

## **Fifth International Symposium on Digital Earth**

### **Collaborative Multi-User Image Exploration: A New Framework for Sharing and Exploring Very High-Resolution Panoramic Photography Online**

**Dr. Carl DiSalvo and Dr. Illah Nourbakhsh**  
**Carnegie Mellon University**

Just as spatial earth browsers such as Google Earth and Microsoft Live Local provide extreme visual detail that can be actively explored by users; very high-resolution photographic panoramas of a locale can provide users with unique and compelling human-scale visual artifacts for exploration. In the case of satellite eye's view browsers such as Google Earth and Microsoft Live Local, features such as overlays and forum-style narratives provide the opportunity for user-generated content and, thus, multi-user collaborative exploration. Yet in the case of very high-resolution photographic panoramas, which are equally ripe for active exploration, there are as yet no widely adopted tools that enable multi-user collaborative exploration.

In this talk we will present and demonstrate the Gigapan panorama sharing site: an online participatory system for sharing, navigating and annotating very high-resolution panoramas. The Gigapan panorama website provides a platform for both motivating and investigating the social opportunities and design challenges of the online exploration of very high-resolution panoramas.

We will begin by discussing our general goals for the Gigapan panorama website within the vision and context of the Digital Earth Symposium. Like the vision of the Digital Earth Symposium, our goal is to promote an appreciation and understanding of other places, peoples and cultures through access to images. In addition, we sought to enable creative expression for both photographers and viewers alike through the system. Working forward from our goals we will present the needs analysis for this new form of internet-based panorama sharing — addressing the question "What are the fundamental attributes of such a system?" Through the needs analysis we will discuss our assumptions of how to facilitate exploratory browsing and annotation which guided the system design.

From the needs analysis we will proceed to detail and demonstrate live the core functionality of the Gigapan panorama website, discussing strategies for display, navigation, annotation and search, as well as a discussion of the technical system for file uploading and storage. Specifically, we will highlight those challenges particular to exploring high-resolution panoramas. For example, because of the massive amount of content in any single panorama, both textual and visual annotation of the image is necessary. In addition, the most interesting content of a high-resolution panorama may not be immediately apparent in the default view — it may require zooming and/or panning. To address this, we introduce the concept of the "snapshot" as a novel form of annotation integrated into both the panorama display and search results. Likewise,

because of the potentially huge sizes of each individual panorama, we will also present a model for storage and sharing of the photos themselves using on-line servers, which are simply too big and too numerous to be stored in any other way.

After demonstrating the general functionality of the system we will present examples of particularly active panoramas (those with a multitude of snapshots and annotations) and discuss what qualities of these panoramas seem to foster such engagement. We will also briefly present current and near future work with the system.

We will then conclude the presentation by providing the opportunity for audience feedback. Our goal with the Gigapan panorama website has been to design and develop an participatory system, thus ending our discussion with the input of a committed and engaged audience seems most appropriate.