# The Hopkins Centre

Research for Rehabilitation and Resilience

# VR for Pain & Injury Rehabilitation

## Fiction, Fad, or Future


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Bold ideas. Better solutions.

Griffith UNIVERSITY | MENZIES HEALTH INSTITUTE QUEENSLAND | Metro South Health | Queensland Government

A joint initiative of the Division of Rehabilitation, Metro South Health, and Menzies Health Institute Queensland, Griffith University.

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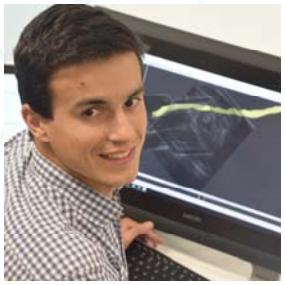
# THEGROUP

## Musculoskeletal health & persistent pain

research group

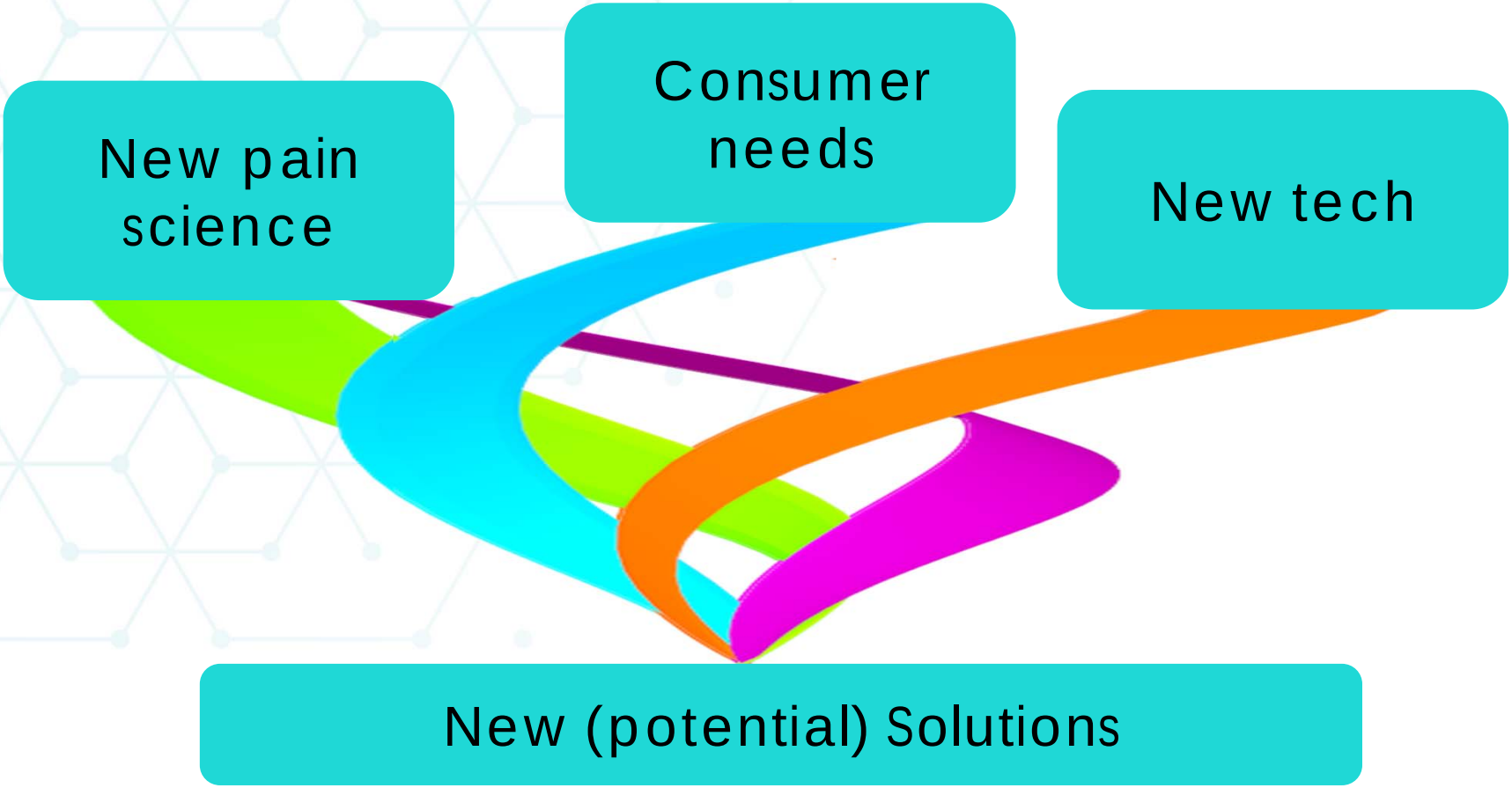




# THE PROBLEM OF PAIN

- 1 in 5 Australians have a persistent pain state (MBF Foundation)
- Low back and neck pain: the greatest cause of years lived with disability world wide (Vos)
- Whiplash inj: 1/2 people have ongoing symptoms (Stirling)
- SCI: Over 60% of people develop ongoing pain after SCI (van Gorp)

# THE NEED FOR INNOVATION

***Multimodal (biopsychosocial) treatments are best but insufficient for many*** (Plethora)



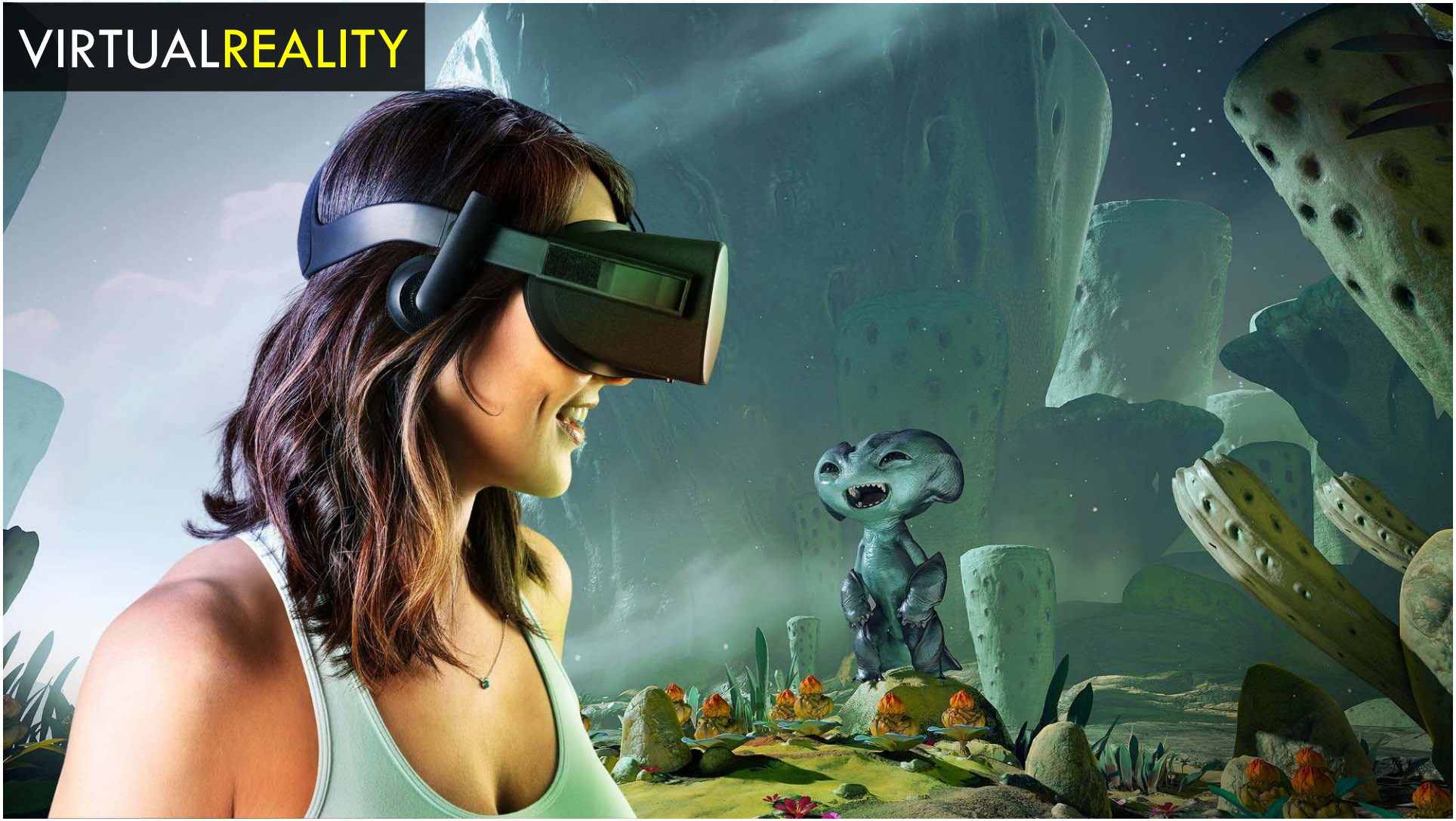
EXTENDEDREALITY



## Birth of Consumer VR

2014-2019


# VIRTUALREALITY



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# MIXEDREALITY

# ILLUSORYMOTION 2014

**Pain with movement depends on perceived movement, not only real movement**

Harvie, D. S.....Moseley, G. L. (2015). Bogus visual feedback alters onset of movement-evoked pain in people with neck pain. *Psychological Science*, *26*(4), 385-392.

# WHYVR?

- Great plasticity in human perception when faced with visual trickery

- Can potentially leverage this feature of humans, for therapeutic gain…

- Ability to simulate a wide range of parameters
  - Environment
  - Task
  - Bodily appearance
  - Functional ability
  - Modes of feedback/gamification

# CURRENT PROJECTS

## VR FOR NECK PAIN

+ WCL

## VR FOR BACK PAIN

@ Princess Alexandra Hospital Persistent Pain Management Service (Hopkins Seeding Grant)

## VR FOR SCI PAIN

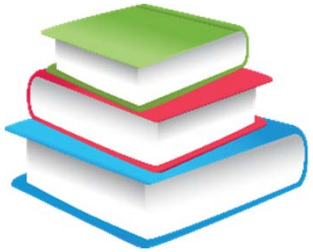
VR-simulated walking for SCI-related pain

Lead: Prof. Coppieters, *Pending funding

# VR FOR NECK PAIN/WAD

## Immersive therapeutic education

- Targets specific learning outcomes linked to poor recovery (e.g. misunderstanding that pain=damage)



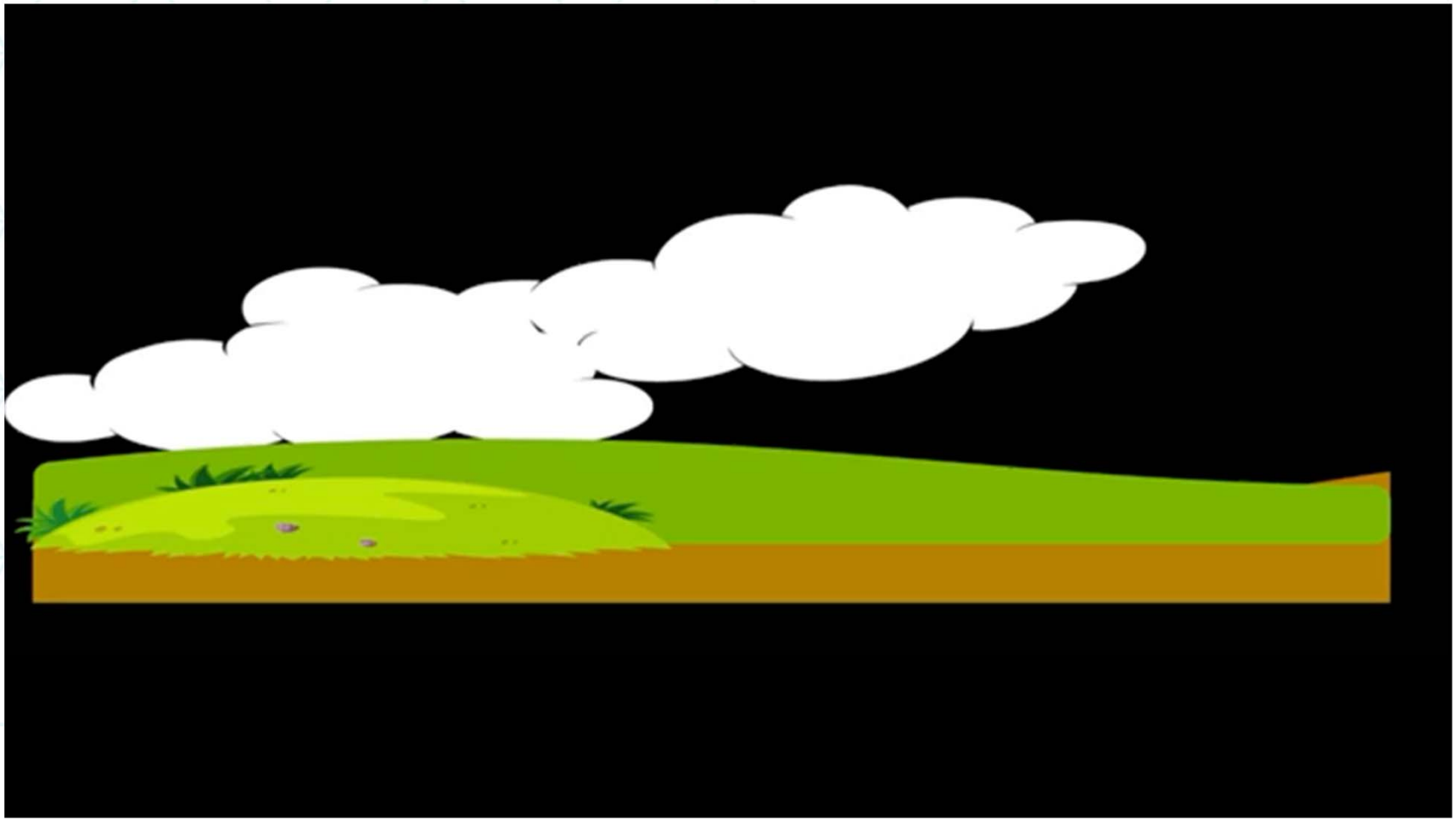
## Exercise

- Body confidence, range of movement, control
- Gamified for engagement/adherence
- Progress tracking

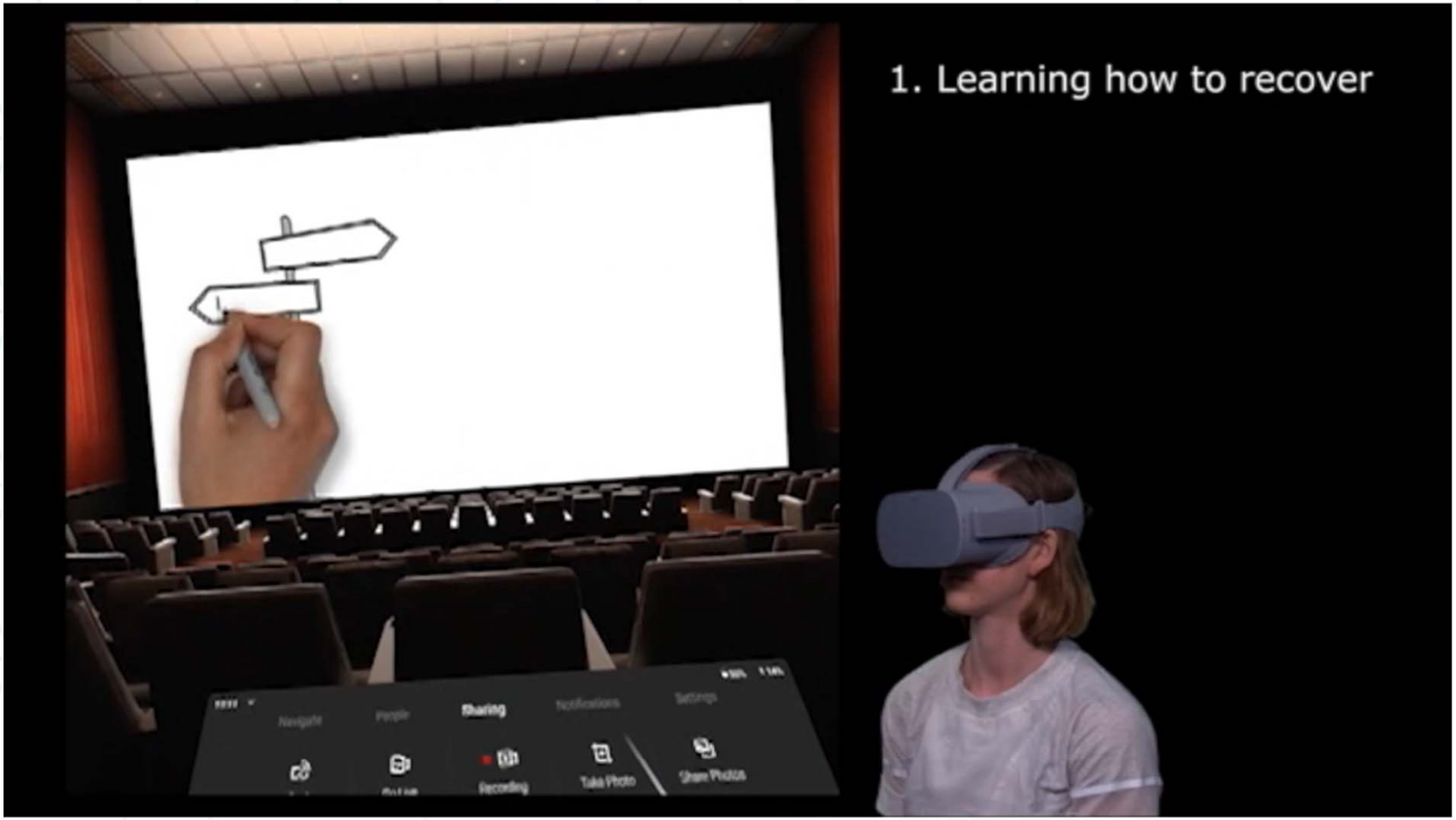
## Stress modulation

- Stress (i.e. hyperarousal) linked to non-recovery following MVA

# IMMERSIVE EDUCATION



# THEPROTOTYPE




*Currently on the development slow track, seeking support.

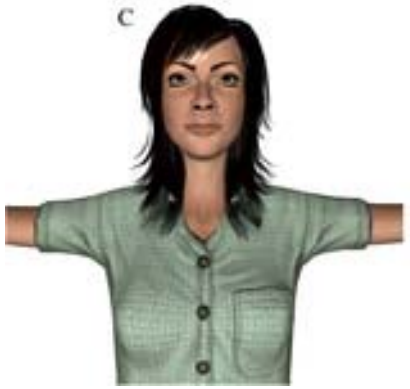
# VRFOR BACKPAIN



## Embodying Einstein in VR makes you smarter & Reduces ageism (bias against the elderly)

Banakou et al. (2018) Virtually being Einstein results in an improvement in cognitive task performance and a decrease in age bias.

VRFOR
BACKPAIN


Virtual race transformation reverses in-group bias

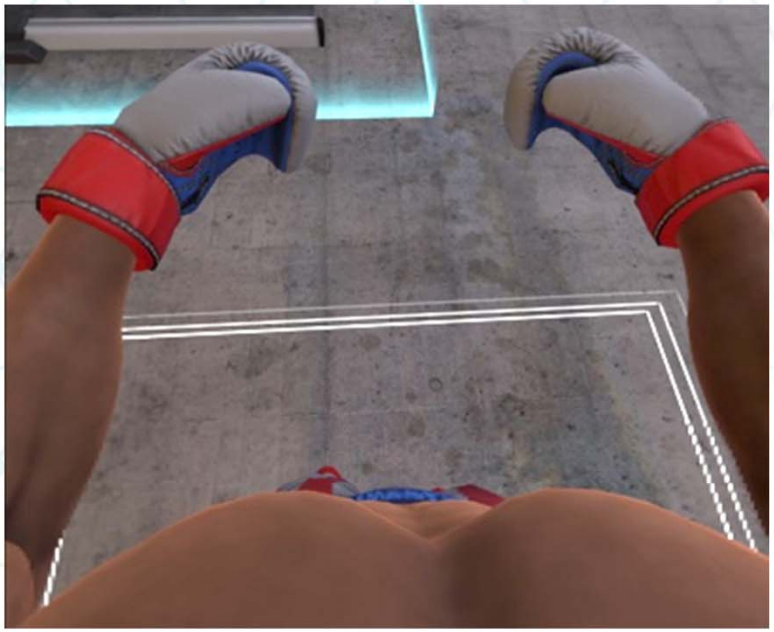
VRFOR
BACKPAIN

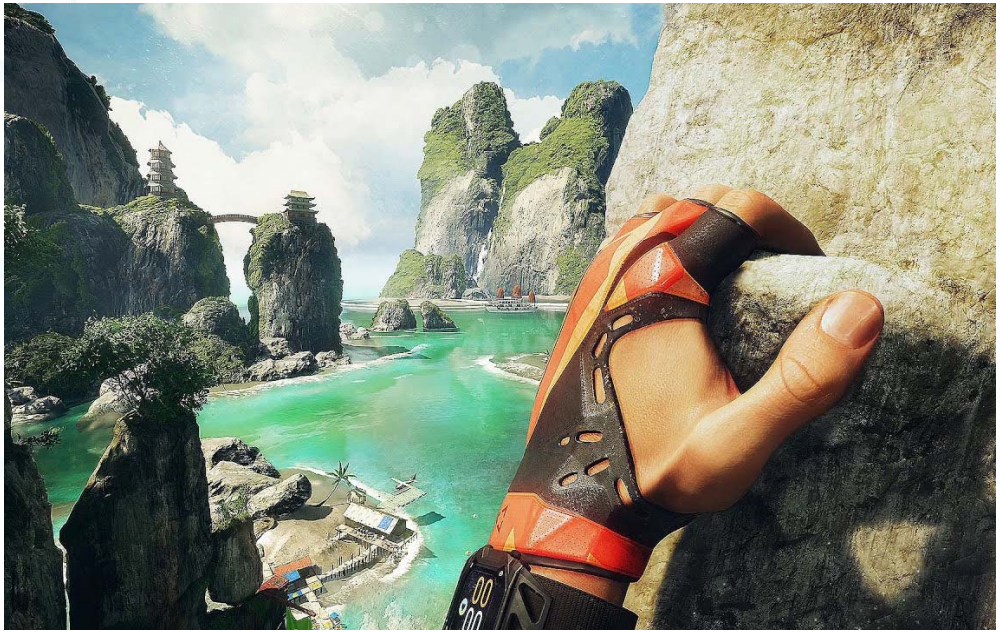
Human cognition & behaviour is strongly linked to the bodies (perceived) capabilities – "Embodied cognition"

# VRFOR BACKPAIN

Like embodying Einstein improved intelligence….

*Does looking stronger and more capable, reduce perceptions of vulnerability and increase perceptions of capability?*



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2019

VRFOR BACKPAIN

## Perceived Vulnerability Scale

*Rate how strong your body FEELS (not how it looks):*

0 1 2 3 4 5 6 7 8 9 10

Very weak — Very Strong

0 1 2 3 4 5 6 7 8 9 10

Very Vulnerable — Very Resistant to Injury

VRFOR

SCIPAIN

Prof. Coppieters (*pending funding applications)

VR@HOPKINS

The Hopkins Centre
Research for Rehabilitation and Resilience
HablTec
the sociotechnical space

### Soo Oh, Prof. Elizabeth Kendall

A space where technologists, clinicians, researchers come together to create custom solutions that support independence.

### Prof Heidi Zeeman

Can VR promote recovery in patients with brain injury and stroke?


### Dr Ali Lakhani

Simulated Natural Environments and the Psychological Health of People with Traumatic Injury

### Prof. Michel Coppieters

Can virtual reality relieve neuropathic leg pain (via cortical reorganization) in people with paraplegia?

# INCLOSING

VR enables new possibilities for rehabilitation, but…

Like any new idea, development and efficacy research takes time and resources.

On that note…

# Thanks to The Hopkins Centre's Core Partnerships

## Foundation Partners

Griffith University

Menzies Health Institute Queensland

Queensland Government

Metro South Health

## Affiliate Partners

MAIC

SYNAPSE
AUSTRALIA'S BRAIN INJURY ORGANISATION

Spinal Life Australia

Gold Coast University Hospital

Microsoft

RACQ

HCQ Health Consumers Queensland

West Moreton Health

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