

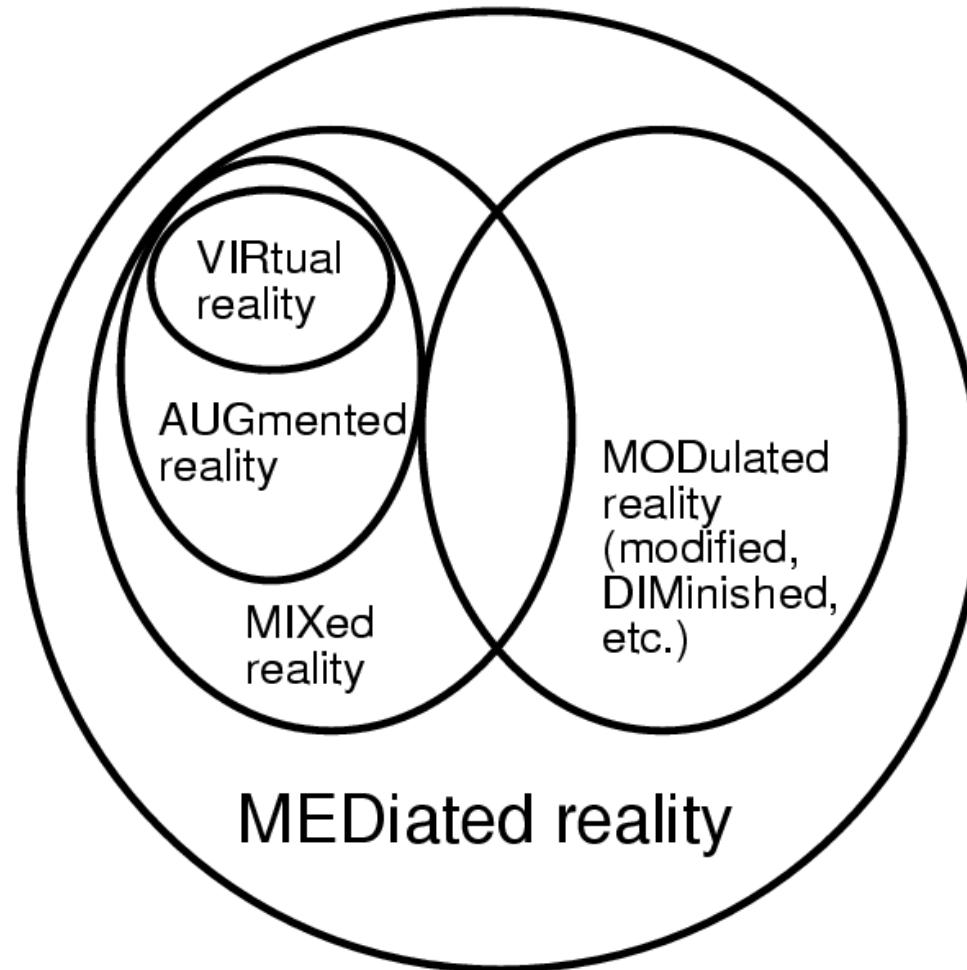
Virtual Reality Augmented Reality

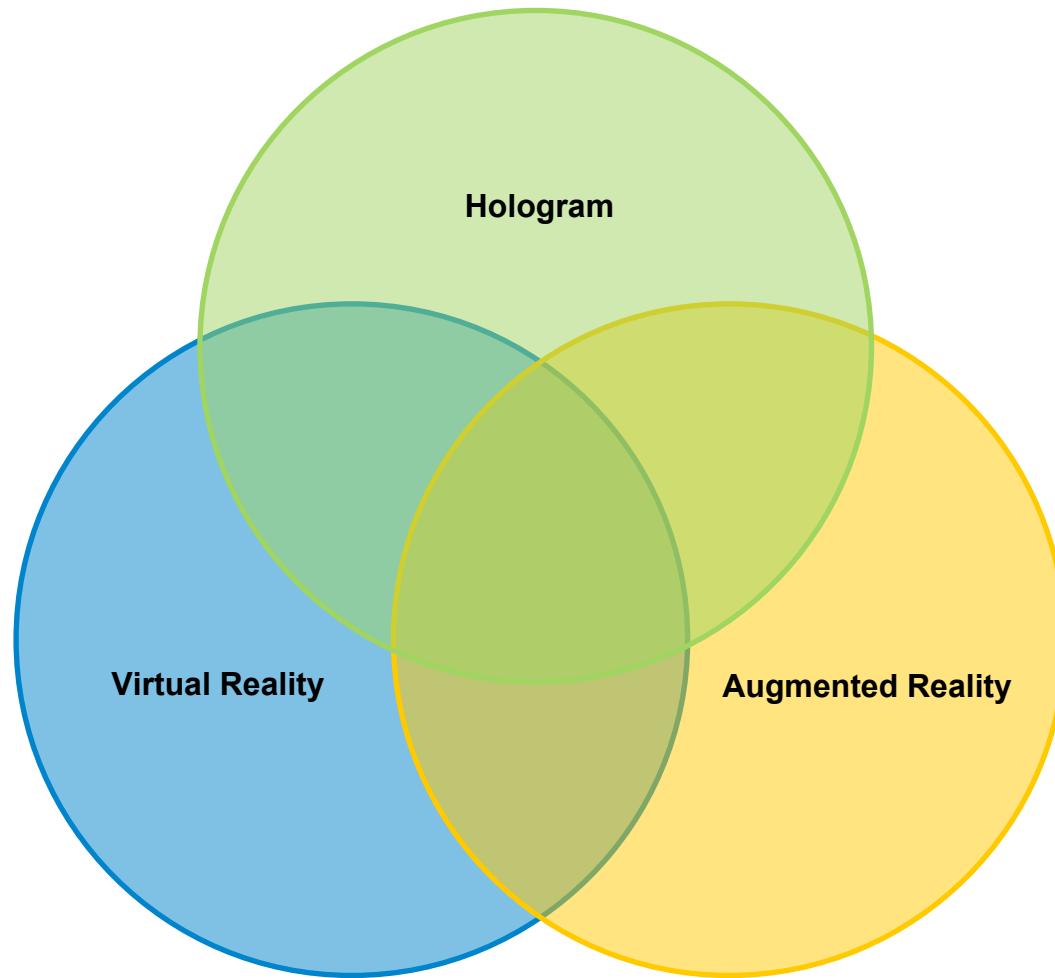
UXE Team - Tongfang Sun

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User Experience, Princeton, NJ

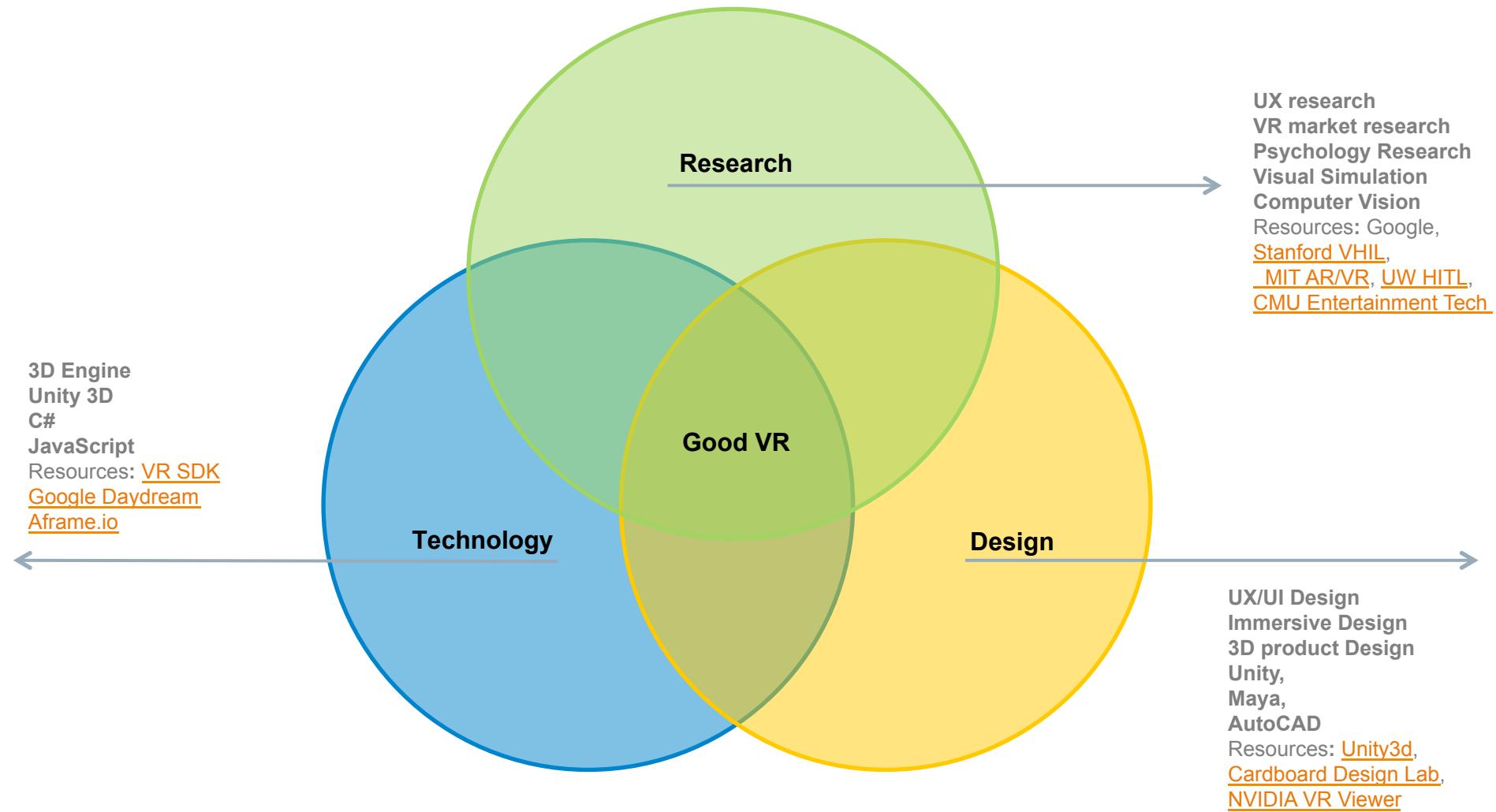




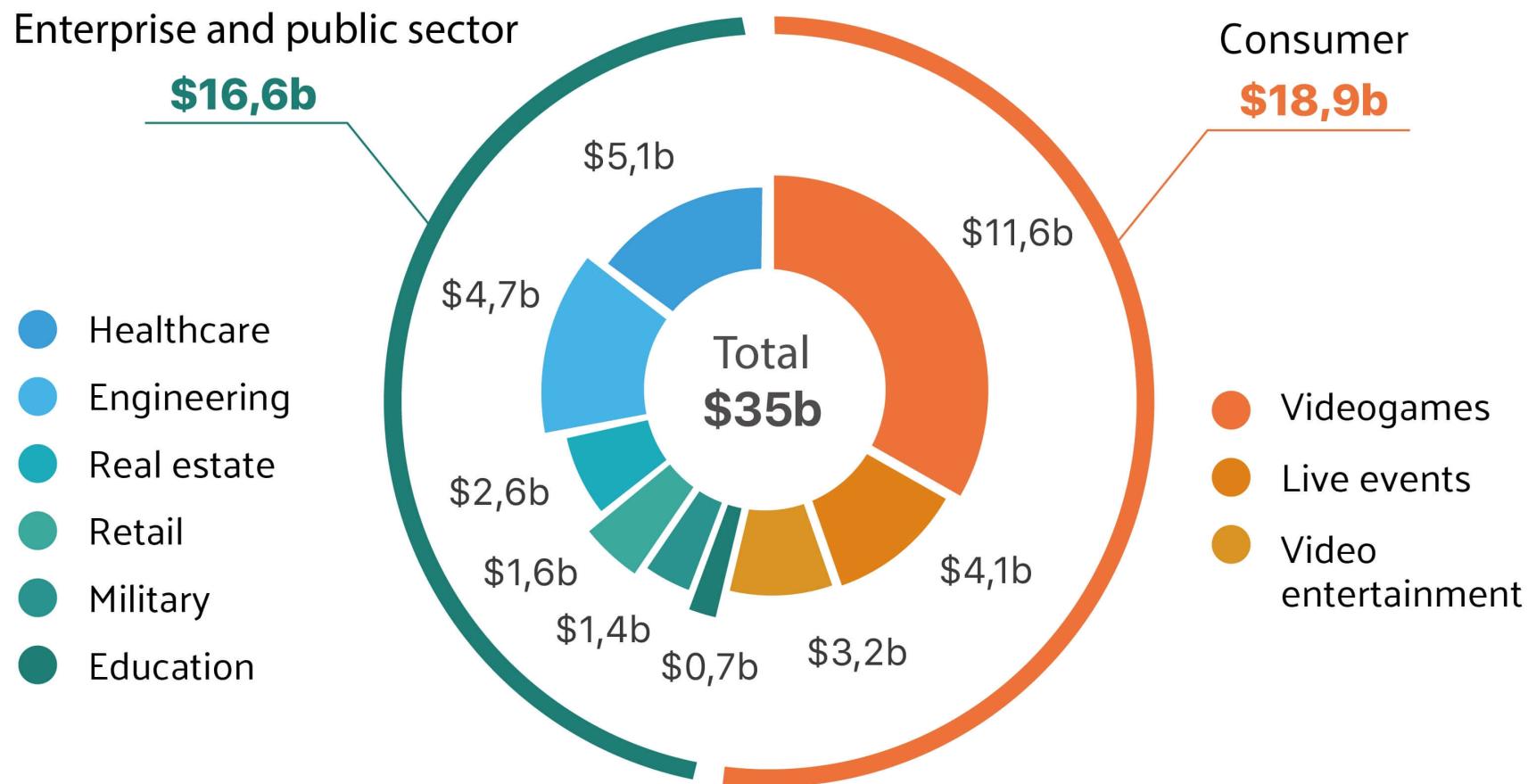


| Products | Definition | Products & Companies |
|-----------------------|--|--|
| Virtual Reality | A realistic and immersive simulation of a 3 dimensional environment , created using interactive software and hardware, and experienced or controlled by movement of the body | <ul style="list-style-type: none">• Hardware: Oculus, Sony, Google, WorldViz, ...• Software: Steam, Unity |
| Augmented Reality | A live direct or indirect view of a physical, real-world environment whose elements are augmented | <ul style="list-style-type: none">• Hardware: Google, lots of daily device...• Software: Pokemon Go, Visual Art, Heads up Display |
| Holography / Hologram | A photographic recording of a light field , rather than of an image formed by a lens, and it is used to display a fully three-dimensional image of the holographed subject . | <ul style="list-style-type: none">• Hardware: Magic Leap, Musion, Eyemonic• Software: No needed so much |

Virtual Reality

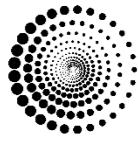


The Diverse Potential of VR & AR Use Cases in 2025





25 Virtual Reality Use Cases And their leading innovators



Venture
Radar

Cinema

JAUNT

Meditation



Sports Training



Recruitment

Wade & Wendy

Pain Relief



Mental Health



Travel



Architecture

iris

Education



“People Will Spend the Majority of
Waking Time in Virtual Reality by 2020”

- Zack Kanter

Surgery Training



Automotive Design



Sports Spectating

livelike

Pilgrimage



Social Networking

AltspaceVR

Workspaces

Breakroom

Industrial Training



Marketing



Courtroom



Journalism



Flying



Data Visualisation



Cognitive Training

CEREVRUM

Manufacturing



Gaming

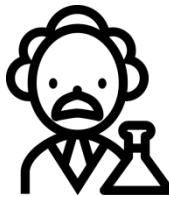


Shopping



Good VR Startup Structure

Professor with many years experience in AR/ VR, has patient, nice published paper



CEO, has experienced to build a startup company, manage skills



PhDs help the professor to make the patient or paper theory to application



Employees (developer, designer, manager, ...)

Desktop VR (Oculus Rift Touch, HTC Vive)



Cons

- High requirement for computer. (at least i5, NVIDIA GTX 970)
- Only for gaming
- Wired



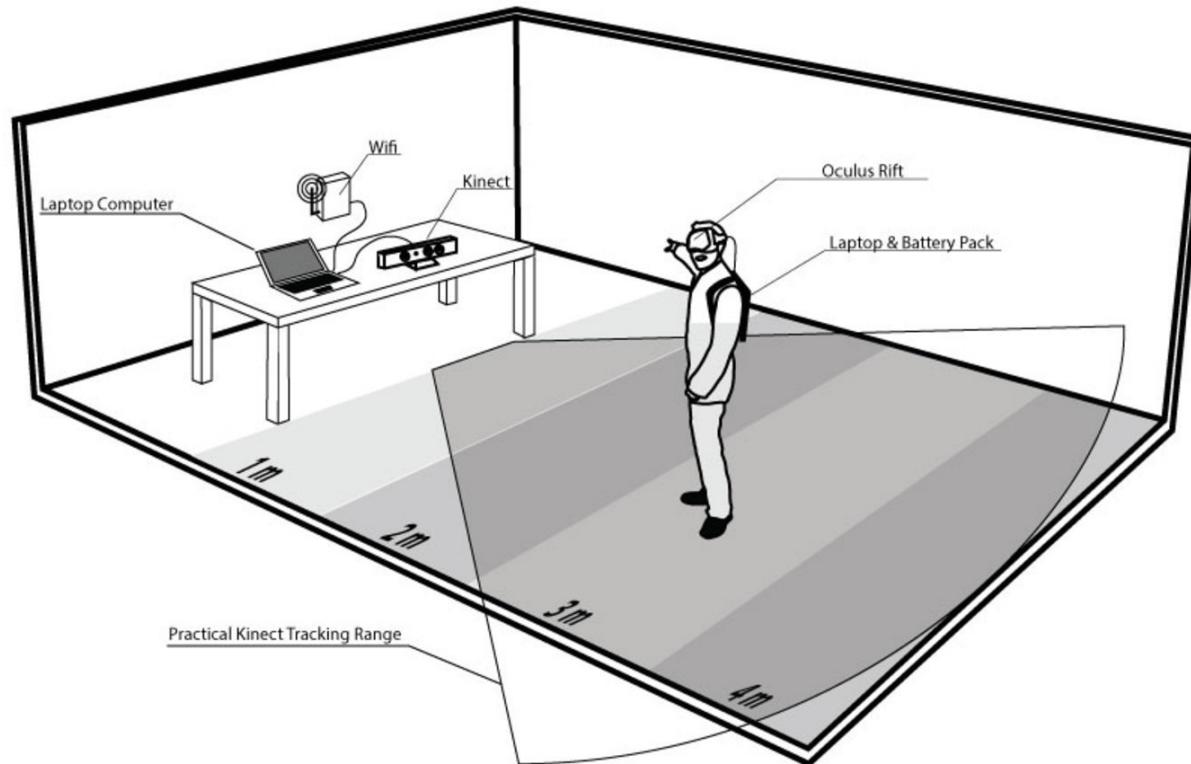
Pros

- Interaction Tool for gaming
- Play game in Steam VR
- Better interact than air gesture



- Core Tech**
- VR station system
 - 3D simulation (gaming)
 - Gesture Interaction
 - 3D media
 - Sensor Tracking

- Customer**
- Individual Player (now)



Current

- Chief Scientist in Oculus

Previous

- Valve (Steam) VR Developer
- Wrote **game rom for DirectX7**
- Pro in gaming software not a pro research background scientist



Virtual Reality

Mobile VR (Google Cardboard, Gear VR)

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Pros

- Easy to buy, cheap
- Low requirement to device
- Nice for public to use and accept
- Nice try

Cons

- Bad User Experience
- Not good interaction design
- Lack of system support
- Bad design

Virtual Reality

Google Cardboard core tech

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Core Tech

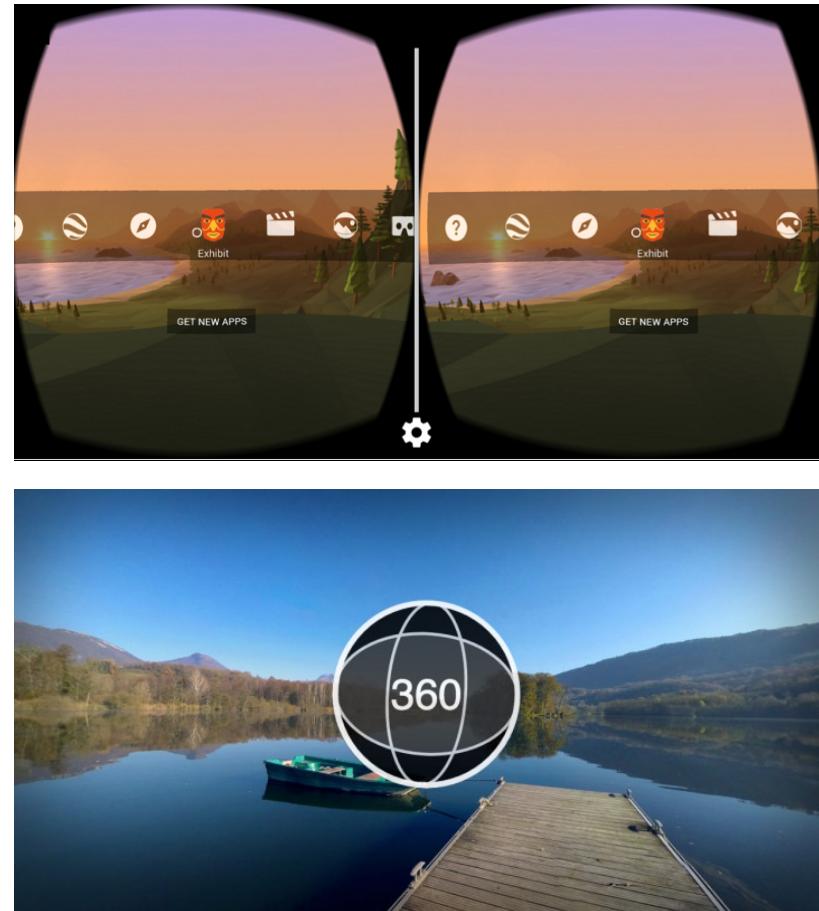
- System Platform
 - Android based on Java
 - Game engine for Unity using C#
 - iOS system

Good environment

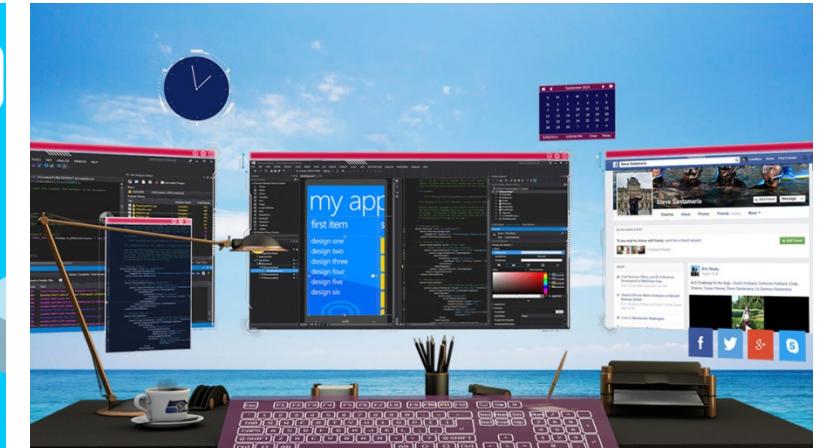
- 360 degree viewer
 - GoPro
 - YouTube
 - Facebook
- Millions independent small startup

Customer

- Public



VR Potential Companies with core tech



Potential VR Hardware company – Leap Motion

Sensor Device for VR to improve the interaction experience

Core Tech

- Sensor Degree 135 degree
- More flexible gesture
- Good match with current device
 - Windows 7
 - Oculus or Vive
- Try out in other fields (Medicare, education and etc)

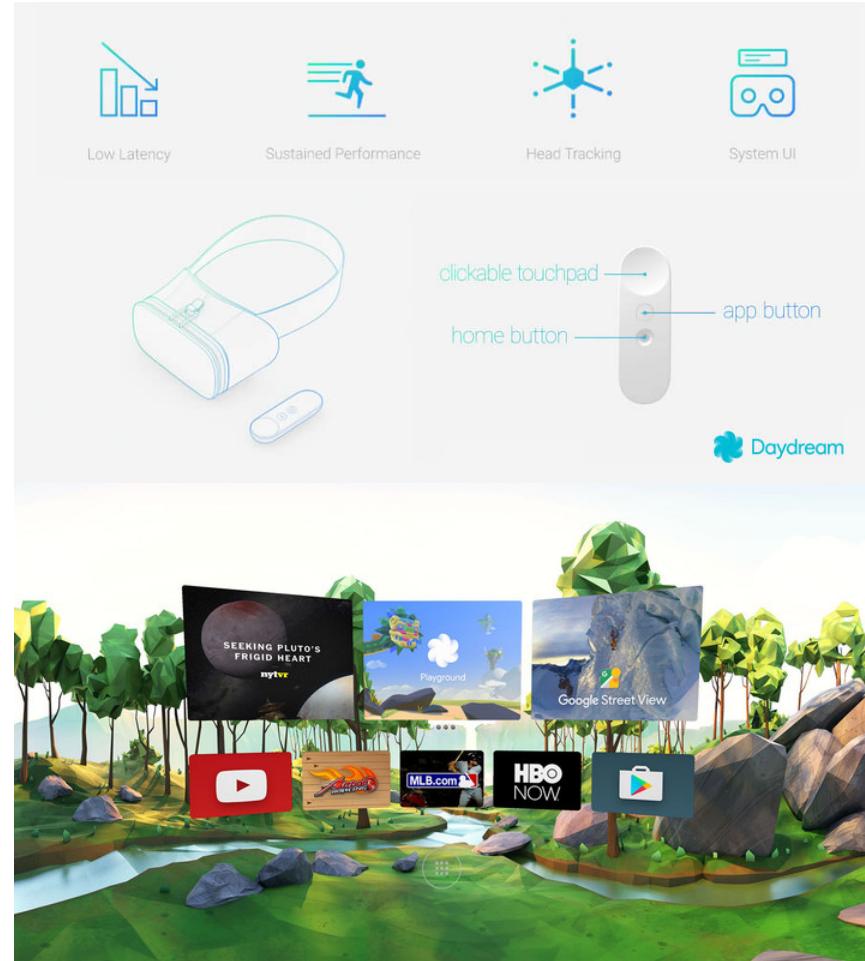


Virtual Reality

Potential VR software company – Daydream

Virtual Reality System and device for public
Core Tech

- System Platform
- Compatible for all VR Device
 - Windows → PC
 - Android → Smartphone
 - Daydream → VR



Virtual Reality

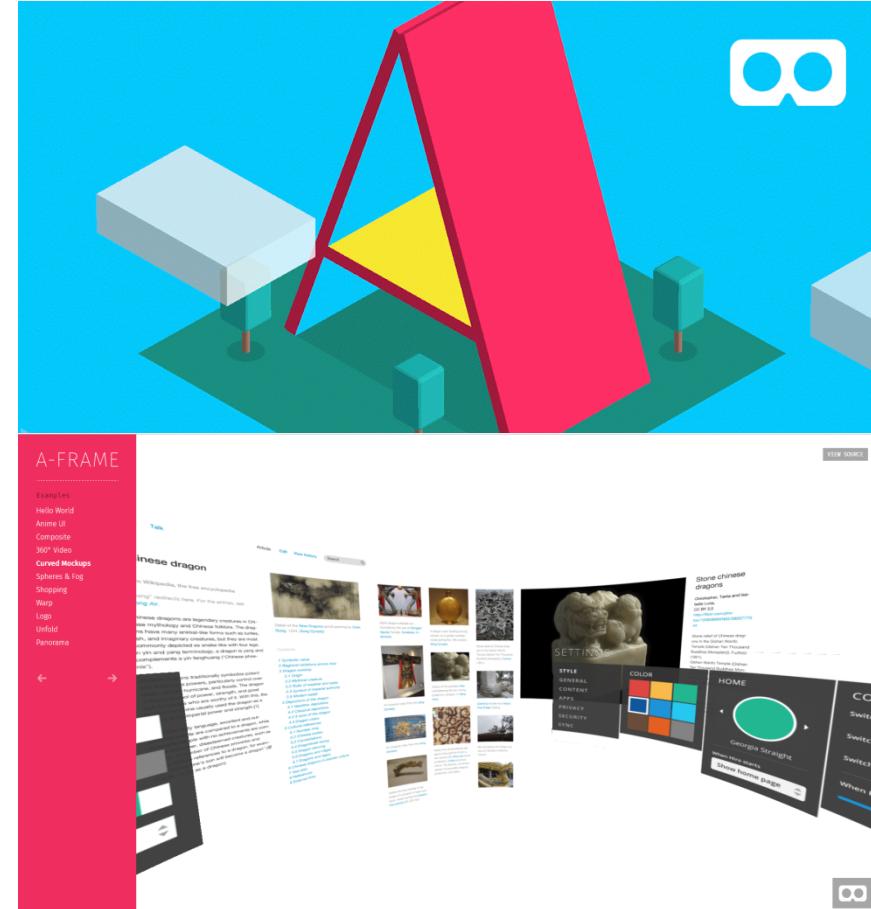
Potential VR software company – Aframe.io

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Open source package for VR app prototype

Core Tech

- Open Source for VR prototype
- Based on Html, JavaScript
 - 360 degree view
- Startup has lots of potentials
- Package easy to use



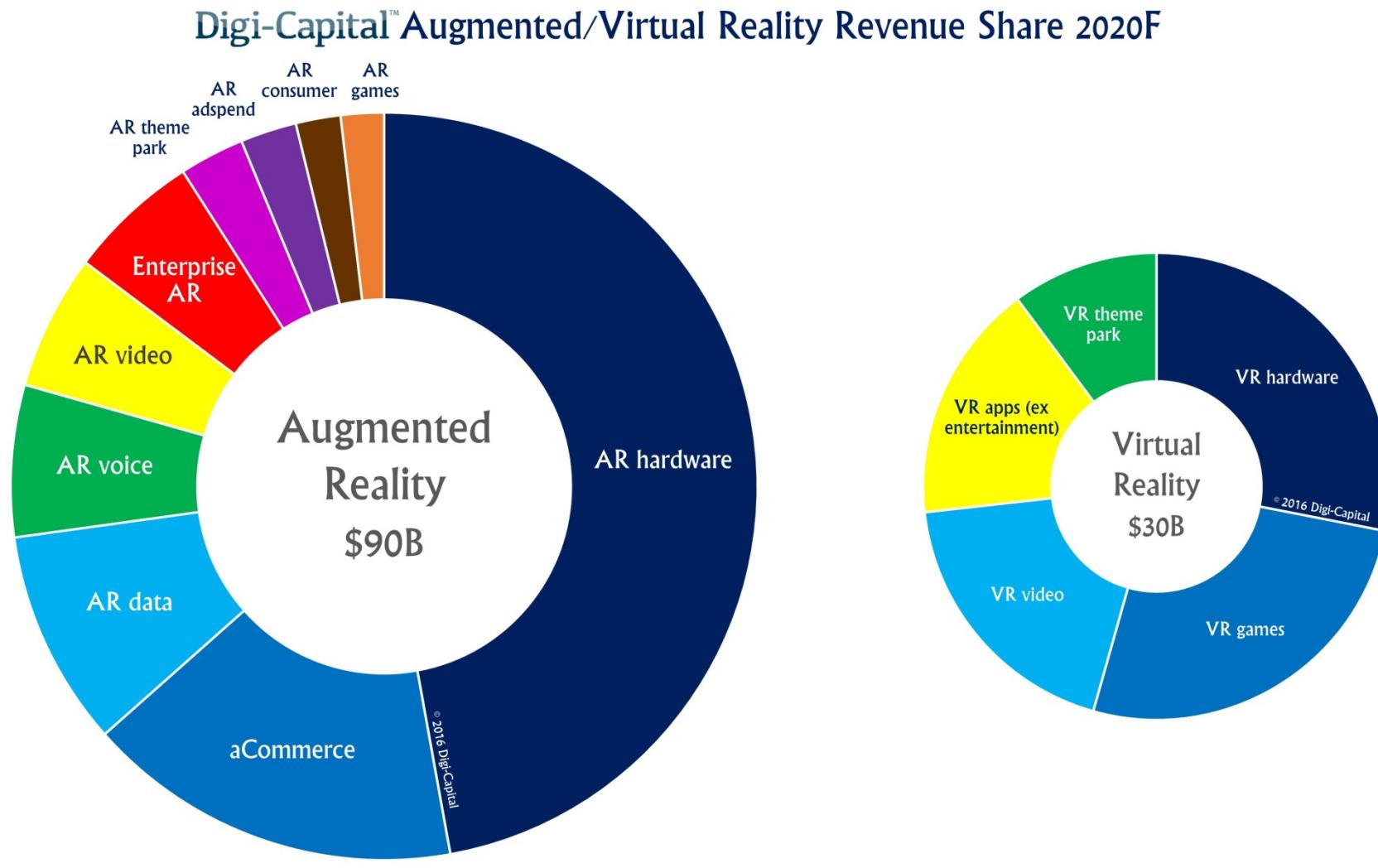
Potential VR software company – Envelop VR

VR Platform based on Windows System
Core Tech

- Envelop VR – Windows App
- Work office in VR platform
- VR interface system
- Have good research team to support



Augmented Reality



Augmented Reality



Technology

• Hardware

- Head mounted (HoloLens)
- Glasses (Google Glass)
- HUD (Audi, BMW)
- Contact lenses
- Virtual retinal display
- Eye Taps

Augmented Reality

Potential VR Hardware company – NVIDIA

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Core Tech

- Computer Vision
- Graphic Processing Tech
- Better Computer GUI understanding than competitors
- Cheap price
- Better design
- Does not isolate people's habits
- Easy to adapt



Potential VR Hardware company – Google Tango

Core Tech

- Computer Vision
- Unity SDK
- Java API
- C API
- Platform:
 - Mobile/ tablet
 - Easy to use
 - Nice interaction
- <https://github.com/googlesamples/?query=tango>
- Example: Pokemon Go

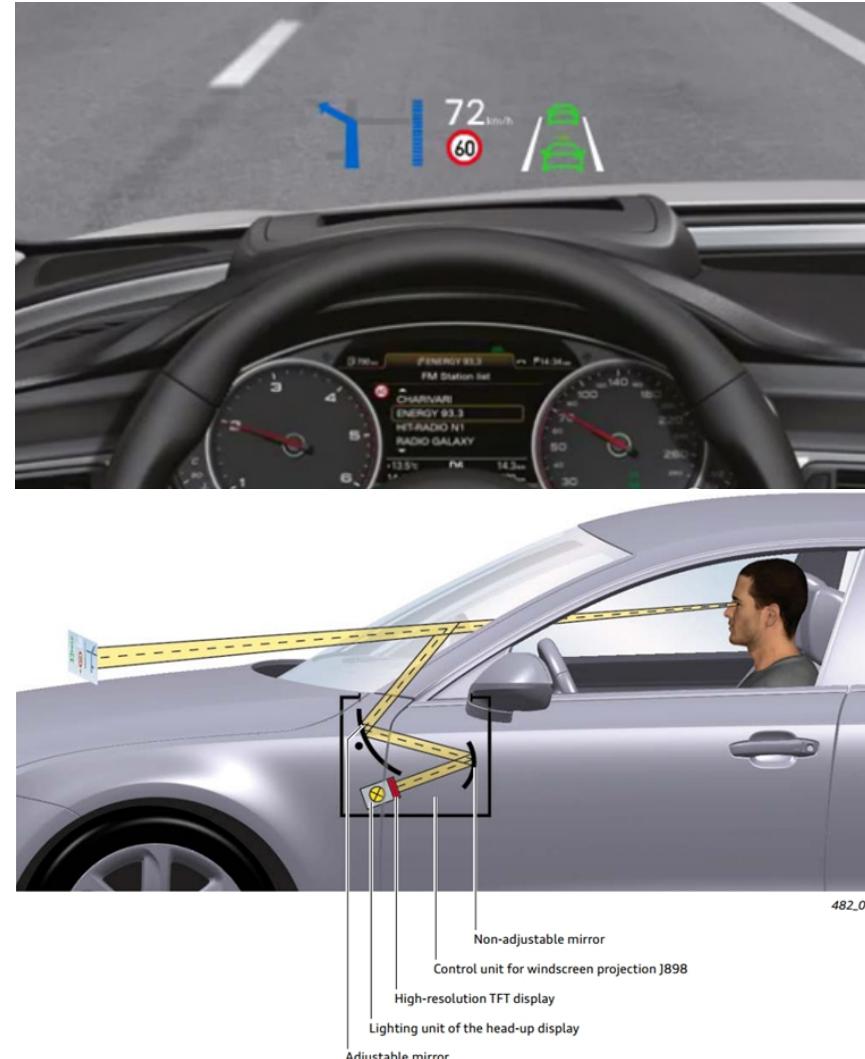


Augmented Reality Heads Up Display (HUD)

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Core Tech

- Vehicle
- Real time tracking
- Good use cases not high technology
- [Resources](#)

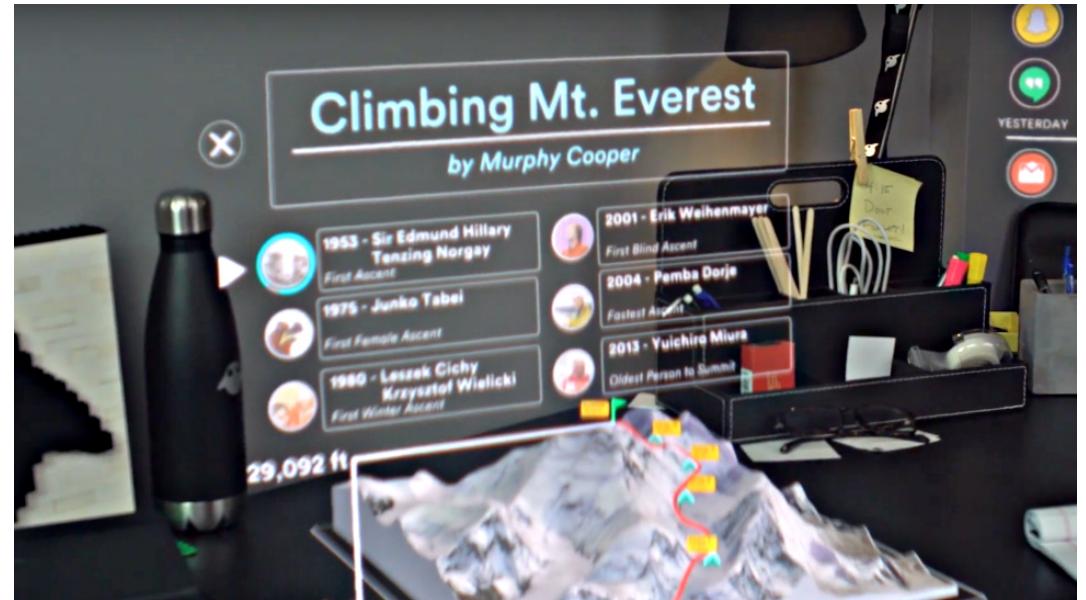


Hologram Magic Leap

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Core Tech

- ???
- ???
- ???
- Scientist
 - Ruigang Yang
 - Gary Bradski
 - Adrian Kaehler
 - Brian Schowengerdt (HITLab)
 - Alysha Naples (UX design/ research)



Hologram

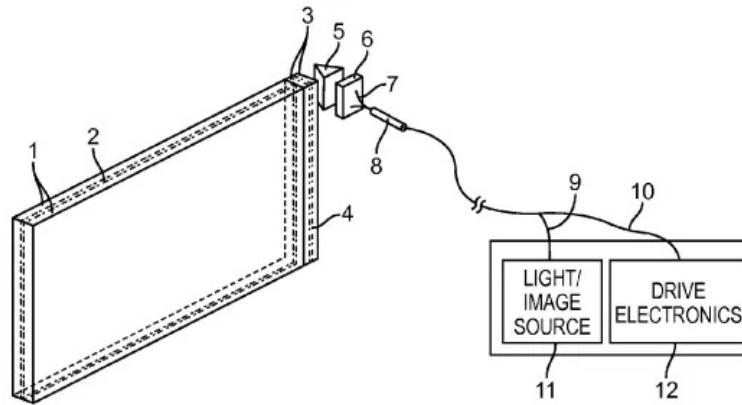
Magic Leap core tech maybe

- Fiber Scanning Display
- Photonic Lightfield Chip

Recourses:

<http://uploadvr.com/magic-leap-how-it-works/>

[https://www.technologyreview.com/s/532001/
how-magic-leaps-augmented-reality-works/](https://www.technologyreview.com/s/532001/how-magic-leaps-augmented-reality-works/)



Hologram Magic Leap (Ruigang Yang)

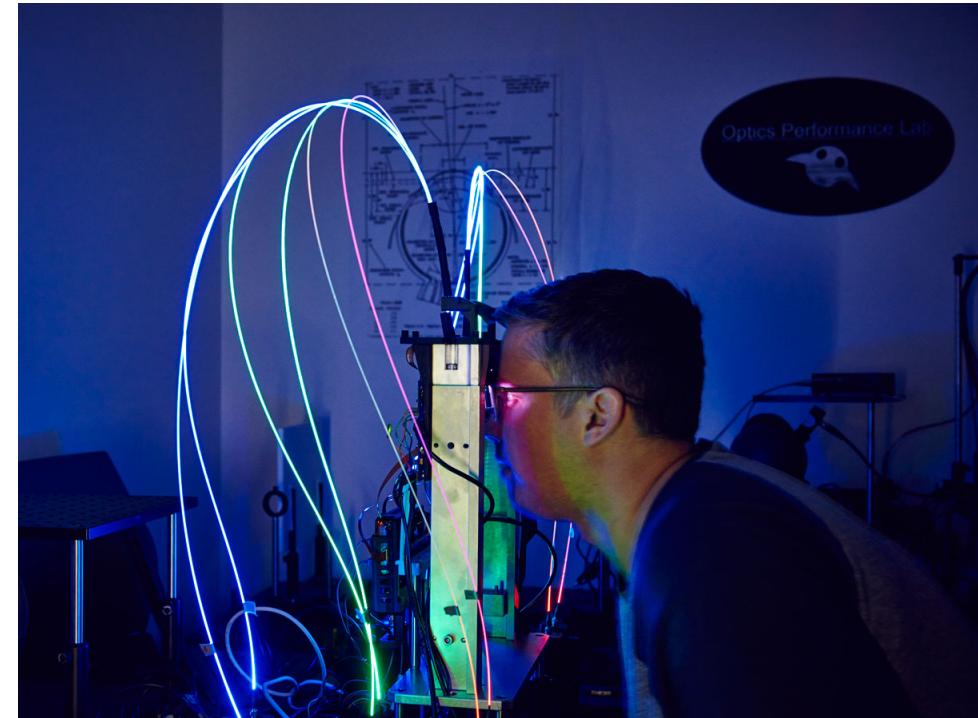
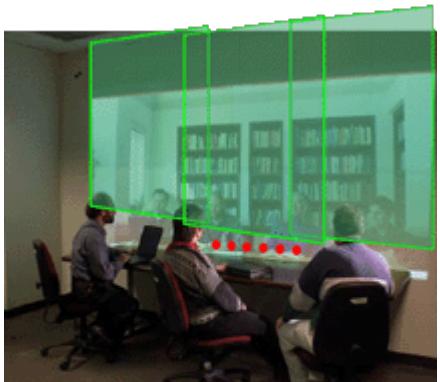
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Core Tech

- Computer Vision
- Line light field rendering

Resources:

[http://www.cs.unc.edu/Research/ootf/
Projects/groupti.html](http://www.cs.unc.edu/Research/ootf/Projects/groupti.html)



Hologram Magic Leap (Gary Bradski)

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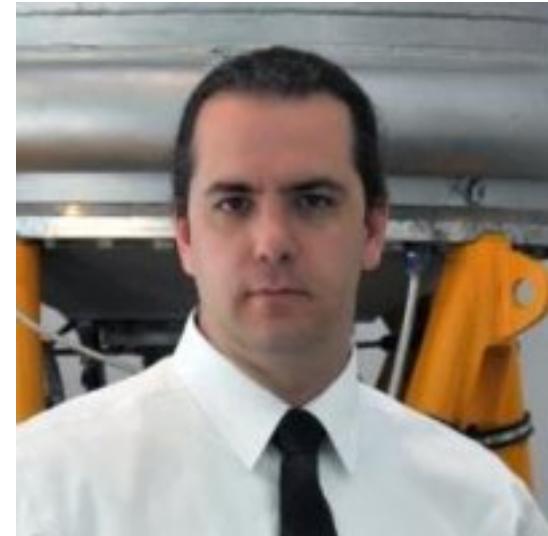
- The OpenCV Library
- Computer Vision Software Library
- Intel



Hologram Magic Leap (Gary Bradski)

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- Was vice president of special project in Magic Leap
- Computer Vision Software Library
- Fields:
 - Robotics
 - Computer Architecture
 - Machine learning



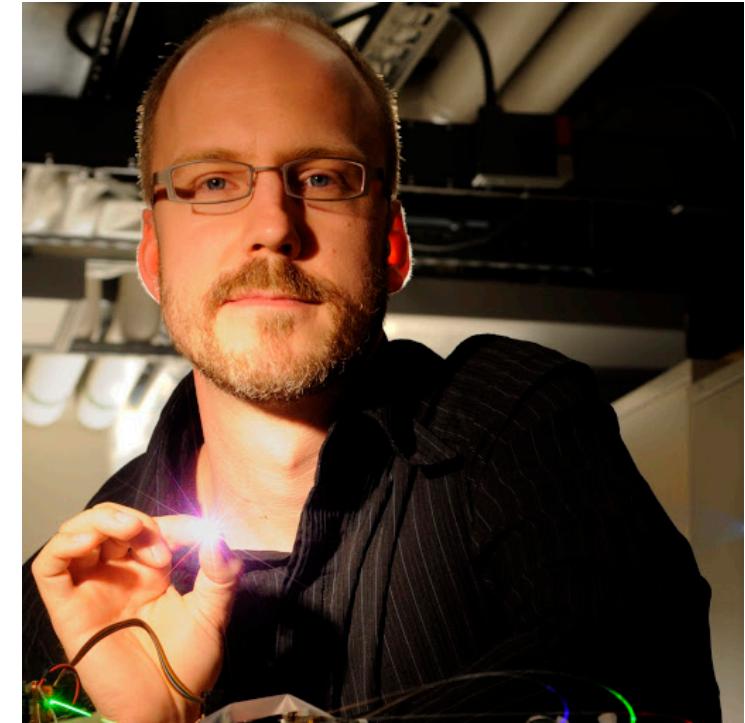
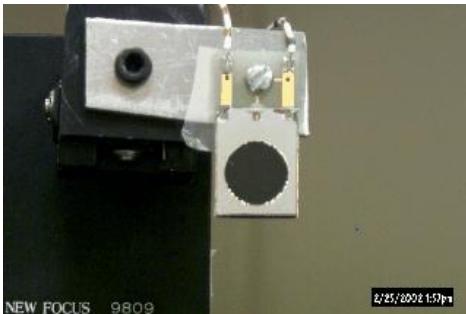
Hologram Magic Leap (Brian Schowengerdt)

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- HITLab Professor (3D true display)
- Chief Scientist in Magic Leap

True 3D scanned voxel displays using single and multiple light sources. *Journal of the Society for Information Display*

<http://www.hitl.washington.edu/projects/common/papers.php?idx=46>



Hologram Magic Leap (Alysha Naples)

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- Was user experience designer/ researchers in Magic Leap
- ISDA
- When Worlds Collide: Physical and Virtual Connections

<https://vimeo.com/142652272>

