



**RESPONSIBLE  
RESEARCH**  
IN PRACTICE

1/1/2019

2019

TRAINING COURSE/WORKSHOP SUMMARIES

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Thank you for your interest in **RESPONSIBLE RESEARCH IN PRACTICE** TRAINING SERVICES.

*“My name is Dr Nikki Osborne and I am the founding Director of this bioscience training and consultancy business. My own research background is in the Biomedical Sciences and it is from here that I developed a passion for research integrity, ethics, responsible innovation and good research conduct.”*

**RESPONSIBLE RESEARCH IN PRACTICE** prides itself on combining technical knowledge, research experience and a passion for helping others to create truly bespoke training and consultancy services tailored to each client’s individual requirements.

On the following pages you will find detailed summaries for each of our most popular training courses and workshops. At the end of each summary you will find a *specifications* section where we have tried to indicate how each workshop or course might be tailored to client requirements. This section is just for illustrative purposes only. If your preferred option is not listed please do not hesitate to contact us via our email [info@responsibleresearchinpractice.co.uk](mailto:info@responsibleresearchinpractice.co.uk), or website to arrange a convenient time to call and discuss how training could be tailored to meet your requirements.

**RESPONSIBLE RESEARCH IN PRACTICE** is also able to offer a 100% bespoke training service to create completely unique training sessions, material, or e-learning content.

**Whatever you need, one thing can be guaranteed: WE WILL ALWAYS DO OUR BEST**

To read more about the **CONSULTANCY** services we offer, or one of our **INSIGHTS BLOGS** please visit our website [www.responsibleresearchinpractice.co.uk](http://www.responsibleresearchinpractice.co.uk). Here you will find some client **CASE STUDIES** showcasing examples of our work, but also perhaps offering a little inspiration. We would encourage you to take a look and hear direct from our clients what **RESPONSIBLE RESEARCH IN PRACTICE** as a company is like to work with.

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**BIOSCIENTIST’S GUIDE TO RESEARCH INTEGRITY**

**Course description:** This half-day (4 hour) workshop is intended for Bioscience researchers at any stage of their research career who want to understand what research integrity (RI) means in their context of their own research so that they can work to meet expectations of good research conduct with renewed confidence. Participants will consider what the consequences are when expectations are not met and discuss the relevance to broader issues such as reproducibility. An overview of the culture of scientific research here in the UK will be discussed along with common conflicts, pressures and tensions (risk factors) that can impact upon an individual’s research conduct. Participants will then be supported to reflect upon their own personal risk factors and opportunity given to identify potential strategies to avoid or overcome these risk factors.

This course assumes no prior knowledge of research integrity issues.

**In summary:**

<b>Course title</b>	Bioscientist’s Guide to Research Integrity
<b>Who for</b>	Bioscience researchers at any stages of their research career who wish to refresh their understanding of what research integrity (RI) means in their context of their own research so that they can work to meet expectations of good research conduct with renewed confidence.
<b>Length</b>	4 hours with 2x15 minute comfort breaks.
<b>Format</b>	Interactive mix of presentations, individual and group activities, and discussions.
<b>Overall Purpose</b>	To give participants a current overview of what research integrity is what it means in terms of how they conduct their own research and the freely available tools and resources that exist to support researchers to meet published expectations of responsible research conduct.
<b>Key content</b>	<ol style="list-style-type: none"> <li>1. Theory: <ul style="list-style-type: none"> <li>• what ‘research integrity’ is and means in terms of their own research conduct and daily practices</li> <li>• the culture of research in the UK and the common risk factors/tensions/influences that can impact upon an individual’s research conduct</li> <li>• freely available tools, resources, training and support to avoid or address poor research practices</li> </ul> </li> <li>2. Activities: <ul style="list-style-type: none"> <li>• Awareness – participants will discuss what are the consequences and for whom if expectations of responsible research conduct are</li> </ul> </li> </ol>

	<p>not met, or short cuts are taken</p> <ul style="list-style-type: none"> <li>• Understanding – participants will identify what research funder and employer expectations of good research conduct apply to them and what fulfilment of these expectations means in practice</li> <li>• Planning &amp; application – participants will reflect upon personal risk factors that impact upon how they conduct their research to identify what they can do differently and develop strategies to manage or resolve potential conflicts</li> </ul>
<b>Learning outcomes</b>	<p>By the end of this workshop delegates will be able to:</p> <ul style="list-style-type: none"> <li>• recognise what research integrity and responsible research conduct means in practice for their research project(s)</li> <li>• discuss how research integrity relates to current issues regarding the reliability and reproducibility of biological and biomedical research.</li> <li>• work with increased awareness of all relevant research funder(s) and institutional expectations regarding the responsible conduct of bioscience research</li> <li>• identify relevant tools and resources that are freely available to help support researchers to meet expectations</li> <li>• reflect upon current practices and the culture of research around them in order to identify and develop strategies to manage or resolve potential conflicts in practice</li> </ul>
<b>Pre-requisites/pre-work</b>	None
<b>Course provider</b>	Responsible Research in Practice
<b>Course Tutor</b>	Nikki Osborne
<b>Max no. of attendees</b>	30
<b>Room requirements</b>	Tables for groups of 5-6 people facing projector Need sufficient space for attendees to move around and discuss
<b>Equipment requirements</b>	Projector with screen, computer or laptop and speakers for course tutor to use to present information Flip charts or white boards with markers for group work
<b>Refreshments</b>	Hot and cold soft drinks for attendees plus biscuits or fruit for comfort breaks
<b>Specifications</b>	This workshop can be tailored to specific institutional, research funder(s), scientific Society or discipline specific requirements

**FOSTERING A CULTURE OF CARE**

**Course description:** This half-day (4 hour) workshop is intended for Bioscience researchers at any stage of their research career who want to understand how to promote a good research culture. Participants will identify what expectations exist in terms of their own research practices, before considering what the consequences are when such expectations are not met. The relevance of broader issues such as the reproducibility and reliability of biomedical research will be discussed, along with examples of common research misconduct. With an increased awareness of problems that can arise, the group will identify and discuss common conflicts, pressures and tensions (risk factors) that exist within the culture of research here in the UK and strategies to avoid or resolve them.

This course assumes participants will have a little or no prior knowledge of research integrity issues.

**In summary:**

<b>Course title</b>	Fostering a culture of care
<b>Who for</b>	Bioscience researchers at any stage of their research career who want to understand how to promote a good research culture when supervising students, or setting up and running a research group.
<b>Length</b>	4 hours including 2x15 minute comfort breaks.
<b>Format</b>	Interactive mix of presentations, individual and group activities, and discussions.
<b>Overall Purpose</b>	To give participants a current overview of what good research integrity and responsible research conduct means in practice, and an understanding of how their actions can influence the conduct of others working within their local research culture.
<b>Key content</b>	<p>3. Theory:</p> <ul style="list-style-type: none"> <li>• what ‘research integrity’ means in terms of their own research conduct and daily practices</li> <li>• the culture of research in the UK and how individuals contribute to it</li> <li>• common risk factors/tensions/influences that can impact upon an individual’s research conduct</li> <li>• freely available tools, resources, training and support to avoid or address poor research practices</li> </ul> <p>4. Activities:</p> <ul style="list-style-type: none"> <li>• Awareness – what are the consequences and for whom if expectations of responsible research conduct are not met, or short cuts are taken</li> <li>• Understanding – real life examples of common research misconduct</li> </ul>

	<p>issues will be discussed</p> <ul style="list-style-type: none"> <li>• Planning &amp; application – reflect upon personal priorities and risk factors to identify what they can do differently and develop strategies to manage or resolve potential conflicts</li> </ul>
<b>Learning outcomes</b>	<p>By the end of this workshop delegates will be able to:</p> <ul style="list-style-type: none"> <li>• recognise what research integrity and responsible research conduct means in practice for their research discipline and what can go wrong</li> <li>• discuss how research integrity relates to current issues regarding the reliability and reproducibility of biological and biomedical research</li> <li>• communicate the major research funders, journals and institutional expectations regarding the responsible conduct of bioscience research</li> <li>• promote initiatives seeking to improve research practices and resources that are freely available to help support researchers to meet expectations</li> <li>• understand the value of a good research culture, how individuals contribute to it and how it influences them</li> <li>• reflect upon current practices and the culture of research around them in order to identify and develop strategies to manage or resolve potential conflicts in practice</li> </ul>
<b>Pre-requisites/pre-work</b>	None
<b>Course provider</b>	Responsible Research in Practice
<b>Course Tutor</b>	Nikki Osborne
<b>Max no. of attendees</b>	30
<b>Room requirements</b>	Tables for groups of 5-6 people facing projector Need sufficient space for attendees to move around and discuss
<b>Equipment requirements</b>	Projector with screen, computer or laptop and speakers for course tutor to use to present information Flip charts or white boards with markers for group work
<b>Refreshments</b>	Hot and cold soft drinks for attendees plus biscuits or fruit for comfort breaks
<b>Specifications</b>	This workshop can be tailored to specific institutional, research funder(s), scientific Society or discipline specific requirements

**ANIMAL RESEARCH: CRITICAL, CHALLENGING & CREATIVE THINKING**

**Course description:** This course comprising of four half-day (3hour) workshops is for Bioscience research students at any stage of their MPhil or PhD projects who are actively planning and/or conducting research involving the use of live animals, animal derived material or animal-derived data. Each workshop supports participants to develop their knowledge and understanding of a different aspect of good research conduct: 1. Introduction to animal use in research and public opinion in the UK; 2. Research Integrity in the context of research involving animal use; 3. Common pitfalls in experimental design, how to identify and avoid them; 4. Introduction to animal welfare and the 3Rs in practice. Throughout these workshops participants will be supported to think critically and creatively with respect to how they communicate, plan, conduct and report their own animal research.

This course does not require participants to hold a personal licence or to have undertaken licensee training.

**In summary:**

<b>Course title</b>	Animal Research: Critical, Challenging and Creative Thinking
<b>Who for</b>	Bioscience research students at any stages of their research project who wish to gain greater understanding of how to communicate, plan, conduct and report their research in accordance with current good practice guidelines.
<b>Length</b>	4x 3 hour workshops, each including 1 or 2x 15 minute comfort breaks.
<b>Format</b>	Interactive mix of presentations, individual and group activities, and discussions.
<b>Overall Purpose</b>	To support participants to: think critically when reading research and designing their own experiments; challenge research methods, models and practices to identify the best approach to test their hypothesis; be creative and innovative in how they conduct and communicate their research.
<b>Key content</b>	<p>5. Theory:</p> <ul style="list-style-type: none"> <li>• Introduction to animal use in research and public opinion in the UK includes: the historical context for animal use in research within the UK, the latest local and national statistics, the range of and trends in societal viewpoints on the use of animals in research.</li> <li>• Research Integrity in the context of research involving animal use includes: the research framework and expectations at a local, national and international level within the scientific community, the UK <i>Concordat to support Research Integrity and Concordat on Openness on Animal Research</i>, the Nuffield Council on Bioethics “<i>Culture of scientific research within the UK</i>” report.</li> </ul>



	<ul style="list-style-type: none"> <li>• Common pitfalls in experimental design, how to identify and avoid them includes: topics as the title suggests to help maximise the robustness, reliability and reproducibility of results, a basic overview of what systematic reviews and meta-analysis are, free tools and resources available to help support the effective planning and reporting of research, including the PREPARE and ARRIVE guidelines.</li> <li>• Introduction to animal welfare and the 3Rs in practice includes: what is animal welfare and why it is important, examples of the 3Rs in practice as a tool to minimise uncontrolled variables and confounding factors that may impact upon the quality of research results, and why the whole lifetime experience of experimental animals is important.</li> </ul> <p>6. Activities:</p> <ul style="list-style-type: none"> <li>• Awareness – students will write and receive feedback on a non-technical summary of their research project</li> <li>• Understanding - Students will discuss real-life case studies of common misconduct issues and ethical dilemmas</li> <li>• Understanding – students will use the ARRIVE guidelines to assess a research paper, what is/is not reported, and how this impacts the results, conclusions, and study reproducibility</li> <li>• Planning and application – students will be supported to plan and write a draft experimental protocol to apply what they have learnt, identify opportunities to implement the 3Rs and any additional training/mentoring needs they may have</li> </ul>
<p><b><i>Learning outcomes</i></b></p>	<p>By the end of this course delegates will be able to:</p> <ul style="list-style-type: none"> <li>• communicate their research in an open and transparent manner, with an informed understanding of how animals are used for scientific purposes within the UK and of the range of societal opinions that exist on this issue.</li> <li>• recognise what responsible, ethical, good practice research conduct means in the context of their individual research project, and why it is important for the quality, reproducibility and reliability of their research data.</li> <li>• write a testable hypothesis and plan their experiments using a range of tools and resources that are available to support them to design and report their research well.</li> <li>• understand what good animal welfare means, consider what factors can impact on the welfare of the animals used in research, and reflect on how the 3Rs can be effectively implemented during the course of their own research project/activities</li> </ul>

<b><i>Pre-requisites/pre-work</i></b>	None
<b><i>Course provider</i></b>	Responsible Research in Practice
<b><i>Course Tutor</i></b>	Nikki Osborne
<b><i>Max no. of attendees</i></b>	30
<b><i>Room requirements</i></b>	Tables for groups of 5-6 people facing projector Need sufficient space for attendees to move around and discuss.
<b><i>Equipment requirements</i></b>	Projector with screen, computer or laptop and speakers for course tutor to use to present information Flip charts or white boards with markers for group work
<b><i>Refreshments</i></b>	Hot and cold soft drinks for attendees plus biscuits or fruit for comfort breaks
<b><i>Specifications</i></b>	The course and each of the workshops can be tailored to individual establishment requirements and the individual workshops that make up the course run at a frequency to suit i.e. back to back over 2 consecutive days, over four consecutive mornings or afternoons within a week, or once a week for four weeks.

**GUIDE TO RESPONSIBLE ANIMAL RESEARCH**

**Course description:** This one day (7 hour) workshop is intended for Bioscience researchers at any stage of their research career who are actively planning, supervising and/or conducting research involving the use of live animals, animal derived material or animal-derived data. Following a brief introduction to set the current Societal and cultural context for the use of animals in research within the UK, participants will be introduced to a six step animal research (AR) checklist. Each step of the AR checklist will be worked through in sufficient detail and with illustrative examples to ensure participants understand what the implementation of each step means in the context of their own research. Relevant freely available tools and resources that exist to support researchers to improve research practices will also be signposted.

This course does not require participants to have a licence to work under ASPA, and is relevant to both licenced and non-licenced animal work.

**In summary:**

<b>Course title</b>	Guide to Responsible Animal Research
<b>Who for</b>	Bioscience researchers who are actively planning, supervising and/or conducting research involving the use of live animals, animal derived material or animal-derived data, and wish to refresh or update their understanding of good practice within the laboratory animal sciences and what the conduct of responsible animal research entails.
<b>Length</b>	7 hours including a 1hr break for lunch and 2x15 minute comfort breaks.
<b>Format</b>	Interactive mix of presentations, individual and group activities, and discussions.
<b>Overall Purpose</b>	To give participants an overview of all the information, tools, resources and/or further support they can use to support, or implement the responsible use of animals in research in accordance with contemporary good practice.
<b>Key content</b>	<p>7. Theory:</p> <ul style="list-style-type: none"> <li>• An overview of animals use in the UK, trends in public opinions relating to animal research and the concordat on openness on animal research in the UK</li> <li>• What does the responsible use of animals in research mean and what can go wrong?</li> <li>• What makes a good hypothesis and how to identify the most appropriate research model, method or technique to test it?</li> <li>• An overview of what good basic experimental design entails, common pitfalls and how to avoid them</li> <li>• freely available tools, resources, training and support to avoid or address poor research practices</li> </ul>

	<ul style="list-style-type: none"> <li>• Current thinking in animal welfare, working towards a ‘life worth living’ for laboratory animals, managing experimental variables and confounding factors</li> <li>• Critical, creative and challenging thinking</li> </ul> <p>8. Activities:</p> <ul style="list-style-type: none"> <li>• Awareness – participants will discuss what they would include if they were creating an Animal Research checklist</li> <li>• Understanding – participants will discuss published case studies of poor practice based upon real-life examples</li> <li>• Understanding – participants will discuss what the consequences of poor research practices are and for whom</li> <li>• Planning – participants will review a peer reviewed research paper using the ARRIVE guidelines to identify what information is missing and discuss the potential impact this has for reproducibility and interpretation of the results.</li> <li>• Application – participants will be given the opportunity to reflect upon an aspect of their research to identify potential opportunities for refinement, and/or any changes they could implement to improve research practices.</li> </ul>
<b>Learning outcomes</b>	<p>By the end of this workshop delegates will be able to:</p> <ul style="list-style-type: none"> <li>• recognise what responsible animal research means in the context of their own work, and why it is important for the quality, reproducibility and reliability of their research data.</li> <li>• plan their experiments with renewed confidence using a range of tools and resources that are available to support them to design and report their research well.</li> <li>• understand what good animal welfare means, and have increased awareness of how the 3Rs can be effectively implemented during the course of their own work</li> <li>• reflect upon the welfare of the animals used in their research, and their own research practices in order to think critically and creatively about what they can do differently</li> </ul>
<b>Pre-requisites/pre-work</b>	None
<b>Course provider</b>	Responsible Research in Practice
<b>Course Tutor</b>	Nikki Osborne
<b>Max no. of attendees</b>	30
<b>Room requirements</b>	Tables for groups of 5-6 people facing projector Need sufficient space for attendees to move around and discuss
<b>Equipment</b>	Projector with screen, computer or laptop and speakers for course tutor to

<b><i>requirements</i></b>	use to present information Flip charts or white boards with markers for group work
<b><i>Refreshments</i></b>	Hot and cold soft drinks for attendees plus biscuits or fruit for comfort breaks
<b><i>Specifications</i></b>	This workshop can be tailored to specific institutional, research funder(s), scientific Society or discipline specific requirements

**CONTROVERSIAL TOPICS IN BIOSCIENCE RESEARCH**

**Course description:** This half day (4 hour) workshop is intended for Bioscience researchers at any stage of their research career who wish to gain greater understanding of the cultural context for their research activities here in the UK, and wish to undertake public engagement activities with improved confidence. Participants will gain an understanding of common causes of controversy in relation to the range of societal views expressed here in the UK, and to understand the impact that controversy can have for science and Society as a whole. With this improved awareness participants will identify what can be done differently and begin to plan how they could minimise the risk that their own research will become controversial.

This course assumes participants will have a little knowledge of trends in public opinions and limited public engagement experience.

**In summary:**

<b>Course title</b>	Controversial Topics in Bioscience Research
<b>Who for</b>	Bioscience researchers at any stage of their research career who wish to gain greater understanding of the cultural context and range of public viewpoints regarding bioscience research here in the UK.
<b>Length</b>	4 hours including 2x15 minute comfort breaks.
<b>Format</b>	Interactive mix of presentations, individual and group activities, and discussions.
<b>Overall Purpose</b>	To give participants a theoretical understanding of the current Societal context for their research and practical insight into how and why research becomes controversial. Participants will consider how to plan their own research activities to minimise the risk of controversy and gain improved confidence to undertake public engagement activities.
<b>Key content</b>	<ol style="list-style-type: none"> <li>1. Theory: <ul style="list-style-type: none"> <li>• introduction to ‘culture’ - what culture is, how they contribute to it</li> <li>• overview of the current mix of ethical theories that influence the cultural context for bioscience research here in the UK</li> <li>• UK statistics on public attitudes to science and bioscience research</li> </ul> </li> <li>2. Activities: <ul style="list-style-type: none"> <li>• Awareness – group discussion of real life case studies to identify common causes of controversy</li> <li>• Understanding – groups will review examples of recent public engagement activities and research communication efforts to identify what could be done differently</li> </ul> </li> </ol>

	<ul style="list-style-type: none"> <li>• Planning &amp; Application – reflect upon how they can effectively communicate and engage the public with their own research.</li> </ul>
<b>Learning outcomes</b>	<p>By the end of this course delegates will understand, appreciate or know:</p> <ul style="list-style-type: none"> <li>• what factors can influence whether research becomes controversial;</li> <li>• the ‘cultural context’ for research undertaken in the UK;</li> <li>• case studies illustrating how public engagement and research communication can influence the ‘cultural context’ for research activities;</li> <li>• common factors that can contribute to controversy, and how to minimise these with respect to their own work</li> </ul>
<b>Pre-requisites/pre-work</b>	None
<b>Course provider</b>	Responsible Research in Practice
<b>Course Tutor</b>	Nikki Osborne
<b>Max no. of attendees</b>	30
<b>Room requirements</b>	Tables for groups of 5-6 people facing projector Need sufficient space for attendees to move around and discuss.
<b>Equipment requirements</b>	Projector with screen, computer or laptop and speakers for course tutor to use to present information Flip charts or white boards with markers for group work
<b>Refreshments</b>	Hot and cold soft drinks for attendees plus biscuits or fruit for comfort breaks
<b>Specifications</b>	This workshop can either: include examples broadly relevant to the organisation, OR be tailored to specific bioscience research topics, methods, models or techniques for example genome editing, animal research.

### ANIMAL RESEARCH REPORTING

**Course description:** This one day (7 hour) workshop is intended for researchers at any career stage who are actively planning and reporting animal studies. Participants will gain an improved understanding of how to plan and report animal studies in accordance with the key good practice biomedical and animal research reporting guidelines. We will discuss the benefits of reporting research well, the costs and consequences of inadequate reporting, and challenges faced when improving practices.

This course assumes participants will have a little knowledge of animal research planning and reporting practices.

**In summary:**

<b>Course title</b>	Animal Research Reporting
<b>Who for</b>	Bioscience researchers at any stage of their research career who are actively planning and reporting studies involving the use of live animals, animal derived material or animal-derived data.
<b>Length</b>	7 hours including a 1hr break for lunch and 2x15 minute comfort breaks.
<b>Format</b>	Interactive mix of presentations, individual and group activities, and discussions.
<b>Overall Purpose</b>	To give participants a better understanding of how to plan and report animal studies in accordance with good practice guidelines to improve the quality and reproducibility of published animal studies.
<b>Key content</b>	<p>3. Theory:</p> <ul style="list-style-type: none"> <li>• Why report research well – what are the benefits and for whom</li> <li>• What is good practice and what does it involve – an overview of key biomedical and animal research-specific reporting guidelines, checklists and tools</li> <li>• The costs and consequences of the inadequate reporting of animal studies</li> </ul> <p>4. Activities:</p> <ul style="list-style-type: none"> <li>• Awareness – we will assess the current awareness of reporting guidelines and understanding of the ARRIVE guidelines</li> <li>• Understanding – the ARRIVE guidelines will be used to assess a research paper, what is/is not reported, and how this impacts the results, conclusions, and study reproducibility</li> <li>• Planning &amp; application – individuals will be supported to identify how they could improve their own research and reporting, the challenges they might face, and discuss how to overcome them</li> </ul>



<b>Learning outcomes</b>	By the end of this course participants will understand, appreciate or know: <ul style="list-style-type: none"> <li>• The key good practice biomedical and animal research planning/reporting guidelines and what they entail in practice;</li> <li>• The benefits of reporting research well;</li> <li>• The consequences of inadequate reporting practices;</li> <li>• The challenges that improving their research planning and reporting could present and strategies to overcome them</li> </ul>
<b>Pre-requisites/pre-work</b>	None
<b>Course provider</b>	Responsible Research in Practice & Catalyst Editorial, Ltd
<b>Course Tutors</b>	Nikki Osborne and Jane Alfred
<b>Max no. of attendees</b>	30
<b>Room requirements</b>	Tables for groups of 5-6 people facing projector Need sufficient space for attendees to move around and discuss.
<b>Equipment requirements</b>	Projector with screen, computer or laptop and speakers for course tutor to use to present information Flip charts or white boards with markers for group work
<b>Refreshments</b>	Hot and cold soft drinks for attendees plus biscuits or fruit for comfort breaks
<b>Specifications</b>	This workshop can be tailored to individual establishment requirements. For example, the workshop could be specific to a field of biomedical research, or in terms of the level of detail provided for specific planning /reporting requirements.

**EXPERIMENTAL DESIGN AND POWER ANALYSIS FOR *IN-VIVO* SCIENTISTS**

**Course description:** This one day (8 hour) intensive workshop is intended for Bioscience researchers at any stage of their research career who wish to be able to design a robust experiment when working with animal models. Participants will gain the theoretical and practical knowledge necessary to design *in vivo* experiments that are robust and reproducible. A freeware tool that can calculate the statistical power for many designs and a design proforma which can guide researchers through the design process will also be introduced.

This course is for beginners and assumes no prior knowledge of experimental design for *in vivo* experiments.

**In summary:**

<b>Course title</b>	Experiments design and power analysis for <i>in-vivo</i> scientists
<b>Who for</b>	Bioscience researchers at any stage of their research career who are actively designing <i>in-vivo</i> experiments
<b>Length</b>	8 hours including a 30 minute lunch break and 2x15 minute coffee breaks.
<b>Format</b>	Interactive mix of presentations, group discussions, demonstrations, and paper exercises.
<b>Overall Purpose</b>	To give participants the theoretical and practical knowledge necessary to design experiments that are robust such that causality can be assigned and have sufficient sensitivity for the effect of interest.
<b>Key content</b>	<ul style="list-style-type: none"> <li>5. Theory: <ul style="list-style-type: none"> <li>a. Experimental design</li> <li>b. Statistical power</li> </ul> </li> <li>6. Activities: <ul style="list-style-type: none"> <li>a. Debate: causes of replicability crisis</li> <li>b. identify potential confounders</li> <li>c. Debate: type one versus type two errors which is worse</li> <li>d. Identify experimental unit</li> <li>e. Calculate statistical power</li> <li>f. Review an experimental design proforma</li> </ul> </li> <li>7. Demonstrate: <ul style="list-style-type: none"> <li>a. randomisation tools</li> <li>b. Russ Lenth power tool</li> </ul> </li> </ul>
<b>Learning outcomes</b>	By the end of this course participants will understand, appreciate or know:

	<ul style="list-style-type: none"> <li>the goal of an experiment is to assign causality and the main risks to an experiment arise from five areas: low power, poor control of type one errors, poor randomisation, low internal validity, low external validity, and low construct validity.</li> <li>the roles of various possible controls in experimental design.</li> <li>the risk of extrapolation and that breadth of an experiment is a balance between clarity and resources available.</li> <li>the difference between randomising and controlling and to appreciate that the experimenter will need to identify which factors are significant in affecting their experiment and decide whether to randomise or control these when planning the experiment.</li> <li>why we use randomisation and awareness of tools that can help randomise samples or animals.</li> <li>why experiments should be blind and gain an awareness of the strategies used to achieve this.</li> <li>the role of statistical tests in data analysis and to know the different possible outcomes of a statistical test (correct call/false positive/false negative).</li> <li>all statistical tests have assumptions and when these assumptions are not met the tests will not perform as expected.</li> <li>more complex experiment designs exist that can be more efficient when you are interested in the effect of multiple factors.</li> <li>there are research reporting standards</li> <li>the differences between a type 1 and type 2 error</li> <li>statistical power is a measure of sensitivity, and appreciate the factors that influence the statistical power of an experiment.</li> <li>why low power inflates both type 1 and 2 error rate.</li> <li>statistical power can be estimated for classic statistical tests and have practical skills in calculating power for a student's t-Test.</li> <li>to adjust the sample size estimation to account for sample attrition</li> <li>that there are alternative approaches, such as simulation, to estimate sample size when using non-standard analysis.</li> </ul>
<b>Pre-requisites/pre-work</b>	None
<b>Course provider</b>	Responsible Research in Practice
<b>Course Tutor</b>	Natasha Karp
<b>Max no. of attendees</b>	20
<b>Preferred room layout</b>	Tables for laptops facing projector Need sufficient space that attendees can move around and discuss in small groups.
<b>Equipment requirements</b>	Projector with screen, computer or laptop and speakers for course tutor to use to present information, and computers or capacity for a laptop for each attendee

	Flip chart or white board with markers
<b><i>Refreshments</i></b>	Hot and cold soft drinks for attendees plus biscuits or fruit for comfort breaks
<b><i>Specifications</i></b>	This workshop can be tailored to specific institutional requirements.