

# Architecture

with Dr Negin Imani

## Talking points

### Knowledge & Comprehension

1. What are plant stomata, and what is their function?
2. In what ways have Negin's designs been inspired by nature?
3. What are the active and passive parts of the shading system Negin designed? How do they both work?

### Application

4. Think about the building you are in right now. What environmental conditions does it most need to adapt to?
5. Negin leads an interdisciplinary team of researchers – what types of knowledge, expertise and skills would be needed to design biomimetic adaptive building façades?

### Analysis

6. How will Negin's biomimetic adaptive façade improve buildings?
7. Think about a traditional building and a building with an adaptive façade. What are the advantages and limitations of each?

### Evaluation

8. How do you think buildings will need to change as the effects of climate change become more extreme? What role could adaptive façades play in this? And how could adaptive façades help to reduce building energy use and make them better able to adapt to climate change?

## Activity

### Design a biomimetic adaptive façade

Buildings in different parts of the world will have different priorities when it comes to the environmental conditions they are exposed to. These could include:

- A rainy city at risk of flooding
- A hot desert environment with droughts and dust storms
- A windy mountain village with heavy winter snowfall

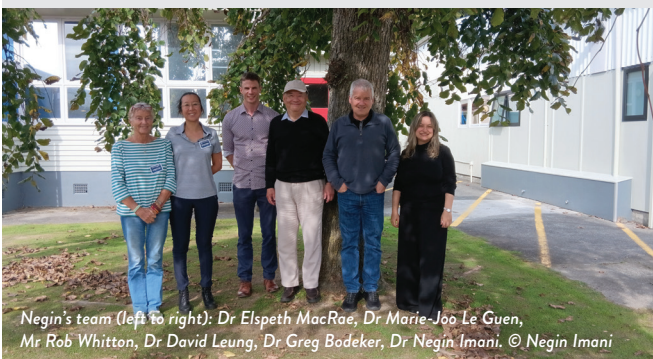
Individually or in groups, choose a location/environment (from the list above or think of your own ideas) and design an adaptive façade suitable for that environment, inspired by a plant, animal, fungus or natural process. How would your façade respond to changing environmental conditions?

You may want to think about the following:

- What would be the priorities for a building in your location? What environmental conditions might the building and its occupants need to be protected from, and what conditions might need to be enhanced?
- What plants, animals, fungi or natural processes could inspire your design? It may be helpful to research the types of wildlife that thrive in those environments, but you may also find inspiration elsewhere.
- What challenges might be faced when implementing your biomimetic adaptive façade on buildings in your chosen location in real life?

## More resources

- Negin founded Biomimicry New Zealand: [biomimicry.org.nz](http://biomimicry.org.nz)
- Listen to Negin talk about her research into biomimetic buildings: [youtube.com/watch?v=GFjIR\\_Ep554](https://youtube.com/watch?v=GFjIR_Ep554)
- Negin has written several books about biomimetic architecture:
  - *Heating with Wolves, Cooling with Cacti* ([doi.org/10.1201/9781003081937](https://doi.org/10.1201/9781003081937))
  - *Biomimetic Adaptive Buildings* ([doi.org/10.3390/books978-3-7258-6907-7](https://doi.org/10.3390/books978-3-7258-6907-7))
  - *Biomimetic Buildings: Copying Nature for Energy Efficiency* ([doi.org/10.3390/books978-3-0365-5402-0](https://doi.org/10.3390/books978-3-0365-5402-0))



Negin's team (left to right): Dr Elspeth MacRae, Dr Marie-Joo Le Guen, Mr Rob Whitton, Dr David Leung, Dr Greg Bodeker, Dr Negin Imani. © Negin Imani



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