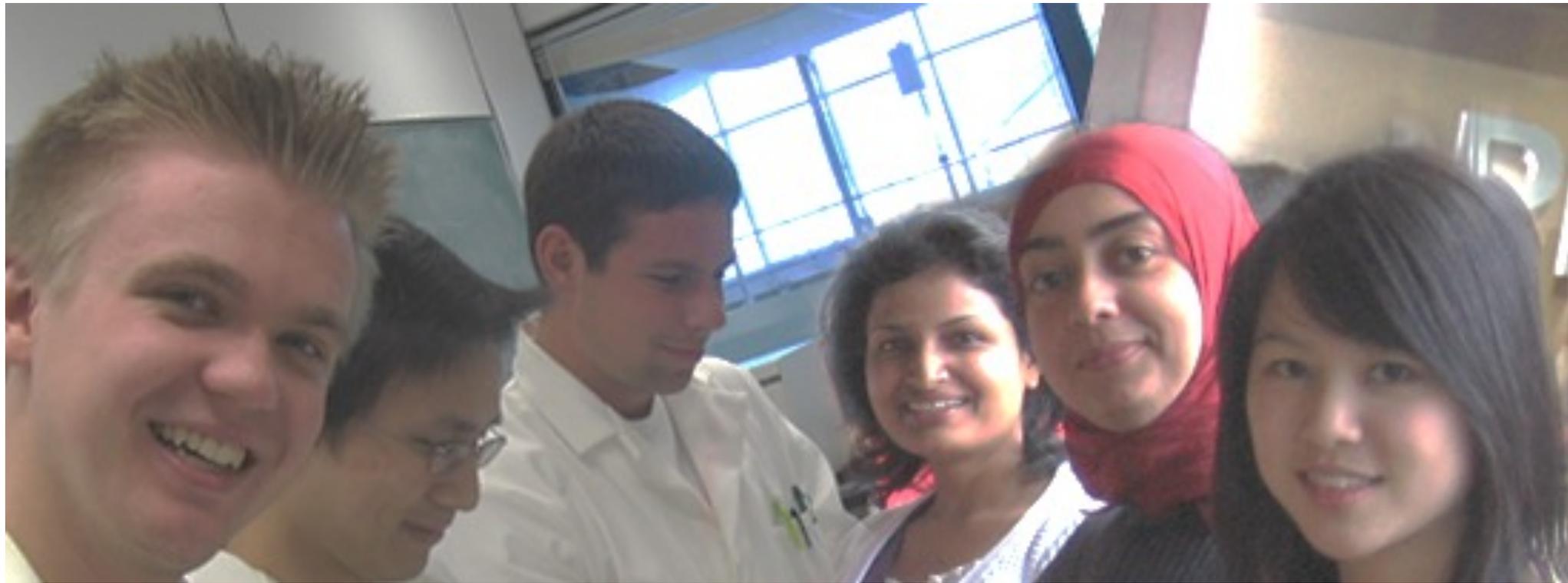


Your Summer Research Program at FOMD

Think Boldly

Dream Big

**Be
Responsible**



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Email: elena.chaves@ualberta.ca

Why would you spend your summer doing research?

I did it last year and I loved it!!!

I need a job

I need a letter of recommendation for my future school application

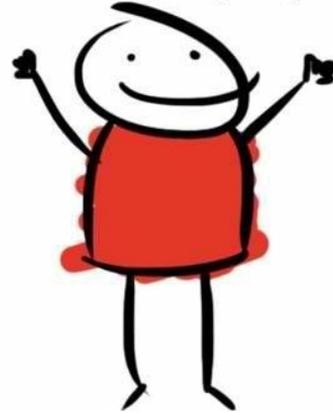
I want to know how scientific research really works

I envision pursuing a career in research



What Can You Expect from Your Summer Research?

I HAVE NO IDEA
WHAT'S GOING
TO HAPPEN.

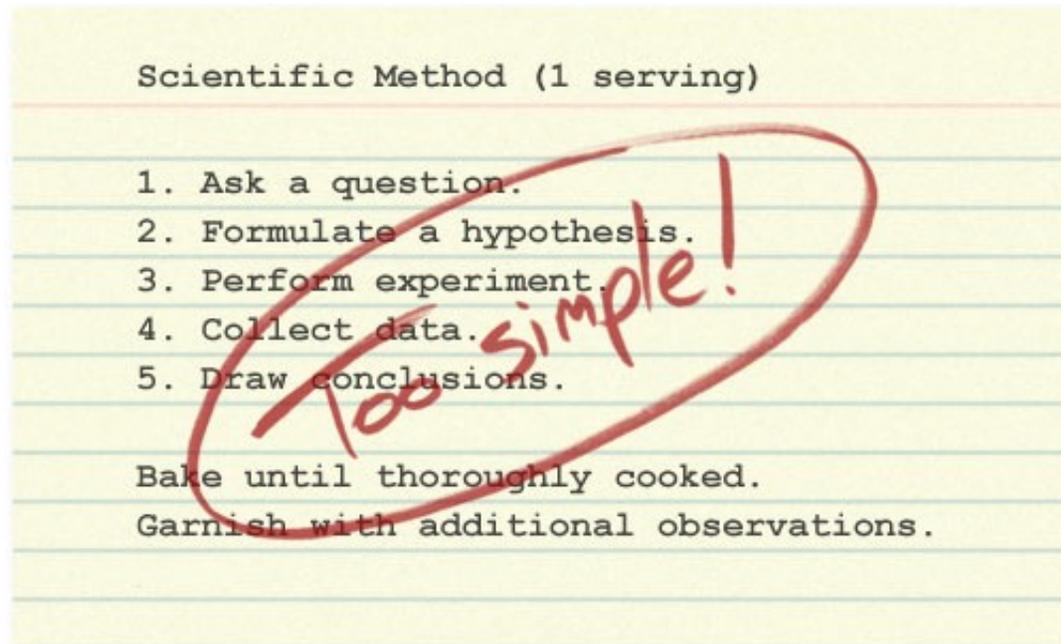


What can you get from a Summer Research at FoMD?

Learn how
science really
works



The Scientific Method

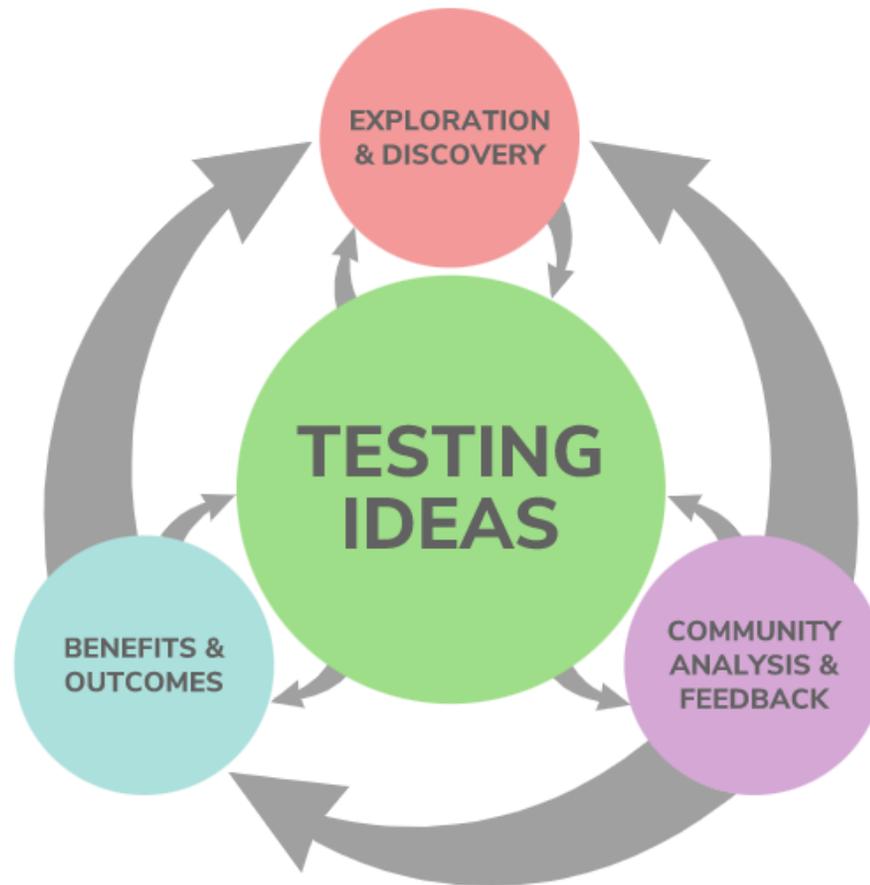


Finally done with the first two steps of The Scientific Method! Now for one simple experiment, and I can prove that my hypothesis is right!



Is this how science really works?

The Real Process of Science



Exploration and Discovery

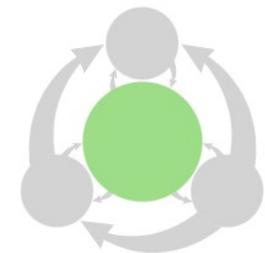
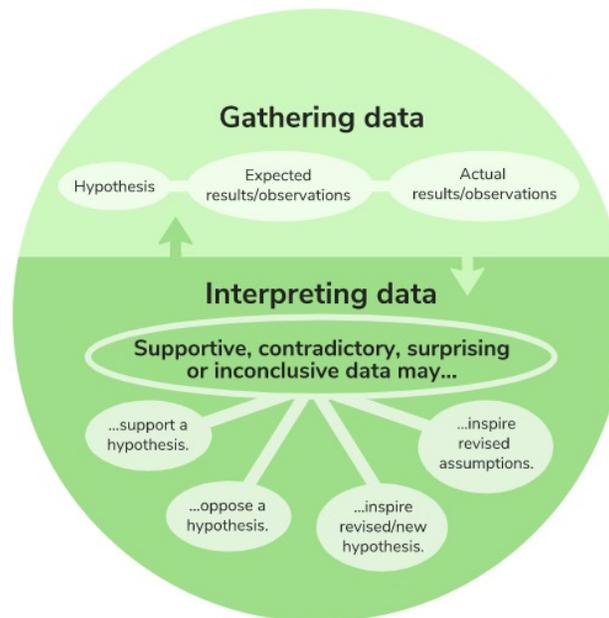


<http://undsci.berkeley.edu>

Making observations and forming questions are key to the process of science

Testing Ideas

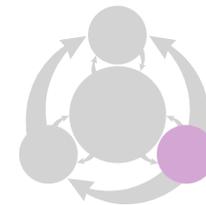
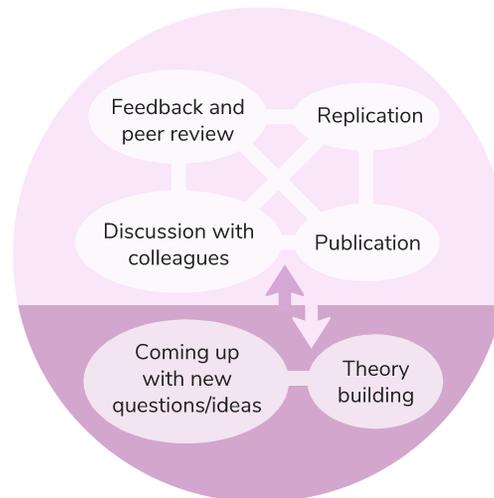
<http://www.understandingscience.org>



- Testing hypotheses and theories is at the core of the process of science
- We use data to evaluate possible explanations, keeping only those that are supported by evidence

Community Analysis and Feedback

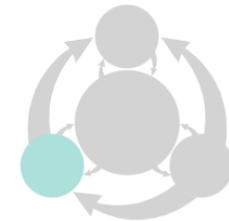
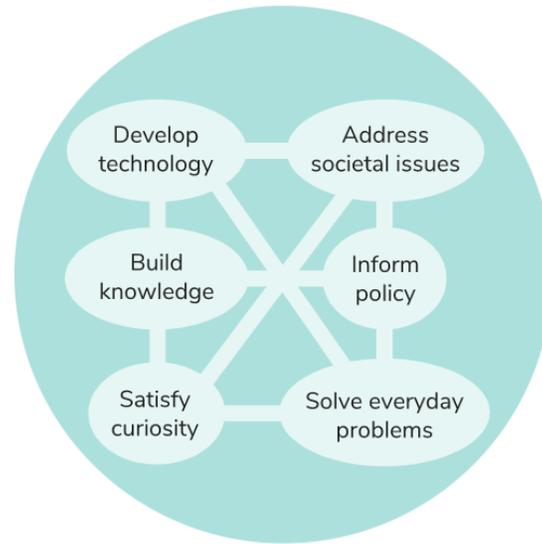
<http://www.understandingscience.org>



- Community interactions are essential to the process of science
- Scientists must share their research for it to be evaluated and built upon by other scientists
- The scientific community helps ensure science's accuracy

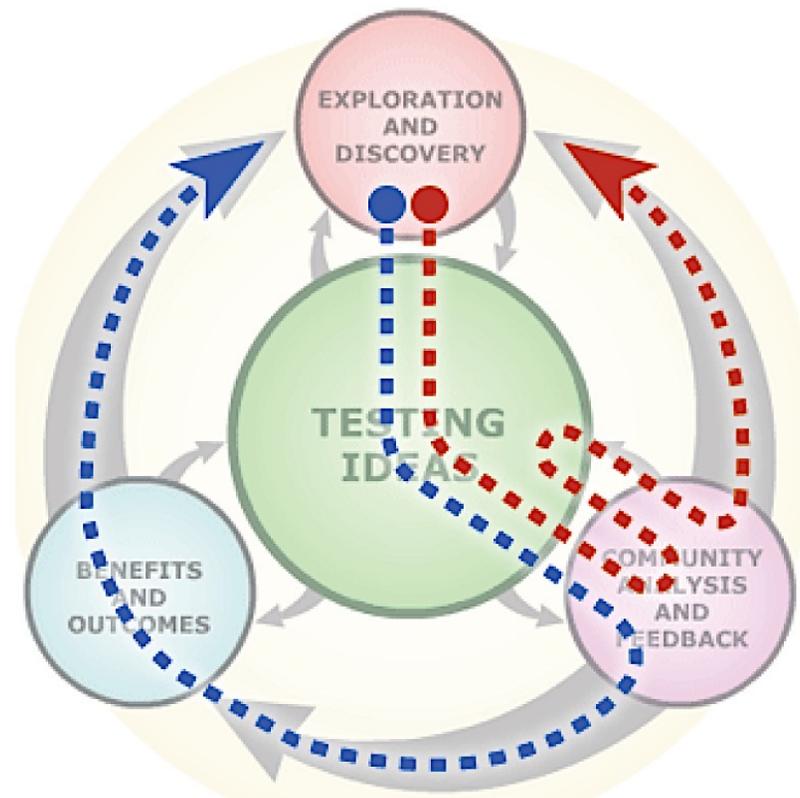
Benefits and Outcomes

<http://www.understandingscience.org>



The process of science
influences society and is influenced by
society

The Process of Science is not pre-determined



The summer research program
offers you opportunities to:

BECOME COMPETENT AT PERFORMING EXPERIMENTS





INCREASE YOUR TEAMWORK SKILLS

Image: Chesapeake Bay Program / Flickr / CC BY 2.0

IMPROVE YOUR ORGANIZATION AND COMMUNICATION SKILLS



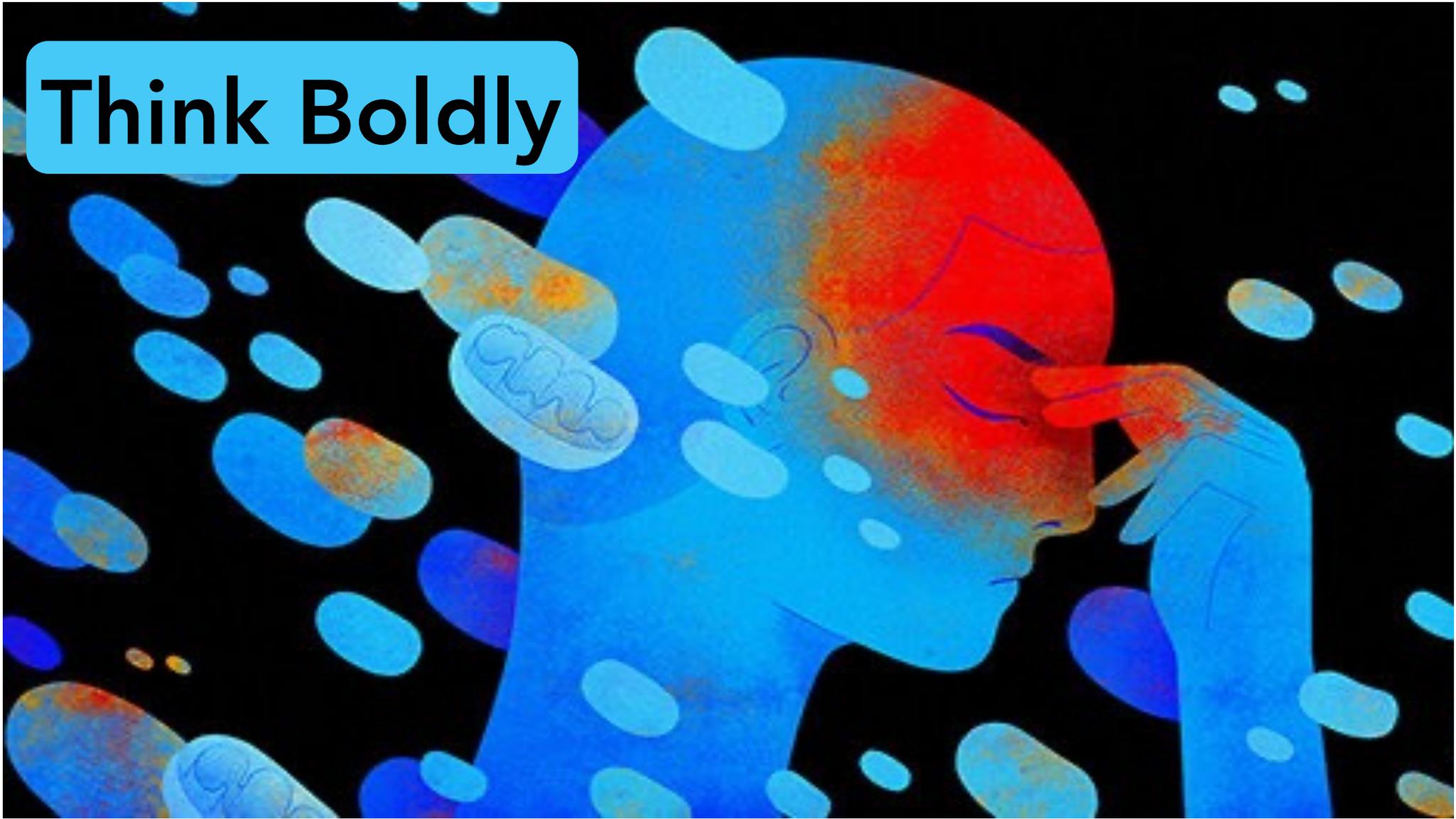
What can you get from a Summer Research at FoMD?

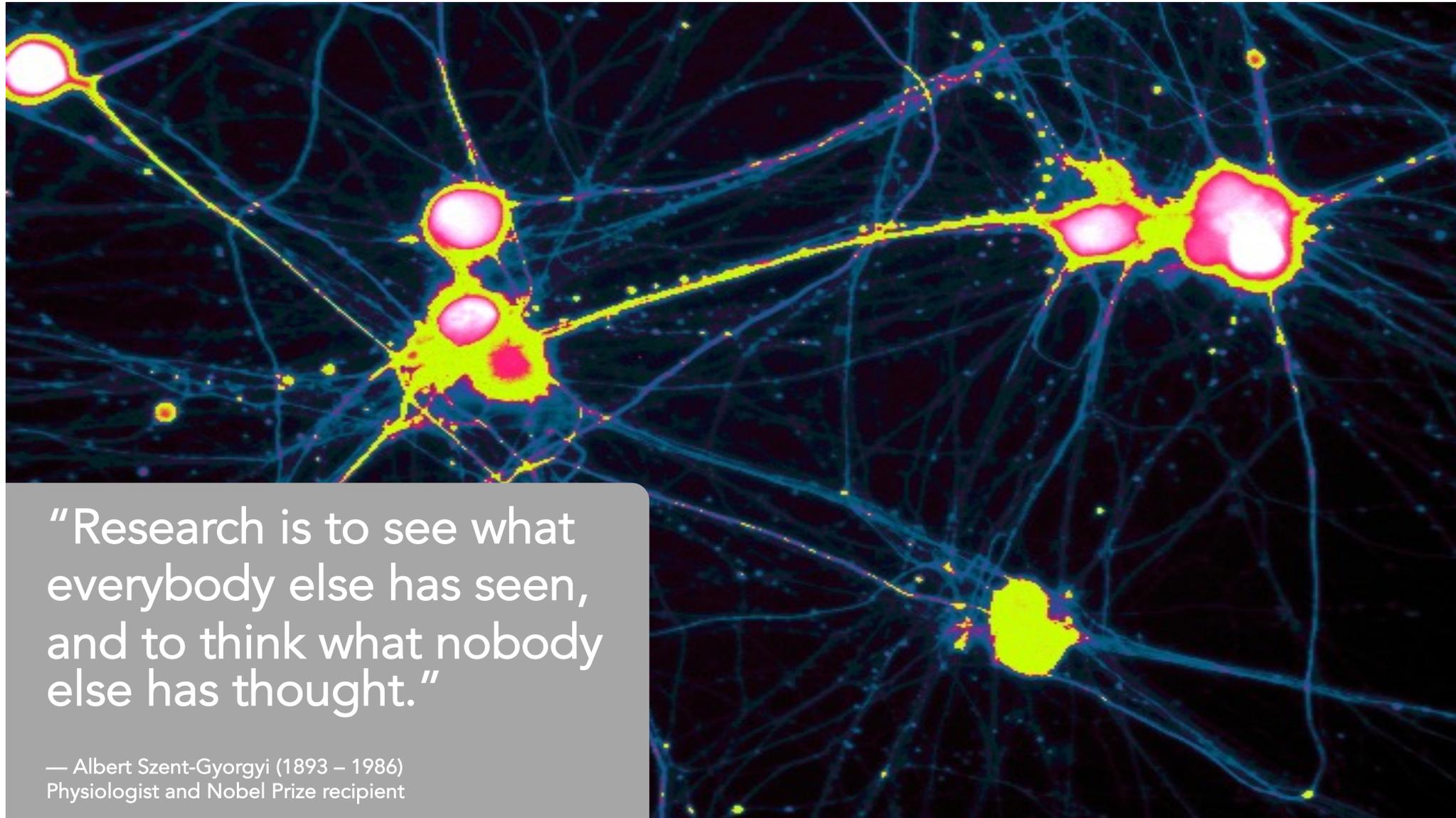
Find out if scientific research is your way to change the world

Learn how science really works



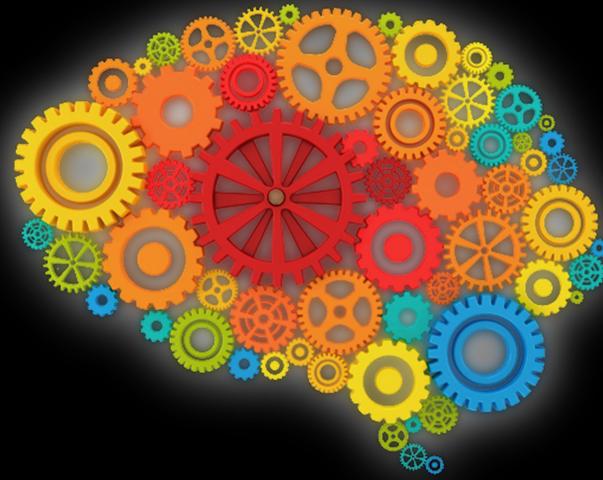
Think Boldly





“Research is to see what everybody else has seen, and to think what nobody else has thought.”

— Albert Szent-Gyorgyi (1893 – 1986)
Physiologist and Nobel Prize recipient



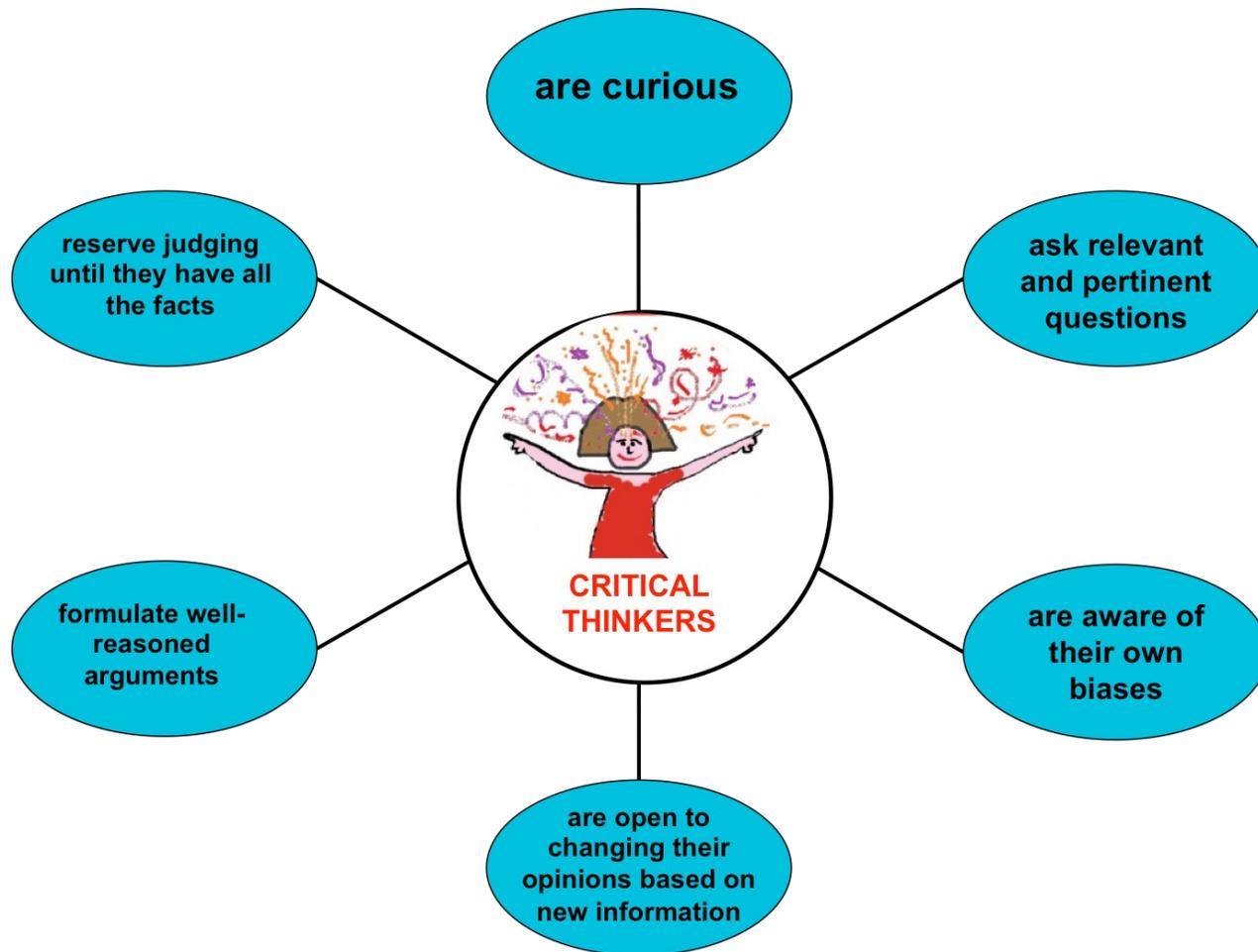
**Think
Out of the
Box**

Will I ever have
my own
research ideas?



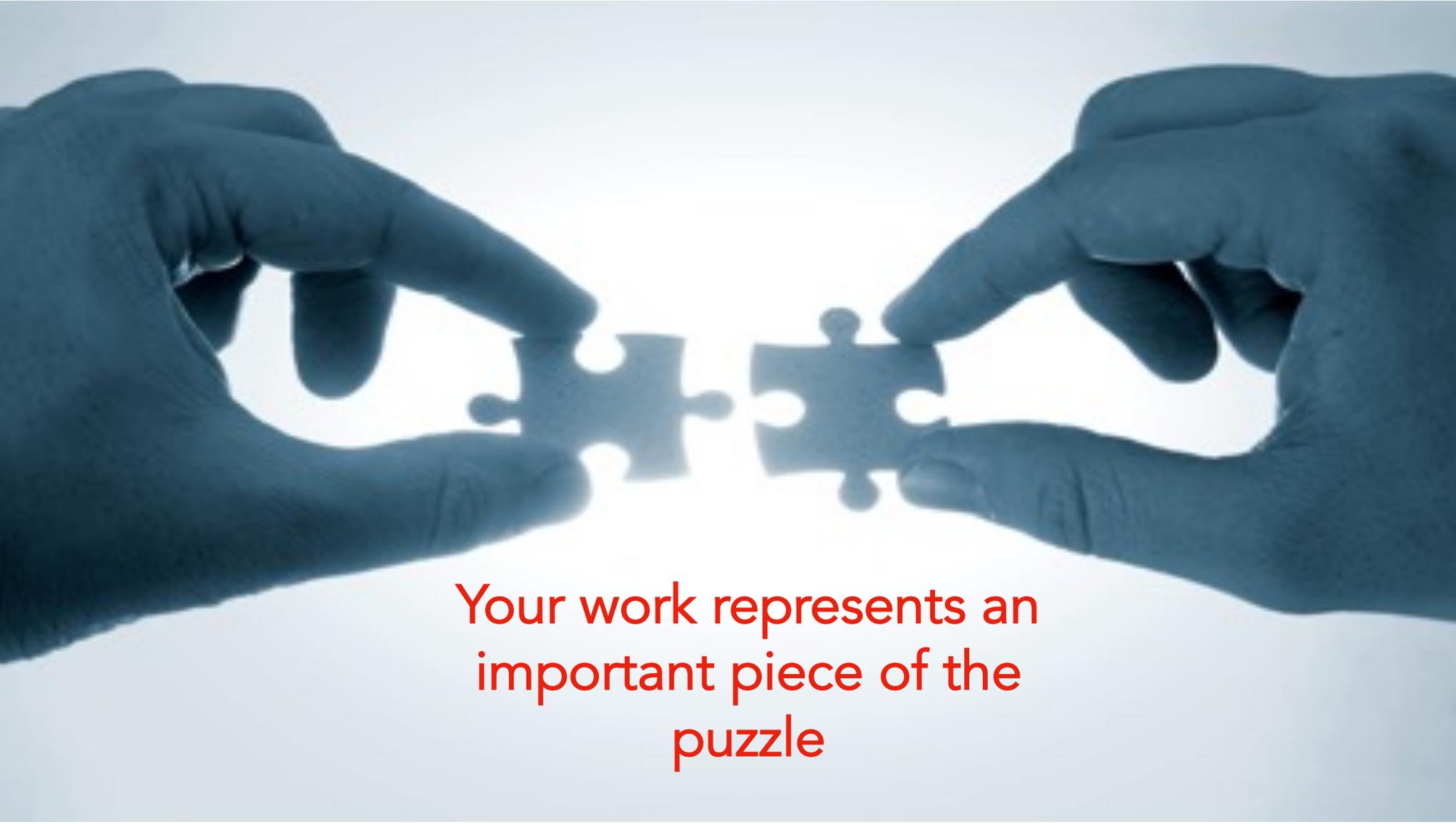
In time you would
develop original
research ideas

You would become a critical thinker



You are trying to answer an important scientific question



A photograph showing two hands, one on the left and one on the right, holding two interlocking puzzle pieces. The hands are positioned as if they are about to fit the pieces together. The background is a light, neutral color. The text "Your work represents an important piece of the puzzle" is overlaid in red at the bottom center of the image.

Your work represents an
important piece of the
puzzle

Be Responsible

RESEARCH INTEGRITY

<https://www.the-scientist.com>

- Scientific responsibility includes the responsibilities of scientists towards science, their fellow scientists and society

- Scientists are responsible for conducting and communicating scientific work with:
 - integrity
 - respect
 - fairness
 - reliability
 - transparency

Number 1 Responsibility: **HONESTY**



Be Responsible when...

■ Planning and performing experiments

✓ Working with animals

✓ the three Rs

- **Replace** the use of animals with alternative techniques, or avoid the use of animals altogether
- **Reduce** the number of animals used to a minimum
- **Refine** make sure animals suffer as little as possible

✓ Working with human patients, human samples or manage data from patients

✓ Confidentiality

Be Responsible when....

- **Communicating your results**
 - To scientists
 - Be accurate and thorough
 - To the general public
 - Be mindful of the **knowledge gap** between the general public and scientists
 - Be mindful of the **gap** between public **expectations** and the reality of scientific progress toward clinical application

What can you get from a Summer Research at FoMD?

Enrich your perspective on scientific medical research

Find out if scientific research is your way to change the world

Realize that scientific research is not for you

Learn how science really works



Understand the inherent uncertainty of Science



Science is founded on uncertainty. Each time we learn something new and surprising, the astonishment comes with the realization that we were wrong before.

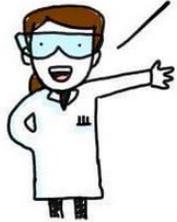
Lewis Thomas

American physician, researcher, author, and teacher best known for his essays, which contain reflections on a wide range of topics in biology.

Working in Scientific Research

Aim:

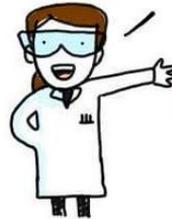
We will solve this
Problem using
Science!



PROBLEM

THEORISED result:

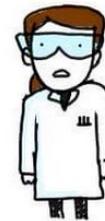
We have solved
the problem.



PROBLEM

Actual result

The problem is
more complex than
we first thought

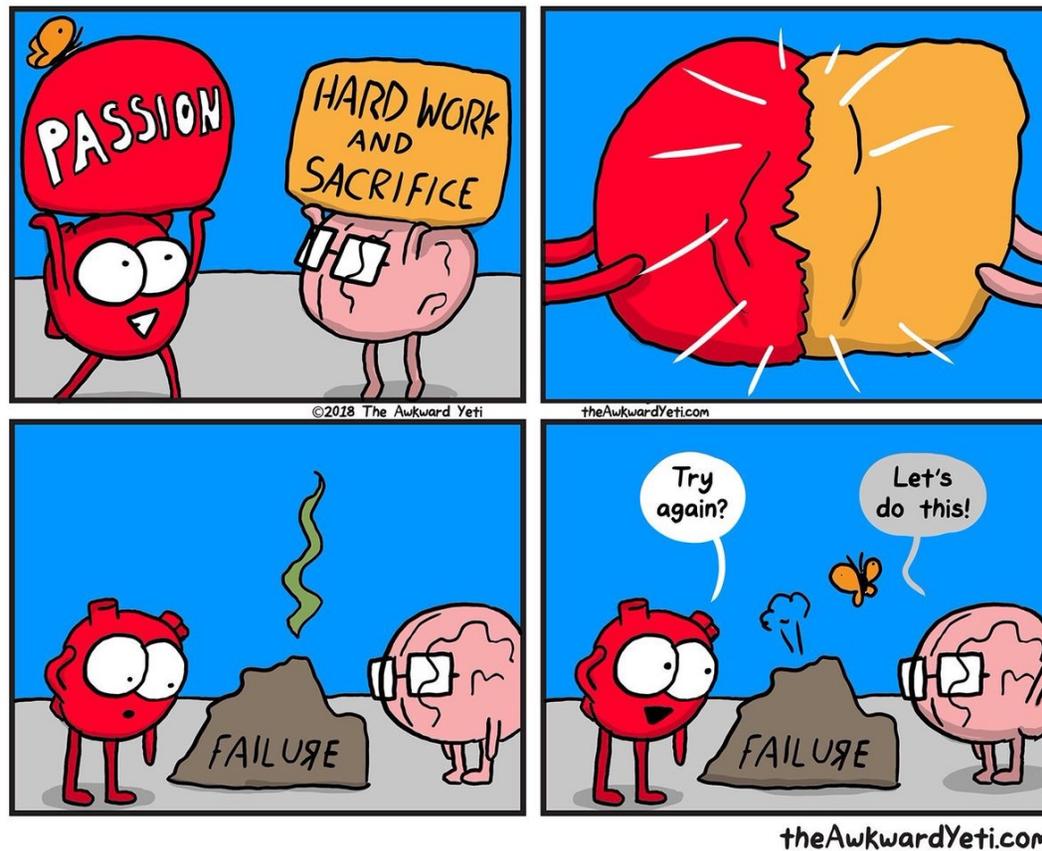


PROBLEM

@twisteddoodles

Realize the complexity of scientific research

Appreciate the importance of perseverance in scientific research



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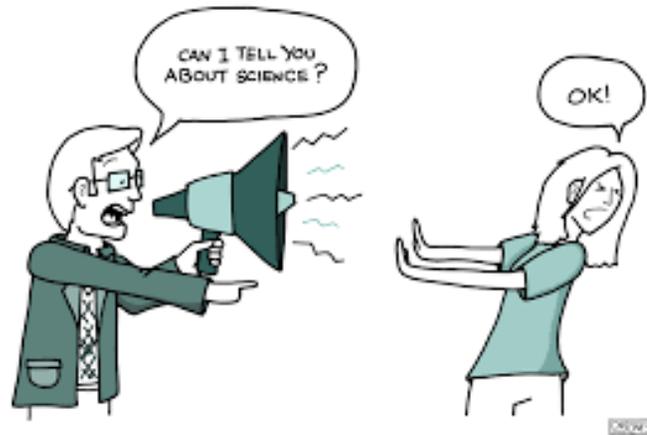
Learn how science really works

Become an advocate for science



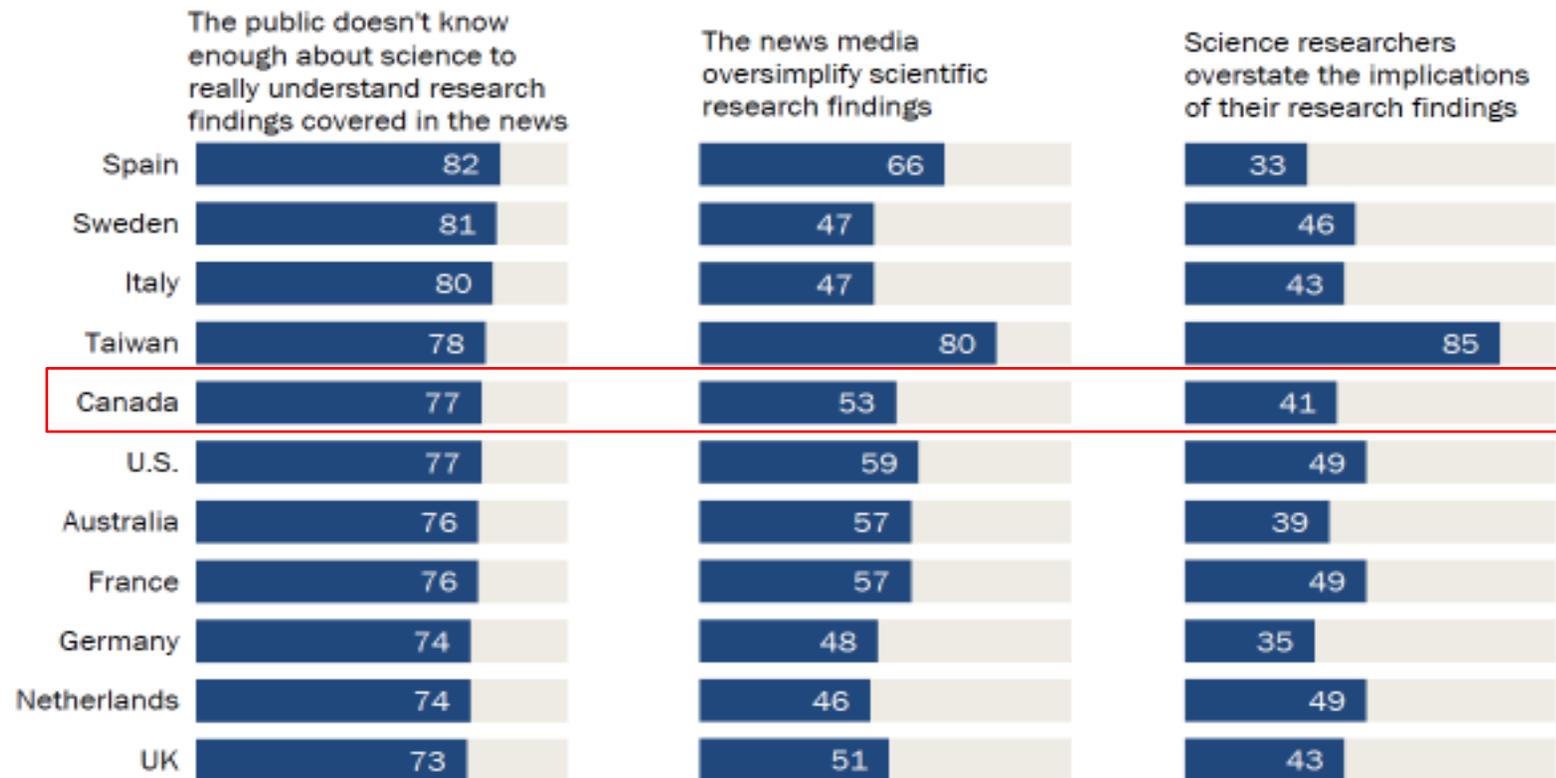
Why is Important to be Science Advocates?

Public trust in scientists seems to be decreasing and this is shaping the attitude of policy makers towards the negative



Majorities say the public doesn't know enough about science to understand research findings covered in the news

% who say each of the following is a problem with news reports of scientific research findings

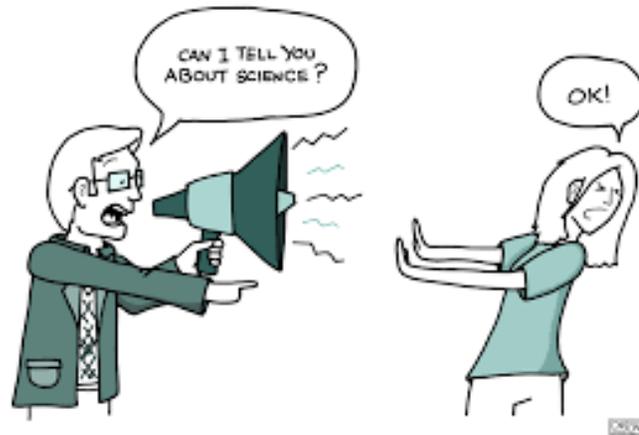


Source: International Science Survey 2019-2020. Q41a-c.
 "Science and Scientists Held in High Esteem Across Global Publics"

PEW RESEARCH CENTER

Why is Important to be Science Advocates?

Public trust in scientists seems to be decreasing and this is shaping the attitude of policy makers towards the negative



The majority of policy makers and people in positions of power are not scientists

Transparency between scientists and non-scientists prevent policy makers to follow the will of misinformed members of the public

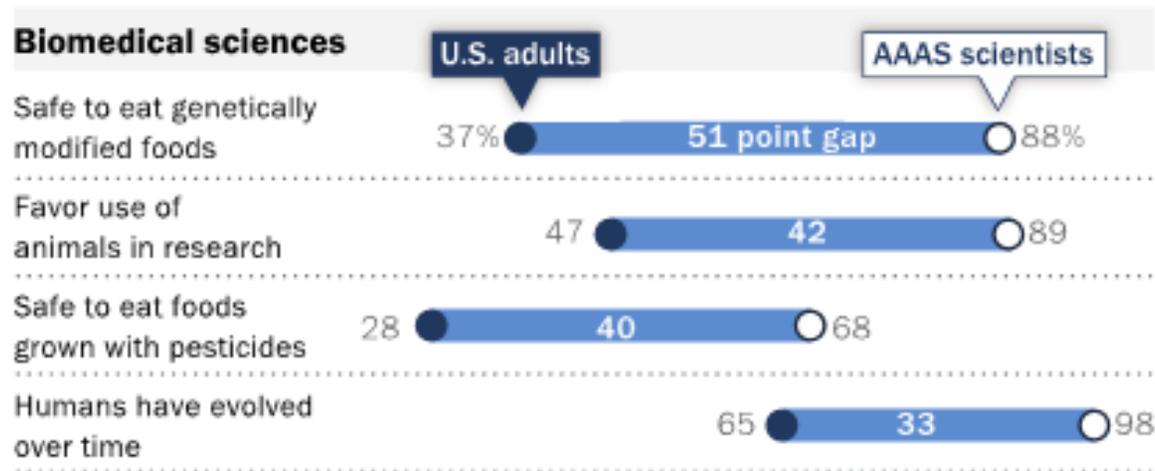
Research is funded with money from the taxpayer

The general population
has notably different
views from those of the
scientific community on
key science-related
issues

An Opinion Gap Exists Between the General Public and Scientists on Science and Technology Topics

Opinion Differences Between Public and Scientists

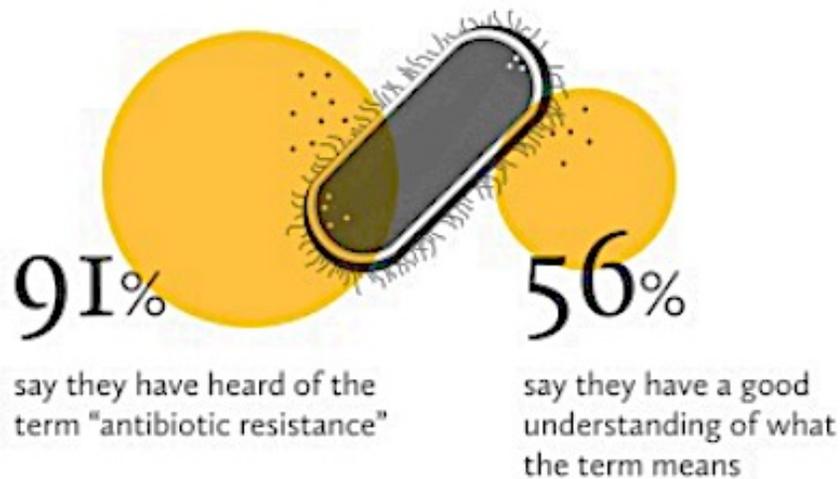
% of U.S. adults and AAAS scientists saying each of the following



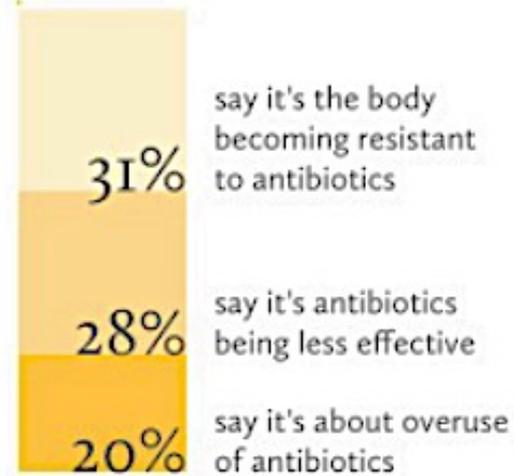
(http://www.pewinternet.org/2015/01/29/public-and-scientists-views-on-science-and-society/pi_2015-01-29_science-and-society-00-02/)

Antibiotic resistance

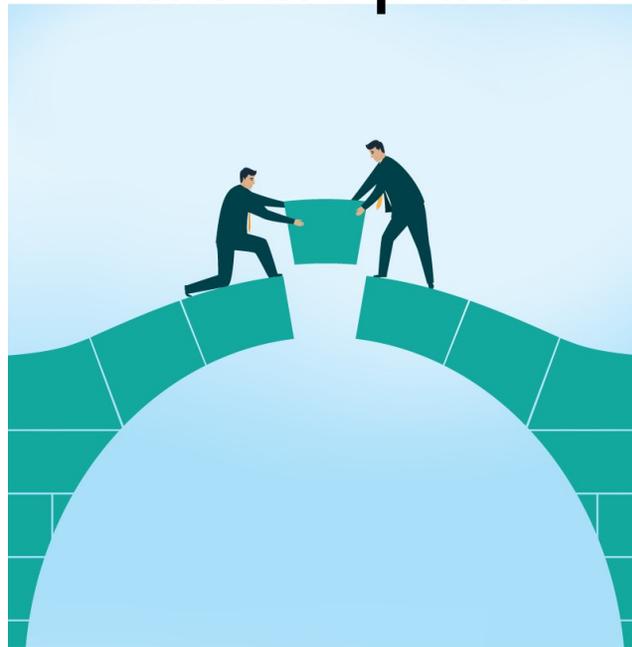
Knowledge and understanding of antibiotic resistance



What do people understand by the term "antibiotic resistance"?



In an age of such rapid scientific and technological advancement we risk widening the gap between scientists and the public



“Speaking up for the importance of science to society is our only hope...”

Leshner, A. I. Bridging the opinion gap. *Science* 347, 459, doi:10.1126/science.aaa7477 (2015).

What can you get from a Summer Research at FoMD?

Whatever path you follow, you will have a learning experience that will make a true and lasting impact in your future

