

Welcome To  
State Key Laboratory of VR Technology and Systems  
&  
National Engineering Laboratory for VR/AR

 虚拟现实技术与系统国家重点实验室  
STATE KEY LABORATORY OF VIRTUAL REALITY TECHNOLOGY AND SYSTEMS, CHINA



智网互联实验室  
Connected Universal Experiences Labs

# What is Virtual Reality?

## Physical world

Society  
Life  
Products  
Currency  
...



Automatic  
Acquisition

information  
models in the  
physical world

Virtual  
Reality

information models in  
the virtual world

## Virtual world

Virtual society  
Virtual life  
Virtual products  
Virtual currency  
...



Equipments in industries

Equipments for the masses

Real-time interaction

Real-time interaction

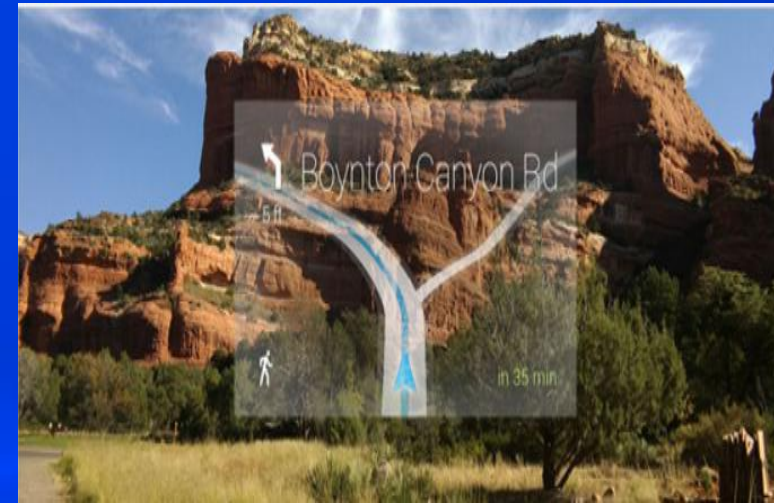


Clients

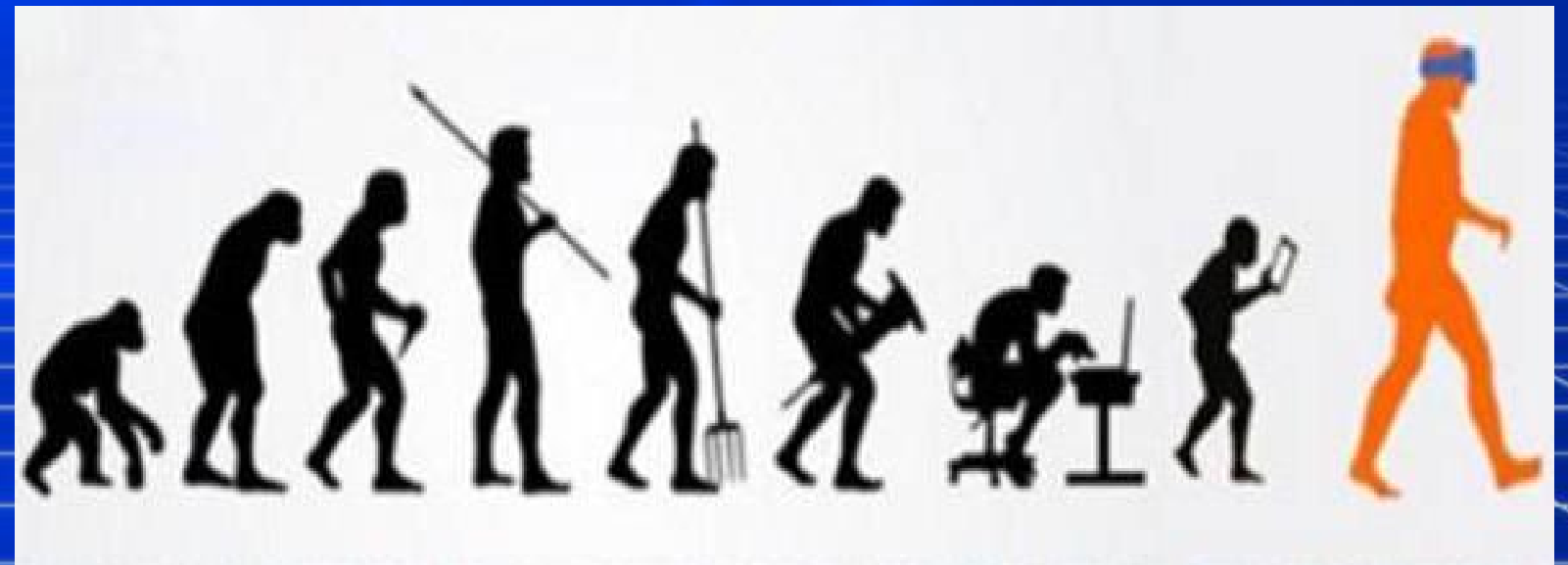


Human society

**In five years, virtual reality will enter into normal people's lives in the form of a universal computing platform.**



VR integrates the virtual world of information with human beings in the physical world, so as to greatly enhance humans' capacities in both the physical world and the virtual world, and to bring remarkable changes to industries and normal people's lives.



# The Beginning of Virtual Reality

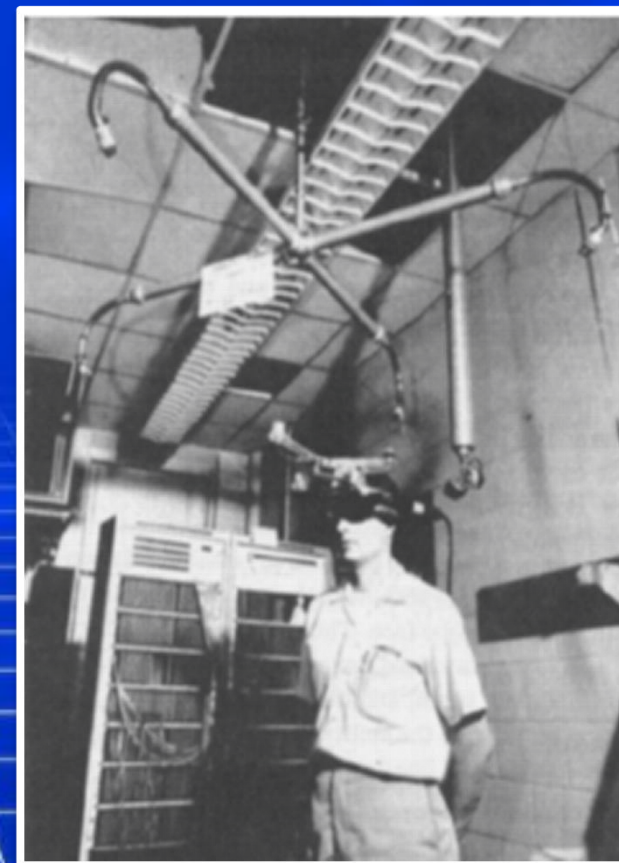
In 1929, Edwin A. Link invented a flight simulator-Blue Box



In 1956, Morton Heilig developed motorcycle simulator-Sensorama with 3D Feedback



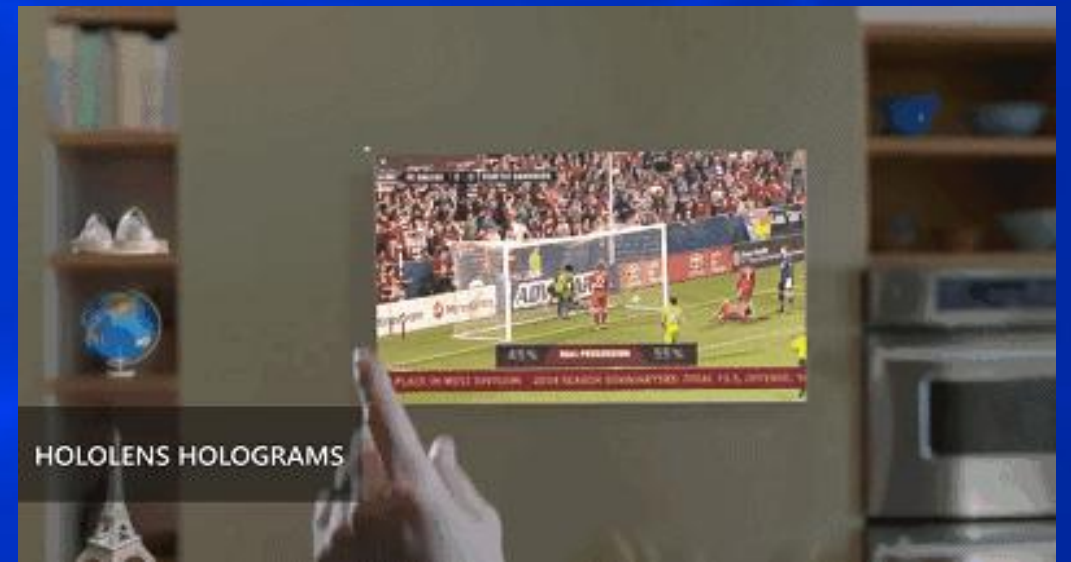
In 1966, Ivan Sutherland made a Hamlet mounted Display



In 1989, Jaron Lanier of VPL Research proposed VR



# Worldwide Applications of Virtual Reality



# Our history sparked the VR research in China

1994

the first  
research lab  
specializing  
in VR in  
China



1999

Leading the  
VR research  
into  
Provincial-  
level



2007

Established  
the only  
State -level  
VR lab with  
Beihang Univ.

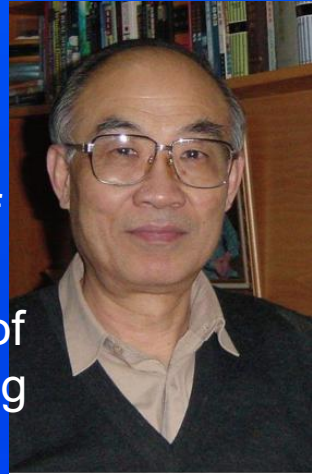


2016

Established  
the only  
National-level  
VR/AR Eng.  
lab

# Advisory Board

WANG  
Chengwei



Member of  
Chinese  
Academy of  
Engineering  
(CAE)

LI  
Bohu



Member  
of CAE

FANG  
Binxing



Member  
of CAE

LU  
Xicheng



Member  
of CAE

SUN  
Jianguang



Member  
of CAE

LI  
Deyi



Member  
of CAE

Ruzena  
Bajcsy



Professor  
of  
UC Berkeley

J. Edward  
Colgate



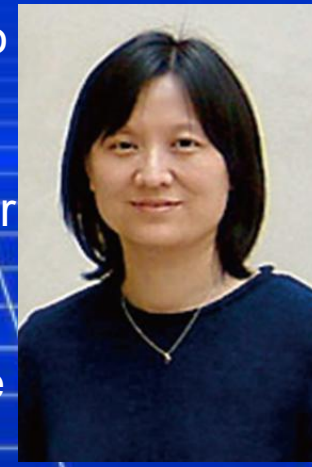
Professor  
of  
Northwestern  
Univ.

Ming C.  
Lin



Professor  
of  
UNC at  
Chapel Hill

Jing Xiao



Professor  
of  
UNC at  
Charlotte

GAO  
Wen



Member  
of CAE

LV  
Jian



Member of  
Chinese  
Academy  
of Science

# Faculty and Research

60 researchers from 6 schools of Beihang Univ.

More than 500 graduate students



## Research Areas

**I Modeling Theory and Methods**

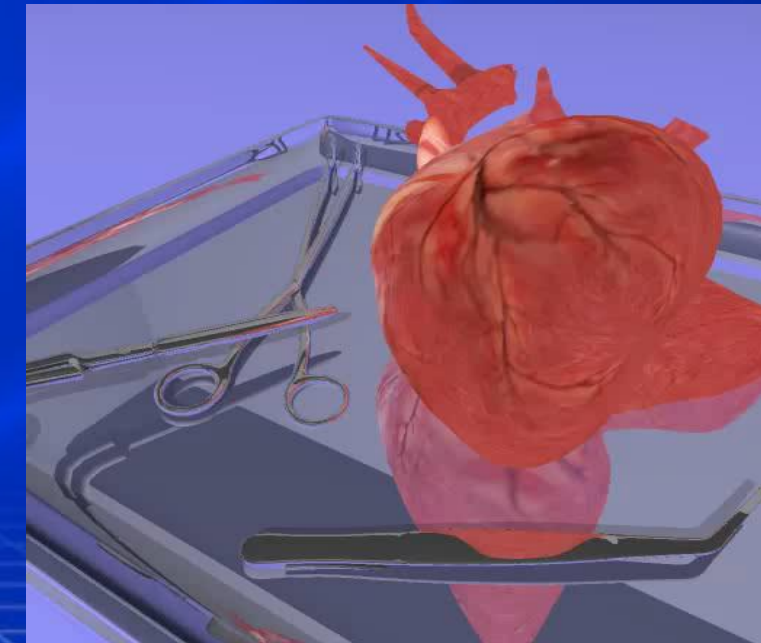
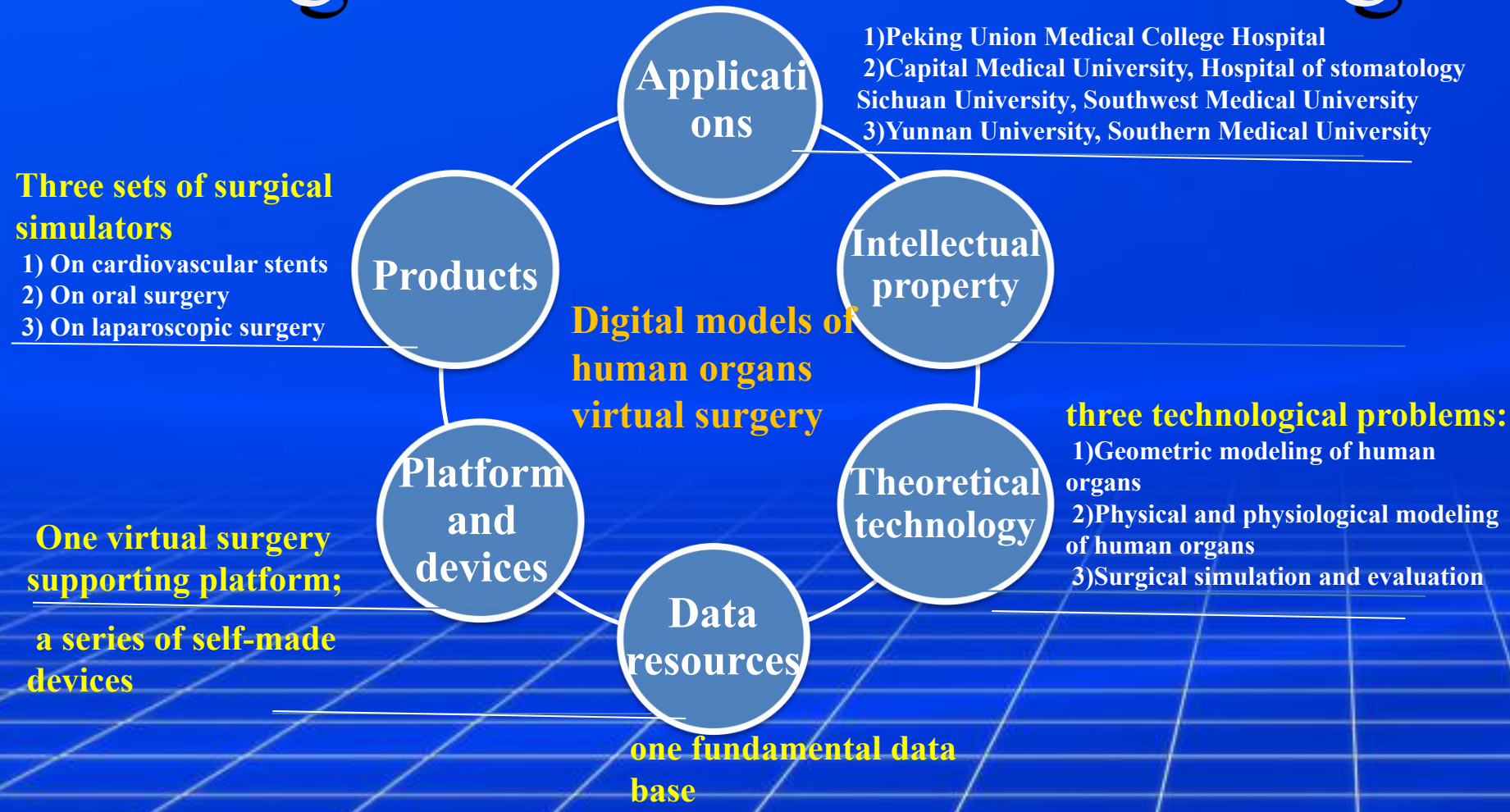
**II AR and Natural HCI**

**III Web-based VR Methods and Tech.**

**IV Platform and System**

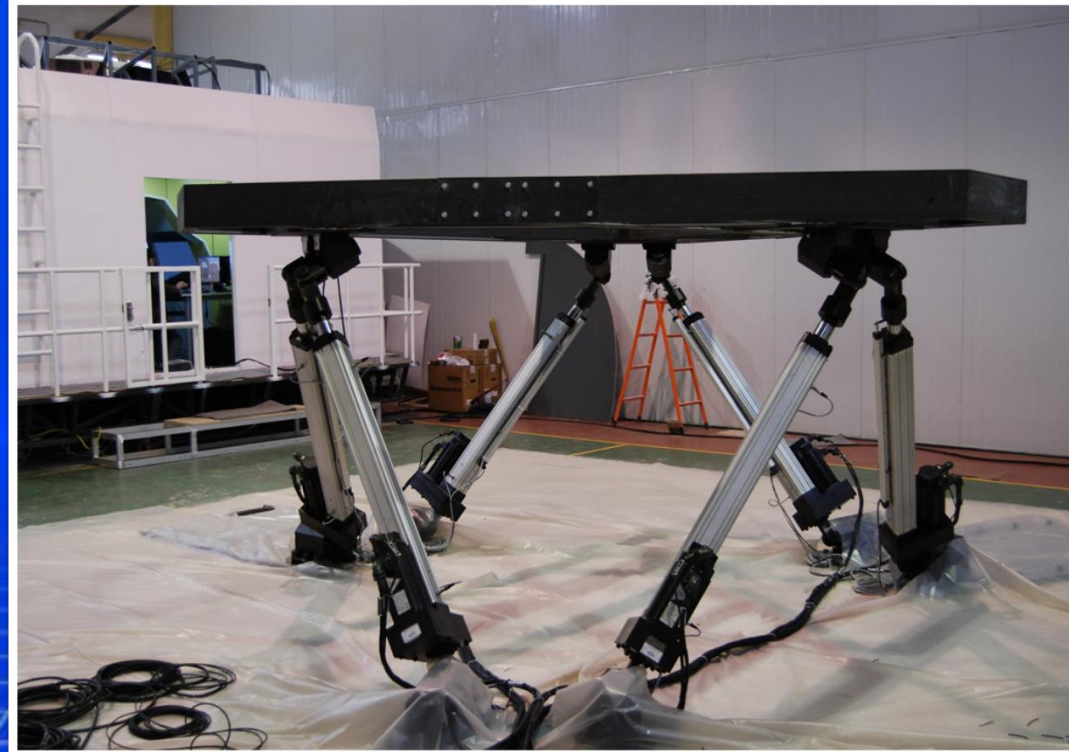
# Representative achievements:

## 1. Digital models of human organs and surgical simulators



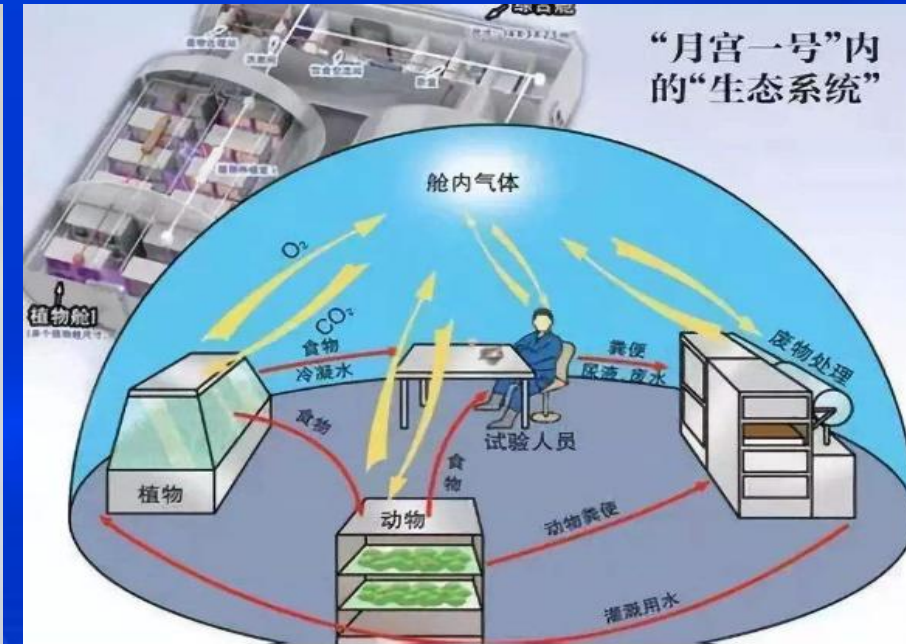
**Funded by National Natural Science Foundation of China (20 million yuan)**

## 2. Flight simulators of six-degree freedom

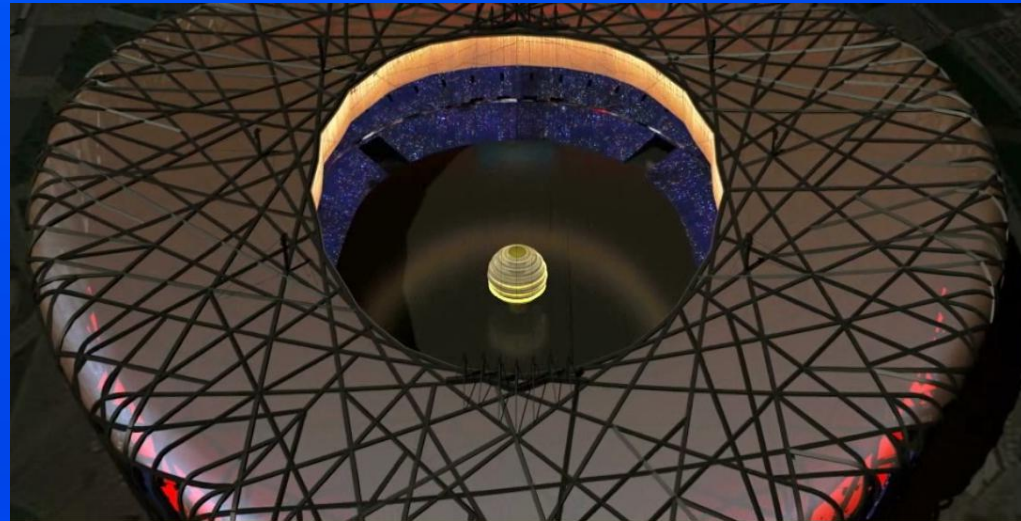


# 3. Yuegong-1

A space base with a virtual device of the ecological system to sustain lives



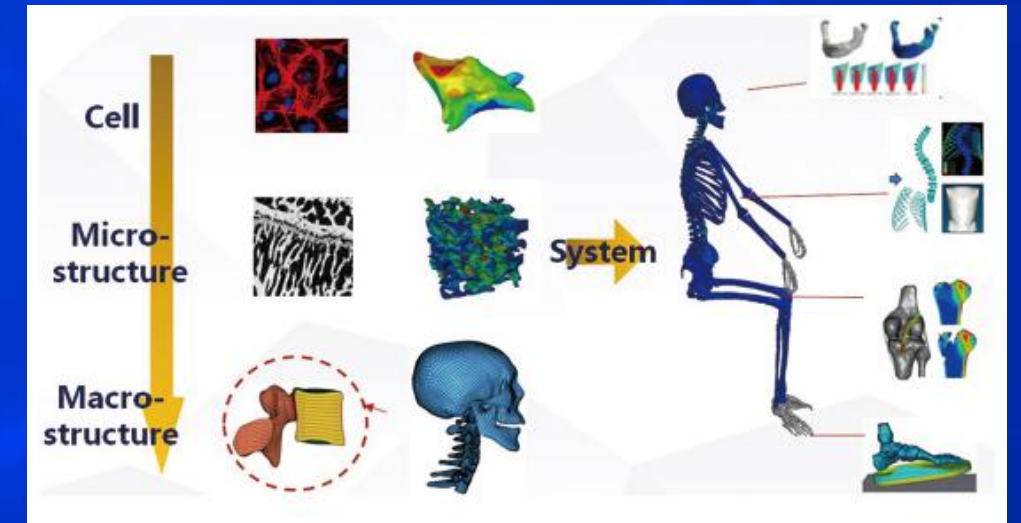
# Projects



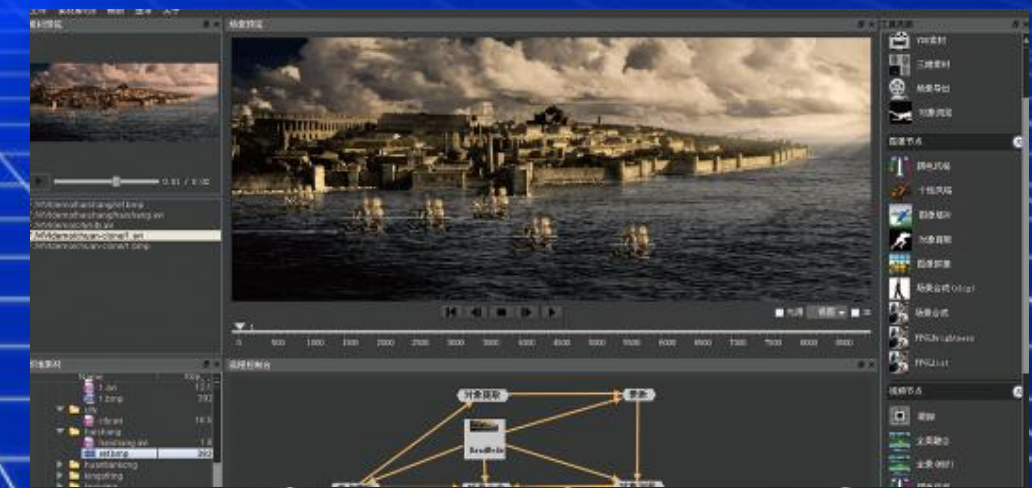
Real-time 3D Modeling  
Lunar Palace I



Feedback and Haptics  
Surgery Simulator



Physiological System Modeling  
Data-driven Generation



# Study in VR Lab

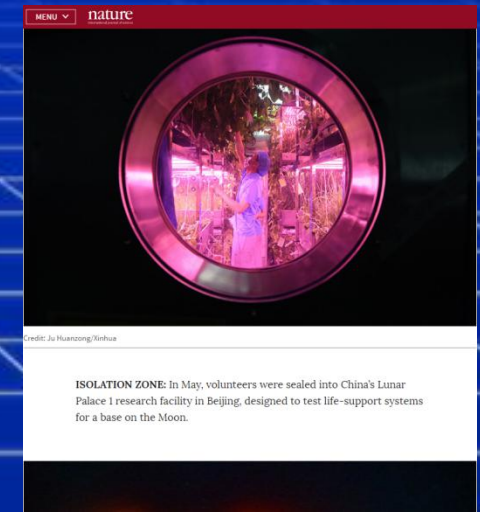
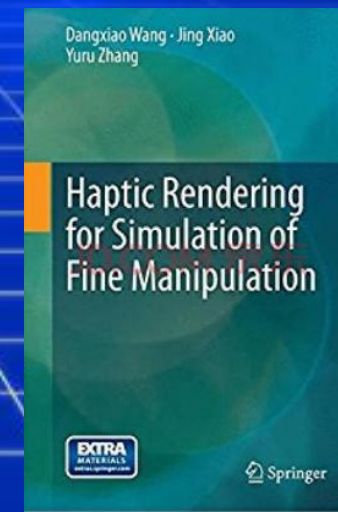
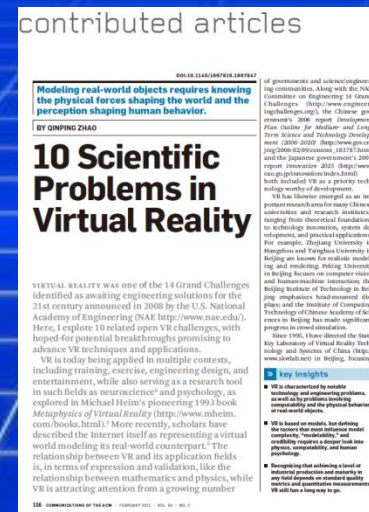
Related work published in

ACM TOG    ACM MM  
IEEE TIP    SIGGRAPH  
IEEE TVCG    IEEE VR  
IEEE Transactions on Haptics  
Communication of the ACM

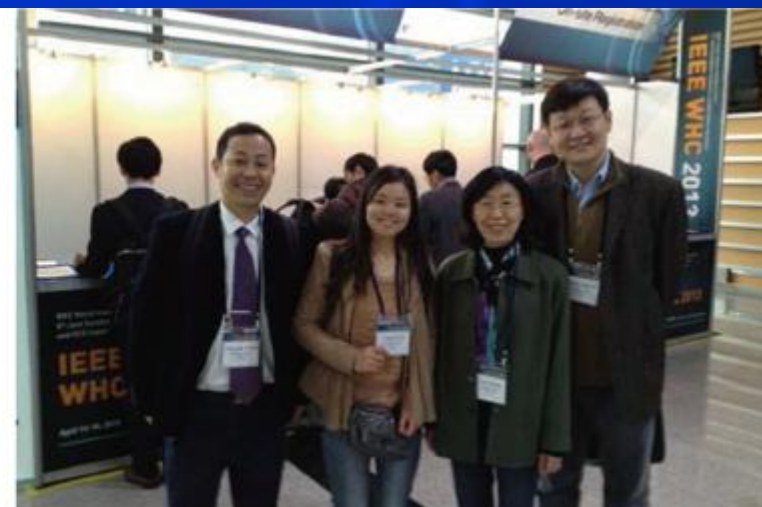
IEEE TPAMI  
IJCV, ICCV  
IEEE CVPR

IEEE ICRA    IEEE TMM  
IEEE ICVRV    Composites Part B  
SCIENCE China    Nature  
IAA Humans in Space Symposium  
IEEE Transactions on Cybernetics

Bioresource Technology  
Nonlinear Dynamics  
ASTROBIOLOGY  
Scientific Reports



# Life in VR Lab





# Connected Universal Experience Labs

*Our Infrastructure for China's Virtual Distance Learning*

- China's Ministry of Education plans to certify 1000 distance learning courses using VR and simulation technology, during 2017-2020
- State Key Laboratory supports this initiative with infrastructure and technology with “Connected Universal Experiences Labs” (NUX Labs)
- During 2017-1068 courses were built by different universities and colleagues, 401 courses were certified at national level

# Connected Universal Experience Labs

*Our Infrastructure for China's Virtual Distance Learning*

- Courses covers a wide range of Natural Science, Engineering, Medical, Art, Social Science, Law ...
- Studying credits at certified NUX Labs courses are recognized by all Chinese universities

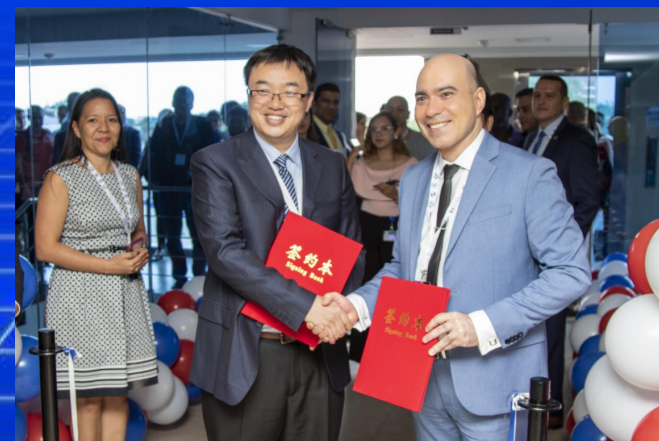
# Three Example Courses of NUX Labs

- Ecological System Study and Preservation of the Yellow River Delta (Web & Mobile Based)
- Symptomatic Clinical Skills Thinking (Web Based)
- Chimes Learning (VR Based)



# NUX Labs Outreach Into Latin Americas

- Agreement with 17 Colombian Universities to Build Virtual Distance Learning Courses
- Learning center established in Cali, Colombia
- Exemplar project of China-Colombia educational collaborations



# We Look Forward to Brazilian Collaborations

- Checkout more about the lab at:
  - [vrlab.buaa.edu.cn](http://vrlab.buaa.edu.cn)
- Contact:
  - Dr Xun Luo, deputy director on international projects
  - [xun.luo@ieee.org](mailto:xun.luo@ieee.org)