

Collaborative Visualization Institute

Submitters:

_____	_____
Name	Department/College
_____	_____
Tim McLaughlin	Visualization
_____	_____
Name	Department/College
_____	_____
Name	Department/College

Involved Colleges/Schools:

Department of Visualization, College of Architecture
Department of Computer Science, Look College of Engineering

Summary:

Summary goes here of at most 2–4 sentences that will be put in our externally visible website.

The results of scholarly activity must be communicated effectively for knowledge and understanding to spread. This Institute seeks to foster the wide use of IT for the purpose of creative collaboration through education, tool development, and research. The proposed Collaborative Visualization Institute will promote the communication of scholarly work through concerted effort to place the tools, skills, and processes of dynamic visual communication into the hands of the scholars. To facilitate this effort the Institute will promote the development of collaborative work environments that foster creativity among multiple participants.

1. MERIT AND IMPACT

Explain and justify the intellectual merit and potential for societal and scholarly impact.

Collaborative Visualization is the process through which the capacity to create novel and informative experiences through visual media is extended to all parties with a stake in the outcome of the media's use. The goal of Collaborative Visualization is the democratization of the capacity to create effective visual communication. Collaborative Visualization broadens authorship and rejects linear processes. Imagine the dynamism of social networking, YouTube, and Wikipedia in the service of scholarship and the concept of Collaborative Visualization will become clear.

Every day, multiple times per day, on the campus of Texas A&M University these things happen: 1) a researcher pictures in his or her mind's eye a brilliant concept or a leafs through a ream of data and wonders how to communicate the information to colleagues; 2) an instructor stands before a classroom of students and strives to create understanding along with the communication of information; 3) specialists on campus with the capacity and skill to create engaging media turn away requests for services due to lack of time, resources, or mission. The **intellectual merit** of this proposed Institute stems from the need to seize the latent power of democratized media and use it in the service of research, scholarship, and creative works. The Collaborative Visualization Institute will concentrate resources and intellectual effort in two areas:

1. Increasing the population of competent visual communicators by providing visualization and IT training to researchers and students.
2. Development of processes, environments, and tools that enhance creative interactivity and collaboration among connected individuals and institutions.

It is difficult to maintain both a deep knowledge of a subject and a reliable sensitivity to its accessibility by lesser-schooled individuals. Yet the success of scholarship, particularly with regard to licensing and pedagogy, is often highly dependant upon communication as much as solid research. One **broader impact** of this proposed Institute is an increase in the reach of Texas A&M University's research. Scholarly journals, conferences, and exhibitions explicitly appeal to peers. Images, particularly those that are aesthetically considered as well as accurate, have the potential to engage viewers from broad ranges of experience. This Institute seeks to increase not only the output of visual material but enhance the quality and appeal.

A second **broader impact** of this proposed institute is an increase in the effectiveness of multi-disciplinary collaboration. All academics are faced with an advancing landscape crisscrossed by the pathways of other disciplines. To engage effectively, more efficiently, Texas A&M University's researchers and creative faculty must learn from peer-to-peer connectivity of its 20 year old students. Social networking, file sharing, and collaborative work environments are in adolescence both technologically and in terms of who is primarily using them. Adulthood is coming on quickly. This Institute seeks to foster the wide use of IT for the purpose of creative collaboration through education, tool development, and research.

2. MULTIDISCIPLINARY ASPECTS

Explain the multidisciplinary nature of topic, especially the extent to which the proposed landmark area will combine the efforts of multiple paradigms and contribute to the intellectual vitality of multiple disciplines. Specify the level of participation of units across the University and by external partners. Demonstrate the potential for leveraging resources and priorities of colleges and schools on campus as well as of external partners.

The Collaborative Visualization Institute relies directly on the knowledge and skill base of the Departments of Visualization and Computer Science for implementation, but the goal of the Institute is to be a service to the University as a whole. Rather than seeking to concentrate capacity, the Institute seeks to distribute it. It is difficult to imagine an area of scholarly study undertaken on campus that does not have a need for visualization. The Institute seeks to build the capacity and skill necessary to carry out effective visual communication within individual research clusters.

The knowledge base required to implement the goals of the Institute is primarily housed within the Department of Visualization faculty, staff, and graduate students, and the Visualization Laboratory. The Department of Computer Science is home to research in the areas of haptics and interface design.

3. ALIGNMENT WITH UNIVERSITY AND COLLEGE PLANS

Demonstrate alignment with Vision 2020 and the plans of individual colleges or schools.

The proposed Collaborative Visualization Institute directly addresses two imperatives of Vision 2020. **Imperative Number 1** seeks to elevate the faculty and their teaching, research and scholarship. Vision 2020 states with certainty that meeting the challenges of the future will require interdisciplinary work in the form of partnerships between scholars and researchers. This project addresses the challenge by targeting the specific goal of creating and refining structures and mechanisms that encourage and support interdisciplinary work.

Imperative Number 4 seeks to build the Letters, Arts, and Sciences core. Vision 2020 broadly states that, “[t]he desire and need to express ourselves through visual and performing arts is an intensely human trait.” This proposed project builds upon that concept by extending the process for visual creativity into other disciplines. While Vision 2020 directly calls for the integration of visual and performing arts into the life of the university this proposal seeks to create a distinctive culture on campus in which the arts are infused throughout the scholarly disciplines as well as co-curricular activities. This goal tracks with the societal changes, brought on by technological advancement, which have lead to a pervasiveness of media and visual communication unrecognized by the writers of the original document.

4. CRITICAL MASS AND GROWTH NEEDS AND POTENTIAL

4.1. Existing Critical Mass

Identify the existence of critical mass and excellence currently at Texas A&M and its external partners. Include a detailed table of relevant personnel from Texas A&M and external partners in Appendix A.

Through the existing Visualization Laboratory (“Viz Lab”) Texas A&M University has developed a global reputation for developing outstanding technical artists. Their work is

presented in yearly exhibitions internationally at SIGGRAPH, locally at Viz-A-Go-Go, and through a variety of both national and international competitions. The largest and most innovative firms in the visual effects, animation, and simulation business line-up to recruit students from the Visualization Sciences program.

The acclaim of Viz Lab students is made possible through the Renaissance style of their education -both the faculty and curriculum are composed of the arts and science. Art and science are engaged simultaneously throughout the course work and not treated as separate entities. The fifteen faculty and five staff members of the Department of Visualization recognize the value of this mixed environment and wholly support it in their teaching –in fact several were party to its initial framing twenty years ago. This small group of people has made a large impact on promoting achievement in the area where computing and imagery merge.

In the Computer Science Department several faculty deal directly with human computer interfaces –an essential component to the democratization of visualization skills. Dr. Tracy Hammond is the Director of the Sketch Recognition Laboratory that develops 2-D pen and 3-D hand gesture recognition technologies. Dr. Hammond also teaches classes on sketch recognition, haptics, and computer human interaction. Dr. Andruid Kerne researches interface ecosystems and the augmentation of the creative process through wearable computing and virtual spaces.

The proposed work of the Institute is not possible without infrastructure. Willis Marti, Director of Networking for the Computing Information Systems (CIS) group at Texas A&M is currently involved with developing the networking infrastructure of Texas A&M University in anticipation of the need for high bandwidth connectivity both on campus and beyond.

4.2. Needs for and Availability of Candidates for Building Excellence

Discuss needs for additional faculty and staff in order to realize the goals of the proposed landmark area. Identify categories of personnel carefully, including full professors (especially of the superstar category), junior faculty, research staff, and support staff. Provide supporting evidence for the availability of excellent candidates and the types of individuals who could be recruited.

The Department of Visualization recently hired three junior faculty after receiving over 100 applications for the announcement tenure-track positions. Each candidate interviewed, including the three hired and a short-list of approximately six who were not hired, spoke of the unique nature of the program relative to other positions available. The opportunity to pursue visual problem solving in a technically rigorous environment is rare.

There were several senior faculty who were not hired due to the funding level available for the three open positions. These candidates would be excellent first contacts in support of the Institute. Identification of senior faculty in the areas of serious gaming, interactive media and IT for collaborative environments is essential.

5. SPACE AND INFRASTRUCTURE

Address the space and infrastructure feasibility of the proposed landmark area. Outline space needs and compare with existing facilities. Identify what building, renovations, or new facilities are needed. Identify what equipment or other infrastructure is needed.

The Collaborative Visualization Institute will require a physical home and computing infrastructure. The physical space will require offices for administration and graduate assistants,

as well as an instructional computing lab, production workspace, and physical space required for networking.

A highly visible on campus facility where research, exhibitions and processes can be exhibited would serve Texas A&M University’s academic community. An exhibition facility that encourages interaction and involvement (at the University level and beyond) is integral. This would serve not only as an “open notebook” for the University at large, but a center for cross-disciplinary dialogue, visiting artists/scholars lectures, and newly conceived experimentation.

More significant to its stated mission is the need for high capacity networking infrastructure across campus and between connected campuses. The infrastructure should support internet-based services that are at the technological edge in the service of ubiquitous connectivity, open technologies, and distributed databases.

6. FUNDING POTENTIAL

Discuss the availability of appropriate funding from government, corporate, foundation, and philanthropic sources to support research and graduate education in the proposed landmark area. Also identify other awards and public recognitions that the landmark area will attain. Appropriate funding does not necessarily equate to “big funding” but does imply continuity of funding as the state of the discipline evolves.

The Computer Science Department has received an NSF IIS Grant: Developing Perception-based Geometric Primitive-shape and Constraint Recognizers to Empower Instructors to Build Sketch Systems in the Classroom and an NSF HCC Grant: Pilot: Let Your Notes Come Alive: The SkRUI Classroom Sketchbook. In addition, the lab has two Defense Advanced Research Projects Agency-funded grants.

While the National Science Foundation offers a variety of funding lines to support transformational technology (CISE, CPATH, CreativeIT, among others) that should be exploited, the expectation is that funding for the Collaborative Visualization Institute will be provided indirectly. The Institute will operate as a service for researchers. As such, it will require fees for services. These fees may be written into the budgets of individual research projects.

7. COST EFFECTIVENESS

Specify the needed resources for advancing the landmark area, including itemized and detailed assessment of the needs identified in Sections 4 and 5. Identify major senior faculty hires, which could be justified through new state-funding. Identify supporting personnel that would be targeted by individual colleges and schools, and reference the relevant priorities or plans mentioned in Section 3. Justify strategically the use of those resources for advancing the proposed landmark area.

REFERENCES:

APPENDICES (beginning no later than page 5)

APPENDIX A. KEY PERSONNEL

Include a table that lists each key person in the project his or her name, email address, department(s), and areas of expertise. For Word documents, use the template below:

<i>Name</i>	<i>email</i>	<i>Department</i>	<i>Special Qualifications</i>
Joshua Bienko	bienko@viz.tamu.edu	Visualization	Artist: value of art in post-

			production
Dr. Tracy Hammond	Hammond@cs.tamu.edu	Computer Science	Researcher: haptics; Director, Sketch Recognition Lab
Bill Jenks	bdj@viz.tamu.edu	Visualization	Director, Visualization Laboratory
Dr. Andruid Kerne	andruid@cs.tamu.edu	Computer Science	Researcher/Artist: Creativity Support Tools, Games, Information Visualization, Human- Centered Computing.
Carol LaFayette	lurleen@viz.tamu.edu	Visualization	Artist: multi-media collaborative projects
Terry Larsen	tlarsen@archmail.tamu.edu	Visualization	Specialist: virtual architecture
Dr. John Keyser	keyser@cs.tamu.edu	Computer Science	Researcher: graphics, modeling, and simulation
Willis Marti	wmarti@tamu.edu	Computing Information Services	Director, Networking and Chief Info Security Officer
Tim McLaughlin	timmm@viz.tamu.edu	Visualization	Specialist: visualization production; administration
Dr. Fred Parke	parke@viz.tamu.edu	Visualization	Researcher: immersive environments
Dr. Vinod Srinivasan	vinod@viz.tamu.edu	Visualization	Researcher: serious games for teaching and training

APPENDIX B. BIBIOGRAPHY