

# Snowballs: An experiment in Winter frivolity

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<http://www.scompt.com/school/classes/computer-graphics-2/snowballs>

## Summary

I plan to implement the technique described in [SOH99]. It is "a simulation model of ground surfaces that can be deformed by the impact of rigid body models". I would like to apply it to a ground cover of snow that has objects rolled around on it. The ultimate goal is to create an animation of a ball being rolled on the ground and creating a path in the snow. Ideally, the ball would grow in size as it rolls and picks up snow, simulating the process of creating a snowman. This project will illustrate numerous aspects of the rendering pipeline. Realism is a definite goal of the project. To this end, I plan to create a RenderMan shader to give the snow a realistic appearance.

## System and Software

All of my animation and rendering will be done offline using one of the RenderMan renderers available. Initial tests have been done using 3Delight, but I would also like to experiment with prman. Because of the render time necessary, I will attempt to distribute the rendering. I will be describing and animating the scene using cgkit, a python interface to the complete RenderMan API. Initially, animation parameters will be given in code or through command-line arguments. Eventually, a simple GUI may be written to set the parameters. At this point, these parameters are unknown, so the GUI cannot be described.

## Project Timeline

- Create a reasonable height field that can be used to represent a virgin snow-covered plane.
- Place a simple object in the snow to see the deformation work.
- Animate a simple object being placed in the snow.
- Animate an object moving across the snow.
- Create shader to improve realism of snow.

Ideally, there would be a week or so between the accomplishment of each milestone. I will have the chance to do some work over Christmas break, so hopefully the first milestone and some work on the second one can be done.

## Final Presentation

For the final presentation, I will probably display the completed animation. The results of the above milestones would also be good to show to illustrate the evolution of the code. Also, renders from intermediate steps in the algorithm would be useful to illustrate the algorithm.

## References

- [SOH99] Robert Sumner, James F. O'Brien, and Jessica K. Hodgins. Animating sand, mud, and snow. *Computer Graphics Forum*, 18(1):17–26, March 1999. ISSN 1067-7055.