



Motion capture in the SIG Center,
with Nicole Griffin Ward, SAS 2013

Letter from the Director

It's Spring in Philadelphia! After a wild winter of record snowfall, we see everywhere evidence of Spring renewal. This means, too, the graduation of another fine class of Computer Graphics students from Penn. Not only do we think so, but employers do, too. DMD and CGGT graduates are heading to Pixar, Dreamworks, Facebook, and other great careers.

In this fourth issue of the CG@Penn Newsletter, we bring you up-to-date on many of the activities of the past year, stories of some recent graduates, and awards our students have earned. We introduce Joe Kider, PhD student and new Associate Director of the SIG Center for Computer Graphics now that Jan Allbeck has moved on to be an Assistant Professor in Computer Science at George Mason University. Joe has brought considerable technical and academic skills into the SIG Center. Read about his Best Paper awards and a prestigious Excellence in Graduate Student Teaching Award. Our DMD students have distinguished themselves by winning two Moore School Awards: Lu Chen won the Eichert award and Jon McCaffrey won the Korn. Grace Fong won the Dawn and Welton Becket DMD Award. And DMD Brynn Shepard won the Wolf-Hallac Award, competing against all Engineering students.

We also thought that many of our Alumni would enjoy seeing that their publications continue to be influential and informative for the community at large. We present three "Top 10" lists of publication citations, online downloads and recent downloads. To find out more about these papers, please go online and search Google Scholar or visit the "Scholarly Commons" at Penn for the download files.

We also highlight some of the novel course offerings of the past year, including a second time for CIS 106 (Visualizing the Past; Peopling the Past) I co-taught with Anthropologist Clark Erickson and David Comberg's novel "Information Presentation" course in Fine Arts. In addition, Steve Lane talks about the new version of the Game Design Practicum to begin in Fall 2010. The focus of this course will be about exploring the concept of "fun" in games, while developing interactive 3D and physics-driven content. Part of the course will feature speakers from industry who can relate their experiences firsthand. We already have one speaker lined up: Kevin Dill, formerly of Rockstar Games (now with Lockheed-Martin), worked on Grand Theft Auto, among others.

Our still "new" SIG Center space is great. We appreciate everyone who made it possible and insured maximum usability. By the end of the term every workstation is taken up with student projects, our Vicon motion capture system works beautifully, and we have new biosensing devices synchronized with the mocap. But more on that in the next Newsletter.

There's lots more inside. Enjoy!

Norm Badler
Director, SIG Center for Computer Graphics



Brynn Shepherd, enjoying her time in San Francisco!

Social networking technology is constantly changing, and graduates from CG@Penn are helping to transform the industry. In this issue we share the perspective of graduates working at Meebo, Facebook, and Zynga.

An Insider's View of Facebook

by Brynn Shepherd, DMD 2010

When I first got to Penn 4 years ago, Facebook had only recently become popular among college students and most people outside of that demographic had never even heard of it. In the time since, its user base has exploded to over 400 million people - that's 1/15th of the entire world's population! The main reason the site has been so hugely successful, I think, is that it enables people all over the world to connect with each other and share stories about their lives. This is something people have always been doing, of course; Facebook has just made it much more convenient.

As an intern on the design team at Facebook last summer, I worked on redesigning the form that people use on the site to create events and invite their friends. Previously, this form was confusing and unintuitive to use, which prevented less experienced users (like my mom!) from ever creating events. My redesign simplified the process by breaking it down into three basic steps and removing any unnecessary fields. I was responsible for both the higher-level design of the form and its implementation in code, which I ended up rewriting from scratch. This was a learning experience, to say the least, but I can state with great confidence that I wouldn't have been able to do it without the computer science education I've received from Penn. At the end of my internship, I was thrilled to receive a full-time offer from Facebook, and now I'll be heading back out to California after I graduate!

An Insiders View of Meebo

by Andrew Watterson, DMD 2008

Seth Sternberg will tell you Meebo is for live communication on the web.

Wait, what?

That's like saying Google is trying to catalog all the world's information (which is actually what their mission statement says). It's true, but that's not what you tell your grandmother when she asks you what Google is. You tell her the story of what Google can do for her: Google is for searching. Every element on their site tells this story and how it works: there's a big input box (input boxes are for typing into - type in a search) that leads you to a list of links (links are for clicking on

- find what you were looking for). The elements on screen tell you what's going on, how to use it, how much fun it is, how secure it is, and a dozen other subconscious impressions - it's in a company's best interest to pay attention to their design.

This is what I do all day for a web company called Meebo: narrowly, I decide what elements are going to go on screen; broadly, I tell our users the story "Meebo is for ____." The marketing team tells this story in terms advertisers can understand, our CEO tells this story in terms potential partners can understand, and I tell it in terms the end user can understand.

Meebo's story is changing. The product that made Meebo famous was an instant messaging website, but we're shifting more generally to "social media," an incredibly broad category that encompasses all the ways to make money on the way people relate to their friends. Our latest product is a widget that websites can include on their page that lets people get to the articles they care about and their friends on a variety of services. We've been redesigning our front page - we need to come up with a way of introducing what we're all about to very different groups of people (users who are expecting our traditional chat website, potential advertisers, website owners who want to use our newer product with their site). Words aren't going to cut it - we need to demonstrate. Logos of popular instant messaging services we work with make our product seem instantly relevant to people who use them. A login box or signup form demonstrates how to start using our product right away. A ticker of headlines from websites our widget appears on demonstrates that we integrate with other sites.

Telling these stories has become my story.

An Insiders View of Zynga

Zynga Game Network, Inc., a games company founded in 2007, is the brainchild of Mark Pincus, a Wharton grad and serial entrepreneur. Pincus, former founder of Tribe.net, had been passionate about social networks from the beginning and wanted to create a new world of games designed for the web. Zynga is now the largest developer of web based social games, and is also creating games for the iPhone. Zynga's games include casino games such as "Texas Hold'em," role playing games like "Farmville" and the game that Adrian has worked on, "Treasure Island." If you have ever been on Facebook, chances are you've seen evidence of the Zynga empire.

by Adrian Roe, CGGT 2010

The atmosphere at Zynga is very high energy! In fact, they like to say we move at "Zynga Speed." Essentially this means that work is talked about in terms of hours and days, not weeks and months. People who have been here 6 months are veterans and games go from concepts to production in a fraction of the time of console games. In the competitive and ever growing field of social gaming, you have to adapt and evolve to keep serving your users. For engineers this means having to think on your feet, as well as being able to jump from assignment to assignment.

The Zynga game "Farmville" has more people playing it everyday than Halo, COD or Grand Theft Auto have sold altogether. As a Zynga game engineer, your work reaches millions of people, sometimes on the same day that you are assigned the feature. That is a lot of responsibility, but its also very rewarding to see something that you created being played by so many people.

UPenn helped to prepare me for working here by setting a high standard of work product. When so many people are going to be playing your game, its essential that you maintain good coding practices. Working hard comes with the territory, but if you think you're a rockstar programmer, then this should definitely be at the top of your list of places to work. Zynga treats its employees with respect, expecting great things of them and rewarding them for their hard work.

Alumni Awards

Nathan Schreiber, DMD 2003, has been nominated for an Eisner award. The awards, named for acclaimed comics creator Will Eisner, are in their 22nd year of highlighting the best publications and creators in comics and graphic novels, and are known as "the Oscars of comics." Nathan's comic, Power Out, has been nominated in the Digital Comics Category. For more information about the Eisner awards, please check out their website at: http://www.comic-con.org/cci/cci_eisners_main.shtml. Nathan was also awarded the 2010 Xeric Foundation award, which gives grants for self published comics. The Xeric Foundation is a private, nonprofit corporation established by Peter A. Laird, co-creator of the Teenage Mutant Ninja Turtles. The Foundation offers financial assistance to committed, self-publishing comic book creators. For an interview with Nathan about Power Out, please go to: <http://www.nycgraphicnovelists.com/2010/01/nathan-schreiber-powers-up-with-xeric.html> and to read Power Out, follow this link: <http://www.poweroutcomic.com>



DMD award winners Grace Fong, Jon McCaffrey, Lu Chen and Brynn Shepherd..

2010 Award Winners

The 2010 academic year has been a good one. Four DMD students have won major awards within SEAS. Lu Chen, a DMD junior, won the E. Stuart Eichert, Jr. Memorial Prize, established by Technitrol Incorporated, in memory of Mr. Eichert, a company co-founder and distinguished alumnus of the Moore School's Class of 1942. The prize is awarded each year to students at the end of their junior year in the Moore School who, in the judgment of the School's faculty, best demonstrate initiative, intellectual attainment, and commitment to the professional practice of engineering. Lu has been a TA in our Intro to Computer Science course and the designer of some of the most creative assignments offered in that class! Lu will be interning at Google this summer.

Another Moore School award was given to Jon McCaffrey, a DMD junior who qualifies as a senior because of the number of courses he has taken in his three years here. Jon was awarded the Walter Korn Award, which was established by the Korn family as an enduring tribute to their father, husband and friend. It is awarded annually to an outstanding senior in the Moore School who will be continuing on at the Moore School for a graduate degree. Selection of the recipient is made by the Moore School chairs and faculty, in conjunction with the SEAS Associate Dean. Jon will be interning at Lucas Arts this summer before he returns to Penn to sub-matriculate into the MSE in computer science program.

Brynn Shepherd is the winner of the Wolf-Hallac Award, which was established in October 2000 and goes to a graduating female

senior from Penn Engineering who is seen as a role model and who has achieved excellence academically. The award is for the student who has also demonstrated a commitment to the school and/or the community. Her work as a freshman advisor and mentor was stellar, and her work with Women in Computer Science (WICS) was noted and praised. Brynn will graduate with a dual degree in Fine Arts and will be inducted into Phi Beta Kappa as well. Brynn's senior project, with Nirav Sanghani, is focused on building "an iPhone and web application that will allow users to collect ONE unit of personal information a day, which we are calling a "caplet." Each one of these will be a time capsule of data, capturing a particular moment in a user's life, and including at least the following dimensions: image, text, location, time, mood and weather." Brynn will be going to work for Facebook after graduation.

Also noted for her mentoring and for her various roles within the student SIGGRAPH chapter is Grace Fong, the Dawn and Welton Becket Digital Media Design Achievement Award winner. The award, established in 2004, is presented to the DMD senior who exemplifies the ideals of the DMD program through outstanding achievement, citizenship, and mentoring. Grace's contributions to the SIG Center, HMS research, and her hours of work with SIGGRAPH make her the ideal candidate for this award! Grace's senior project is designing a tool for artists that will easily construct stylized figures through a sketch-based interface. The user will be able to easily modify curves to parameterize body segments recursively to allow for further modifications. Take a look at: <http://seniordesign-gfong.blogspot.com/>. Grace will be going to work for DreamWorks after graduation.

Congratulations to all of our winners and to all who mentored them!

Introducing Joseph Kider

Joseph Kider is the newest Associate Director of the Center for Human Modeling and Simulation in the SIG Center for Computer Graphics. Joe came to the HMS after completing his undergraduate degree in Electrical Engineering and Computer Sciences from Catholic University in 2003. During his time as a Masters and PhD student, Joe has actively pursued his research interests which include combining aspects of computer graphics with physically based rendering, integrating motion capture into maintenance training, and using the GPU for graphics and general purpose applications. Joe has been integral to the creation and development of our course CIS 565 (formerly 665): "GPU Programming and Architecture," a graduate level class that examines the programming, architecture, and capabilities of modern GPUs. Joe worked first as a co-instructor with Gary Katz, and their work, "All-Pairs Shortest-Paths for Large Graphs on the GPU", was presented at the Graphics Hardware conference in Sarajevo, Bosnia-Herzegovina in 2008. Joe is now an Adjunct lecturer for the course and was just awarded the 2010 Penn Prize for Excellence in Graduate Student Teaching.

As if running the lab and teaching a course as well as pursuing his PhD work were not enough, for the last two years Joe has also acted as a co-instructor with Norm Badler for the undergraduate senior projects course, CIS 497/EAS 499. The course allows undergraduates to define, design, and execute a project of their own choosing, and in the last two years has led to several publications including undergraduates. Joe's recent research highlights include the Best Paper Award for "Recreating Early Islamic Glass Lamp Lighting," co-authored with (among others) two 2009 DMD graduates, Rebecca Fletcher and Nancy Yu.

We are delighted to have Joe as the Associate Director of the SIG Center and as an instructor and know that he will continue to elicit the best from all of our students!

Google Scholar Citations	Scholarly Commons Downloads	Scholarly Commons Downloads in March 2010
Simulating Humans: Computer Graphics, Animation, and Control 681	Do You See What Eyes See? Implementing Inattentive Blindness 853	Synthesis and Acquisition of Laban Movement Analysis Qualitative Parameters for Communicative Gestures 58
Animated Conversation: Rule-based Generation of Facial Expression, Gesture & Spoken Intonation for Multiple Conversational Agents 474	Visual Attention and Eye Gaze During Multiparty Conversations with Distractions 803	A Kinematic Model of the Human Spine and Torso 54
Animating facial Expressions 394	Modeling Crowd and Trained Leader Behavior during Building Evacuation 799	Modeling Crowd and Trained Leader Behavior during Building Evacuation 30
Model-based image analysis of human motion using constraint propagation 326	A Kinematic Model of the Human Spine and Torso 698	Anthropometry for Computer Graphics Human Figures 28
Real-time inverse kinematics techniques for anthropomorphic limbs 311	Synthesis and Acquisition of Laban Movement Analysis Qualitative Parameters for Communicative Gestures 672	Real Time Inverse Kinematics with Joint Limits and Spatial Constraints 28

Virtual Human Communities

The 10th International Conference on Intelligent Virtual Agents (IVA) 2010 will be held on the University of Pennsylvania campus at the Inn at Penn on September 20-22, 2010. Co-Chaired by Norm Badler, Jan Allbeck, Catherine Pelachaud and Tim Bickmore, the conference is the major venue for state-of-the-art research and applications of animated "intelligent virtual agents." IVAs are interactive characters that exhibit human-like qualities and communicate with humans or with each other using natural human modalities such as behavior, gesture and speech. IVAs are capable of real-time perception, cognition and action that allow them to participate in a dynamic social environment. IVA 2010 will also host the "Gathering of Animated Lifelike Agents" (GALA) and have a live demonstration session and a hands-on Virtual Human software workshop. Three exciting Keynote Speakers have been lined up: Paul Debevec of ICT/USC, Ruben Gur of Penn Neuropsychiatry, and Lee Sheldon of Indiana University.

For 2010, our special theme is "Virtual Human Communities." IVA achievements to date lead naturally to studies involving the formation, simulation and understanding of ever widening social, cultural and cognitive interactions among humans and virtual humans. Computer graphics techniques now permit the visual simulation of large collections of individual agents, offering real-time visualization platforms for expanding social units to families, co-worker teams, building inhabitants and even an entire virtual populace. Mobile interactive devices and emergent human interests in real-time social networking provide some additional economic incentives and a growing industry presence. This topic also builds on the special theme of IVA 2009, games, in that participants in virtual environments will need to interact not just with the space or with individual IVAs, but perhaps with a community of IVAs in order to achieve desired situations or goal states. IVA 2010 offers the opportunity for further interdisciplinary cross-fertilization between the IVA and virtual populace simulation fields.

Please visit the IVA 2010 website at <http://IVA2010.org>

Virtual Human Crowd Models

Virtual human crowd models have been used in the simulation of building and urban evacuation, but have not yet been applied to underground coal mine operations and escape situations with emphasis on smoke, fires and physiological behaviors. A paper recently accepted to The 23rd Annual Conference on Computer Animation and Social Agents (CASA) is the "Real-Time Evacuation Simulation in Mine Interior Model of Smoke and Action" which features the collaborative work of SIG Center visiting scholars and work from undergraduate and PhD students at Penn. The project's authors include: Pengfei Huang, Joseph T. Kider Jr., Ben Sunshine-Hill, Jonathan B. McCaffrey, Desirée Velázquez Rios and Norman I. Badler from Penn and Jinsheng Kang from Brunel University School of Engineering and Design. This was Jinsheng's second summer sabbatical visit to us, sponsored by Brunel. Desirée spent the summer in the SIG Center sponsored by the "SUNFEST" NSF Research Experience for Undergraduates" program in Penn Engineering. Desirée is an undergraduate Mathematics and Computer Science student at the University of Puerto Rico.

This paper explores mine evacuation through a real-time simulation model, MIMOSA (Mine Interior Model Of Smoke and Action), which integrates an underground coal mine virtual environment, a fire and smoke propagation model, and a human physiology and behavior model. Each individual agent has a set of physiological parameters as variables of time and environment, simulating a miner's physiological condition during normal operations as well as during emergencies due to fire and smoke. To obtain appropriate agent navigation in the mine environment, they have extended the HiDAC framework (High-Density Autonomous Crowds) navigation from a grid-based cell-portal graph to a geometry-based portal path and integrated a novel cell-portal and shortest path visibility algorithm. The work can be found here: <http://cg.cis.upenn.edu/hms/research/MIMOSA/2010CASA.pdf>

CIS 497/EAS499: Senior Design

The DMD senior design projects have evolved over the last two years to become significantly more rigorous and also more fun. Currently instructed by Norm Badler and PhD student and Joseph Kider, the quality of these projects has improved to the point that we believe that the DMD senior projects are some of the best in the School of Engineering. Last year, four seniors (Rebecca Fletcher, Nancy Yu, Tamar Nevo, and Mark Henderson) had their work published due to their exceptional research in various venues, and two of these publications won awards.

The senior project curriculum requires that DMD seniors pick a project idea and write a proposal which is vetted by Badler and Kider and any other faculty with whom the student may be working. Each week students are required to blog their current progress and meet with their advisors. Halfway through the semester, students have a rigorous alpha review and they are asked to demonstrate their framework's basic functionality. The process culminates in "DMD Senior Design Day" where students make presentations to faculty, students and invited guests. Take a look at this year's projects by going to: <http://www.cis.upenn.edu/~cis499/>

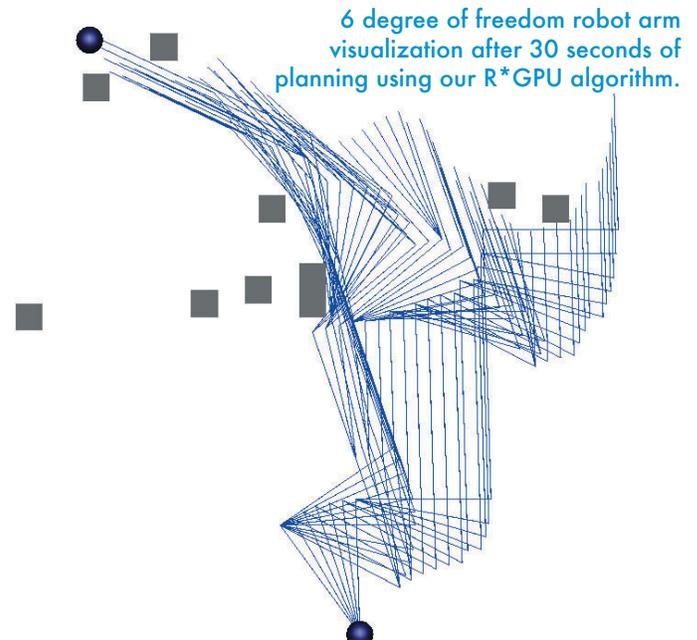
Last year, two projects led to publications. The first, "Recreating Early Islamic Glass Lamp Lighting," delved into how to best simulate the light cast by flame in early Islamic mosques. Early Islamic light sources were not simple, static, uniform points of light, and the fixtures themselves were often combinations of glass, water, fuel and flame. Various physically based renderers such as Radiance are widely used for modeling ancient architectural scenes; however they rarely capture the true ambiance of the environment due to subtle lighting effects. Specifically, these renderers often fail to correctly model complex caustics produced by glass fixtures, water level, and fuel sources. While the original fixtures of the 8th through 10th century Mosque of Córdoba in Spain have not survived, the authors have applied information gathered from earlier and contemporary sites and artifacts, including those from Byzantium, to establish a baseline hypothesis of what kind of illumination was likely. The mosque was illuminated by either single jar lamps or supported by polycandela that cast unique downward caustic lighting patterns which helped individuals to navigate and to read. To re-synthesize such lighting, the students gathered experimental archaeological data and investigated and validated how various water levels and glass fixture shapes, likely used during early Islamic times, changed the overall light



Jon McCaffrey's Senior Project:
Implicit Surface Ray Casting

patterns and downward caustics. The authors proposed a technique called Caustic Cones, a novel data-driven method to 'shape' the light emanating from the lamps to better recreate the downward lighting without resorting to computationally expensive photon mapping renderers. Additionally, they demonstrated on a rendering of the Mosque of Córdoba showing how this approach greatly benefits archaeologists and architectural historians by providing a more authentic visual simulation of lighting.

This project was a successful collaboration between PhD student Joseph Kider and DMD undergraduates Rebecca Fletcher and Nancy Yu. They spent countless hours photographing and gathering evidence how these patterns formed before they ran their simulation. This project also featured a multi-disciplinary collaboration between the



6 degree of freedom robot arm
visualization after 30 seconds of
planning using our R*GPU algorithm.

department of Art History at Penn with Professor Renata Holod and Dr. Alan Chalmers from the University of Warwick. This work won the "Best Paper Award" at the 10th VAST International Symposium on Virtual Reality, Archaeology and Cultural Heritage in September. <http://cg.cis.upenn.edu/hms/research/Archaeology/>

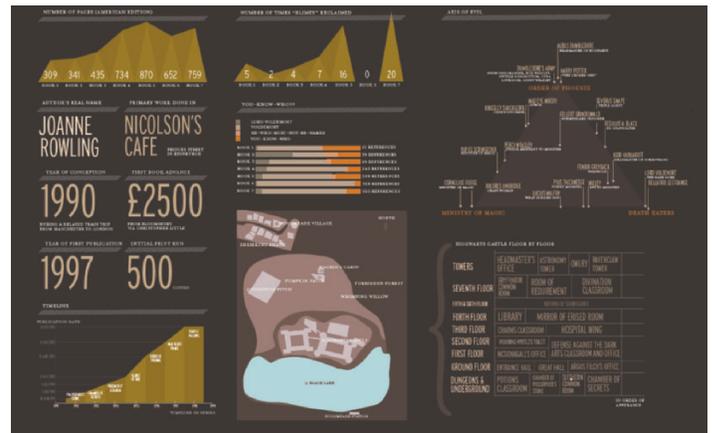
Another project to merit publication last year was the "High-dimensional Planning on the GPU" study. Optimal heuristic searches are commonly used for low-dimensional planning such as 2D path finding. These algorithms however, typically do not scale well to high-dimensional planning problems such as motion planning for robotic arms, computing motion trajectories for robotic vehicles and motion synthesis for humanoid characters. This work showed that in addition to its scalability, R* lends itself well to a parallel implementation on the GPU (R*GPU). This process showed that R*GPU consistently produced lower cost solutions, scaled better in terms of memory, and ran faster than CPU versions. These results held for both motion planning for a 6-DOF robot arm planar as well as 2D path finding. The project was a successful collaboration between PhD student Joseph Kider and DMD undergraduate Mark Henderson. Both spent weeks running and verifying experiments on a variety of grid maps. This project also featured a multi-disciplinary collaboration between the GRASP and SIG labs featuring Dr. Maxim Likhachev. This project won the "Best Poster Award" at the GPU Technology Conference and was published in the International Conference on Robotics and Automation.

FNAR 337: Information Design and Visualization

by David Comberg, datadesign.wordpress.com

Mass Observation was a project by volunteer writers in Britain in the 1930s to study the everyday lives of ordinary people. For more than twenty years hundreds of observers compiled hand-written notes on the shouts and gestures of motorists, personal bathroom behavior, and endless other aspects of daily life with the intent of creating 'weather-maps of public feeling' with the collected data.

At the time this was an extraordinary and ambitious project, but today we take it for granted that our every action is being measured, counted, and analyzed. From the gathering of personal health and medical data, shopping habits, and security data to the sequencing of the human genome, we live in a culture of massive data collection and analysis. The difference today, however, is in the sophisticated digital means and ubiquitous nature by which raw data is collected, interpreted, and transformed into useful information.

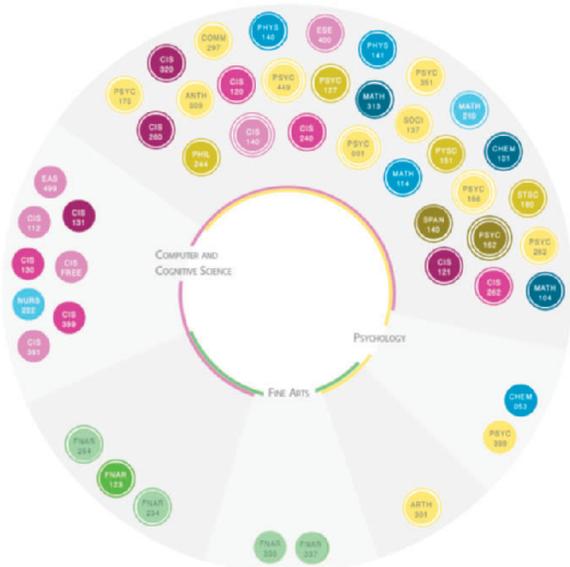


Hogwarts Visualized, Cynthia Ip
A visual miscellanea of Harry Potter's school

ingredients of an oatmeal cookie, a map of Kobe Bryant's 81-point basketball game, a graphical display of a student's iTunes playlist, a complete chart of French cheeses, a visualization of the fictional Hogwarts school, and a flow diagram showing alternatives to corn-derived ethanol.

Information visualization has traditionally been seen as a method to explore and develop theories – an analytical tool to make sense of raw data. Although function and usefulness are still at the core of information design, a new, more artistic activity is emerging. Today, with more and more data available and with sophisticated visualization tools, artists and designers are broadening this once narrow field. In collaborations with programmers, they are developing a new field where data is the fuel for artistic creation.

Like the leaders of Mass Observation, students today are creating their own 'weather-maps' with the data they find and collect. These new creations, however, are more than simple reflections of culture. They are original aesthetic constructions and an index of this growing and dynamic field of scientific and artistic collaboration.



Patterns Of A Penn Undergraduate, Victoria Schwanda:
A visualization of the relationships between grades and course attributes
<http://victoria.schwanda.org/flash/final.html>

Information Design and Visualization (FNAR337) is a collaboration of the Digital Media Design and Fine Arts programs. The course explores the symbiotic relationship between visual design and the field of information visualization and connects graphic design with statistics and technology. Students from engineering and science rub shoulders with others from the arts and humanities to make a fertile mix of programmers and artists. Projects range from simple info-biographies and how-to diagrams to more complex designs for spatial mapping and interactive and animated narratives. The focus of the projects is on developing an analytic and critical design process, demonstrating how design can affect and improve the understanding of information. Work must achieve a high degree of visual excellence while enabling patterns and trends in the data to be revealed through the design.

Projects in the course have included a visualization of one student's 4-year academic transcript, an interactive visualization of a student's top 100 mutual friends on Facebook, a diagram of the



Oat Everything Cookies, Alyssa Rosenzweig
A visualization examining the distance traveled, price, quantity and nutritional breakdown of the ingredients to determine value of resources used

CIS 568: Game Design Practicum

Starting in the fall of 2010, DMD and CGGT students will be able to take a new course with Dr. Stephen Lane known as the Game Design Practicum (CIS568). The goal of the Game Design Practicum is to enable students to explore the principle of 'fun' in games through the development of interactive 3D content driven by a physics-based game mechanic.

From a gamer's perspective, life is spent either at work, rest or play. Therefore, in order to make great games, it is important for students to understand the connection between fun and play. The evolutionary roots of play involve learning and practicing cooperative and competitive survival skills in a relatively safe setting. Since in the past people who didn't like this type of practice were less likely to survive, at its most basic level, fun is associated with the sense of enjoyment that comes with acquiring and/or refining survival skills through play. As a result, fun can be organized into the following categories:

Physical Fun, which usually involves games with hand/eye coordination and/or exploration. For example, hand/eye coordination skills are generally used in sports to increase the player's strength, stamina, agility and situational awareness (i.e. survival skills which would have been useful in battle), while crafts help facilitate a player's use of tools (and weapons). Exploration activities enhance a player's navigation skills, knowledge of local places and the recognition and collection of objects of interest.

Social Fun, which revolves around language as a central component and often involves activities such as storytelling (as a way to learn important survival skills and lessons from others), gossip (as a way to share information with others) and flirting (as a way to find mates by showing off), and

Mental Fun, which involves activities requiring abstract reasoning (planning and problem solving), pattern matching (music, art and puzzles) and categorization (collecting and organizing)

Well designed games attempt to incorporate activities involving all three types of fun to increase their popularity by broadening its appeal. However, this is only part of the solution - the game design must also present an interesting set of challenges and conflicts into the activities so that the player's mind and/or body is stretched to its limits in order to accomplish a clear and compelling goal. When implemented properly, the game play balances feelings of frustration with accomplishment as skills are acquired thereby producing what is known as the "state of flow." In this state, players are totally absorbed in the situation at hand and lose all track of place and time. They play the game for no other reason except to enjoy the experience that the game provides. Getting the player into a state of flow is what good game design is all about.

Accordingly, the Game Design Practicum will provide students with an opportunity to convert what they have learned about the "theory of games" to practice by creating a prototype of an original game concept. This will be supplemented with user studies, project critiques and guest lectures by game industry visitors..

Creative Industries Press Tour brings International journalists to Penn

The state of PA's Department of Community & Economic Development sponsored a tour of Philadelphia and Pittsburgh for international journalists from France, Spain, Germany, China and Canada. The purpose of the trip was to encourage foreign investors interested in new media and games to consider Philadelphia and Pittsburgh as potential locations for new ventures. So on the morning of

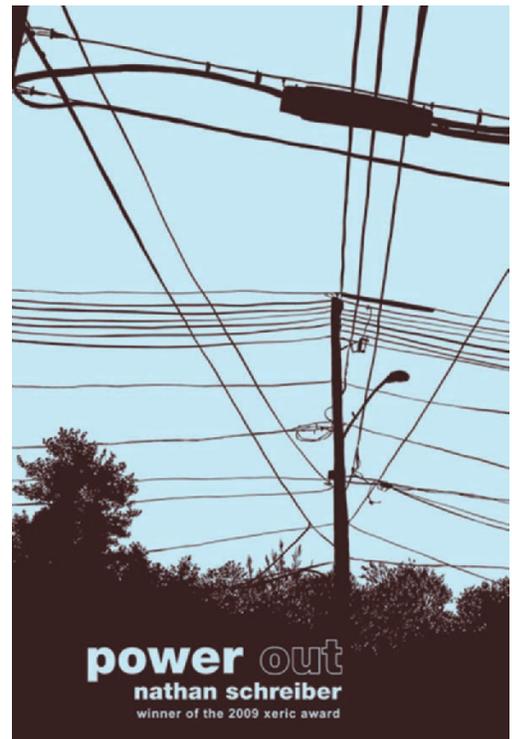
March 24th, after a warm welcome from Dean Glandt, Norm Badler gave the journalists an overview of the SIG Center for Computer Graphics and Joe Kider gave a motion capture demo. DMD alumni then presented the future of graphics ventures in Philadelphia. Salim Zayat talked about the games venture that he directs at the Center for Autism Research and Warren Longmire spoke about the games he

helped to design at the Penn Links lab, before joining Salim at the CAR lab. Michael Highland spoke about the iPhone game that he and fellow DMD alumnus Keith McKnight are developing in the city.

We've already seen several local articles about the efforts to spawn an indie games boom in Philly. As everyone knows, Philadelphia offers a great talent base, especially given the plethora of art and engineering schools, plenty of business space, a relatively low cost of living in comparison to LA or San Francisco. Recent articles related to this tour include:

<http://technicallyphilly.com/2010/04/14/shop-talk-the-diy-game-makers-of-port127>
<http://www.upenn.edu/pennnews/current/features/040810-3.html>
<http://technicallyphilly.com/2010/03/24/stopping-braindrain-at-penns-digital-media-design-program>

In addition, the latest article, by Stephan Steininger, Senior Editor of GamesMarket (print/online) was published in the 8/2010 issue in Germany. The article is not yet available on line, but has a delightful photo of the participants.



Cover Illustration from Schreiber's "Power Out"





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PHILADELPHIA, PA 19104-6389

Peopling the Past

by Natalie Gravier, DMD 2014

Computer science and anthropology students collaborating in one class? But how? "Visualizing/Peopling the Past" (or cross-listed as CIS 106/ANTH 258) is a class that's intrinsic success is very much dependent upon the variety of talents and interests of each student, and successfully implements these talents into the end result. This studio-seminar focuses on one final interactive project worked on by the entire class. This year the project is an online exhibit using computer science and anthropology and archaeology related skills to re-create the sacred Inca capital of Cuzco, Peru, buried beneath Spanish-built buildings in the present.

Offered last fall, the first half of the course focused on how archaeology and the past are presented in modern culture through the use of movies, games, art, and

other forms of media. This first half of the class focused on remembering what to avoid when working on a project involving archaeology. Professor of Anthropology Clark Erickson and Professor of Computer Science Norm Badler directed the class. Professor Erickson often presented videos on life in ancient and modern day Peru, giving the class insight on the anthropological aspect of our project, while Professor Badler presented information on the application of computer graphics to the reconstruction of ancient Cuzco and its people. We were also taken to the Penn Museum of Archaeology and Anthropology to inspect artifacts of the time for our reference, perhaps in creating 3D models of the clothes or for research purposes. We also had expert guest speakers like Tom Zuidema and Brian Bauer provide us with necessary information.

The most challenging and entertaining part of the class was actually working as a group to come up with a final product. The

class made a list of each student's talents and we employed these talents to make an interactive website with information, images and 3D models of the Inca people and their environment, reconstructed astronomical maps, and more. At the beginning the sheer size of the project was a little disheartening, but anthropology and computer science majors were able to work together to reach a satisfying end. In fact, at the end of the course, we all wished that we had more time to continue working on the project to perfect it! However, this did not hinder my enjoyment in working on my portion of the project, which was designing and coding the website, and ensuring that everyone had their information on the website (www.visualizingthepast.webs.com/). Overall, CIS 106 was definitely the most interesting course I have taken at Penn thus far.