

360

End-2-End

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IMPA

Outlook

- Motivation
- 360 @ Visgraf
- State-of-the-Art
- The Course

Motivation

360 is the Way!

End-2-End

- Input
 - Cameras
 - Sensors
- Output
 - Displays
 - Sound



dependencies

Cameras

- Omnidirectional
 - Insta-360
- Plenoptic
 - Lytro Immerge
- RGB-D
 - Real Sense



The Dream Camera

- 360 Degrees
- Depth
- HDR
- Adaptive Resolution
- Noiseless
- Robotic

Displays

- Full Dome
 - LA Sphere
- Head Mounted (HMDs)
 - Apple Vision Pro
- Light Field (Plenoptic)
 - NVIDIA Near Eye



Ideal Display

- Stereo 3D / Holographic
- Viewpoint Aware
- Tone Mapped HDR
- Retina High-Res
- Space Embedded
- Zero Latency

Dilema!



individual

or



group

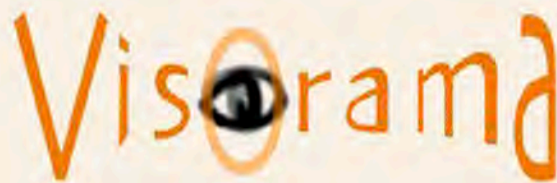
- Are Theatres Doomed?
- Multiple Scenarios / Platforms ...

360 @ VISGRAF

Timeline

- Visorama (1997)
- N-Pan (2009)
- RioHK (2010)
- Expanded Panoramas (2013)
- IMPA+IMS (2018)
- Ray VR (2019)
- Interactive 360 VR (2019)
- Egypt XR (2024)

Visorama



Visorama is a virtual reality system
which makes possible new multimedia applications.

[Visorama Development \(VISGRAE/IMPA\)](#)

[Visorama Applications \(ECO/UFRJ\)](#)

[Visorama Software \(Version 1.0\)](#)

N-Pan



RioHK

RIO·HK: The Rio–Hong Kong Connection.

[Info](#) | [News](#) | [Gigapixel Panoramas](#) | [Textured Models](#) | [Documents](#) | [Related](#)

Latest news:

- 67 Gigapixel image of Rio de Janeiro, produced by RioHK project, is part of the exhibition "Understanding the Earth", from Ars Electronica GmbH in Linz (April 2013)
- The new CICC video wall will feature our panoramic image from URCA (April 2013)
- US students learn about Brazil with gigapixel image from RioHK project (November 2012)
- Press Release on the world record at HKUST (December 2010)
- Jdo É magazine publishes a note on our panorama "Sugar Loaf, 0.15 TP" (October 2010)
- News clip about our panorama "Sugar Loaf, 0.15 TP" at TV Brasil (October 2010)



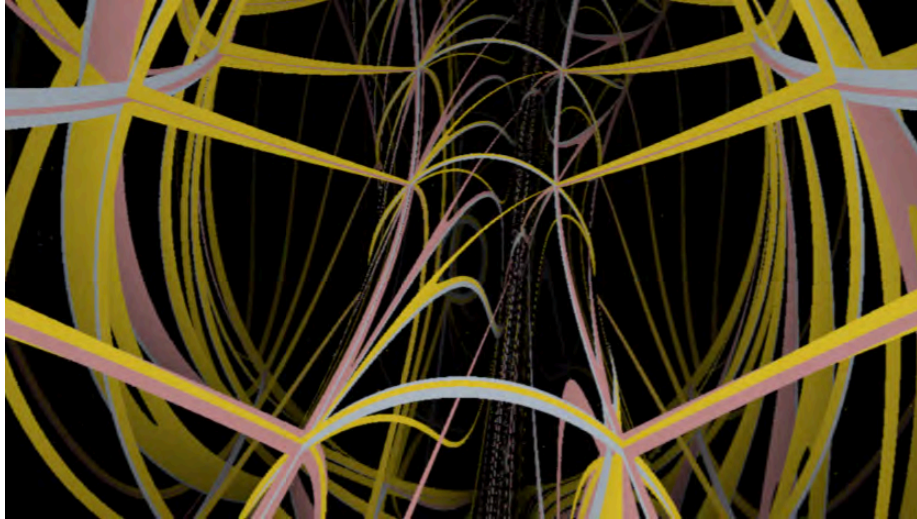
Expanded Panoramas



IMPA+IMS



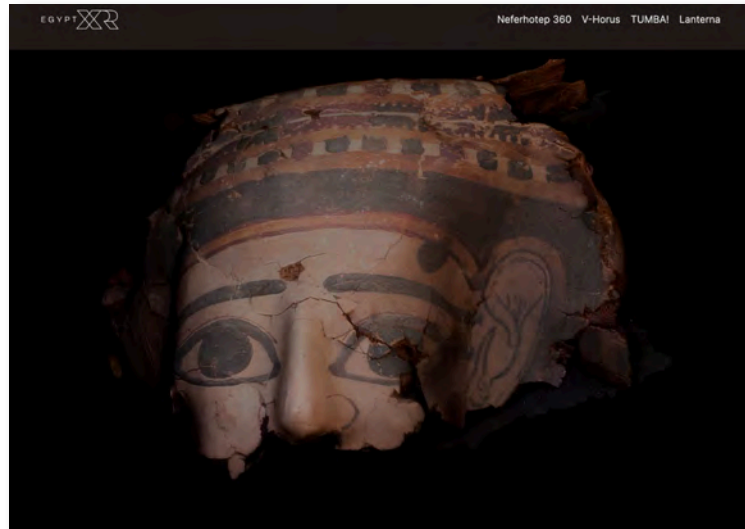
Ray VR



Interactive 360 VR



Egypt XR



State of the Art

Immersive Light Field Video with a Layered Mesh Representation

Michael Broxton, John Flynn, Ryan Overbeck, Daniel Erickson,
Peter Hedman, Matthew DuVall, Jason Dourgarian,
Jay Busch, Matt Whalen, Paul Debevec

Google LLC
SIGGRAPH 2020

This video has audio.





LayerPano3D: Layered 3D Panorama for Hyper-Immersive Scene Generation



The Course

Administrivia

- About the Course
- Course Material
- Lecture Schedule
- Coursework
- Resources

Website

360 e-2-e: <i>Analysis and Synthesis of Omnidirectional Video</i> IMPA - August to November 2025	
About the Course	<ul style="list-style-type: none">• Course Description• Instructor: Luiz Velho• Meets
Course Material	<ul style="list-style-type: none">• Bibliography
Lectures	<ul style="list-style-type: none">• Schedule• Reading Material• Videos
Resources	<ul style="list-style-type: none">• Elsewhere• Resources• Etc.