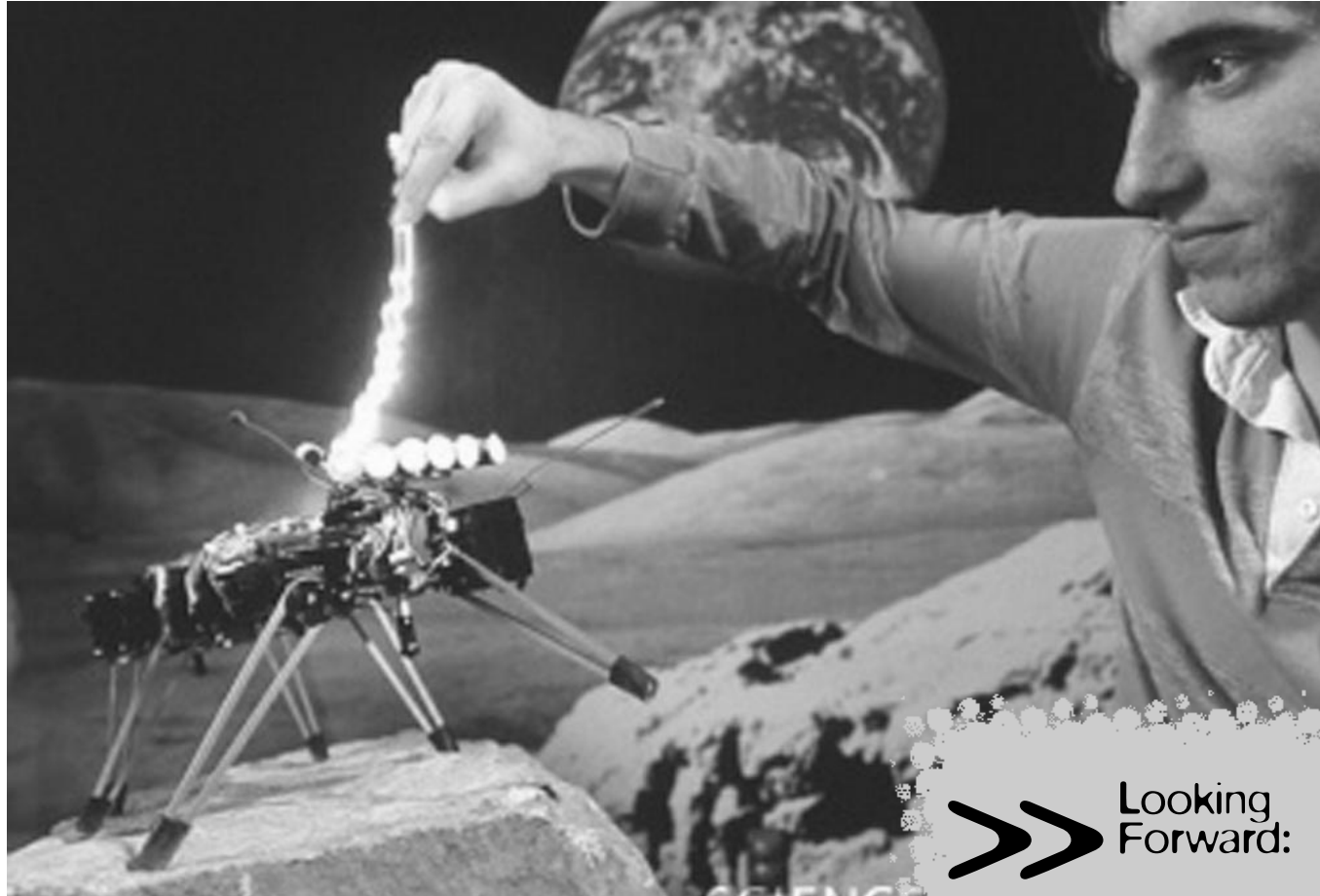


Robots are an exciting and useful type of machine. Their impact on our world is on the increase. Robots can perform a range of helpful tasks with little or no supervision by people.

Those that can work completely by themselves are called autonomous. Others are remote controlled by humans and are called teleoperated machines.



A researcher gives life to 'Genghis', a robot insect made by the Massachusetts Institute of Technology (MIT), USA.

## Under Orders

Robots follow sets of instructions, usually written as computer programs. Many robots can have their programs changed in order to perform different tasks.

The Cye home robot, for example, can fetch and carry items, act as a home security guard or vacuum a room using different programs and attachments.

## Looking Forward:

### The Thinking Robot

Robots can react to their environment and remember things. But their brains are nowhere near as flexible or powerful as the human brain. The goal of many people working in the field of artificial intelligence (AI) is to change that. Already, robots that can learn from their mistakes have been created.

## Sensors And Controllers

To work on their own, robots need to know information about themselves and the world around them. Devices called sensors collect information, such as the robot's position or the size of an obstacle ahead.

Sensors pass this data back to a robot's controller. This is the "brain" of the robot, which makes decisions and instructs a robot's parts. The controller is usually some form of computer microprocessor.

Android robot Honda P3 walking down stairs in a laboratory. This remote-controlled robot can walk in a line, open a door, turn a corner and

## Degrees Of Freedom

The moving parts of a robot are powered by actuators. These can be electric motors, hydraulic pistons or compressed air systems.

Each direction that a robot, or a robot part, can move is called a degree of freedom. Robot arms, for instance, are fitted with joints. Each joint may give a robot an extra degree of freedom.

## Looking Back

**What's In A Name?** The word *robot* comes from the Czech word *robota*, meaning "forced labour". It was first used by Czech playwright Karel Capek in his 1920 play *Rossum's Universal Robots*.

His play was about human-like robots that took over the world. This view of robots and their threat to people has remained a popular theme in sci-fi books and films ever since.

