TTI FELLOWSHIP PROPOSAL

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DATE	2 December 1998
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ACADEMIC DEPARTMENT/SCHOOL	Department of Drama
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I. Project Title and Summary

Interfacing Instructional Web Media with Live Stage Lighting Control

The most important aspect of stage lighting instruction is the practical manipulation of light in the studio. Supported by a diverse range of instructional materials and lighting technologies, one of the greatest challenges to the beginning student is the technical learning curve. The daily process of organizing materials, setting up equipment, and providing technical instruction is a time-consuming process that significantly limits class time available for practical work.

In this project I propose to create a set of web-based instructional materials for my undergraduate lighting courses: Drama 211: Lighting Technology and Drama 411: Lighting Design. Included in this resource will be a special visual HTML interface to a *Windows*-based lighting control system in the studio classroom. Together they will create an efficient and uniform medium for lighting instruction that will ultimately result in improved student design and critical thinking skills.

II. Pedagogical Aims of Project

Instructional Challenges in Theatrical Lighting

Theatrical lighting design is a multimedia art-form. The lighting designer is both artist and technologist, equally adept with paintbrush and color as with computer control systems and stage lighting hardware. Consequently, instruction in stage lighting is heavily dependent upon technology and a variety of instructional media. These range from research folios, photographs, slides, artwork, text, and video to CAD drawings, spreadsheets, and lighting control system software, hardware, and equipment. The greatest instructional challenge is the orchestration of these sometimes cumbersome and diverse elements into an efficient straightforward process appropriate for undergraduate teaching.

Of the many elements of lighting course content, the most important is the manipulation of light in the studio classroom for lectures and student project presentations. For the beginning lighting student, there is currently a significant technical learning curve to

overcome before the first lighting instrument can be turned on. Currently there is no single text or other media resource that can adequately prepare the student to independently move from technical theory to the practice of lighting. As a result, in-class technical instruction takes valuable class time away from actual work with light in the studio.

Another challenge to teaching in the lighting studio classroom is the significant out-of-class hours required from both faculty and students for set-up and adjustment of lighting equipment and control system programming. Set-up time is often the greatest limitation to the sophistication and depth of both lecture/demonstration content and student project presentations. Since there is currently no single medium for the storage and organization of lighting control system information, most demonstrations and projects are built from scratch each semester through physical manipulation and adjustment of equipment based on various forms of paper and electronic documentation.

In addressing these specific challenges, this project will seek to close the gap that currently exists between traditional computer-based instructional technology and stage lighting performance technology. Stage lighting technology currently in use includes computer dimming and control systems, computer automated lighting fixtures, distributed network systems, and control and design software. Traditional computer-based instructional materials currently have little similarity to the proprietary interfaces of our existing lighting control hardware. This project will merge these technologies to create an efficient and uniform medium for teaching lighting design both in and out of the studio.

A Software Based Lighting Control System

The primary technology to be introduced in this project is a *Win98* software-based lighting controller with a visual HTML interface. Now, instead of an expensive custom controller with a proprietary interface, a standard *Win98* PC running *Horizon* lighting control software (with a special hardware interface) can operate the lighting in the studio. This offers several important instructional advantages.

The familiar *Win98* interface will flatten the learning curve for beginning students. Any student with a basic understanding of the *Win98* interface and web-navigation skills will be able to take control of the lighting system in the studio. This immediate hands-on interactivity will not only reduce the amount of time spent on control system instruction, but will allow students to jump right into the design process at the beginning, the same way a beginning graphic artist might jump into *Photoshop* and begin to manipulate images.

The *Horizon* software uses a standard file format that can be easily transferred over networks, stored to floppy disk, e-mailed as attachments or embedded in web pages. This makes control system information (whether faculty lecture materials or student projects) portable in a way that has not previously been possible. Demonstrations can be pre-programmed and made instantly available in the studio or for students to work with independently. Specific lighting assignments can be created by the instructor as show files and made available as part of other instructional materials on the course web-site. Students can then modify and work with them either in the studio or off-line on any *Win95/98* PC.

The *Horizon* control software is free-ware. Without the hardware interface found on the studio PC, it will not actually control lighting. It can, however, be used on any *Win95/98* PC as a “blind” editor to create basic design and cueing structures, experiment with different functions, test timing sequences, and prepare projects for later live work in the studio. The ability of students to work on projects off-line would significantly reduce student competition for studio time.

Automating the Studio

To take full advantage of the powerful possibilities of the control system, five automated lighting fixtures would be added to the studio inventory. These fixtures have remote controllable focus, color, pattern, and intensity control, and require no adjustments once installed in the studio. Placed in a standard configuration the automated fixtures would provide a highly efficient and versatile medium for pre-programmed interactive lectures and demonstrations. A demonstration on color theory, for example, would be pre-programmed and an appropriate visual interface created. Semester to semester modifications and improvements could be easily added without the need to re-build the demonstration from scratch each semester as is now the case.

Automated lighting technology is expensive. My first choice lighting instruments are nearly $8000 apiece and are out of the budget range of the TTI program. I have instead chosen to place the primary focus of the project on teaching materials and on the control system side of the studio. The studio will contain a combination of conventional (manually adjusted instruments) and automated instruments. I have provided enough automated lighting equipment to support most of my lectures, but the students will still have to occasionally get out their crescent wrenches. Additional automated lighting technology can easily be integrated into the studio in the future as other funds become available.

Adding Web Instructional Materials

With a control system and instrumentation in place, web-based instructional materials would be developed for two specific parts of the undergraduate lighting courses. First, existing lecture/demonstrations would be programmed on the controller, lecture support materials converted into web-documents, and then a visual control interface created for the lecture. Second, student project instructions and assignments would be created as web documents with background information, research links and source material, and show-files provided that contain relevant set-up and instructional information for use either off-line or in the studio.

Similarities in the Approach of Teaching CAD

The approach taken by this project is similar to the web-based instructional approach currently used in my course: Drama 219/719 CAD for the Stage Designer. In this course all lecture support materials were available both in class and on-line from the course web site. Prototype and example CAD drawings were distributed electronically, edited by students and then presented in class or submitted for evaluation via the course web site.

Eliminating the paper from what was previously a manual drafting course, and bringing instructional documents and CAD software together onto the *Windows* platform was a

great success. More in-class time was available for student work and one-on-one instruction. By applying a similar approach to studio lighting instruction, this process can be taken one step further. On-line work and electronic materials don't just become models or representations, but real images of light in space. The technology will serve not to just teach technical skills, but will emphasize the development of conceptual and design skills.

Long Term Teaching Improvements

Among many significant course improvements, there are two key long term teaching improvements that will result from this project. By moving all instructional and support materials to the *Win98* platform, complexity is reduced, efficiency improved, and information is made portable. This means that class prep time can be spent adding to and updating materials instead of re-creating them from scratch each semester. Having a single medium, and an existing structure with which to work, will allow the course to grow from semester to semester.

By decreasing the technological learning curve and the amount of time necessary for in-class technical instruction, critical class time can be primarily focused on designing with light in the studio. As a result I will be able to open the Lighting Design course to a greater number of students without previous lighting experience and give them a greater opportunity to explore the enormous design potential of light.

In the long term, the focus of the Lighting Design course would be shifted away from technology, and the Lighting Technology class streamlined from an instructional point of view. Basic lighting stagecraft (the hands-on manipulation and adjustment of conventional equipment and cable), however, would remain at the core of the Lighting Technology class.

Impact on Other Courses and the Drama Production Program

In addition to other graduate and undergraduate lighting classes, the project will benefit a number of Drama courses for which I do regular semester guest lectures and demonstrations. These include: Drama 117: The Magic of Theatre Technology (LaVahn Hoh), Drama 221: Scenic Technology (LaVahn Hoh), Drama 201: Image to Form (Gweneth West), Drama 101: Introduction to Theatre (Doug Grissom), and special workshops for various acting classes.

In the long run, the process of developing this project might also suggest ways in which instructional technologies might be integrated in other areas of performance such as scenic design and computer modeling, scenic technology and motion control systems, and sound editing and production.

All of the technologies in the Drama building--from the rolling blackboard and overhead projector to lap-top computers and computer video projectors—are at some time incorporated into production. The possibilities for the technology and support materials created as part of this project are unlimited with respect to how they might be used creatively on stage.

III. Preparation and Feasibility

The process for creating this project would be similar to the production lighting design process. It includes a design and research phase, a construction and implementation phase, and a programming and rehearsal phase. The specific steps necessary to complete the project are as follows:

1) Creation of an outline of specific lecture and project materials and documents to be created for Drama 211: Lighting Technology and Drama 411: Lighting Design. The outline will include the structure and all media required for each web document, its source, and format. Included will be a synopsis of controller cue data and associated HTML interface information for use in programming the lighting system. Drama 211 materials will likely include four to five lecture/demonstrations. Drama 411 materials will include all ten existing demonstrations and five design projects.

2) Creation of a prototype instructional unit including all of the materials for one selected demonstration or project. This will allow the process as outlined to be tested and allow experimentation with both the technology and the format of the information. It will also provide an opportunity to let students work with the system and evaluate the process at an early stage.

3) Organization and conversion of existing electronic materials into web documents. Existing CAD drawings and spreadsheet data will be converted into PDF files. Existing design materials in Photoshop and Illustrator format, such as magic sheets (visual cue-writing reference), renderings, and production slides, will be organized for editing and converted to JPGs for inclusion in web documents.

3) Digitization of remaining instructional materials. Included are: selected photographs, image-boards, renderings, slides, and a few short video clips. Additional slides or short video animations might be created and digitized during the Spring semester to augment existing materials.

4) Writing of tutorial text and designing of web documents. Tutorial and instructional text will be written to tie each individual unit and the project as a whole together. A prototype for the design and layout of the web site will be created and template web pages created.

5) Formatting and implementation of web documents. Individual web documents will be created that contain all elements, and placed on the server.

6) Studio lighting system design and layout. The layout and design of the physical stage lighting equipment will be carefully planned to support the lecture demonstrations and student projects that have been created. Complete documentation of the system will be formatted and included on the course web-site.

7) Programming of demonstrations on lighting control system. Each lecture demonstration and project will be programmed step-by-step into the control system. Lighting control information will be carefully labeled and documented to allow

students to easily interact with the system, and to facilitate future updating and editing.

8) Creation of web-interface to controller. The visual HTML interface to the lighting controller will be created. It will be tied directly in with the associated instruction web documents for each presentation or project.

A Special Note About Programming

The only part of this project that goes beyond standard formatting of HTML documents, is the programming of the lighting control system. In performance lighting terminology *programming* refers to the process by which individual lighting elements are set moment by moment (cue by cue) by entering channel, level, and timing information in the computer control system. Although creating light cues and sequences requires knowledge about the use of the control system software, it does not require computer programming in the traditional sense.

The *programming* necessary for this project will be undertaken primarily by me with the assistance of students in the Drama 211: Lighting Technology class during the Fall semester 1999. It will follow a process similar to the creation of cues for any production, where information is entered into the controller live in the studio. The class will function as the crew for the project by assisting with the adjustment, configuration, and troubleshooting of equipment as the project develops. Ongoing updates and enhancements will be easily made by me on a semester to semester basis with the assistance of students in both lighting classes

Project Timetable

The design and research phase (steps 1-3) will be completed during the Spring Semester 1999. The construction phase, including the bulk of the formatting and web-page creation (steps 4-6) will take place during Summer of 1999. The programming of the lighting system and creation of the associated HTML interface (steps 7-8) will occur concurrently with the teaching of Lighting 211: Lighting Technology in Fall of 1999, with several specific units to be introduced during that semester. The project will be completed by January 2000 for implementation in Drama 411: Lighting Design.

IV. Evaluation and Assessment

During the fellowship year the project can be evaluated at specific stages by several criteria. These include: over-all teaching effectiveness of the project design, potential for improving class efficiency, and progress toward enabling students to focus on design over technology.

In the initial outline stage, the project design could be reviewed by TTI technology advisors and/or past fellows. The review could help determine the project's likely impact on teaching effectiveness in comparison to other similar past or ongoing projects. This level of evaluation would provide valuable input and guidance while the project is still in the planning stages.

A complete evaluation could be performed on the prototype instructional unit once it is created. This could include implementation of the unit in the Lighting Design course, followed by both student and instructor evaluations. The student evaluation might focus on comprehension of information and ease of use, while an instructor self-evaluation might focus on the effectiveness of the unit with regard to student learning and application of design and critical thinking skills. Information gathered at this stage of the process would help guide future development of the project, and might suggest changes or additions to the structure of individual instructional units.

At the project's midway point a progress assessment will be necessary. This self assessment will insure that the project is on schedule and note any structure or content changes that may have developed along the way. The written report would be provided in conjunction with the annotated project outline.

During the final phase of the project, as instructional units are implemented in the Lighting Technology class, a more complete evaluation is possible. Student interest, participation, class efficiency, and time use might be assessed on a limited basis through class observation, student evaluation, video tape, or other methods.

Project Success and Measurement of Pedagogical Effectiveness

The project will be successful if it is effective in enabling students with no lighting experience to quickly create with the technology in the studio. It will be successful if more time is spent on class demonstration and project design work, and less time on technical instruction, paperwork management, and equipment setup. The project will be successful if it is able to integrate all of the current instructional media to create an efficient and uniform medium for teaching. Ultimately the project will be successful if student visual design and critical thinking skills are improved. The pedagogical effectiveness of the project in these four areas can be measured by several methods. These include student evaluation, instructor self-evaluation, student assessment, and peer review.

To facilitate student course evaluation, special evaluation forms can be introduced at the end of the Spring 1999 term (before project implementation) and then again at the end of the Spring 2000 term (after project implementation). These would focus on student evaluation of the balance of class time between technical instruction, instructor demonstrations, and design projects. Students could also provide feedback about the usefulness of course materials and web-site, as well as provide an evaluation of course over-all effectiveness.

To aid with self-assessment an instructional journal could be employed. The journal would provide a record of time spent in various class and preparatory activities both before and after project implementation. It would also aid in the assessment of student design and critical thinking skills by providing a daily log of student's questions, comments, and design presentations. The journal could be supplemented by video-tape or slides of selected projects and classes. Instructor self-assessment would conclude with a summation of these materials, and an examination of over-all course improvement.

Peer review could be accomplished at the Departmental level or through the TTI program via class observation, guest lecture/presentation, and review of assessment materials. In reviewing teaching and course improvements with other Drama faculty I would hope to open the conversation to the application of the project to other areas in the Department of Drama. Input from other Drama faculty about the effectiveness of the course in relationship to the rest of the undergraduate Drama program will be especially valuable in measuring project success from a curricular point of view. Review by faculty outside of the Department might also offer valuable insights and could open the door to further conversation about the application of the project to other disciplines.

V. Collegiality in Project Development

An important aspect of the TTI program is the interdisciplinary interaction that it fosters. As a collaborative artist, interaction with others is a necessary part of my process in any project. I look forward to discussions throughout the process with a goal of sharing instructional ideas and experiences in applying technology to teaching. Some specific ways in which interdisciplinary interaction may assist with the development of this project include: guidance and support in project planning, assessment of implemented units, general pedagogical discussion about the use of technology in arts education, and the exploration of possible interdisciplinary applications of the project.

In the early stages of the project I hope to receive guidance from former fellows to help outline content for specific instructional units as well as to clarify my pedagogical goals. I also hope to be able to share project ideas with others in an informal brainstorming session similar to a theatrical production design meeting. This type of discussion would be useful by suggesting new ideas and avenues of investigation for myself and others.

I hope to make use of the contacts available through the TTI program for assessment throughout the project design and implementation process. At an early stage this could take the form of informal evaluation of prototype instructional materials. At a later stage, assessment might include evaluation of student work or mutual classroom observation. In addition to receiving feedback on teaching I would be interested in participating in the assessment of other projects in progress.

Of particular interest to me would be pedagogical discussions with faculty about both arts education, and instruction in applied technology. Since instruction in stage lighting deals with aspects from both of these areas, I will be especially interested in dialog with my colleagues in the Art Department and the Engineering Department about teaching approaches and techniques. These discussions would also allow me to share the specific issues that I face in teaching stage lighting and explore connections with these other disciplines.

In the lighting design process ideas are often better communicated through visual materials and demonstrations. A public demonstration of elements of this project for TTI advisors, other fellows, and other interested faculty could be scheduled as an additional medium for generating discussion. An open demonstration would have the added benefit

of not only making others aware of this project, but in demonstrating the unique way in which the technology will be applied.

VI. Dissemination

The Department of Drama faculty and students will be made aware of this project through guest lectures, public demonstrations, and the involvement of Departmental faculty in project assessment, and curricular discussions.

A workshop entitled *The Actor/Light Relationship*, could serve as a way to engage the acting/performance faculty and show-case the project to a large number of our undergraduate majors. I first did this workshop for a graduate course in movement and mask in Spring of 1998. I plan to rework it as the first instructional unit for the Lighting Design course. With the support of this project *The Actor/Light* workshop would not only be a way to showcase the project, but would serve as a way to introduce the largest number of students to light as a design medium.

The current regular guest demonstration that I do each semester on Advanced Lighting Design and Technology would also be an excellent existing forum with which to showcase this project. The unit on Advanced Lighting Design and Technology when reworked under this project will be the most complex unit to be created. It would provide a bold visually exciting way to generate interest in and awareness of the project. Current regularly invited classes include Drama 101: Introduction to Theatre, Drama 201: Image to Form, and Drama 221: Scenic Technology. In its new form the demonstration might find application to classes outside the Department of Drama as well.

An additional personal goal that will be supported by the dissemination of elements of this project is the increase of the inter-disciplinary application of stage lighting technology. Currently, I have Engineering students interested in the hardware, software, robotics, optics, and network systems involved with stage lighting. I also have Architecture students interested in the application of advanced stage lighting technologies to Architectural and interior design. Recently I even did a guest lecture/demonstration for an Astronomy class on automated lighting technology. I would also like to purse the obvious connections to Art and Music, by allowing students and faculty from these other disciplines to experience the enormous potential application of lighting design and technology.

Academic and professional channels that might serve to disseminate this project at the regional level include the Southeastern Theatre Conference annual conference and The United States Institute of Theatre Technology South East annual master-class. Both provide forums for the presentation of projects involving theatre technology and teaching. At the national level a session might be developed for United States Institute for Theatre Technology (USITT) conference, or an article written for publication in the monthly USITT journal *Theatre Design and Technology*. The publication of the course web-site would also be an excellent method for dissemination of the project.

VII. Summary of Equipment and Support

The following is a list of all anticipated needs for technology and support for this project. Most of the budget will ultimately be spent on computer and lighting hardware required for the creation and implementation of the project.

1) Computer workstation**.** The workstation will be initially used as an authoring station, but will ultimately become the studio control system. System and accessories include a *Win98* multi-media PentiumII workstation with 21" monitor, CD-ROM drive, sound-card, ethernet card, *Microsoft* intellimouse, and Zip drive; 75’ of ethernet cable; and a rolling computer cart that will allow the workstation to be moved safely within the building.

2) *Horizon* Lighting Control System Hardware, Software and Accessories. Includes: *Horizon* 1024 DMX interface w/MIDI/SMPTE option, *Horizon Gold* Software, *Horizon* submaster wing panel, and 75’ of DMX Cable.

3) Authoring Software. Required software includes: *OfficePro97*, *Adobe Illustrator*, *Adobe Photoshop*, *Adobe Acrobat*, and *Microsoft Frontpage*.

4) Lighting Equipment. Equipment to be purchased includes: 5 High End Systems *Trackspot* Automated Lighting Fixtures. Additional conventional lighting equipment, hanging hardware, cable, and accessories are currently owned by the Department of Drama.

5) Backup and Storage. A JAZ drive and CDR are currently available in the Department of Drama for use with this project.

6) Support from New Media Center. Needed support includes the scanning of slide materials, some scanning of print materials, a limited amount of video digitizing, and server space for the project.

7) Training. There are no specific training needs anticipated for this project. I have extensive experience with web page creation and associated software.

8) Student project support. Students in the Lighting Design and Lighting Technology Courses will be involved with the lighting system setup, troubleshooting, hang, and focus as part of their course-work. Additional support and assistance with programming will be provided by undergraduate and graduate lighting assistants within the limitations of their current shop hours and course load.

VIII. Budget	item number	unit	price	source
1) Computer workstation				
450MHz Pentium II processor with 512k Cache				
128MB 100MHz SDRAM				
21inch color monitor				
ATI Rage Pro Turbo 8MB 2x AGP Graphics Accelerator				
10GB 5400RPM SMART II Ultra ATA hard drive				
3.5inch 1.44MB diskette drive				
13X min./32X max. CD-ROM drive				
Sound Blaster AudioPCI 64D & GCS100 Speakers by Altec				
E-Series 8-bay Mid Tower				
3COM ISA Ethernet Combo				
IOMEGA Internal ZIP Drive				
104+ Keyboard				
MS IntelliMouse mouse				
Microsoft Windows 98	Gateway E 4200 450		$2,968.00	Gateway
100' ethernet cable			$39.95	
		subtotal	**$3,007.95**	
2) Horizon Lighting Control System				
Horizon 1024 Interface	HZ-1024			
w/SMPTE/MIDI Option			$1,595.00	Rosco
Horizon Gold Software	IPS-HZ-GOLD		$1,995.00	Rosco
Submaster wing panel	IPS-HZ-SWP		$1,195.00	Rosco
75' DMX Cable			$79.50	Premier
		subtotal	**$4,864.50**	
3) Authoring Software				
OfficePro2000			$199.00	Microsoft
Adobe Illustrator			$149.00	
Adobe Photoshop			$279.00	
		subtotal	**$627.00**	
4) Lighting Equipment				
HES Trackspot		5 $1,265.00	$6,325.00	Secoa
		subtotal	**$6,325.00**	
5) Summer Stipend			**$5,000.00**	
Project Total			**$19,824.45**	