cg@penn

UNIVERSITY OF PENNSYLVANIA

ISSUE 2, SUMMER 2008

A rendering of the pilot from the SIGGRAPH student chapter's latest short, thanks to Nancy Tsang (DMD '09).

Letter from the Director, Norm Badler

Dear Friends:

Commencement is a great time for us to reflect on the year's events, challenges and accomplishments. We're excited to bring you this second issue of the CG@Penn newsletter, because we have such great activities to report. Filling this newsletter with the tangible evidence of our collective excitement just makes us, well, recursively excited!

In this issue we're able to bring you the first public glimpses of the Center for Human Modeling and Simulation space renovation plan. Designed by the architectural firm of KVA MATx of Boston, the CG@Penn team has been fully engaged in the design development process. You'll also see that we will proudly carry the new name of "SIG Center for Computer Graphics" to honor the major corporate donor to the project. We expect to be in temporary quarters from July 2008 till January 2009, when we can move back in. Expect a party announcement for the dedication ceremony!

Since CG@Penn runs academic programs within the CIS Department, we've included some curriculum highlights from this year. Notable are new character and physically-based animation courses offered by

Professor Alla Safonova. We were also able to run our GPU programming course again thanks to new graphics board donations from nVidia, and offer a first-time course in User Interfaces and the Web.

Our DMD students continue to excel academically and, not surprisingly, fare extremely well in job internships and placements in industry leaders such as Pixar, Sony and Dreamworks. Sometimes we hear back from alumni and HMS visitors, such as Ambarish Goswami of the Honda Research Institute. Let's hear from you!

CG@Penn hosts a number of student organizations, such as the ACM SIGGRAPH Student Chapter. The image above is from their short movie, now in production. Hopefully it will exploit our new render farm of 70 dual-core processors, kindly donated to CG@Penn by Disney Feature Films. We also now have an emergent Second Life presence – our own island – thanks to DMD students Ted Aronson and John Drake.

Our research presence is strong, based on citation indices and paper downloads. We send students and faculty to conferences all over the world, and I personally get to present our work at venues such as KAIST in South Korea, the Digital Human Modeling

Conference in Pittsburgh, RAVE08 in Barcelona, the Cityscapes workshop at VR 2008 in Reno, and the Cognitive Animation Workshop in Yosemite. Also, be sure to check out the excellent article on Alla Safonova in the Penn Engineering News for Spring 2008 (including cover graphics by Alla and Grace Fong). Our students and alumni continue to contribute to major motion pictures – look for them in IMDB.

I wish to personally thank all our donors and friends of CG@Penn for their financial support, especially Harlan Stone and Ramanan Raghavendran, and recognize Diane Chi and Tripp and Dawn Becket Becket for their role in establishing the SIG Center for Computer Graphics. Their enthusiasm translates directly into activities that support CG@Penn's major asset: its students. The entire CG@Penn enterprise exists due to the energy and dedication of our faculty, staff and students. Open the Newsletter and join the celebration!

Norm

The Future of CG@Penn

CG@Penn has received its largest corporate gift to date from The Susquehanna International Group, LLP, better known as SIG (http://www.sig.com), to build a new computer graphics center and gallery for the program, as well as creating the largest academic motion capture studio in the region.

The SIG Center for Computer Graphics and the SIG Gallery at Penn will open in the Spring of 2009 and provide a state-of-the-art Vicon Motion Capture system and laboratory for projects such as 3D motion picture special effects, computer graphics and animation, simulation and modeling of large-scale human crowds, and research into the interrelationships of human movement, language and communication.

The motion capture studio will be approximately 800 square feet. The accompanying gallery will serve as the public entrance to the Center and will include a virtual companion wall that will be programmed to interact with visitors, indicating the nature of the program and its research. These newest additions to Penn computing will be housed in the School of Engineering and Applied Science, next to Penn's first computer, ENIAC.

"Collaboration is a key for Penn's computer graphics programs," says Norman Badler, professor of Computer and Information Science at Penn and director of the SIG Center. "With SIG's generous support, we will expand our laboratory and its computer graphics equipment to provide undergrads to doctoral candidates with the tools required to collaborate on projects in computer science, engineering, fine arts and communications. It is what this industry needs and demands of students entering the job market."

With the SIG Center's emphasis on a left and right brain approach to education that includes computer programming project work, mathematical models and frequent deadlines, many graduates of the program who do not enter the entertainment, game or design industries often choose to work in financial markets and firms like SIG, where emphasis is placed on innovative solutions and collaboration between technologists able to work on multi-expert teams.

Because of this shared philosophy and successful recruiting of Penn graduates, SIG partnered with Penn's School of Engineering and Applied Science to create the new lab space. SIG is one of the largest privately held financial institutions in the world and provides trading and market modeling services, institutional sales, research, private equity, venture capital, and investment banking.
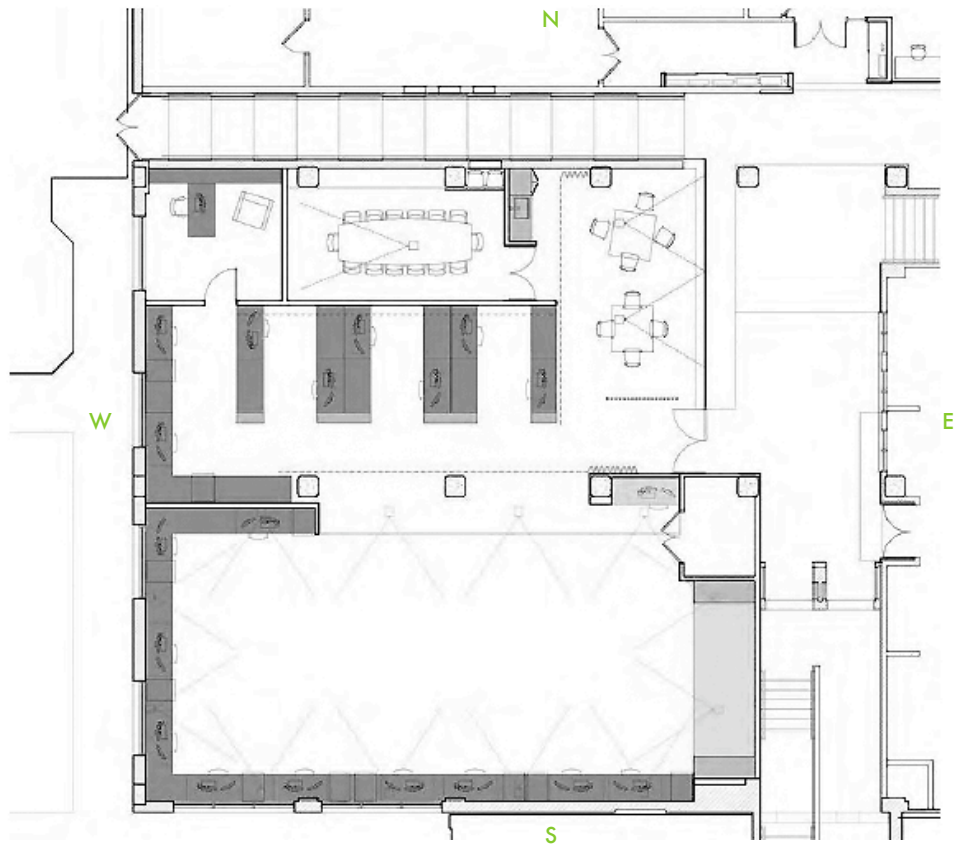

Left: a rendering of the new lab from the new entrance. Above: The plan for the new space includes a large motion capture area on the south end surrounded by workstations. There is a storage area and a closet on the east end. The mo-cap space is separated from the general work area to the north by a curtain that will provide privacy when closed and promote a spacious feeling when open. In the northwest corner of the lab is the associate director's office. Next to it, the new conference room will include a built-in projector and lots of whiteboard space. There is a kitchenette near the entrance to the conference room that will feature a sink! The northeast corner of the lab is a group work area with a couple of small tables and a whiteboard. The eastern wall of this area is opaque glass that will serve as a projection surface. Two projectors will be mounted in the ceiling of the lab and project CG@Penn projects of interest for display in the hallway outside of the lab. And there are 4 new windows in the western wall of the lab!

Curriculum Highlights

CIS 700: Physically Based Character Animation

Dr. Alla Safonova joined us last fall and began her work with CG students by teaching a seminar course related to her thesis material. The course offered an in-depth study of topics in physically based character animation. Students looked at data-driven, optimization and simulation based approaches for synthesizing natural and physically realistic human motion. The course also included reading fundamental papers as well as recent papers presented at SIGGRAPH and SCA. The course included presentations of papers and techniques by students in the class, focusing on the benefits and drawbacks of various techniques, as well as a semester-long project for each student.
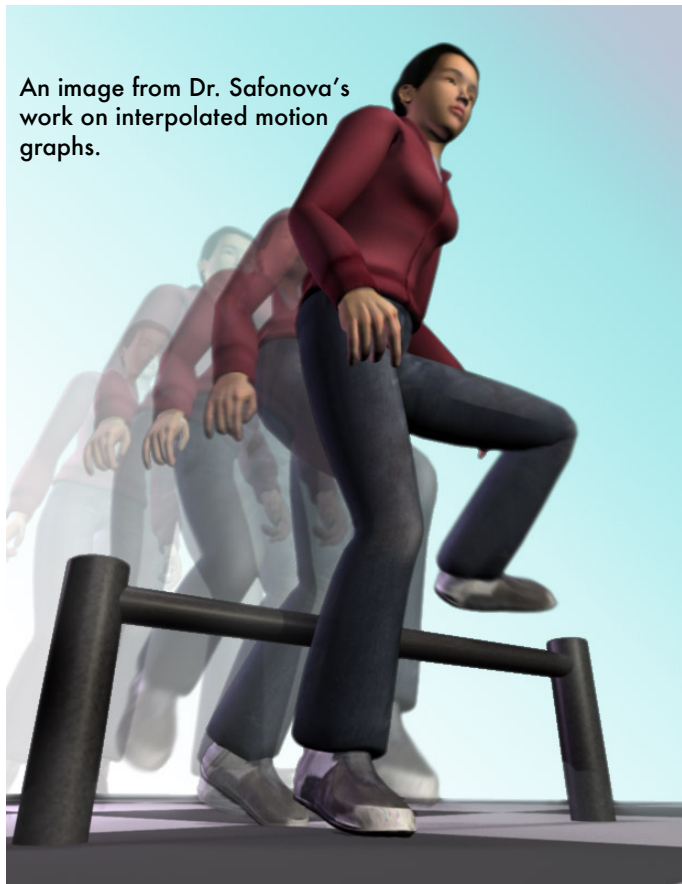
An image from Dr. Safonova's work on interpolated motion graphs.

CIS 399-006: Special Topics – User Interfaces and the Web

Jeffry Nimeroff returned to Penn for the spring semester to teach this course in web technologies and interfaces. This course gave an overview of the fundamentals of Human-Computer Interaction (theory, design, implementation, experimentation, evaluation) in the context of current web interaction mechanisms, technologies, and applications. The course content emphasized and leveraged open source technologies to design, prototype, implement, and test user-interfaces and functionality in the context of today's most intriguing web trends, such as social networking). Some examples of the assignments and more information about this course can be found at: http://www.hciuxd.com/

CIS 563: Physically Based Animation

Dr. Safonova's spring course, Physically Based Animation, was of interest to both graduate and undergraduate students. As expected, the topic has become increasingly popular for producing extremely realistic special effects in movies and for its use in video games and surgical simulation systems. This course introduced students to common physically based modeling techniques for animation of virtual characters, fluids and gases, rigid and deformable solids, cloth, explosions and other systems. To gain hands-on experience, students implemented basic simulators for several systems.

EAS 285: Teaching Computer Science Basics

Continuing in a long line of community outreach courses, EAS 285 was designed to reach two target audiences, current Penn students and high school students. In the course, Penn undergraduate students were asked to develop tutorials and lessons in computer science for area high school students. The high school students (who were also enrolled in the class) were asked to attend classes and lectures, use the tutorials, and provide a quality feedback loop as to what worked and what did not work in the Penn students' presentations. The main goal of the course was to expand area high school students' knowledge and interest in computer science by having them interact with students who have a passion for the field. The instructors for the course were CIS Senior Lecturer Jean Griffin and HMS Ph.D. candidate Catherine Stocker. Similar courses have been taught in the past by former CGGT students Mark van Langeveld and Alfie Hanssen.

CIS 277: Introduction to Computer Graphics Techniques

In our second offering of this introductory computer graphics course, students were challenged to program a novel 2D game called "PolyPong." PolyPong consists of a convex polygon with a "hole" inside of it. At the start of the game, a ball is launched inside the polygon and bounces off the interior walls. The objective is to keep the ball from falling into the hole, and the player controls the action by rotating the polygon. The final team project involved moving PolyPong to 3D with a "Labyrinth"-like interface and a height field as the terrain rather than just a flat plane. It was a challenging assignment to program, but the results were both fun to play and to watch!
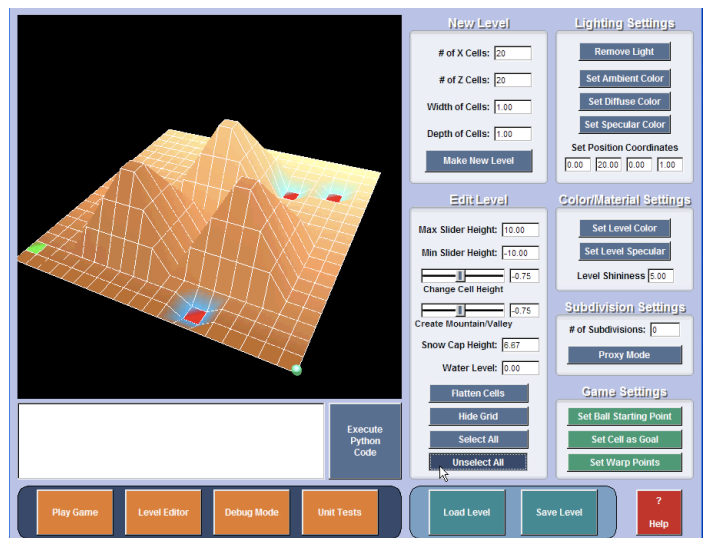
277 Final Project by Ramkrish Raja, Jeffrey Petkun, and John Fazzie

Profiles
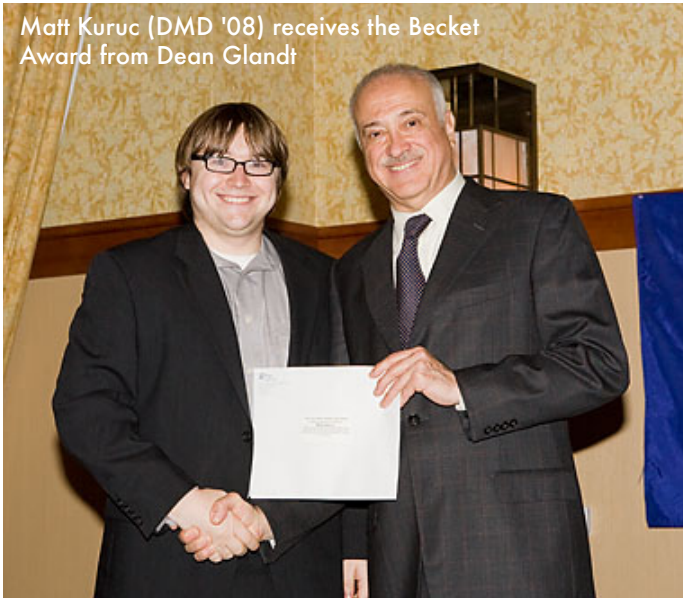
Matt Kuruc (DMD '08) receives the Becket Award from Dean Glandt

Dawn and Welton Becket DMD Achievement Award: Matt Kuruc

This year's Dawn and Welton Becket DMD Achievement Award was presented to senior Matt Kuruc at the SEAS Awards Dinner on May 2nd. Matt was an HMS intern after his freshman year and has continued to work on HMS research projects throughout his time at Penn. Matt has also held internships at Disney Feature Animation Studios and Pixar Animation Studios. He has served as the chair of Penn's ACM SIGGRAPH student chapter, has been a residential advisor, and he's also been a writer and co-host of a U-TV film show. Matt has had a significant impact upon our curriculum, first as a teaching assistant for CIS 110 (our intro programming course) and then in our Intro to Graphics course, CIS 277, which he helped to develop. Matt has accomplished all of this while staying on the Dean's List and working towards minors in Mathematics and Cinema Studies. Most recently, Matt has taken on the time-consuming task of setting up our render farm, and he also collaborated on research in non-photorealistic rendering animations, the result of which has been accepted to NPAR 2008. Matt will be going to present his work in France in June, and then head off to his TD job at Pixar. Congratulations, Matt!

Future newsletters will be electronic! If you would like to receive a copy, please send your preferred email address to cginfo@seas.upenn.edu

Ambarish Goswami

Ambarish Goswami, HMS PostDoc 1998-99, is a Senior Scientist at Honda Research Institute in Mountain View, CA. The main objective of his research is to develop an advanced balance maintenance system for the Honda humanoid robot Asimo, so that it can confidently survive and function within human surroundings. To survive in non-laboratory environments, Asimo must have a complex, yet fast-responsive balance system, and should be able to handle unforeseen eventualities (e.g., a bump from a human). Goswami's work attempts to develop a new balance model and associated control strategy for this purpose.

In a project with Northwestern University, he is working towards a novel method of lower-extremity exoskeleton control. Termed as the "Active Impedance" approach, the control provides assistance to the human body without requiring measuring its intention.

Alfie Hanssen

While working toward his CGGT degree, Alfie put his interest and experience in community development and construction to use in one of our community outreach courses at Penn. The course focused on building technical skills as well as an understanding of how construction projects unfold. His practical approach focused upon how communities make decisions, use resources, and how targeted skills can change that equation. After receiving his Master's degree, Alfie joined the NPO organization, Miracle Corners of the World. Alfie was named the Associate Executive Director of Field Programs for MCW, an "international nonprofit organization committed to empowering youth to be agents of change in their own communities and around the world." In this role, Alfie has travelled throughout much of Africa to monitor and evaluate MCW's international programs and aid in the development of community centers. With powerful results in Tanzania and Sierra Leone, MCW turns to Rwanda with plans for a multi-functional community center designed to advance post-genocide reconstruction and reconciliation. For more info, please take a look at: http://www.miraclecorners.org/programs_housing.htm

The Jaros Baum & Bolles Award for advancing women in engineering was awarded to Michelle Rosenthal, DMD '08 (shown here with her father David Rosenthal, CIS PhD 1978).

Conceptual art for the latest SIGGRAPH animated short thanks to Nancy Tsang (DMD '09).

Organizations

Second Life

CG at Penn, Penn's very first Second Life island, is nearing completion, and to celebrate, we are hosting a huge Second Life party in our very own art museum! For those of you who don't know, CG at Penn was initially created as a showcase for the artwork that DMD, CGGT, and HMS students have created. However, it's grown in size to encompass the full spectrum of art, from stills to videos to sculptures to music. Currently, however, the museum is empty, and we need to fill it! The island builders, DMD sophomores Ted Aronson and John Drake, would like to showcase art from everyone in computer graphics, so please share some material! Alumni, if you would like to join our Second Life island, please gather up all your art, zip it up, and send it to Ted (aronson@seas.upenn.edu). Specifically, we are looking for the following:

Images: jpg, tiff, or targa, no larger than 2048 pixels
Videos: Quicktime format, no larger than 20 Mb
Sculptures: Maya Binary or Wavefront Object files, extra points if the model is cut up into chunks topologically equivalent to a sphere (e.g., no holes)
Music: .mp3 format only
In addition to any submissions, please include the following in a .txt or .doc file: your name, a short bio, your website (if you have one), a picture of you (optional), and the name of each work and how you made it.

Currently CG at Penn is Penn's largest Second Life presence, and the only one run by students. Since Second Life is home to many influential folks in the computer graphics arena, we'd like you to be included in our museum!

Interested in exploring the island as it's under construction? If you have a Second Life avatar (available for free at secondlife.com), log in and send a message to Chuckles Gaffer saying that you want to be added to the VIP list. Chuckles, CG at Penn's avatar, manages the island, and is in charge of our very own group, which for the moment acts as a VIP list for the island. As we are not finished, the island is still closed to the public. After we open the island, though, visiting is easy. Just enter "CG at Penn" into your map, and you'll teleport to our own little slice of virtual heaven. We hope to see you there!

SIGGRAPH

The Penn ACM SIGGRAPH animation chapter is a student-run group that creates original animated shorts and hosts a variety of animation-specific events. The group also holds tutorials related to animation production. Past tutorials have included CG modeling and animation using Autodesk's Maya, and texturing and shading using Pixar's RenderMan.

Currently, the animation group is working on a short involving a biplane pilot, an important but mysterious case, and several angry army generals. Animation production involves storyboarding, modeling, texturing, animating, rendering, tools writing, and much more. Anyone is welcome and encouraged to join regardless of experience level. Anyone with ideas for future shorts is also welcome to pitch their ideas.

The Game Department acts as its own game development team, building a wide variety of games. They believe in the idea of learning through immersion, so every member of ACM SIGGRAPH Games, no matter their skill level or ability, is involved with the development of each game. They are currently working with Java 2 Mobile Edition to create a completely new game for cell phones. They highly encourage those with interests in game design, concept art, programming, modeling, animation, lighting, and graphics hardware to join their Game Dev Team.

For more information please visit their website: http://upenn.siggraph.org/

IGDA

In the fall of 2007 Penn became home to the Philadelphia chapter of the International Game Developer's Association (IGDA). The IGDA is a professional association advocating on behalf of game developers worldwide. The local chapter meetings offer students and gaming enthusiasts an opportunity to meet industry professionals and discuss games, technology, and professional and social issues. With Penn's support, the Philly IGDA has gained prominence as one of the 15 most active chapters in the world.

One of the great achievements for the chapter this past year was organizing and hosting the first ever Philly Game Jam. A game jam is a marathon game-building event where teams compete to build working game prototypes based on a theme announced at the start of the contest. The 2008 Philly Game Jam was a 48-hour event, held on campus, featuring 22 participants organized into 4 teams including teams representing Penn's DMD and CGGT students. A total of six new games were built that weekend with Team DMD bringing home the honors for "Best Themed Game." Congratulations go out to Ian Perera, Ryan Smith and Damon Rocco from Team DMD and to all Philly Game Jam participants for a job well done! We also thank Dan Hettrick for his leadership of IGDA and for creating and managing the Game Jam! We are looking forward to another great year of the Philly IGDA @ Penn. Visit http://www.igda.org/philly

SIGCHI

During the last few months, a group of DMD students formed a student chapter of ACM's Special Interest Group on Computer-Human Interaction. This SIGCHI chapter is an organization for students at the University of Pennsylvania interested in the design, evaluation, implementation, and study of interactive computing systems for human use. Students interested in SIGCHI come from a variety of fields, leading to exciting interdisciplinary discussion. The new chapter is aimed at providing a community for students interested in developing technology and applications focused on user-interface design as it relates to any kind of interactive technology. For more information please visit their website: http://cg.cis.upenn.edu/sigchi/

Research

In the past few months we have welcomed three visiting Ph.D. students. Dominik Sibbing joined us from Aachen University of Technology in Germany, as part of an exchange program with IRTG, the International Research Training Group for Emotions in Schizophrenia and Autism. His research focuses on creating photorealistic face models with emotion using video. Funda Durupinar is from Bilkent University in Turkey. She has been collaborating with us on our crowd research, focusing on crowds with personality and emotions as well as the structure and formations of crowds. Liang Liu has been visiting us from the School of Transportation Engineering at Tongji University in Shanghai, China. He has also been working with our crowd simulator toward analyzing ground transportation stations at the new Shanghai airport.

Massive Datasets Workshop

In November 2007, HMS Ph.D. candidate Ben Sunshine-Hill presented the paper "Generating Plausible Individual Agent Movements from Spatio-Temporal Occupancy Data" at the Workshop on Massive Datasets in Nagoya, Japan.

The catalyst for the research was a large amount of motion sensor data collected by Mitsubishi Research, consisting of motion sensings in two floors of an office building over the period of a year. Although the data contained no way of identifying individuals or of unambiguously interpreting path data, he was able to build statistically valid models of the dynamics of crowd activity within the building over the course of a normal workday. These included preferred paths between any two points, relative crowd densities, and varying room utilization. Using these models he was able to build a simulation of individual behaviors in the building for any requested time of day, with the utilization of the space evolving over the course of the day.

Featured Publications from 2007 and 2008:

HMS has continued its steady stream of publications. Publications in 2007 and thus far in 2008 include articles in journals such as Presence and ACM Transactions on Accessible Computing, papers in the Symposium on Computer Animation, the Autonomous Agents and Multi-Agent Systems conference, the IEEE Virtual Reality Conference, and Intelligent Virtual Agents. The paper "Evaluating American Sign Language Generation through the Participation of Native ASL Signers" written by HMS Ph.D. alumni and candidates Matthew Huenerfauth, Liming Zhao, Erdan Gu, and Jan Allbeck won the best paper award at the Ninth International ACM SIGACCESS Conference on Computer and Accessibility.

Also look for a new book this summer from Morgan and Claypool entitled "Crowd Modeling (Synthesis Lectures on Computer Graphics and Animation)" authored by Norman Badler, Nuria Pelechano, and Jan Allbeck.

The painterly render shown here is the work of Matt Kuruc (DMD '08), Chris Czyzewicz (HMS Ph.D. candidate), Vijay Nair (DMD '08) and Norman Badler. The research was recently accepted for presentation at the 6th Symposium on Non-Photorealistic Animation and Rendering in Annecy, France.

HMS Top 10 most downloaded papers from ScholarlyCommons

"Do You See What Eyes See? Implementing Inattentional Blindness"
451 full-text downloads since date of posting (2006-04-14)

"Feature preserving manifold mesh from an octree"
399 full-text downloads since date of posting (2004-08-18)

"Creating Interactive Virtual Humans: Some Assembly Required"
375 full-text downloads since date of posting (2004-10-29)

"Towards Behavioral Consistency in Animated Agents"
317 full-text downloads since date of posting (2006-01-25)

"Visual Attention and Eye Gaze During Multiparty Conversations with Distractions"
292 full-text downloads since date of posting (2006-09-20)

"Modeling Crowd and Trained Leader Behavior during Building Evacuation"
263 full-text downloads since date of posting (2006-12-07)

"Synthesis and Acquisition of Laban Movement Analysis: Qualitative Parameters for Communicative Gestures"
184 full-text downloads since date of posting (2006-11-06)

"Real-time reach planning for animated characters using hardware acceleration"
183 full-text downloads since date of posting (2004-08-18)

"A taxonomy and comparison of haptic actions for disassembly tasks"
161 full-text downloads since date of posting (2004-08-18)

"Representing and Parameterizing Agent Behaviors"
160 full-text downloads since date of posting (2004-10-29)

Jobs & Internships

After a busy recruiting season, CG@Penn students have received a cornucopia of job and internship offers from companies including: Apple, CRA-W Distributed Mentor Project (for graphics research at U. of MN), Disney Animation, DreamWorks Animation, Dyad Communications, Electronic Arts, Goldman Sachs, Google, Harmonix, ILM, ITT, Linden Labs, Meebo, Microsoft, Pixar, Naval Research Lab, Sony Imageworks, Shooters, Inc., and various research labs at Penn.

Project Highlight

Three students, Meng Yang, Jingwan (Cynthia) Lu, and Zehua Zhou, created a project that overlapped between Alla Safonova's Physically Based Animation class, Katherine Kuchenbecker's haptics class, and Katz and Kider's GPU programming course! Their project, Physically-Based Real-Time GPU Smoke Simulation with Haptic Feedback, was demonstrated at the Haptics Lab Open House, where Dean Glandt took a turn at the simulator! Photo courtesy of Jimmy Sastra.

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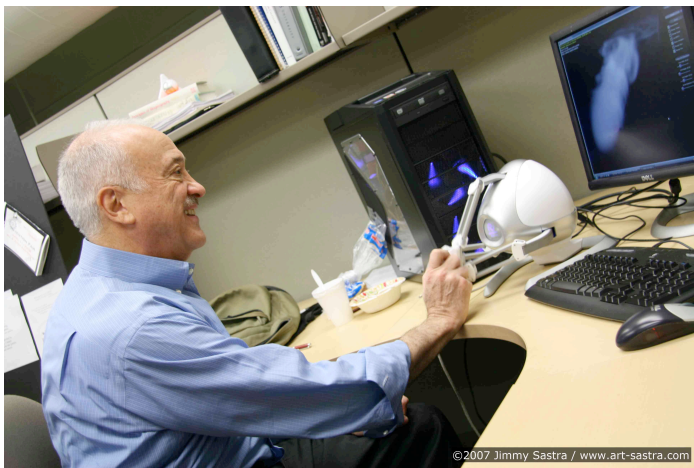
CG Penn Alumni Network

As we mentioned in the last issue, the PennCGA website (http://www.penncga.org/register-yourself) is open to all alumni and friends of graphics at Penn. If you wish to help directly by writing for the blog, coordinating events in your area, or mentoring current students, please write to Matt Roberts at admin@penncga.org with your interests or ideas! As always, thank you, Matt!

GPU Programming Success

In our last issue (http://cg.cis.upenn.edu/Newsletter.pdf), we mentioned our GPU Programming and Architecture course, led by Gary Katz, CGGT '07, and PhD student Joseph Kider. Joe and Gary have developed a unique approach to the shortest-path problem using the GPU, and the paper has been accepted by *Graphics Hardware* for publication. Here is an abstract of their paper:

The all-pairs shortest-path problem is an intricate part in numerous practical applications. We describe a shared memory cache efficient GPU implementation to solve transitive closure and the all-pairs shortest-path problem on directed graphs for large data sets. The proposed algorithmic design utilizes the resources available on the NVIDIA G80 GPU architecture using the CUDA API. Our solution generalizes to handle graph sizes that are inherently larger then the DRAM memory available on the GPU. Experiments demonstrate that our method is able to significantly increase processing large graphs, making our method applicable for bioinformatics, internet node traffic, social networking, and routing problems.

Special Thanks

We would like to acknowledge all of the people and organizations that contribute to the efforts of CG@Penn.

Disney Feature Films recently donated a portion of their render farm to CG@Penn. We now have a functioning render farm composed of approximately 70 HP nodes with Xeon 3GHz processors. Pixar Animation Studios has continued their generous donation of RenderMan licenses and expanded the number of licenses to cover the nodes of the new render farm. Autodesk continues to support our research efforts with their donation of Maya and MotionBuilder licenses. nVIDIA has donated new graphics cards in support of both our research and our GPU programming course. Siemens also continues to donate their Jack licenses, and NDL and Ageia have been supporting the CGGT program with Gamebyro and PhysX licenses respectively.

Happenings

The past few months have been very busy for CG@Penn. These are a few of the events that have taken place at Penn:

April 29: Nancy Pollard, of the Robotics Institute at Carnegie Mellon University, presented a lecture, "Data-Driven Grasping and Manipulation."

April 14: David Luebke, research scientist at NVIDIA, gave a lecture entitled, "The Democratization of Parallel Computing."

April 8: Diana Chang, DMD alumna and Technical Artist at Electronic Arts, gave a talk about working at EA and the life of a Technical Director in the gaming industry.

April 4: Adam Bargteil, of the Graphics Lab at Carnegie Mellon University, presented his lecture, "Modeling Materials and Visual Detail for Computer Animation."

March 28: Hyeong-Seok Ko, of the Graphics and Media Lab at Seoul National University, presented his lecture, "Realism Becomes Accuracy."

March 27: Jernej Barbič, Department of Computer Science, MIT, presented a haptics lecture entitled, "An Algorithm for Deformations, Collision Detection and Contact Between Complex Deforming Geometry Running at Haptic Rates."

February 25: Bjoern Hartmann, PhD Candidate, Stanford University, presented a lecture on observing, prototyping, and building interaction design tools: "Enlightened Trial and Error."

February 21: Robert Kenyon, Computer Science Department, University of Illinois at Chicago, presented his lecture, "Size-Constancy in the CAVE."

February 11: Cary Phillips of Industrial Light and Magic gave a talk entitled "Computer Graphics and Visual Effects at Industrial Light and Magic and LucasArts."

February 9: Paul Kanyuk from Pixar, Inc. gave a talk about his TD work on "Cars" and his crowds work on "Ratatouille".

December 4: Michael Zyda, Director of the USC GamePipe Laboratory, gave a talk entitled "Creating the Future of Interactive Entertainment" as part of the CIS department's Distinguished Lecture Series.

November 28: The 30th Annual Computer Graphics Video Show featuring the 2007 ACM SIGGRAPH Electronic Theater DVD.

November 27: Lars Nyland, Senior Architect from nVIDIA, gave a talk entitled "Ubiquitous Compute Acceleration" as part of the CIS department's Emerging Computational Architectures lecture series.

November 6: Sanjay Patel, Chief Architect at AGEIA Technologies, gave a talk entitled "Life, Death, and Video Games: Revisiting High-Performance Chip Architecture" as part of the CIS department's Emerging Computational Architectures lecture series.

November 1: Mark Botta, Lead Gameplay Programmer and Elio Rutigliano, Associate Producer from Crystal Dynamics, discussed the game creation process from an engineering and production perspective.

October 29: Jerry Tessendorf, Principal Graphics Scientist at Rhythm & Hues Studios, discussed animation, visual effects, and design at the studios.

October 24: An encore screening of DMD senior Michael Highland's documentary, "As Real As Your Life."

October 24: Tony DeRose, a Senior Scientist and lead of the Research Group from Pixar, presented his lecture, "Research at Pixar Animation Studios."

October 23: film screening of DMD senior Michael Highland's film, "As Real As Your Life," a short documentary about video game addiction.

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