

Steven Prawer
*Bionic Vision Australia,
University of Melbourne
Victoria*



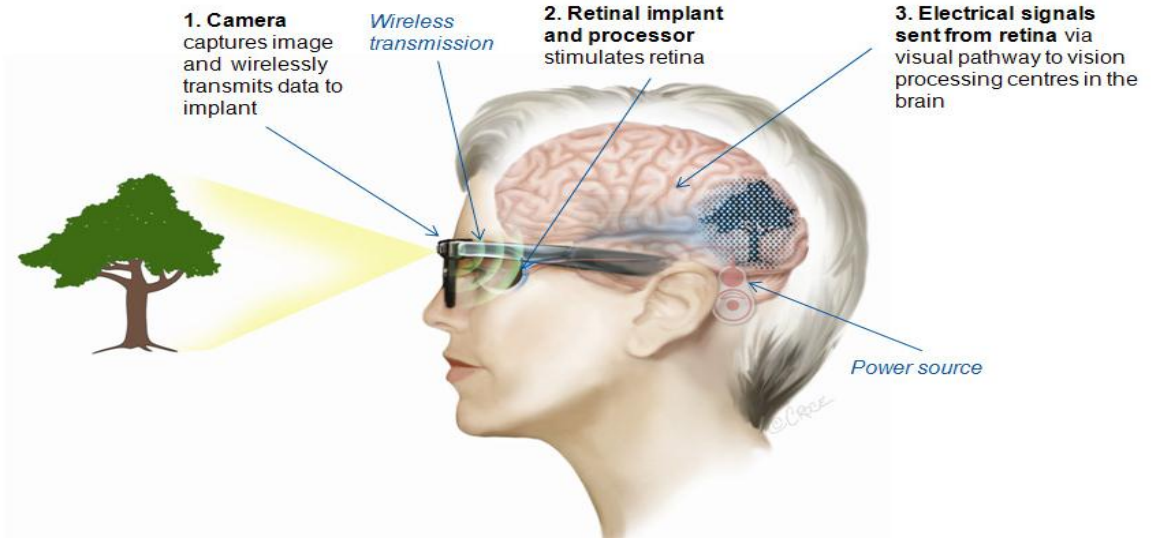
Bionic Vision Australia is a partnership of world leading Australian research institutes



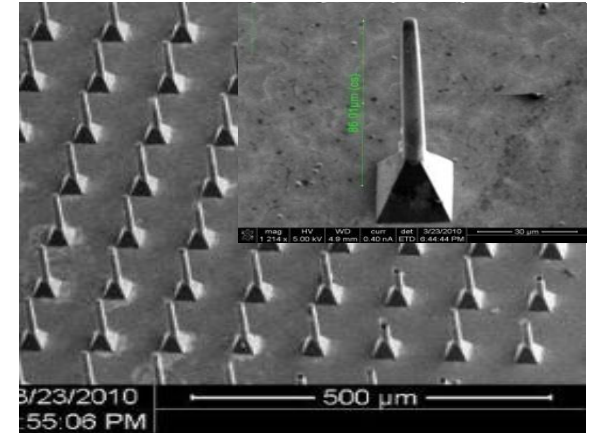
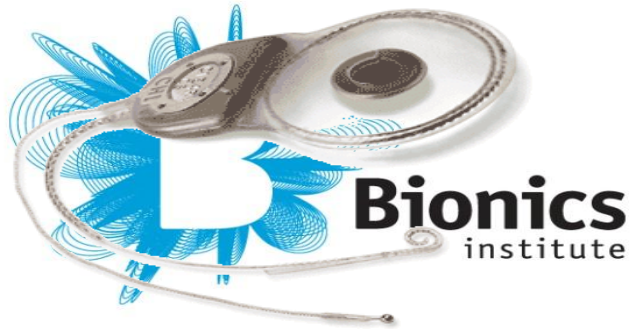
Director: Prof Tony Burkitt Chairman: Prof David Pennington

The bionic eye - how it works

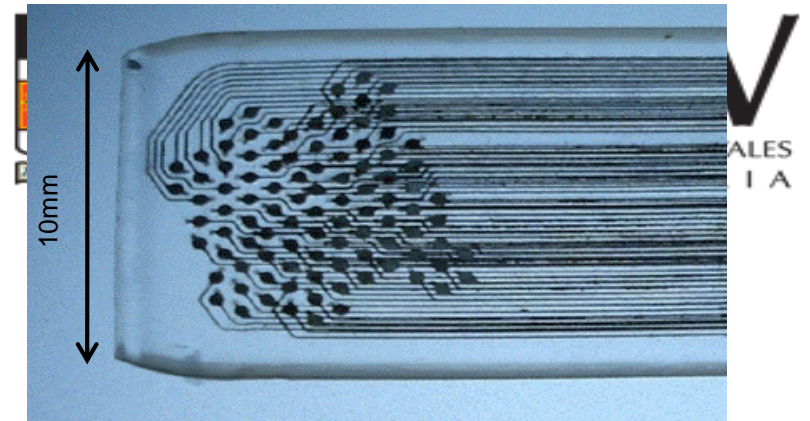
Second prototype: High-acuity neurostimulator



The BVA team



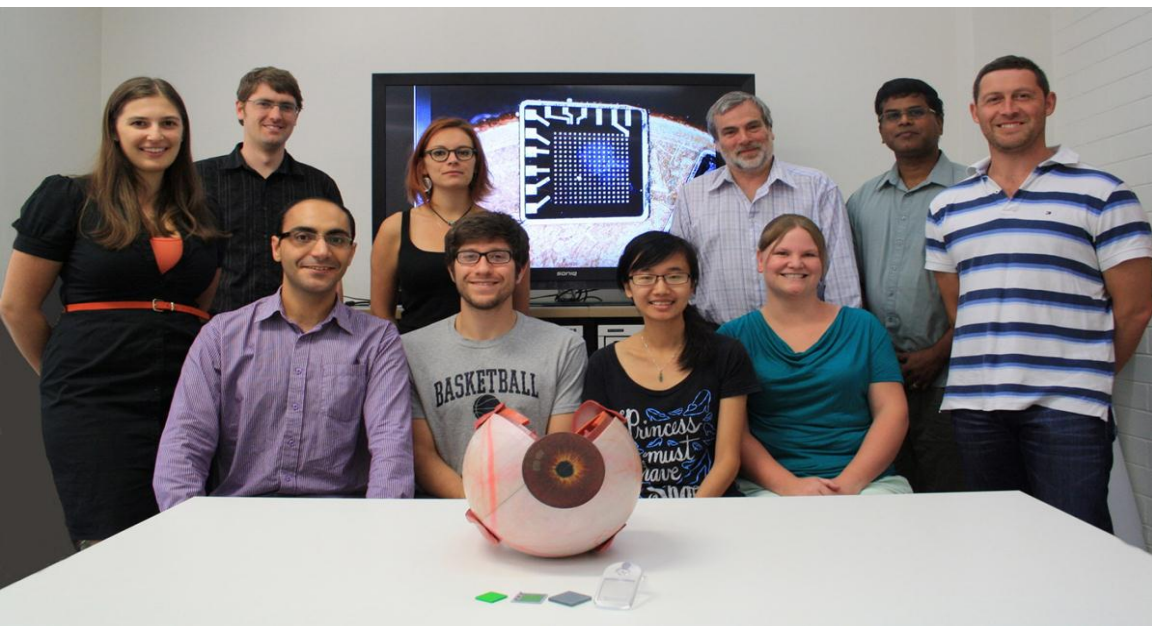
Courtesy of Kumar Ganesan, 2010



Courtesy of Gregg Suaning, 2010

BVA's competitive advantage

The Team



Kumar Ganesan
Sam Lichter
Joscha Specks
David Garrett
Kate Fox
Alastair Stacey
Igor Aharonovich
Hamish Meffin

Arman Ahnood
Nick Apollo
Wei Tong
Mathilde Escudie

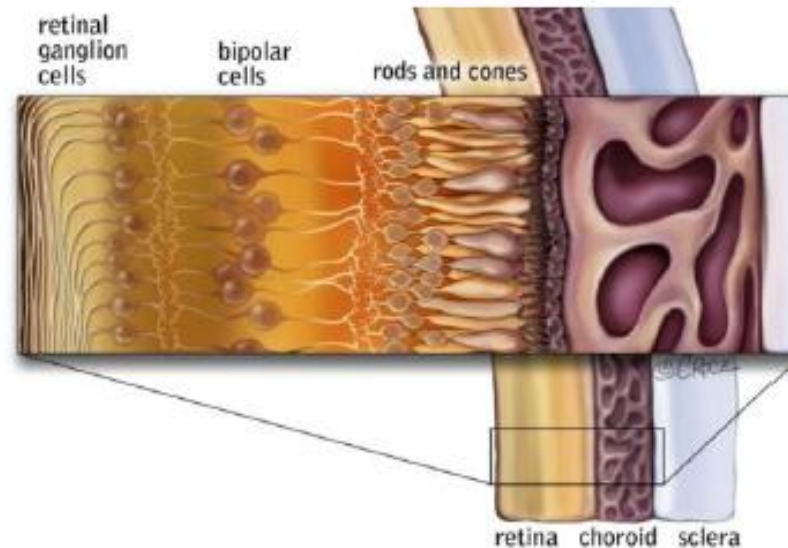
Motivation: Eye Disease

Age Related Macular Degeneration (AMD)

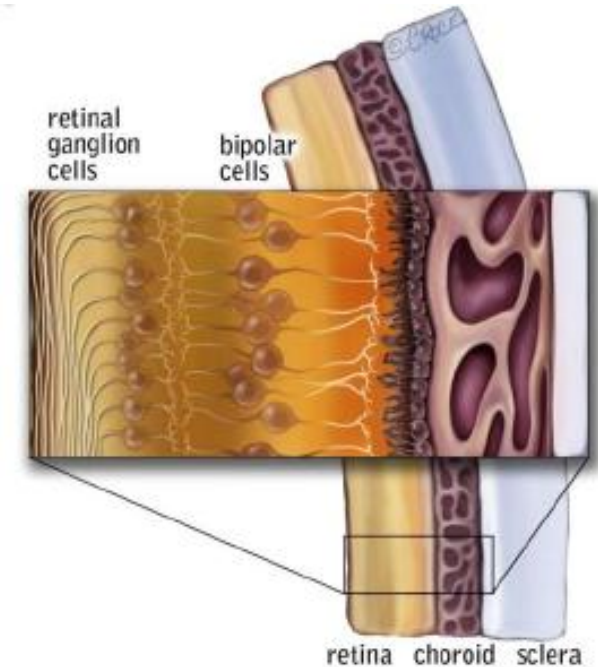
- Major cause of vision loss in Western Countries
- 20-25 million people affected worldwide
- Current cost (Australia) > \$2B/year

Retinitis Pigmentosa (RP) :

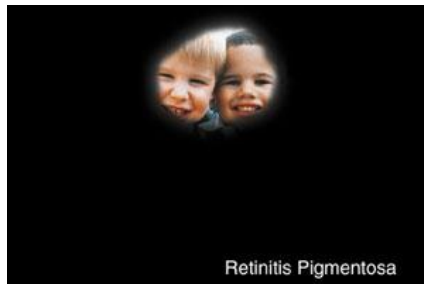
- Leading cause of inherited blindness
- 1.5 million people affected world wide
- 25% of RP patients are legally blind



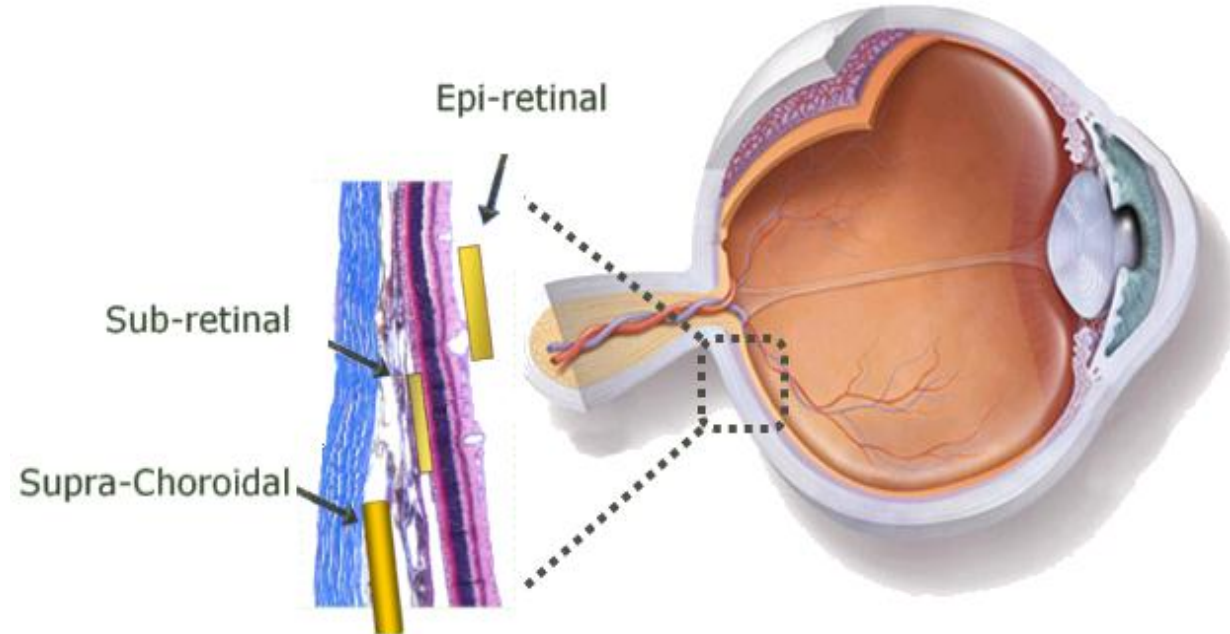
Healthy Vision



Retinal degeneration

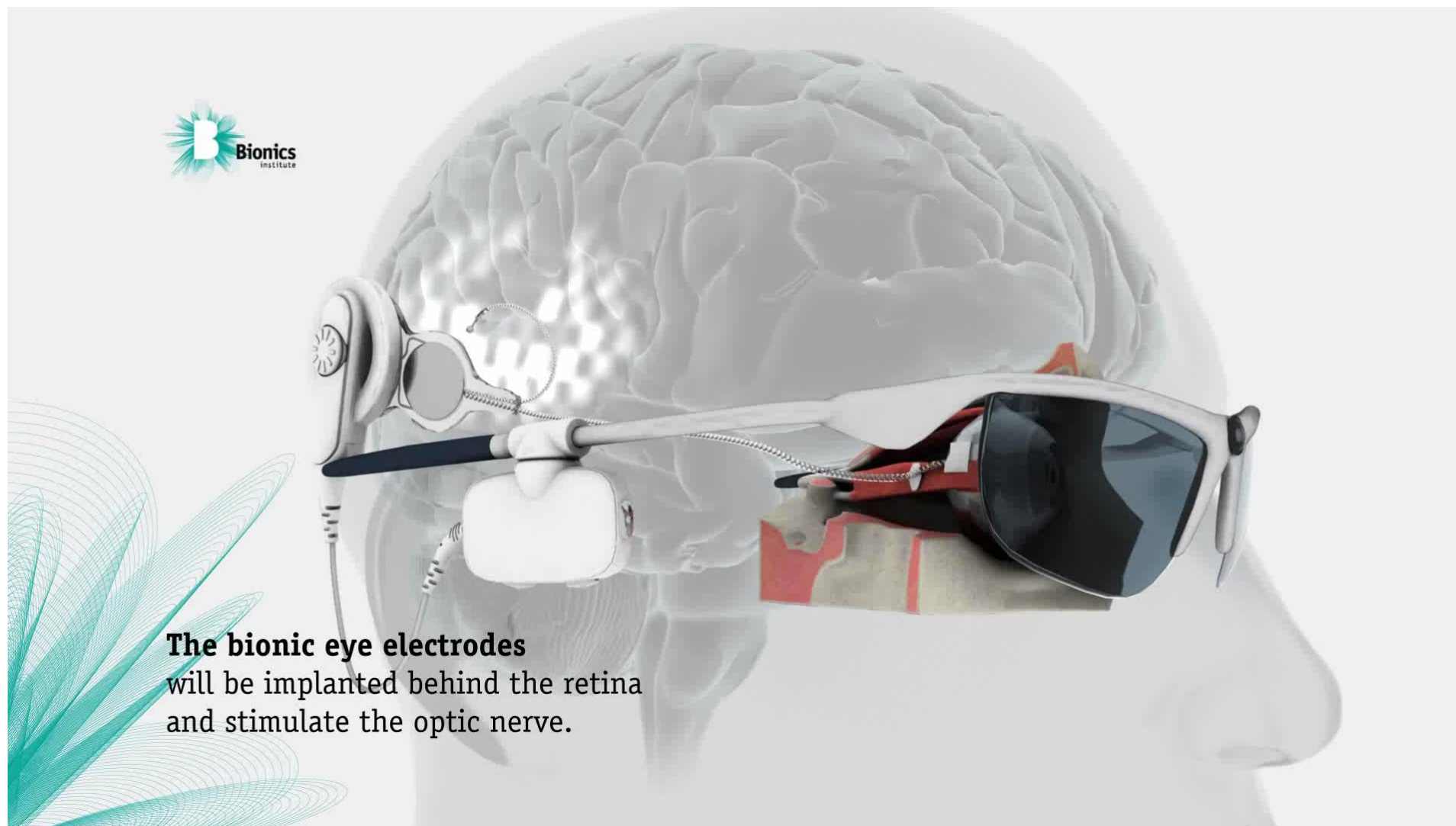


- Epi-retinal
- Supra choroidal
- Sub-retinal



- Aim: stimulate the inner retina bypassing the damaged photoreceptors.

What it looks like



Di Ashworth



1-08-30/bionic-eye-major-development/4231204

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Australian team hails bionic eye success

By medical reporter Sophie Scott and staff
Updated Thu Aug 30, 2012 1:36pm AEST



Dianne Ashworth
Device recipient

VIDEO: Bionic eye patient Dianne Ashworth describes the procedure (ABC News)

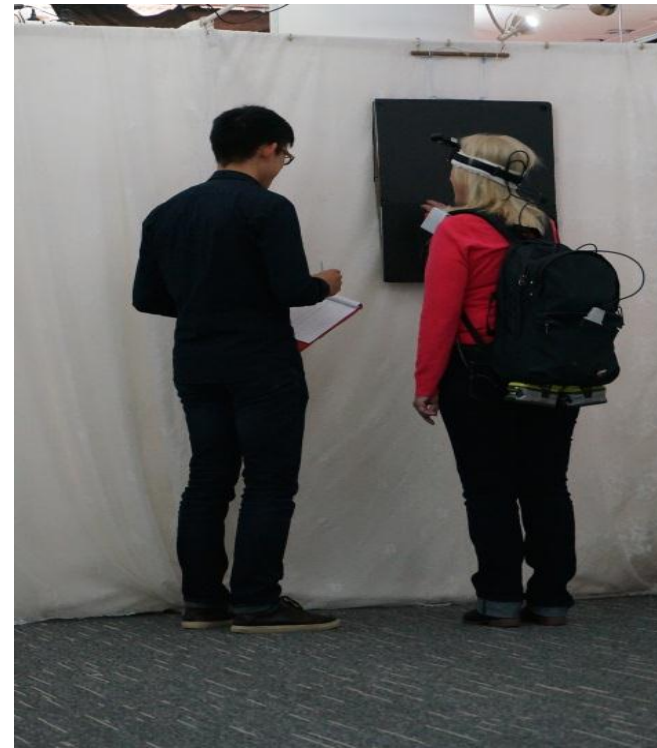
Australian doctors have implanted a bionic eye into a blind patient, in what is being hailed a major step

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- Kings School principal Dr Tim Hawkes and Australian Education Union president Angelo Gavriletos discuss the potential changes to school funding.
- White House staff lift the lid on their home brew recipe for president Barack Obama's favourite honey-flavoured brew.

Got a news tip?

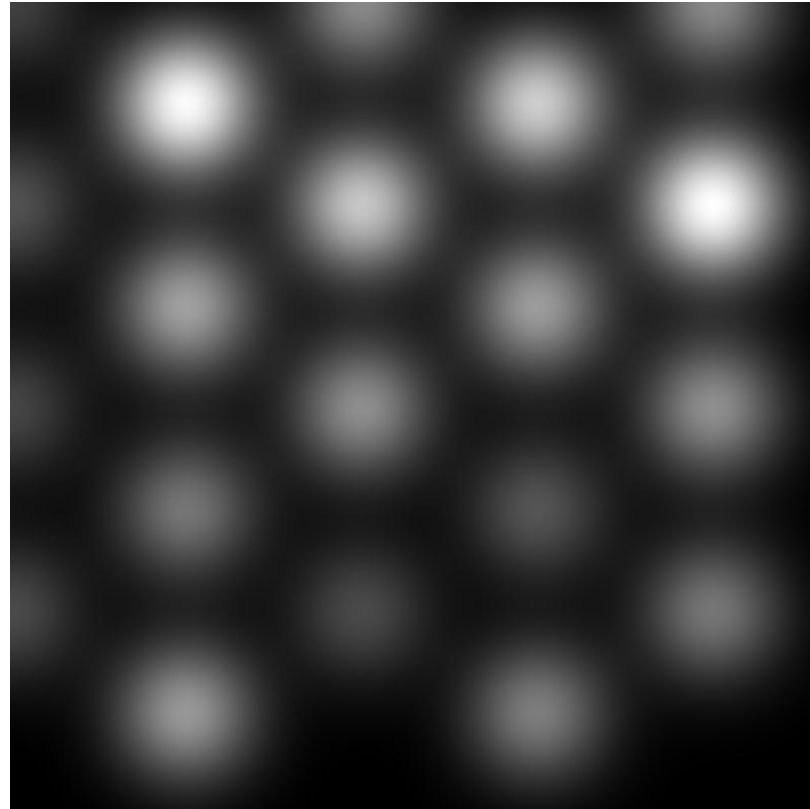


[Di NICTA Testing-HD 720p.mov](#)

[BVA VNR FTA MP4 360p \(16x9\).mp4](#)

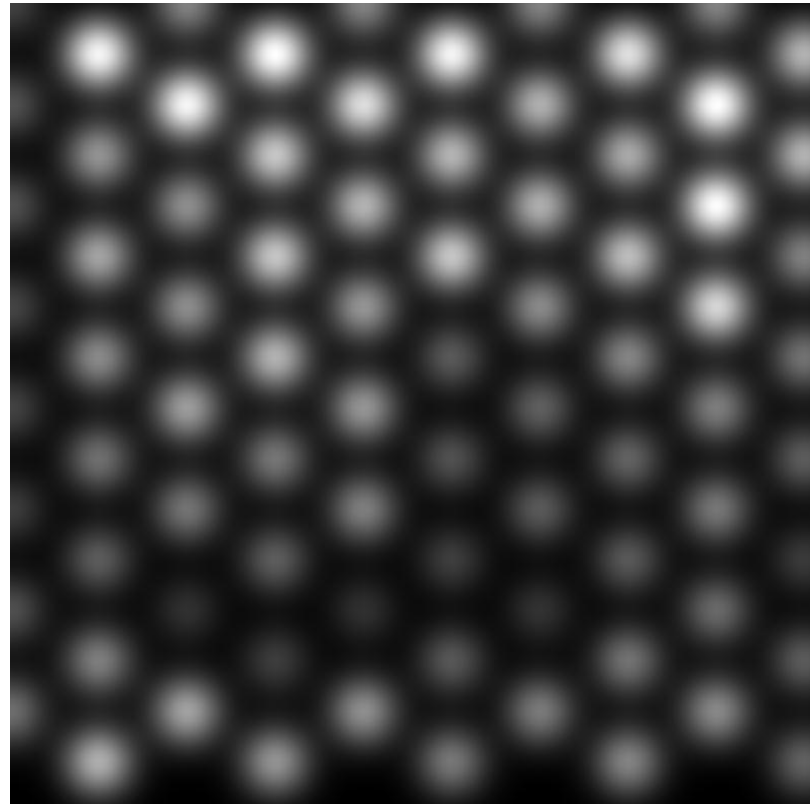
What do you see here?

16 Phosphenes



What do you see here?

64 Phosphenes



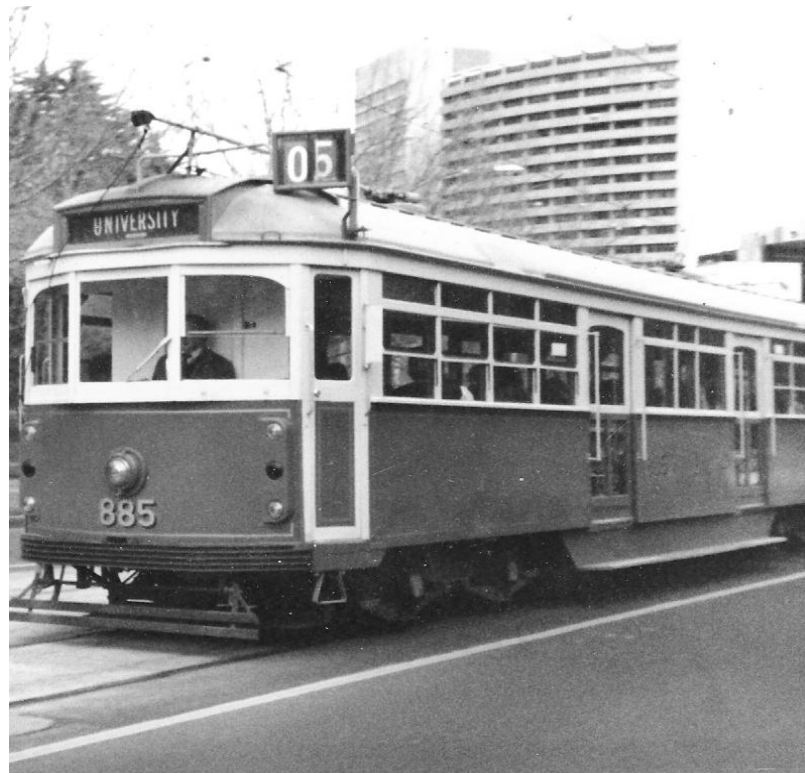
What do you see here?

1000 Phosphenes



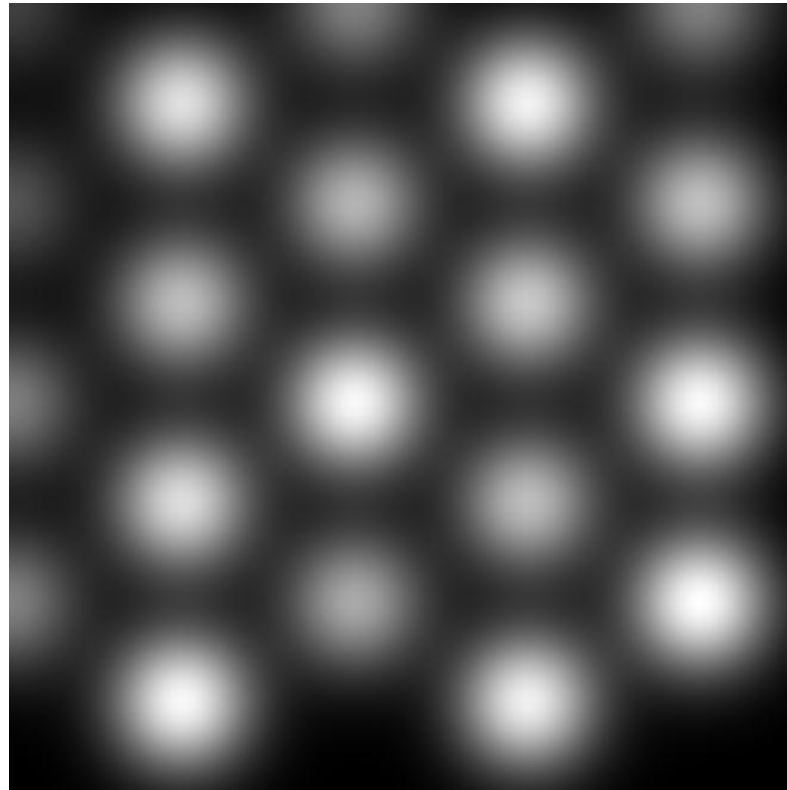
What do you see here?

Original Picture



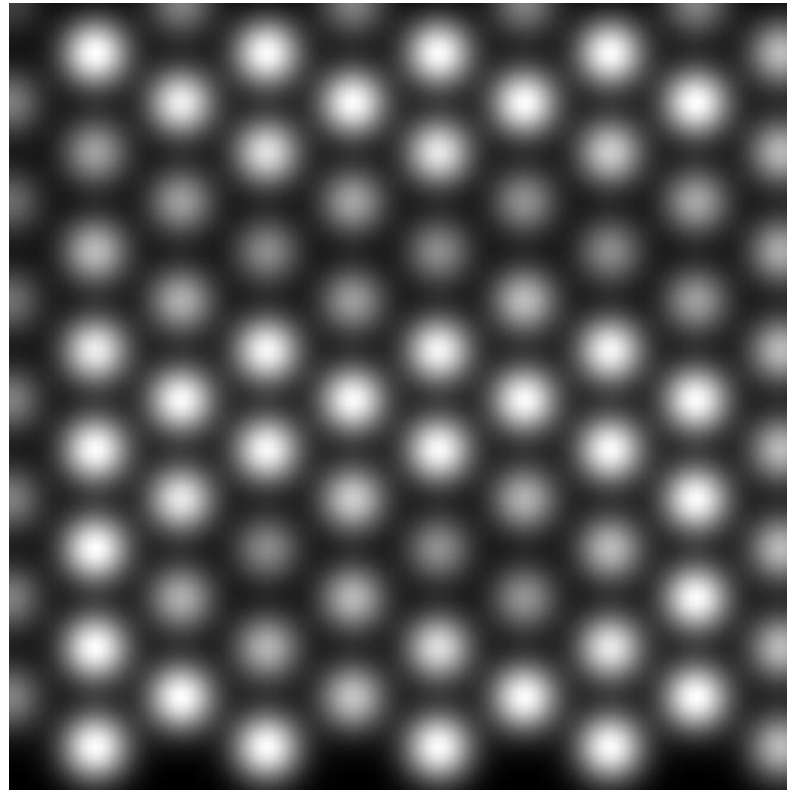
Can you read this?

16 Phosphenes



Can you read this?

64 Phosphenes



Can you read this?

1000 Phosphenes



Choice of material for electrodes



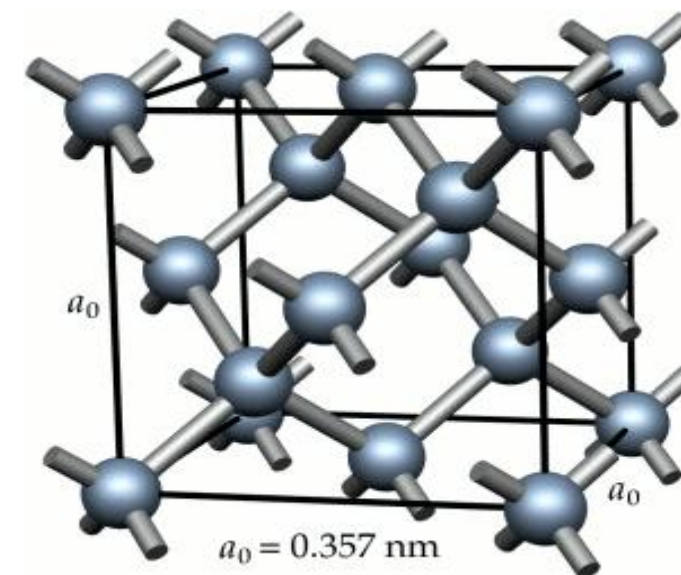
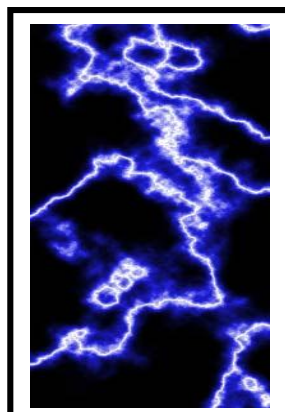
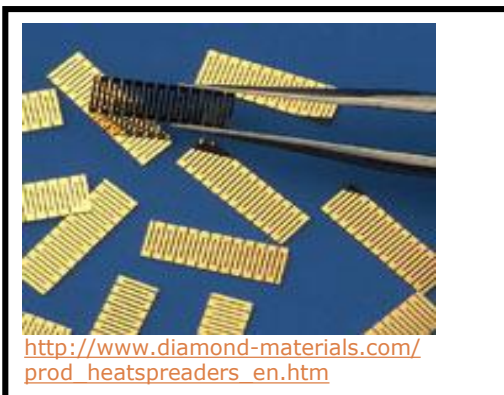
- Mechanically durable
- Electrically conductive core and insulating body
- Biocompatible
- Chemically inert
- High thermal conductivity
- High charge injection capacity



BIONICVISION
AUSTRALIA

Diamond: the material

EXCEPTIONAL PROPERTIES INCLUDE:

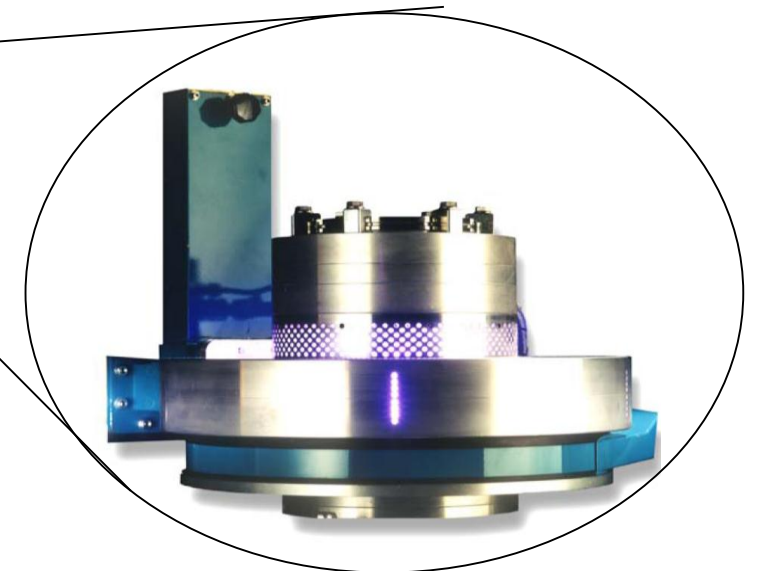
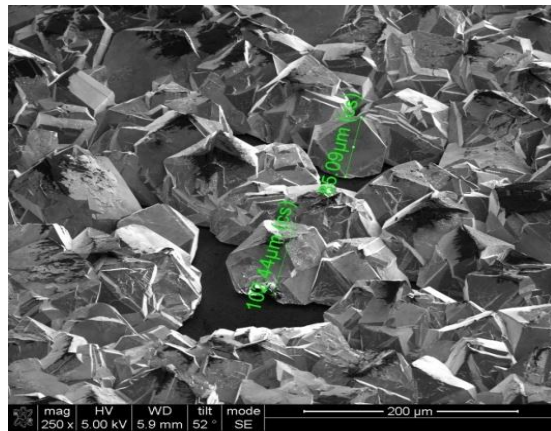


DIAMOND UNIT CELL

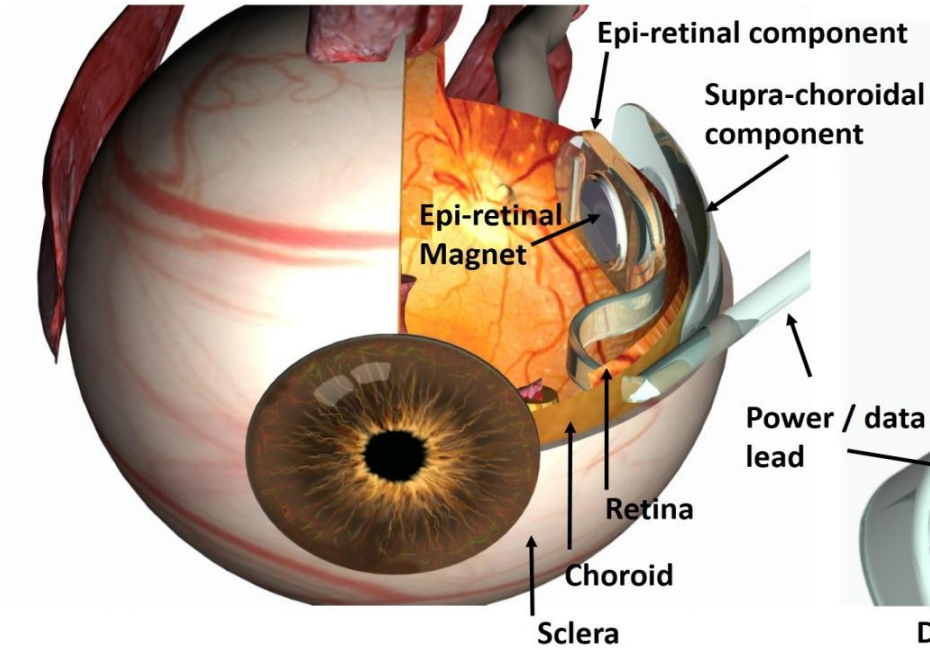
Diamond



- MPCVD - Polycrystalline diamond
- Recipe: H₂, CH₄ for insulating PCD and H₂, CH₄, Ar, N₂ for conducting UNCD
- Conductivity: B- or N-doping



Magnetic surgical location



Epi-retinal component (Exploded view)

