



# TERRAIN

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Teaching responsible  
research and innovation

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# A MANDATE FOR RESPONSIBLE RESEARCH AND INNOVATION

Responsible research and innovation (RRI) is concerned with the nature and trajectory of research and innovation; how it can benefit society and who gets to decide. RRI is being embedded in public and private sectors across the UK and Europe. Two prominent research funding bodies have adopted an RRI framework:

- 1) UK Engineering and Physical Sciences Research Council (EPSRC); and,
- 2) Horizon 2020, the European Commission's flagship science and innovation investment framework.

The EPSRC's framework, 'AREA', asks researchers to Anticipate, Reflect, Engage with, and Respond to a broader range of people with an interest in research and innovation. The EPSRC requires its funded Centres for Doctoral Training to embed RRI in training programmes.

The Engineering Council and the Quality Assurance Agency underline the importance of teaching Science, Technology, Engineering and Mathematics (STEM) students about the social contexts of research and innovation. TERRAIN provides an introduction to these contexts.

**TERRAIN is designed to assist those with responsibility for teaching RRI:**

- **Teachers in STEM Centres for Doctoral Training;**
- **Teachers in STEM postgraduate and upper level undergraduate programmes;**
- **Early career researchers; and,**
- **EPSRC and BBSRC research centres.**



# TERRAIN

## Teaching responsible research and innovation

**TERRAIN is a two-hour introduction to RRI for STEM students and early career researchers, providing them with the knowledge and skills to critically engage with the concept and their own practice in real world interactions.**



### RELEVANCE

Delivered in the form of a talk and discussion exercise to ground participants in the principles, traditions and policy salience of RRI, and to explore the potential that RRI offers in making research innovation more socially robust.



### REFLECTION

Small group work and facilitated class discussion in an interactive exercise to consider the potential for existing outreach and engagement activities to meet the goals of RRI



### SYNTHESIS

In-depth group activity that asks participants to reflect and critically evaluate the RRI components of two STEM research projects.

TERRAIN is designed for a cohort of no more than 50 situated in a flexible room that can accommodate small group discussion.

TERRAIN can be delivered by social science or STEM academics who are comfortable with interactive learning environments.



*Increasing conceptual complexity*

### KNOWLEDGE

### UNDERSTANDING

Learning Outcomes

Participants will be able to describe the four dimensions of EPSRC's RRI framework in the context of current research and innovation policy (Learning Outcome 1).

### APPLICATION

### ANALYSIS

Participants will be able to analyse familiar outreach and engagement activities in the context of RRI. (Learning Outcome 2).

### EVALUATION

Participants will be able to evaluate RRI strategies as they might appear in STEM research project proposals (Learning Outcome 3).

By the end of the sessions, participants will start to appreciate the social implications of research and innovation.

They will understand how RRI addresses these complexities and demonstrates the choices available to STEM researchers and others.

# DEVELOPMENT AND TESTING OF TERRAIN

TERRAIN is underpinned by qualitative research involving interviews with researchers working on large-scale STEM projects that have embedded RRI. TERRAIN draws exclusively on contemporary and stimulating real case studies. TERRAIN has been developed in collaboration with, and has been peer-reviewed by, active interdisciplinary researchers in our partner universities.

TERRAIN has been class-tested and refined in collaboration with Durham University, the University of Glasgow, the University of Sheffield and the University of Nottingham. TERRAIN is flexible and has been successfully delivered to STEM doctoral and final year undergraduate students. It has been delivered by teachers from both the social sciences and STEM. Delivery has been most successful when taught in collaborations across disciplines.

We welcome feedback about TERRAIN in its current form, and its potential for future development.

## OBTAINING TERRAIN

TERRAIN includes a pack for lecturers, slides and printable materials which can be obtained by email free of charge from Dr Carmen McLeod: [Carmen.McLeod@nottingham.ac.uk](mailto:Carmen.McLeod@nottingham.ac.uk)

## FURTHER INFORMATION

- Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York: David McKay Company.
- Engineering Council (2014). The Accreditation of Higher Education Programmes: UK Standard for Professional Engineering Competence. Third edition. Available at: [www.engc.org.uk](http://www.engc.org.uk)
- EPSRC AREA Framework for Responsible Innovation: <https://www.epsrc.ac.uk/research/framework/>
- European Commission statement on Responsible Research and Innovation in the Horizon 2020 funding programme: <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation>
- Owen, R., Bessant, J. and Heintz, M. (2013). Responsible Innovation: Managing the responsible emergence of science and innovation in society. Chichester: John Wiley and Sons
- Quality Assurance Agency (2014). Subject specific benchmarks. Quality Assurance Agency for Higher Education: Gloucester. Available at: <http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/subject-benchmark-statements/honours-degree-subjects>



# HOW TO CITE

Hartley, S., Pearce, W., McLeod, C., Gibbs, B., Connelly, S., Couto, J., Moreira, T., Murphy, J., Smith, R., Staykova, M. and Walls, J. (2016). The TERRAIN tool for teaching responsible research and innovation. University of Nottingham.



The University of  
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The Leverhulme Trust



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