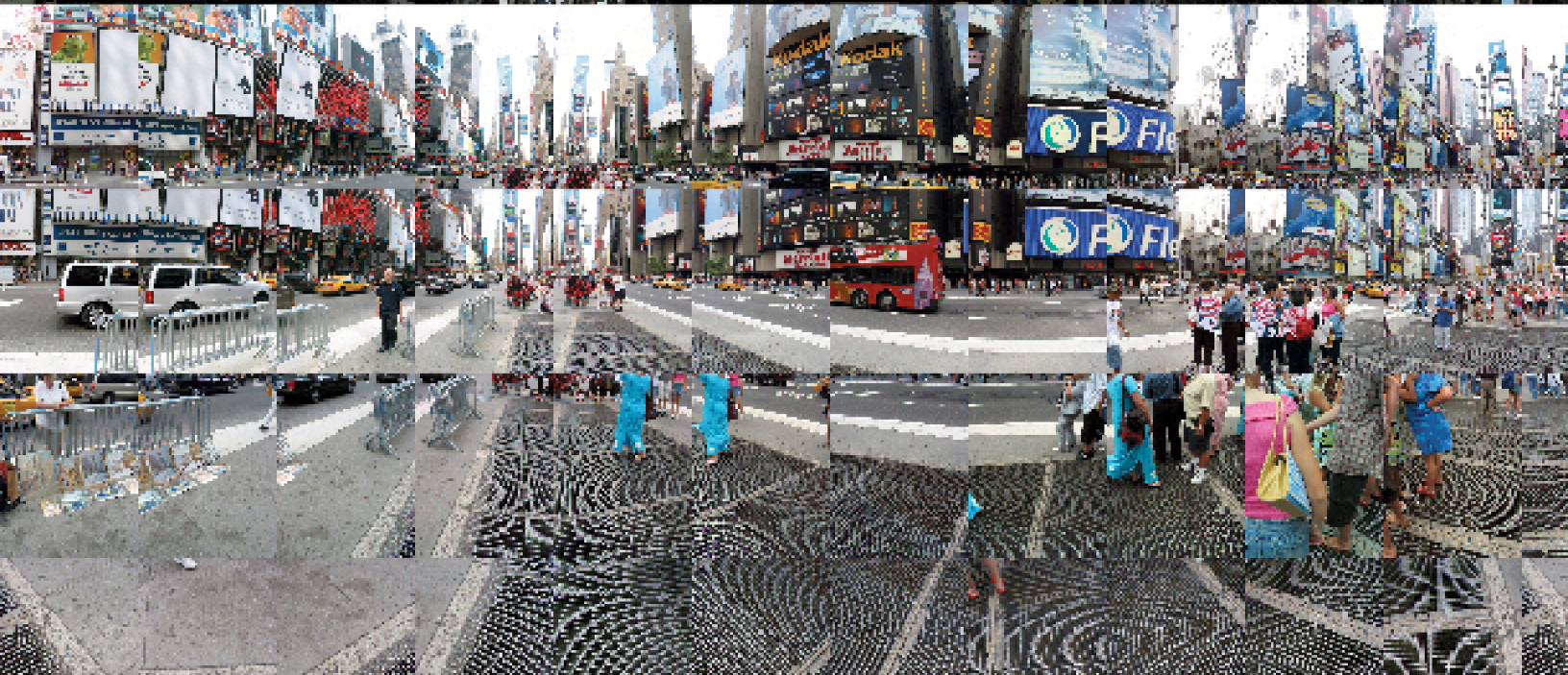
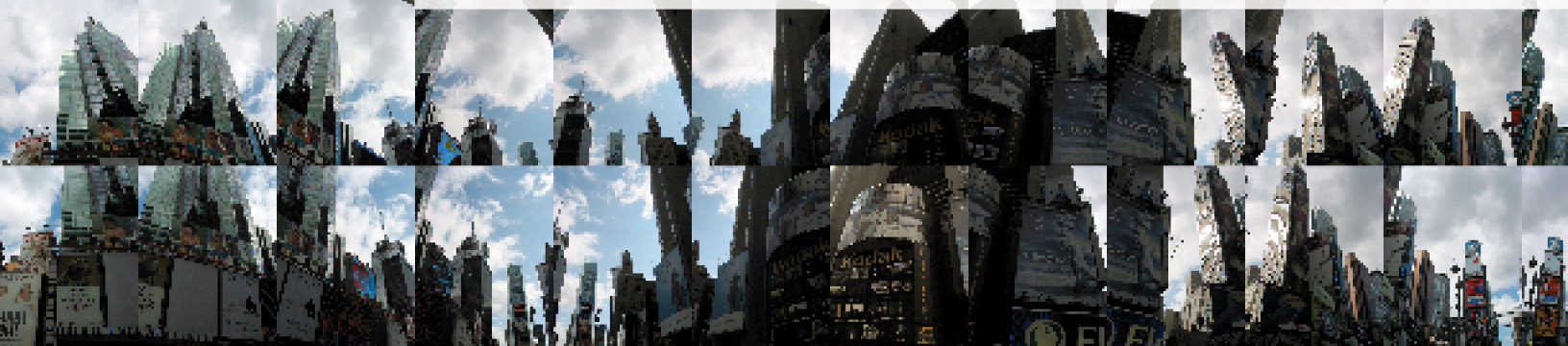




Visualization and Digital Imaging Lab
2003-2005 BiAnnual Report



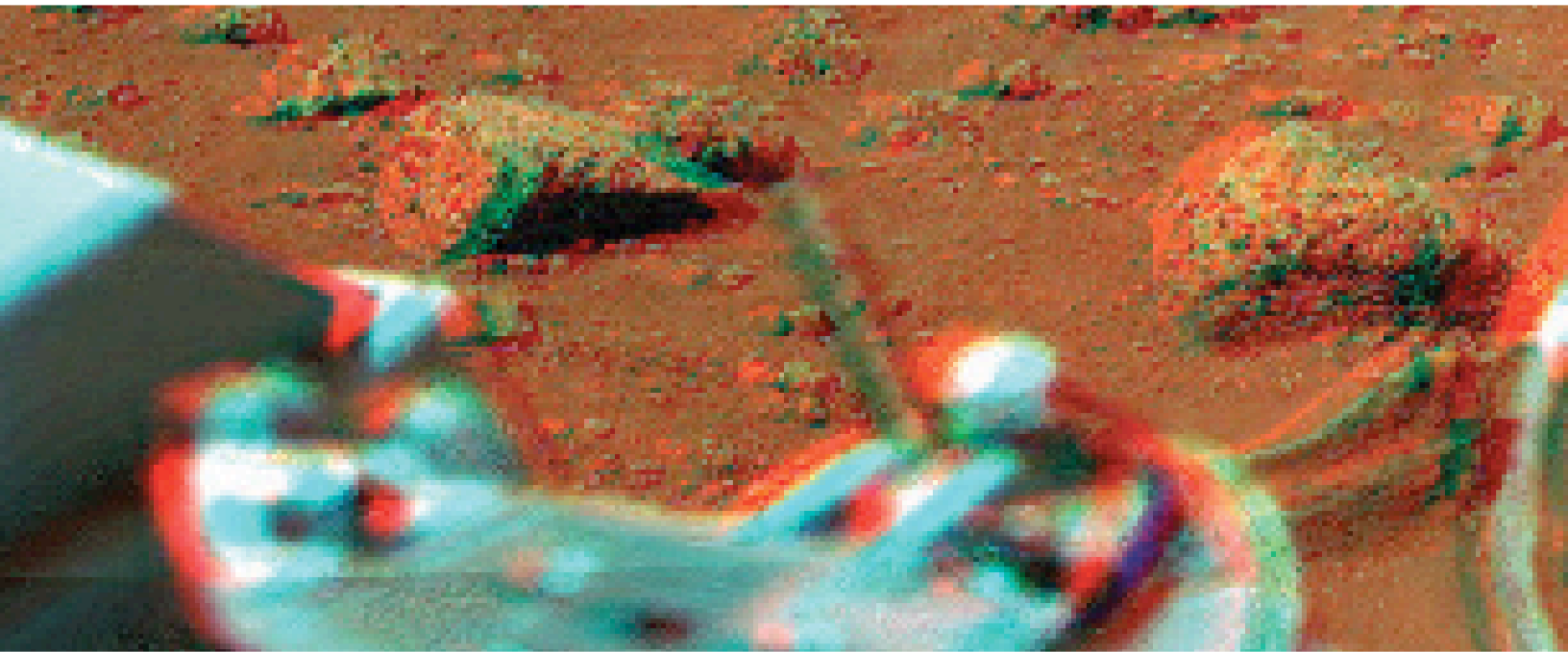
**cover image by
Steve Bardolph (Art + Design)
Times Square**

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Mission Statement

The Visualization and Digital Imaging Laboratory (VDIL) was conceived in 1999 through the vision of UMD Chancellor Kathryn Martin as a limited access facility, open to faculty members and their research associates and students whose primary interest is in high-end visualization projects. The laboratory is a collaborative facility of the School of Fine Arts and College of Science and Engineering. It provides a dynamic multi-media environment for design and scientific researchers to conduct original research in the areas of animation, visual imaging, and scientific visualization. The laboratory integrates design research in the areas of computer graphics, two-dimensional imaging, three dimensional imaging, virtual reality applications and sound/image control.

J. Miller (SFA), Mars 3D Images



Message from Executive Committee

As the result of a strategic positioning initiative, the Regents have established the goal of the University of Minnesota becoming one of the top three research universities in the world. The University of Minnesota Duluth has a long-standing, vibrant record of faculty research. The Visualization and Digital Imaging Lab, designed as a high-end digital lab, enhances faculty research. This resource also facilitates interdisciplinary research between faculty in the sciences and the arts.

The goals of enhanced faculty research and increased interdisciplinary initiatives are being achieved. This report documents some of the exciting faculty research efforts made possible by the presence of the latest digital technology.

Members of the executive committee extend our thanks to Chancellor Kathryn A. Martin for the vision to create this lab and for the continuing financial support to maintain the quality of the lab. Our congratulations to the faculty for their outstanding efforts and successes.

VDIL Patch Bay
photo by Zack Swanson (SFA)



Summer Grants

The purpose of this program is to encourage use of the Visualization and Digital Imaging Lab by research groups and individuals. Grants are intended to encourage researchers to learn how to use the hardware and software tools available in the Visualization and Digital Imaging Lab to enhance a specific research project. Participants are encouraged to share knowledge and skills with other users of the Visualization and Digital Imaging Lab. More than thirty grants of \$2,000 per research project have been awarded since the program's inception in 2001. A grant can go to an individual principal investigator, to an individual graduate student working on the research project with a principal investigator, or can be split among members of a research team.

This program has been particularly successful in introducing new researchers to the lab and its capabilities. A significant number of publications and exhibits have resulted from the intensive summer work. (see Exhibitions and Publications sections)

Digital Music and Video Editing, **Justin Henry Rubin (Music)**: My work entailed becoming familiar with the process of creating multi-media works involving extensive effects. I began working with Final Cut Pro over the course of last year, but only had a chance to learn how to edit material and overdub. This grant gave me the opportunity to learn how to greatly enhance the visual aspects of live footage and develop a personal, perhaps idiosyncratic, use of an almost painterly approach to color and layering that in turn allowed the final films to evolve a sense of poetry.

Building on a series of projects I was involved with over the past school year, I finished the following film:

"The Numbers of Genocide: Comprehending the Magnitude of Mass Murder (9'45'")": This work was the result of a number of years' work and planning. Last summer, my Visualization and Digital Imaging Lab Research Grant allowed me to learn how to use Pro Tools to create original musical compositions using pre-recorded matter, similar to the process involved in making Musique Concrete. I used this skill to make a soundtrack for my installation based on genocide. Although the idea of creating an artistic space in which to use this music fell through, I was able to present a series of lessons in the late spring at Superior Middle School using the concept behind the project. By filming the students involving themselves with the project, I found a way of creating a documentary realization. I learned this summer how to superimpose images and alter their timing and tweak their lighting as such to make the impact of the project palpable to the viewer and using the soundtrack created last year as the 'environment' for this otherwise silent documentary.

Video Backdrop Library, **William Payne (Theatre)**: The VDIL has been a valuable resource for me over the last five years. I have completed video scenery for UMD Theatre productions of *The Bacchae* (1999), *Top Girls* (2002), *Blur* (2002), and *Sweet Charity* (2003). I have steadily built my knowledge of and skill with video technology. I am now ready to fully integrate this

Robert Appleton (Art + Design), China Project



Summer Grants cont.

experience into a theatre project that utilizes video from the very beginning as a way to express more than just location. This technology can help express the very ideas and emotions the story wants to tell. The element of magic realism the play features will be helped a great deal by the resources of the VDIL Summer Research Grant.

Payne has also been working in the VDIL on 50/50, a documentary about voting. (see sidebar)

DVD Production of Bach B Minor Mass, Jean “Rudy” Perrault (Music): On May 11, 2003 the Music Department presented the monumental “Bach B Minor Mass” in Weber Hall. That event involved many of the Music Faculty, the UMD Symphony Orchestra, the University Singers, Arrowhead Chorale and a few other local talents. It was a truly successful event. Audio and video recordings were made of the last concert. I would like to use the VDIL to compile, edit, master and produce this performance on DVD, with the best possible video and sound quality. The final product can be used to promote the accomplishments of the UMD Music Department and also showcase the capabilities of the VDIL.

This high-quality video can be used as a recruitment tool, enticing Music students, Graphic Designers and Art students interested in video editing, mastering and production on DVD.

Visualizing Climate Parameter Changes in Both Time and Space, Erik Brown (LLO): Transfer of energy from low to high latitudes drives global atmospheric circulation. Knowledge of climate change in the tropics is thus a critical part of understanding our changing global climate system. Furthermore, the recent history

William Payne (Theatre)
Top Girls



Looking for Democracy
A Report to my Colleagues in the American
Democracy Project (ADP) of the AASCU
Spring 2005
George L. Mehaffy
Duluth, Minnesota March 2005

One of the most interesting ADP projects underway at the University of Minnesota–Duluth is a documentary on voting, created by William Payne, a faculty member in theater. Payne and a colleague went around the country, interviewing more than 250 people about why they did or didn't vote. A self-described middle-aged liberal, the filmmaker's partner, Zack Swanson, was a young conservative. As they went around the country, they talked about their different views of the world. In their interviews, what struck them both was how unhappy most people were with the current political process, the lack of genuine deliberation, and the demonization of political rivals. For far too many who did vote, the choice wasn't an enthusiastic one...only the lesser of two evils. The film will be ready by late summer, and we're discussing the possibility of a national teleconference in early fall, using parts of the film, perhaps in conjunction with the creation of a new film contest.

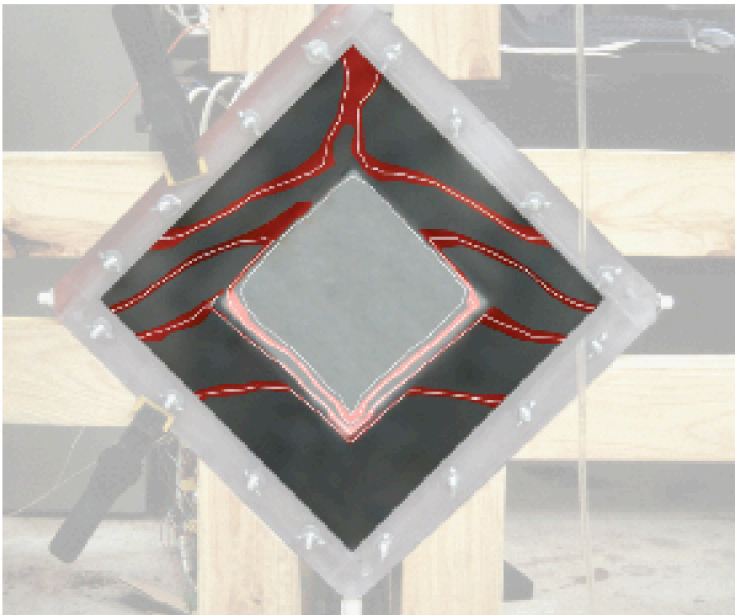
of variability in tropical climate should be taken into account for development of regional resource management strategies. For example, the response of East African lakes to changing climate has significant societal and economic consequences; these lakes provide critical resources—food, transportation, destinations for tourism, and hydroelectric power—for people of the region. In spite of the undoubtedly important role of the tropics in global climate dynamics, we have much to learn about the timing and nature of climate variability in the tropics and the ways in which records from various tropical regions relate to one another and to records from higher latitudes.

Scientists at the Large Lakes Observatory are attacking this problem by unraveling signals of past climate conditions recorded in sediments of the East African Great Lakes (e.g. Johnson et al. 2002; Brown et al. 2000). As we develop longer records of past climate from these lakes, it is becoming important to find clear ways to present complex results. One of the challenges is showing how "teleconnections" of climate from one world region to another have changed over time. For example, we know that episodes of more intense winds from the north over Lake Malawi that occurred during the Late Glacial period (10,000 to 25,000 years ago) were also times of less intense rainfall over the Orinoco River basin in northeastern South America. Analogous "teleconnections" also developed during the Little Ice Age (1500 to 1850 AD). My intent is to work with VDIL graphic artists (e.g. Sandy Pederson) in developing innovative ways of visualizing records of tropical climate history, finding novel graphical representations to show how climate parameters change in both time and space. This is important for presentations within the scientific community (the results of this work will be presented at the 2003 Meeting of the American Geophysical Union and will be submitted for publication in peer-reviewed journals), but also for presentations to the general public, and to policy makers.

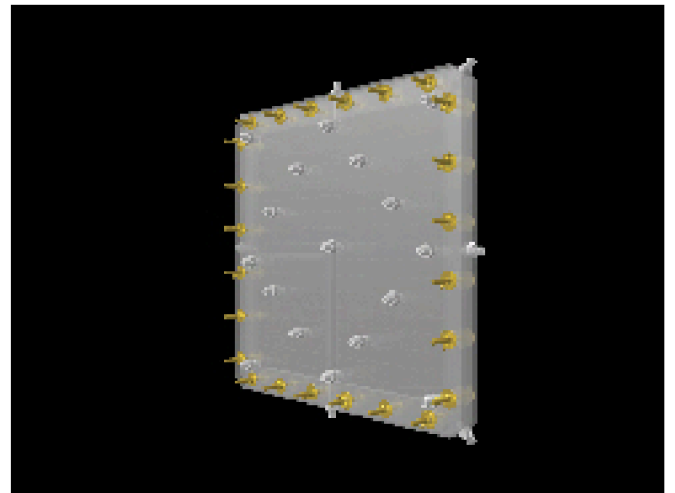
Summer Grants cont.

Fluid Flow Visualization, Steve Sternberg (Chemical Engineering): I will use the VDIL resources to explore new ways to visualize the data sets I have collected (and am currently collecting) in two ways: 1) develop movies to show the time evolution of my experimental system 2) Improve the data analysis through automation so that greater levels of analysis can be completed in less time. My goal then is to learn, through hands on experience, newer data visualization techniques, as well as have access to computers that can perform calculations on large matrices of experimental data.

The data sets created are from experiments designed to investigate the flow of a ground water contaminant through heterogeneous soils. The particular phenomenon I am interested in is the additional mixing caused by the flow as it encounters distinct changes in soil permeability. These changes are called heterogeneities, and are created in the experiments by forming an inclusion of different permeability into a larger region. Data is collected with a 16 x 16 grid of ion specific electrodes embedded into the soil. Each electrode is measured every $\frac{3}{4}$ second. Total experimental time may be 5000 to 15000 seconds. This creates data files of plain text ranging in size from 3 to 10 MB. A simple, small file size visualization showing this phenomenon will be an excellent addition to future presentations.



Steve Sternberg (Chemical Engineering),
Fluid Flow through Hierarchical Porous Media



Sound, Image & Motion in Performance, **Robert Appleton (Art + Design)**: My research in the VDIL developed my existing work of creative theory in the area of musical improvisation: specifically the most recent edition of George Russell's Lydian Chromatic Concept of Tonal Organization, Concept Publishing 2001, Brookline, MA. First published in 1953, Mr. Russell's theory has been credited as a primary influence on modal jazz, and specifically on the early work of the most influential contemporary jazz artists Miles Davis, John Coltrane and Bill Evans. My research deals with lessons to be learned by Design and the Visual Arts from improvised music – in terms of the evolution of our vocabulary. Mr. Russell's theory has expanded the choices of chords and scales available to improvising musicians by approximately one third. My ultimate objective is to accomplish this goal for the visual arts. And my VDIL Research for Summer 2004 set out to make further conceptual sketches of the relationship between music and the visual. *See Conference Presentations and Publications for more details.*

In progress: the book "Robert Appleton: International Master of Graphic Design" has introductions by designers Keith Godard, Niklaus Troxler and Nancy Skolos, and appreciations by jazz composer George Russell, performance artist Fast Forward and others. Kenneth Fitzgerald (a former UMD Professor) has

written a critical appraisal, and Linda Sandino (Senior Research Fellow at Camberwell College of Arts, London) has contributed an oral history. It will be published in Chinese and English by Sanlian in Shanghai, in the format DIN A4, approximately 200 pages. The Series editor is AGI China President Yu Bingnan, Professor, Academy of Arts & Design, Tsinghua University, Beijing." Contracts to publish simultaneously in Europe and the US are currently in discussion with Graphis Press, New York and Phaidon in London.

Research Projects

Currently there are over 80 active researchers in the lab, with over 40 current projects (some researchers are collaborating on projects). From Summer 2003 to Spring 2005 over 300 projects were completed in the Visualization and Digital Imaging Lab, using resources from the lab. Additionally, there are a number of continuing research projects, especially in the sciences. The following is a sampling of some of the Visualization and Digital Imaging Lab projects, past and present.

The ECOPHYS Functional-Structural Model of Tree Growth:

George Host (NRRI), Kathryn Lenz (Mathematics and Statistics), Harlan Stech (Mathematics and Statistics), Graduate Students: Christina Holden and Matthew Zagrabelny (UMD Applied and Computational Mathematics). ECOPHYS is a large-scale simulation for modeling the growth of juvenile poplar clones growing under conditions measured at the Aspen Free-Air CO₂ and O₃ Enrichment (FACE) Project (USDA Forest Service, North Central Research Station, Rhinelander, Wisconsin, USA.) The model relies on a detailed computational sub-model that computes the intensity of light intercepted by each leaf in the tree canopy. Hourly leaf-specific direct sunlight interception is obtained by projecting each leaf to a "shadow" plane orthogonal to the sun's rays. The projection plane is discretized, and each shaded "pixel" is indexed by the leaf that shades it. A scan line algorithm commonly used in computer graphics to fill colored polygons is modified to analyze the leaf projections, and to obtain the fraction of each leaf that is directly sunlit.

As a measure of model accuracy, ECOPHYS-estimated light interception data is compared to that measured by rendering a color-coded image of the canopy with the POVRAY imaging software. The image is generated using an orthographic projection, with camera and light source set at the "sun's view." Anti-aliasing and ambient shading capabilities of POVRAY have been disabled. The image is stored using the Portable Pixmap (.ppm) file format,

which maintains fully accurate information regarding image pixel colors. When POVRAY images are rendered with sufficiently high pixel resolution, one can compute a highly accurate measure of leaf sunlit areas. These results have provided a convenient benchmark by which the ECOPHYS light calculation method has been tested and calibrated. Project work has relied heavily on the Visualization and Digital Imaging Lab Beowulf parallel-processing computer, as well as the lab's POVRAY imaging and Tecplot data visualization software.

Living Histories of Modernist Designers: **Catherine Ishino, (Art + Design)**. I have been conducting video interviews of key, historical figures in US Modernist design. To date I have conducted two interviews, with two designers, who are credited with teaching the first history of graphic design class in the US, at the California Institute of the Arts, in the early 1970s. The VDIL has the ONLY software, hardware and storage capacity as well as capability I need to efficiently as well as effectively do this work.

Philip Pearlstein Film Project: **Jen Dietrich and Sarah Bauer (Art + Design)**. The research is an ongoing project involving one of the last remaining artists of the pre-Warhol era. They are in the early phase of producing a film (documentary) based on the life of Philip Pearlstein, the New York realist painter. Pearlstein has long been considered the father of new realism and he continues to have a profound impact on the New York Art community. At this point, they can do much of the work themselves with the aid of the VDIL.

**Host, Lenz and Stech (Mathematics and Statistics)
Model of Tree Growth**

Digital transcriptome analysis indicates adaptive mechanisms in the heart of a hibernating mammal, **Katharine M. Brauch (Biology)**, **Nirish D. Dhruv (Computer Science)**, **Eric A. Hanse (Biology)**, and **Matthew T. Andrews (Biology)**. Interdisciplinary collaboration between Computer Science and Biology departments at the VDIL made this research possible. See Conference Presentations & Publications. Survival of near freezing body temperatures and reduced blood flow during hibernation is likely the result of changes in the expression of specific genes. In this paper we describe a comprehensive survey of mRNAs in the heart of the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*) before and during hibernation. The heart was chosen for this study because it is a contractile organ that must continue to work despite body temperatures of 5°C and the lack of food for periods of 5-6 months. We used a digital gene expression assay involving high-throughput sequencing of directional cDNA libraries from hearts of active and hibernating ground squirrels to determine the identity and frequency of 3,532 expressed sequence tags (ESTs). Statistical analysis of the active and hibernating heart expression profile indicated the differential regulation of 48 genes based on a $p < 0.03$ threshold. Several of the differentially expressed genes identified in this screen encode proteins that likely account for uninterrupted cardiac function during hibernation including those involved in metabolism, contractility, Ca²⁺ handling and low temperature catalysis.

A sampling of genes showing higher expression during hibernation include phosphofructokinase (PFK), pancreatic triacylglycerol lipase (PTL), pyruvate dehydrogenase kinase 4 (PDK4), aldolase A, sarco(endo)plasmic reticulum calcium-ATPase 2a (SERCA2a), titin, and four and a half LIM domains protein 2 (FHL2). Genes showing reduced levels of expression during hibernation include CDK2-associated protein 1 (CDK2AP1), troponin C, phospholamban (PLB), calcium-calmodulin dependent protein kinase II (CaMKII), calmodulin (CaM), and four subunits of cytochrome c oxidase.



Graduate Studies

The Visualization and Digital Imaging Lab encourages graduate studies and research, particularly in the arts and sciences. The lab provides a space for collaboration between graduate students in different fields as well as high end equipment for their research unavailable elsewhere in the University. Many students in Computer Sciences, Geology, Chemistry and Mathematics have done the bulk of their research for their theses here at the Visualization and Digital Imaging Lab.

In support of the MFA in Graphic Design Graduate Program, the Visualization and Digital Imaging Lab has hosted the Graduate Reviews (formal presentations twice a year by MFA candidates) for the past two years. Candidates who have presented here include Jennifer Gordon, Bryce Howitson, Pete Stevenson, Tony Rostvold, Sandy Pederson, Ida Kumoji. They spoke in relationship to their Master Thesis topics and showed their design investigations, which they conducted surrounding the semester's seminar theme, such as "Diversity and Globalization in Graphic Design Today." Following are several summaries or

illustrations from MFA Graduate Review presentations made in the Visualization and Digital Imaging Lab.

Adinkra: Integration of African and Western Cultural Visual Vocabulary, Ida Kumoji (Art + Design): The project is about the integration of the Adinkra symbols and the Alphabet into a new visual medium. This medium will be a meeting place for both cultures. As a graphic designer, I am trying to create the new medium, introducing elements from different cultures to a new culture. This integration will respect both languages and the new language that is created will maintain the forms of each respective language. The purpose will be to familiarize people from Western and African culture with elements from both Adinkra symbols and the Alphabets in a friendly way.

Beyond the Comfort Zone, Sandra Pederson (Art + Design): (an excerpt from Pederson's thesis abstract) An outgrowth of the design system I developed for idea consideration, was a personal experience with posters as a viewer, not as an author or designer. One poster related asks "how will we be when there is peace?" I realized that we do not know much about peace. It is an ideal, a wish in the future. In order to manifest peace, I believe we need to think about its actuality. Hence, the final portion of my thesis show is devoted to exploring this question. I do not have answers, just thoughts. As a species maybe we can create this new world together. I hope so.

Improving C software and Porting to Java, Ravindra Bharadia (Computer Science): VDIL has played a vital role in shaping up my Computer Science Master's Project.

My project was to improve software written in the C language and port it to Java for a better cross-platform use. I could have successfully done my project in any regular lab, but then the result would not have been the same. In addition to getting all



DONODRUM, Ida Kumoji (Art + Design)

The main reason for this project dealing with anaglyph images of Mars was the VDIL's presentation of 3D Mars last year and it really got me into this idea so I appreciate the push in the right direction! Thanks a lot –Jake Miller, SFA undergrad

the required tools to implement my project, I got an outsider's perspective on the usability of my application and a designer's point of view on the look and feel of my interface. This interdisciplinary lab gave me a true industry experience.

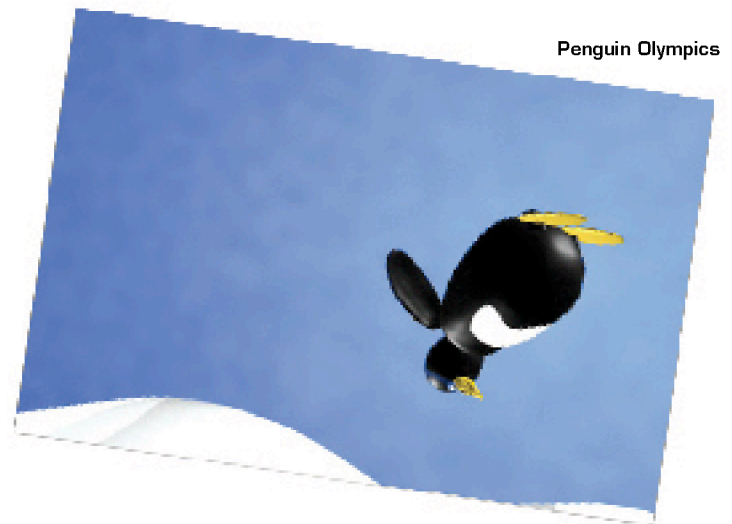
On a personal note, how often does a Computer Science graduate student get to work on a full-fledged animation at the university level? How often does he/she get the liberty to develop an industry standard information kiosk? I got these opportunities at the VDIL and am very thankful to the lab. VDIL needs to be advertised more so that other right/left brained students like me get the opportunity to push their creative limits. Did I mention that I landed an interactive kiosk development job?

Undergraduate Research Opportunities

The Visualization and Digital Imaging Lab encourages upperclass undergraduate research mentored by research faculty in the lab. Some examples follow.

Robert J. Linnemann (Music), received an Undergraduate Research Opportunity (URO) for "Music and Sound Composition for Animation," with **Justin Rubin** as Faculty Sponsor, produced at the Visualization and Digital Imaging Lab. "House Party" is an animated short showing what might happen if a house came alive and had a party itself. This work plays with figure ground and movement, both of sound and image. House Party credits follow: Sound/musical composition: **Robert J. Linnemann**, Animation/Production: 3D Digital Class Maya Group--**Jake Miller, Kim Stoddart, Heather Elliot, Chad Breske, Ravindra Bharadia**. Advisors: **EunKyung Suh and Lisa Fitzpatrick**.

[undergraduate cont. on page 18](#)



Penguin Olympics

Beyond the Leading Edge

The Visualization and Digital Imaging Lab houses the most powerful graphics and imaging hardware and software on campus. The Visualization and Digital Imaging Lab encourages MFA candidates and graduate students from the sciences to apply to use the facilities, as well as selected undergraduates working with faculty on a variety of research/creative activity projects, and through the UROP (Undergraduate Research Opportunities Program) awards program. A variety of high-end workstations (Macintosh, Windows and UNIX) offer lab researchers unparalleled processing power with optimal working conditions. Software applications run the gamut from traditional 2D imaging to programs for digital video editing and 3D modeling/animation. Additional devices in the lab permit researchers a variety of input and output modes. Primary researchers in the Lab come from the School of Fine Arts and the College of Science

and Engineering and engage in research projects consistent with the mission of the Lab as a research computing facility.

The Visualization and Digital Imaging Lab has developed a new online reservation system for equipment and workstations <https://www.d.umn.edu/itss/vdil/> and is now a wireless lab. Another innovative feature of the new Visualization and Digital Imaging Lab website are the video vignettes (<http://www.d.umn.edu/vdil/research/index.html>), produced by William Payne, Theatre, and Zack Swanson, Graphic Design. These are portraits of researchers and their discoveries at the lab.

New camera equipment in the Visualization and Digital Imaging Lab includes two Canon Optura XI camcorders, a Canon SLR Macro Imaging Digital Camera (Eos 10D) and lenses, a Nikon 430 digital still camera and Canon XLI zoom lens and boom mic. A new sound integration system brings sound to the hallway from the lab to highlight video and audio work being done in the lab. Audio and composing capabilities are enhanced with the lab's new Kurzweil pcx2 performance keyboard. The lab has acquired a new HP 130 NR color printer, which prints both large and small scale. Additionally, the lab has a large suite of science software, such as Fluent, and a mission to help researchers access new software. For example, ArcView can be run in the lab, on a faster computer than available elsewhere, on a large flat screen tablet monitor (enabling one to draw directly on the screen). Science researchers have enjoyed the accuracy of the Wacom write-on monitor and Dell Precision 650 2.8 Ghz dual xeon Windows XP pc with Adobe Premier, TecPlot, Flash and Sigma Scan. Three new Mac G5 video editing stations with Final Cut Pro HD and the Adobe CS2 Suite as well as 24 inch and Plasma display monitors make video editing and graphic design a visual feast. 3D Connexion's Spaceball mouse is especially designed for manipulation of 3D images on screen using Alias Maya and Discreet's 3D Studio Max 7 software.



Sound Editing Equipment
Photo by Zach Swanson (SFA)

In terms of software the Visualization and Digital Imaging Lab continues to be an innovator and first adaptor in both the sciences and the arts. Phoretix 2D Gel processing software has been upgraded to 2D Expression for more automated gel processing. Erdas Imagine GIS software allows scientists to work with geological data sets in real-time. Lolitrack from Qubitsystems enables researchers to track video of animal's motions. Gaussian 03 is the latest version of state-of-the-art chemistry analysis software. Other new software includes: Rhino, QuarkXpress, AutoCad, Macromedia StudioMX 2004, Adobe Streamline, Poser, and Bryce.

The Visualization and Digital Imaging Lab has improved production facilities with a Kano DVD copier, a Sony GV-D1000 Digital video recorder, Panasonic AG-W3 PAL/NTSC/Seacam converter, and Epson Expression 10000 XL tabloid size transparency photographic scanner.

The Visualization and Digital Imaging Lab continues to collaborate with the GeoWall Consortium (<http://geowall.geo.lsa.umich.edu/>) in pioneering 3D visualization, producing a 3D display of stereo photography of Mars.

Additionally, Lisa Fitzpatrick, VDIL Coordinator, is on the steering committee of GRAVEL (Games Research and Virtual Environments Lab), which is intended to bridge the interests and expertise on the UM campus with community and commercial enterprises for the mutual exploration and advanced understanding of game and virtual reality environments.

VDIL group Ravi Bharadia, Robert Linnemann, Samuel Erickson and Lisa Fitzpatrick are in the process of building, programming and designing an innovative touch screen information kiosk for the Swenson Science Building.



Looking In to the High Tech World of the VDIL
Photo by Zach Swanson (SFA)

Viz Lab Presents

The Viz Lab Presents Series highlights research in the lab, as well as guest lecturers and technology workshops. This high-tech, user-friendly series is free and open to the public. Past presentations include:

"Finding Nemo," **Lucas Ives** (PIXAR Technical Director of Animation)

Technical demonstration: video editing. **Brian Hubbard**, Director of Photography from NYC, winner of the Wasserman Award for Best Cinematography and awarded Best Film Austin Film Festival 2003 for "Bjargavaettur."

"The Internet & Art Historical Research" **Michael Schroeder**, Microsoft Senior Researcher, (in conjunction with the Gilbert Munger display at the Tweed)

"Bach B Minor Mass," **Rudy Perrault** (Music)

"Digital music editing using Pro Tools software," **Justin Rubin** (Music)

"Developing stimulus video tapes for use in research on emotional displays and service quality," **Alexandra Luong** (CEHSP)

"Detection of small objects from high-resolution satellite images in Matlab software," **Rocio Alba-Flores** (ECE)

"Sequencing and characterization of active and hibernating *Spermophilus tridecemlineatus* heart cDNA libraries via Lasergene software," **Matt Andrews** (Biology), (Katherine Brauch & Nirish Dhruv, Computer Science)

"Directing and editing video sequences using Final Cut Pro," **Bill Payne** (Theatre)

"Developing innovative ways of visualizing records of tropical climate history, showing change in both time and space," **Erik Brown** (LLO)

"Fluid flow over lake trout spawning grounds in the Apostle Islands modelled using FLUENT software," **Nigel Watrus** (LLO)

"Effective visual communication interface on the World Wide Web: Visualization and Digital Imaging Lab website project," **Phil Choo** (Art + Design)

"Designing Scientific Posters," **Steve Bardolph** (Art + Design), **Erik Brown** (LLO)

"Using OSX," **Mike McGraw** (Apple Computers)

"Techno Know-How Q & A," **Sandy Pederson** (Art + Design), **Cassie Li** (Computer Science), **Lisa Valdez** (VDIL)

"Digital Bricolage: the Vasalisa story," **Joellyn Rock** (Art + Design)

"MPI on bwulf at the UMD VDIL," **Paul Siders** (CSE-Chemistry)

"Interactive New Media for Learning Technologies," **Josh Seaver** (Science Museum of Minnesota)

"Sound, Image and Motion in Performance," **Robert Appleton**, (Art + Design)

"The oxo process" **Paul Kiprof** (CSE-Chemistry)

"Video and Audio Production for Art Installations" **Justin Rubin** (Music)

A Dramaturg's View: Documenting "La Traviata" Kate Maurer (CLA-Composition)

"Modelling and Visualization of Stream Response to Rain Events in Duluth's Urban Watersheds" **Rich Axler, Jesse Schomberg, Sea Grant, Nick Zlonis, Sea Grant, and George Host (NRRI)**

"Water Quality Visualization in Lake Superior, based on GIS and RS" **Yuhu Yan (CSE-Physics)**

"Digital Imaging in Experimental Sedimentology" **Jere Mohr (Geological Sciences)**

"Fluent: Visualizing the flow of contaminants through soil." **Steve Sternberg (Chemical Engineering)**

"Pilot the Wireless Workshop" **Peter Angelos (CLA), Bruce Reeves (ITSS)**

"Copyright Issues for Faculty" **Bruce Reeves (ITSS)**

"Designing Scientific Posters" **Andy Breckenridge (LLO), Sandy Pederson (Art + Design), Lisa Valdez (VDIL)**

"Using games to teach Introductory Physics" **Pete Border (Physics, UMTC)**

"Masterclass: Installations and Interactive Events" **Fast Forward, New York Avant Garde Artist/Composer**

"Animation Open House" **Ravi Bharadia, Sandy Pederson, Rob Linnemann, Sam Erickson, Mike Frankosky, Brian Bennet, Scott Gilson, Ryan Rapsys, Lisa Valdez, EunKyung Suh, Heather Elliot, Jake Miller, Kim Stoddart**

**Lucas Ives (Pixar)
Presentation on Nemo Animation**



National and International Exhibits

The VDIL coordinated a 3D printing demo from NRRRI in conjunction with "Contemporary Art & Mathematical Instinct" at the Tweed in Fall 2003.

Italian American Festival 2004: The VDIL facilitated print production for the associated art show in Palermo, Italy and Duluth.

Catherine Ishino (Art + Design): DVD "WW2: Voices of Remembrances, 12 family stories" oral histories of my relatives' experiences of their internment experience, produced in the VDIL has been 'ascended' into the archives of 3 libraries: 1) the Japanese American National Historical Museum, Los Angeles-spring 2005; 2) the Michigan Historical Museum, Lansing, Michigan-February 2005; a) ALSO there was a touch screen kiosk made of my DVD and is on exhibition in their museum now and until the end of summer, with a group exhibition called "Movers and Seekers: Michigan Immigrant Experiences"; 3) Michigan State University's Asian American Center purchased a DVD for their library and archives.

Robert Appleton (Art + Design): Results of my VDIL research include acceptance of poster work created there into the San Francisco Museum of Modern Art, print works for my one person show at Tweed in Fall 2003, sound works presented on the design@umd 2004 website, and the screening of a video documentary created jointly with professor Catherine Ishino at the University of the Arts in Philadelphia in January 2004.

Catherine Ishino (Art + Design) WW2: Voices of Remembrance

Suz Szucs (Art + Design), 2004 presented "Road Work: Deer Project" at Soap Factory, Minneapolis, MN; Fotowerk, Flatfile Contemporary, Chicago; Arrowhead Biennial, Duluth Art Institute; "Seven Deadly Sins," Duluth Art Institute, Duluth, MN; "Absence," Flatfile Photography, Chicago; "Perspectives From America," Palermo, Italy

"All Together Now," Art + Design Faculty Exhibition, Tweed Museum of Art October 19-December 19, 2004 This exhibition presented the work (produced in the VDIL) of faculty members and graduate students, including **Robert Appleton, Steve Bardolph, Sarah Bauer, Phil Choo, Alyce Coker, Jennifer Gordon, Catherine Ishino, Ida Kumoji, Janice Kmetz, Vicki Lehman, Sandy Pederson, Joellyn Rock, Anthony Rostvold, Peter Stevenson, Eun-Kyung Suh, Mariana Wiesman and Rob Wittig.**

Anthony Rostvold, Kai Salmela, Robert Appleton (Art + Design). Mimer Sinon Guzel Sametlar Universitesi, (Fine Arts University) Istanbul, Turkey, May 2-7, 2005. Grafist 9 International Graphic Design Seminar. Workshops and Exhibition: "Graphic Projections on Beyoglu" featured works produced in the VDIL.

Sarah Chokyi Bauer, (Art + Design) 2004-05, "Above Is Below," two-person, site-specific installation, The Minneapolis Institute of Arts, MN, refereed (catalogue) 2005, the prayingproject, Exit Art, New York City, NY performance, curated.



Performances

Italian American Festival 2004: video production for the "Big Band Show the Italian American Crooners" was done in the VDIL by **Bill Payne**, **Catherine Ishino** and a team of undergraduate student videographers. The VDIL facilitated the musical composition of the original score for "The Secret of the Talking Bird" by Louis Dunoyer de Segonzac, as well as digital images in the set (see Karen Hoffman). **Kate Maurer, Dramaturg**, recorded and edited "La Traviata" for archival purposes in the VDIL. The set for "Guys and Dolls," as well as "La Traviata" were designed by **Arden Weaver** in the VDIL.

Eun-Kyung Suh (Art + Design), created her first screen/set design for a theatrical production from the Visualization and Digital Imaging Laboratory. The title of performance is *Lost and Found*, which will be performed by Francine Conley, a Minneapolis-based artist and professor at the College of Saint Catherine, St. Paul. "Lost and Found" is a multimedia production that presents a cast of characters who, as the title suggests, have lost something or are themselves somehow displaced. It was performed at the Center for Independent Artists in Minneapolis from April 8 - 17, 2005.

Robert Appleton (Art + Design), arranged for award-winning New York Avant Garde artist/composer Fast Forward to direct his "Feeding Frenzy" in Duluth, November 21, 2004 with the resources and assistance of VDIL staff. "Feeding Frenzy—a celebration of food" is a 90 minute event which involves simultaneous activities by 5 chefs, 5 musicians, and 5 waiters. While music is created by the five musicians, five separate food courses are prepared and served to the audience. The actions of the chefs and musicians are amplified to create a sonic landscape and live video of the event is projected on a screen within the space.

Karen Hoffman (Theatre). Research that I have been involved in at the VDIL concerned two Dept. of Theatre productions:

"The Secret of the Talking Bird": 1. Use of computers in collaboration with students from graphic design, **Bret Peterson** and **Jackie Menth**, for production of computer graphic projection images which were projected onto scenery; 2. Use of Proxima projector for the run of "The Secret of the Talking Bird."

"Heidi Chronicles": Our student designer, **Emily Bloudek**, used VDIL resources to print images that we used for properties design for this Theatre production, Fall 2004. I also used the VDIL to help prepare images for entrance into the World Stage Design Exhibition, March, 2005.

Mark Harvey (Theatre Sound Design), Student sound designers using VDIL resources for shows: "Twelve Angry Men," "Prometheus Bound," "String," and "The Heidi Chronicles."

Bill Payne (Theatre), "50/50: The American Electoral Divide"—currently being edited with a completion date set for Fall 2005, Sponsored by The American Democracy Project—VCAA, UMD and the SFA. "Raising Children with FASD: A seminar with John Hays"—currently being completed tentative date, Fall 2005. Video Scenery for "Prometheus Bound"—Presented Feb. 10-19, 2005 in the Marshall Performing Arts Center, UMD. Video Scenery Library—ongoing, more processing of raw footage for the library to take place during Spring Semester, 2005.

Rudy Perrault (Music). The following DVD concerts have been edited and produced at the VDIL lab: "Arabian Nights"... The UMD Symphony Orchestra performed music of Berlioz, Rimsky-Korsakov, Saint-Saens. Storytellers Julie Della Torre and Elizabeth S. Nordell were also featured on that Concert. This event took place in Weber Music Hall on November 5, 2004.

Performances cont.

"A Little night music"...The UMD Chamber Orchestra performed music of Mozart, Jaegerhuber, Shostakovich and D'Rivera. This performance took place in Weber Music Hall on December 3, 2004.

"Gloria"....All ensembles from UMD Department of Music performed on a joint concert. The performance took place in Weber Music Hall from the 10th to the 12th of December. This DVD will be used to promote the Music Department at the 2005 MN Music Educators Association Conference in Minneapolis from the 17th to the 19th of February, 2005.

"UMD Chamber Orchestra on Tour." This DVD features the UMD Chamber Orchestra on Tour and in their final performance at the Alvord Auditorium in Ashland, Wisconsin.

"Haiti Benefit Concert." This DVD features the Friends of Haiti Orchestra (Jean R. Perrault, conductor) in their benefit concert at the First Congregational Church of Christ in Appleton, Wisconsin. This performance took place on the 13th of February, 2005.

Upcoming performance

U3 in 3D...A DVD, created in the VDIL, features UMD's Faculty Piano Trio in Concert. Music of Haydn, Arensky and Mendelssohn. This DVD, along with others, will be used as a recruiting tool.

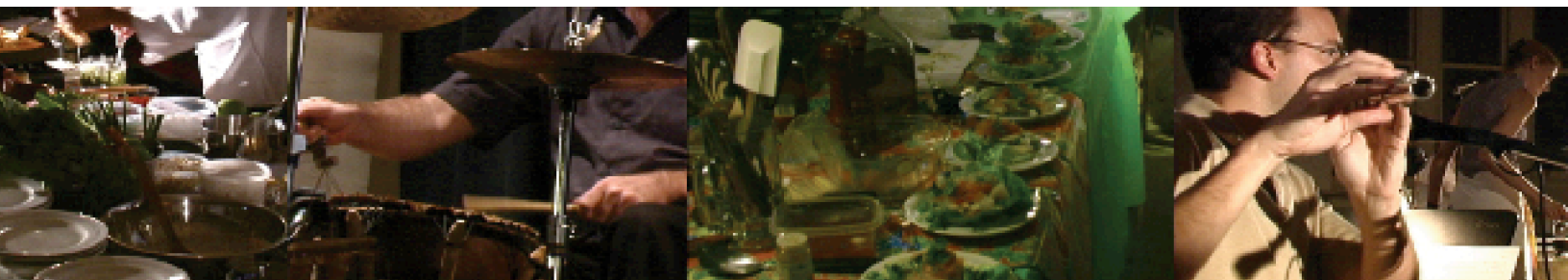
Undergraduate cont.

"Penguin Olympics" is a short animated work showing a nervous penguin at his first Olympic sliding trial. The target audience is children ages 5 to 11. The piece solves problems of snow texture maps, and integration of original music, sounds and images. Interesting sound techniques include: live recording of saxophones timed to animation, ambient sound recording to simulate walking in crunchy snow (done in September in Duluth, without real snow). Penguin Olympics Credits follow: Sound/musical composition: **Robert J. Linnemann**, Animation/production: Interdisciplinary Maya Group--**Ravindra Bharadia, Sam Erickson, Mike Frankosky, Scott Gilson, Sandra Pederson, Justin Rubin, Lisa Fitzpatrick.**

The Maya Group is a small unofficial group of musicians, technicians and students from various disciplines who explore creating animation together at the Visualization and Digital Imaging Lab at UMD.

Undergraduate **Andrew Theros (Art + Design)**, under the direction of **Wanda Percy** displayed a poster created in the Lab for an interdisciplinary final performance on May 11th, '05 4-9 p.m. in the Marshall Performing Arts Center, 'The Black Box' theater at UMD. His piece was titled "Pieces of Me." The performance night was a part of the Creating Across Disciplines class.

Fast Forward, Feeding Frenzy



Workshops

"ProTools sound-editing workshop" by **Steve Horner (Sound Designer and Composer)**, www.hornermusic.com, Platinum Best of Show award winner for TV spots at the Auroras, Gold Addy winner for music score "Inspired." At this second hands-on workshop, Horner demonstrated more sound editing techniques, including live mic setup of Jean R. Perrault playing the violin, how to effectively do multitrack recording, audiosuite, integration of midi into PT, equalizing and de-essing.

"How to make 3D video using Final Cut Pro," by **Jamason Chen (New Media Researcher, School of Journalism and Mass Communication, UMTC)**, videographer and new media researcher. His professional career spans nearly twenty years working as a photojournalist as well as in the motion picture and broadcasting industries. This workshop demonstrated how to log footage and edit it, making stereo video. Examples of stereo video, and hands-on practice with video cameras, theoretical discussions and possible uses of 3D video in the future were shown.

"Making Oral Histories in the Classroom," by **Catherine Jo Ishino (Art + Design)**. This workshop for Art Educators of Minnesota addressed creating projects for students to record histories of their elders. Catherine shared parts of an oral history project she did involving 12 stories from her family's WWII Japanese American internment experience. She also shared video oral histories on the "Elders of Graphic Design", a work in progress, as well as the importance of cultural artifacts in recording history.

"Digital Storytelling," by **Anne Francis Wysocki (Michigan Technological University Professor of Visual & Digital Communication)**. Wysocki is a nationally recognized authority in the studies of design, animation on the web, rhetoric, and technology. **Rob Wittig (Art + Design)** (www.tank20.com) Rob Wittig was granted a Fulbright scholarship to Paris to study the theory and practice of on-line fiction, on the invitation of philosophers Jacques Derrida and Jean-Francois Lyotard, and the Pompidou Museum. This "Digital Storytelling" workshop allowed participants to experiment with new narrative approaches when designing informational media and broaden notions of narrative using multiple voices, branching threads, and digital cameras.

"Basic Storyboarding and Animation," by **Lisa Fitzpatrick, and Ravi Bharadia, VDIL**. This workshop for the Art Educators of Minnesota featured examples of storyboarding, idea generation, a tight storyline, and animatics. Principles of 2D animation and classic animation exercises were shown, as well as differences between a 2D and 3D and traditional and computer generated animation. The objective was to familiarize participants with the artistic field of animation, especially computer animation.

Conference Presentations & Publications

This is a sampling of work done in the VDIL for conferences, presentations and publications.

Photophysical and Chiroptical Properties of Lanthanide Triple Helical Complexes with a Terdentate Chiral C₂ Symmetric Ligand; **G. Muller, O. Mamula, D. Imbert, J.-C. G. Bünzli, H.-R. Mürner, J. P. Riehl**, 226th ACS National Meeting, New York City, NY, USA, September 2003

Refereed Poster Presentation: **H. Stech, K. Lenz, and G. Host**. "Image Processing Techniques for Calibrating and Testing Canopy Light Interception Models", The 4th International Workshop on Functional-Structural Plant Models June 7-11, 2004, Montpellier, France.

Refereed Conference Proceedings: **G. Host, K. Lenz, and H. Stech**. "Mechanistically-based Functional-Structural Tree Models for Simulating Forest Patch Response to Interacting Environmental Stresses," 4th International Workshop on Functional-Structural Plant Models June 7-11, 2004, Montpellier, France, (C. Godin, et al, editors) 150-153, 2004.

Ronald T. Marchese, Professor of Ancient History and Archaeology, Department of Sociology and Anthropology: Books In Press: "Splendor and Spectacle: The Armenian Orthodox Church Textile Collections of Istanbul," principal author (Çitlembik Ltd., Istanbul) - 2005.

Forthcoming: "Images of the Divine: Sacred Embroideries from the Armenian Patriarchate in Istanbul," with M. Breu in *Vivarium in Context*, Pozzo Publishers, Vicenza Italy, December, 2005, pp. 1 - 40 plus 61 illustrations).

"The Armenian Patriarchate in Istanbul", with M. Breu in *Logos: A Journal of Catholic Thought and Culture*, Vol. 7, Number 2 (Spring, 2004), 86 - 100.

Web Page Publications: "Testimonies of Splendor: Religious Textiles from the Armenian Churches of Istanbul, Turkey" with M. Breu, Western Michigan University, Kalamazoo, Michigan http://www.geocities.com/breu_marchese/

Physiol. Genomics (August 2, 2005). doi:10.1152/physiolgenomics.00076.2005 "Digital transcriptome analysis indicates adaptive mechanisms in the heart of a hibernating mammal." **Katharine M Brauch¹, Nirish D Dhruv², Eric A Hanse¹, and Matthew T Andrews^{1*}** ¹ Biology, University of Minnesota Duluth, Duluth, Minnesota, USA ² Computer Science, University of Minnesota Duluth, Duluth, Minnesota, USA (see *Research Projects for abstract*)

George E. Host, Ph.D. Director, Natural Resources GIS laboratory, Natural Resources Research Institute.

Web Page Publication: "Flash Flood for DuluthStreams. Modeling and visualization of urban stream response to rain events" with Nick Zlonis, UMD, featuring Flash animation of flash floods <http://www.duluthstreams.org/stormwater/simulation.html>

Poster presented at the annual Geological Society of America meeting: **Goodge, J., Finn, C., Damaske, D., Abraham, J., Moeller, H.-D., Anderson, E., Roland, N., Goldmann, F., Braddock, P., and Rieser, M.**, 2004, Crustal structure of Ross Orogen revealed by aeromagnetism and gravity, *Geological Society of America Abstracts with Programs*, v. 36, no. 5, p. 495.

Effects of Field Orientation on the Driven Lattice Gas, **Paul D. Siders**, *Journal of Statistical Physics*, 119(3-4), 861-880, May 2005.

Riker-Coleman, K.E, Gallup, C., Webster, J., Cheng, H., Burr, G. Potts, D., Silver, E., Wallace, L., Edwards, R.L. Documentation of carbonate platform drowning during MIS 4 in the Huon Gulf, Papua New Guinea, *Eos Trans. AGU*, v. 85

no. 46, Fall Meet. Suppl., Abstract PP13A-0585, 2004. Poster presented at annual fall meeting of the American Geophysical Union 13-17 December 2004, San Francisco, CA.

Hansen, V.L., 2005, New observations of crustal plateau surface histories and implications for crustal plateau hypotheses: Lunar and Planetary Science Conference XXXVI, 2000.pdf. [conference abstract and poster presentation]

Lang, N.P. and Hansen, V.L., 2005, Venusian channel formation through subsurface processes: Lunar and Planetary Science Conference XXXVI, 2320.pdf. [conference abstract and poster presentation]

McDaniel, K. and Hansen, V.L., 2005, Circular lows, a genetically distinct subset of coronae?: Lunar and Planetary Science Conference XXXVI, 2367.pdf. [conference abstract and poster presentation]

Lang, N.P. and Hansen, V.L., 2005, Geologic Map of Greenaway, V-24, Venus; NASA-USGS Mappers' Meeting, Smithsonian, Washington D.C. [conference abstract and poster presentation]

Hansen, V.L., 2005, Geologic Map of Niobe Planitia, V-23, Venus; NASA-USGS Mappers' Meeting, Smithsonian, Washington D.C. [conference poster presentation]

Lopez, I., and Hansen, V.L., 2005, Geologic Map of Helen Planitia, V-52, Venus; NASA-USGS Mappers' Meeting, Smithsonian, Washington D.C. [conference poster presentation]

The Measurement of the fluorescence detected circular dichroism (FD CD) from chiral Eu (III) complexes: **James P. Riehl, Gilles Muller, and Françoise C. Muller**: Presented at the 24th Rare Earth Research Conference, Keystone, CO June 26-30, 2005

All the national graphics, logos, posters etc. for "Take Back Your Time Day" were designed by UMD students under the guidance of **Joellyn Rock, Art + Design**. (jrock2@d.umn.edu) in 2003. There's a "slow revolution" taking root across the United States and Canada, and independence day is Oct. 24, National Take Back Your Time Day. To read the story in UMNnews, see http://www.umn.edu/umnnews/Feature_Stories/Take_back_your_time.html

Robert Appleton, Art + Design, was acknowledged as an "International Great Master of Graphic Design" in February 2005 by Alliance Graphique Internationale. He was asked to submit a monograph to be published later this year.

Robert Appleton attended the Alliance Graphique Internationale Congresses in Helsinki, Finland in September 2003 and then in Beijing, China in September 2004. He presented about his findings in merging the visual and the aural through technology in Finland and then demonstrated his research with live, editable video clips to 150 international designers in China.

Anthony Rostvold, Kai Salmela, Robert Appleton, Catherine Ishino, Art + Design. May 27, 2005. Lake Superior Advertising Federation. "Global Communication through Design." Reporting on recent design presentations and exhibits in Turkey and China featuring works produced in the VDIL.

E.T. Brown, R. Bendick, D.L. Boursières, V. Gaur, P. Molnar, G.M. Raisbeck, and F. Yiou "Early Holocene climate recorded in geomorphological features in Western Tibet" Proceedings of the Third International Limnogeological Conference, Tuscon, April 2003

E.T. Brown, and T.C. Johnson; "ITCZ Position Over East Africa Since the Late Glacial: The Lake Malawi Record" EOS, 84, no. 46, Abstract PP21A-06, American Geophysical Union Fall Meeting, San Francisco, December 2003

Conference Presentations & Publications cont.

E.T. Brown, R. Braucher, D.L. Boulès, H.D Mooers "Cosmic Ray Exposure Dating of the Western Margin of the Laurentide Ice Sheet: Implications for Ice Flow Reorganization" Proceedings of the 32nd International Geological Congress, Florence, Italy, August 2004.

T.C. Johnson: "The Freshwater Inland Seas of East Africa: Archives of Global Climate Change." This was presented at the Coalition for National Science Funding, congressional presentation in Washington, DC, June 22 2004, showcasing lakes research on behalf of the American Society of Limnology and Oceanography.

Breckenridge, A. and T. C. Johnson. 2005. "Paleohydrology of Lake Agassiz and the Upper Great Lakes from 10,700 to 8,800 cal ybp [9,500-7,900 14C ybp]." Canadian Quaternary Association Biennial Meeting, Winnipeg, Manitoba.

Gingery, A., Karst, M., and Oursler, MJ. "PI3 Kinase Has Divergent Impacts on Osteoclast Survival Depending on TGF β Levels During Differentiation." In: 26th Annual Meeting of the American Society for Bone and Mineral Research, Seattle, WA 2004, pp M 319. Poster presentation and published abstract.

A. Gingery, M.C. Wilkes, E. B. Leof, M.J. Oursler "TGF β Promotes Survival through Activation of Smad Independent Signaling." In: 27th Annual Meeting of the American Society for Bone and Mineral Research, Nashville, TN 2005. Poster presentation and published abstract.

Douglas Dunham, Computer Sciences. Three of my mathematical art prints were exhibited at the Art Exhibit of the Annual Joint Mathematics Meetings of the AMS and MAA. January 5-8, 2005, Atlanta, Georgia. Currently, (September, 2005) a mathematical mural is being painted in the new Science

Center at Manchester College, Indiana. One of my patterns will be the centerpiece for that mural.

Dunham, D. "The Family of 'Circle Limit III' Escher Patterns" in the Art+Math=X International Conference Proceedings, pages 56-60, June, 2005, Boulder, Colorado.

Secret of the Talking Bird, (Theatre)



Dunham, D. "H.S.M. Coxeter and Tony Bomford's Colored Hyperbolic Rugs" in the Bridges 2005 Conference Proceedings, pages 497-504, July, 2005, Banff, Canada. ISBN 0-9665201-6-5; ISSN 1099-6702

Rocio Alba, Fernando Rios and Design Workshop Students. "Mobile Autonomous Robotic Vision-aided Intelligent Navigator," Presented at the Techfest, UMD, Duluth, MN, April 1, 2005.



I have continued work in the VDIL on my research concerning the topic of Karelian Fever, that is the recruitment of North American Finns to Karelia ASSR in the early 1930's. The resources of the lab have been vital to the progress that I have made in the production of a DVD for use in university courses containing approximately 90 minutes of material. I have also conducted research in Finland and making presentations in Sweden and Canada. Specifically, I have presented two papers at a conference at Lakehead University, Thunder Bay, Canada (March 2004). The conference was entitled "Karelian Exodus: Finnish Communities in North America and Soviet Karelia during the Depression." Both papers have been published in The Journal of Finnish Studies (Vol. 8, no. 1, Aug. 2004) for which I also served as co-editor. In October 2004 I presented a paper on my Karelian fever research in Lulea, Sweden at the University of Lulea. The conference was entitled The Uses and Abuses of History in the Barents Sea Region. I spoke on "New Directions in Research on Karelian Fever." I expect that work to be published in the conference proceedings. Overall, I would like to commend the VDIL staff for their helpful, kind, and courteous attitude toward me, making progress on my research and project possible.

Dr. Alexis Pogorelskin, Chair, Dept. of History, UMD

**Report Design by Lisa Fitzpatrick and
Jennifer Gordon with layout assistance
from Bret Peterson
Visualization and Digital Imaging Lab**



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