# Inventing a Collaborative Full Dome Production Course

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Beginning in the spring semester of 2006, ARTS Lab at the University of New Mexico began offering the world's first full semester course in "Full Dome Production." Students from Fine Arts as well as Science and Engineering backgrounds are required to work in collaborative teams to create and produce 1 to 3 minute large format digital video works designed to be projected in an immersive full dome multi-projection system.

Digital Full Dome Theaters exist predominately as Planetaria in Universities and Natural History Museums worldwide. LodeStar Astronomy Center built in 2000 at the New Mexico Natural History and Science Museum was the second digital domed theater of its kind in the world. LodeStar's visionary director David Beining very soon turned to animation students at UNM seeking partnerships in full dome production. Beining encourages experimentation in the medium and is willing to entertain content ranging from his main mission content of public science education through fractal zooms, science viz, game development, artistic expression and student work. After several years of experimentation and collaboration on numerous small projects, UNM's Arts Technology Center Digital Pueblo Project, supported through an NSF grant, began teaching high school students the basics of computer graphics through internships on small full dome projects.

In 2005, ARTS Lab (Art, Research, Technology & Science Lab), under the direction of Dr. Ed Angel, CS professor at UNM, was formed at UNM through a large grant from the State of New Mexico. ARTS Lab's goal is to bring people from diverse disciplines and backgrounds together in art/science collaborations. ARTS Lab is housed in an old Cadillac dealership on Route 66, and includes a green screen studio, motion capture facilities, and the world's first permanently installed 15 foot digital full dome built expressly to support research and development. This facility gives students the very rare opportunity to see test images and movies at intervals throughout the semester, as well as the unique opportunity to hold private screenings at will. But of course, the big thrill for students is seeing their work displayed on LodeStar's 55 foot big dome at the end of semester public screening event!

One of the first UNM courses supported through ARTS Lab is a full semester class in full dome production.

Since this subject has never been offered before in this format, the challenge has been to present a technologically challenging topic in a format which does not overwhelm. The particular group of skills required to produce full dome content spans several disciplines, and few if any students enter the class with more than a small fraction of the skills required.

The process requires production of content in a large scale format, generally created as a sequence of 3200 x 3200 still images at 30 frames per second. This scale precludes the use of live action footage unless one can gain access to a large format camera and/or 35mm film; both of which are generally

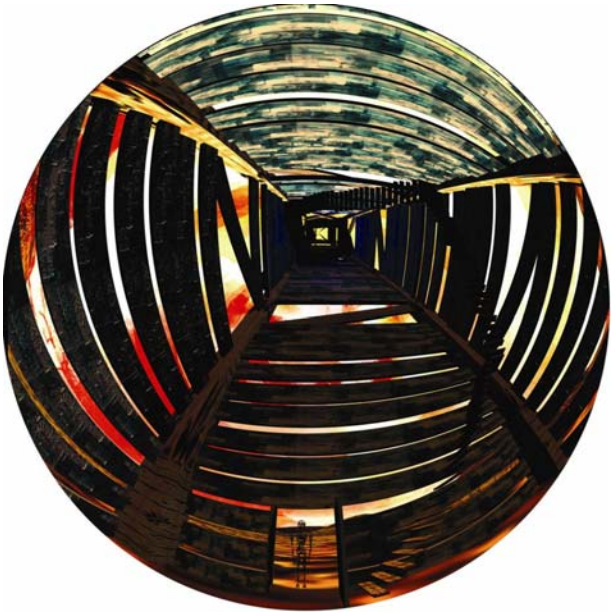

**Figure 1. "Blow" Erin Loader, Hunter Lewis, Justin Golightly**

out of range for students. So most material is either a sequence of fish eye stills or computer generated images.
The complete pipeline requires use of several proprietary applications which are particular to domed screens and in use by a relatively small community of users, and therefore lightly and or non documented and feature light. As stated before, students may enter the class with experience in video, or modeling, or photography, production, or visualization, or programming, all of which are useful skills in the process; but they almost always quickly encounter a part of the process which is completely new to them. The team approach is meant to not only save them time, but to teach them how to make the most of each others' skill sets, to expend their energy on content development rather than learning apps.

Also, full dome production is in its infancy, and the language and library of content is unformed and sparse. As such, the medium is ripe for creatives to join the process of definition and exploration.

The challenges in creating this course were many:

-The instructors needed to learn the process themselves, a process which, because it is still in its formative stages, is reforming, redefining, regrouping and "in process" at all times. Full dome is "messy"!

-Determining which parts of the process were core, and how to best relay those basic processes to a neophyte.

**Figure 2. "Wings of Memory", Hue Walker**

-Bringing new production equipment on line (learning the idiosyncrasies of the equipment impacted the students' productions).

-Most students enter the course with a sense of skill and accomplishment in their own area, only to be faced with challenges quite outside of their previous experience.

-And of course, the greatest challenge is to encourage and support the students in an effort to prevent the technical aspects from hijacking the creative process, from allowing technical concerns to overshadow content creation. This challenge is mirrored for the instructors in the temptation to get sidetracked by the students' desire to learn certain skills and or software rather than focus on their projects.

Hue Walker, the lead instructor for the course, has been collaborating with LodeStar's David Beining since soon after LodeStar opened its doors. She has done numerous short projects for full dome, and had focused from the beginning on clarifying the production process for the curious. She has been involved in DomeFest,(a worldwide full dome media festival originated by David Beining), every year since its inception. It is her involvement in DomeFest that led her to encourage students to become involved in the medium.

As a Maya instructor, then a Digital Pueblo Project instructor, and now working in ARTS Lab, Walker has found many opportunities to introduce interested folks to full dome production methods. The full dome course is the most ambitious attempt to date.

Through a process of classroom presentations and full dome screenings, students are first taught the basic concepts and pipeline, emphasizing understanding of the complexity and limitations facing them. There is also in depth discussion of the unique opportunities, challenges and emerging language of full dome. Students are encouraged to explore the ways immersivity can enter into the very fabric of the content, effecting the unique storytelling capabilities of the medium. Students are invited to consider "what does it mean for an element to enter from behind or beside rather than in front?" or to be aware of the unique motion capabilities presented through engagement of the viewers' peripheral vision. In class discussions cover ideas such as the differences between framed time and immersive time, the social aspect of being immersed in an image together, perception of personal scale, motion perception, immersive transitions, light bounce, world making vs. imaginative involvement.

The sheer complexity of the process can be overwhelming, and it is easy for the students to lose sight of their content, ideas, goals, and become absorbed in the intricacies of the modeling program or simply getting something to look right on the dome. Students are encouraged to "keep it simple".

Not surprisingly, the collaboration requirement turns out to be one of the most challenging aspects of the course for many students. Learning to pool their skill sets and assign tasks intelligently in order to juggle projects which would overwhelm a lone creator proves to be both frustrating and necessary. In an end-of-semester interview, students are asked to speak about their experiences with collaboration, and most say they found it very difficult, but rewarding, and that they learned to realize the power of pooling efforts.

The instructors are challenged to help invent the medium even as they attempt to teach the next generation to feel at home in the full dome. Each semester has brought new insights into the medium and into methods for bringing new participants into the dome. Students are encouraged to make suggestions for future courses, what worked, what didn't, what would have helped them get through more smoothly, and their contributions will help shape future semesters.

**Figure 3. "Stomped", Thomas Keegan, Vincent King**