

INTRODUCTION

by Justin Solomon, *Managing Editor*

In this Fall 2008 issue of ACM *Crossroads*, we continue to explore student work and professional viewpoints across the spectrum of computer science research and development. Whether your interests are in graphics, theory, or systems, you will be certain to find articles to expand your knowledge or introduce new perspectives on ongoing work.

First, demonstrating the power of motion planning and other artificial intelligence methods, Salik Syed of Stanford University presents his experiments writing a program to plan the path of a skateboarder. In his article, entitled "Motion Planning for Skateboard-Like Robots in Dynamic Environments," he demonstrates how computers can plan efficient paths for skateboards through half pipes, ramps, and other obstacles in a reasonable amount of time. The results of the study suggest that the algorithms and heuristics used to plan skateboard paths could be applied to larger and more complex robotics problems.

Moving from artificial intelligence to systems, Joe Bungo of ARM presents his research into optimizing programs for space or time efficiency in an article entitled "The Use of Compiler Optimizations for Embedded Systems Software." By developing a consistent methodology for choosing combinations of compiler flags and other options, Joe is able to achieve smaller program sizes or faster run times without changing a significant amount of code. His research reveals that writing efficient software requires not only algorithmic insight, but also a firm grasp of the features and inner workings of the compiler converting human-readable programs into machine-readable code.

The final research paper to appear in this issue of *Crossroads* comes from the fields of computer graphics and modeling. Contributed by James Hegarty of Stanford University, this paper, entitled "Geometric and Path Tracing Methods for Simulating Light Transport through Volumes of Water Particles," explores methods for rendering fog, clouds, and other water droplet phenomena. The methods James describes allow him to draw detailed scenes involving rainbows, waterfalls, and other features from nature.

Finally, Ed DeHart of East Carolina University introduces the history and basic concepts of encryption in his article, "Data Encryption: Mixing Up the Message in the Name of Security." The foundations Ed describes certainly will continue increasing in importance as services handling private or sensitive information move to the internet.

As usual, all the research papers, tutorials, and other articles you see in this issue are contributed by *Crossroads* readers. If you recently have completed a research project, finished making a large piece of software, or simply would like to share your knowledge of some aspect of computer science, please consider submitting. We accept submissions on a rolling basis, so feel free to send us your contribution at any time. For specifics about the submission process, check our website, at <http://www.acm.org/crossroads>. When you are ready to submit, you can email your article to our editing staff, at crossroads@acm.org.

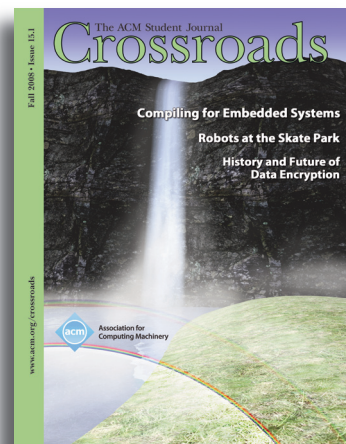
Also, with the new publishing season we continue to change *Crossroads* to suit your interests in programming and computer science.

If you have ideas for additional improvements or if you would like to participate directly by working as an associate editor or columnist, be sure to contact us.

We look forward to filling the 2008-2009 academic year with intriguing new articles from a variety of perspectives in computer science. In the meantime, best of luck as you begin a new year of classes, research, or programming.

Biography

Justin Solomon (justin.solomon@stanford.edu) is an undergraduate at Stanford University double majoring in computer science and mathematics. Along with his work as the managing editor for ACM *Crossroads*, he participates in computer graphics research in collaboration with the Stanford Department of Computer Science and Pixar Animation Studios, competes in programming contests, and plays cello and piano.



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