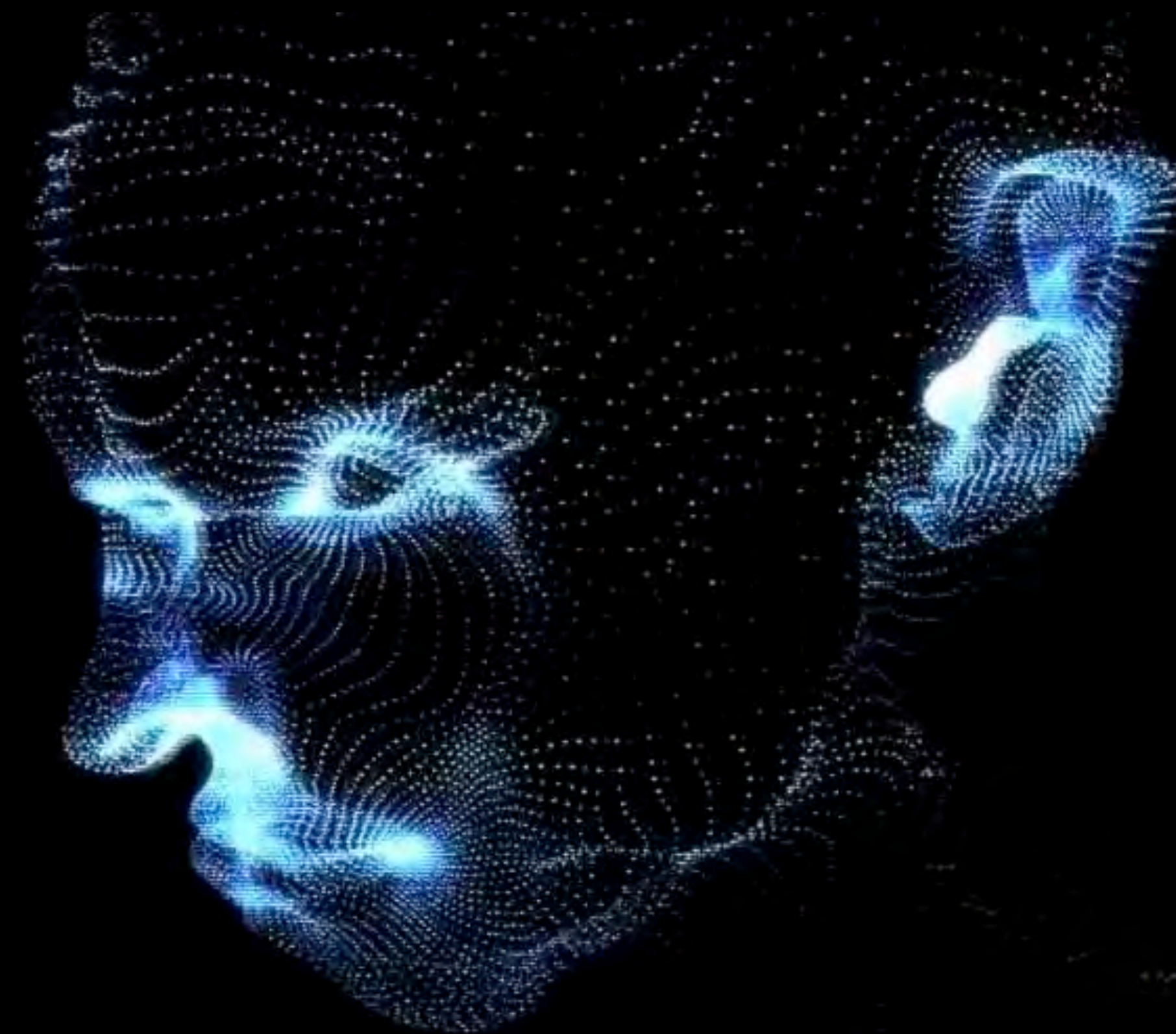


A Universe in the Metaverse...  
**Real People, Real Feelings**

**Cosmic Explorations**



California Institute of Technology  
September 23, 2022

Charles White

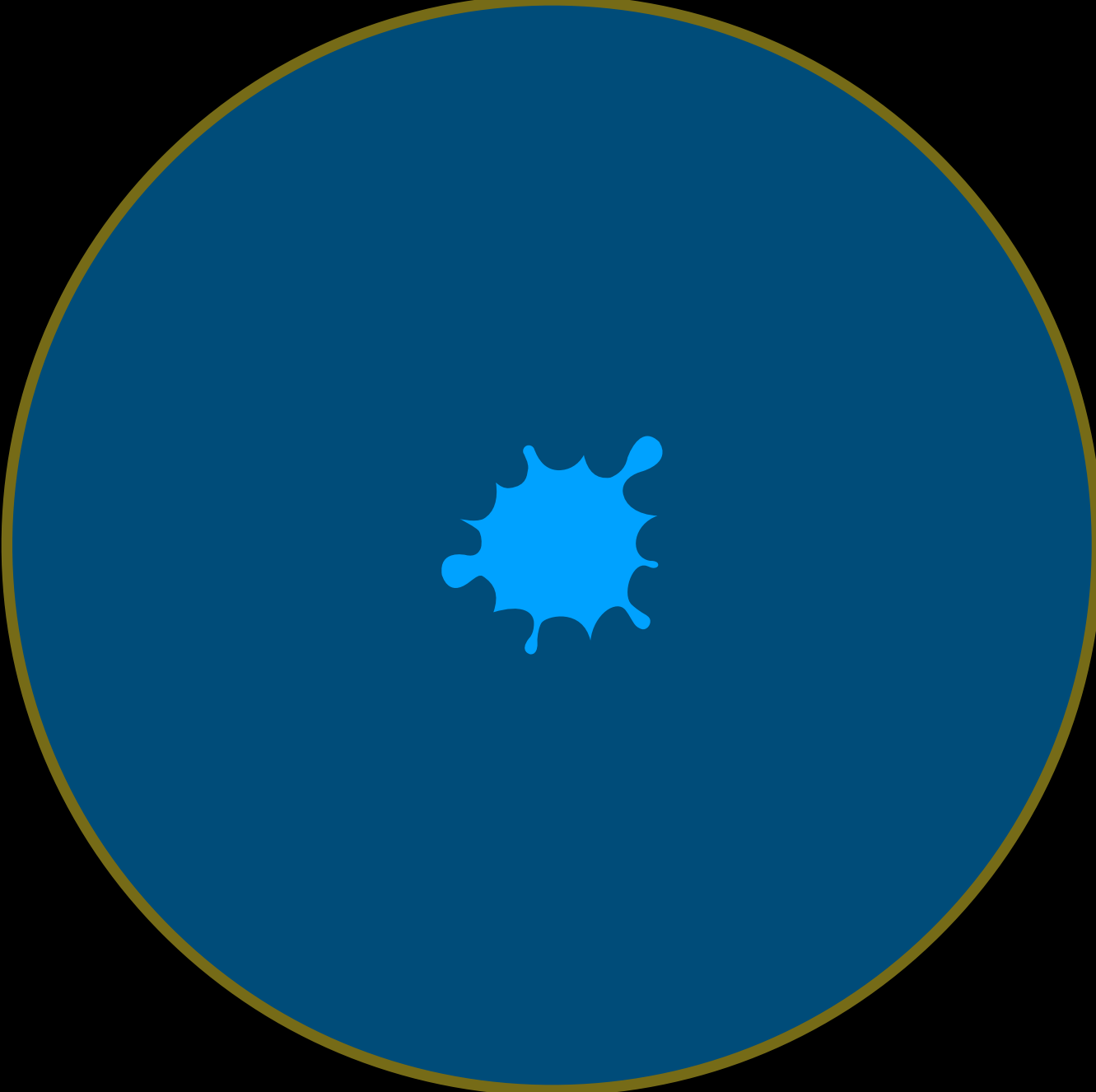
A close-up, profile view of Richard P. Feynman, looking towards the right. He has short, wavy, grey hair and is wearing a light blue shirt. The background is a dark chalkboard filled with faint, white chalk drawings of Feynman diagrams, including various particle interaction paths and loops.

Obligatory Feynman quote...

In talking about the impact of ideas in one field on ideas in another field, one is always apt to make a fool of oneself.

- Richard P. Feynman

**I want to take you into my WORLDS...**



***But first a few disclaimers***

**Not my fault!**

**Disclaimer #1a...**

**I did not call myself the Space Pope.**

*The Players of EVE Online gave me that title...  
Once I dressed up as the Pope, what was done was done!*

*Disclaimer #1b: The opinions here do not reflect the views of the game company CCP hf, an Icelandic company that creates EVE Online.*





Disclaimer #2...

I am speaking today as a private citizen

Neither the U.S. Government, NASA, JPL nor Caltech shall endorse or recommend any commercial products, processes, or services.



Disclaimer #3...

**I am a Burning Man Builder/Artist**

*As a private citizen I have participated with my own radical self expression at Burning Man.*

**MARS ROVER ART CAR**



**BLACK ROCK OBSERVATORY**

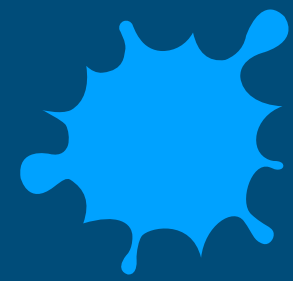


**THE 747 MUTANT VEHICLE**



*Ok with all that out of the way... let's go!*

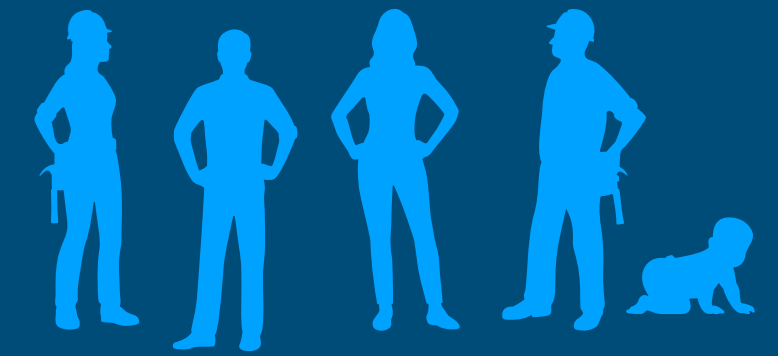
**Burning Man**



**NASA/JPL**



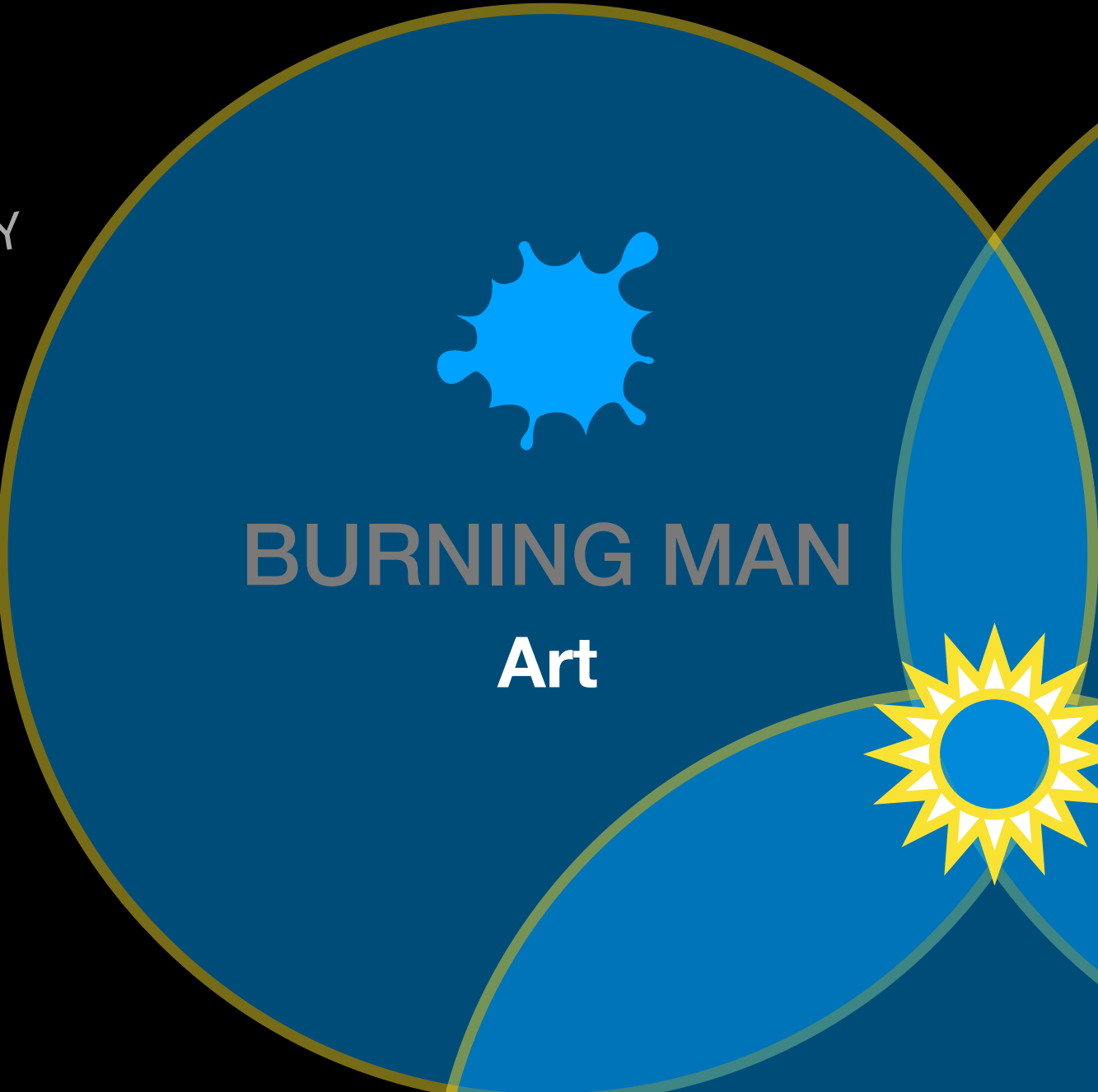
**Virtual Worlds**



**I live in multiple worlds at the same time...**

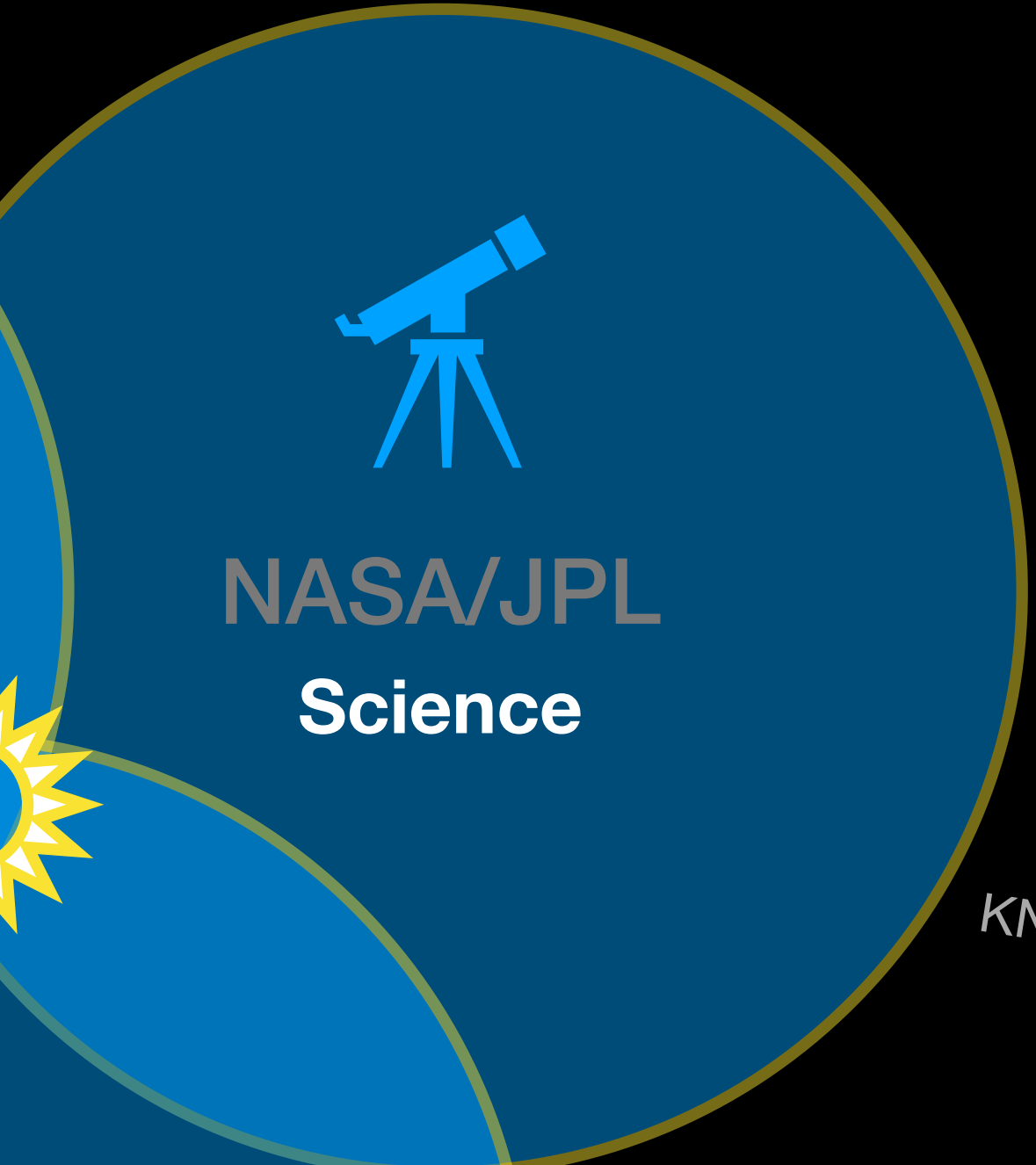
# The Worlds Collided...

BLACK ROCK OBSERVATORY  
MARS ROVER ART CAR  
CHARLIE THE UNICORN  
THE 747



**BURNING MAN**  
Art

This circle contains a blue splatter icon and is part of a three-set Venn diagram. The intersection of this circle and the Science circle contains a yellow sun icon.



**NASA/JPL**  
Science

This circle contains a blue telescope icon and is part of a three-set Venn diagram. The intersection of this circle and the Art circle contains a yellow sun icon.

FLIGHT PROJECTS  
MARS MISSIONS  
INSTITUTIONAL SUPPORT  
VIRTUAL TO REALITY  
KNOWLEDGE MANAGEMENT



**VIRTUAL WORLDS**  
Community

This circle contains a blue silhouette of four people and a dog. It is the bottom circle of a three-set Venn diagram.

SECOND LIFE  
CALTECH/MICA  
EVE ONLINE  
Space Pope

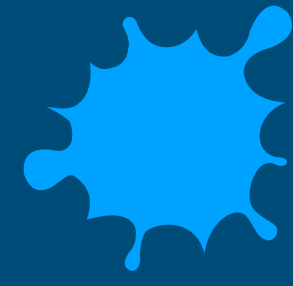


# What I Learned...

People have amazing passion for space sciences!

The joy in a person's face when they see Jupiter or Saturn through a telescope with their own eyes was exhilarating!

The money they spend to go on astronomy/space related vacations to see stars or watch a rocket launch is a metric of that passion.



BURNING MAN

Art



THE 747 MUTANT VEHICLE



MARS ROVER ART CAR



BLACK ROCK OBSERVATORY





People would walk over a mile to get to the observatory in the far reaches of the playa.

They would stand in line for over an hour.

Others became volunteers to help!



# Virtual World: Second Life...



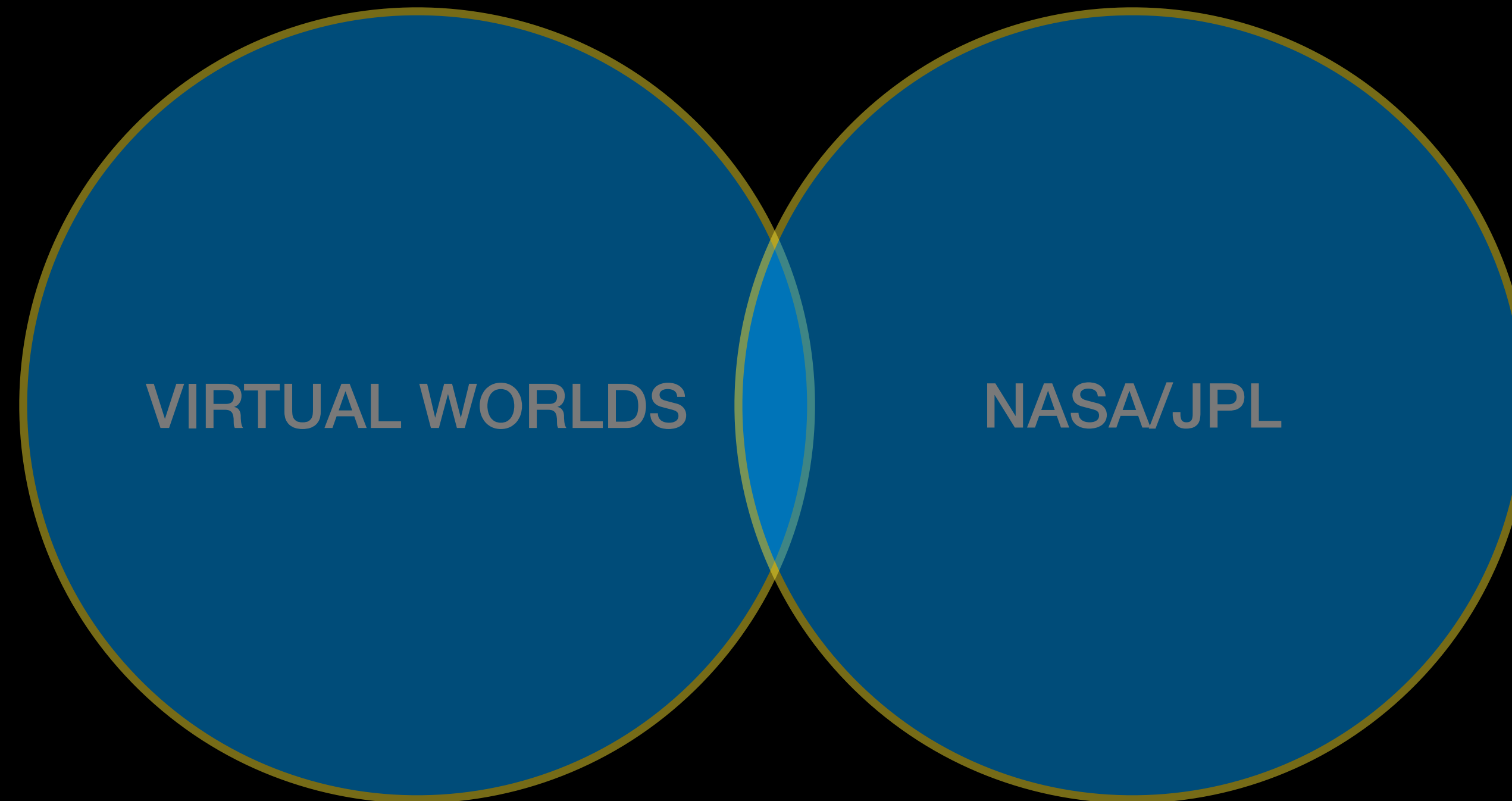
## Meta Institute for Computational Astrophysics (Second Life)



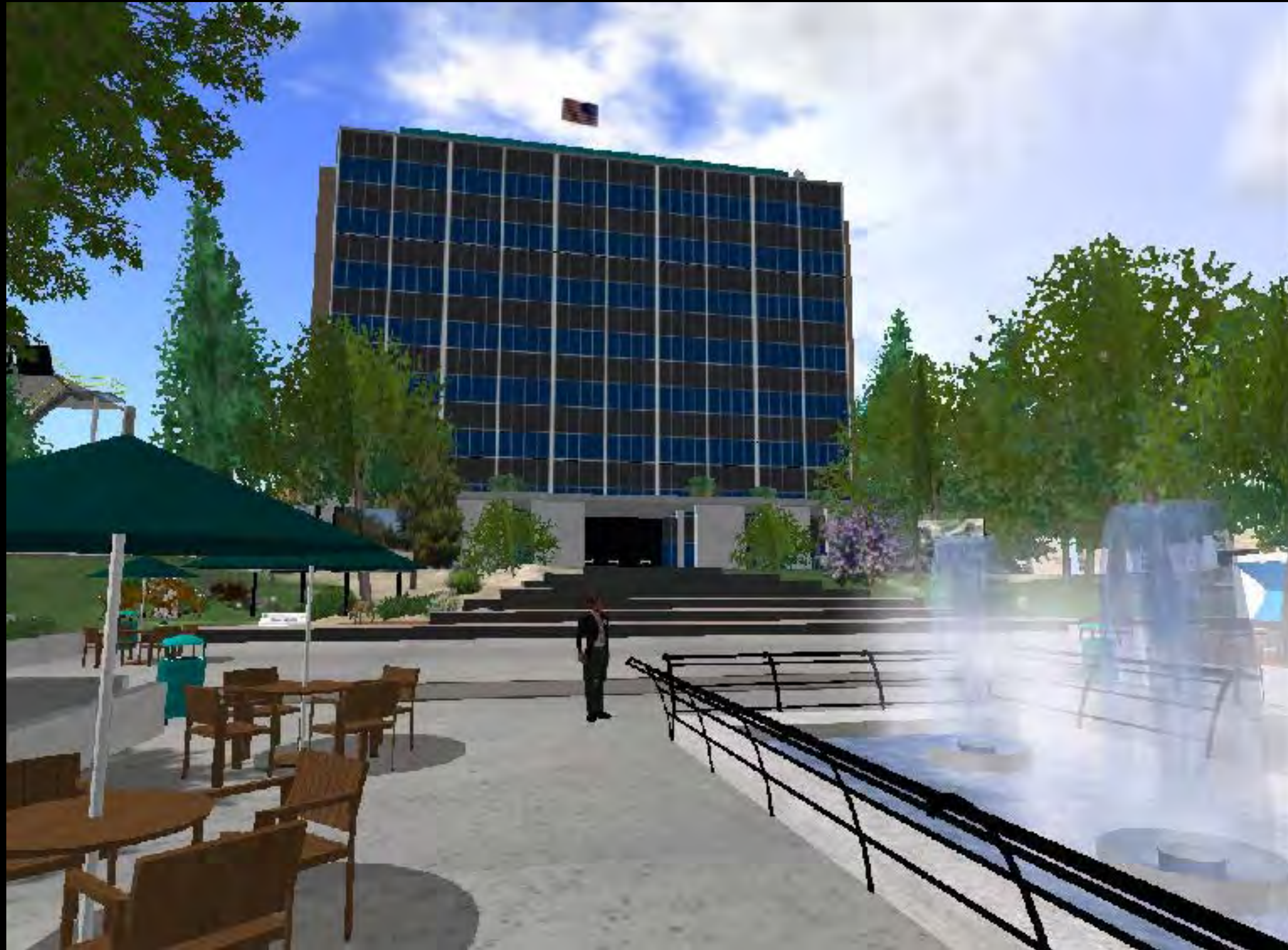
“I’m disabled and I see maybe 2 people a year visit my apartment, but in Second Life, I meet and know hundreds.”

-Paradox Olbers

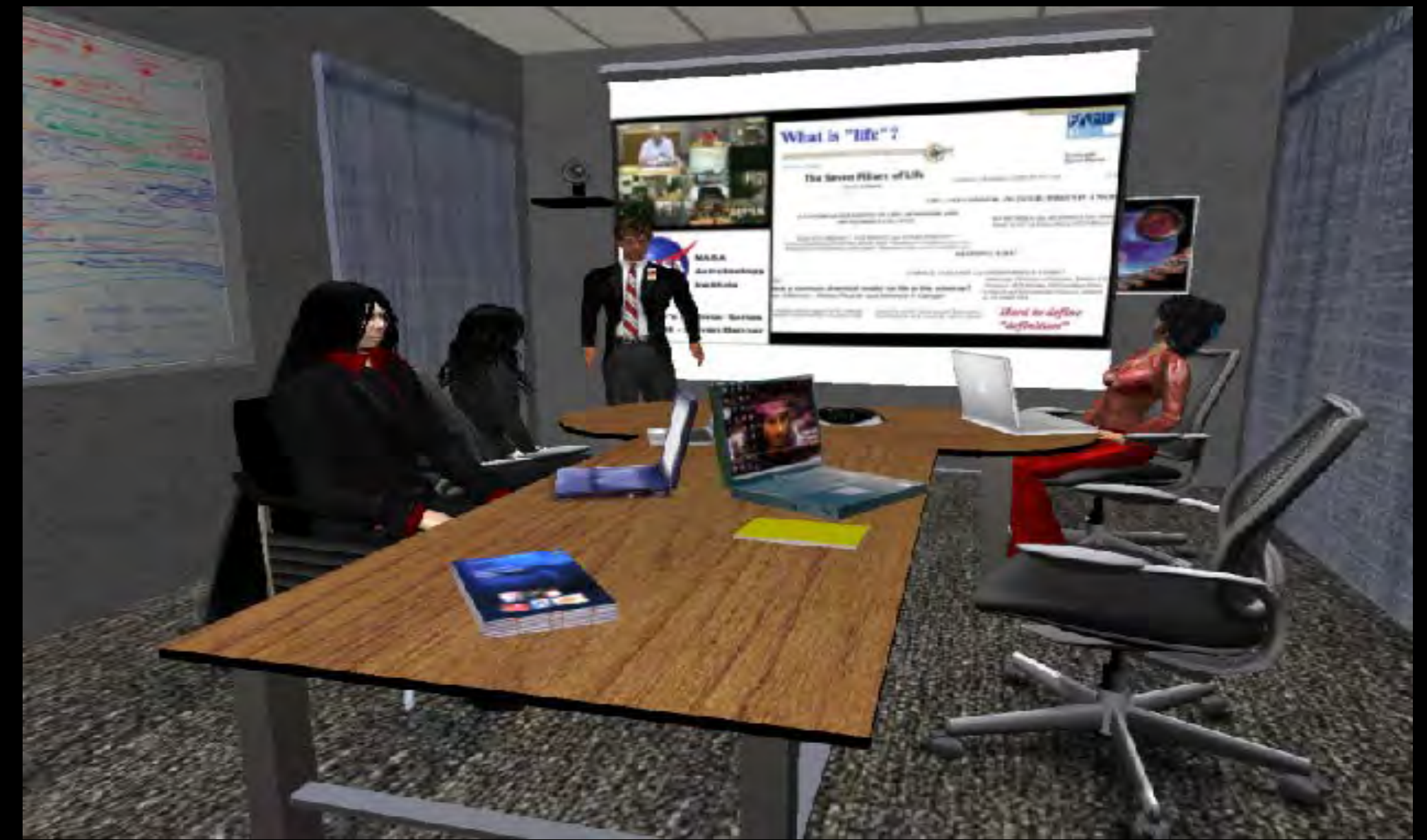
# Virtual World + JPL: Second Life...



My 'untraditional' experiments in Virtual Worlds...  
Second Life to real world JPL facilities



JPL Mall & Building 180



Astrobiology Center



Mechanical Design Center



**Earth Science Center, JPL Building 264**  
**Second Life to real world JPL facilities**

**“You can’t feel blueprints”**  
**-Anonymous Reviewer**



Second Life Version: Earth Science Center

**“Build it!”**  
**-Charles Elachi**

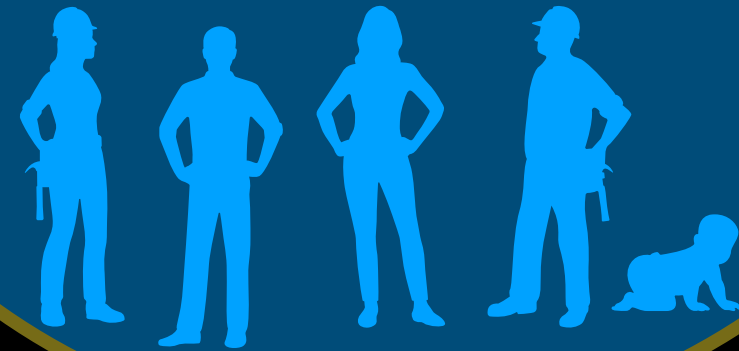


Real World: Approval review!



# Virtual World: EVE Online...

VIRTUAL WORLDS  
Community



**EVE Online...**

**Is now a major part of my life!**





**EVE**  
ENGINE

Space Pope

**One game: 19 years ongoing (persistent universe)**

**Contains 7,805 star systems (each with planets & moons)**

**Players control the economy and the outer rim areas**

**Multiple Guinness world records achieved**

**Millions of players over the years (20,000+ online right now)**

**EVE**  
ONLINE

A silhouette of a person sitting in a space capsule, viewed from the side. The person's hand is on the steering wheel. The background is a dark space with stars and a glowing blue light source. A glowing blue banner with a black arrow on the left side is at the bottom.

# THE CAPSULEER

Apocalypse Battleship  
1.2 KM long!

Each person flies one ship of various sizes.


We use Discord as our 'radio communications'

The recordings you are about to hear...  
[actually came from real game play!](#)

'Max Singularity'  
(Before becoming Pope)



HERO COALITION

SYSTEM: WD-VTV  
REGION: CATCH 

**WOW**

**Shaking hands...**

**I was there feelings...**

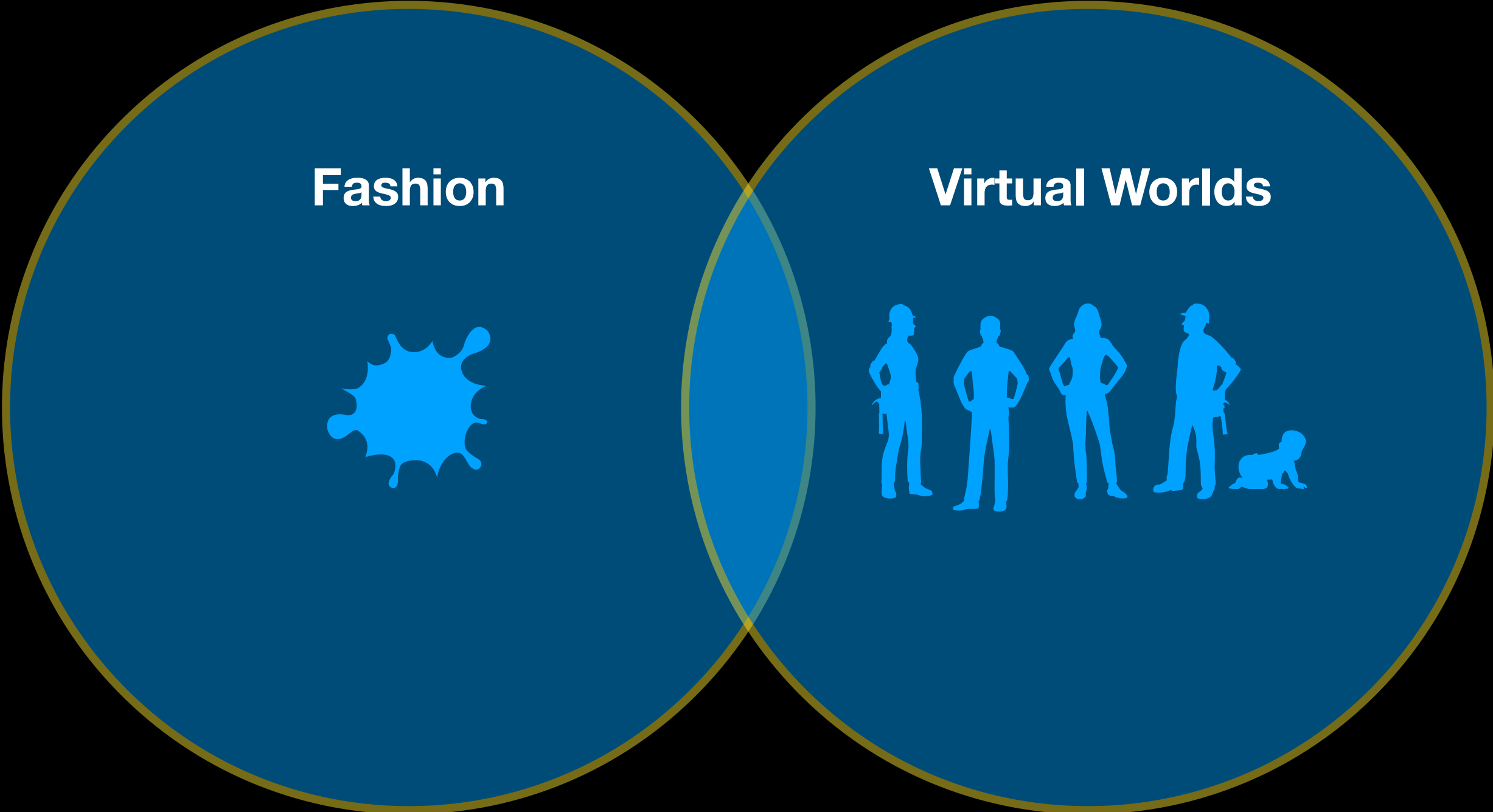


**But wait...**

**EVE is more than a game!**

**It crosses into the real world.**

# Virtual Worlds: EVE Online and the real fashion world



New York Fashion Week 2011...


VIA

Magazine Vol. 4. Autumn / Winter

Presenting the man  
who mesmerized Mugler

Nicola  
Formichetti

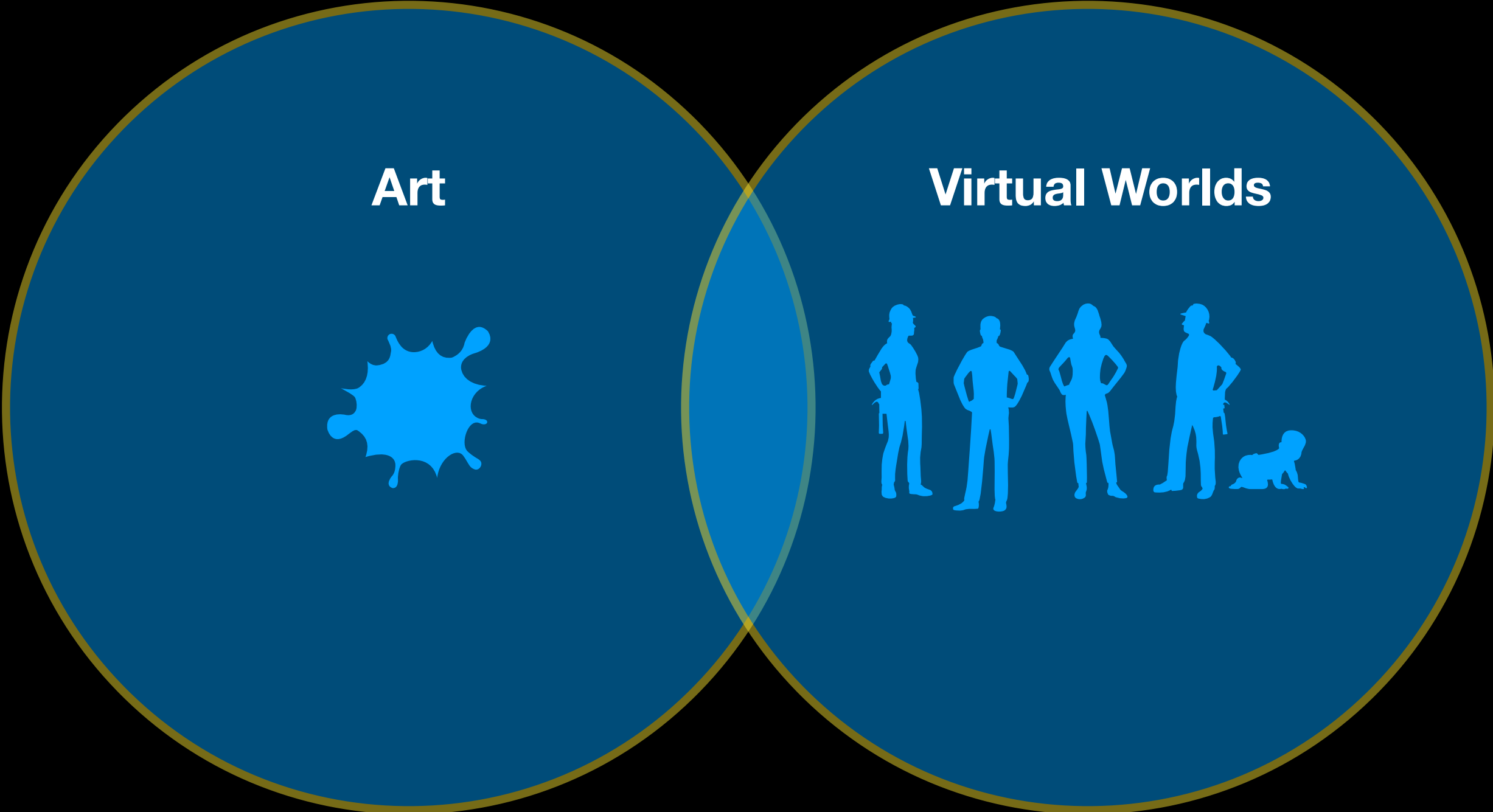


A man with short dark hair and a light beard is sitting cross-legged, looking down and to his left. He is wearing a light-colored, vertically striped button-down shirt with the sleeves rolled up and dark trousers. He has a dark leather bracelet on his right wrist and is holding a small, silver, rectangular object in his hands. The background is a textured, light-colored wall.

**NICOLA FORMICHETTI**  
FASHION DIRECTOR



# Virtual Worlds: EVE Online + Art





## The Rixx Javix Art Print Collection

Exclusive & Officially Licensed Eve Online Art Prints

What is the most expensive item that you have sold at auction or commission?

Hmm probably 7,500 for a private commission I did for an Eve player who runs his own company back in 2016

It's a large piece that no one but him has seen

Ofc except those that have visited his office

5,000 once for three pieces

Rest are various under that

Can I feature the three pieces?



One of three...  
Sold for \$5,000



TYPHOON SPECIAL EDITION  
ILLUSTRATION BY BRYAN WARD

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**The Rixx Javix Art Print Collection**

Exclusive & Officially Licensed Eve Online Art Prints



Two of three...  
Sold for \$5,000



VAGABOND SPECIAL EDITION  
ILLUSTRATION BY BRYAN WARD

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**The Rixx Javix Art Print Collection**

Exclusive & Officially Licensed Eve Online Art Prints

Three of three...  
Sold for \$5,000



APOCALYPSE SPECIAL EDITION  
ILLUSTRATION BY BRYAN WARD

The Rixx Javix Art Print Collection

Exclusive & Officially Licensed Eve Online Art Prints

One of one...  
Sold for \$2,500

But why would anyone  
pay for these?

A) Because it is worth it to  
them.

I can ask... why do pay so  
much for a vacation trip?

A) Because it is worth it to  
you... for the experience!

**The Rixx Javix Art Print Collection**

Exclusive & Officially Licensed Eve Online Art Prints



HEL: TRONHADAR INK EDITION

ILLUSTRATION BY BRYAN WARD

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MoMA Museum of Modern Art...

Video Wall exhibit about EVE Online

GAMING

# New MOMA exhibit embraces the art of video games as it explores their design

By Brian Crecente | @crecenteb | Mar 4, 2013, 11:00am EST

f t SHARE

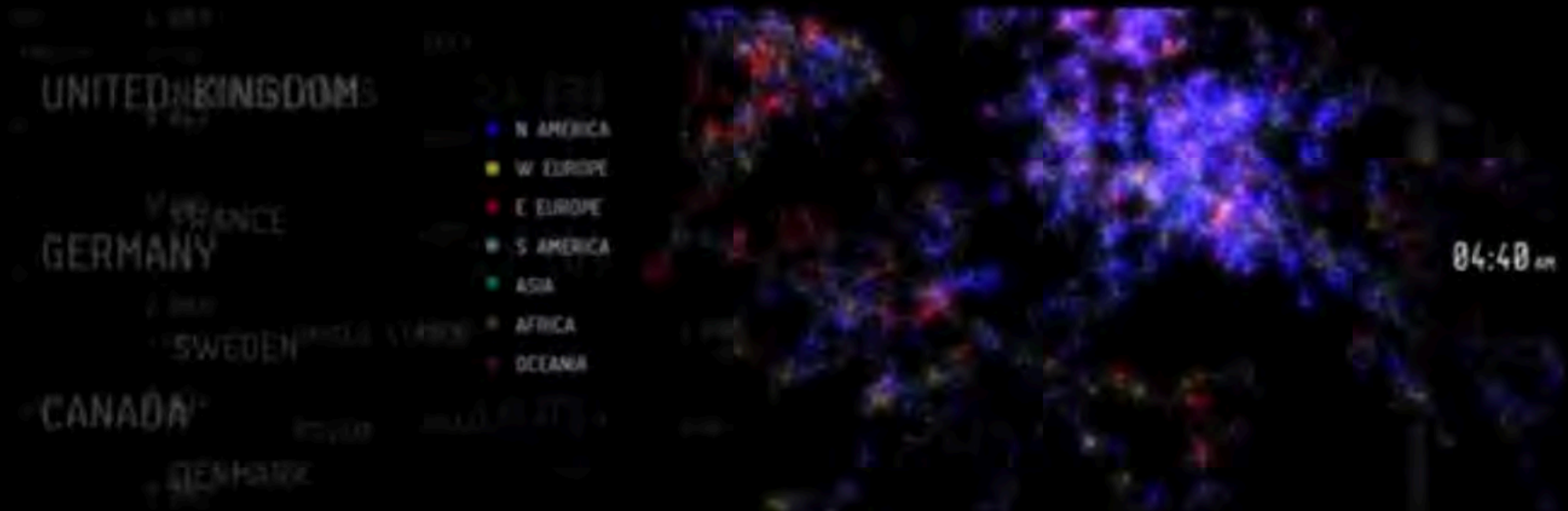
**VB** Events GamesBeat Data Pipeline GamesBeat Summit Next 2022 [Become a Member](#)

GamesBeat

## Eve Online exhibit to become a permanent fixture at New York's Museum of Modern Art

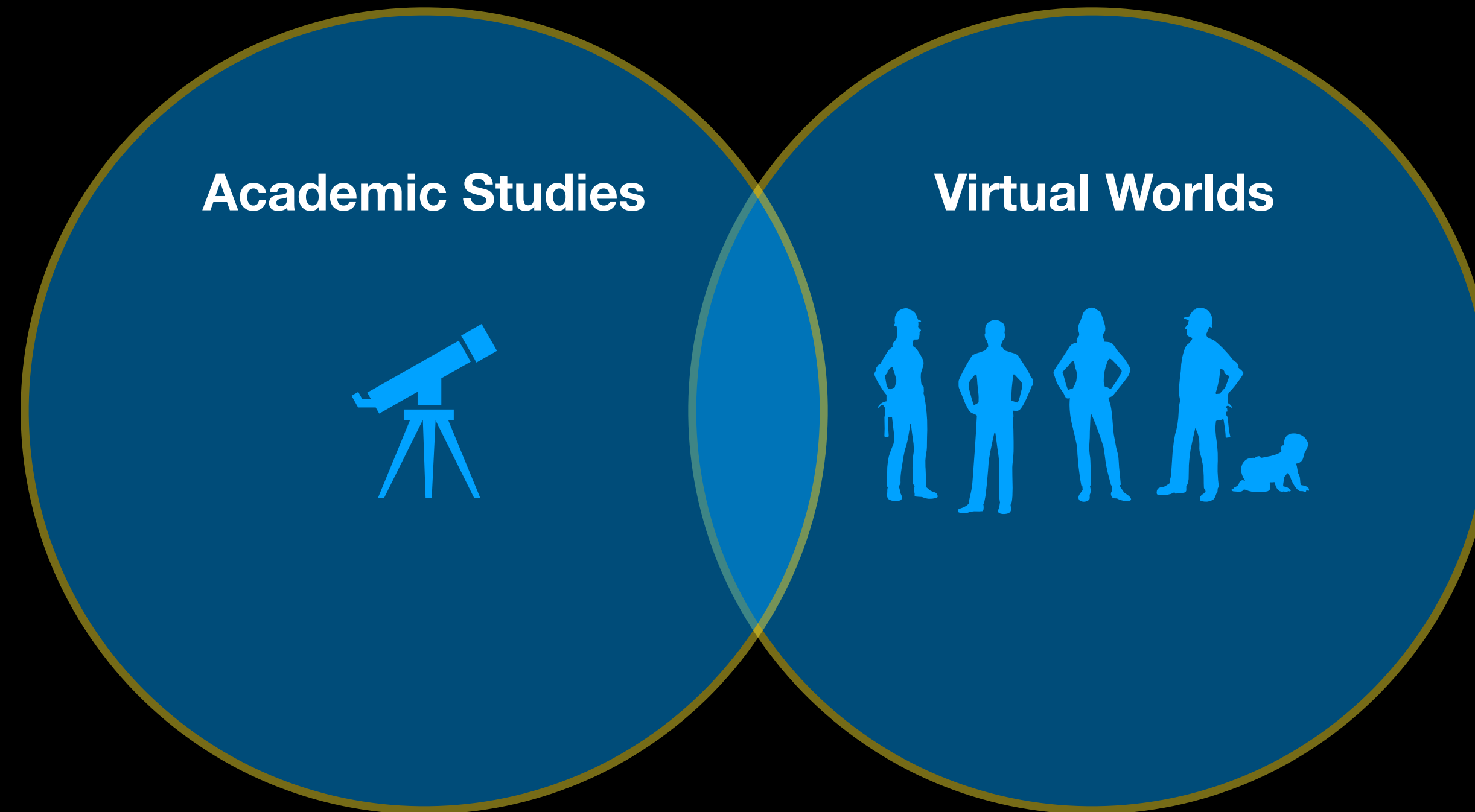
Dean Takahashi  
@deantak  
May 12, 2015 10:00 AM

f t in



(Also: An exhibit at the London V&A Museum)

# Virtual Worlds: EVE Online & academia...



### EVE: Online as a Potential Microeconomic Model

**Christopher Smith**, author  
Dr. Marianne Johnson, Economics, faculty mentor

Christopher Smith is a junior at UW Oshkosh majoring in economics. He plans to attend graduate school to earn his Ph.D. in economics. His career goal is to become a professor of economics at a university.

Dr. Marianne Johnson is a professor of economics at UW Oshkosh. She frequently teaches a research methods class called econometrics as well as introductory economics courses and public economics. She has supervised nine Student/Faculty Collaborative Research grants over the years as well as an equal number of *Oshkosh Scholar* publications.

#### Abstract

*EVE: Online (EVE)* is a video game with one of the largest virtual economies in existence. The question reigns, can a video game economy function realistically according to microeconomic theory? To test this, I examined multiple variables for a commodity in *EVE* over an extended period. I found that the commodity's price and demand acted in the same way that real-world commodity prices do. This suggests that *EVE's* economy adheres to microeconomic theory. Knowing this, there are many useful applications for *EVE* as a tool to measure and predict microeconomic behavior and possibly even macroeconomic behavior.

#### Introduction

*EVE: Online (EVE)* is a video game set in outer space with seemingly little application for scholarship in economics. *EVE* may be a video game, but it is still useful in economics. Designed by Icelandic Economist Dr. Eyjólfur Guðmundsson, *EVE* has been affectionately nicknamed Spread Sheets, Math Simulator, and the most boring, thrilling game ever. The game is known for its steep learning curve and applicable mathematics, statistics, and economics. Guðmundsson calls the game a "national economics institute, statistics office and central bank" that models real-world economics, with an in-game economy estimated to be worth over 18 million USD (Gilbert 2014). If this is true, then the laws of supply and demand should hold. The law of demand states that, holding other factors constant, at higher prices people should demand less. At lower prices, people should demand more. The law of supply states that at high prices, companies want to supply more product and at lower prices less (Perloff 2009, 14). If these laws hold, at some price — what economists call the equilibrium market price — the quantity supplied should equal the quantity demanded. The purpose of this paper is to understand how well virtual market economies can operate according to basic economic principles. Do the online markets that evolve in *EVE* conform to the basic beliefs about supply and demand? In other words, can we find evidence that the laws of supply and demand hold in the virtual world?

### Games and Culture

Impact Factor: **2.180** / 5-Year Impact Factor: **2.312**

JOUR

Restricted access | Research article | First published online July 30, 2015

### Virtual Warlords: An Ethnomethodological View of Group Identity and Leadership in *EVE Online*

Oskar Milik | [View all authors and affiliations](#)

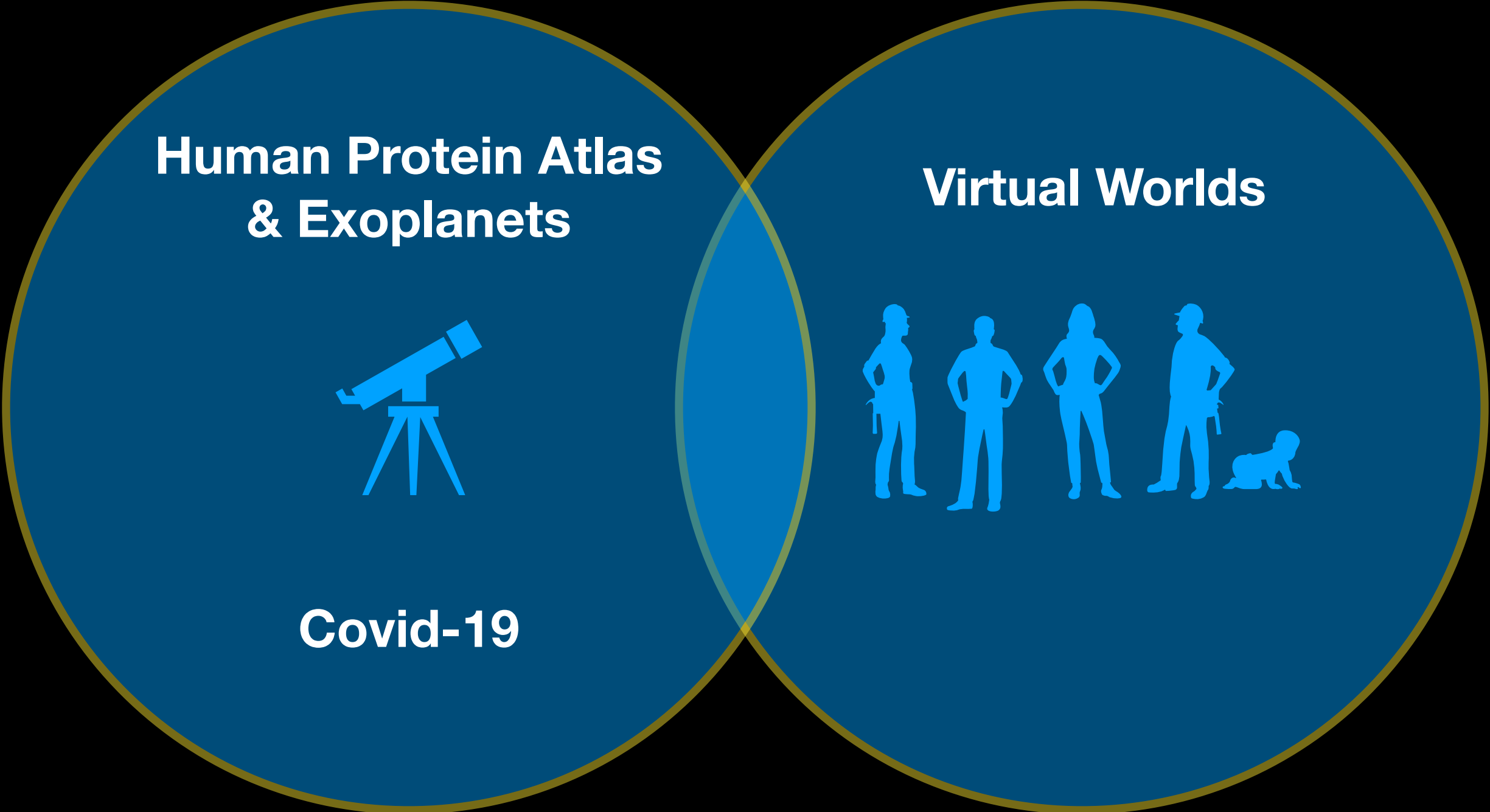
Volume 12, Issue 7-8 | <https://doi.org/10.1177/1555412015597814>

Contents | Get access | Cite article | Share options | Information, rights and permissions | Metrics

#### Abstract

*EVE Online* grants individuals the anonymity and freedom to act in any way they wish, going so far as to encourage and reward in-game criminal behavior toward other players. This design might lead some to expect anarchy within this digital universe. Instead, this virtual world is highly ordered, containing large organizations led by powerful leaders. To gain understanding of how such social structures operate, this project observes speeches made by heads of organizations in *EVE Online* to determine the categorization tools used to maintain order in a potentially chaotic environment. It finds that by focusing on group identity, leaders emphasize their role and responsibility for creating and maintaining organizational culture. Additionally, by crafting a narrative of territorial conflict and their own role as a warlord and military leader, they encourage ruthlessness on the part of their membership and establish a social system based upon the individual leader.

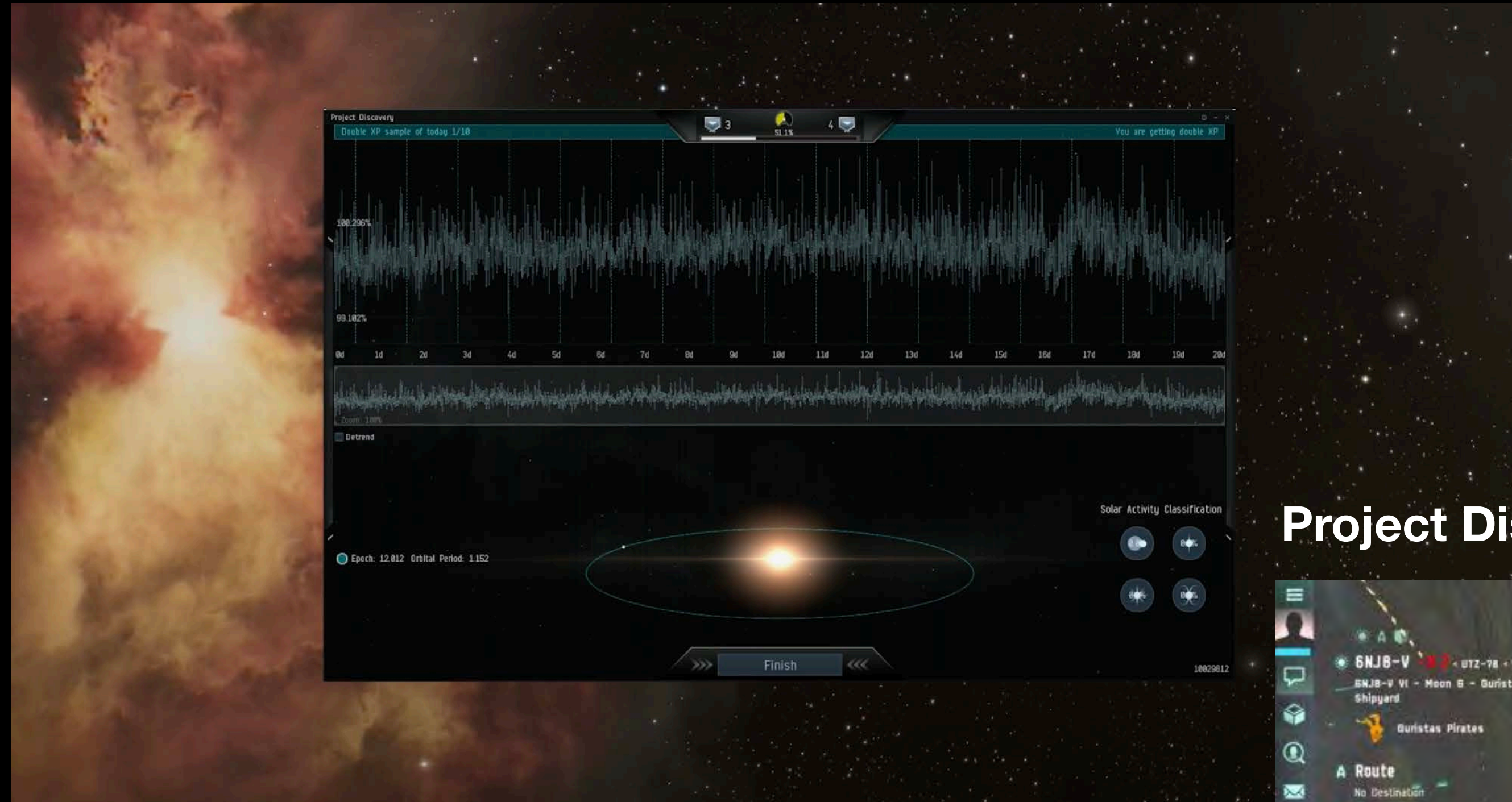
# Virtual Worlds: EVE Online and citizen science...







# Project Discovery: Exoplanets



# University of Reykjavik, Iceland



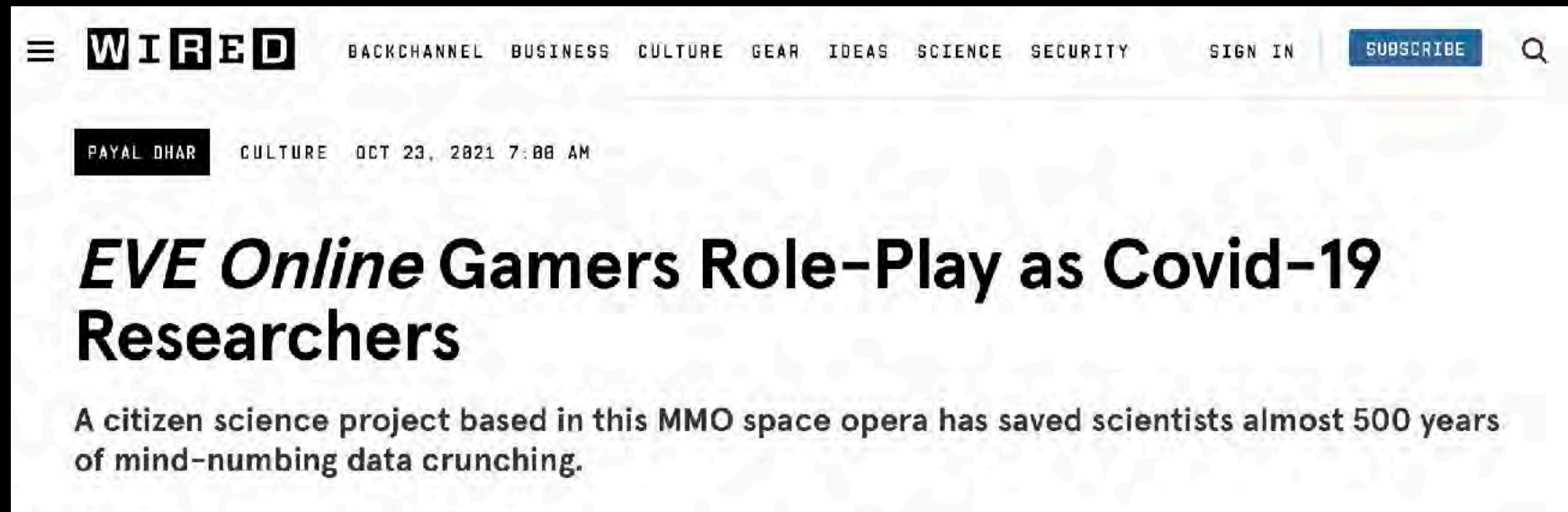
# Project Discovery: Human Protein Atlas

The screenshot shows the 'Project Discovery' interface for the Human Protein Atlas. The main window displays a 'Foreign Cell Sample' with a fluorescence microscopy image of cells. A 'Cytoskeleton (microtubules)' analysis is shown, with a text box stating: 'Thin strands stretching throughout the cell. Overlaps perfectly with the red marker making the color turn yellow.' Below this, there are two hexagonal icons labeled '3 PERIPHERY' and '4 NOT IDENTIFIABLE'. A 'Submit' button is visible at the bottom. The interface includes a sidebar with navigation options like 'Route' and 'Opportunities', and a top navigation bar with 'Enter Captain's Quarters' and 'Unlock' buttons. The background is a futuristic, glowing green space environment.

# University of Geneva, Switzerland

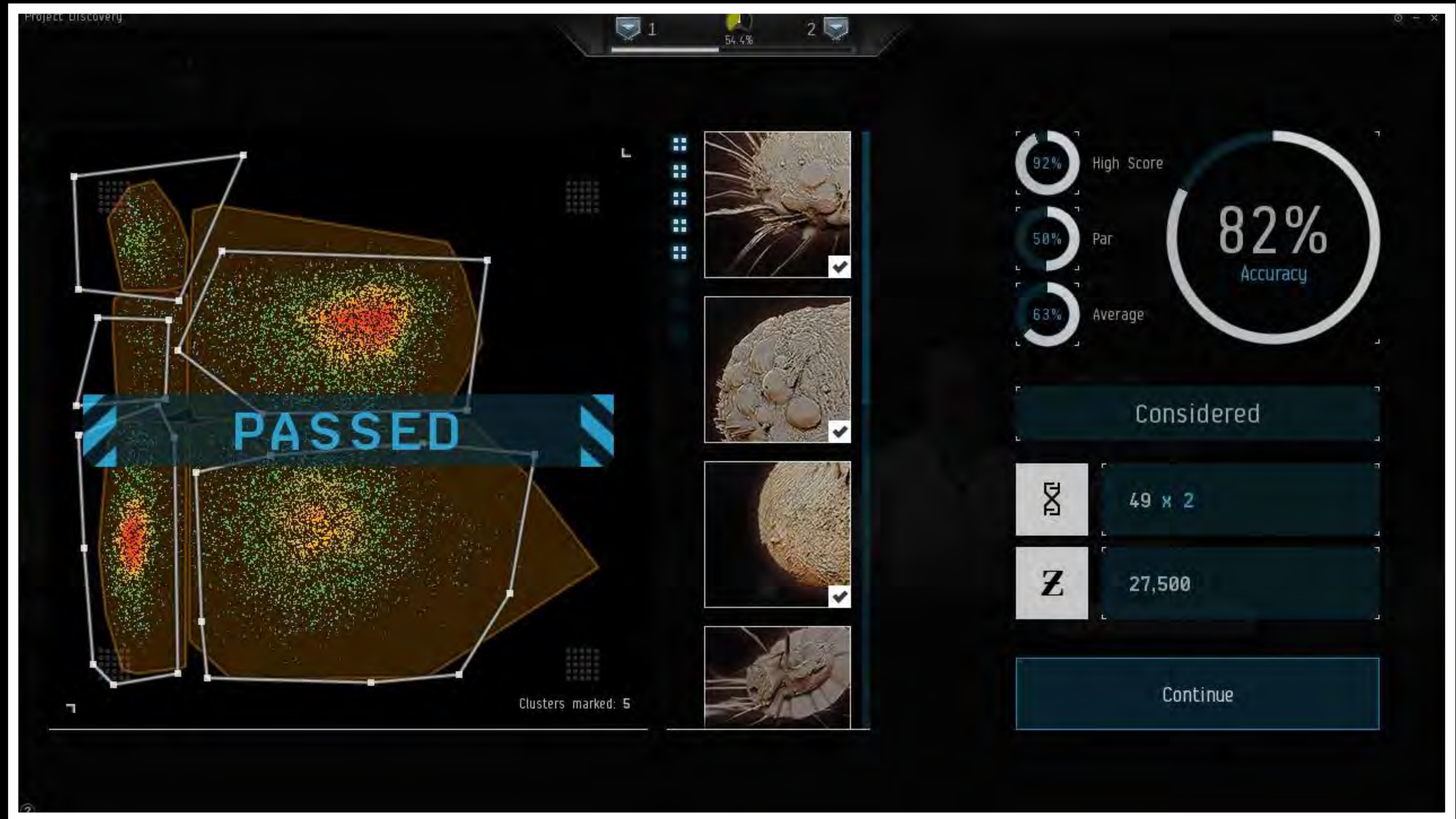


# Virtual Worlds: Covid-19 research contribution...



The project is a collaboration with:

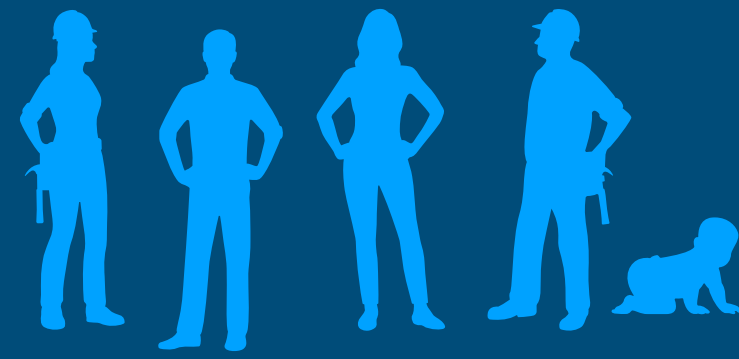
- British Columbia Cancer Research Centre
- Reggio Emilia School of Medicine
- University of Pennsylvania
- University of Modena
- McGill University



There are 426,000 players participating in the Covid-19 mini-game right now, and they have completed 1.8 million analysis tasks since the project's launch in June 2020.

# Virtual Worlds: Community...

Virtual World  
Community



# Virtual Worlds: EVE Online Charity...



# Virtual Worlds helping the real world...

## Plex for Good

- 2005 - **\$25,326** – Southeast Asia (Tsunami)
- 2010 - **\$34,350** – Haiti (Earthquake)
- 2010 - **\$38,900** – Pakistan (Monsoon)
- 2011 - **\$44,600** – Japan (Earthquake and tsunami)
- 2011 - **\$32,900** – United States (Hurricane Irene)
- 2013 - **\$190,890** – Philippines (Typhoon Haiyan)
- 2015 - **\$103,650** – Nepal (Earthquake)
- 2020 - **\$107,454** - Australia (Bushfires)
- 2020 - **\$135,550** - Global (COVID-19)
- 2022 - **\$501,652** – Ukraine (War)



A total of **\$1.2 Million USD** raised by EVE Online players and CCP through PLEX for Good



# Virtual Worlds are bringing people together...

## Human interaction theory

4 things needed to establish a **strong social connections** that lead to **friendship**

**Friendship** = Proximity + Frequency + Duration + Intensity



The image features a dark, star-filled space background. In the center, the word "EVE" is written in a white, stylized, blocky font. The letters are composed of horizontal bars, giving it a digital or futuristic appearance. A bright, horizontal light streak or lens flare passes through the center of the text, creating a sense of depth and focus. At the bottom of the image, a thin, glowing blue arc represents the horizon of a planet or celestial body, adding to the cosmic atmosphere.

EVE

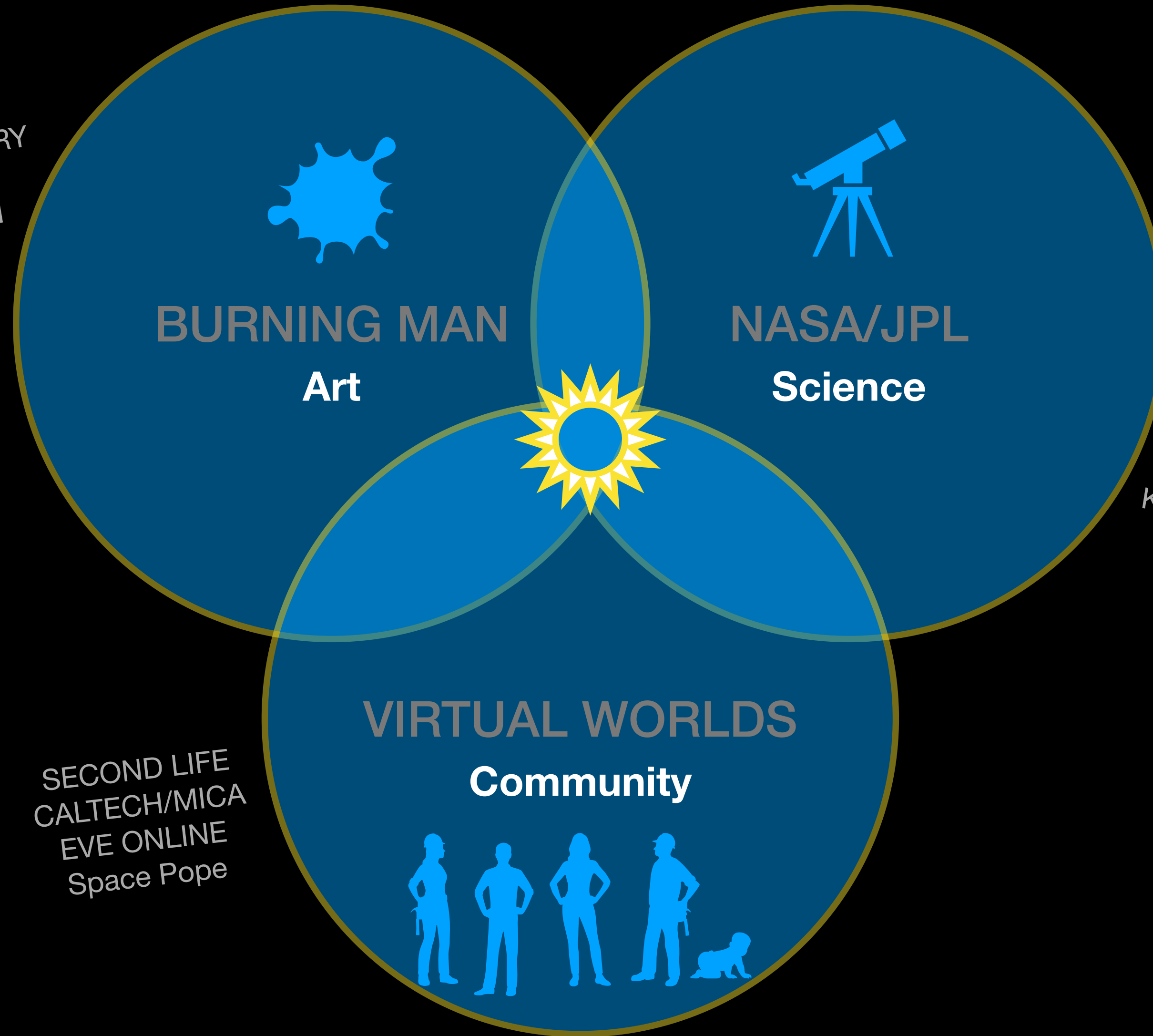
In a virtual world... its real people, and real feelings.





# These are my worlds...

BLACK ROCK OBSERVATORY  
MARS ROVER ART CAR  
CHARLIE THE UNICORN  
THE 747



FLIGHT PROJECTS  
MARS MISSIONS  
INSTITUTIONAL SUPPORT  
VIRTUAL TO REALITY  
KNOWLEDGE MANAGEMENT

SECOND LIFE  
CALTECH/MICA  
EVE ONLINE  
Space Pope

A Universe in the Metaverse...

**Real People, Real Feelings**

**Cosmic Explorations**

California Institute of Technology  
September 23, 2022

**We are all seeking a better future**

**Some of us are sharing a common reality**

**In virtual worlds of real people, and real feelings**

A Universe in the Metaverse...  
**Real People, Real Feelings**

**Cosmic Explorations**  
with Charles White



Thank you!

