

# BIOMEDICAL ENGINEERING WITH DR CHI HWAN LEE

## TALKING POINTS

### KNOWLEDGE

1. What is a wearable biomedical device?
2. What characteristics must wearable biomedical devices have?

### COMPREHENSION

3. What are the benefits of being able to measure a patient's biosignals while they are at home?
4. How do drug delivery contact lenses work?
5. What are the advantages of drug delivery contact lenses over eyedrops and ointments?

### APPLICATION

6. As well as monitoring swallowing conditions, what other medical applications can you think of for sensors placed on the skin?
7. What electronic textiles would you design for humans? How would your textiles be worn, what biosignals would they measure, and why would they be useful?
8. What questions would you want to ask Chi Hwan about his research and career path?

### ANALYSIS

9. Why did Chi Hwan need to develop the 'peeling technique'?
10. Why is it so important that Chi Hwan works with both clinicians and patients when developing wearable biomedical devices?

### SYNTHESIS

11. "Problems regarding human health and disease cannot be tackled by one discipline alone." Why not?
12. Think of a healthcare-related issue. How many different disciplines, research fields and occupations can you think of that could contribute to solving the problem?

### EVALUATION

13. Chi Hwan recommends not limiting yourself to the one specific area that you are currently interested in. Why do you think this is? Do you think this might be difficult advice to follow? Why, or why not?

## ACTIVITIES

1. **Design a wearable biomedical device** that could be used to monitor or treat a health condition. Your device could be worn directly on the skin or eye or as an electronic textile. Draw a labelled diagram of your device and consider the following:

- What health condition will it address?
- Will it monitor or treat the condition, or both?
- What biosignals will it measure?
- How will it administer treatment?
- How will it be worn by a patient?
- What type of material will it be made from?
- How will you ensure it is comfortable?
- What challenges do you think would arise when making this device?

2. **Design a leaflet** for patients with glaucoma, encouraging them to wear Chi Hwan's smart contact lenses that can continuously monitor their condition, and his drug delivery contact lenses that can effectively treat their condition. Consider the following:

- How will you explain Chi Hwan's research in a clear and easy-to-understand way?
- What are the benefits of using smart contact lenses to monitor their condition?
- What are the benefits of using drug delivery contact lenses to treat their condition?
- How will you relieve any potential fears about using these contact lenses?

## MORE RESOURCES

- Listen to biomedical entrepreneur Laura Indolfi's TED talk about cancer treatment. Laura creates implantable devices that can deliver drugs locally to the site of a tumour: [www.ted.com/talks/laura\\_indolfi\\_good\\_news\\_in\\_the\\_fight\\_against\\_pancreatic\\_cancer](http://www.ted.com/talks/laura_indolfi_good_news_in_the_fight_against_pancreatic_cancer)
- Visit Chi Hwan's research group website 'StickTronics' to see photos and read more about his projects: [engineering.purdue.edu/StickTronics/research](http://engineering.purdue.edu/StickTronics/research)

HEAD TO CHI HWAN'S FUTURUM WEBPAGE FOR A POWERPOINT ABOUT HIS WORK:

[www.futurumcareers.com/how-can-smart-contact-lenses-monitor-and-treat-eye-conditions](http://www.futurumcareers.com/how-can-smart-contact-lenses-monitor-and-treat-eye-conditions)