Meridianus Divinitus

A Project and Exhibition for the Requirements for
The Master of Fine Arts in
Electronic Visualization
University of Illinois, Chicago

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Exhibition Dates:
10/30-31/09

Thesis Committee:
Drew Browning, Chairman
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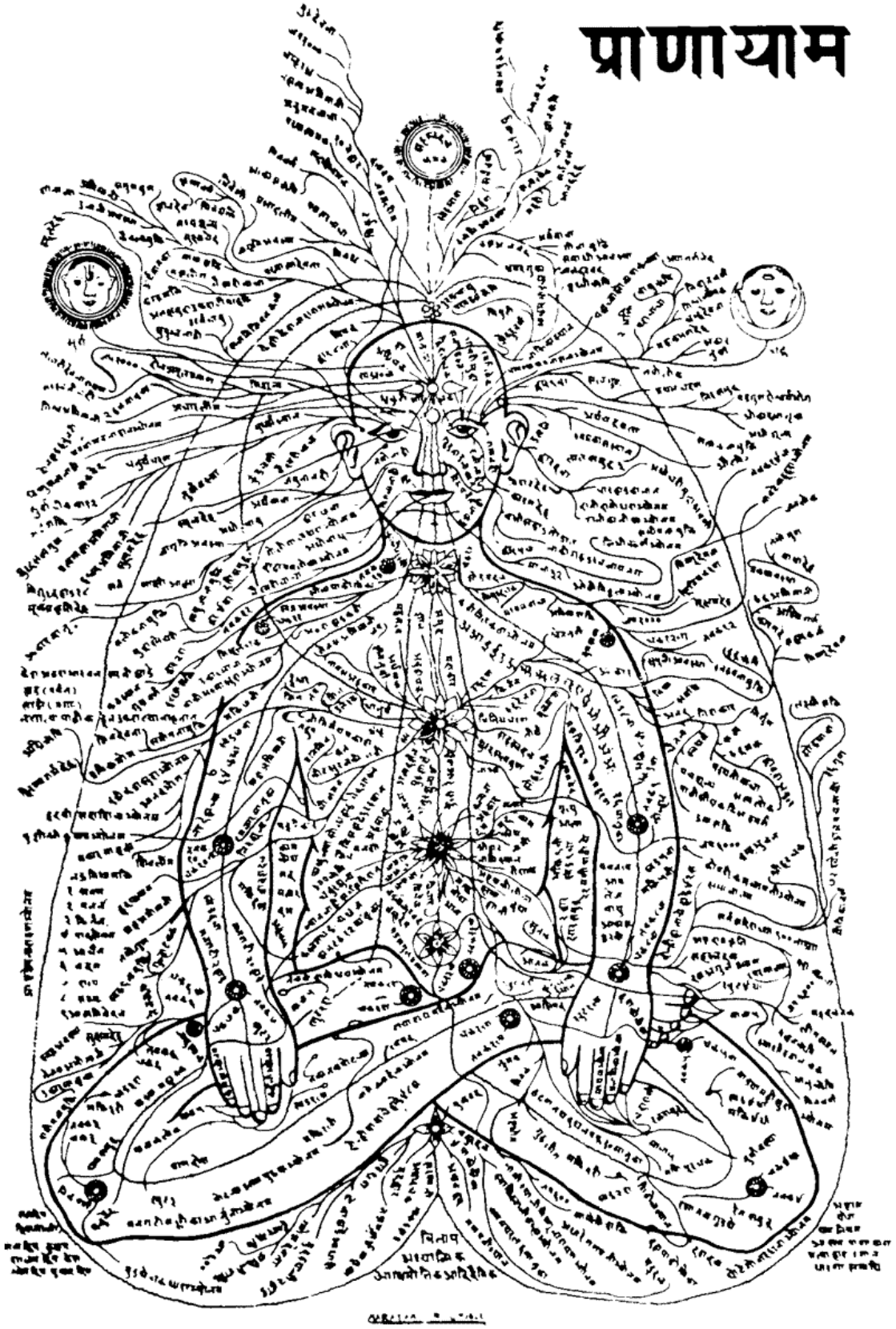

Nadis Diagram [1]

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Abstract:

This document outlines the research, implementation, and aesthetic philosophies of *Meridianus Divinitus*. *Meridianus Divinitus* is an artistic reinterpretation of the body energetic. It was created by taking data from existing charts which outline the flows of chi through out the human body for use in training acupuncture and acupressure, augmented by personal impressions attained by tactile remote sensing. This information was used to create a system of rules for particle creation and flow. Simple sets of spatial locations were artistically interpreted into five separate video animations, based loosely on the ancient five "sacred" elements (in Western cultures): fire, water, air, earth, and spirit. These works culminated in a four-channel gallery installation, juxtaposing four animations of archetypal classic elements projected in the four cardinal directions.

Background:

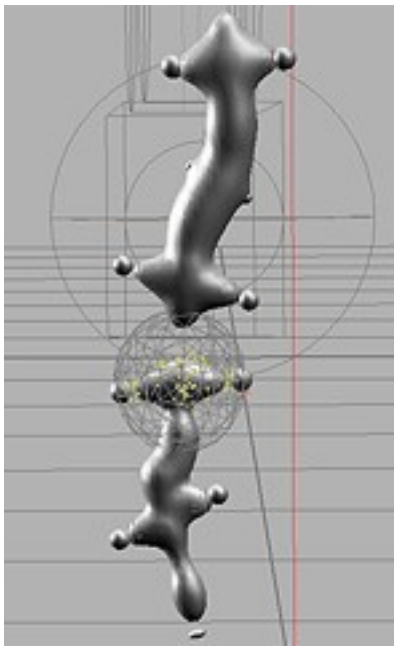
In most Eastern traditions, it is believed that the body is not merely a temporary housing for the soul, but also serves as a conduit for the energies that make up the divine essence of consciousness. These energies not only flow within the body, but also are interactive with the divine energies that lie hidden from normal physical perception. Woven throughout the material universe, these energies are simultaneously separate and symbiotic with the physical aspects of existence. This energy has many names: “chi”, “lifeforce”, “prana”, etc.[2] The life force flows through the body in channels called nadi or meridian flows which contain hundreds of power centers where energy collects and redirects. The strongest nadi flows from the top of the head and the base of the spine meeting at the solar plexus. The power centers along this channel are exponentially stronger than any of the other meridians in the body's energy circular system and are referred to as chakras. This central channel of energy and its chakras are the engine which power the meridian flows networking throughout the rest of the body. There are seven chakras: crown, third eye, throat, heart, solar plexus, reproductive organs, and the base of the spine.[3]

The oldest recorded mapping of nadi can be found in some of the earliest Upanishads (Hindu scriptures from around 800 BC).[4] Though they discuss meridians, the concept of chakras does not appear until the writing of the later Upanishads centuries later. Charts of these flows can be found in ancient and medieval sacred and instructional art in many of the East Asian cultures. One of the earliest was a set of silken scrolls with acupuncture instructional charts discovered in the tomb of Prime Minister Quanhou Licang from the early Han dynasty.[5] In more recent times, interest in chakra and meridian flows has increased as an aspect of the New Age movement. With this trend, many artists such as Alex Grey have explored the subject of the body energetic.[6] However they share the same flaw which plagues earlier representations of the body's dynamic flow: all of these earlier works are static. This was the point of departure for creating *Meridianus Divinitus*.

The Process:

Creating *Meridianus Divinitus* was an extensive multi-step process. The first step was creating a human model in lotus position to use as a framework for positioning the chakras, meridians, and their flows. A human model created in *Poser 7* was manipulated for this purpose, exported as an .obj file, and imported into the *Houdini* software at a scale of 1:1. In retrospective, scaling the model twenty or thirty times the original size would have better accommodated the of level of detail the simulations required. As a result, a number of complications arose when generating shading and lighting for the created models. A larger Houdini model could have simplified various elements and stages of the over all simulation process.

The next step was to create the chakra simulations, referred to as interdependent force simulations. Each separate particle system is affected not only by it's own set of forces, but also by the forces of all the other chakra simulations. The particles were generated in the volume of spheres positioned at the corresponding locations of the chakras near the surface within the volume of the template object. When particles were generated within their source object, no innate directional force was applied to them. All the forces were generated by a volume of "metaballs" with lateral and rotational force creating an influence similar to a tornado. Though the rotational aspects were not required to move the particle from one place to another, they added much needed complexity and corresponded to the natural rotation of chakra centers. The crown and base chakras only had one source while the other five chakras had two sources aligned to the front and back of the body. This required two types of force generators. Their sources had overlapped horizontal force generators which would bring them into the central column of vertical force generators. The vertical force generators started at the top of the template model's head overlapping the crown chakra's particle source and a corresponding location



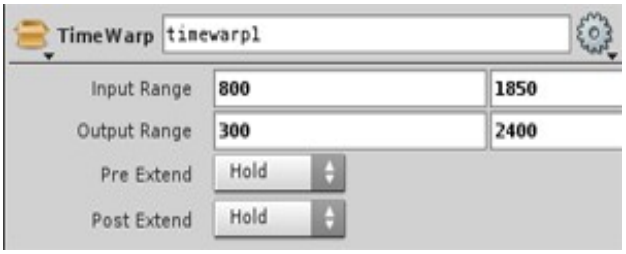
overlapping the base chakra's particle source. From these chakra flow generators, a series of vertical flow generators were applied to draw the particles from “base” and “groin” flows upward and the “crown”, “third eye”, “throat”, and “heart” chakras downward to come together between the solar plexus particle sources. However, the solar plexus horizontal flow generators were not sufficient to keep the non solar plexus particles constrained to the energy core area; two half spheres, which were not rendered, were used as reflective objects to keep all the flows within the target region. The resulting particle flows were within ninety-five percent accuracy of their intended positioning and behavior. As a final step, a series of bounding boxes with a kill expression[7] were used to shorten the life span of the occasional stray particle that managed to break free from particle flow regions.

Originally, the meridian flows were built as an interdependent force simulation as well. However, the sheer complexity of meridian flow network made this unfeasible as a long term solution. Use of a larger scale human model may have better addressed the complex requirements of the system, yet anomalies encountered in the visualization process would nonetheless be very difficult to troubleshoot. The system was created by first plotting the meridian points. Small spheres were snapped to the surface of template model at each of meridian positions. These served as particle source volumes. There were over 300 source spheres plotted throughout the system. Force generators were placed in a train between the meridians going in directions based on acupuncture charts and in some cases dousing the physical human body to determine flow direction. The meridian charts were fairly detailed, creating a sufficiently complex system to reveal the significant weakness of a large interdependent system. Extensive artifacts were created by individual flows not quite reaching their destination or by stray particles flying off into space. Unfortunately, the latter problem could not be solved by the solution of bounding boxes with a kill expression. The meridian flow network was simply too complex.

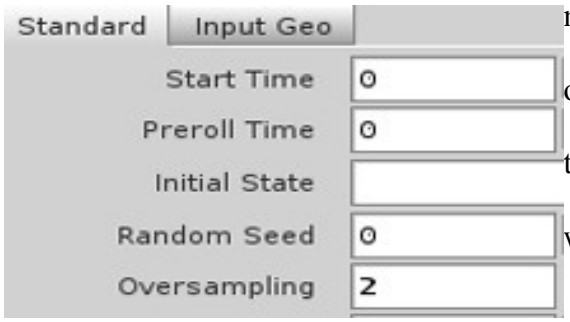
The alternate solution was implemented, creating one large network of approximately 1200 overlapping, stand alone particles simulations. This allowed for much easier troubleshooting of

gapping problems and stray meridian particle artifacts were nonexistent. Using the original framework as a template, the individual simulations were chained together, the ends of one simulation overlapping beginning of the next simulation. The same meridian source spheres were used for the new system, however it was not unusual for there to be two, three or even four flows strung between two meridian points. This not only helped maintain particle density along the flows, but also made it possible to create curves and turns for the between two meridians. Flows were all generated from copies of the same base simulation. Around 6000 frames of the base simulation were baked out into a sequence of object files. These were loaded in sequence using simple expression. Chakra simulations were baked out in a similar manner. This not only decreased the time to load simulations, but also allowed for increasing the speed of simulation.

In the early stages of the project, the only type of time shifting tool available in *Houdini* was scrubbing through the simulation or speeding it up by skipping frames. An open source renaming tool, *Rename It* was used as a work around to parse through file listings, copying and renaming the appropriate quotient of files. The release of *Houdini 9* brought with it new functionalities for manipulating time, yet also required a large portion of the original simulation system to be rebuilt. However, the added functionality of the *Timewarp* tool with time shifting and speed altering capabilities were extremely advantageous to the creation of the final simulations. That said, the function was not without its flaws. Simulations that were not previously baked out took a very long time to load. When working from sequences of files, time translation and simulation speed up functioned without significant problems. However, slowing down a simulation proved problematic. The slowed down simulation was rendered into sets of identical frames consequentially resulting in jerky motion. As this was a commonly known problem among *Houdini* users, a number of complicated approaches were recommended, attempted and failed.[8] The implemented solution used



the *Over Sampling* option in *Houdini's* object node that queries the particle simulation data. Normally, *Over Sampling* is used to prevent particles from going through the surface they are interacting with. *Over Sampling* interpolates the distances in between frames; an over sampling value of 2, yields an X, Y, Z position at the half frame points, as well as the at the frame points. Slowing down a simulation using *Over Sampling* became a matter of matching the level of over sampling with the desired degree of delay. The only downside to using this technique is the increased size of individual object files, which are multiplied by the level of over sampling used. The resulting file size for the eight simulations of approximately 5400 frames each was considerable. Regardless, the *Timewarp* function adequately altered the speed of the base simulations to produce the desired effect for the altered simulations to manifest the five reinterpretations of the sacred elements.



Fire:

Fire was the first reinterpretation to be applied to the chakra and meridian particle simulation. It was also the second from the last element to be completely rendered. Of all the elements, *Fire* was the most difficult to visualize. A number of methods were attempted to generate fire, including use of a custom shader, but were insufficient for the task. An X-ray surface shader with a displacement applied was used instead. Applying an X-ray shader to an object results in a transparent center transitioning to opaque edges, which for simple objects results in an X-ray-like appearance. However, with the extremely complicated surfaces and motion used in *Meridianus Divinitus*, the appearance of flame was achieved.

Motion was accomplished in two ways: the motion of the particles themselves, and the motion of displacement shaders over a surface over time. The set speed for the *Fire* simulations was triple speed for the chakra simulations, and double speed for the meridian simulations. During the early stages of *Fire* using *Houdini 8* - speed manipulation was accomplished by parsing and renaming a separate sequence of object files. The final effect was satisfactory, and though the *Timewarp* capability became the tool of choice for the other four elements, the *Fire* simulation was completed using the parsing/renaming technique. In the case of the chakra simulations, the chakra systems were loaded into object space and converted into two overlapping objects. One was a series of primitive spheres with one variation of the fire displacement shader. The other was a complex object built from metaballs with a different variation of the fire displacement shader. Each chakra flow had its own color, which were based on modern chakra interpretations.

Meridians used simple primitive spheres with a white, almost transparent version of the X-ray shader. A large number of particles were used to mask the simplicity of the object. Initial meridian flows were designed with complex metaball structures that ultimately negatively impacted file load and render times, and did not yield as aesthetically pleasing results as the primitive spheres.

The displacement shaders turned out to be the weak link in the creation of *Fire*. Displacement

shaders were necessary for X-ray shaders to take on the appearance flame. Displacements also controlled which direction the emulated flames seemed to flow. When the displacements were in harmony with the motion of the particles, it gave the appearance of plasma-like flame. The most significant problem was visual artifacts of horizontal banding introduced by the displacements. These flaws were prone to occur when a particle was close to the camera, but could also randomly appear in simulation. Upgrading to *Houdini 9* exasperated the flaws.

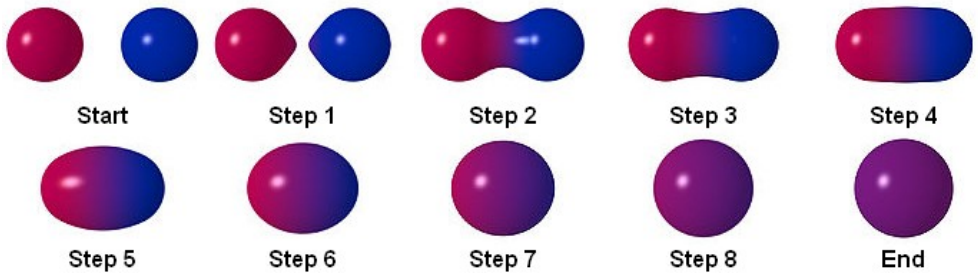
Due to a mismatched option and node settings between versions of *Houdini*, the previously developed versions of the chakras and meridians were rendered non-functional. Node settings were converted to repair each broken option settings to their proper command calls, the displace bounds controller became functional and the horizontal banding artifacts were significantly reduced.[9] These flaws were not entirely corrected, but the frequency and severity were reduced sufficiently to be corrected in post production using the compositing software, *Shake*.

In order to facilitate editing from one chakra to another, or from one element to another, each scene incorporated a 360 degree fly-through camera pointed to the center of the horizontal particle flow of the chakra being showcased. By setting up all the cameras in similar manner and creating a uniform series of motions, seamless and simplified editing was achieved. In the case of *Fire*, the rendered animations were enhanced by using *Shake*. Once the rendered files were brought into *Shake*, the first task was to rotoscope out the sections of the animation which still exhibited artifacts. Once these flaws had been rotoscoped, the generated shapes of the rotoscope function were used as a selection mask and applied waveform and noise-based deformations to break up horizontal bands of the rendered displacement artifacts. In addition to correcting render artifacts, *Shake* was also used to generate several glow affects based on the luminance of the original rendered image.

Water:

Water was created using a less traditional interpretation; liquidity as a state was created in the form of flowing liquid glass. The speed of the base simulation was significantly reduced using the *Timewarp* function. Early instantiations had a somewhat jerky motion, however this problem was resolved using the over sample option when baking out particle simulations. Because of the unusually slow rates required to produce the proper level of viscosity, over sampling levels as high as seven were used. This had the side effect of significantly slowing the load time for the baked simulation files.

The smooth glass forms of the chakra and meridian flows were generated using metaballs. Metaballs, also known as blobby objects, were first developed by Jim Blinn in the early 1980's. They were originally designed to approximate an atom using a Gaussian potential. A metaball is an implicit model. The shape of its isosurface is determined by "fields" which radiate from the objects center. These fields decrease in strength using a smooth step type of function. When two metaball fields come within close enough contact to each other, where their fields overlap, the strength of both fields pulls on the isosurface of both metaballs. As the metaballs come closer to each other they fuse together in much the same way as water droplets.[10] Modern metaballs usually have several smooth step functions available to them. Each achieved a slightly different look as they use different mathematics to generate the force falloff curve. The Wyvil model was used for this project.



When a copy function was first applied to the time shifted simulation, it was discovered very quickly that there were far too many particles. This did help reduce the bloated size of the object file sequences. Once the particle count was reduced to twenty-five percent of its original, the forms created looked a lot more like the aesthetic envisioned. As these forms were created and fine tuned, the works of Dale Chihuly were often tapped as a source inspiration.[11] Once the isosurfaces were fairly close to the desired form, they were converted to polygonal models so that they could be shaded and rendered. Fairly smooth geometry was generated for the chakra flows.

Unfortunately, the sheer complexity of the meridian network required a large number of polygonal faces to create. Very quickly, the model generated became too large for the software to handle at approximately fifteen million faces. It took over a month of trial error to figure out exactly how refined the model could be without crashing the software. Once that level of refinement had been determined, the expression which loaded the appropriate object files determined by current frame number had to be disabled for the meridian flows while lighting and shader work was completed. The object was so dense that even reloading another frame of that complex geometry would crash the program. It also required the use of a render farm technology to be able to even render more than a frame in sequence. The reason for this was because *Deadline* queries *Houdini's* renderer, instructs it to load the *Houdini* file for a set frame, render that frame, and then closes the file. This system worked around both the fussiness of loading an object that was almost too large to use, and the lack of rendered robustness in *Houdini 9*. This added stability did not come without a price. On average, renders took between fifty to seventy percent longer than when a file was rendered from the GUI.

Once a sufficient number of frames were rendered out to analyze the motion of the computer generated fluids, a ‘popping’ was observed at the sources and dying regions of the particle simulation. Individual particles appearing and disappearing were the source of the problem, which was solved by applying an expression to the scale of the individual particles. This expression takes the lifetime of the individual particles and converts that length into a normalized value. This variable allows the creation

of a smooth step multiplier to scale at the beginning and the end of a particles life period. The end result were particles which went from zero to hundred percent scale over the first ten percent of a their lifetime, and from one hundred to zero percent over the last twenty percent of their lifetime. This smoothed out the popping at the source regions and took on the appearance of slow boiling.

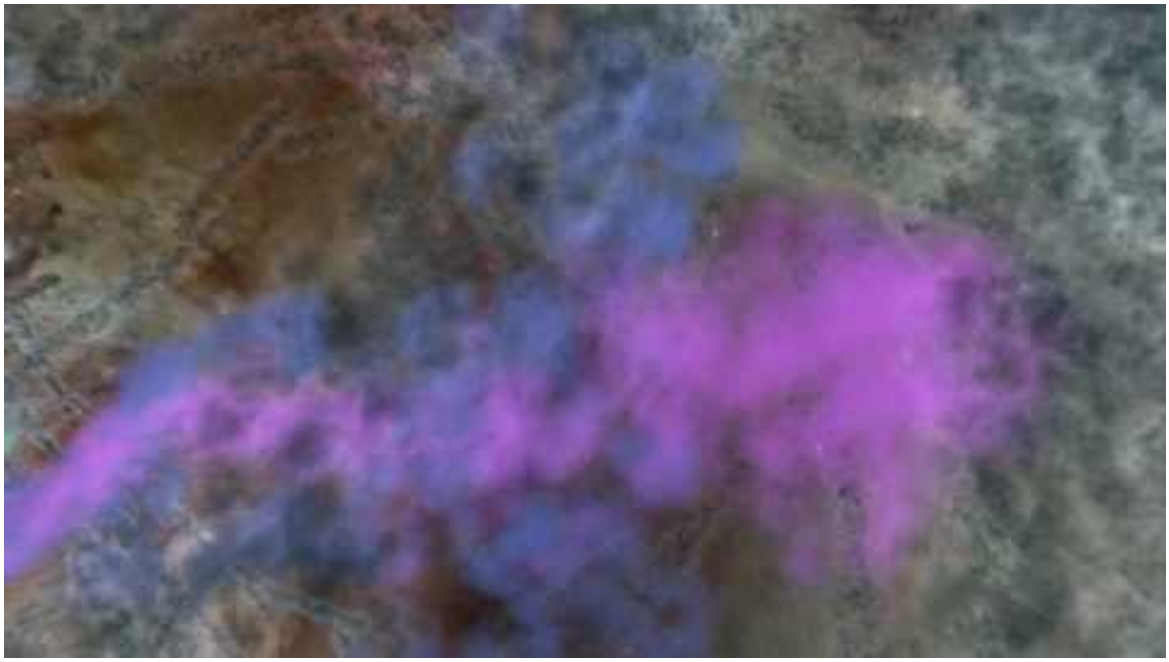
The final step, once the forms were behaving properly, was to apply glass shaders to the chakra and meridian objects with lighting to make the most of the complex geometry. In the early stages, the glass shaders really did not look all that much like glass. However, the problem was fairly easily solved. The ray-trace functions for the geometry's object node had been hidden and shut down. This was a side effect of transferring nodes from the earlier *Houdini 8* files into *Houdini 9* files. Once the settings for adjusting these options were turned back on, it was possible to control the number of reflections and refractions improving the overall appearance of the renders.[12] As with *Fire*, each glass flow is tinted the color of its originating chakra. Glass from the meridian network was rendered as clear crystal with a refraction index that was slightly denser that the index of the chakra glasses. The background was generated by a series of overlapped spheres of and opacity and imagery.

Air:

Of the five elements, *Air* was by far easiest to accomplish. The first step was to slow down the particle simulations. At the early stages, the particle simulations were slowed down to half their normal rate using the *Timewarp* function. Once the simulations were baked out at their proper speeds, the particles were copied out as simple primitive spheres. By using this simple geometry, *Houdini* was able to handle a much larger number of particles. The trick to making this particle simulation successful was in the shader application. The shader created for *Air* was the exact opposite of the X-ray shader used for *Fire*. Instead of the edges of an object being mostly opaque while the center becomes completely transparent, the shaders used for *Air* were opaque at the center with completely transparent edges. Opacity was further affected by a simple noise multiplier. This multiplier significantly cut the overall opacity of individual spheres making them appear as a thin irregular smoke puffs. When a large number of these spheres overlapped each other, it gave an appearance similar to clouds and took on the appearance of nebular clouds once the chakra colors had been applied.

The shader for the meridian flows took a slightly different direction than the ones which were created for the chakra flows. In addition to the noise multiplier, a linear multiplier was also applied so that the level of opacity could be more easily controlled. The complete opacity of the shader was dropped by sixty-five percent. In response to the reduced opacity of the simulations, the number of particles were doubled to create sufficient density for the flows. When backlit, the meridian flows took on the appearance of dust in sharp contrast to the glowing, multi-hued clouds of the chakra flows. To keep the meridian flows backlit while the rest of the scene was lit normally, a set of special lights designed to illuminate only the meridian flows was used. These lights were positioned at opposite locations from the regular scene lights positioned behind the camera. After analyzing the motion of the renders with a proper lighting solution in place, the speed of the meridian flows further reduced from one half to one quarter the original simulation's speed. This further enhanced the illusion the meridian flows were composed of cosmic dust.

The final step was to create a space environment giving the chakra and meridian an appearance of nebular gas and dust. This environment was generated using two objects. A simple primitive sphere with a tile-ready nebula texture applied to the diffuse value of the environment sphere's shader. This texture map was created by taking a high resolution photo from the Horsehead Nebula and using the offset filter in conjunction with clone stamp, and the healing brush to create an environment map with no seams. In the space between the environment sphere and the chakra and meridian flows, a light density point cloud was created from a sphere with a heavy level of fractal displacement. To each of the points in this cloud, primitive spheres using an orange tinted shader almost identical in functionality to the shader used in the meridian simulation. These almost transparent spheres of orange smoke rotated in an opposite direction from the cameras while the individual spheres changed their distance using translation locked to a noise-based expression. The end result was an enhanced sense of three-dimensional space for the entire composition.



Spirit:

The aesthetic for *Spirit* was inspired by the use of flower petals and colored leaves as interactive props in Asian martial arts cinema. A more current example can be seen in the American animated film Kung Fu Panda when the protagonist's elder mentor ascends from the mortal realm as a whirlwind of peach petals.[13] With this type of visual in mind, the chakra and meridian flows were run at regular speed. *Spirit* was the only element where the original simulation speed was actually successful. A similar scaling expression to the one utilized with *Water* was used to prevent popping at the beginning and end of a particles lifetime. However, the smooth up and down from full scale is done in the first and last five percent of the particles' lifetime. This system of quick scaling allows for the new particles to suddenly appear without being visually abrupt.

The individual flower petals were generated as a very special type of sprite. Normal sprites are projected onto single polygon planes. This would not work for most flower petals; as a general rule flower petals are curved. Instead of using standard planes, a special curved plane was developed by taking a nurbs sphere and using the carve tool to remove all of the sphere except for a section which was shaped like a plane but with some of the original sphere's curvature. Onto these curved planes shaders of flower petals using alpha channels were projected. These shaders not only masked out the shape of the flower petal, but also provided a light degree of texture to the individual petals. Each chakra had three different types of flower petals. These three shaders were put into a switch node, which would pick one of the three shaders based upon a random integer between zero and two which was generated by the particle ID number being processed. This created a greater degree of variance within each chakra flow. The types of flowers were chosen by how closely they matched with the individual chakra colors. This was not the case with the petals used for the meridian flows. Any white flower petals might have been sufficient, but cherry blossom petals were specifically chosen. Cherry blossoms are a common visual element in Japanese culture and symbolize the transient nature of life.[14] Three types of cherry blossoms were used - each a variation of cream color and degree translucency.

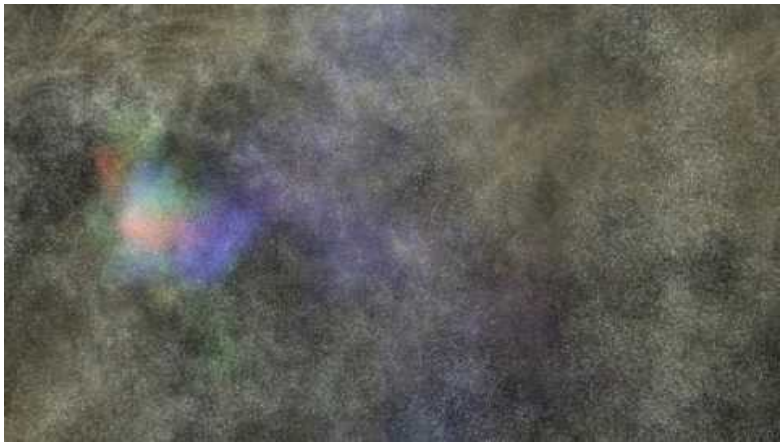
Once the system of chakra and meridian flower flows were set up, environment and lighting had to be added to the picture. For this piece, a full three hundred sixty degree panoramic image from the Chicago Botanical gardens was shot and stitched together. Though this environment map barely showed in any of the renders, its illumination values were applied to a sequence of six cone lights to create an effective form of global illumination.

The tile floor from *Spirit* was taken from the Mayang Texture collection. This image was projected onto two polygonal cylinders. The outer cylinder was slightly upraised giving the illusion of an outer curtain of tiles that were less than an inch higher than the regular tiled surface. When viewed in conjunction with heavy map-based displacements, a convincing facsimile of a section of garden path was created. This served as stable pedestal for the dynamism of the flower petal flows.

Earth:

The simulations for *Earth* were created using a complex sprite system similar to the flower sprites in *Spirit*. There were some key differences; the sprites generated for *Earth* were forty to fifty grains of sand using alpha channels. To maintain the proper visual density for the scene, over eight million particles were needed compared to the thousands needed for *Spirit*. To keep the scene manageable for the software, all sprites for *Earth* were projected onto single polygon planes. Also, speed was doubled from the original simulation's speed.

The sand shaders for the chakra flows were tinted to chakra appropriate colors, while the sand shaders used for the meridian flows and the environment used the natural colors of the individual sand grains. In addition to chakra and meridian flows, environment flows were generated from large spheres. The individual environment particles spawned at the beginning of the animation and had an infinite life span. The wave displacement node was used to move the particles in and out while the particle simulation was rotated over time in one axis or another. There were four of these particle layers rotating in opposite directions from one another. Between and beyond these layers of particle were five primitive spheres. Each had a different variation of tan to black noise. Each also had a different alpha map designed to only show a certain color spectrum of the noise color map. These also rotated in different directions and speeds. The end result was a sand storm aesthetic, with the chakra flows appearing as multi-hued foxfire.



Presentation:

The final renders for Meridianus took place from mid April to the last week of August in 2009. In that time over 70,000 frames of animation were rendered. The majority of these renders were carried out on a homemade render farm comprised two Quadcore and two I7 CPU's. Each PC was controlled using *Deadline*. Though somewhat slower than rendering directly from *Houdini*, *Deadline* saved time as it proved far moh.264re stable than rendering directly from software, and required far less human intervention. The frames from the animation were rendered at a resolution of 960x540 pixels, making them easily and effectively sized from their original resolution to 1080p video. Though the work was exhibited using available 1024x768 projectors, the rendered resolution was selected to accommodate for future high definition applications.

Post-production and compositing of all rendered sequences was accomplished by using the compositing software, *Shake*. Varying amounts of post production work was required depending on the sequence. This created the glow effects for *Fire* as well minor color correction or simulated film grain which were applied to achieve the final desired aesthetic. Once the image sequences were fully composited, they were rendered out as *Quicktime* videos using the *H.264* compression codec. These videos were then imported into *Premiere* for final editing. In industry practice, these videos would have been rendered out as a new sequence of stills or as an uncompressed *Quicktime*. However, this methodology would not have worked well for this particular project. The raw image files rendered in *Houdini* were well over one hundred twenty gigabytes in total hard drive space, and uncompressed *Quicktime* files created from these image sequences would not have been much smaller than the original sequences. By using the *H.264* compression, the size of raw video file directory was only a little over twelve Gigabytes. Editing was done on a laptop while the processing intensive tasks used other more high-performance computing resources. A disadvantage of compressing the raw videos was some loss in image quality and resolution, which was offset by the gain in hard drive space and functionality when using post-production tools and related software.

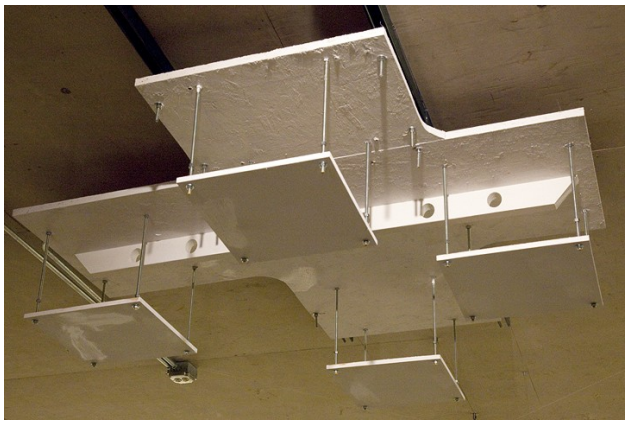
Each element was edited as a separate *Premiere* file, which were then assembled into a master compilation consisting of all five elements sequenced one after another. Each individual element sequence was five and a half minutes long when combined totaled twenty-seven and a half minutes of content. As the video installation consisted of four projection screens, the final compilation consisted of the order of the elements offset by one elemental sequence per video. This allowed the video elements to rotate counter clockwise around the installation space without elements being projected in duplicate or not being displayed for more that a single sequence.

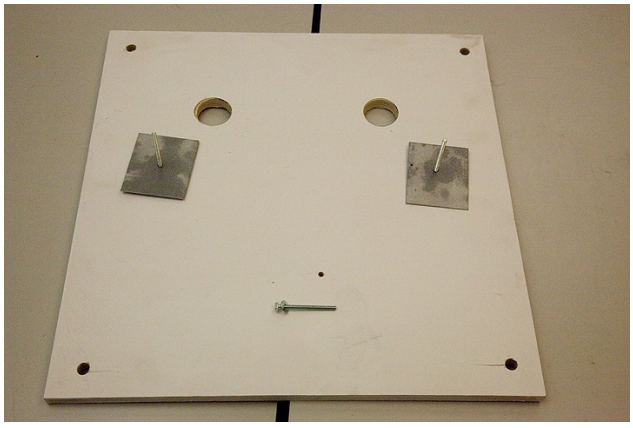
Sound was a very challenging aspect of *Meridianus Divinitus* as it was the only collaborative component of the project. Managing sound design talent under scheduling constraints and over long distances was difficult. The five soundtracks originally conceived for this work were not completed in time for the thesis exhibition. As an alternative, a sample sound track created for *Air* was expanded to a full five and a half minutes to serve as the master audio track for the entire series of video segments shown in the installation. A version of each video segment with original sound composition has since been created for future presentations, and stand-alone versions of the work. George Hardin is credited as the sound designer for this body of work.

The exhibition also included still images extracted from the works and printed on high quality photo paper. The video editing process served to identify suitable frames for this purpose, though not all the frames rerendered were the same as those originally taken from the video. Cameras were zoomed and rotated until the exact composition was within the render gate, then rerendered at very high resolution to support large scale printing. Print trials using inkjet canvas and handmade picture box frames proved fragile and difficult to produce. Silver halide emulating paper was chosen as a more suitable alternative. Images were framed with simple white mats and black frames. A total of eight *Meridianus Divinitus* prints were displayed between northern, eastern, and southern projections in the installation space. Two prints from a separate project, *Hammer*, were hung in the gallery entryway.

The Center for Virtual Reality in the Arts (CVRA) in the University of Illinois at Chicago's Art

& Architecture building was the thesis show venue. Four portable walls were positioned within the space in each of the cardinal directions. These walls served as the projection screens in the space. A central rig for ceiling mounting the projectors was constructed. The original design was a T shaped structure, suspended from C-channels to serve as a platform for suspending four smaller platforms from which the projectors were supported. Modifications to the projection mount were required to carefully and properly align images to each projection surface. Cables were run through holes drilled in the projection rig's support beam and threaded between the primary platform and the ceiling. The projectors were controlled via four desktop computers that sequenced the video playback. The result was a wide open, meditative space where the audience was enveloped by images and sounds to explore an artist's reinterpretation of the body energetic - *Meridianus Divinitus*.





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7 A single line of computer code which ends a particles life if certain parameters are fulfilled.

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