



The

# UTAH TEAPOT

Summer 2002

A QUARTERLY NEWSLETTER FOR THE ALUMNI AND FRIENDS  
OF THE UNIVERSITY OF UTAH SCHOOL OF COMPUTING

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*The teapot was one of the first free-form models used in computer graphics. Since it was created at the University of Utah (by Martin Newell) in 1975, the teapot has become a favorite computer graphics benchmark. The teapot symbolizes Utah's distinguished leadership in computer graphics.*

## U.S. News & World Report Ranks Graduate Computer Science Program 29th in the Nation

The School of Computing's graduate program was ranked 29th in the nation by *U.S. News & World Report* in its April issue of "America's Best Graduate Schools."

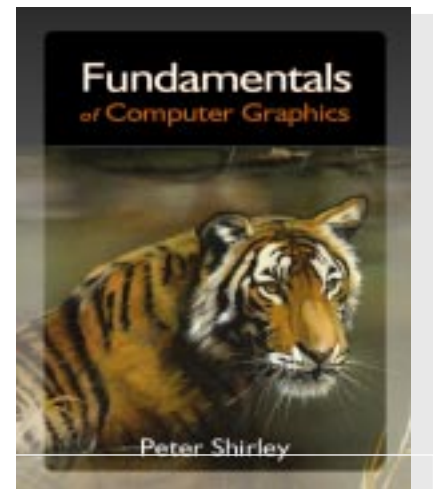
"This is good for Utah and shows that our strong tradition in computing continues and that the strong support of the university administration and the state's Engineering Initiative is making a difference. This ranking will help us attract the best students to Utah to pursue their studies, and contribute to Utah's computing accomplishments and heritage," said Tom Henderson, director of the School of Computing.

The *U.S. News & World Report* rankings are based on two broad types of data expert opinion about program quality and statistical indicators that describe the strength of a school's faculty, its research, and the performance of students both as they enter and leave a program. *U.S. News & World Report* gathered indicator and opinion data by surveying more than 1,000 programs and 9,000 academics and other professionals in the fall of 2001. ☐☐

## Fundamentals of Computer Graphics

by Peter Shirley

This July my new introductory computer graphics book will be coming out (*Fundamentals of Computer Graphics*, AK Peters, 380 pages, \$49). I worked on the book for the last two years, and I have learned a lot in its preparation. The book is something of a throwback in that there are no application program interface (API) covered, and details of things such as triangle rasterization are covered. Although this approach goes against modern trends, it has been my experience that students who have written a graphics pipeline from scratch use APIs more effectively than those initially taught using a specific API such as OpenGL.



Peter Shirley's new book: *Fundamentals of Computer Graphics*

I have wanted to write an introductory graphics text for some time. Over the years my course has developed to a point where no single book seemed appropriate. In particular, the mathematical foundations such as implicit and parametric equations, as well as modern algorithms such as Perlin solid tex-

*continued on page 2*



## Shirley Introduces New Computer Graphics Textbook

*continued from page 1*

tures need to be covered. Add to that the modern graphics pipeline with clipping in homogeneous coordinates, as well as ray tracing and subdivision surfaces, and no single book fit the bill. I decided now was the time because I had a sabbatical leave in 2000/2001 and that provided me enough time to make a good start on the project. All of the writing was done on an Apple Powerbook, with much of it taking place in various coffee shops in Salt Lake City.

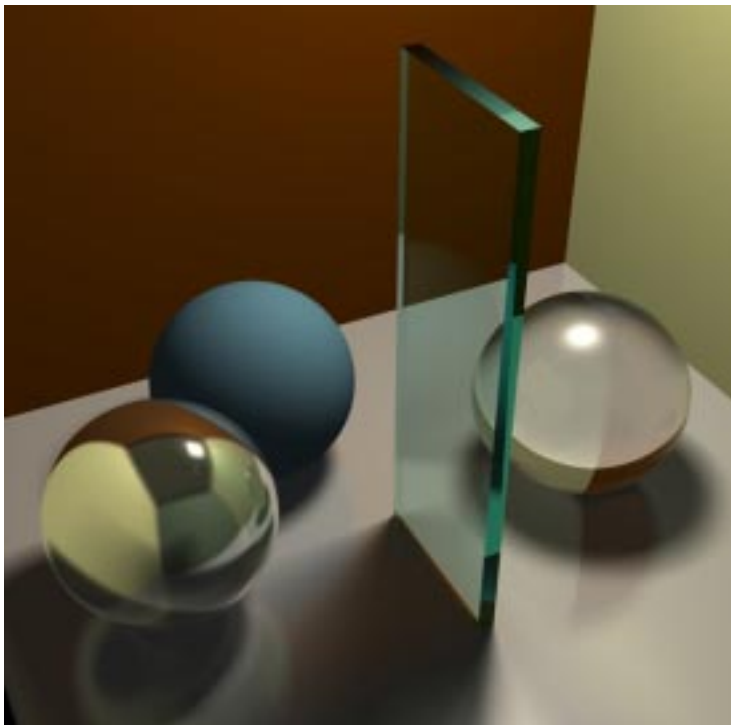
The book's approach is to use the cleanest math possible so that the algorithms will be clean as well. This creates an initial barrier for some of the students, but in the end their code is cleaner.

For example, for triangle rasterization Peneda's barycentric method is used where implicit equations for the triangle edges are used to directly compute signed distances from the edges to the pixel being rasterized. This requires the students to learn the geometric properties of implicit equations, as well as the mechanics of barycentric coordinates. While this adds a week to the syllabus of a graphics course relative to traditional scan-conversion, it gives a foundation that can be drawn on repeatedly (e.g., ray-triangle intersection is straight forward to derive using barycentric coordinates).

The draft of the book was test-driven this year at the University of Wisconsin, the University of Minnesota, Trinity College Dublin, and in my own Honors Introduction to Com-

puter Graphics here at Utah.

It went through many changes as I received feedback. I did most of the layout and all of the illustra-



Distribution ray-traced images with 1 sample per pixel, 16 samples per pixel, and 256 samples per pixel. Images courtesy Jason Waltman.

tions myself using LaTeX and Adobe Illustrator, so I was able to add corrections and new material right up to the last minute. That made for a crazy semester, and I doubt I would have made it if not for the Olympic break in February.

The book includes coverage of the graphics pipeline including details such as perspective-correct texturing. It also has a long chapter on ray tracing with a section of distribution ray tracing. The advanced chapters include global illumination, radiometry, visualization, and basic sampling and measure theory. Many of the topics covered were developed at Utah including the z-buffer, texture mapping, bump mapping, Phong shading, and Loop subdivision

surfaces. I am very pleased with the chapters on raster algorithms, ray tracing, and transform matrices.

Some of the other chapters certainly will need some work in the next edition, while some topics were completely deferred until that edition. The quote that comes to mind is: "A poem is never completed. It is merely abandoned."

The book was greatly improved by my editor, Alice Peters. In addition to correcting my horrible grammar, she found many math errors, including an absolute disaster in the triangle rasterization section. Alice has a Ph.D. in math, which is a definite bonus in one's editor! She also helped me fight several LaTeX issues such as the numbering and placement of margin figures.

The painting of the tiger on the cover is a tribute to Alain Fournier. In 1999 he gave a brilliant talk that included a discussion of the difficulties of rendering such a scene. I wanted a painting for the cover because most computer renderings look so dated after a few years. I was very lucky to have the fine artist J.W. Baker get me exactly the painting I wanted.

I will have a book signing in the AK Peters booth at SIGGRAPH on the afternoon of Tuesday, July 29. We are pleased that this will be the third straight SIGGRAPH with a new book by Utah authors.

I hope to see you there! ☺☺

*Peter Shirley is an associate professor in the School of Computing, where he teaches computer graphics, visualization, visual perception, and software methodologies for graphics. shirley@cs.utah.edu*



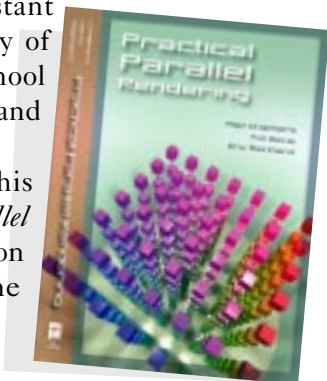
## Postdoc Joins Faculty in Florida



Erik Reinhard

Erik Reinhard, currently a postdoctoral fellow working with Chuck Hansen and Pete Shirley, has accepted a position as assistant professor at the University of Central Florida in the School of Electrical Engineering and Computer Science.

Erik will be signing his new book “*Practical Parallel Rendering*” at SIGGRAPH on Wednesday July 31st at the AK Peters booth. ☐☐



Erik Reinhard's new book:  
*Practical Parallel Rendering*,  
co-authored with Alan Chalmers and  
Tim Davis.

SIGGRAPH 2002

The University of Utah School of Computing Professional ACM SIGGRAPH Chapter is pleased to present the:

**Third Annual University of Utah  
Alumni Birds of a Feather Meeting at  
SIGGRAPH 2002 in San Antonio,  
Texas.**

*Wednesday, July 24, 2002*

*Patio Room at the Menger Hotel*

*8:30 p.m.*

*Address questions to Amy Gooch.*

*gooch@cs.utah.edu*

## *Tempest in a Teapot*

### Summer Break

By Tom Henderson

Director, School of Computing

Summer is here and gives us all the opportunity to take some time off from our regular routine and try out some new places, activities, and customs. Our lives take place in a certain context, e.g., taking or teaching courses, working on a research project, and mostly working at the University of Utah. Putting that daily context to other places and pursuits can help us evaluate how useful, interesting or realistic our regular activities are. This might involve working in industry, visiting a different lab, or as in my case, visiting colleagues in another continent (Europe!) and learning what is going on there. For example, it is not just in science or industry that computing has an impact, but in art as well; I visited the Center for Art and Media in Karlsruhe Germany, and it has some of the best state-of-the-art virtual reality environments accessible to the public and supports research that mixes art, dance, film and computing in diverse ways.

Another important possibility for this kind of intellectual adventure is the sabbatical - a leave of absence which the university allows for faculty to explore new directions or take an extended visit at another university and work with colleagues there. Prof. Ganesh Gopalakrishnan will be taking a sabbatical this coming year in California at Intel, working on verification projects. Such leaves are essential to maintain research depth and breadth.

I encourage everyone to take advantage of such breaks and to occasionally take time to explore the world outside computer science. It builds perspective, and equally important, it's fun! ☐☐

*Email Tom Henderson at [director@cs.utah.edu](mailto:director@cs.utah.edu)*

*Interested in creating internship opportunities at your company for U of U students? Contact Chris Coleman for more information.  
(801)581-8580, [coleman@cs.utah.edu](mailto:coleman@cs.utah.edu)*

# GRADUATION 2002

On May 10th the School of Computing celebrated the 2001-2002 graduating class with ceremonies held at the John M. Huntsman Event Center. The 2002 class included 111 undergraduate and 28 graduate students. ☐☐



Tony Dhaliwal, Erik Brunvand, Jessica Sherrid, and Jian Chen.

  
THE  
UNIVERSITY  
OF UTAH



Jason V. Morgan

Jason Morgan (BS CS '02) was awarded the College of Engineering Graduating Student Leadership Award during the graduation ceremonies on May 10th. Jason also presented the student address during the ceremonies. ☐☐

Erik Brunvand was awarded the University of Utah Distinguished Teaching Award during the College of Engineering Convocation on May 10th. Erik was nominated by three of his students Tony Dhaliwal (CE '02), Jessica Sherrid (CE '02) and Jian Chen (CE/CS '02). Erik has been teaching at the University for 12 years. Previous award recipients in the School of Computing include Chris Johnson, Joe Zachary and Bob Kessler. ☐☐



Computer Science students waiting to enter the Huntsman Center for the 2002 College of Engineering graduation ceremonies.

## 2002-03 Undergraduate Scholarships Recipients

### Tuition Wavier for 1 year

- Patrick Angell
- Richard Whit Johnson
- Christopher Mayfield
- Justin McMurray
- Jeremy Wright
- Sam Wakefield

### Women's Scholarship

- Deboshmita Ghosh

### School of Computing Faculty Scholarship

- Usit Duongsaa

### SOC Eccles Scholarship

- Richard Terrell
- Omid Saadati

### High School Computing Institute

#### - Evans & Sutherland Scholarship

- Daniel Perry

### High School Computing Institute

#### - Novell Scholarship

- Heballa Al-Zahawi

### Goldwater Scholarship

- Scott Little

### COE Collins Scholarship

- Hung Nguyen
- Hai Huynh
- Gyoungghwa Choikim
- Chengjian Che
- Amy Williams

### COE Clyde Christiansen Scholarship

- Brandon Mansfield
- Justin Olson
- Qing Zhang
- Greg Nelson

### Bryner Scholarship

- Timothy Adams
- Amber Blake

*Undergraduate scholarships provided for School of Computing students totaled over \$40,000.*

**Send news items to  
[teapot@cs.utah.edu](mailto:teapot@cs.utah.edu)**

## Graduate Students Fellowships 2002-2003

### SCHOOL OF COMPUTING FELLOWSHIP

*For graduate studies 2002-03. Stipend for first year and full tuition wavier.*

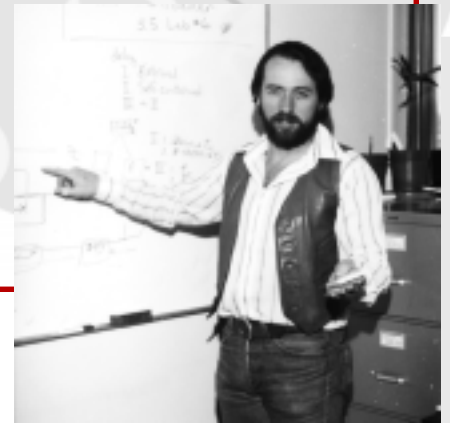
- Ali Sezgin, Ph.D. student

### COLLEGE OF ENGINEERING BROWN FELLOWSHIP

*For graduate studies 2002-03. Stipend for first year and full tuition wavier.*

- Nicole Anderson, Ph.D. student

## Faces of the Past



Identifies revealed on page 7



## FACULTY

**Erik Brunvand** received the University of Utah Distinguished Teaching Award during graduation ceremonies on May 10th.

**Elaine Cohen** has been reappointed to a second term on the Computing and Telecommunicating Board of the National Research Academy.

**Frank Stenger** has discovered an algorithm for inverting the wave equation (a common tool for imaging the interior of the human being), a procedure which requires almost no computations. It is expected that this discovery will have considerable impact in ultrasonic and electromagnetic imaging, for medical purposes.

**Ganesh Gopalakrishnan** will be taking sabbatical leave for 2002-03 and will be working for Intel in their Multiprocessor Platform Architecture group. Congratulations Ganesh on your new baby girl, Kajal Ganesh, born April 24th.

Postdoctoral fellow **Yarden Livnat** has been named Research Assistant Professor in the School of Computing.

## STUDENTS

**Todd Smith** (BS CS '02) was awarded the student scholarship at the Game Developers Conference in San Jose, California on March 19th.

## ALUMNI

On March 24th **Lance Williams** (PhD '00) was presented with a technical Oscar by the Academy of Motion Picture Arts and Sciences' for "his pioneering influence in the field of computer-generated animation and effects for motion pictures."

On May 15th **Prosenjit Chatterjee** (PhD '02) joined the Nvidia company as a formal verification engineer in their hardware division. Prosenjit will be the first employee to join this division to help start their formal verification efforts. Prior to his spring graduation, he took third place in the Utah Entrepreneur Challenge with his company Universal Verifiers.

## NEW STAFF MEMBER

**Sara Hanney** joined the School of Computing in June 2002. As a new office support professional, she manages all travel plans and procedures along with taking care of key orders, mail, and shipping. Sara is a Utah native. She recently completed her undergraduate degree at Weber State. She loves 7-11 nachos and traveling.



## IN THE NEWS

Professor **John Hollerbach** was featured in a *technologyreview.com* article titled "Keeping It Real." The article reported on his work in "locomotion interfaces" using the Treadport, a virtual reality system that combines computer graphics and a treadmill to simulate navigation in real-world terrain.

## 2002 Organick Memorial Lecture

David Gelernter presented the 16th annual Organick Memorial Lecture at the School of Computing



During his three day visit to the School of Computing, Dr. Gelernter met with faculty and students, presented two lectures and was interviewed by KCPW radio.

David Gelernter and Ganesh Gopalakrishnan

Dr. Gelernter is chief scientist at Mirror World Technologies and a professor at Yale University. ☐☐

## Save the Date! New Major Day

The School of Computing will welcome its newest group of Computer Science majors to the program on August 27th with tours, demos, orientation and a welcome reception. Alums are welcome! We are also looking for industry participants who want to meet students early in their career path. To get involved, contact Ann Torrence at [torrence@cs.utah.edu](mailto:torrence@cs.utah.edu). ☐☐



## Senior Projects presented at “Demo Day”

Seniors in CS 4500 showed off their creativity and skills during Demo Day on May 2. CS 4500 is the senior software engineering laboratory where computer science students engage in a semester-long project to build a software system based on their own interests.

Ellen Riloff the instructor of the class said, “The CS 4500 senior project demonstration day was enormously successful, with students showing off a wide variety of software systems, including web-based applications, computer games, educational software, and image retrieval applications. Everyone seemed to enjoy seeing the demonstrations and interacting with the students, and many of the judges and spectators commented that they were very impressed with the projects.” ☐☐



Students show off their project at Demo Day.



Sample of student project



## The Utah Teapot

*A quarterly newsletter for alumni and friends of the University of Utah School of Computing.*

Editor: Ann Torrence  
torrence@cs.utah.edu

Asst. Editor & Layout Design:  
Chris Coleman

coleman@cs.utah.edu

School of Computing  
University of Utah

50 S. Central Campus Drive  
Room 3190

Salt Lake City, Utah 84112-9205

Phone: 801-581-8580

Fax: 801-581-5843

<http://www.cs.utah.edu>

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## Founder of Atari Visits College of Engineering

The College of Engineering welcomed Nolan Bushnell, co-founder of the Atari video game company, to campus on April 13. Bushnell, an Electrical Engineering alum-



Nolan Bushnell and SOC students, Mac Newbold, Shawn Ramsey, Russell Christensen, Scott Little and Brent Olson

nus, lectured on the computer gaming industry and participated in an Atari tournament. Scott Little, a junior in computer engineering, won the tournament, which was co-hosted by Micron as a special event for its scholarship recipients at the University of Utah.

“I love being at the university because I meet people like that, just icons,” Little said about Bushnell. “He’s simply amazing.” Bushnell has returned to the computer gaming industry as CEO, Founder and Chairman of the Board of uWink, Inc. ☐☐

## MEB Remodel (phase 2)

Remodeling of Merrill Engineering space for the School of Computing began June 3. The project will create new faculty offices, new staff offices, new and expanded classrooms and an advising consultation room.



MEB 3rd floor hallway

Remodeling funds were appropriated by the state legislature as part of Governor Michael Leavitt’s initiative to increase the number of engineering and computer science majors. The remodel is expected to be completed before fall semester begins. Last summer the first phase of the remodel was completed which added a new teaching classroom and computer machine room. ☐☐

Answers to page 5 top: Prof. Tom Henderson  
Bottom: Prof. Al Davis

# CALENDAR



**June 17 – July 18, 2002**

High School Computing Institute

**July 21 - 25, 2002**

SIGGRAPH conference

**July 29 - August 2, 2002**

TeachScheme workshops

**August 14 - 16, 2002**

New Graduate Orientation

**August 21, 2002**

Fall semester begins

**August 27, 2002**

New Major Day

**September 2, 2002**

Labor Day

**October 3 - 4, 2002**

Fall Break

**Next Issue:**

Meet new faculty members  
Mike Kirby and Emil Praun.



School of Computing  
University of Utah  
50 S Central Campus Drive  
Rm. 3190 MEB  
Salt Lake City, UT 84112-9205



