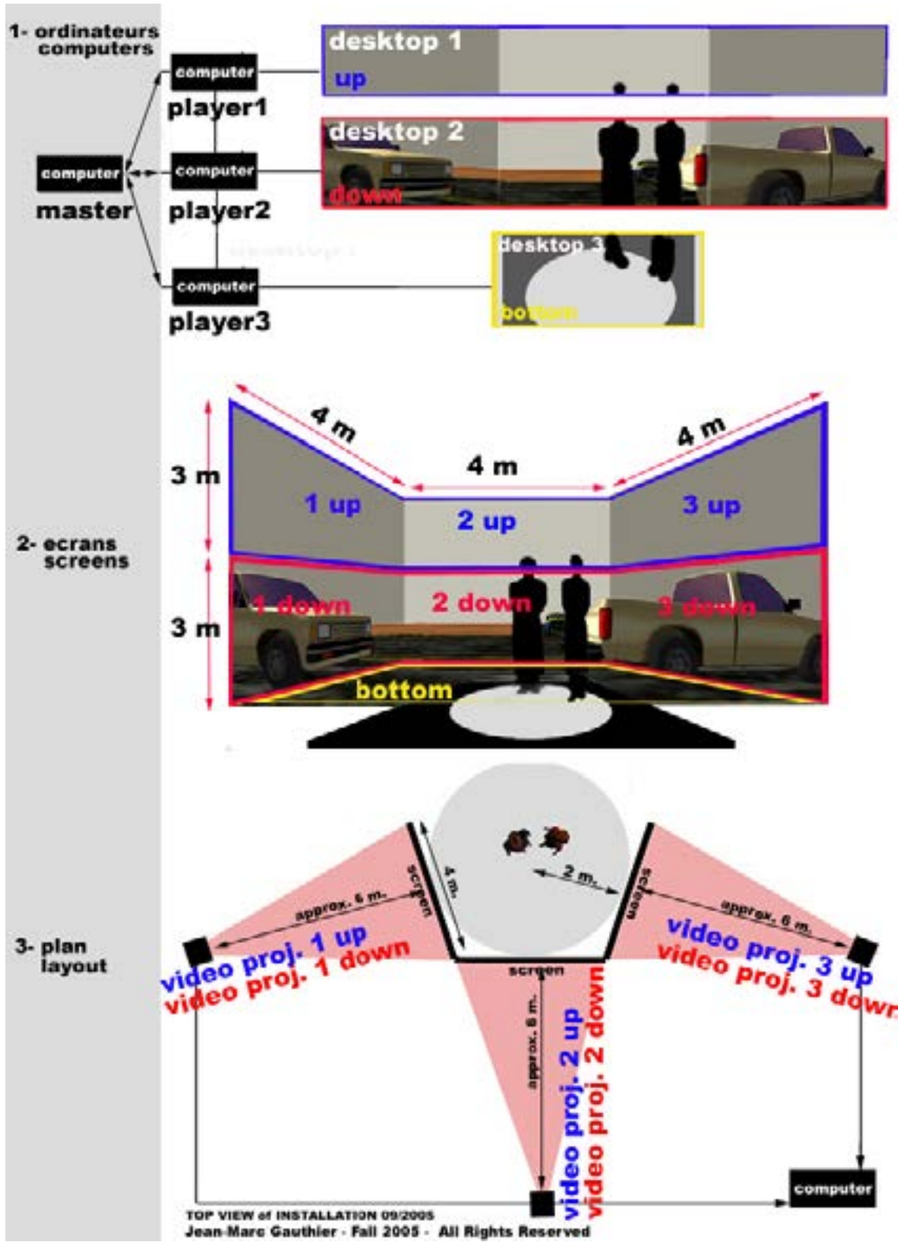


CROSSING THE STREET Jean-Marc Gauthier

Low Vision Mobility Rehabilitation in Virtual Reality: An Efficacy Study

Research on immersive environments and interactive interface design.
Credits: Lei Liu, Kent Higgins, Jean-Marc Gauthier, Jianna Cho, Hillary Gauthier
Status: National Institute of Health grant proposal / under review

(Images include schematics of the immersive system and possible street scenarios.)



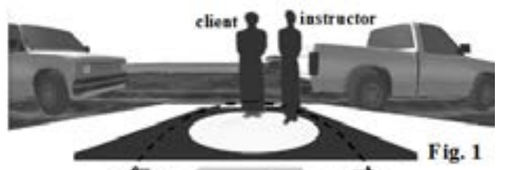


Fig. 1

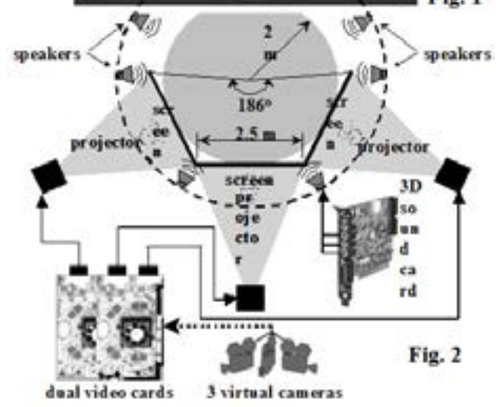


Fig. 2

What they wrote:

Lei Liu, Phd, vision research scientist

"Standing at the curb before cross-ing the street is a multi-sensorial and multi-layered spatial experience that is complex to visualize. The huge amount of infor-mation coming fast at the viewer can be recreated inside a VR simulator by com-bining multiple dynamic three-dimensional stimuli. In a VR simulator visual and audio stimuli can confuse the viewer and provide crucial information at the same time. This is similar to a real world situation when a viewer needs to process a wide range of visual and audio stimuli and to assign vari-ous levels of priority for each stimulus.

Creating a VR simulator presents several psychological and technical chal-lenges. In some cases simulations may convey to the viewer a pleasing but unreal « wow » effect, where realistic scenes « look too good to be true ». We are aware of the possibility of underperformance of hyper-realistic displays. Sallman and Wow. Our design process takes several steps in order to steer away from misplaced faith put in realistic 3D displays, naive realism and poor performance of realistic display - Sallman and Wow.

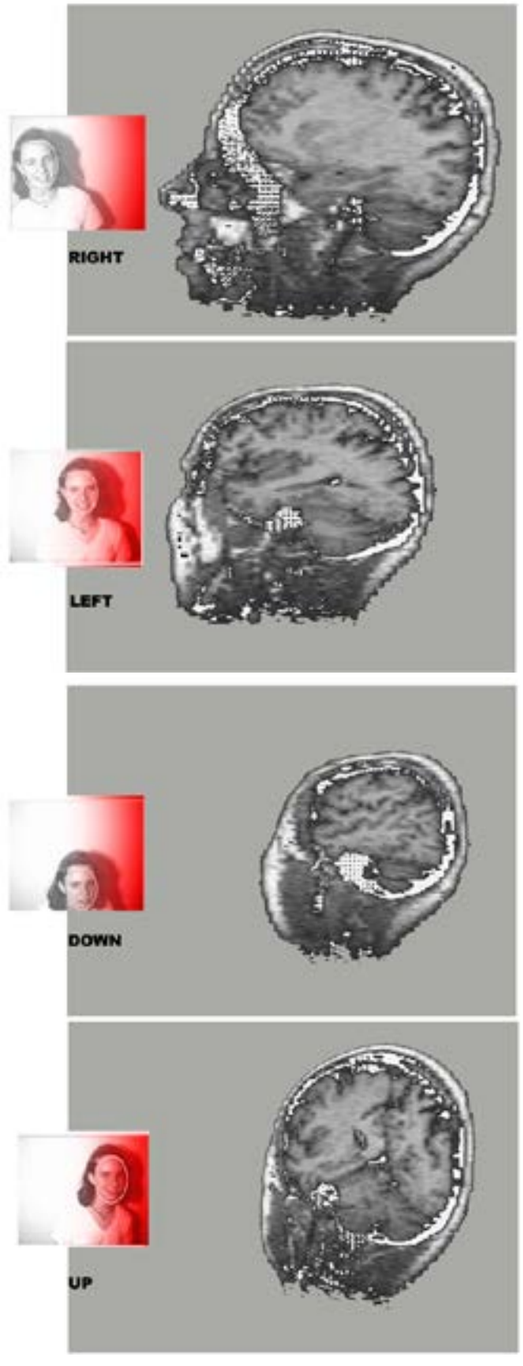
This research provides a tracking system for errors of perception, dissimilari-ties and for situations that have a lower degree of relevance than the real world. The VR simulator uses an extensive data-base to track down imprecisions of percep-tion and the parameters of case studies where they occur. This database can feed back into the VR simulator in order to cor-rect and improve scenes and scenarios, to supplement perception in case studies deemed to be ambiguous or to rule out the use of the VR simulator in some cases case that are not recreated in a satisfacto-ry way. Defining a usability comfort zone for the user is an important contribution to the evaluations made inside a virtual world. It will also improve the evaluation of us-ability in computer human inter-action."

BRAIN PROJECT Jean-Marc Gauthier

Status: Current research on 3D visualization and interactive interface design. Work in progress.
Credits: Joint collaboration between ITP Tisch School of the Arts and Department of Neurosurgery, School of Medicine, NYU, Jean-Marc Gauthier and Patrick Kelly. Collaborators for this project also include ITP student members of the Brain Group: Caroline Pino, Rocio Barcia, Jae In Lee, Sandra Villareal, Chunxi Jang. Additional programming for the new version under development: Didier Bouchon.
MRI data from NYU Medical Center and paul.morgan @ nottingham.ac.uk
Links to documentation used for this demo: http://www.sph.sc.edu/comd/rorden/ and http://www.nottingham.ac.uk/radiology/paul/

Webcam navigation window following movements of a viewer's head

3D Visualizer using texels and MRI images



What they wrote:

Richard Pierce, NYU Today

"According to Kelly, the problems for surgeons operating on the brain are some-what analogous to being on a sailboat in foggy weather with little to no visibility. "The navigational challenge for the sailor starts with gathering all the necessary available in-formation in advance—navigational and cur-rent charts (maps), weather forecasts, tide tables, and mariner's notices, for instance. Then I plan my course. And finally, I sail my planned course, but in real world conditions that require me to be constantly correcting and updating my information as I go."

A neurosurgeon uses a similar three-step process. Before operating on a patient, he collects important imaging data that includes computed tomography (CT scan-ning), magnetic resonance imaging (MRI) and angiography (blood vessel study of the brain). This planning phase allows the sur-geon to navigate the safest course to reach a tumor located deep inside the brain without damaging important areas of the brain and blood vessels. But even with all this imag-ing information, and with the more recent introduction of visualization tools available to neurosurgeons now, it's still not always enough for the job at hand.

Gauthier has long been interested in finding new applications for the details that three-dimensional technology can provide. "It was through my real-time 3-D visualization process for the Dynamic Virtual Patient proj-ect a couple of years ago that Dr. Kelly and I discovered we were both passionate about resolving problems of 3-D navigation inside visual data," said Gauthier. **The chal-lenge was to find a way to accom-modate the nearly infinite amount of data needed in a 3-D replication of the inside of a human brain.** There seemed to be no solution to the problem of excessive data, unless the two could find a new way of looking at things."

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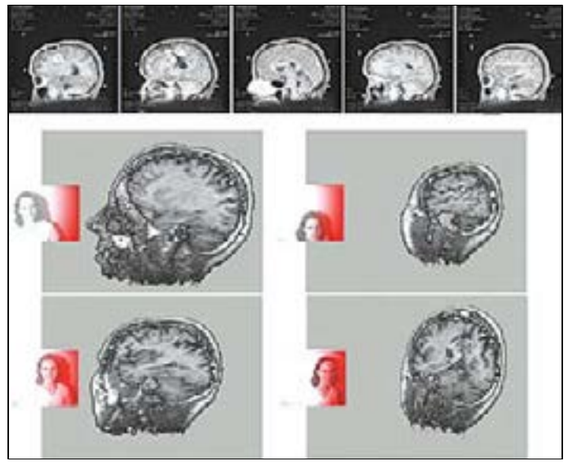


The top images (black and white) offer 2-D pictures of the brain. The four images below them illustrate how a Webcam image controls the 3-D navigation system inside the brain.

Gauthier has long been interested in finding new applications for the details that three-dimensional technology can provide. "It was through my real-time 3-D visualization process for the Dynamic Virtual Patient project a couple of years ago that Dr. Kelly and I discovered we were both passionate about resolving problems of 3-D navigation inside visual data," said Gauthier. The challenge to both explorers now was to find a way to accommodate the nearly infinite amount of data needed in a 3-D replication of the inside of a human brain. There seemed to be no solution to the problem of excessive data, unless the two could find a new way of looking at things.

At the same time the two were discussing possible solutions, Gauthier was grappling with a similar type of problem while working on 3-D interactive maps of Manhattan. The amount of 3-D details requested when moving the virtual camera from a birds-eye view of 42nd Street to the details of a block on Times Square also seemed close to infinite. He started working on a small prototype where 3-D anatomic details were cloned and assembled together as they entered the line of sight of a virtual camera traveling inside the human body. "This camera concept is revolutionary because we usually create a virtual world with 3-D models, textures, and animations first, and then shoot a scene inside that virtual world. In this case you are entertaining the idea of introducing a virtual camera into a world that already exists and that you have yet to discover in its various dimensions," he said.

Applying the same technique, Gauthier and Kelly were able to successfully develop a way to visualize not only the vast amounts of brain data but navigate through the virtual 3-D 'cloud' that resulted. The next step was to record the interactive experience of the surgeon navigating through the data. It was then that Gauthier suggested utilizing a webcam in order to track the head of the surgeon. This precise tracking of the surgeon's head movements could allow control of the virtual camera from a distance without the need to touch a mouse and a keyboard. The hands-off approach, which is very useful in the operating room, uses computer vision and augmented reality in order to record and analyze how the surgeon moves though the brain in order to plan a path before surgery.

The whole path-planning process can be stored in a database and replayed later in the operating room. Tracking how surgeons navigate inside a 3-D brain can help for comparing planned path versus real path decisions that may occur prior to and during surgery. This type of information can be useful for the training of surgeons in addition to enabling a seasoned surgeon to revisit their path.
Kelly and Gauthier's new Internet-based Web browser allows 3-D navigation inside a brain using a cloud of voxels, or pixels, located in space. Since the images of slices of the brain are displayed in space they can be visited from many angles, including new angles that were not included in the original pictures. This is key to enabling freer navigation. The viewer can then navigate the virtual brain in any direction regardless of the orientation of the original slices of the MRI.

To the current prototype Gauthier is now adding a layer of artificial intelligence in order to learn from the surgeon's eye movements. The patient's brains may be different, and each surgeon's way of looking at a brain may also be different, but there may be some consistency in the way one particular surgeon approaches the brain. The software will be able to anticipate the surgeon's needs the same way Amazon.com or Google learn about the habits of its customers and get better at displaying items that may fit their needs. This time higher resolution levels of details will be retrieved faster from an online database by anticipation of the surgeon's interests.

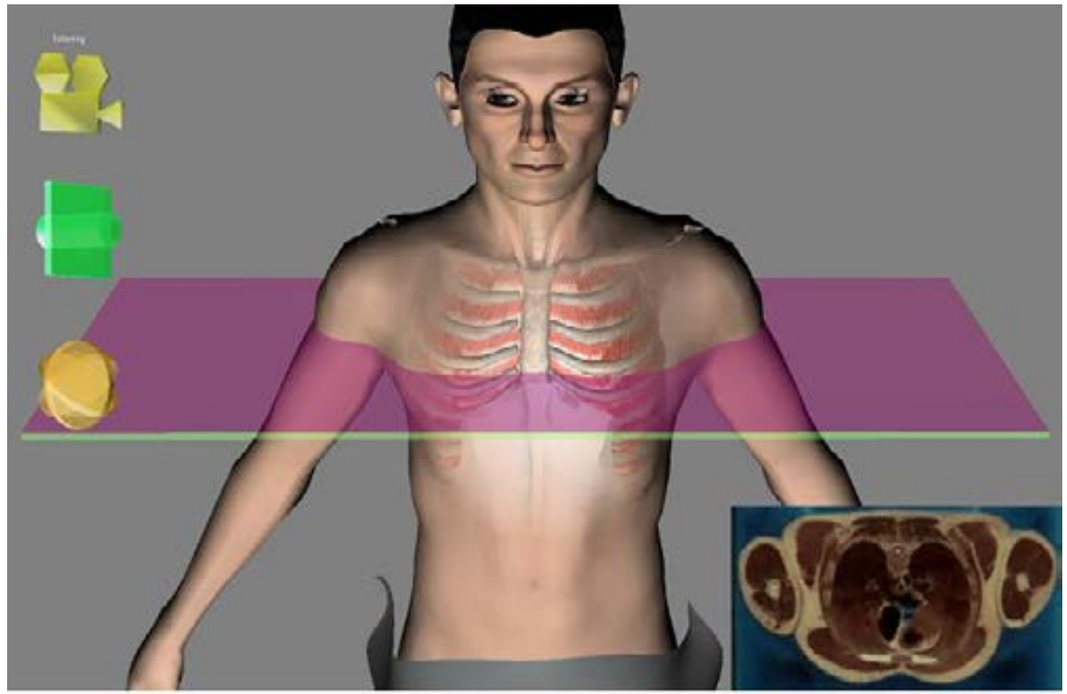
For more information about the project and online demonstrations, visit www.tinkering. net. The brain project is a joint collaboration between ITP Tisch School of the Arts and the Department of Neurosurgery, School of Medicine, NYU. Collaborators for this project also include ITP student members of the Brain Group: Caroline Pino, Rocio Barcia, Jae In Lee, Sandra Villareal, and Chunxi Jiang. Some of the new ideas about visualization of the brain were also discussed in meetings of the Brain Group from Gauthier's "Sciviz" class during spring 2006.

Back to top

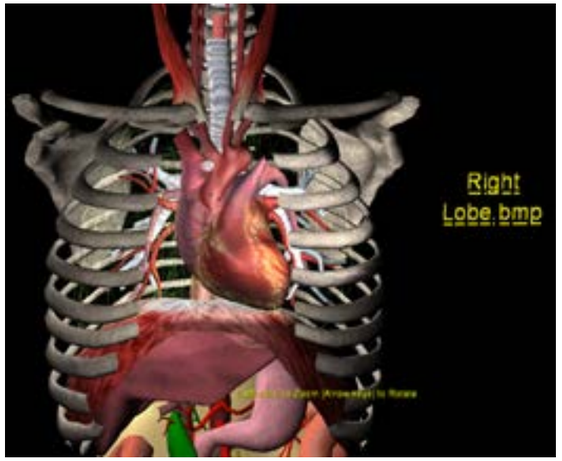
DYNAMIC VIRTUAL PATIENT SIMULATOR Jean-Marc Gauthier

Video at http://vimeo.com/78137146

Research on 3D visualization and Interactive interface design
Credits: Joint collaboration between ITP Tisch School of the Arts and AES School of Medicine, NYU. Principal Investigator - Jean-Marc Gauthier. Co-author - Martin Nachbar. Collaborators on the Virtual Patient Project: Miro Kirov, Zach Rosen, Mike Olson, Marc Triola, Henry Feldman, Fabien Barati, Ganesh Ramanathan, Hillary Gauthier, and Maria Mayer.
Prototype: Jean-Marc Gauthier and Zach Rosen
Sponsor: Funding for the research is provided, in part, by NYU's CDCF 2004-2005 grant.



(Images include different views of the user interface for the Virtual Patient.)

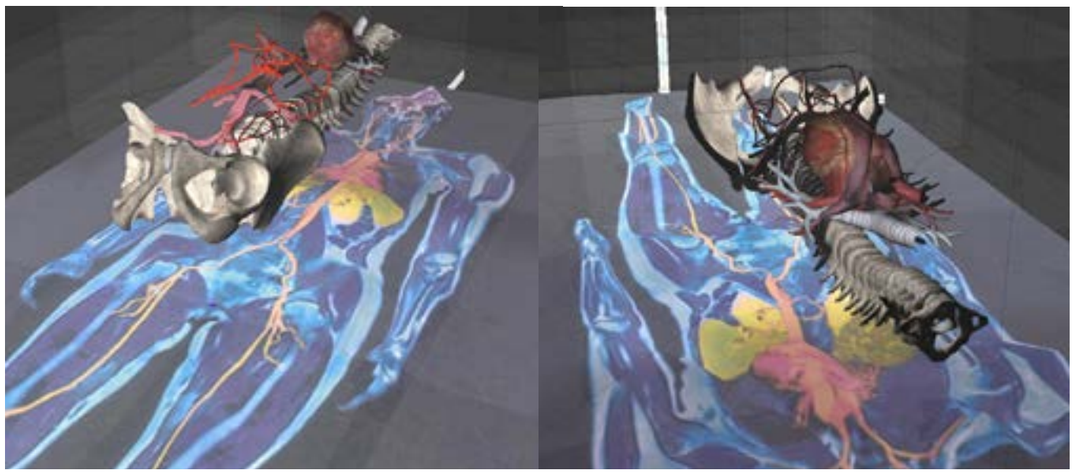


What they wrote:

Martin Nachbar, Director of AES School of Medicine, NYU

"We want to be able to simulate the complex elements of the human body, For example, the interactions between the physiologic systems and the rules governing them would be one area of interest. There is a connection between pain perception and the control of blood pressure. Severe sudden pain may cause someone to faint as exces-sive neuronal stimulation or discharge may lead to a dramatic slowing of the heart rate and in insufficient blood sup-ply to the brain."

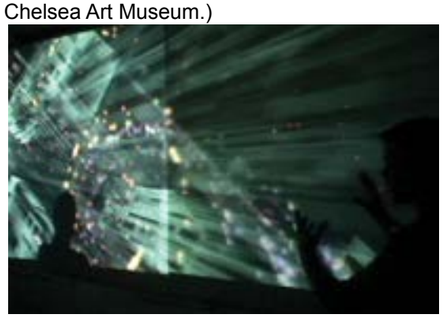
"**The research is endeavor-ing to find a way that will allow a computer user to influence a system of relationships be-tween organs instead of just viewing them as static models.** We want to go beyond just the anatomic representation of the body by attempting to understand the human body as a whole, by integrating knowledge from different areas of medical expertise, and by assembling and visually organizing information. Viewers will be able to see on the same screen physiological data describing the event and its effect on the virtual body."



INFINITE CITY Jean-Marc Gauthier

Interactive installation
Credits: Jean-Marc Gauthier, James Tunick, Miro Kirov
Venue: Convergence, Chelsea art Museum, NYU, NYC

(Images include views of the immersive display at the Chelsea Art Museum.)



3D SENSING DEVICE Jean-Marc Gauthier

RGB + Depth (PrimeSense and GoPro

NICEBOTS Jean-Marc gauthier

Video at http://vimeo.com/62355210

What they wrote:

Mark Argo, ITP alumn

"My response to the exhibit is that it's been a fantastic experience.

Firstly, it's been great to become acquainted with the every day functioning of a major museum, and the process of installing a work of art. There are major lessons to be learned on how to prepare your installation and yourself for contingencies, and how to deal with the people involved in every step of the instal-lation from administration to security. This is the type of knowledge that is priceless, especially when it is learned with the help of an expe-rienced tutor (Jean-Marc) and a wonderfully helpful administrator (Sylvie).

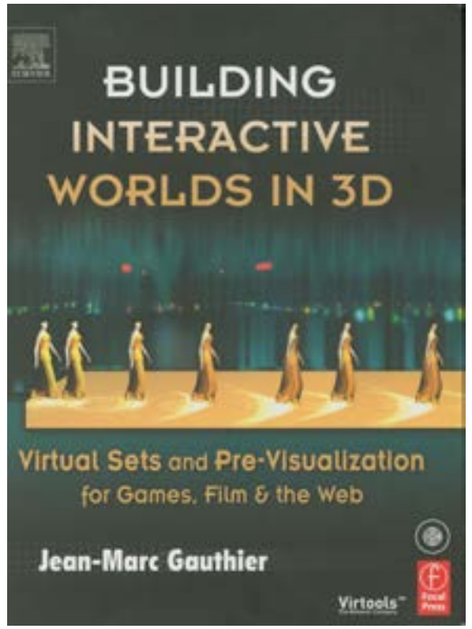
The type of exhibit that we installed is quite unique, and has provided us with many challenges. Because it's a show and atelier, we have received curious responses from the audi-ence, some uncertain of what they're viewing and others assuming the wrong things. Seeing the interest on their faces once we explain what is taking place is one of the most rewarding experiences. They find the idea of a workshop quite intriguing and the fact that it's a robot workshop even more amazing.

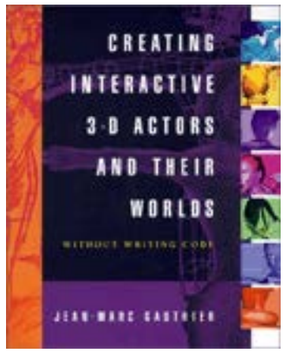
Kids have marveled equally at the creations and the tools of creation, and we might have even sparked a keen inter-est in both art and robotics in several of the younger patrons. Even the adults are fascinated with the process of the work. Generally they seem impressed with the amount of work that goes into each bot.

Finally, the experience of being in the South of France is a prize in tself. Nice is beautiful, the food is fantastic and the people are kind and friendly. I couldn't ask for a better place to spend a couple weeks learning and reflecting on my time at school. The separation has done wonders to give me the proper buffer space to consider the next steps of my life and this exhibit has provided the firepower to shoot me in whatever direction I choose. In all, the experience is indeed unique and life changing."

BUILDING INTERACTIVE WORLDS IN 3D

Virtual Sets and Pre-Visualization for Games, Film and the web



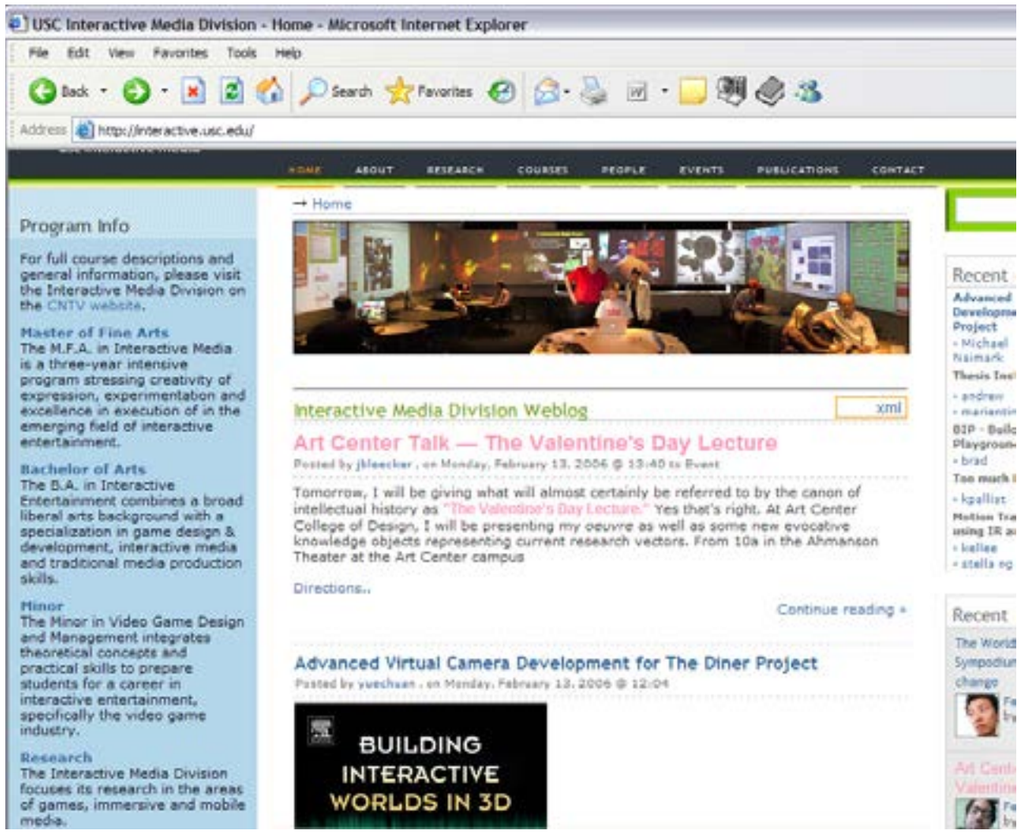


Books published by Focal Press.
Author: Jean-Marc Gauthier

What they wrote:

Michael Naimark, Visiting Associate Professor, Interactive Media Division, USC School of Cinema and Television

“Jean-Marc’s teaching, as exempli ied in his books “Building Interactive Worlds in 3D” and “Interactive 3D Actors and their Worlds”, is hands-on and project-orient-ed, in the ITP tradition. To survive and thrive at ITP as a teacher requires as much, and in doing so becomes a valuable learning experience for the teacher as well as for the students. His art installations, particularly over the past three years, have been particu-larly prolific.”



What they wrote:

Noa Steimatsky, Phd, Associate Professor of the History of Art and Film Studies, Yale, Tisch al-umn

“He understands better than many theoreticians, I think, the imaginary dimensions of actual space and, at the same time, the practial implications and responsibilities of virtual space.”

“Jean-Marc’s analysis helped me ask myself some old questions in new ways: on optics and mental process which are so often used as metaphors for each other, on how cinemas’s mode of articulation-camera, movement, framing, editing - informs us about viewing habits generally, and about how those may be subverted.”

Outdoor installation using three screens created for Nighthawks