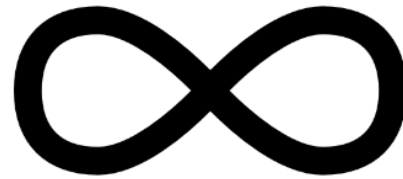
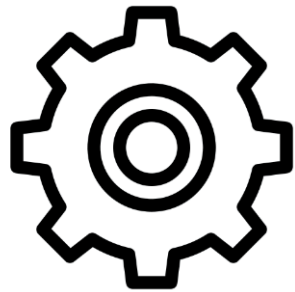
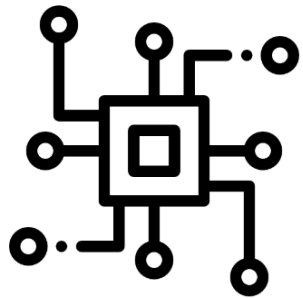
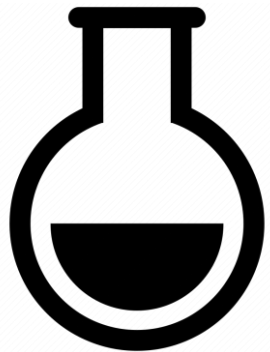
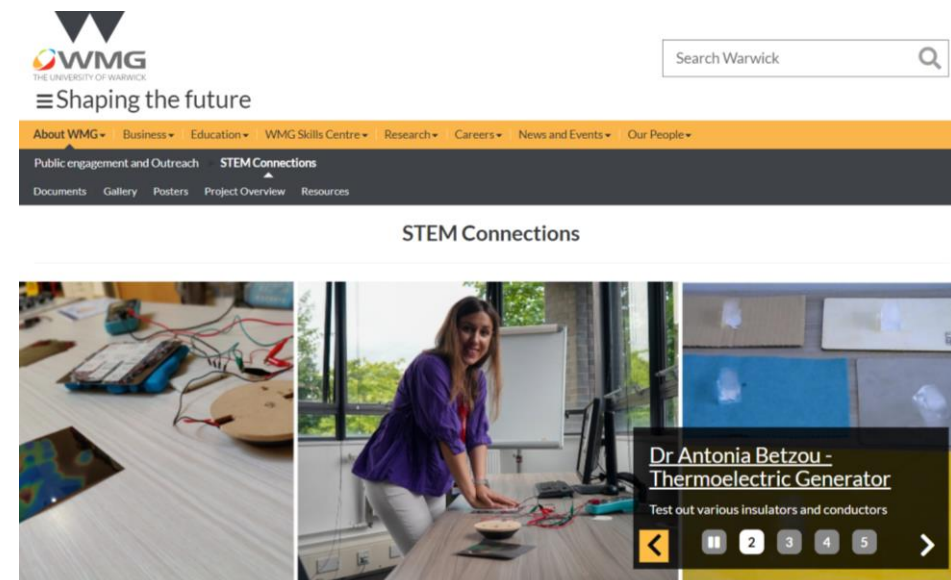


# STEM Connections



# STEM Connections

STEM Connections is a Research England funded project at the University of Warwick that highlights the technology that is being researched at the university, the impacts that research could have on the local population and wider society, and the personal stories of the people involved in that research.

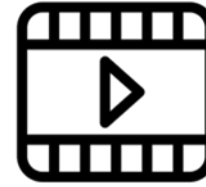


# STEM Connections

Meet the Academic

Dr Negar Riazifar

## Self-Balancing Robot – Dr Negar Riazifar



PLAY VIDEO



### What would be your dream research project?

Developing an efficient algorithm for hearing aids, which is completely affordable for developing countries. The goal would be low cost hardware, open source technology, and a partnership with local manufacturers.

Find out more:



[www.warwick.ac.uk/stemconnections](http://www.warwick.ac.uk/stemconnections)

# Self-Balancing Robot – Dr Negar Riazifar

## How do self-balancing robots work?

Self-balancing robots are like skilled acrobats in which they can stand by themselves without falling over!

They do this by using special sensors that constantly check if the robot is leaning too much in any direction. If it starts to tip forward, backward, or to the sides, the sensors quickly tell its wheels or legs to move in the opposite direction.

The robot keeps making tiny adjustments super-fast to stay upright, which gives it a fantastic sense of balance so, no matter where it goes, it can stay steady on its "feet" and keep rolling along without tumbling over.



# Self-Balancing Robot – Dr Negar Riazifar

**Meet Negar Riazifar**, an Assistant Professor in Engineering Mathematics. Negar uses robotics as a way of showing people how combining knowledge and practical skills can solve problems and make fantastic products.



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## *Dr Negar Riazifar*

**STEM** +  
**Connections**



# Building a self-balancing system

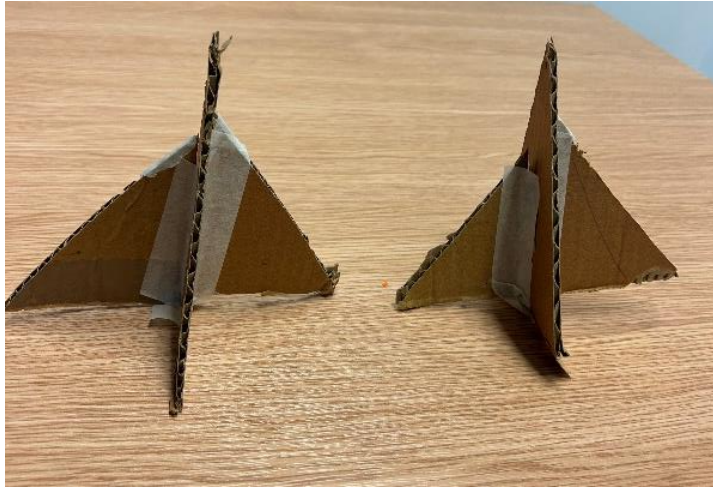
## Materials Required:

- Large cardboard box
- Scissors
- Dowel Rod (Skewer)
- Sticky Tape / Glue
- Ruler (optional)

## Step by Step Instructions:

1. Cut out two large triangles and four small right-angled triangles to use as a base





2. Using glue or sticky tape, attach the right-angle triangles onto the larger triangles to help them stand.



3. Make a hole at the top of the Triangle Stands to Poke the Dowel Rod (skewer) through to make a seesaw base.



4. Cut a long thin rectangle and two smaller rectangles like shown in this image. For the see-saw balance beam.



5. Stick the smaller rectangles onto the larger one. Leaving a gap in the centre of the larger rectangle.



6. Place structure onto the base

7. What can you balance on each side of the seesaw.

## Exploring this concept further:

- Use different shapes as a base and see how rigid the base is
- Can you build a structure on top of the seesaw?
- Use some building blocks at home and see how high you can build on a curved shape as your base





SECONDARY: Linking Academics area to careers and industry  
Other useful websites

PRIMARY: Linking to subjects offered in Secondary schools  
Maths, Science (Biology, Chemistry, Physics), Design &  
Technology (Engineering)

Thank you!

STEM Connections

