

**PUBLIC ENGAGEMENT LUNCH**  
**ICIC DATA ANALYSIS SCHOOL 2016**



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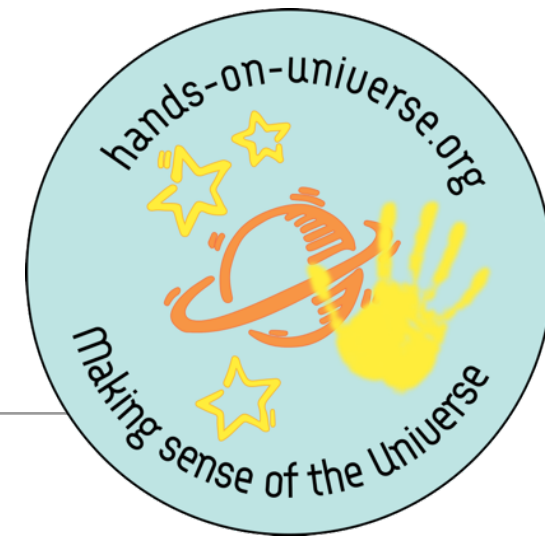
**@R\_TROTTA**



**Science & Technology  
Facilities Council**

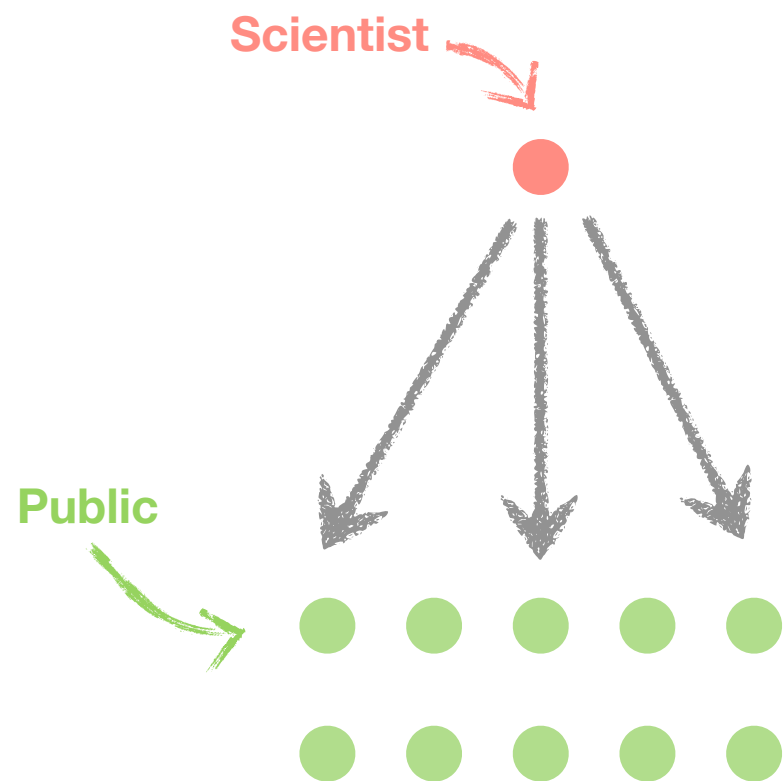
# Why does Public Engagement matter?

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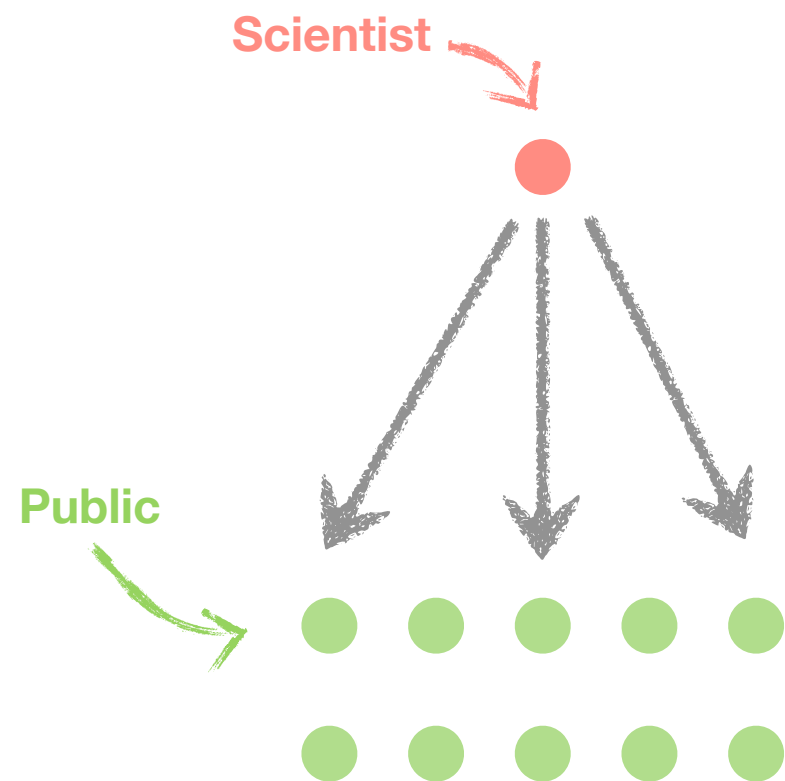


- ★ "Impact" of research is increasingly important.
- ★ Outreach is one of the ways to increase your visibility and impact.
- ★ Good communications skills are useful whatever you do.
- ★ Talking to/with the public helps you put your research in the wider context

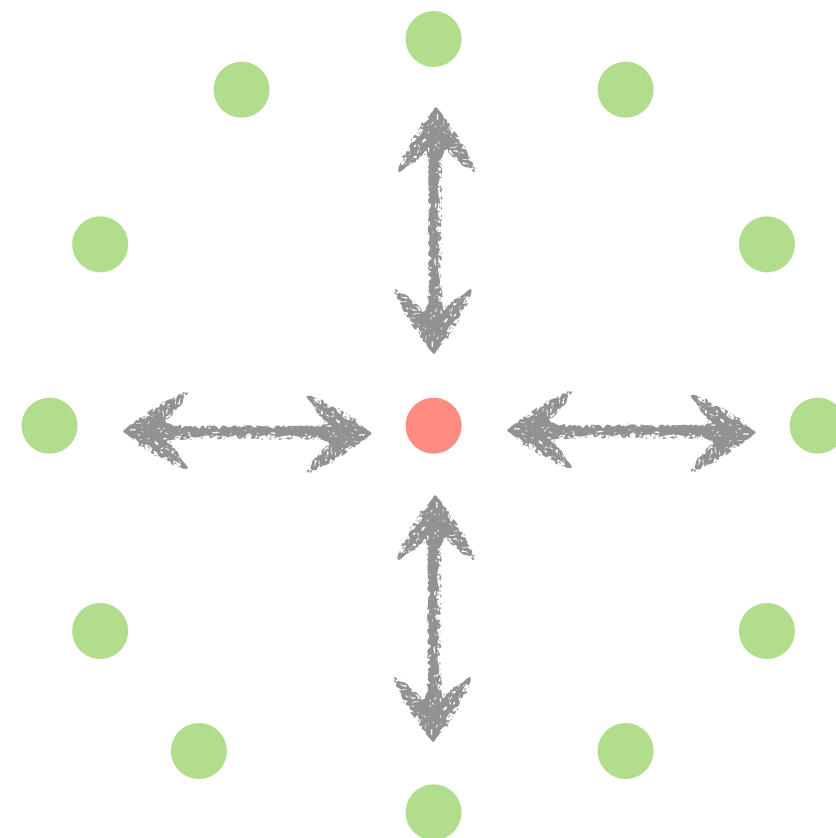
## Old: top-down



Old: top-down



New: dialogic

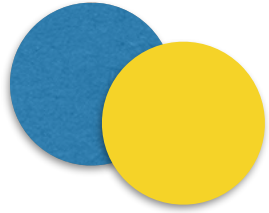




YOU



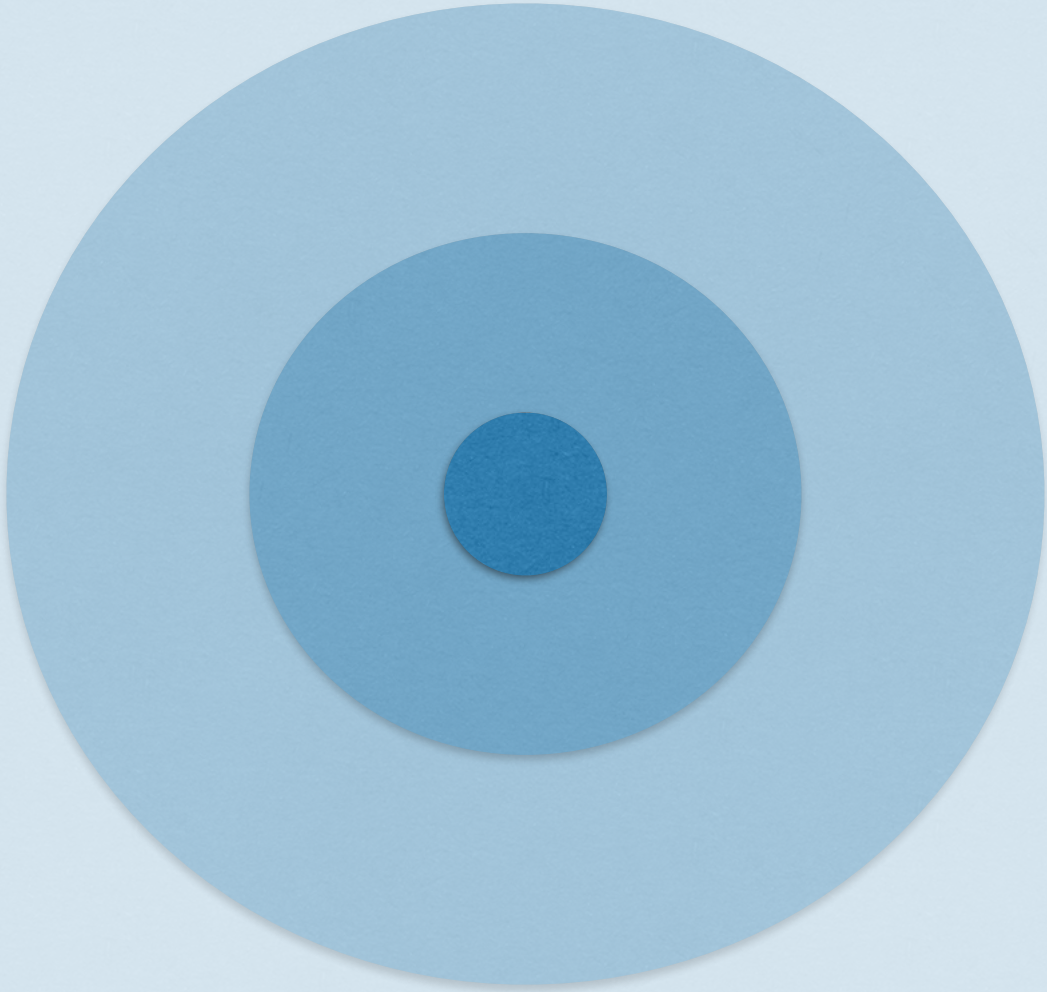
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YOU

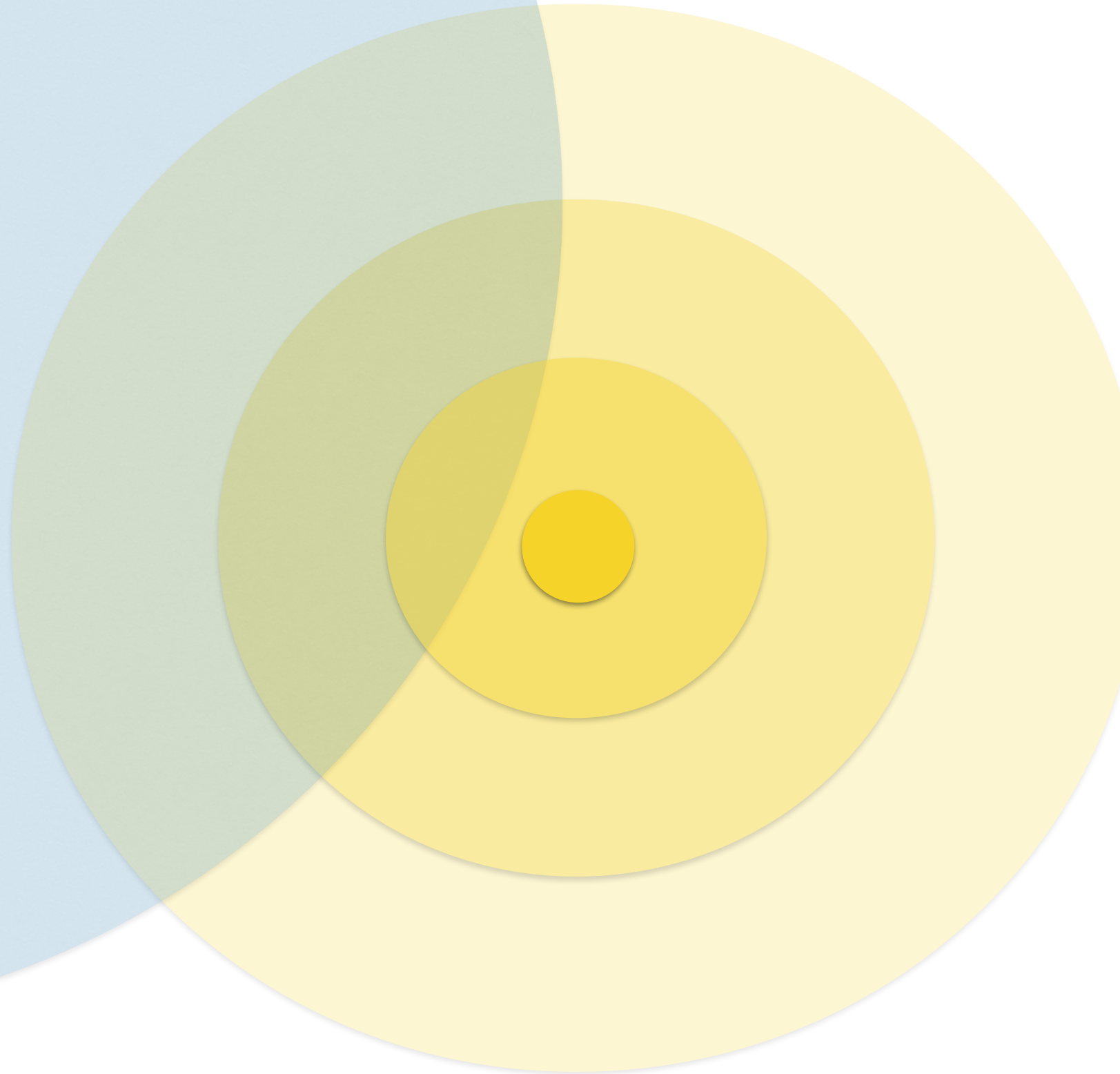
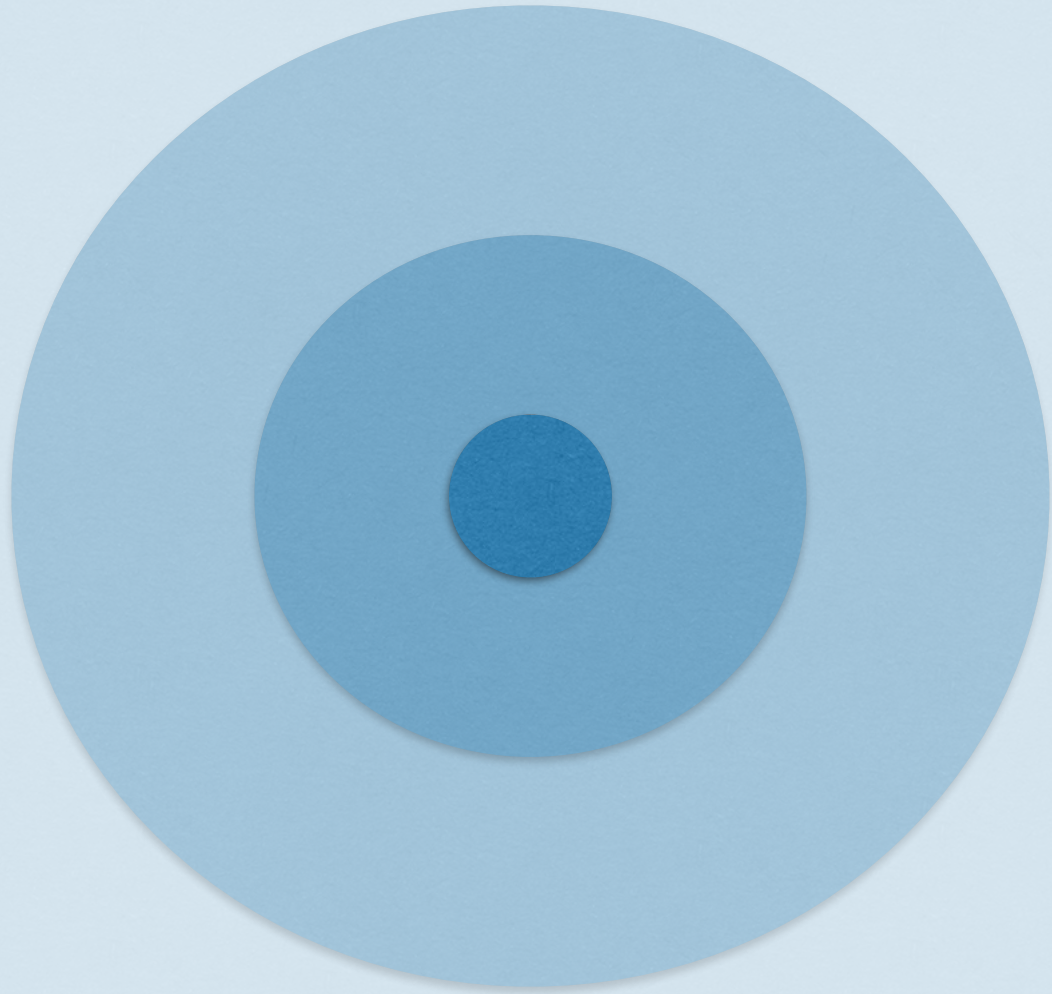


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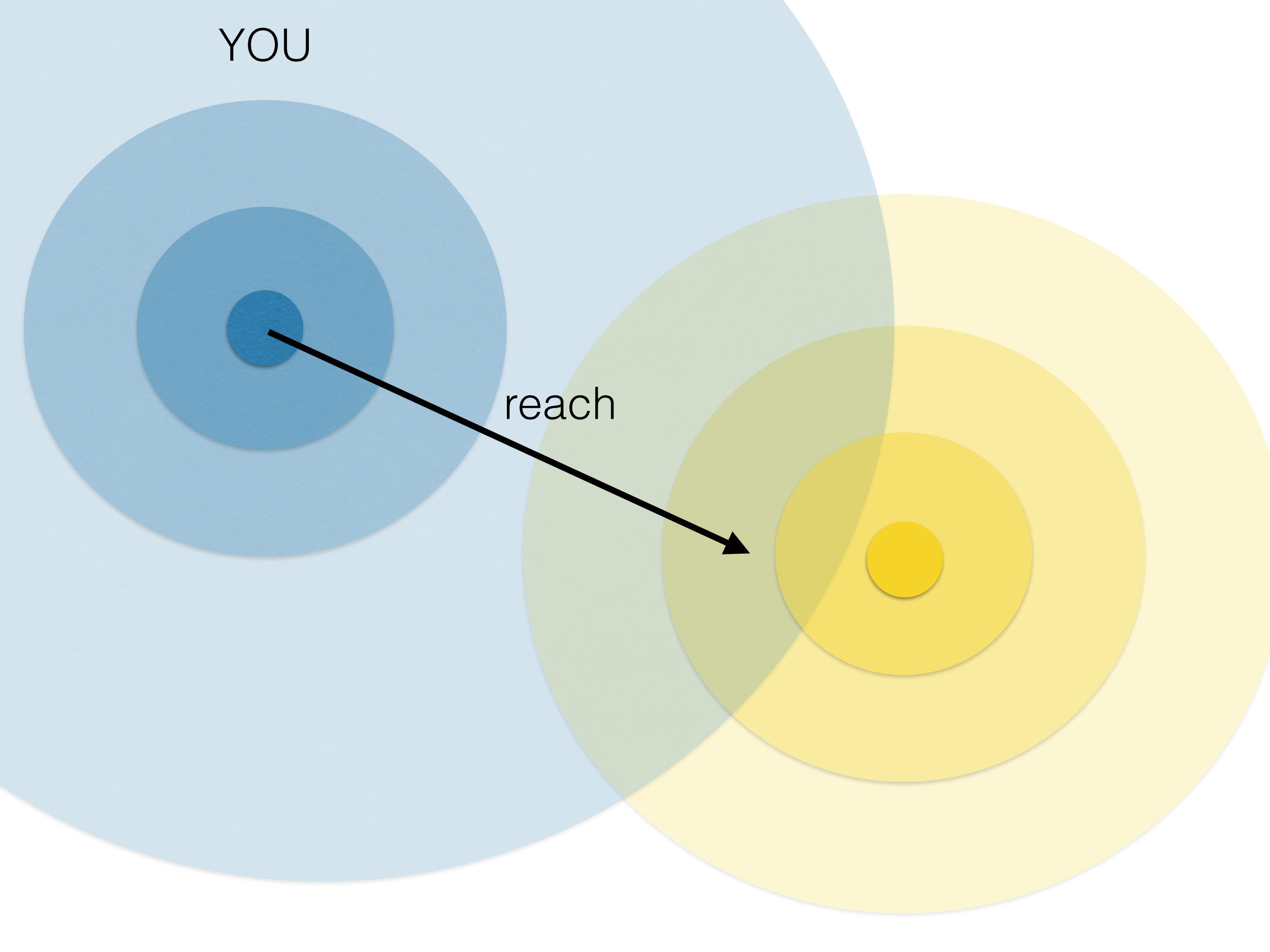




YOU



YOU



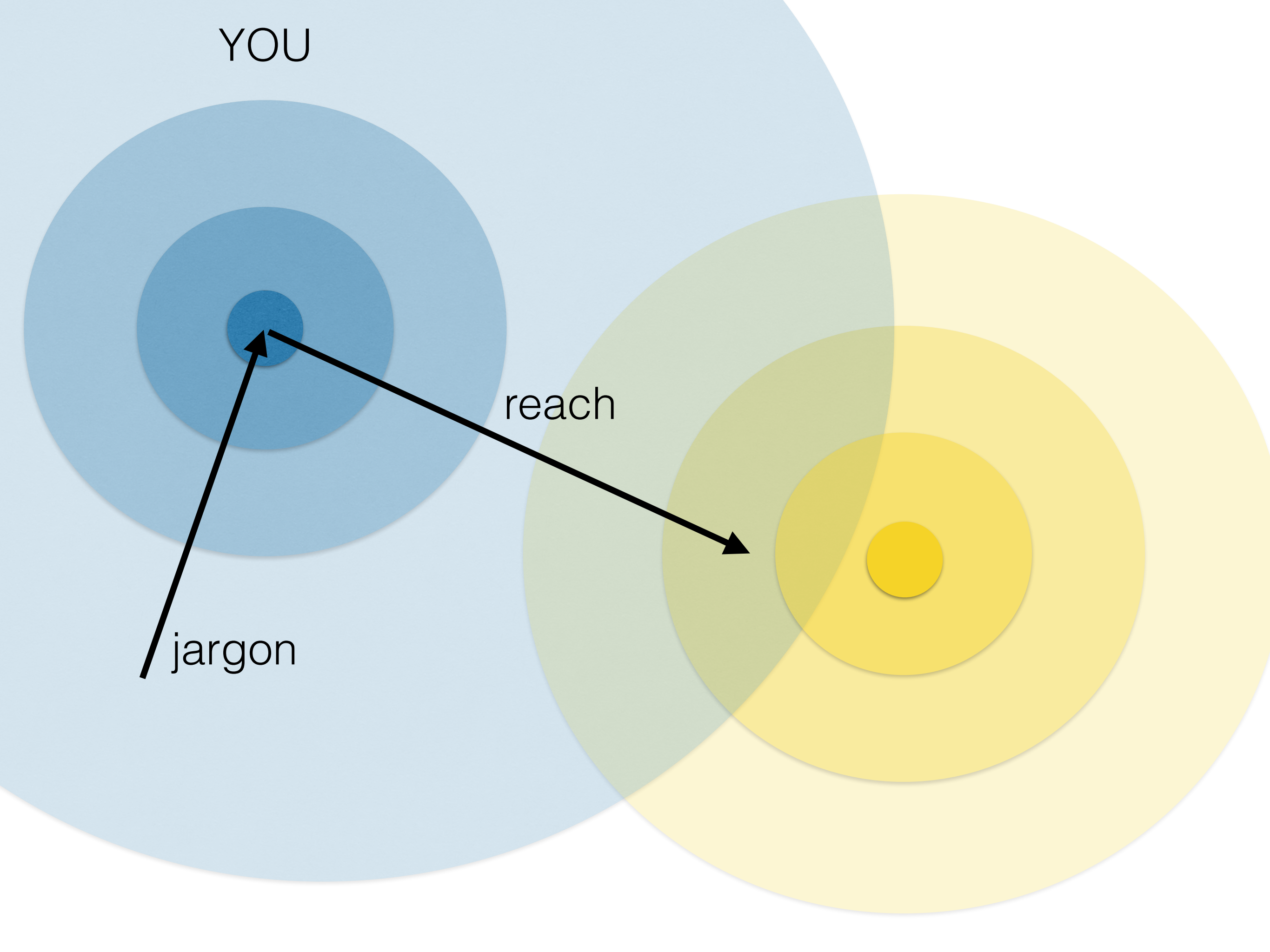
reach



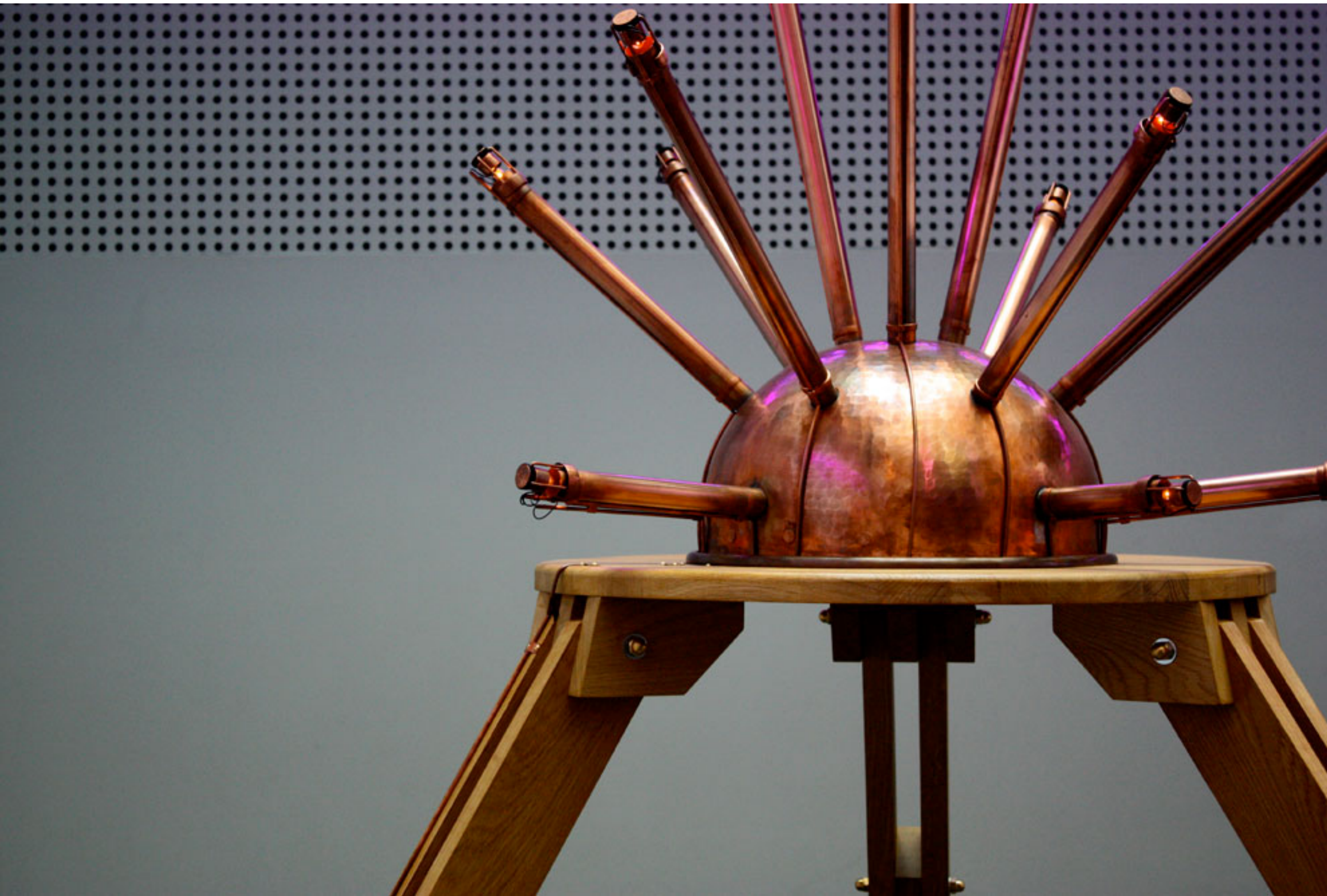
YOU

jargon

reach









ART

# Pinball wizardry

A European show reveals new ways of thinking about energy, Daniel Cressey learns.

What is energy? For the past two years, a group of 27 European physicists, architects and artists have been working together to build installations that illuminate different aspects of the concept. Developed initially for the 2010 Venice Architecture Biennale, the fruits of their labours are on show this month at London's Architectural Association (AA) School of Architecture.

The exhibits in *Beyond Entropy* include an impossible pinball machine, with hundreds of balls in play inside a clear box, their energy just out of reach once they shoot behind a mirrored divider. Another recreates a 'time machine', proposed in 1899 by French absurdist writer Alfred Jarry, from an array of giant wooden flywheels. Holograms and images of the Moon's cratered surface also show how energy may be embodied in pictures.

These collaborative pieces are the brainchild of Stefano Rabolli Pansera, an Italian architect who teaches at the AA school. After worrying about the disappointingly conventional approach to energy that most designers take, Pansera sought new ways of thinking from other disciplines. He hopes that the show will inspire fresh approaches from architects — and that it will also set the minds of those who are interested in physical concepts spinning in new directions.

The project aims to consider energy as a broad concept, related to the idea of continuous transformation. Eight small teams



A prototype 'time machine' based on an 1899 idea explores the theme of mechanical energy.

of researchers, each including an artist, an architect and a scientist, explored energies electrical, mechanical, potential, mass, sound, thermal, chemical and gravitational. The groups visited CERN — Europe's particle-physics lab near Geneva, Switzerland — to see the enormous amounts of energy being consumed there, and developed their ideas in workshops.

Andrew Jaffe, a cosmologist at Imperial College London, worked on the time machine. Tasked with exploring mechanical energy, his team discussed Jarry's early expression of time as a fourth dimension in his 1899 pseudoscience treatise *How to Construct a Time Machine*. They built a version of his fantasy mechanism, consisting of "three rapidly rotating gyrostats with shafts parallel to the three dimensions of space".

"I found it fascinating that Jarry wrote his piece around the same time as H. G. Wells's *The Time Machine* and well before Einstein. The idea of time as a fourth dimension must

culture", says Jaffe.

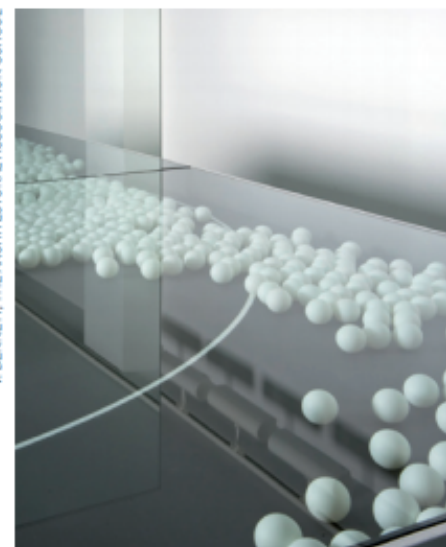
Roberto Trotta, also a cosmologist at Imperial College London, who worked on the pinball machine

developed by the potential-energy team, said he welcomed the fact that the cross-disciplinary conversations went beyond the normal 'top-down' popular lectures that he regularly gives. "I also want to explore a more level approach, where there is an ongoing reflection and dialogue," he explains, "where the scientist doesn't just show up and tell people how nature actually works."

How some of these weird and wonderful creations relate to energy is not always obvious at first glance. But this could be part of the group's plan. "We will be happy if people come away confused," says Trotta. "Not in a bad way, but rather, inspired to think of energy from a different perspective." ■

*Beyond Entropy*  
Architectural  
Association School of  
Architecture, London.  
Until 26 May 2011.

V. BENNETT, THE ARCHITECTURAL ASSOCIATION SCHOOL



V. BENNETT, THE ARCHITECTURAL ASSOCIATION SCHOOL



# Things I've tried...

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IMPERIAL  
FESTIVAL

$t_H = 13.798 \pm 0.037$   
billion years

α  
μ  
β



# The Edge of the Sky

All you Need to Know about the All-There-Is

Named one of the best science books of 2014

Roberto named a Foreign Policy Global Thinker 2014

*"This book will be more important than any other science book I will read for a very long time."* —The Book Bag

*"The Edge of the Sky makes the whole topic sound like a wonderful fairy tale – reading it just makes you feel good."* —BBC Sky at Night Magazine

*"A wonder-ful not-afraid story-telling try-it-and-see. Very not-usual, most good. Fun, too. Buy now!"* —Ian Stewart

*"A surprisingly clear, and often poetic, primer"* —Scientific American

*"This beautifully written book, with its limited vocabulary, soars."*—Publishers Weekly, starred review

*"One part children's book for grownups, one part imaginative exercise in economical yet lyrical language, and wholly wonderful."*—Brain Pickings, Best Science Books 2014

*"A master storyteller."*—Foreign Policy

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## Spacecraft built from graphene could run on nothing but sunlight


› 28 May 2015 by [Jacob Aron](#)

› Magazine issue 3023. [Subscribe and save](#)

› For similar stories, visit the [Space flight](#) Topic Guide

GRAPHENE to the stars. The material with amazing properties has just had another added to the list. It seems these sheets of carbon one atom thick can turn light into action, maybe forming the basis of a fuel-free spacecraft.

Graphene was discovered accidentally by [researchers playing with pencils and sticky tape](#). Its flat structure is very strong and conducts electricity and heat extremely well. [Yongsheng Chen](#) of Nankai University in Tianjin, China, and his colleagues have been investigating whether larger arrangements of carbon can retain some of these properties. Earlier this year they published details of a "graphene sponge", a squidgy material made by fusing crumpled sheets of graphene oxide.

While cutting graphene sponge with a laser, they noticed the light propelled the material forwards. That was odd, because while lasers have been used to [shove single molecules around](#) , the sponge was a few centimetres across so should be too large to move.



Graphene might make solar sails redundant (*Image: NASA*)





## In so many words: How to ride the space-wind to the stars

› 15:45 04 June 2015 by [Roberto Trotta](#)

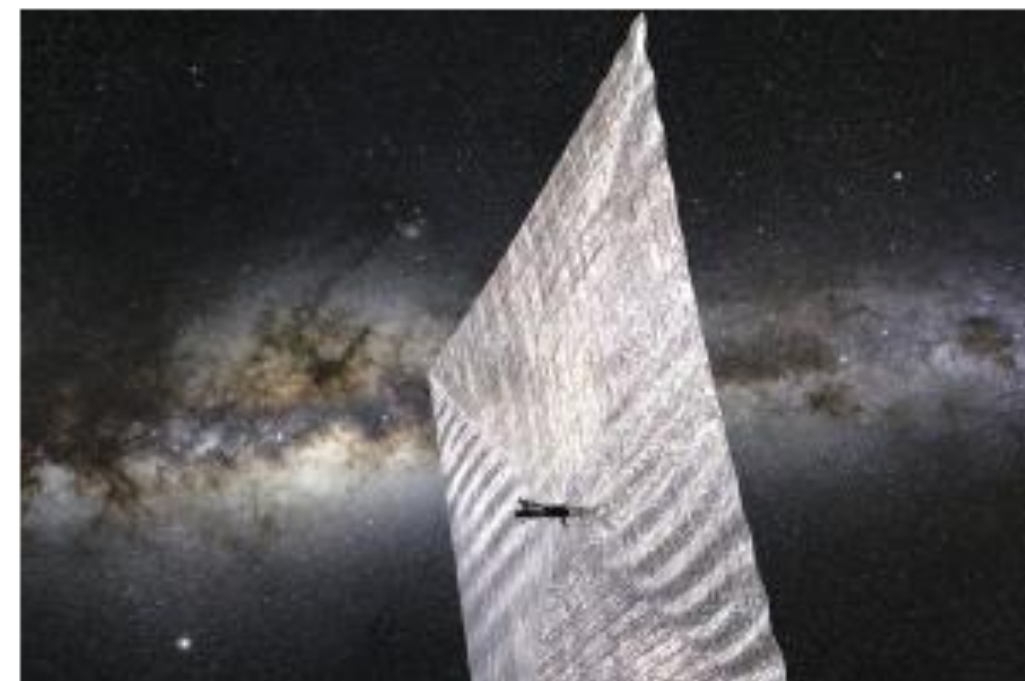
› For similar stories, visit the [Books and Art](#) and [Space flight](#) Topic Guides

*In so many words* is where we retell our stories on space and physics using only the 1000 commonest words in English.

If you want to go to another world, one of the biggest problems is how to power your space-car. Normal space-cars today throw out fire from their back, and that pushes them forward. But this is not a very good way of getting to very far-away worlds: you'd have to fill up your space-car with a lot of stuff to burn, and this would be too heavy to carry.

A better idea is to do as people did in old times when they crossed big blue bodies of water: catch the wind – but this time in space. [Light from the sun works like a space-wind](#) that can push your space-car forward into deep space if you have a big enough wind-catcher.

Now student-people think they might have found an even better way. They took [a new type of finer-than-paper stuff](#), made by tiny bits of that clear rock that is on the ring a man gives to his girlfriend when he wants to marry her. The finer-than-paper stuff is very light and very strong, and has many interesting uses.



Space wind-catchers might no longer be needed  
(Image: NASA)

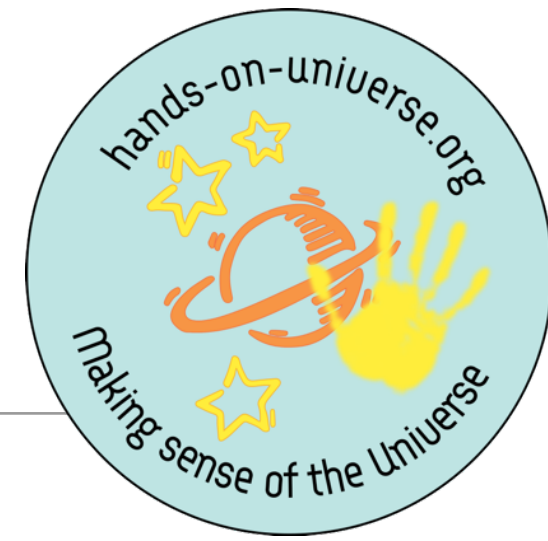
- Know your audience: level, age, expectations.
- Logistics: What style? One-on-one (fair, exhibit, stand-up) or lecture-style?
- Engagement: How can you promote 2-ways discussion?
- Demos and getting people to contribute
- Social media and engagement: reinforce your message
- Feedback (beware of selection effects)
- Extending your reach
- Non-traditional audiences and venues
- New ways of talking about science: arts, music, cookery, 1000-words only, ...
- Be creative!

- Potential funding avenues:
  - Physics and Astronomy dept seed funding (~ 1k)
  - IOP (seed money, ~ 100's £)
  - ArtsCatalyst, Art Council England
  - STFC Small (~ 5-10k) Award Scheme (also, Large Awards)
  - Artangel, Futurecity, CommunitySpaces, Goulbenkian Foundation
  - The Courtauld Institute of Art
  - The Royal College of Arts (collaborative work with artists/designers)
  - The Architectural Association (collaborative work with architects)
- Start small, build experience and track record, then expand



# Give it a go!

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- ★ **1-minutes gig:** Explain (to A-level students) one thing about your research in 60 seconds.
- ★ Not a summary - you need to explain one single idea.
- ★ Immediate feedback!