



# The safety and efficacy of a second generation suprachoroidal retinal prosthesis

The Retina Society Meeting 2020 PJ Allen Centre for Eye Research Australia









Saving sight. Changing lives.

## **Disclosures**

An initiative of

Australian Government Australian Research Council

- This work has been supported by Australian Research Council Special Research Initiative in Bionic Vision Science and Technology to Bionic Vision Australia
- National Health and Medical Research Council Grant 1082358
- Victorian Government infrastructure support

Our partners

NICTA

Eye Research Australia

Our members

MELBOURNE



• I and my colleagues hold patents in the technology







#### **Summary**

- Surgical approach safe and reliable
- Device produces reliable reproduceable percepts
- Results better for orientation and mobility (O and M) and activities of daily living (ADL) testing device on vs device off
- Produces functional advantages for O and M and ADL
- Produces positive patient experiences



#### An Australian bionic eye for vision restoration



Allen et al., ARVO Poster, USA, 2019

#### **Retinal implant**



#### Bionic eye system





#### **Clinical Trial Participants**

Gender	Male	Female	Male	Male
Age at implant (years)	39	66	47	63
Eye condition	Rod Cone Dystrophy	Cone Rod Dystrophy	Rod Cone Dystrophy	Rod Cone Dystrophy
Observed nystagmus	Mild	None	Mild	Intermittent
Level of vision	Light perception only	Light perception only	Light perception only	Light perception only
Years of blindness	19	~25	~17	~20
Primary mobility aid	Cane	Dog	Cane	Cane
				Eye Research

Australia

## Surgery





#### Clinical images – P 1 - 4



200 µm

noo buu

#### **Thresholds vs Weeks Post Switch-On**



# Clinical trial - Device ON consistently better than Device OFF in the lab

#### Table top search

![](_page_8_Picture_2.jpeg)

![](_page_8_Figure_3.jpeg)

#### **Door detection**

![](_page_8_Picture_5.jpeg)

![](_page_8_Figure_6.jpeg)

![](_page_8_Picture_7.jpeg)

Kolic et al., ARVO Poster, USA, 2019

![](_page_8_Picture_9.jpeg)

#### **Obstacle Avoidance**

![](_page_9_Figure_1.jpeg)

![](_page_9_Picture_2.jpeg)

# Patient anecdotes of using device in the real world

- "From the ground floor looking up, the first floor is like a veranda, where you can see people walking around. I've been in .... nearly 26 years and I never knew this!"
- "I did have success though when doing the washing as in I was able to separate the light items from the dark ones. **Something I haven't been able to do for a number of years**. So that was rather cool!"
- "Picked up on a lot of different things such as the pylons that support the building and was able to note things in the shop windows. I couldn't really tell what they were but to me, at least it was an awareness that there was something in those shop windows. **Something I'm not aware of with my natural eyes."**
- "I was sitting in a café, scanning around to see what I could pick up. I found myself observing people and tracking them. Where were they going? To some people this might seem like a trivial thing but I found it fascinating."

![](_page_10_Picture_5.jpeg)

#### Activities of daily living

![](_page_11_Picture_1.jpeg)

![](_page_11_Picture_2.jpeg)

# **Acknowledgements – Study** personnel

![](_page_12_Picture_1.jpeg)

![](_page_12_Picture_2.jpeg)

Dr Jonathan Yeoh

![](_page_12_Picture_4.jpeg)

Dr Mark McCombe

![](_page_12_Picture_6.jpeg)

Dr Robert Buttery

![](_page_12_Picture_8.jpeg)

Dr Daniel Chiu

![](_page_12_Picture_11.jpeg)

Dr Rosie Dawkins

![](_page_12_Picture_13.jpeg)

A/Prof Robert Briggs Otolaryngologist

![](_page_12_Picture_15.jpeg)

![](_page_12_Picture_16.jpeg)

A/Prof Chris Williams Pre-clinical Lead

A/Prof David Nayagam Pre-clinical Lead

![](_page_12_Picture_19.jpeg)

Dr Matt Petoe Fitting & Evaluation Lead

![](_page_12_Picture_21.jpeg)

Jessica Kvansakul Fitting & Evaluation

![](_page_12_Picture_23.jpeg)

![](_page_12_Picture_24.jpeg)

A/Prof Chi Luu Pre-clinical and Clinical

![](_page_12_Picture_26.jpeg)

Dr Carla Abbott Pre-clinical & Clinical

![](_page_12_Picture_28.jpeg)

Australian

THE UNIVERSITY OF

National

A/Prof Nick Barnes **Computer Vision Lead** 

![](_page_12_Picture_30.jpeg)

Maria Kolic Clinical Lead

![](_page_12_Picture_32.jpeg)

**Elizabeth Baglin** Clinical

![](_page_12_Picture_34.jpeg)

![](_page_12_Picture_35.jpeg)

William Kentler Hardware Development

![](_page_12_Picture_37.jpeg)

![](_page_12_Picture_38.jpeg)

![](_page_12_Picture_39.jpeg)