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Never Before Seen

A Thesis submitted in partial satisfaction of the requirements
for the degree Master of Fine Arts

in

Visual Arts

by

Leigh Ann Cole

Committee in charge:

Professor Amy Adler, Co-chair
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2011

The thesis of Leigh Ann Cole is approved and it is acceptable in quality and form for publication on microfilm and electronically:

Co-Chair

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University of California, San Diego

2011

DEDICATION

In dark pits beneath the earth's crust and from telescopes on every continent, scientists are searching, staring intently into the most extreme regions of the universe. Seeking to answer a fundamental and simple question: how did the universe begin? Over the past year I have become captivated with the weight of such a question. I sense a kinship between the scientific method and my art practice. Constant questioning and skepticism of easy answers influence the research behind my work. *Never Before Seen* is dedicated to the absurd and beautiful tradition in science of endless inquiry.

EPIGRAPH

The fairest thing we can experience is the mysterious. It is the fundamental emotion which stands at the cradle of true art and true science.... A knowledge of the existence of something we cannot penetrate, of the manifestations of the profoundest reason and the most radiant beauty, which are only accessible to our reason in their most elementary forms.

Albert Einstein

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ABSTRACT OF THE THESIS

Never Before Seen

by

Leigh Ann Cole

Master of Fine Arts in Visual Arts

University of California, San Diego, 2011

Professor Amy Adler, Co-chair
Professor Jennifer Pastor, Co-chair

Never Before Seen combines science and art into a short-lived experience. This installation is inspired by black holes, and their impact on the public perception of science. Constructed from steel, fiber optics, plastic wrap, and house paint; the installation fills a 24 foot x 36 foot space and is presented in the dark. Black holes have remained out of our physical grasp despite their presence within cinema and popular culture. By giving form to the intangible, this project illuminates that which is truly never before seen.

NEVER BEFORE SEEN

When I was 8, I started working for my family's business. After school and on weekends I would sell t-shirts, soda, popcorn, and other trinkets at the local convention center to earn spending money. This afforded me a certain behind-the-scenes glimpse of events like Ringling Bros. and Barnum and Bailey's Circus and Monster Jam. The space inside of a coliseum holds a magical quality. People cheer when watching a giant dragon, made of car parts, breathe fire and tear a smaller car to shreds, or when motorcycles zip past each other inside a huge orb. There is simplicity in this type of entertainment. It's visceral, as though you can feel the acceleration and anxiety of the motorcyclists, or feel the power of wielding a giant metal dragon.

Figure 1. Antechamber sign for *Never Before Seen*, designed by Austin Stracke, May 2010

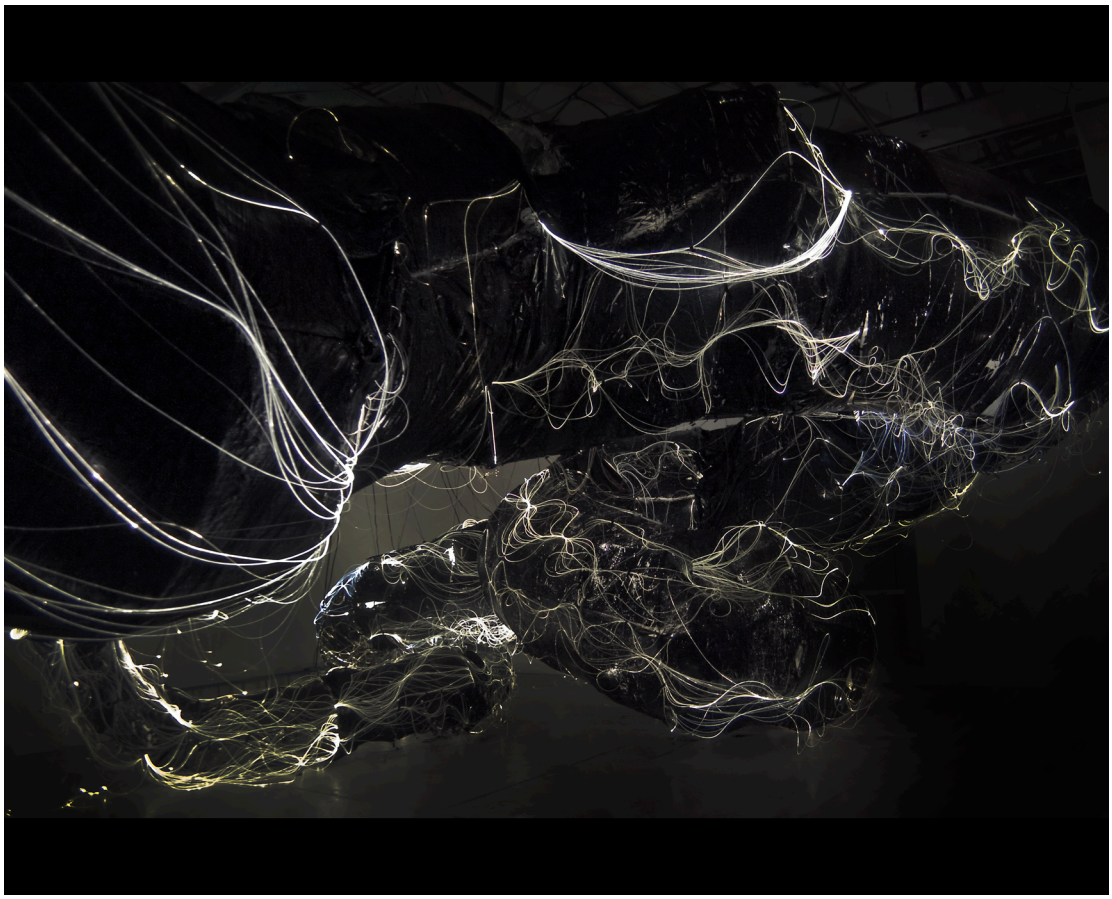

Figure 1. Installation Photograph, *Never Before Seen,* August 2010

These shows are designed to conjure fantasy within a generic space, and like these shows, *Never Before Seen* crafts its own illusion. Within the gallery an almost infinite space is created. An antechamber allows access to what awaits inside. Then darkness. Visitor's pupils slowly dilate allowing their eyes to become more sensitive. Light darts erratically across a surface, and a glow emanates from within, revealing uneven dark lines. A shape emerges in the dim space. Its long winding tubular structure snaking around the room. Lines of light and blackness stretched over a hanging scaffold of connected rings.

Never Before Seen incorporates 120 hand bent steel circles. Each circle connects in an ascending scale from six inches to eight feet. The shape follows a predetermined path, forged entirely from mathematics, sketches, and brute force.

I performed hundreds of calculations, took measurements, and developed a grid system, all in an effort to match my sketches. However, during construction numbers did not always match up. I felt as though all of my measurements and planning were faulty. In the face of this doubt, *Never Before Seen* tested both my skill and faith in the original design. The sketches were a roadmap, leading the way through a form that was almost incomprehensible. Segments increased in scale, and with every new ring the piece evolved into more of an environment than a sculpture.

Sixty thousand feet of painted plastic wrap squeezes and masks the steel. The semi-opaque nature of the plastic wrap provides both a barrier and stage for the ultimate optical display, a flowing field of fiber optic wire. Light flows from tiny LED illuminators built into the steel structure, traversing all 120,000 feet of fiber optics at the speed of light. The fiber optics skip across the surface, drooping in certain spots and clinging in others. Each strand operates as a minuscule house of mirrors, instantly shooting the light forward delaying its inevitable escape.

This environment necessitates darkness and time, both fundamental factors in studying a particularly intriguing formation of the Universe, the black hole.

Figure 2. Fiber optic detail, *Never Before Seen,* May 2010

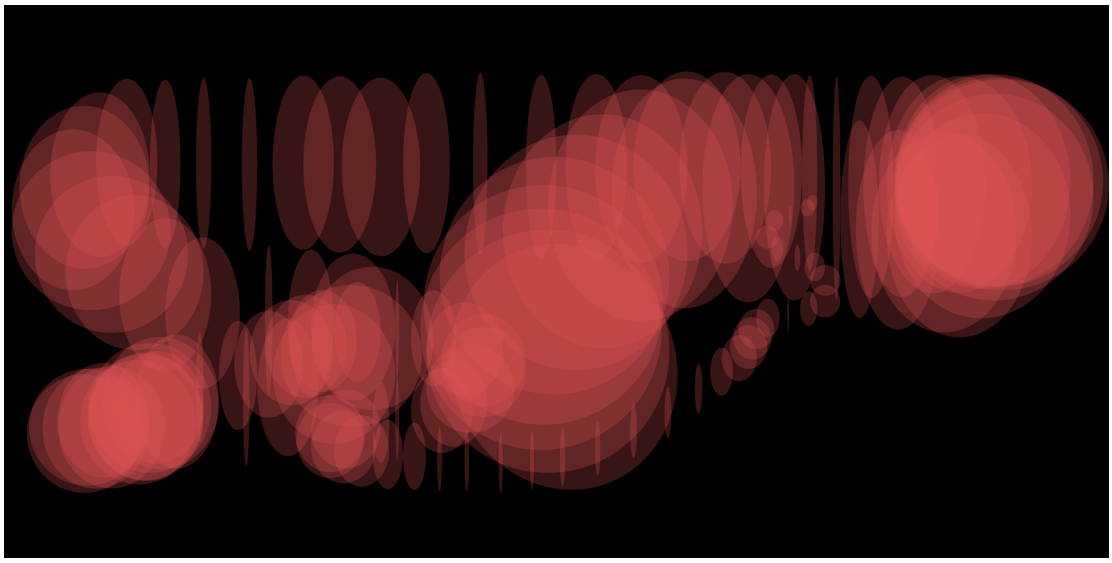

Figure 4. Steel armature final sketch, *Never Before Seen,* October 2009

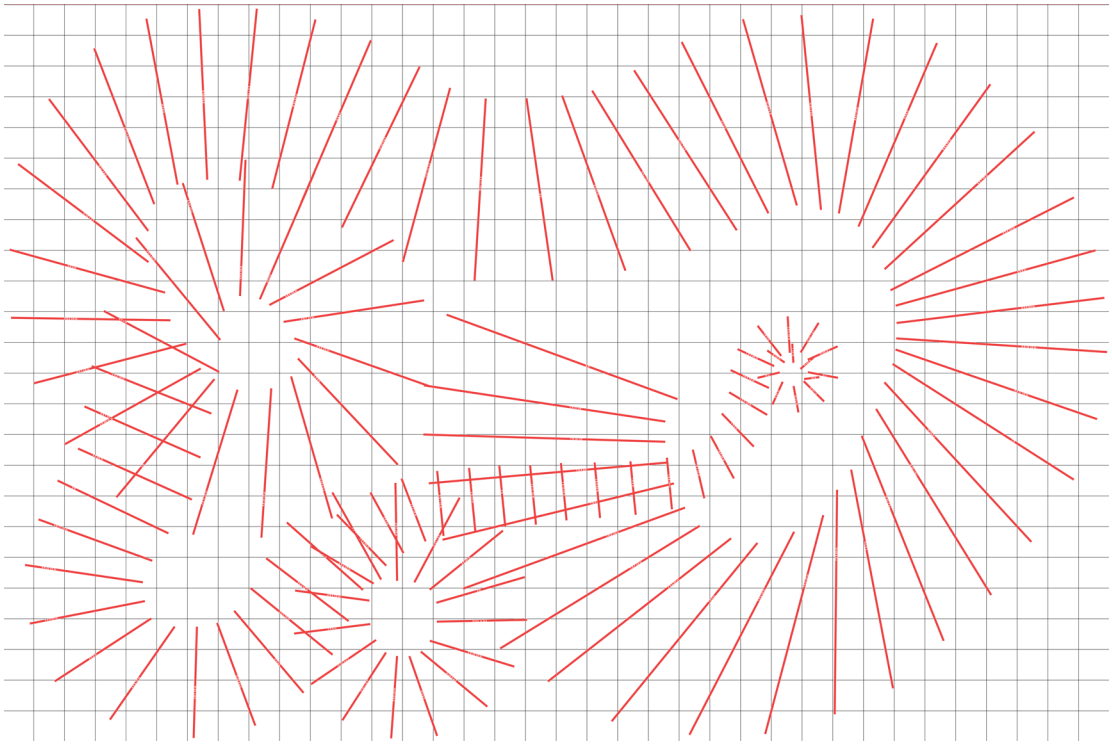

Figure 5. Steel armature sketch (floor plan; each square is one foot of floor space), *Never Before Seen,* October 2009

Figure 6. Calculation sheets for metal rings, *Never Before Seen,* October 2009

	Diameter (ft)	Diameter (in)	circumference	circumference	circumference # pieces/length
MB	6' 10.5"	82.5"	21.6'	259.18"	6/ 3 ft 7.2 in
LC	6' 9.75"	81.75"	21.4'	256.83"	6/ 3 ft 6.8 in
LC	6' 9"	81"	21.2'	254.47"	6/ 3 ft 6.4 in
LC	6' 8.25"	80.25"	21'	252.11"	6/ 3 ft 6 in
LC	6' 7.5"	79.5"	20.81'	249.76"	6/ 3 ft 5.6 in
LC	6' 6.75"	78.75"	20.6'	247.4"	6/ 3 ft 5.2 in
MB	6' 6"	78"	20.42'	245.04"	6/ 3 ft 4.8 in
MB	6' 5.25"	77.25"	20.22'	242.69"	6/ 3 ft 4.4 in
MB	6' 4.5"	76.5"	20.03'	240.33"	6/ 3 ft 4.1 in
MB	6' 3.75"	75.75"	19.83'	237.98"	6/ 3 ft 3.7 in
LC	6' 3"	75"	19.64'	235.62"	6/ 3 ft 3.3 in
MB	6' 2.25"	74.25"	19.44'	233.26"	6/ 3 ft 2.9 in
MB	6' 1.5"	73.5"	19.24'	230.09"	6/ 3 ft 2.5 in
MB	6' .75"	72.75"	19.05'	228.55"	6/ 3 ft 2.1 in
LC	6'	72"	18.85'	226.19"	4/ 4 ft 8.6 in
LC	5' 11.25"	71.25"	18.65'	223.84"	4/ 4 ft 8 in
LC	5' 10.5"	70.5"	18.46'	221.48"	4/ 4 ft 7.4 in
TC	5' 9.75"	69.75"	18.26'	219.12"	4/ 4 ft 6.8 in

	Diameter (ft)	Diameter (in)	circumference	circumference	circumference # pieces/length
TC	5' 9"	69"	18.06'	216.77"	4/ 4 ft 2.3 in
MB	5' 8.25"	68.25"	17.87'	214.41"	4/ 4 ft 5.6 in
TC	5' 7.5"	67.5"	17.67'	212.06"	4/ 4 ft 5.1 in
TC	5' 6.75"	66.75"	17.48'	209.7"	4/ 4 ft 4.4 in
TC	5' 6"	66"	17.28'	207.35"	4/ 4 ft 3.8 in
TC	5' 5.25"	65.25"	17.08'	204.99"	4/ 4 ft 3.2 in
TC	5' 4.5"	64.5"	16.89'	202.63"	4/ 4 ft 2.7 in
TC	5' 3.75"	63.75"	16.69'	200.28"	4/ 4 ft 2.1 in
TC	5' 3"	63"	16.49'	197.92"	4/ 4 ft 1.5 in
TC	5' 2.25"	62.25"	16.3'	195.56"	4/ 4 ft .9 in
TC	5' 1.5"	61.5"	16.1'	193.21"	4/ 4 ft .3 in
TC	5' .75"	60.75"	15.91'	190.86"	4/ 3 ft 11.7 in
ZM	5'	60"	15.71'	188.5"	4/ 3 ft 11.1 in
ZM	4' 11.25"	59.25"	15.51'	186.14"	4/ 3 ft 10.5 in
ZM	4' 10.5"	58.5"	15.32'	183.78"	4/ 3 ft 10 in
ZM	4' 9.75"	57.75"	15.12'	181.43"	4/ 3 ft 9.4 in
ZM	4' 9"	57"	14.97'	179.07"	4/ 3 ft 8.9 in
ZM	4' 8.25"	56.25"	14.73'	176.71"	4/ 3 ft 8.2 in

	Diameter (ft)	Diameter (in)	circumference	circumference	circumference # pieces/length
ZM	4' 7.5"	55.5"	14.54'	174.36"	4/ 3 ft 7.6 in
ZM	4' 6.75"	54.75"	14.33'	172"	4/ 3 ft 7 in
MB	4' 6"	54"	14.14'	169.64"	4/ 3 ft 6.4 in
MB	4' 5.25"	53.25"	13.94'	167.29"	4/ 3 ft 5.8 in
MB	4' 4.5"	52.5"	13.74'	164.93"	4/ 3 ft 5.2 in
MB	4' 3.75"	51.75"	13.55'	162.58"	4/ 3 ft 4.7 in
ZM	4' 3"	51"	13.35'	160.22"	4/ 3 ft 4.1 in
MB	4' 2.25"	50.25"	13.16'	157.87"	4/ 3 ft 3.5 in
MB	4' 1.5"	49.5"	12.96'	155.51"	4/ 3 ft 2.9 in
MB	4' .75"	48.75"	12.76'	153.15"	4/ 3 ft 2.3 in
MB	4'	48"	12.57'	150.8"	4/ 3 ft 1.7 in
ZM	3' 11.25"	47.25"	12.37'	148.44"	4/ 3 ft 1.1 in
ZM	3' 10.5"	46.5"	12.17'	146.08"	4/ 3 ft .5 in
ZM	3' 9.75"	45.75"	11.98'	143.73"	4/ 2 ft 11.9 in
ZM	3' 9"	45"	11.78'	141.37"	4/ 2 ft 11.3 in
ZM	3' 8.25"	44.25"	11.59'	139.02"	4/ 2 ft 10.8 in
ZM	3' 7.5"	43.5"	11.39'	136.66"	4/ 2 ft 10.2 in
ZM	3' 6.75"	42.75"	11.19'	134.3"	4/ 2 ft 9.6 in

	Diameter (ft)	Diameter (in)	circumference	circumference	circumference # pieces/length
LC	3' 6"	42"	11'	131.95"	4/ 2 ft 9 in
ZM	3' 5.25"	41.25"	10.8'	129.59"	4/ 2 ft 8.4 in
LC	3' 4.5"	40.5"	10.6'	127.23"	4/ 2 ft 7.8 in
LC	3' 3.75"	39.75"	10.41'	124.88"	4/ 2 ft 7.2 in
LC	3' 3"	39"	10.21'	122.52"	4/ 2 ft 6.6 in
LC	3' 2.25"	38.25"	10.01'	120.17"	4/ 2 ft 6 in
LC	3' 1.5"	37.5"	9.82'	117.81"	4/ 2 ft 5.5 in
LC	3' .75"	36.75'	9.62'	115.45"	4/ 2 ft 4.9 in
LC	3'	36"	9.43'	113.1"	2/ 4 ft 8.6 in
LC	2' 11.25"	35.25"	9.23'	110.74"	2/ 4 ft 7.4 in
LC	2' 10.5"	34.5"	9.03'	108.23"	2/ 4 ft 6.2 in
LC	2' 9.75"	33.75"	8.84'	106.03"	2/ 4 ft 5 in
LC	2' 9"	33"	8.64'	103.67"	2/ 4 ft 3.8 in
LC	2' 8.25"	32.25"	8.44'	101.32"	2/ 4 ft 2.6 in
LC	2' 7.5"	31.5"	8.25'	98.96"	2/ 4 ft 1.5 in
LC	2' 6.75"	30.75"	8.05'	96.6"	2/ 4 ft .3 in
LC	2' 6"	30"	7.85'	94.25"	2/ 3 ft 11.1 in
LC	2' 5.25"	29.25"	7.66'	91.89"	2/ 3 ft 10 in

	Diameter (ft)	Diameter (in)	circumference	circumference	circumference # pieces/length
LC	2' 4.5"	28.5"	7.46'	89.54"	2/ 3 ft 8.8 in
LC	2' 3.75"	27.75"	7.27'	87.18"	2/ 3 ft 7.6 in
LC	2' 3"	27"	7.07'	84.82"	2/ 3 ft 6.4 in
LC	2' 2.25"	26.25"	6.87'	82.47"	2/ 3 ft 5.2 in
LC	2' 1.5"	25.5"	6.68'	80.11"	2/ 3 ft 4.1 in
LC	2' .75"	24.75"	6.48'	77.75"	2/ 3 ft 2.9 in
LC	2"	24"	6.28'	75.4"	2/ 3 ft 1.7 in
LC	1' 11.25"	23.25"	6.09'	73.04"	2/ 3 ft .5 in
LC	1' 10.5"	22.5"	5.89'	70.69"	2/ 2 ft 11.3 in
LC	1' 9.75"	21.75"	5.69'	68.33"	2/ 2 ft 10.1 in
LC	1' 9"	21"	5.5'	65.97"	2/ 2 ft 9 in
LC	1' 8.25"	20.25"	5.3'	63.62"	2/ 2 ft 7.8 in
LC	1' 7.5"	19.5"	5.1'	61.26"	2/ 2 ft 6.6 in
LC	1' 6.75"	18.75"	4.91'	58.9"	2/ 2 ft 5.5 in
LC	1' 6"	18"	4.71'	56.55"	2/ 2 ft 4.3 in
LC	1' 5.25"	17.25"	4.52'	54.19"	2/ 2 ft 3.1 in
LC	1' 4.5"	16.5"	4.32'	51.84"	2/ 2 ft 1.9 in
LC	1' 3.75"	15.75"	4.12'	49.48"	2/ 2 ft .7 in

	Diameter (ft)	Diameter (in)	circumference	circumference	circumference # pieces/length
TC	1' 3"	15"	3.93"	47.12"	1/ 3 ft 11.2 in
ZM	1' 2.25"	14.25"	3.73'	44.77"	1/ 3 ft 8.8 in
TC	1' 1.5"	13.5"	3.53'	42.41"	1/ 3 ft 6.4 in
TC	1' .75"	12.75"	3.34'	40.06"	1/ 3 ft 4.1 in
MCF	1'	12"	3.14'	37.7"	1/ 3 ft 1.7 in
MCF	11.25"	11.25"	2.95'	35.34"	1/ 2 ft 11.4 in
ZM	10.5"	10.5"	2.75'	32.99"	1/ 2 ft 9 in
ZM	9.75"	9.75"	2.55'	30.63"	1/ 2 ft 6.6 in
ZM	9"	9"	2.36'	28.27"	1/ 2 ft 4.3 in
ZM	8.25"	8.25"	2.16'	25.92"	1/ 2 ft 1.9 in
ZM	7.5"	7.5"	1.96'	23.56"	1/ 1 ft 11.5 in
LC	6.75"	6.75"	1.77'	21.21"	1/ 1 ft 9.2 in
LC	6"	6"	1.57'	18.85"	1/ 1 ft 6.8 in
	5.25"	5.25"	1.37'	16.49"	1/ 1 ft 4.4 in
	4.5"	4.5"	1.18'	14.14"	1/ 1 ft 2.2 in
	3.75"	3.75"	0.98	11.78"	11.8 in
	3"	3"	0.79	9.42"	9.5 in
	2.25"	2.25"	.59'	7.07"	7.1 in

> When we enter a dark room, the eyes first adapt by opening up the iris to allow light in. Over a period of about 30 minutes, there are other chemical adaptations that make the rods become sensitive to light…. After this time we see much better in the dark, but we have very little colour vision. This is known as scotopic vision. (Gibbs)

The process of switching to scotopic vision happens unconsciously, usually only marked by a gradual shift in what is visible. Environments are perceived through any of the 5 senses. Touch and taste require direct contact. Smell and sound extend the realm of sensory perception, but all of these pale in comparison with sight. Sight extends further than any other sense, and with a little help it can even reach beyond our own surroundings, out into the heavens.

David Hickey postulates that, "[o]ur commonality as citizens resides almost exclusively in the world before our eyes." (74) We may not see the same thing, but the method by which our eyes see is not unique to the individual. The eye requires light to feed the brain sensory information. A constructed environment allows control to be exerted over the light that enters the eye. *Never Before Seen* brings eyes into a place where they must adjust, but in reciprocity, they experience something new, something hidden in the dark.

Before we had the power to detect them in space, scientists and mathematicians were taken with the idea of black holes. At a meeting in 1922 where black holes were discussed, the British astrophysicist Arthur Stanley

Eddington stated, “that [a black hole] was the Magic Circle inside of which no measurement could bring us.” (Vishveshwara, 183) Essentially from Eddington’s perspective, there were simply places in the universe inside of which no one can see, not with mathematics or a really big telescope.

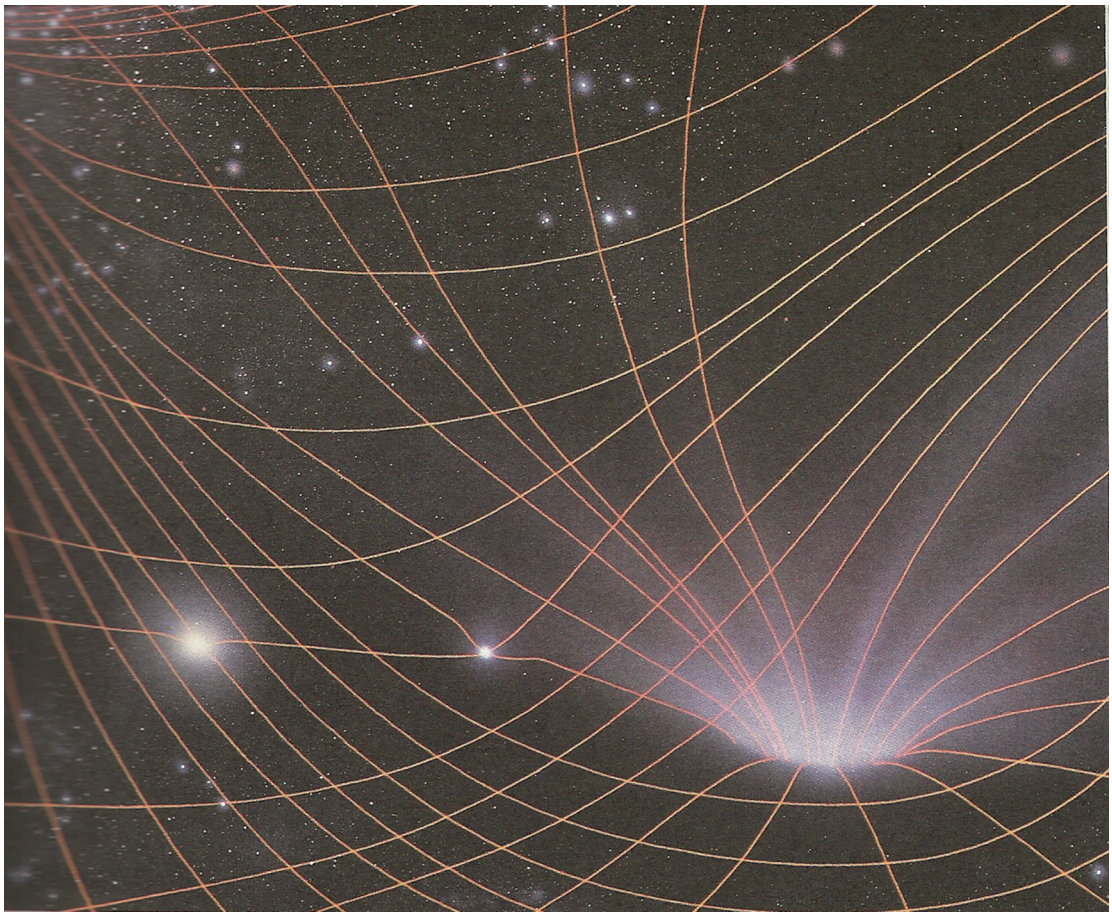

Figure 7. Isaac Asimov’s Library of the Universe: Quasars, Pulsars, and Black Holes, 1988

A black hole exists in 3-D space, which means that it takes the shape of an infinitely small orb. That orb is probably implied in scientific imagery by the finite end of a funnel, but it certainly isn’t featured in any image. The previous image seems to suggest that a black hole forms a large cone burrowing into

deep space. I began to wonder how this slight, but important, misinterpretation of scientific images impacts the existence of black holes within popular culture.

Controversy caused by the start up of the Large Hadron Collider at CERN peaked my interest, as a large part of the public and scientific community protested its start up. Some believed that colliding particles would produce a black hole, destroying all of mankind and the solar system. (Overbye) This concern became such a media sensation that at an annual meeting of the American Association for the Advancement of Science, the topic was discussed in detail. While in attendance, I was unsurprised to hear them dismiss any possibility of this catastrophe, citing that nature would have already created a black hole through the numerous collisions that occur naturally every day.

The distance between the earth and the nearest known black hole is a mere 1600 light years (a light year equals 5.88 trillion miles, so that would be 1600 x 5.88 trillion which equals 940,800,000,000,000,000,000 miles), despite the distance, black holes continue to occupy a potent part of science fiction and controversy.

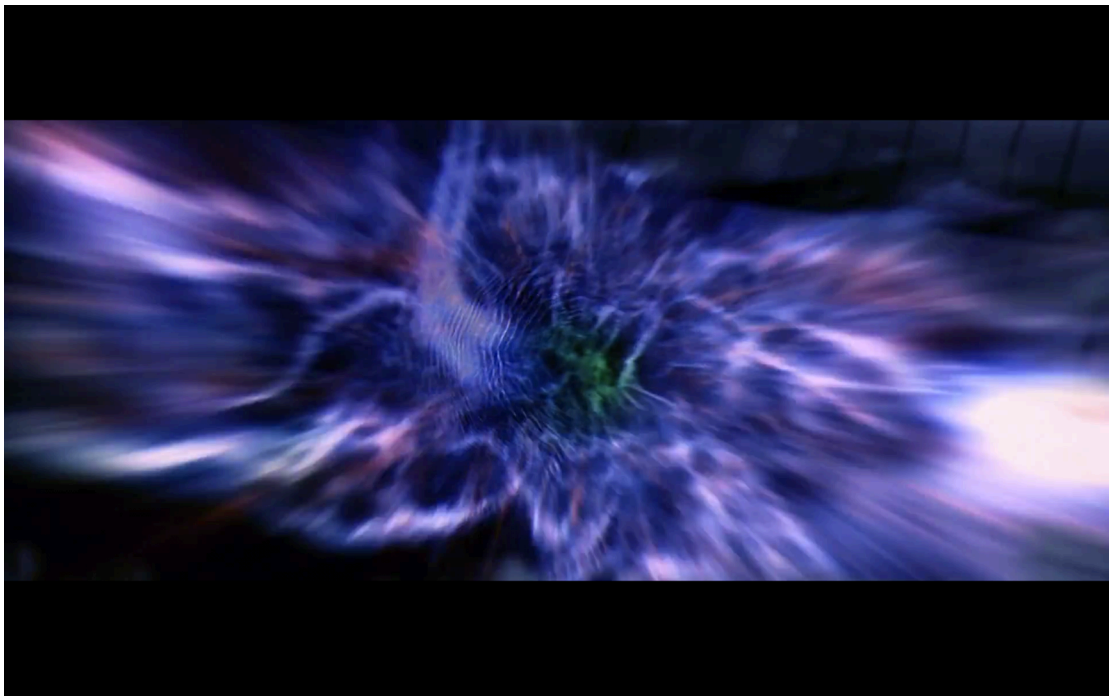

Figure 8. Film still, *Contact*, Warner Bros., 1997

Movies such as *Contact* from 1997 and *Star Trek* from 2009 intermingle the traits of wormholes and black holes to allow time travel in their narratives. Stephen Hawking states that, black holes and wormholes are fundamentally different. "...[W]ormholes are all around us, only they're too small to see. Wormholes are very tiny. They occur in nooks and crannies in space and time." He also postulates that time travel is possible utilizing both anomalies. The scenario including time travel with a black hole doesn't even require passage through it. Simply orbiting it for a length of time would be enough. (Hawking)

These ideas remain theoretical for obvious reasons, making them perfect fodder for science fiction. From the minds of screenwriters who remain

blessedly uninhibited by practicality and reality, spring infinite possibilities. Despite the inherent inaccuracy of cinematic representations, movies provide the main avenue by which the general public engages with theoretical science.

Cinematic liberties that have been taken with science provided a basis for *Never Before Seen*. I was seduced by the mash ups, and utter disregard for a reality filled with practical constrictions. Black holes populate our entire universe, but their own darkness makes them incredibly illusive. In the realm of black holes, both scientists and science fiction writers must imagine and postulate; the dark environment of *Never Before Seen* provides the viewer with a similarly mysterious experience.

Figure 9. Panorama photograph, *Never Before Seen*, August 2010

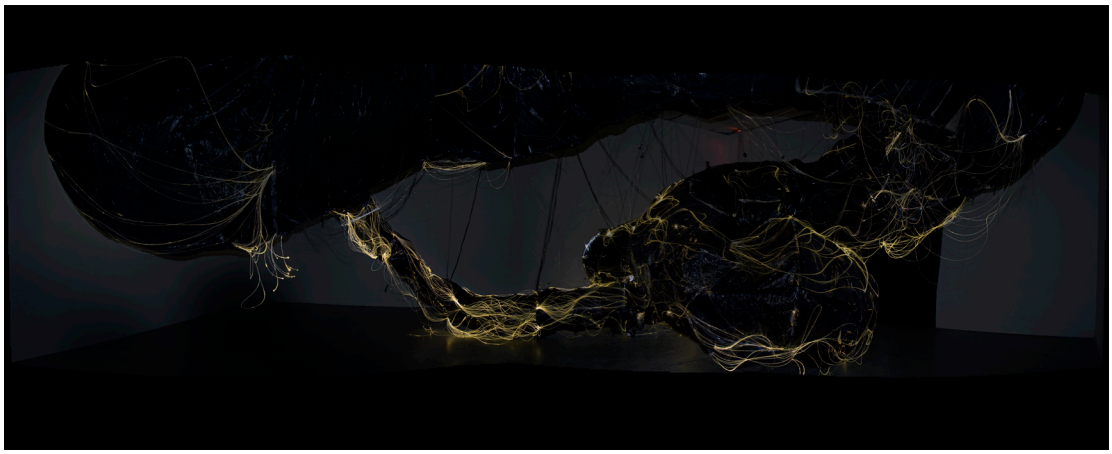

Figure 10. Panorama photograph, *Never Before Seen,* August 2010

Never Before Seen shares the characteristic of unmanageable scale with works by Jeff Koons, Anish Kapoor, and Richard Serra; however, the darkness cloaks its raw physicality. What starts out as an experience involving slight maneuvers and groping through the darkness, concludes with a dramatically different understanding of the inhabited space. This evolution of perception within the installation allows early physical interactions to blend with what slowly develops ocularly. Easily accessible visual associations are avoided, crafting singular encounters for each visitor.

Kapoor's sculptures claim the space that surrounds them, turning the entire room into a gravitational experience. In the absence of the body his sculptures just don't make sense. It is their physicality, the impact of scale and illusion of perception that makes his work successful.

In an interview with Marcello Dantas, Kapoor describes scale as "...a tool….scale is not about how big a thing is but is about how meaningful a thing

is." (C4 Contemporary) Many of his works dwarf the human body, and the viewer's very physical reactions in their proximity cannot be denied. This holds true with other artists such as Jeff Koons and Richard Serra who produce work on a monumental scale. These gentlemen may strive to connect the viewer with massive amounts of content, but the gravity and impact of physical scale remains an integral part of their subject matter. Monumental sculpture ruthlessly enforces its physicality, and viewers must try to reassert their primordial dominance in the face of an obviously larger and therefore superior structure.

Over the last three years I have explored the logical world of electricity and its illuminating byproduct through my work. This project blends together facets of science and art to produce an experience. Its form was inspired by popular culture, and it is designed to create a common space and moment within the imagination of each individual. Black holes have remained out of our physical grasp despite their presence within cinema and popular culture. By giving form to the intangible, this project illuminates that which is truly never before seen.

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