

# Making the GigaPixelArtZoom

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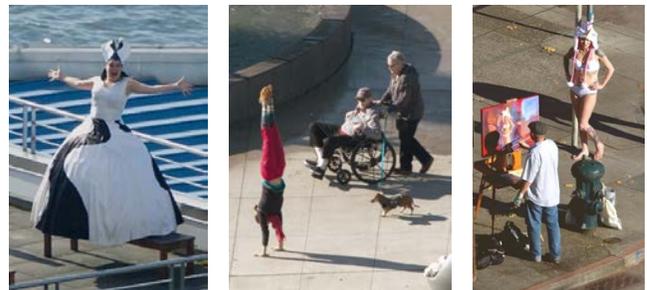
Before the age of movies and the internet, people flocked to see large-scale panoramas displayed in buildings designed specifically for them. Fast forward to the present, and only very recently can such large-scale panoramic imagery again be created and viewed.

In 2007, Johannes Kopf, and colleagues at Microsoft Research showed how to capture gigapixel-scale images containing billions of pixels, and more importantly demonstrated new online viewing capabilities. Novel viewing techniques were needed because gigapixel scale images contain a thousand times more pixels than a typical screen can display, and therefore require smooth panning and zooming to explore the immense detail.

Since then, the ability to create panoramas and view them has spread from desktop computers to mobile devices. Microsoft's Photosynth app, for example, allows you to capture panoramas on an iPhone or Windows Phone, and share them using a viewer that runs in any modern web browser. The same Photosynth viewing technology is being used to present the Gigapixel ArtZoom panorama.

We captured our first gigapixel image back in 2006 of Seattle's downtown skyline. Although the panorama was beautiful, it struck us upon exploring the image that there were hardly any people to be found. When we did discover a person in the panorama, we were excited to think about who that individual was and why they were there. We spent hours exploring this single image, but always wished there were more interesting things to find.

For several years, we considered creating a new gigapixel panorama of Seattle, this time making sure it was populated with fascinating people and activities. Finally, in the fall of 2013, we set out to do just that, and the GigaPixelArtZoom project was born. We first sought out the perfect rooftop location from which to shoot such a panorama. We were lucky enough to find the Bay Vista condominium building, and thanks to the gracious owners, got access to amazing 360-degree views that include the Seattle Center, the Olympic Sculpture Park, and Seattle's stadiums, as well Mount Rainier, Puget Sound, and Lake Union.



John Boylan, who has deep roots in the Seattle art scene helped us attract great interest from the arts community to come out and help create this celebration of the arts in Seattle. John introduced us to Elise Ballard, who coordinated the efforts of everyone involved, and finally, videographer Kris Crews helped us assemble a team to shoot footage of the artists and performers from the ground.

Beginning on a brilliant sunny day in October, we climbed up to the roof to capture our first panorama using a Canon digital SLR camera, a professional 400 mm lens, and a Gigapan robotic tripod head. The full panorama consists of 2,368 twenty-two-megapixel images. We stitched these images together using our Image Composite Editor (ICE) software, which is available for free from Microsoft Research. This resulted in two 10-gigapixel half panoramas (from two corners of the roof), recording the city in fantastic detail.

Over the next few weeks, we climbed to the roof six more times to capture individual artists, acrobats, and other performers at dozens of locations visible in the panorama. These photos were captured from the same spots as the panorama shots, using a Canon digital SLR with lenses ranging from 400 mm to 600 mm. While we captured still shots of the performers from the roof, video crews filmed the events on the ground.

Back at Microsoft Research, Celso Gomes worked his magic, compositing the individual shots of artists and performers into the final 20-gigapixel panorama. Meanwhile, the video footage from the ground and other media was assembled to create short video vignettes. Finally, Eric Stollnitz built a web site that provides the world access to the panorama and other media. The result is the Seattle GigaPixel ArtZoom. We hope you have as much fun exploring the imagery as we had creating it. Head to <http://GigapixelArtZoom.com>.