

# Stylization and Interfaces for Navigation in Virtual Environments

Postdoctoral Fellowship

Scientific Host: George Drettakis

Contact: [George.Drettakis@sophia.inria.fr](mailto:George.Drettakis@sophia.inria.fr)  
<http://www-sop.inria.fr/reves>

This postdoctoral fellowship is within the context of the INRIA collaborative research [initiative](#), NIEVE (web site available end of Feb. 2010: <http://www-sop.inria.fr/reves/NIEVE> )

The goal of this postdoctoral fellowship is to study appropriate rendering representations for navigation, and to use them to develop appropriate audiovisual navigation interfaces in immersive environments. The fellowship has two centres of interest, first concentrating on representations and views for navigation and a second part concentrating on immersive navigation interfaces. The emphasis on either focus will depend on the candidate and their appropriate competences. We are interested in finding excellent candidates; their centres of interest will be taken into account for the definition of the exact research program in the context of the NIEVE initiative.

The first focus of the fellowship is on the study of realistic vs. non-photorealistic [Gooch 98] rendering styles for navigation tasks and on appropriate combinations or transitions between “top” or “map view” and “first person” views. We are particularly interested in determining criteria to determine when a stylized rendering should be chosen over a realistic rendering, and whether it makes sense to combine different styles. Such questions are related to recent work on the generation of tourist maps for example [Grabler08]. The study of such questions will involve the development of novel algorithms for stylized, realistic and combined rendering. A fundamental question will be to investigate how to maintain both temporal and spatial coherence.



Left: Realistic (direct lighting only) rendering and Right: pen-and-ink rendering (from [Coconu06]).

In addition to rendering style, we will investigate ways to combine, and transition between, top- or map-views which typically use expressive rendering styles, to first person views which involve realistic or a combination of realistic and expressive styles. 3D audio may potentially be used to facilitate these transitions.

The second focus of the fellowship is more related to human-computer interfaces and perception. It will potentially build on the appropriate representations developed previously to build novel navigation interfaces in an immersive environment (the Immersive Space and INRIA Sophia-Antipolis). The interfaces will be evaluated in several scenarios, and will also be part of a study of the influence of emotion on navigation in Virtual Environments.

## Requirements

The successful candidate should have a Ph.D. degree in Computer Science (alternatively in cognitive or neuroscience, but in a CS context), and preferably be knowledgeable in computer graphics and in computer graphics programming, with knowledge of OpenGL or DirectX, and some experience with shading languages such as GLSL/HLSL/Cg.

## References

[Coconu06] Liviu Coconu, Oliver Deussen, Hans-Christian Hege Real-time pen-and-ink illustration of landscapes, NPAR 2006. <http://graphics.uni-konstanz.de/publikationen/index.php?language=english#2006>

[Grabler08] Floraine Grabler, Maneesh Agrawala, Robert W. Sumner, Mark Pauly Automatic Generation of Tourist Maps, SIGGRAPH 2008  
<http://www.floraine.ch/berkeley%20site/Automatic%20Generation%20of%20Tourist%20Maps.htm>

[Gooch98] Amy Gooch, Bruce Gooch, Peter Shirley and Elaine Cohen , A Non-Photorealistic Lighting Model For Automatic Technical Illustration (SIGGRAPH 1998).  
<http://www.siggraph.org/publications/bibliography/index.php?detail=11591>