

# BRAIN COMPUTER INTERFACES

## WITH PROFESSOR CHIN-TENG LIN

### Talking points

#### KNOWLEDGE

1. What is a brain-computer interface?
2. What are three of the main current limitations of BCIs?

#### COMPREHENSION

3. Why do you think more invasive methods of measuring brain activity are more precise? Despite this, why do they have less potential for application in society?
4. Why has the development of wearable computers boosted BCI research?

#### APPLICATION

5. What questions would you ask CT to learn more about direct-sense BCIs and their advantages over other BCIs?

6. As well as computer scientists, what other types of researchers and professionals do you think are involved in the development of BCI systems? What is the likely role of each?

#### ANALYSIS

7. What do you think are some possible future opportunities for direct-speech and direct-sight BCI within society?
8. Why was CT's invention of fuzzy neural networks such a key moment for the field of computational intelligence?

#### EVALUATION

9. CT has seen interest in BCIs gain increasing attention and funding from industry in recent years, whereas before interest was principally from governments. What factors do you think have driven this trend?
10. Some academics are cautious about the future of BCIs, citing concerns about ethics and opportunities for societal good and bad. On balance, do you think BCIs pose more of an opportunity or a risk for society?

## Activities

1. There are a number of different brainwave measurement techniques available, with their own unique advantages and disadvantages both in terms of research and opportunities for real-world applications. Use the article and the internet to fill out the following table:

Type of measurement	How it works	Pros (research)	Cons (research)	Pros (society)	Cons (society)
EEG (electroencephalography)					
fMRI (functional magnetic resonance imaging)					
MEG (magnetoencephalography)					
ECoG (electrocorticography)					

2. Imagine a future world where some of the possibilities of BCIs have become a reality and are commonplace in society. Write a short story that explores the impacts of these from a certain point of view. What does your future society look like? Have BCIs changed it for the better or the worse – or somewhere between the two? Take the time to further explore possible applications of BCIs using the internet before diving in.

## More resources

- This video from public broadcaster DW Shift explains what Brain-Computer Interfaces are, and their possible applications – both good and bad – in the future: [www.youtube.com/watch?v=6QcY7v9Kio4](https://www.youtube.com/watch?v=6QcY7v9Kio4)
- 'Fuzzy logic' is an important cornerstone of computational intelligence. Read this article from *Scientific American* to learn more about the term and its diverse applications: [www.scientificamerican.com/article/what-is-fuzzy-logic-are-t/](https://www.scientificamerican.com/article/what-is-fuzzy-logic-are-t/)