

# GRAND CHALLENGES EXPLORATION (GCE)

A tool for innovation and collaboration

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**IF YOU WANT TO GO FAST,  
GO ALONE.**

**IF YOU WANT TO GO FAR,  
GO TOGETHER.**

— African proverb

# WHAT IS GRAND CHALLENGES?

A family of initiatives & network of partners seeking to:

- Engage the world's most creative minds from across sectors, organizations and geographies
- Support high-risk, high-reward innovations on the most difficult and pressing issues
- Bring innovation to scale for the benefit of the world's poor

**Grand Challenges sources innovations and then builds collaborations to accelerate impact**

Grand Challenges  
in Global Health

wellcome trust

FOUNDATION  
FOR THE  
National Institutes of Health

BILL & MELINDA  
GATES foundation



Canadian Institutes  
of Health Research

Grand Challenges

Solving global health and development problems for those most in need



Grand Challenges Canada™  
Grands Défis Canada™

BOLD IDEAS FOR HUMANITY™



**USAID**  
FROM THE AMERICAN PEOPLE



**KOICA**  
Korea International  
Cooperation Agency



清华大学  
Tsinghua University



सत्यमेव जयते  
Department  
of Biotechnology  
Govt. of India



# WHAT IS GRAND CHALLENGES? INNOVATORS & INNOVATIONS

~70K Applications from 190 Countries. >2000 Awards in 87 Countries.



## SUPPRESSING MOSQUITO REPRODUCTION

Project: Distorting the sex ratio of malaria-transmitting mosquitoes using 'selfish genes'

**Researchers:** Austin Burt, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## ELIMINATING DENGUE FEVER

Project: Blocking dengue virus transmission by mosquitoes using *Wolbachia* bacteria

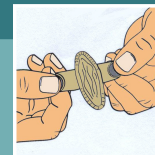
**Researchers:** Scott O'Neill, University of Queensland, Australia  
**Program:** Grand Challenges in Global Health



## NANOEMULSIONS FOR NASAL VACCINES

Project: Using nanoemulsions as adjuvants to boost needle-free vaccine efficacy

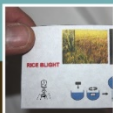
**Researchers:** James R. Baker, University of Michigan, USA  
**Program:** Grand Challenges in Global Health



## A BETTER CONDOM

Project: Developing a condom using polyethylene that is easier to put on and increases sensation

**Researchers:** Ron Frezzer, California Family Health Council, USA  
**Program:** Grand Challenges Explorations



## ANTIBACTERIAL BUSINESS CARDS

Project: Treating infected crop plants using bioactive business cards integrated with sensors that kill bacterial agricultural pests

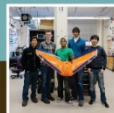
**Researchers:** David J. Nisbet, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## STINKY SOCKS, NO MALARIA

Project: Using the odor of stinky socks in traps to lure malaria-transmitting mosquitoes

**Researchers:** David J. Nisbet, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## DRONES FOR VACCINES

Project: Developing a sustained-release vaccine that can be deployed by self-propelled drones to deliver vaccines to rural locations

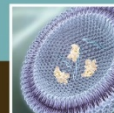
**Researchers:** David J. Nisbet, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## HOW MILK DOES A JOEY GOOD

Project: Studying how milk proteins help protect young animals from disease in order to design a supplement for human babies born prematurely or underweight

**Researchers:** David J. Nisbet, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## POLIOVIRUS IN A BUBBLE

Project: Making a new kind of polio vaccine by enclosing bits of virus in tiny spheres made of fat molecules

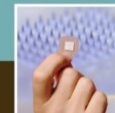
**Researchers:** David J. Nisbet, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## AN INVISIBLE BEDNET

Project: Using infrared light — like the kind that comes from TV remote controls — to repel malaria-transmitting mosquitoes

**Researchers:** David J. Nisbet, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## MICRONEEDLES FOR VACCINES

Project: Developing a microneedle patch to deliver insulin and a recently delivered vaccine

**Researchers:** David J. Nisbet, Imperial College London, UK  
**Program:** Grand Challenges in Global Health



## RALLYING THE IMMUNE SYSTEM

Project: Boosting malaria vaccines to trigger both arms of the immune system

**Researchers:** Adrian Hill, University of Oxford, UK  
**Program:** Grand Challenges in Global Health



## MAKING SANITARY PADS AFFORDABLE

Project: Manufacturing inexpensive but high-quality sanitary pads in Kenya out of locally available agricultural byproducts

**Researchers:** Megan Mukuria, ZanaAfrica Group, Tanzania  
**Program:** Grand Challenges Explorations



## CONFUSING THE MOSQUITO NOSE

Project: Deciphering how malaria-transmitting mosquitoes sense humans

**Researchers:** Richard Axel, Nobel laureate Columbia University, USA & Leslie Vosshall, The Rockefeller University, USA  
**Program:** Grand Challenges in Global Health



## UNDERSTANDING MALNUTRITION

Project: Using optical brain imaging technology to study cognitive function in malnourished children

**Researchers:** Clare Elwell, University College London, UK  
**Program:** Grand Challenges Explorations



# WHAT IS GRAND CHALLENGES? A NETWORK OF PARTNERS

- = Anchor Partner
- ▲ = Country Partner
- = Other Funding Partner

## Seed Innovation Initiatives

1. Bill & Melinda Gates Foundation (Grand Challenges Explorer), USA
2. Grand Challenges Canada (Stars in Global Health)
3. USAID (Development Innovation Ventures)
4. IAP Knowledge Park, India
5. State-Based Research Foundations/FAPs, Brazil
6. Tsinghua University, China
7. CONICET, Peru
8. Ministry of Foreign Affairs, Israel

- ## Saving Lives at Birth
9. Ministry of Foreign Affairs, Norway
  10. Department for International Development, UK
  11. World Bank, USA

- ## Saving Brains
12. Bernard van Leer Foundation, Netherlands
  13. World Vision, Canada
  14. Aga Khan Foundation of Canada
  15. Maria Cecilia Souza Inghel Foundation, Brazil
  16. Norlien Foundation, Canada

- ## Preventing Preterm Birth
17. Global Alliance to Prevent Prematurity and Stillbirth, USA

## Network Promoting Global Health Innovation through a Grand Challenges Approach

2003

Bill & Melinda  
Gates Foundation

2011

USAID

2013

India

2015

Japan,  
Thailand,  
China,  
Africa,  
Ethiopia

2010

Grand  
Challenges  
Canada

2012

Brazil

2014

Israel,  
Peru,  
South Africa

2016

South Korea



# WHY DO WE USE GRAND CHALLENGES?

- We do not have a preferred approach or partner to achieve our objective;
  - We want to acquire a better landscape of the idea space or potential investigators;
  - We want to engage in a broad conversation with the stakeholder community;
- **We want to build a portfolio of competing or complementary investments:**
    - In creating new learning communities and/or working to decompose problems in to constituent areas of excellence
  - **We want to work with partners to collaborate:**
    - In defining the problem we wish to solve together;
    - Identify the landscape of possible solutions; and
    - On nurturing solutions towards impact.

# HOW DO WE SCORE GRAND CHALLENGES?

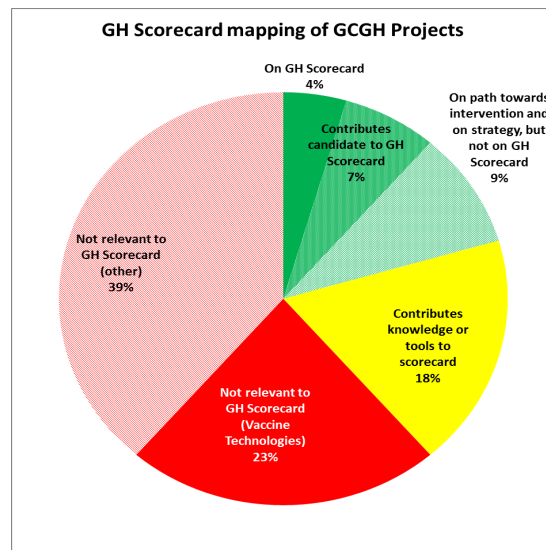
$$\text{ROI} = \frac{\begin{array}{l} \text{Projects progressed to} \\ \text{clinical testing} \end{array} + \begin{array}{l} \text{Strategic learning \&} \\ \text{landscaping} \end{array} + \begin{array}{l} \text{Scientific knowledge} \end{array} + \begin{array}{l} \text{Capacity development} \end{array} + \begin{array}{l} \text{Good ideas funded by} \\ \text{others} \end{array} + \begin{array}{l} \text{Increased awareness} \\ \text{of our issues} \end{array} + \begin{array}{l} \text{Strengthen Foundation} \\ \text{brand} \end{array}}{\begin{array}{l} \text{Project funding} \end{array} + \begin{array}{l} \text{Programmatic \& business} \\ \text{operating costs} \end{array} + \begin{array}{l} \text{Opportunity costs} \end{array}}$$


## Return on investment (ROI) shortcomings:

- Grand Challenge evolution includes increased breadth of project types
  - Clinical testing not always good intermediate benchmark
- What is good?
  - What are appropriate denominators?
  - What are appropriate benchmarks?

**Primary Metric;** *Secondary Metrics*

Abbreviations: GC, Grand Challenge; GH, Global Health; Vx, vaccine.





Grand Challenges | EXPLORATIONS

# ONE GREAT IDEA

TWO PAGES TO FILL OUT.  
\$100,000 TO PROVE IT.

GREAT IDEAS CAN COME FROM ANYWHERE. ALL CAN APPLY.

# GRAND CHALLENGES EXPLORATIONS (GCE)

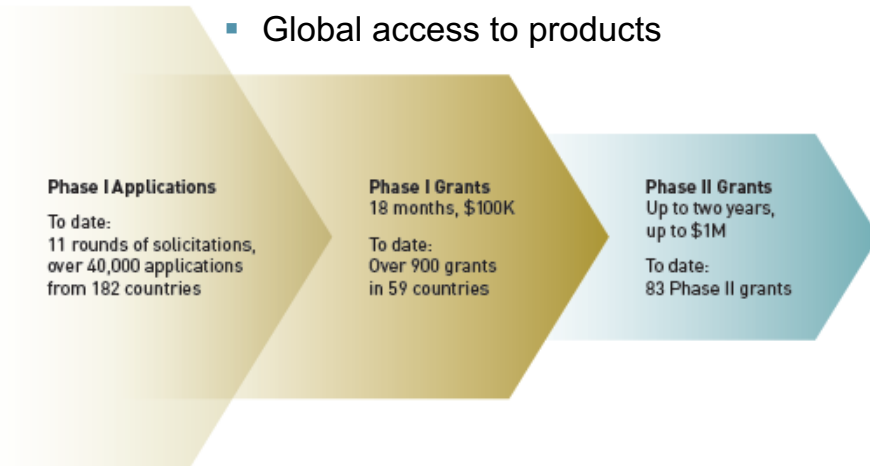
[www.grandchallenges.org](http://www.grandchallenges.org)

## Key Objectives:

- Define challenges whose solution would unleash progress in key areas
- Engage the world's most innovative researchers
- Focus research on making an impact for those most in need
- Build collaboration among researchers and funders to accelerate impact
- Build an expanding global network of programs and partners

## How GCE is unique:

- Global reach and low barrier to entry
- Strategic topics
- Blinded, champion-based review
- High risk, high reward
- Global access to products

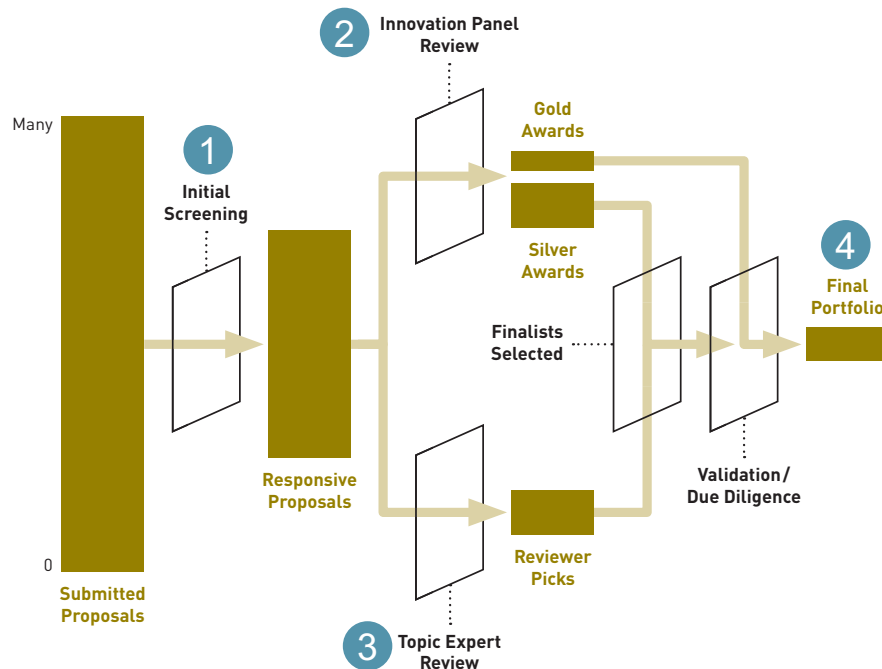


# GCE: ONE GREAT IDEA. \$100,000 TO PROVE IT.

- Two open RFPs each year, Mar to May and Sept to Nov
- 4-6 specific, defined challenge topics developed in partnership w/ PSTs
- Two-page application, no data required, \$100k budget
- Anyone can apply (as long as they are connected to an organization)

## Review:

1. Initial internal triage for responsiveness to topic
2. Blind, champion-based review by Innovation Panelists
3. Blind review by external experts
4. Final portfolio selection by topic lead



# GCE: ONE GREAT IDEA. \$100,000 TO PROVE IT.

	Phase I	Phase II
Calls for proposals	<ul style="list-style-type: none"><li>▪ Twice yearly</li><li>▪ Open RFP</li></ul>	<ul style="list-style-type: none"><li>▪ Twice yearly</li><li>▪ Closed RFP (Phase I winners only)</li></ul>
Topics	<ul style="list-style-type: none"><li>▪ 4-6 specific, defined challenges</li><li>▪ Developed with PSTs and partners</li></ul>	<ul style="list-style-type: none"><li>▪ Phase I grants were awarded under specific Phase I topic</li></ul>
Application	<ul style="list-style-type: none"><li>▪ 2 pages</li><li>▪ No data required</li></ul>	<ul style="list-style-type: none"><li>▪ 5 page Phase I final report</li><li>▪ 5 page Phase II application</li></ul>
Review	<ul style="list-style-type: none"><li>▪ D&amp;TS or PST Topic Lead</li><li>★ <li>▪ Innovation Panel</li><li>▪ Parallel Panel and internal review</li></li></ul>	<ul style="list-style-type: none"><li>▪ D&amp;TS Domain Lead or PST Topic Lead</li><li>▪ Internal and external expert review</li></ul>
Award budget	<ul style="list-style-type: none"><li>▪ \$100,000 USD</li></ul>	<ul style="list-style-type: none"><li>▪ Up to \$1M USD (shaped by review)</li></ul>
Timeline	<ul style="list-style-type: none"><li>▪ 18 months</li></ul>	<ul style="list-style-type: none"><li>▪ Up to 2 years (shaped by review)</li></ul>
Payout Budget	<ul style="list-style-type: none"><li>▪ GH topics paid by D&amp;TS</li><li>▪ GD, other paid by own budget</li></ul>	<ul style="list-style-type: none"><li>▪ Cross-cutting projects paid by D&amp;TS</li><li>▪ All others paid out of PST budget</li></ul>

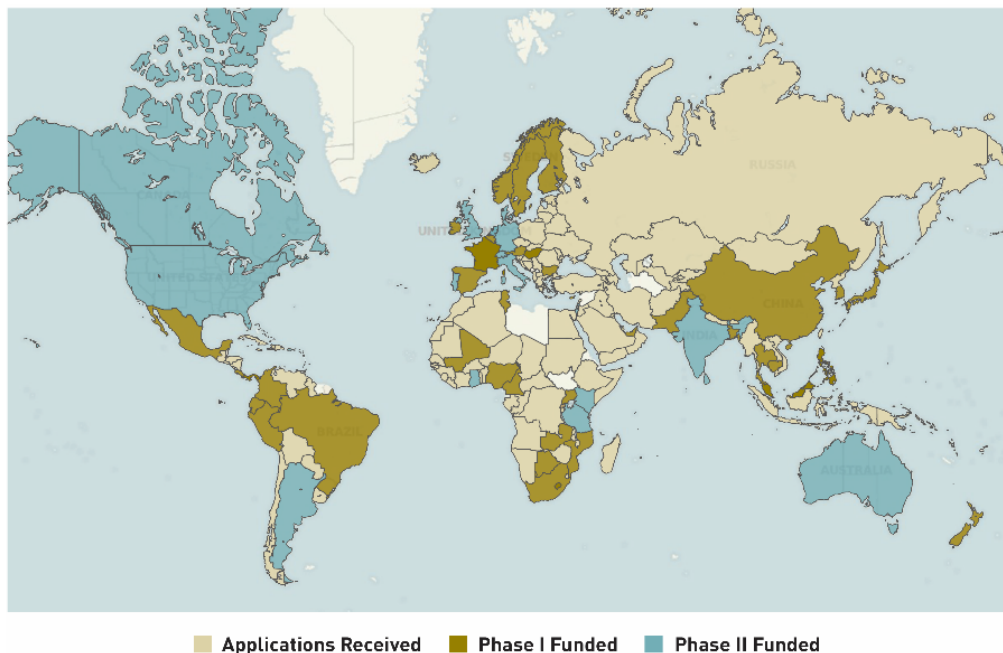
# GCE: GRANTS PIPELINE

## ~1,300 Phase I Projects:

- Distributed across 16 foundation strategies
- ~25% of grantees receive additional funding elsewhere
- ~40% of grantees publish about their project
- ~20% of grantees file patents about their idea
- 65 countries represented

## 100+ Phase II Projects:

- Distributed across 11 foundation strategies
- 9 developing world researchers





# WHAT MAKES FOR A SUCCESSFUL GCE TOPIC

- Can you easily describe the challenge that you'd like to solve? What has been tried previously and why that approach haven't those approaches worked?
- Do you see the solution relying on new technology development?
- Would \$100,000 be sufficient to achieve (or start to achieve) proof-of-concept in 18 months? Provide clarity to enable follow-up award of up to \$1M?
- Is it clear where innovation is needed? A paradigm shift? Develop a new product? Design a new process?
- Does the greatest barrier lie in implementation of a known solution? Or are potential solutions still unknown?
- Can communicate to the applicant examples of approaches that you feel would be likely to succeed?
- Would multi-disciplinary approaches be beneficial? Or do you feel traditional expertise is the best route?
- Can you structure a call that lowers the barrier to unique resources more readily enabling new ideas?
- If a proof of concept is achieved, are there partners to help translate this idea or could it directly implemented?

# WHAT MAKES FOR A SUCCESSFUL GCE APPLICATION

- Your proposal must demonstrate an innovative approach that complies with all restrictions and guidelines for the topic to which you are applying. GCE only funds projects responsive to the topics.
- Proposals are sent to reviewers without personal or organizational information. Do not include this information in the body of your proposal. Proposals that include personal or organizational information in the body of the proposal may be automatically removed from consideration.
- In addition to subject matter experts, your proposal will be reviewed by a panel with broad expertise and a track record in identifying innovations – these reviewers may not be deep domain experts in your field. You must describe your idea in clear language without the use of jargon unique to your field.
- The work proposed in your application must include a clear set of key experiments or activities that test your idea in a way that could provide sufficient evidence to warrant funding. Proposals with vague descriptions or vague testing methodologies will not be funded.

WE ENVISION A  
WORLD WHERE  
**EVERY  
PERSON**  
HAS THE OPPORTUNITY  
TO LIVE A HEALTHY,  
PRODUCTIVE LIFE



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## Q&A

# GRAND CHALLENGES

	Grand Challenges Explorations	Grand Challenges	Other Challenge Programs (Reinvent the Toilet, etc.)
Timing	<ul style="list-style-type: none"> <li>Two Rounds per year</li> </ul>	<ul style="list-style-type: none"> <li>Ad Hoc</li> </ul>	<ul style="list-style-type: none"> <li>Opportunistic</li> </ul>
Topics	<ul style="list-style-type: none"> <li>4-6 specific, defined challenges</li> <li>Developed with PSTs &amp; partners</li> </ul>	<ul style="list-style-type: none"> <li>Specific defined challenges</li> <li>Developed with PSTs &amp; partners</li> <li>Independent Partner Challenges</li> </ul>	<ul style="list-style-type: none"> <li>Specific to team strategy</li> </ul>
Application	<ul style="list-style-type: none"> <li>2 pages</li> </ul>	<ul style="list-style-type: none"> <li>Designed to match goals</li> </ul>	<ul style="list-style-type: none"> <li>Designed to match goals</li> </ul>
Award size	<ul style="list-style-type: none"> <li>\$100,000 USD – Phase I</li> <li>Up to \$1M – Phase II</li> </ul>	<ul style="list-style-type: none"> <li>\$250K - \$10M matched to goals</li> </ul>	<ul style="list-style-type: none"> <li>Typically specific to PST</li> </ul>
Strategy alignment	<ul style="list-style-type: none"> <li>Topic lead led</li> <li>Idea space Landscaping &amp; piloting</li> </ul>	<ul style="list-style-type: none"> <li>Program/portfolio matched to specific investment strategy</li> </ul>	<ul style="list-style-type: none"> <li>Program/portfolio matched to specific investment strategy</li> </ul>
Timeline	<ul style="list-style-type: none"> <li>18 months – Phase I</li> <li>Up to 2 years – Phase II</li> </ul>	<ul style="list-style-type: none"> <li>Awards vary: up to five years, milestone based</li> </ul>	<ul style="list-style-type: none"> <li>Awards vary matched to team goals</li> </ul>
Payout Budget	<ul style="list-style-type: none"> <li><b>Baseline Phase I paid by D&amp;TS</b></li> <li>Topic lead PSTs budget Phase IIs</li> </ul>	<ul style="list-style-type: none"> <li>Matched to strategy (&gt;\$5M)</li> <li>Cross PST &amp; Partner leverage</li> </ul>	<ul style="list-style-type: none"> <li>Matched to strategy (&gt;\$5M)</li> <li>Cross PST &amp; Partner leverage</li> </ul>
Support	<ul style="list-style-type: none"> <li>Marketing/Branding/Grant making &amp; operational support</li> </ul>	<ul style="list-style-type: none"> <li>Partners/Marketing/Branding/Grant making &amp; operational support</li> </ul>	<ul style="list-style-type: none"> <li>Ad-hoc collaboration</li> </ul>