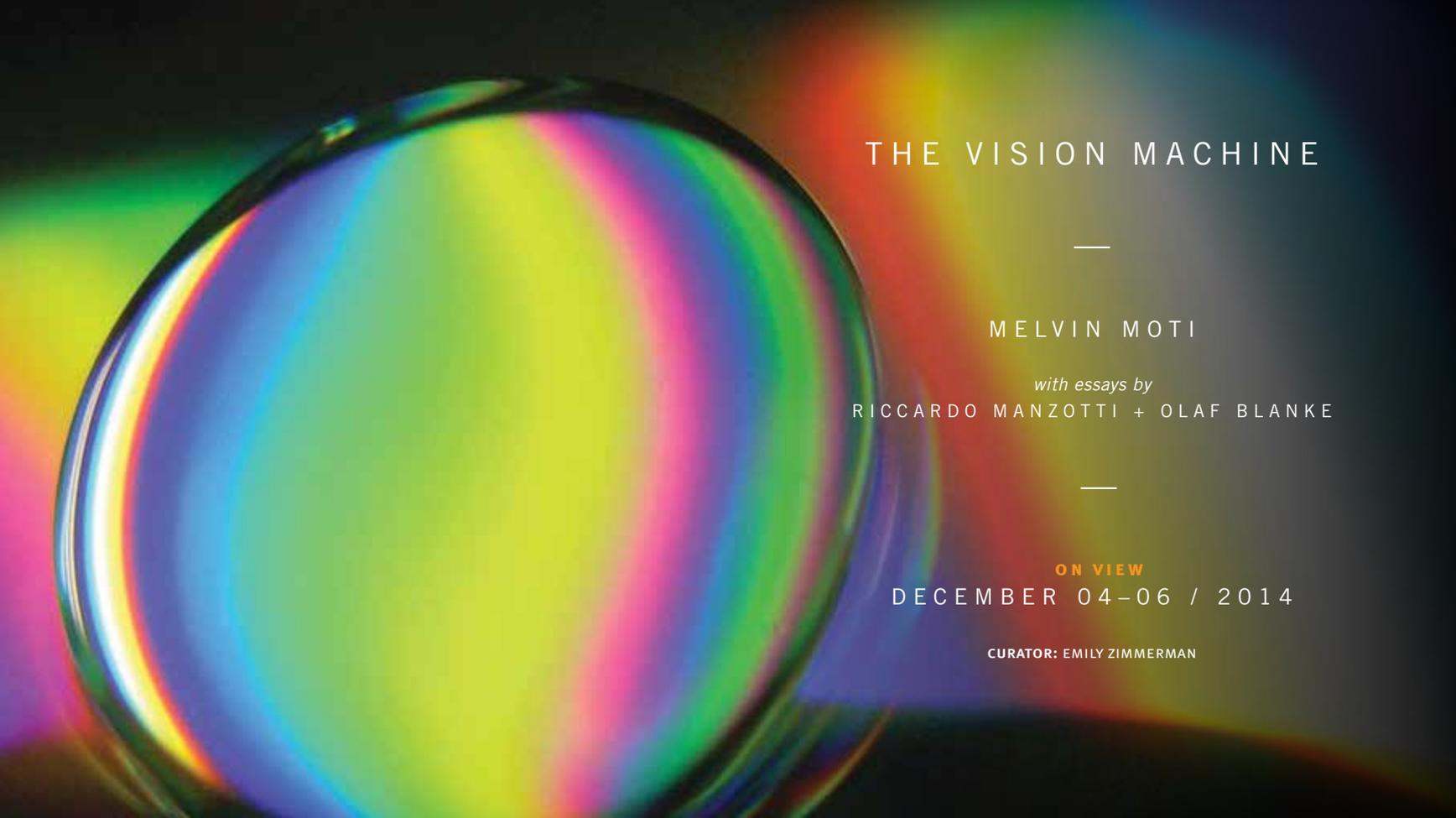


THE VISION MACHINE



THE VISION MACHINE

MELVIN MOTI

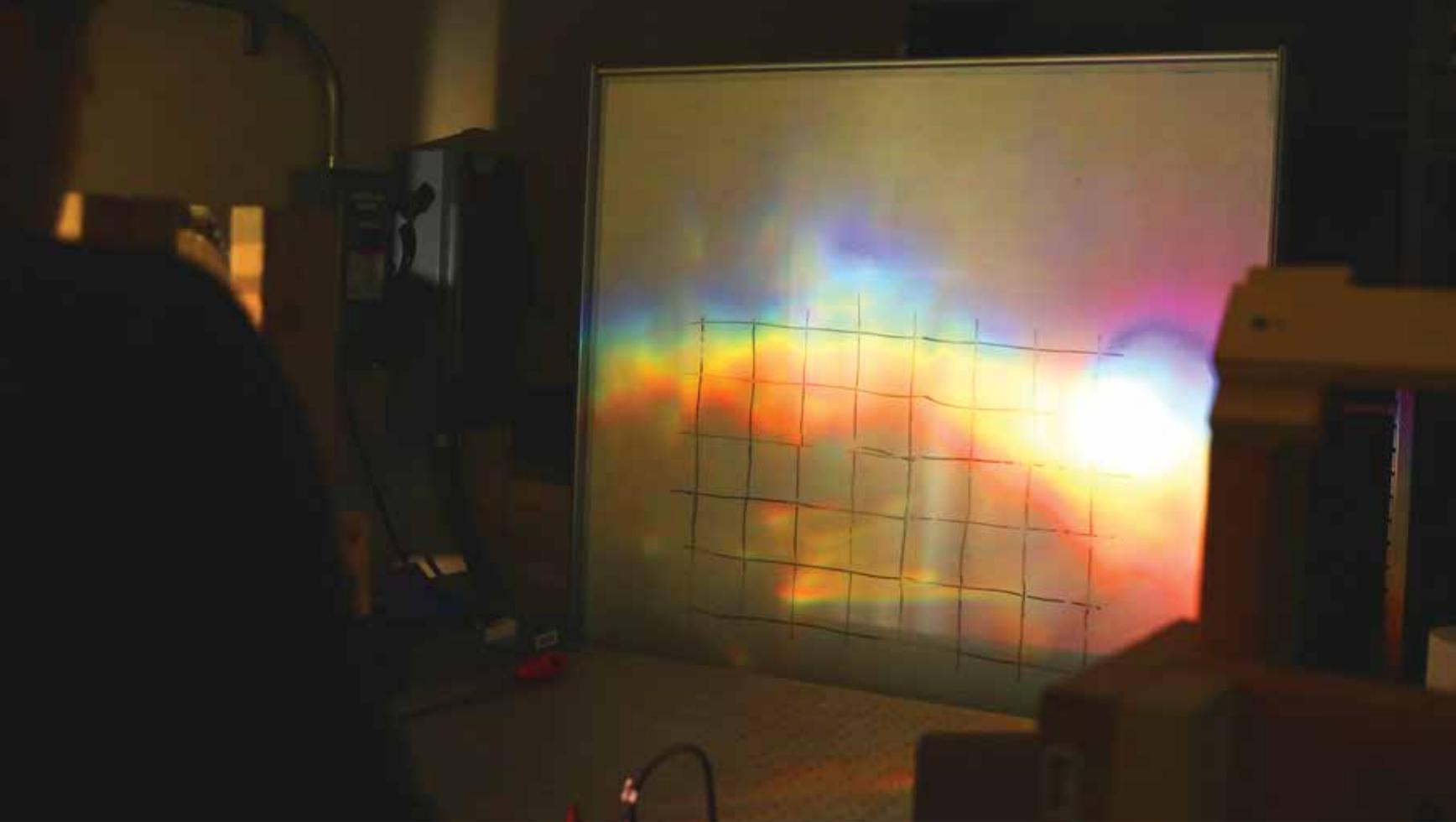
with essays by
RICCARDO MANZOTTI + OLAF BLANKE

ON VIEW
DECEMBER 04-06 / 2014

CURATOR: EMILY ZIMMERMAN

EMPAC

CURTIS R. PRIEM EXPERIMENTAL MEDIA AND PERFORMING ARTS CENTER



INTRODUCTION

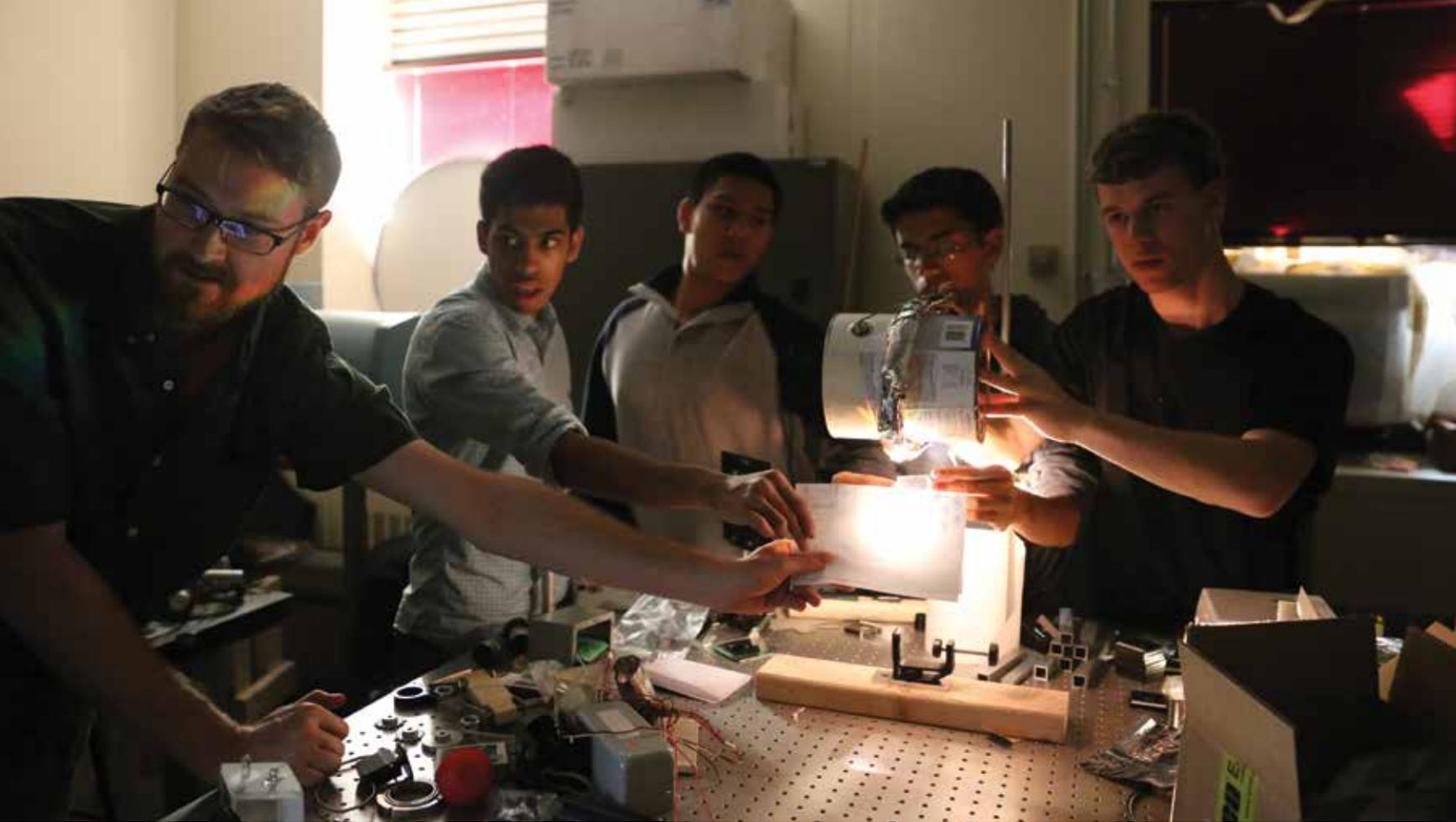
EMILY ZIMMERMAN



BOX 01 : EFFECTS 1 AND 2

Sun dogs, or phantom suns, appear when sunlight moves through ice crystals in high-altitude cirrus clouds or low-lying air currents (known as diamond dust) and refracts horizontally to create a halo of light around the sun. Inspired by sun dogs, Melvin Moti's *The Vision Machine* is a moving image installation that will operate with the same mechanical system for a period of 50 years, positioning the poetics of light refraction against the policies of planned obsolescence. *The Vision Machine* is a projector that creates images of refracted light through the paired-down vocabulary of a light source, lens, and several rotating prisms. The piece was partially inspired by Riccardo Manzotti's "the spread mind," a radical externalist theory that holds that consciousness is spread between the material world and an individual. *The Vision Machine* is anchored between these two sources of inspiration—one physical, the other theoretical—arguing for the infinite interdependency of thought and materiality.

Commissioned by the Experimental Media and Performing Art Center (EMPAC) at Rensselaer Polytechnic Institute, *The Vision Machine* opens at EMPAC on December 4, 2014. The work was realized through a close collaboration between Melvin Moti and six students in the Physics and Engineering departments at Rensselaer: Parviz Alam, Henry Choi, Ravi Panse, Eduardo Gonzalez, Joseph Lapierre, and Philip Sweeting, all led by Peter Persans, Professor of Physics, Applied Physics and Astronomy at Rensselaer.



INTERVIEW // MELVIN MOTI

A conversation between curator Emily Zimmerman and artist Melvin Moti for BOMB Magazine, online December 2014.



EMILY ZIMMERMAN // To start, could you describe the ideas that gave rise to *The Vision Machine*?

MELVIN MOTI // I remember we first met and spoke about *The Vision Machine* in the summer of 2012, when everybody was observing the last phase of celluloid and film projectors moving out of the cinemas. I was playing with the idea of making a film without any “carrier,” without any medium involved. That is how the idea started. Since then I tried to stay close to the original concept of making a film (as in a narrative developing over time) without a medium and therefore without technical issues, which will become complications in the future. The technical part of the machine is therefore an essential part of the work, and the machine consists entirely of non-digital, rather old-school mechanical components. In this way, it can be played in 50 or 75 years with as much ease as today. The design is so elementary that it won't age.

A second part of the background of this work is the representation of light. Light is always filmed when it hits a surface but, before that moment, it travels in the air. Traveling light is very hard to capture on celluloid, which is ironically a medium made by light. I've been working with this contradiction for a while;

in 2008 I made a film where I tried to film light traveling through air, before it hits a surface. Recently I produced a series of works on silk that show sunbeams shining through clouds. *The Vision Machine* started as an attempt to make a narrative using only light, to let light do the talking.

EZ // It has always seemed to me that there are two registers of intention at work in *The Vision Machine*: one is resolutely material, relating to the obsolescence of celluloid film and resisting the material configurations of digital circuitry, the other interested in particular theories of consciousness. How do these two registers come together in the piece?

MM // Moving images have always been related to technology. I'm not nostalgic about film becoming obsolete because it's a technological medium and technology changes. Film has also always been a part of mass media and popular culture, which is a part of cinema I absorbed as much as its counterculture (experimental cinema). For cinema to keep appealing to the masses it should be economically sustainable and celluloid is not.

With technology changing, the idea of cinema will also change. It used to be a medium where you immobilize the body and mobilize the brain; that's less applicable nowadays. I wanted to make a projector that bypasses all the technological and economical factors of cinema and plugs directly into the mind of the viewer. To think that this projector will function in much the same way 50 years from now, operated with the same ease, it taps into the mind as directly now as in the future. Technology doesn't stand in the way. I wanted to tell a story with more than a five-year relevance.

Additionally, I think cinema can best be described as a void. My job as a filmmaker is to create a void, which the viewer can inhabit to create one's own fiction. That is truly where the story is told and where cinema is taking place, in the mind of the viewer, which ricochets between the elements surrounding my void.

EZ // Yes, it is crucial to understand the complex interdependency between materiality and immateriality, rather than using simplistic dichotomies and conceptual shorthands. When you say, "plugs into the mind of the viewer," what do you mean by that? When did you learn about Manzotti's idea of "the spread mind" and how did it inform this project?

MM // My film projects mostly consist of narratives in which many unconnected elements are placed together to form one temporality. It's been an experiment to see how far I can go with creating a harmonious structure by juxtaposing unconnected or associative elements. This structure opens up a third space: the mind of the viewer. Plugging into the mind of the viewer would mean that, with this project, I tried to zoom into this third space without any interference or other story lines. The mind is space, a space which is a synergy between physical and mental processes. I consider *The Vision Machine* an abstract film, which cuts to this space without deviation.

I think I read about Manzotti's idea of the spread mind about two years ago. I've been interested in the mind/body relationship for many years. This is also how I discovered Olaf Blanke's studies of out-of-body experiences. I've been reading about this subject from different perspectives, and have been mostly captivated by theories about the location of the mind. Both Manzotti's

and Blanke's work refer to the mind as something that could be located outside of the body and, at some point, I realized the connection with how I consider cinema, as something that is located outside the film.

EZ // That echoes the tenets of expanded cinema. Was that tradition important to your thinking about *The Vision Machine*?

MM // Yes, entirely. How expanded cinema relates to what's inner and what's outer is something that has become embedded in my work. Kubrick's cosmic consciousness or Belson's cosmic cinema I feel very close to. I think expanded cinema tried to describe an audience that becomes an author instead of merely a receiver of ideas. In contemporary life, entertainment and consumption have become preoccupied with letting the audience create their own originals instead of remaining passive. It's extraordinary how foreseeing this theory/movement has been, picking up on exactly the right signals, which would decide our relationship between technology/media and consciousness. It surely has been important for my work and, with *The Vision Machine*, I think I've tried to reduce some of those ideas in an attempt to get my head around it.

EZ // The fact that *The Vision Machine* will continue to operate in the same way for 50 or 75 years touches on the urgent topic of the conservation of works in digital media. Has this been an issue you've had to grapple with in your other work?

MM // All of my movies, including the recent *Eigengrau* (2011) and *Eigenlicht* (2012), were shot and shown on 35mm film. Conservation is a very big issue, with digital as well as analog mediums. Conservation is always an issue when innovation is important, and for that reason I've been interested for a while in "primitive" forms. For example, entopic phenomena, like floaters on the retina, which become attached to your eyes in the uterus and stay on your retina practically unchanged for your entire life. Or phosphenes, which you can induce by pressing the eyeballs on certain points, and always appear in the same location in the same form. These forms are universal, appearing similarly in people regardless of gender and culture. I've been looking for these universal, somewhat timeless forms, which are in contrast to the constant search for "the new," and are exactly what makes conservation an urgent topic. More concretely, I am very concerned with the conservation of the color black as it appears on celluloid. This is the reason I've kept working on celluloid, because of the deep and textured black it creates. Digital black tends to be gray and milky. More than the conservation of the medium, I'm very concerned with the conservation of a color, one that has been essential for my work and the reason why I haven't compromised how I make or show my films. The reason for me to continue working on celluloid is to conserve the color black on my negatives.

EZ // This question of timeless structures within the dynamic flux of visual perception brings to mind Kierkegaard's argument in *The Concept of Anxiety* that the moment is not the most basic unit of time, but of eternity. He says, "Nothing is as swift as the blink of the eye, yet it is commensurable with the content of the eternal." He goes on in a footnote to contrast the lack

of glance within Greek statuary, against the Christian symbol of the eternal as an eye. This entwining of momentary perception and timelessness, is this also a dynamic you see within *The Vision Machine*?

MM // It's interesting to connect experience with technology. Thinking in this direction, the shutter can be considered the equivalent of the eyelid, a blink when film is transported in a camera or projector to the next frame. But the eyelid Kierkegaard speaks about as a portal to eternity is maybe more of an *unwillfull* moment instead of a mechanical repetition. Duchamp spoke about the "infra-thin," which measured the immeasurable distance between two things: the warmth of a seat that has just been left, people who go through subway gates at the last moment, the whistling sound made by velvet trousers when walking. The infra-thin is infinite not because it's immeasurable but because it's an unwillfull moment. In the theory of emptiness, *the now* is considered infinite and empty. To fully experience *now*, one needs to sharpen one's concentration, to fully become conscious of the texture of now, to witness how everything in the entire universe happens during the blink of an eye. This experience of infinity is definitely related to the senses and perception, however, any willful force is so strongly reduced, it's something you can reach through meditation and not really through art. Or you'd have to make a film for an audience who blinks at 24 frames per second, synchronous with the projector and only when the filmframe is on, so they would only ever see the shutter and witness an entirely black film. That would be amazing!





SEEING WITHOUT IMAGES \\ MOTI'S VISION MACHINE

RICCARDO MANZOTTI

Since Brunelleschi's seminal invention of perspective, the visual pyramid has not only hijacked western art but also shaped the dominant model of the relation between mind and world. Science and popular culture ensued along the same tracks, suggesting that the subject was the ideal vertex of a timeless mathematical projection. The resulting and still-dominant view consisted in the separation between mind and nature, between appearance and reality, and between experience and the world. If the subject and the object were separate, how could the subject ever get in contact with the surrounding reality? The mandatory scapegoat—not different from the role assigned to other fictitious entities such as the infamous *phlogiston* and the equally embarrassing *luminiferous ether*—has been the notion of *image* as something that brings the external world inside one's mind.

In fact, we got so accustomed to the notion of knowing the world by means of intermediate entities that we take it as a natural fact. We assume that there has to be something that goes from the world to our mind. The image is then a phantom that should at once hide and reveal the external object. According to such a gloomy Kantian stance, when one looks at the world, one sees images and not the world itself.

If, during the Renaissance, Leonardo spoke abundantly of *forma*, *eidola*, and *simulacra*, contemporary neuroscience speaks—with no greater understanding—of *input*, *information* and *representations*. In this regard, in the last century, the world-renowned psychologist Burrhus Skinner enjoyed

comparing the dominant view of reality to a digestive model, in which senses are akin to hungry jaws devouring floating images out of the surrounding world, while the brain is akin to a digestive tract excreting sensations, perceptions, and thoughts. *Images* and *inputs* ought then to be nothing but morsels of reality that our senses bite, our brain munches, our cognition digests, and—finally—our mind transfigures into mental contents. Such a view is—no need to insist further—hopelessly flawed and intrinsically dualist.

Yet, thanks to the combined influence both of theories of perception and of visual art, images conquered center stage. By and large, scholars and laymen alike still consider the act of seeing as a matter of dealing with images. Thus, we commonly say that one sees by means of images, one shoots images, one stores images, and one captures images. Many scholars—such as David Freedberg in his very influential *The Power of Images* (1989)—have regarded images as powerful entities capable of influencing human life. A great intellect like John Kepler wondered about the most difficult problem of all: how does the brain capture images? More recently, neuroscience and computer science have provided a scientific disguise for such a cumbersome and vague notion in terms of other concepts equally vague and yet endowed with a tantalizing aura of scientific authority—neural model, neural image, isomorphic neural activity and the like.

The fact is that no one has ever seen an image. What we see are objects such as apples, chairs, bodies, buildings, trees, cars, trucks, mountains, planets, stars, and so forth. Some of these objects are flat surfaces such as paintings, canvases, photos, digital screens, displays. Nevertheless, they are not images. At most, they are pictures. Visual arts—both traditional ones like painting and more recent ones like cinema or digital videos—have

encouraged the common and widespread mistake of assuming the existence of images. However, such arts are not based on images but on pictures—namely on flat reproductions of the three-dimensional world. Even when a visual work is an abstraction, the artwork is a piece of matter and not an abstract image, no matter how much flat and thin! To cut short a long story, a picture is a flat physical object, respectable and real. In contrast, an image is a phantom, a fairy flame, a fictitious entity, an aesthetic phlogiston. The notion of image is nothing more than a conceptual crutch to safeguard obsolete models of the mind.

In this context, it is all the more poignant and brave that an artist—Melvin Moti—has considered challenging the engrained model of perception by addressing the very notion of image. Moti envisaged and designed a sort of rainbow machine—a contraption (or a series of optical contraptions) capable of emulating natural phenomena like rainbows, sundogs, and halos. My understanding is that he focused on such phenomena because they show—more dramatically than household objects, such as chairs and paintings—the fallacy of the traditional model. In a slogan: rainbows, sundogs, and halos demonstrate that there is no separation between one's experience and the world. Why so? Because their existence is entangled with that of their observers and vice versa.

The naïve faith in a static yet noumenic world collapses in the case of rainbows and the like. One cannot define a rainbow without the help of a viewpoint whose position is constitutive of the location and radius of the rainbow itself. The rainbow does not exist autonomously. Each rainbow takes place uniquely because of a unique observer. A caveat is here mandatory: the observer I am referring to is not a mental subject. The observer is a physical system

whose only required qualification is the capability to allow the raindrops and the sunrays to act as that colored arch that we call rainbow.

The Vision Machine discloses the structure of reality by pulling into existence rainbows that are a natural synthesis of multiplicity and unity, of appearance and reality, and of actuality and existence. I add a few words for each of these dichotomies: The rainbow is made of thousands of reflections and yet it is a unity, which is physical and not just a Gestaltic form. The unity of the colored arch is not the unity of a mental entity. Such a unity is there, in front of us, and yet it is the result of the causal intercourse between *The Vision Machine* and us. At the same time, the rainbow is an identity between existence and becoming. The rainbow is not there as a static and perduring entity. The rainbow takes place. The machine does not host a rainbow; it keeps recreating it. More precisely, it maintains the conditions in which a rainbow can continue to take place. Physically, there is not a single rainbow. There is a flow of rainbows tantamount to how there is an experiential flow. Thus, the rainbow is intrinsically made of time and causation too. If we could freeze time, the rainbow would disappear. The existence of the rainbow is actual insofar as it is possible only by taking place in the observer's now. Actual existence entails becoming. Ideal existence does not. Moti's *The Vision Machine* does not linger with abstract fictitious entities. It compels us to have an intimate contact with reality.

Philosophers love to generalize and, indeed, I believe, this is a good opportunity to exercise such a tendency. All objects are akin to rainbows once we reveal their causal structure and their dependency on other physical systems. The world we live in is not the aloof and eternal platonic world made of noumenic objects, whose nature we can only approximate by means of ethereal and fictitious images. The world we live in is the concrete and actual unfolding of

moments in which causal intercourse carves out the objects that are, at once, our experience and our world. Moti's *The Vision Machine* shows that. It challenges the roots of our intuitions about the nature of the world we perceive. *The Vision Machine* strives to produce perception without pictures. *The Vision Machine* is a film without a film. It implements objects that cannot be disentangled from their observers. In fact, each beholder will see a personal and private rainbow that no other beholder can share.

In the same spirit, other artists have tried to get rid of the visual pyramid. A notable example is Robert Pepperell's attempt at taking advantage of a new model of perception. On one hand, he has questioned the traditional notion of mind that represents the world on an internal mental screen. On the other hand, he has developed a personal technique in which he explicitly shows the causal coupling between subject and object. Although his artworks exploit traditional, painted surfaces, he shatters the traditional analogy between visual fields and painted canvas. He is not alone. Other artists, scientists and philosophers alike are trying to get free from the constraints imposed by seeing through intermediate images.

According to Jonathan Crary, the way in which we perceive the world has a deep historical character that is the result of artworks, technical devices, and theories of perception. I do agree. In this regard, I like so much Moti's *The Vision Machine* because it implements an alternative to the traditional model of perception. He achieves such an ambitious goal by means of a concrete artwork in which there are no images in the traditional sense. He shows how vision does not require images. We see the world, not a visual representation.



PROJECTION OF VISION AND SELF

OLAF BLANKE

Pythagoras was probably the first to propose that vision does not occur inside the eye (and ensuing brain processes) and that vision is not caused by passively receiving information in the eye from the world. The Greek philosopher is thought to have systematically analyzed and described the extramission theory of vision: that is, that vision is a projection from the eye into the world and not the other way around. Thus, he proposed, that vision is an active process by which light is projected or emitted from the eye into the world and onto objects, illuminating the world. He argued that an “internal fire was generated within the eye and that this fire played an important role in vision by leaving the eye” and that fire was subsequently reflected from external objects back into the eye. Aristotle rejected Pythagoras’ extramission theory and argued in favor of a vision theory in which the eye passively receives visual input from the world. Aristotle’s account developed into most currently accepted theories of vision that were further refined in the era of Newton and Kepler and, of course, by much recent research, as the inspection of any textbook on vision will show. I will highlight here only three lines of research that suggest that, despite the great importance of passive perceptual mechanisms in vision (from world to eye to brain), recent work points towards the importance of efferent/extramission and, thus, more generally to active observer-dependent mechanisms in vision.

There are many situations in which eye movements are continuously filtered out from vision and this testifies to the intricate and inseparable relationship

between efferent/extramission signals and passive afferent signals in vision. Thus, we do not detect the smear of the visual scene that a passive observer should see during each eye movement and we are also unaware of the perceptual blackouts during our 10-15 blinks that we perform involuntarily each minute. Both cases show that efferent signals from the observer's brain shape visual perception, arguing against passive vision. Moreover, vision without the capacity of the observer to make eye movements does not exist, as it has been reported that humans cease to see the world in cases when the muscles that move the eyes are paralyzed.

Pythagoras added another interesting observation to show that visual perception is not a passive but an active process: by rubbing and slightly deforming the eyeball (and thus mechanically stimulating retinal nerve cells), small stars and lights—phosphenes—can be induced. However, phosphenes, and many other visual hallucinations, can also be induced by stimulation and interference with different brain regions, even in cases of retinal blindness. These data about retina and visual brain regions highlight not only the crucial role of the brain for visual perception, but also the projective character of visual experience, again supporting the extramission theory and the projective nature of visual experience into the world by the central nervous system.

Such cerebral projections may not only include phosphenes and visual objects of different complexity (lights, stars, dots, houses, objects), but may also concern the observer's own body, as during so-called "illusory own-body perceptions." Here, the subject has the impression of seeing a second version of one's body in extrapersonal space, such as during autoscopic hallucinations and heautoscopy—visions of a human double. The most striking example

may be an out-of-body experience, during which the subject not only experiences seeing a second version of one's body, but also that the center of awareness (or self-consciousness) is projected to a distant location from one's actual, physical body location. Pythagoras' fire does not only seem to project objects into the world, but also entire subjects of experience.

In brief, many elegant models of vision exist that are based on passive, bottom-up mechanisms. However, vision is also strongly influenced by top-down mechanisms, efferent motor control, and signals related to the prediction of the visual consequences of actions. These latter signals are continuously integrated with passively received visual signals and jointly generate conscious human vision. The above brief list of findings may be considered extramission elements and may turn out to be important for our understanding of conscious visual experience. It therefore seems that the extramission theory of vision (and perception), and the projective character of vision along with Pythagoras' fire, may yet again become a hot research topic and matter of dispute, shifting our focus from the eye to the brain to the making of consciousness.

CITATION: *Otto-Joachim Grüsser, "On the History of Ideas of Efference Copy and Reafference," Essays in the History of the Physiological Sciences: 35.*

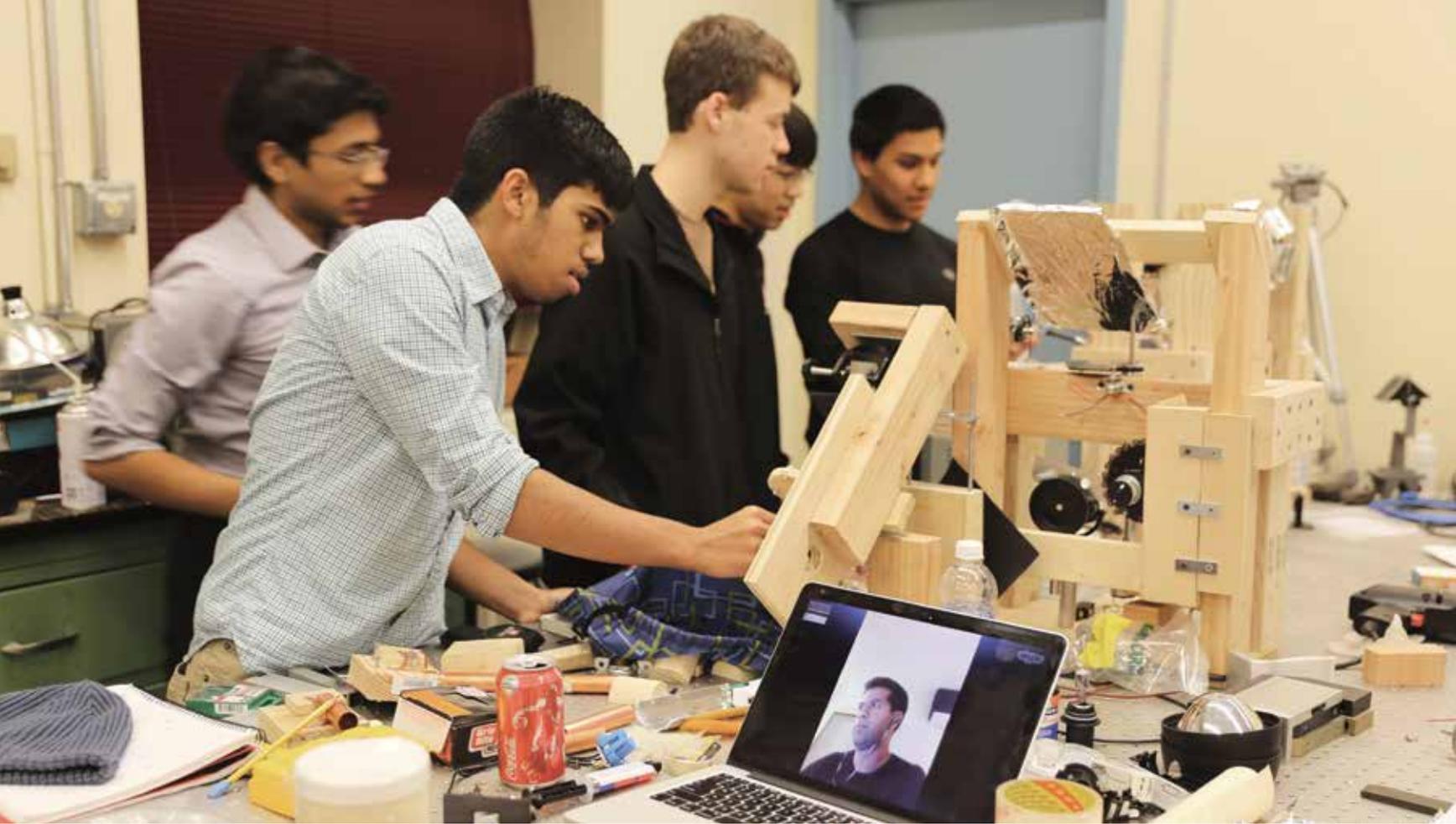


MELVIN MOTI lives and works in Rotterdam, Netherlands. He examines neurological, scientific, and historic processes in relation to visual culture. Over the last several years he has produced films, artist books, objects, and drawings. He has had solo exhibitions at Mudam (Luxembourg), Wiels (Brussels), Kunstverein Harburger Bahnhof (Hamburg), Stedelijk Museum (Amsterdam), and MMK (Frankfurt). His two most recent films, *Eigengrau* (2011) and *Eigenlicht* (2012), were included in *The Encyclopedic Palace* at the 55th International Art Exhibition, Venice, Italy.

RICCARDO MANZOTTI is a philosopher, psychologist, and artificial intelligence scholar. He earned his PhD in robotics and is currently a Fulbright visiting scholar at MIT's Department of Linguistics and Philosophy. His work has made significant contributions to the problem of consciousness, the possibility of outlining a physical model of phenomenal experience, and the relationship between mind and world. Much of Manzotti's research has focused on the concept of the "Spread Mind," which challenges the traditional separation between subject and object. This view suggests that the conscious mind is larger than any single body.

Manzotti has published more than 100 scientific papers, and has written two books that explore the place of consciousness in the physical world: *Conscienza e Realtà* (2001) and *L'esperienza* (2008). He also co-edited two books for Imprint Academic: *Artificial Consciousness* (2008) and *Situated Aesthetics* (2011).

OLAF BLANKE is founding director of the Center for Neuroprosthetics and Bertarelli Foundation Chair in Cognitive Neuroprosthetics at the Ecole Polytechnique Fédérale de Lausanne (EPFL). He also directs the Laboratory of Cognitive Neuroscience at EPFL and is Professor of Neurology at the Department of Neurology at the University Hospital of Geneva. Blanke's human neuroscience research is dedicated to the understanding of how the brain represents our body and the neuroscientific study of consciousness using human neuroimaging techniques. In clinical neuroscience he pursues invasive neurosurgical investigations as well as neuroprosthetics investigations in neurological, orthopaedic, and psychiatric patients. He pioneered cognitive neuroprosthetics by using engineering techniques such as robotics, haptics, virtual reality and became most interested in developing cognetics: robotics to study mind, cognition, and consciousness. He has recently published a book on art and the brain *Lignes de fuite. Vers une neuropsychologie de la peinture*.



THE VISION MACHINE \ 2014

Melvin Moti worked collaboratively with a team of Rensselaer undergraduate physics and engineering students to create *The Vision Machine*, including:

PARVIZ ALAM
HENRY CHOI
EDUARDO GONZALEZ
JOE LAPIERRE
RAVI PANSE
PHILIP SWEETING

The initial studies of light refraction were conducted by Henry Choi and Ravi Panse from June to August 2014. Melvin Moti and the students met over Skype on a weekly basis to discuss *The Vision Machine*, with the guidance of Peter Persans, Professor of Physics, Applied Physics and Astronomy at Rensselaer and Geoff Abbas, EMPAC Director for Stage Technologies.

CURATED BY EMILY ZIMMERMAN

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Michael Wells / Production Technician
Emily Zimmerman / Associate Curator

RICCARDO MANZOTTI

TALK

THE SPREAD MIND

—

DECEMBER 04, 7:00 PM

According to popular wisdom, consciousness takes place inside the mind, something with which Galileo, neuroscience, and the movie *The Matrix* would all agree. How are neurons able to create this internal mental world? Scientists have gone so far as to conclude that most of what we see around us exists only as an acquired image in the mind of the spectator, separated from what is perceived.

In this talk, Riccardo Manzotti will make the case for “externalism,” or consciousness that spreads beyond the brain, out into the world. Our minds exist both in front of our eyes and behind them. The individual doesn’t see a world; he is part of a world process. To support this claim, Manzotti will demonstrate a causal account of the object, examining several “internalist” arguments (e.g., illusions, phosphenes, hallucinations, Charles Bonnet syndrome, phantom limb pain, and dreams), showing how each is actually compatible with an “externalist” view of the mind.

Presented in conjunction with Melvin Moti’s installation *The Vision Machine*

THE VISION MACHINE



MELVIN MOTI