

Opportunities, Challenges and “How to” do Responsible research and Innovation



What is Responsible Research and Innovation?

Steve Miller

UCL-UK Hub for RRI

Department of Science and Technology Studies

University College London

Highly efficient Cas9-mediated gene drive for population modification of the malaria vector mosquito *Anopheles stephensi*

Valentino M. Gantz^{a,1}, Nijole Jasinskiene^{b,1}, Olga Tatarenkova^b, Aniko Fazekas^b, Vanessa M. Macias^b, Ethan Bier^{a,2}, and Anthony A. James^{b,c,2}

^aSection of Cell and Developmental Biology, University of California, San Diego, La Jolla, CA 92093-0349; ^bDepartment of Molecular Biology and Biochemistry, University of California, Irvine, CA 92697-3900; and ^cDepartment of Microbiology and Molecular Genetics, School of Medicine, University of California, Irvine, CA 92697-4500

Contributed by Anthony A. James, October 26, 2015 (sent for review October 11, 2015; reviewed by Malcolm Fraser and Marcelo Jacobs-Lorena)



Anthony James



BBC Radio 4 “Today” programme – November 24, 2015



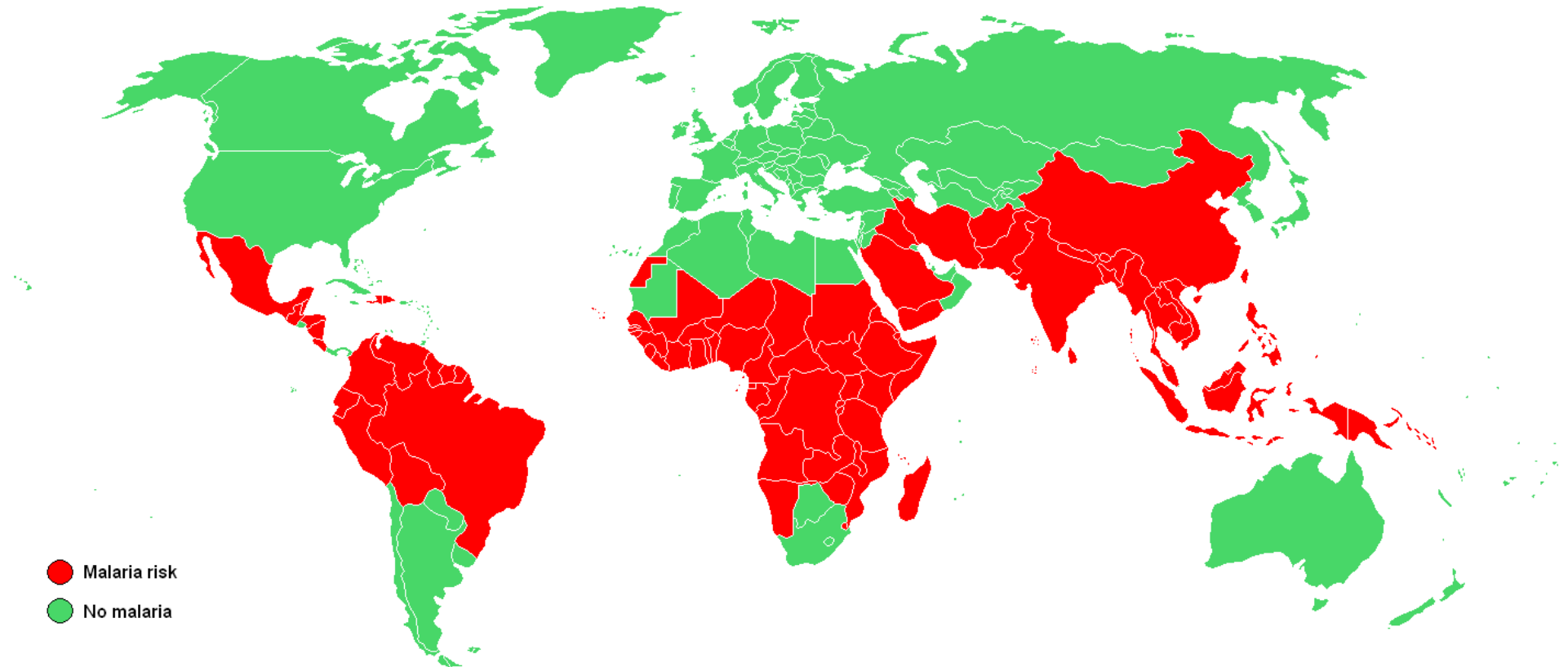
Look at the issues raised here

European Union Grand Challenges



Health, demographic change and wellbeing
Climate action, environment, resource efficiency and raw materials

European Union Agenda “keys”



“Mosquitoes no respecters of borders”

Governance

Law of unintended consequences



Mosquito - malaria

Law of unintended consequences



Sand fly - leishmaniasis

RRI Process Requirements



Anticipation and Reflection

Looks like “textbook” how to communicate science in a straightforward and factual way but it raises:

EU Grand Challenges as Outcomes

EU Agenda “keys”

EU “process requirements”



Public engagement →



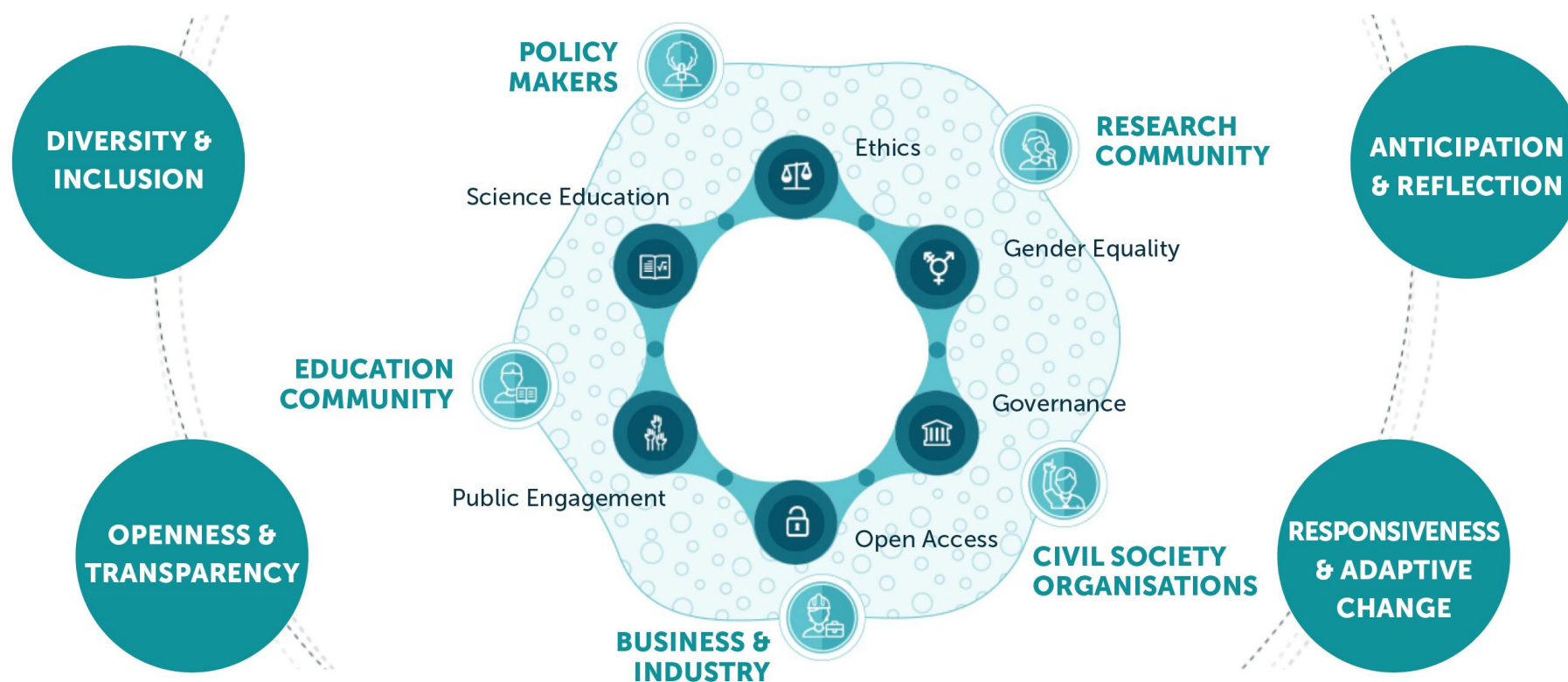
What is it that RRI is hoping to achieve?

<i>Learning outcomes</i>	<i>R&I outcomes</i>	<i>Societal impacts</i>
<ul style="list-style-type: none">• Engaged Publics• Responsible actors• Responsible institutions	<ul style="list-style-type: none">• Ethically acceptable• Environmentally sustainable• Socially desirable innovations	<p>Contribute to solving societal challenges</p> <p>e.g. 7 Grand Challenges (EU)</p>

How is RRI hoping to achieve this?



With whom and why?



Some possible misconceptions

RRI is the end of
'true' science



Science needs to
become *Responsible*?
So scientists are
irresponsible now?!



RRI is about much more
than only research! It is too
demanding for researchers!

I find it difficult to grasp.
What is it and why is it
important?



RRI—that's just old wine
in new bottles...



We first need to
educate citizens before
they can participate!

The chance to bring **science and society closer** and avoid future controversies



Democratic benefits from more engaged citizens

Creating **better innovations**, new markets and increased competitiveness and creativity through wider input, problem focus and new networks

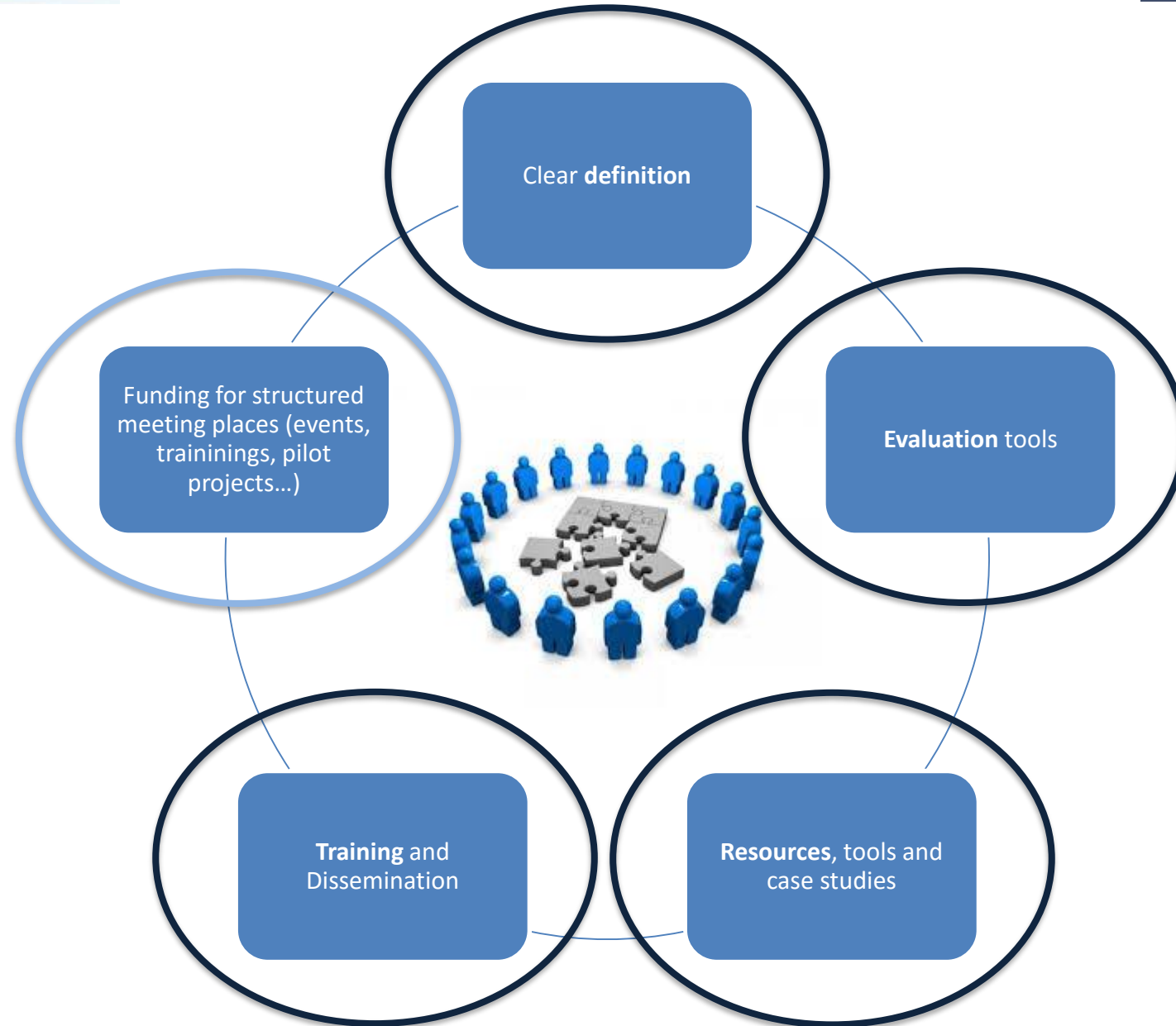


Improving the **culture** of science and scientific careers by expanding the role of scientists in society



To raise questions that have never been addressed





RRI Opportunities in Horizon 2020

**Science with and for Society relevant topics in the
Horizon 2020 Work Programme 2016-17**



RRI Tools has assembled:

- **Definition of RRI, Policy Brief, Catalogue of Promising Practices**
- **Explanations of the opportunities flowing from RRI, and what's needed to overcome obstacles**
- **A toolkit of existing “RRI Tools” and our own “showcases”**
- **An RRI training programme for all and individual stakeholders**
- **An advocacy and dissemination programme**
- **A one-stop website – www.rri-tools.eu**

**Questions and
Comments?**