Lecture 8

Augmented Reality

- – Definition
- – Visualization Approaches
- – Applications

NYTimes – Augmented Reality DataStories

- – Examples

Gigapixel Visualization

- – Motivation
- – "Infinite Zooming": Seadragon DeepZoom
- – **Gigapan**: stitching multiple images into image pyramid
- – **Photosynth**: linking images based on pattern matching
- – **whereRU**: Virtual Experience of Rutgers
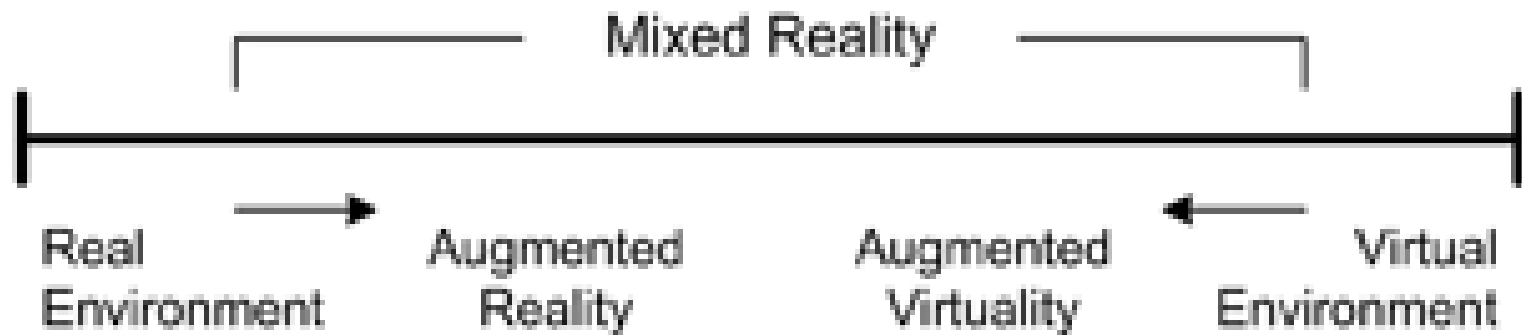- – Tools, Links and Definitions

Augmented Reality – Definition

Combines of **computer-generated imagery** with physical **real-world** environment

- – **Superimpose** imagery

In **Real-time**, **Interactive** and **3D Registered**

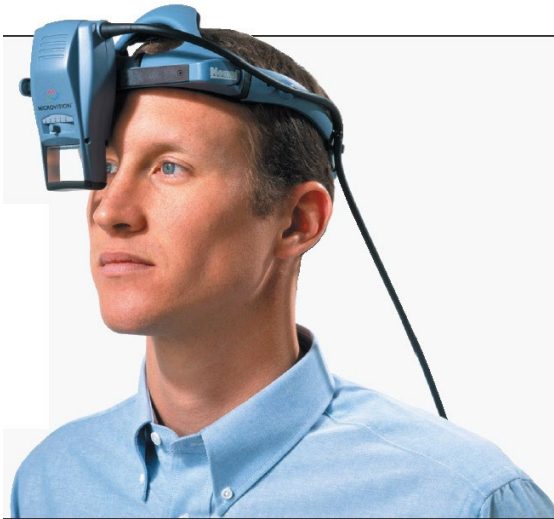- – Ability to **Track User** using **Computer Vision** and **Sensors**

http://en.wikipedia.org/wiki/Augmented_reality
http://www.howstuffworks.com/augmented-reality.htm

Augmented Reality – Visualization Approaches

- **Overlay Displays** in Mobile Devices

- **Head-Mounted Displays**

- **Virtual Retinal Displays**

Augmented Reality – Possible Applications

- **Advertising**: promote a new product via an interactive, web-based AR application.

- **Support Complex Tasks**: assembly, maintenance, and surgery can be simplified by inserting additional information into the field of view.

- **Navigation Devices**: head-up displays used in fighter jets.

- **Military and Emergency Services**: wearable systems to provide information such as instructions, maps, enemy locations, and fire cells.

- **Prospecting**: in hydrology, ecology, and geology, AR can be used to display an interactive analysis of terrain characteristics.

- **Architecture**: simulate planned construction projects.

- **Sightseeing**: show places as they previously existed.

- **Collaboration**: conferences with real and virtual participants.

- **Entertainment and Education**: virtual objects in museums, theme park attractions and games.
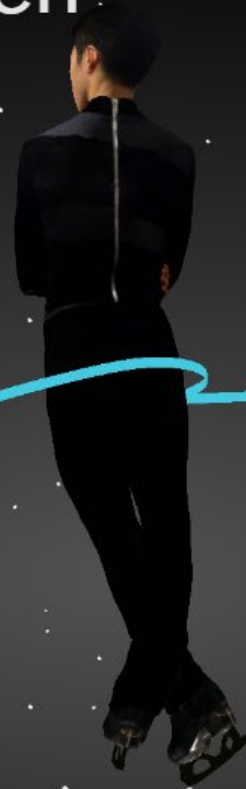
Four of the Best Olympians, as You've Never Seen Them
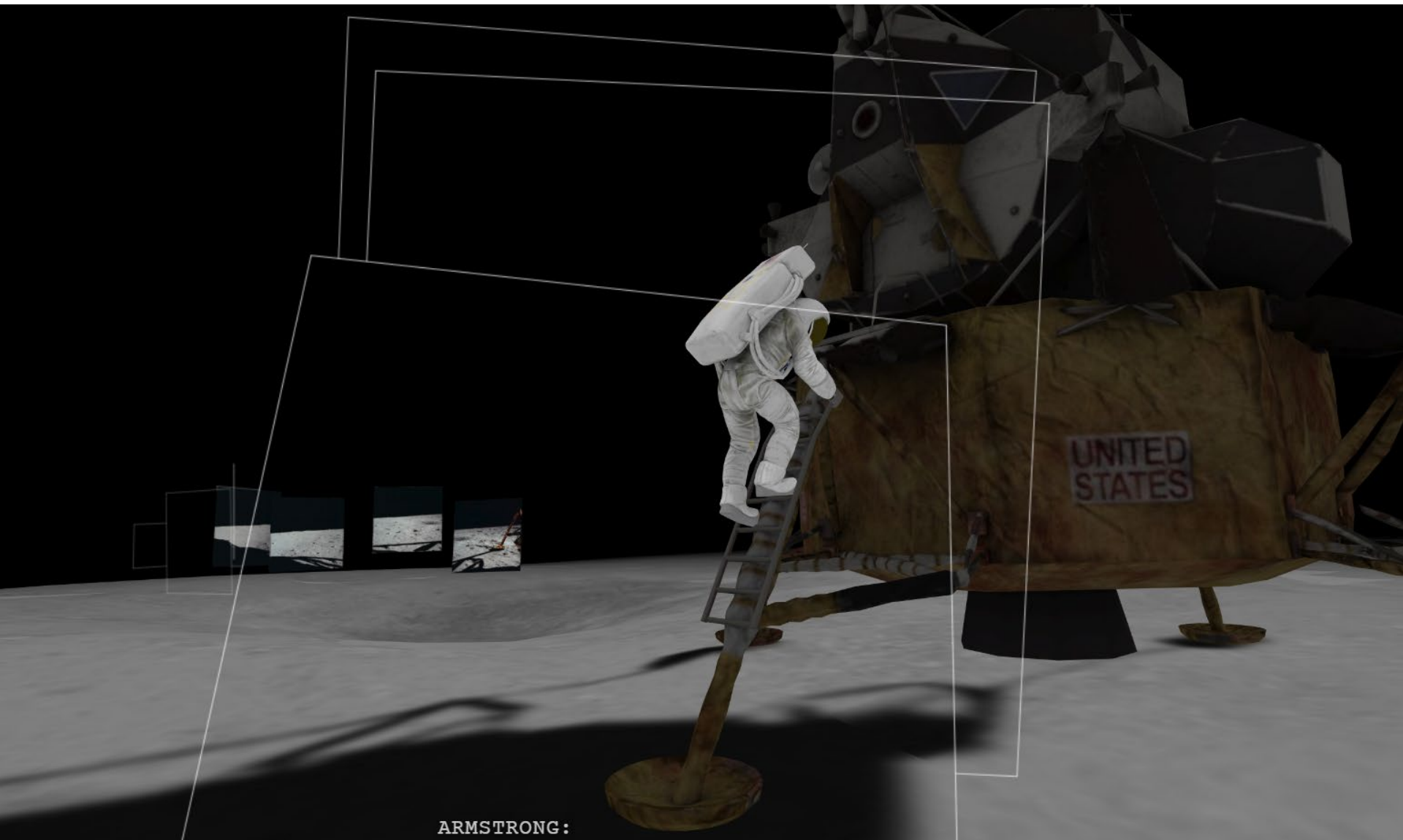https://www.nytimes.com/interactive/2018/02/05/sports/olympics/ar-augmented-reality-olympic-athletes-ul.html

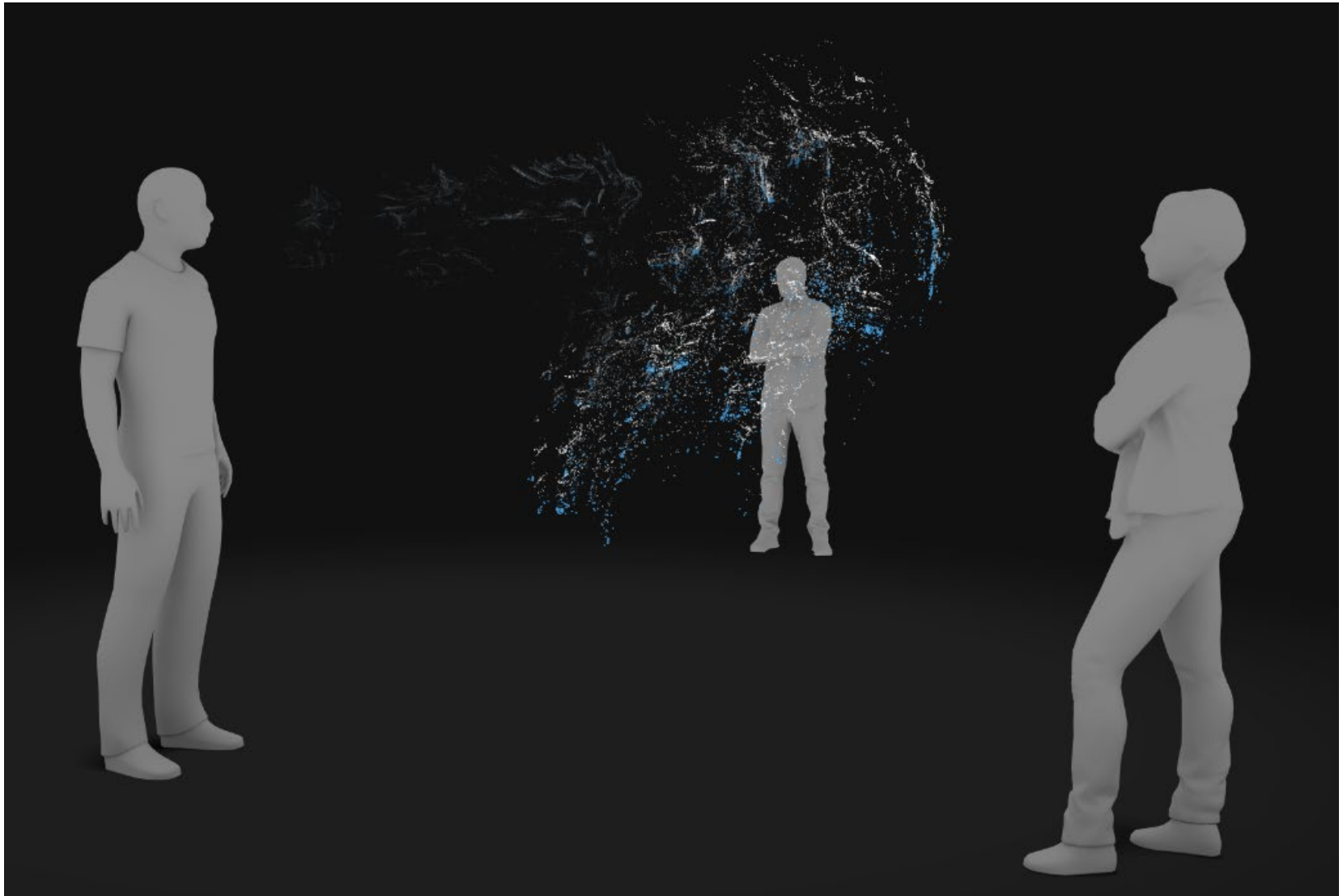## Apollo 11 - As They Shot It - A Small Step
https://www.nytimes.com/interactive/2019/07/18/science/apollo-11-moon-landing-photos-ul.html
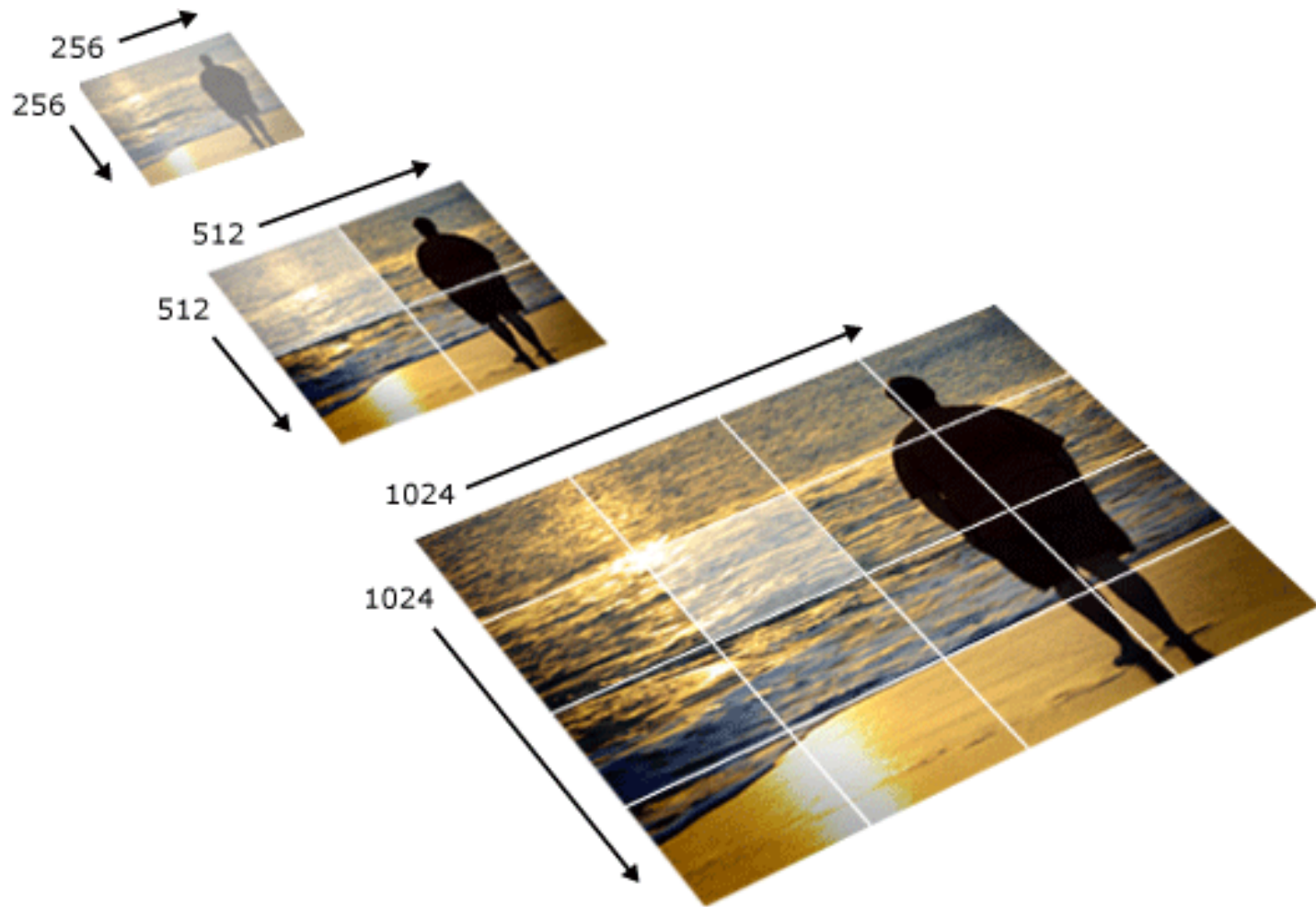
NYTimes Visualizations – Augmented Reality

This 3-D Simulation Shows Why Social Distancing Is So Important
https://www.nytimes.com/interactive/2020/04/14/science/coronavirus-transmission-cough-6-feet-ar-ul.html
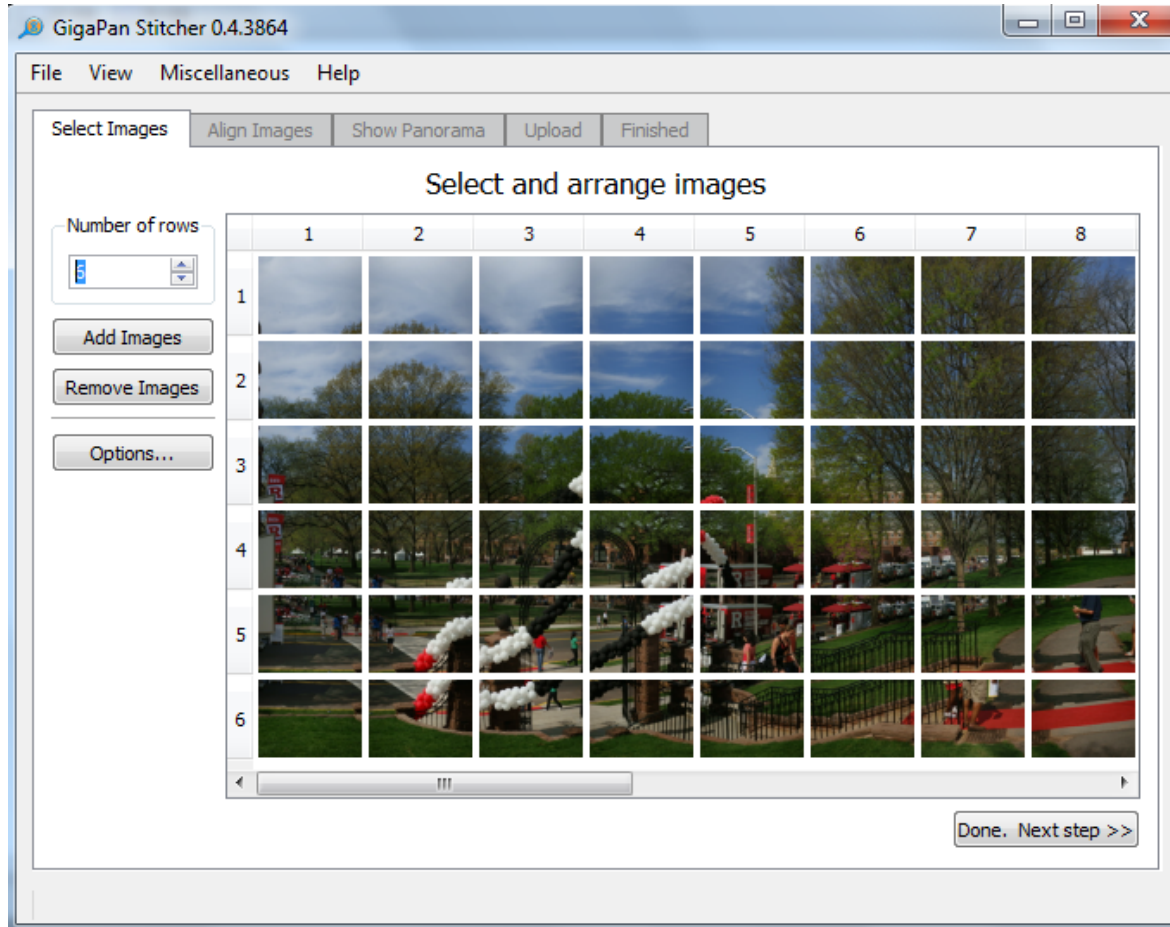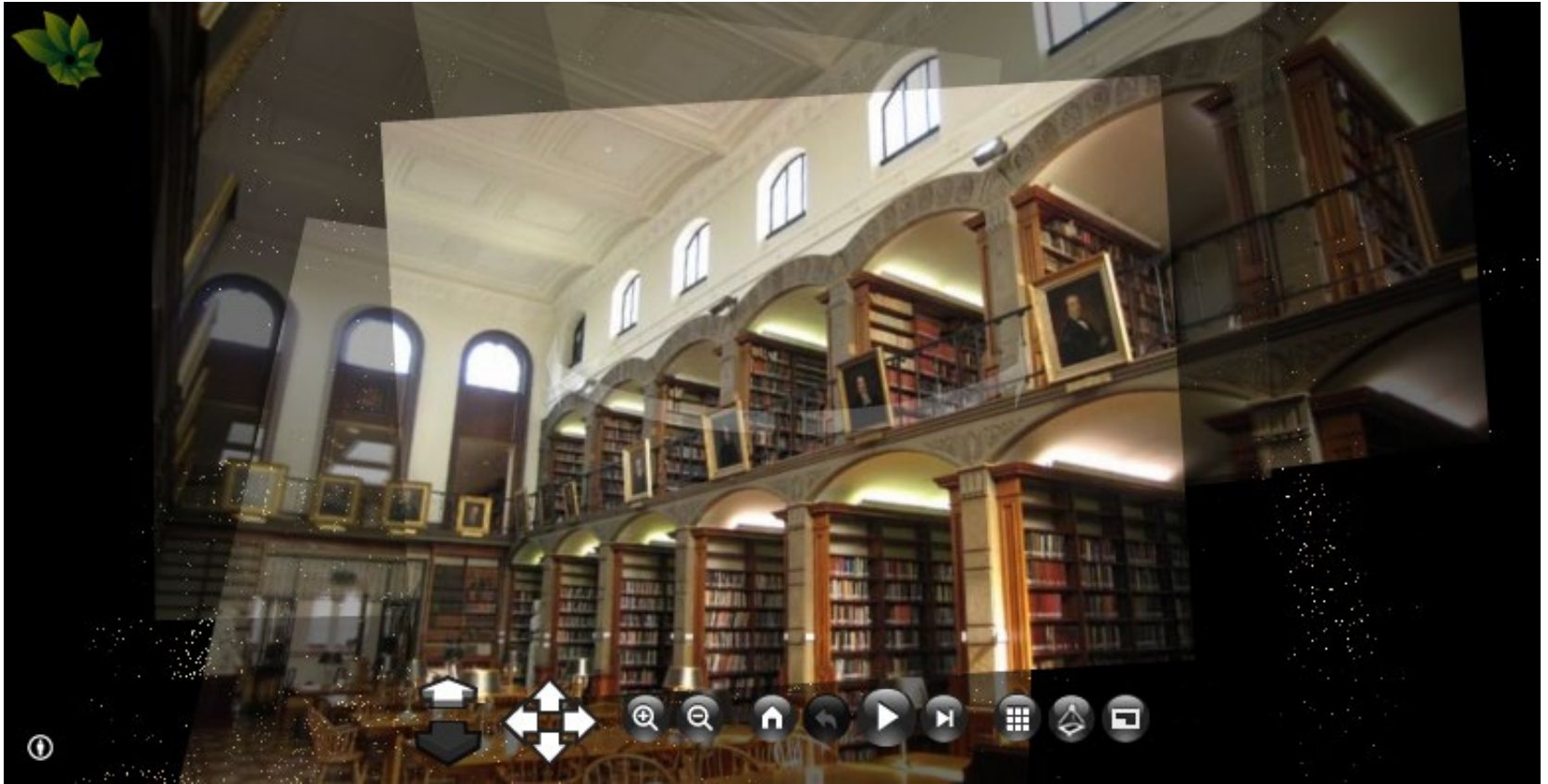
Infinite Zooming" – Seadragon's DeepZoom

256

256

512

512

1024

1024

http://seadragon.com/

Gigapan – stitching multiple images into image pyramid

Gigapan ➔ **Google Earth** ➔ **"Streetview" Anywhere**

Photosynth – linking images based on pattern matching

http://whereru.rutgers.edu/photosynth.html

whereRU: Virtual Experience of Rutgers using Gigapans & Photosynths

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Tools & Links

Photosynth site

Gigapan site

360cities site

Krpano site

whereRU site

Definitions: Gigapixel | Zoomable Interfaces | Map Projections