UCL Research Ethics Committee

Note to Applicants: It is important for you to include all relevant information about your research in this application form as your ethical approval will be based on this form. Therefore anything not included will not be part of any ethical approval.

You are advised to read the Guidance for Applicants when completing this form.

Application For Ethical Review: Low Risk

Are you applying for an urgent accelerated review? Yes ☐ No ☒ If yes, please state your reasons below. Note: Accelerated reviews are for exceptional circumstances only and need to be justified in detail.	
Is this application for a continuation of a research project that already has ethical approval? *For example, a preliminary/pilot study has been completed and is this an application for a follow-up project?*	Yes ☐ No ☒
If yes, provide brief details (see guidelines) including the title and ethics id number for the previous study: N/A	

Section A: Application details

1	**Title of Project**	**Chromatic Adaptation Experiments in Spheres**
2	**Proposed data collection start date**	20/11/2017
3	**Proposed data collection end date**	02/12/2017
4	**Project Ethics Identification Number**	9357/003
5	**Principal Investigator**	Daniel Garside
6	**Position held** (Staff/Student)	PhD Student
7	**Faculty/Department**	CEGE
8	**Course Title** *(if student)*	Research PhD
9	**Contact Details** Email: Telephone:	daniel.garside.14@ucl.ac.uk 07588452204
10	**Provide details of other Co-Investigators/Partners/Collaborators who will work on the project.** ***Note:*** *This includes those with access to the data such as transcribers.*	
Name: Kees Teunissen		Name: Lindsay MacDonald Position held: Honorary Professor

Position held: Senior Research Scientist (Industry Supervisor) Faculty/Department: N/A Location (UCL/overseas/other UK institution): Philips Lighting Research, Eindhoven, Netherlands Email: kees.teunissen@philips.com	Faculty/Department: CEGE Location (UCL/overseas/other UK institution): UCL Email: lindsay.macdonald@ucl.ac.uk
If you **do not know** the names of all collaborators, please write their roles in the research.	

11	**If the project is funded *(this includes non-monetary awards such as laboratory facilities)***
Name of Funder	EPSRC and Philips Research
Is the funding confirmed?	Yes – part of funded PhD

12	**Name of Sponsor**
The Sponsor is the organisation taking responsibility for the project, which will usually be UCL. If the Sponsor is not UCL, please state the name of the sponsor.	N/A

13	**If this is a student project**
Supervisor Name	Stuart Robson
Position held	Head of Dept.
Faculty/Department	CEGE
Contact details	s.robson@ucl.ac.uk

Section B: Project details

The following questions relate to the objectives, methods, methodology and location of the study. Please ensure that you answer each question in lay language.

14 Provide a *brief* (300 words max) background to the project, including its intended aims.

The aim of the PhD project is to improve our understanding of chromatic adaptation (the process whereby the sensitivity of human visual system changes in response to changes in the colour of ambient lighting), specifically with the aim of improving museum lighting, where extreme colours and low overall levels are required for conservation reasons.

Chromatic adaptation plays a role in providing stable perceptions of objects (objects don't change drastically in appearance when lighting changes), which is important for object understanding and recognition. It is understood that this ability is provided by a scaling, or calibration, of retinal cone cell outputs (the cells which provide our visual sensation at most luminances).

The incumbent theory states that retinal cone cells are self-calibrating due to bleaching (reaching a state of saturation). Our hypothesis is that another class of retinal cells, 'intrinsically photosensitive retinal ganglion cells' (ipRGCs), play a role by calibrating signals from the other retinal cells before they are passed on to the optic nerve. These cells seem to have the appropriate attributes to calibrate for slow changes in the colour of daylight.

Through a carefully designed experiment, where participants observe a set-up under different lighting conditions, designed to differentially affect the ipRGCs, and report their observations, we shall be able to gain an insight as to whether this is indeed the case. If we see performance which corresponds that which we would expect to see if ipRGCs were involved in the process, this will provide evidence in support of this theory.

If this proves to be the case, it would vastly add to our understanding of the human visual system, and have widespread implications in the related disciplines of lighting engineering and colour reproduction.

15 **Methodology & Methods** (tick all that apply)

☐ Interviews*	☐ Collection/use of sensor or locational data
☐ Focus groups*	☒ Controlled Trial
☐ Questionnaires (including oral questions)*	☐ Intervention study (including changing environments)
☐ Action Research	☐ Systematic review
☐ Observation	☐ Secondary data analysis – ***(See Section D)***
☐ Documentary analysis (including use of personal records)	☐ Advisory/consultation groups
☐ Audio/visual recordings (including photographs)	☒ Other, give details:
**Attach copies to application (see below).*	The proposed experiment falls into the category of 'psychophysical study, a common method is vision science. Definition: "Psychophysics quantitatively investigates the relationship between physical stimuli and the sensations and perceptions they produce."

16a **Provide – <u>in lay person's language</u> - an overview of the project;** focusing on your methodology and including information on what data/samples will be taken (including a description of the topics/questions to be asked), how data collection will occur and what (if relevant) participants will be asked to do. This should include a justification for the methods chosen. **(500 words max)**

This experiment aims to provide information about the eye and the brain through the presentation of visual stimuli on a computer screen, where the participant makes observations and reports these observations by moving two handheld sliders.

The experiment is a psychophysical study (psychophysics being the branch of psychology which deals with the relationship between physical stimuli and the sensations and perceptions they produce) of a type commonly used in studies of this type; that of 'achromatic setting'. In an experiment of this kind, an observer views a scene (referred to as an adapting stimulus) for an extended period (generally a broad flat field of colour provided by a computer screen or some sort of lighting booth) before setting the appearance of a second stimulus such that it appears achromatic (without colour: black, grey or white).

Using multiple different adapting stimuli, the relative effect of each adapting stimuli can be determined. It would be expected that the effect of an adapting stimulus would be to shift the observers perceived neutral point towards the colour of the adapting stimulus. For example, if an observer viewed a strongly blue adapting stimulus for a length of time, and then immediately modified the appearance of a second stimulus to appear

	grey to them, their chosen colours would normally be objectively blue-er than they would be under normal circumstances. In this case, the observer shall look into an illuminated sphere of roughly 70cm diameter, where the attributes of the adapting stimulus (the interior walls of the sphere) shall be determined by the lighting (provided through a hole on the top of the sphere), whilst using handheld sliders to control the colour of an LCD screen visible through a small hole on the far side of the sphere. The observer's task will be to modify the colour of the visible part of the screen until it appears achromatic. Upon pressing a button to confirm their satisfaction with the achromacy of the colour, a new random colour will be presented on the screen, and the observer will again be asked to adjust this new colour until it appears achromatic. This process will repeat 150 times per session (which should take observers between 30 minutes and 1 hour). Continuing the experiment for this length of time serves multiple purposes. Firstly, if there is a slow ramp up to a stable adaptation point (as is the case with rods which take roughly 40 minutes to fully adapt) then this shall be captured in the data. Secondly, if adaptation continued beyond an hour (as some have hypothesised it may) then an impression of this shall be captured by looking for an ongoing trend line across the time of the experiment. Finally, data collecting using a method such as this is generally very noisy. Taking 150 recordings for each session shall allow us to calculate reasonably accurate averages, and also to explore the influence of other factors on the introduction of this noise. There will exist two distinct experimental conditions. Whilst both should appear identical to observers, they will provide differing levels of ipRGC activation. This type of design is referred to as a 'silent substitution' design, and is possible through the use of carefully selected narrowband LEDs in combination for the illumination. Observers will repeat observations of the two conditions. Sessions will be held on successive days. Each observer will therefore be asked to complete 4 sessions of up to one hour in length, one per day. Additionally, they will be asked to attend an initial set-up session in order to set the illumination conditions such that they appear identical for each individual observer. A result which showed little distinction between the two conditions would provide evidence for the incumbent theory (that the cone cells are self-regulating), whereas a result that showed great distinction for these two visually identical conditions would provide evidence for the theory that non-cone cells, such as ipRGCs, are involved in the process of chromatic adaptation.
16b	**Attachments** If applicable, please attach a copy of any interview questions/workshop topic guides/questionnaires/test (such as psychometric), etc and state whether they are in final or draft form. N/A

17	**Please state which code of ethics (see Guidelines) will be adhered to for this research (for example, BERA, BPS, etc).**
BPS	

Location of Research	
18	**Please indicate where this research is taking place.**

	☒ UK only (Skip to 'location of fieldwork') ☐ Overseas only ☐ UK & overseas
19	**If the research includes work outside the UK, is ethical approval in the host country (local ethical approval) required?** ***(See Guidelines.)*** Yes ☐ No ☐ **If no,** please explain why local ethical approval is not necessary. **If yes,** provide details below including whether the ethical approval has been received. **Note:** Full UCL ethical approval will not be granted until local ethical approval (if required) has been evidenced.
20	**If you (or any members of your research team) are travelling overseas in person are there any concerns based on governmental travel advice (*www.fco.gov.uk*) for the region of travel?** Yes ☐ No ☐ **Note:** *Check www.fco.gov.uk and submit a travel insurance form to UCL Finance (see application guidelines for more details). This can be accessed here:* https://www.ucl.ac.uk/finance/secure/fin_acc/insurance.htm (You will need your UCL login details.)

21	**State the location(s) where the research will be conducted and data collected. For example public spaces, schools, private company, using online methods, postal mail or telephone communications.** UCL, Chadwick Building, Room B06
22	**Does the research location require any additional permissions (e.g. obtaining access to schools, hospitals, private property, non-disclosure agreements, access to biodiversity permits (CBD), etc.)?** Yes ☐ No ☒ **If yes,** please state the permissions required.
23	**Have the above approvals been obtained?** Yes ☐ No ☐ **If yes,** please attach a copy of the approval correspondence. **If not,** confirm they will be obtained prior to data collection. Yes ☐ No ☐

Section C: Details of Participants

In this form 'participants' means human participants and their data (including sensor/locational data, observational notes/images, tissue and blood samples, as well as DNA).

24	**Does the project involve the recruitment of participants?**
Yes ☒	Complete all parts of this Section.
No ☐	Move to Section D.

Participant Details	
25	Approximate maximum number of participants required: 10 Approximate upper age limit: 30 Lower age limit: 18 Justification for the age range and sample size: Age range: Above the age of 30 the spectral sensitivity of vision changes as a result of yellowing of the lens and other factors. It is a limit of the experimental design of silent substitution experiments such as this that sensitivity to wavelengths approaching 400nm is required, which is increasingly lacking as age increases. The use of participants from a narrow range of ages not only avoids this lack of sensitivity, but also allows for a reduced set-up time since the sensitivity of all observers will be similar. Sample size: Standard deviation in previous trials was roughly 6 delatE units, and the expected difference between treatment effects is expected to be roughly 10-15 deltaE units. With 3 observers, the requisite deltaE difference for a 95% confidence interval would be 11.4. With 5, it would be 8.9 and with 10 it would be 6.3. Following this logic, where the resulting deltaE values are only roughly known, using 10 observers seems a fair compromise between confidence and inconvenience.
Recruitment/Sampling	
26	Describe how potential participants will be recruited into the study. Considering that each observer will be required for one hour per day on multiple days, it seems efficient to recruit participants who would normally attend UCL on a regular basis for other reasons. For this reason, participants will be recruited from the group of peers (fellow PhD students), and staff members within the department of CEGE, and personal friends who would have reason to be in the proximity. Participants will be approached in person or via email with details of the study. Special note will be made that no person should feel under any obligation to take part.
Informed Consent	
27a	Describe the process you will use when seeking to obtain consent. Participants will be asked to sign a consent form, having read the information form. See attached consent form.
27b	**Attachments** Please list them below: Consent form Information sheet Risk Assessment
27c	If you are ***not*** intending to seek consent from participants, clarify why below: N/A

28	How will the results be disseminated (including communication of results with participants)? *Potentially:* • Conference presentation(s)

	• Journal publication(s) • Blog post(s) • Press article(s) In addition, anonymised data will be made publicly available through a system such as figshare. Participants will be provided, via email, with copies of the above, where copyright allows.

Section D: Accessing/Using Pre-collected Data

Access to data	
29	If you are using data or information held by third party, please explain how you will obtain this. You should confirm that the information has been obtained in accordance with the UK Data Protection Act 1998. N/A

Accessing pre-collected data	
30	**Does your study involve the use of previously collected data?** **No** ☒ Move to Section E. **Yes** ☐ Complete all parts of this Section. **Note:** If you ticked any boxes with an asterisk (*),ensure further details are provided in Section E: Ethical Issues.

31	**Name of dataset/s:**		
32	**Owner of dataset/s (if applicable):**		
33	**Is the data in the public domain?**	Yes ☐	No ☐
	If not, do you have the owner's permission/license?	Yes ☐	No* ☐
33	**Is the data anonymised?**	Yes ☐	No ☐
	If not:		
	i. Do you plan to anonymise the data?	Yes ☐	No* ☐
	ii. Do you plan to use individual level data?	Yes* ☐	No ☐
	iii. Will you be linking data to individuals?	Yes* ☐	No ☐
34	Is the data sensitive (DPA 1998 definition)?		Yes* ☐ No ☐
35	Will you be conducting analysis within the remit it was originally collected for?		Yes ☐ No* ☐
36	If not, was consent gained from participants for subsequent/future analysis?		Yes ☐ No* ☐

Section E: Ethical Issues

Ethical Issues

37 Please address clearly any ethical issues that may arise in the course of this research and how they will be addressed. Further information and advice can be found in the guidelines.

Participation (power relations)– the use of peers and friends may open the researchers to a situation where participants have a lesser ability to make decisions based on personal preference, such as where a participant may feel compelled to continue with an experiment where they might not wish to. This will be addressed by clearly stating (multiple times) that participants are free to withdraw at any point and that there is no disincentive, of any type, to doing so.

Withholding information (Mild deception) - The observers will not be informed that they are viewing different lighting conditions (reminder- each lighting condition will appear identical). This information will be withheld to avoid bias based on this information. Following the experiment this information will be revealed.

Risks & Benefits

38 Please state any *benefits* to participants in taking part in the study (this includes feedback, access to services or incentives),

Financial reward in the form of Amazon vouchers.

39 Do you intend to offer incentives or compensation, including access to free services)?

Yes ☒ No ☐

If yes, specify the amount to be paid and/or service to be offered **as well as a justification for this**.

£10 per session, in amazon vouchers. 5 sessions (4 viewing sessions + initial set-up) = £50.

If an observer chooses to withdraw partway through, they will be paid for each session completed or part-completed.

. Observers will be required to complete 5 sessions of up to 1 hour in length, at the same time on separate (ideally successive) days.

Whilst the experience of participating in similar experiments has previously been described as ‘meditative’, and ‘quite pleasant’, it is thought that simply the pleasure of taking part, or the goodwill of contributing to science, may not be enough to recruit participants in a timely fashion.

The level of reimbursement considered above is proposed as fair and appropriate considering the level of burden, with thought given to the additional burden of travel to the experimental location of 5 separate days, at specific times of day (each observer will need to do each session at the same time of day throughout their run of 5 sessions, and so this is likely to have an impact on the participants’ ability to schedule the rest of their week).

Providing financial recompense for time seems an appropriate method for recruiting participants in this case, particularly because of the lack of a time constraint in the experiment (participants can rush, or take their time, as they wish). Providing financial recompense should reduce the incentive for participants to rush as they might do had they volunteered their time freely. If a participant rushes a trial, it is likely that their data will be of less value than if they had not.

	The mechanism of Amazon vouchers has been chosen to avoid the need to handle cash. Payment will be made in a timely fashion via email following completion of all sessions, or withdrawal from participation. In summary, whilst ideally observers would freely offer their time and commitment to this experiment, a financial incentive is deemed appropriate considering the burden placed on observers. This will enable the recruitment of participants in a timely fashion, and encourage the participants to deliver a higher quality of data than might be possible otherwise.
40	Please state any *risks* to participants and how these risks will be managed. Light levels will be carefully monitored to ensure that they are safe in terms of spectral characteristics and absolute level.
41	Please state any *risks* to you or your research team and how these risks will be managed. The researcher will be working in a darkened room, and so any trip hazards will be minimised.

Section F: Data Storage & Security

Please ensure that you answer each question and include all hard and electronic data.

42	**Will the research involve the collection and/or use of personal data?** Yes ☒ No ☐ ***Personal data*** *is data which relates to a living individual who can be identified from that data OR from the data and other information that is either currently held, or will be held by the data controller (the researcher).* *This includes:* – *any expression of opinion about the individual and any intentions of the data controller or any other person toward the individual.* – *sensor, location or visual data which may reveal information that enables the identification of a face, address, etc (some postcodes cover only one property).* – *combinations of data which may reveal identifiable data, such as names, email/postal addresses, date of birth, ethnicity, descriptions of health diagnosis or conditions, computer IP address (if relating to a device with a single user).* If you do not have a registration number from Legal Services, please clarify why not:
43	**Is the research collecting or using** – sensitive personal data as defined by the UK Data Protection Act (racial or ethnic origin / political opinions / religious beliefs / trade union membership / physical or mental health / sexual life / commission of offences or alleged offences), and/or – data which might be considered sensitive in some countries, cultures or contexts. **If yes,** state whether explicit consent will be sought for its use and what data management measures are in place to adequate manage and protect the data. No

44	**All research projects using personal data must be registered with Legal Services before the data is collected, please provide the Data Protection Registration Number:**

	Z6364106/2017/11/45

During the project *(including the write up and dissemination period)*	
45	**State what types of data will be generated from this project** (i.e. transcripts, videos, photos, audio tapes, field notes, etc). Text and matlab files of chosen colour values. Digital files with name, age and sex of participants. **How will data be stored, including where and for how long?** This includes all hard copy and electronic data on laptops, share drives, usb/mobile devices. This data will be held until the end of the PhD project (~Nov 2018). Additionally, data will be released as open access data on a website such as figshare. Such data will be anonymised. **Who will have access to the data, including advisory groups and during transcription?** Initially, access will be limited to the researcher and their supervisors. Once processing is complete, anonymous data will be released as open access data as above.
46	**Do you confirm that all personal data will be stored and processed in compliance with the Data Protection Act 1998 (DPA 1998).** Yes ☒ No ☐ **If not,** please clarify why.
47	**Will personal data be processed or be sent outside of the European Economic Area (EEA)?*** Yes ☐ No ☒ **If yes,** please confirm that there are adequate levels of protection in compliance with the DPA 1998 and state what the arrangements are below. ***Please note** that if you store your research data containing identifiable data on UCL systems or equipment (including by using your UCL email account to transfer data), or otherwise carry out work on your research in the UK, the processing will take place within the EEA and will be captured by Data Protection legislation.

After the project	
48	**What data will be stored and how will you keep it secure?** Name, age and sex of participants, and achromatic co-ordinates. **Where will the data be stored and who will have access?** The data will be stored on a password protected laptop, in a locked cupboard, behind a code-locked door, behind a key-card access door. Where appropriate this data will be transferred to others working on the project. **Will the data be securely deleted?** Yes ☒ No ☐ **If yes,** please state when this will occur: At the end of the PhD project (~Nov 2018)

49	**Will the data be archived for use by other researchers?** Yes ☒ No ☐ **If yes,** please provide further details including whether researchers outside the European Economic Area will be given access. Anonymised data will be made openly available using an online repository such as figshare. Access will not be geographically limited.

Section G: Declaration **I confirm that the information in this form is accurate to the best of my knowledge.**	
Signature	
Date	02/11/2017
If student: **I have met with and advised the student on the ethical aspects of this project design.** Supervisor Name: Stuart Robson	
Supervisor Signature:	
Date:	02/11/2017

Signature of Head of Department (or Chair of the Departmental Ethics Committee)

Part A

I have read the 'criteria of minimal risk' as defined on page 3 of the Guidelines (http://ethics.grad.ucl.ac.uk/forms/guidelines.pdf) and I recommend that this application be considered by the Chair of the UCL REC.

Yes ☒ No ☐

Part B

I have discussed this project with the principal researcher who is suitably qualified to carry out this research and I approve it. I am satisfied that (highlight as appropriate):**

1. **Data Protection registration:**
   - has been satisfactorily completed
2. **A risk assessment:**
   - has been satisfactorily completed

3. Appropriate insurance arrangements are in place and appropriate sponsorship [funding] has been approved and is in place to complete the study.

Yes ☒ No ☐

4. A Disclosure and Barring Service check(s):

- ~~has been satisfactorily completed~~
- ~~has been initiated~~
- is not required

Note: Links to details of UCL's policies on the above can be found at: http://ethics.grad.ucl.ac.uk/procedures.php

****If any of the above checks are not required please clarify why below.**

Name:	Nicola Christie
Signature:	
Date:	14.11.2017

Updated 19.10.2017

Information Sheet

You will be given a copy of this information sheet.

Title of Project: Chromatic Adaptation Experiments in Spheres

This study has been approved by the UCL Research Ethics Committee (Project ID Number): 9357/002

Name	Daniel Garside
Work Address	Chadwick Building, UCL
Contact Details	daniel.garside.14@ucl.ac.uk

We would like to invite you to participate in this research project.

Details of Study:

Whilst in a dark room you will look into an illuminated sphere, and use handheld sliders to vary the colour of a small circle inside the sphere until you are happy that this patch is a neutral colour (black/grey/white). Upon pressing a button to confirm such, a new colour will be presented, and the process shall start anew. This will continue for sessions of one hour.

This research will increase our understanding of how the visual system adapts to different lighting. Participants will be recruited from colleagues and friends within UCL. Participation consists initially of five sessions of less than 1 hour in length.

You are free to withdraw from participation at any point.

Flickering lights will be used in the set-up, if this presents a risk to your health please alert the experimenter immediately. There are no other risks associated with this experiment further than exposure to light of a similar nature to that of a standard computer monitor.

Participants will be provided with any publications resulting from this research, where copyright allows.

Data will be published online in an anonymous form (*without* name, age, sex). All data will be collected and stored in accordance with the Data Protection Act 1998.

It is up to you to decide whether to take part or not; choosing not to take part will not disadvantage you in any way. If you do decide to take part you are still free to withdraw at any time and without giving a reason.

At the end of the five sessions, you will receive £50 in amazon vouchers. If you withdraw before completing 5 sessions, you will be reimbursed £10 per session completed or part completed.

Please discuss the information above with others if you wish or ask us if there is anything that is not clear or if you would like more information.

Informed Consent Form

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Project: Chromatic Adaptation Experiments in Spheres

This study has been approved by the UCL Research Ethics Committee (Project ID Number): 9357/002

If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you to decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

Participant's Statement

I _____

- have read the notes written above and the Information Sheet, and understand what the study involves.
- understand that if I decide at any time that I no longer wish to take part in this project, I can notify the researchers involved and withdraw immediately.
- consent to the processing of my personal information for the purposes of this research study.
- understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.
- agree that the research project named above has been explained to me to my satisfaction and I agree to take part in this study.
- agree that my data, after it has been fully anonymised, can be shared with other researchers
- agree to be contacted in the future by UCL researchers who would like to invite me to participate in follow-up studies.

Signed: Date:

APPENDIX III	RESEARCH INVOLVING NON-IONISING RADIATION

Complete this section if the study involves the use of non-ionising radiation (this does NOT include the use of MRI scanners).

1	If you are intending to use non-ionising radiation, i.e. lasers, microwave, ultra-violet or other type of electro-magnetic energy, please provide details of exposure and how any associated risks will be minimised:

Light safety has been assessed through the use of the implementation of 'Ophthalmic instruments - Fundamental requirements and test methods - Part 2: Light hazard protection (BS EN ISO 15004-2:2007)' written by Manuel Spitschan and available at https://github.com/spitschan/SilentSubstitutionToolbox/tree/master/LightSafety, to make computations on data collected with a Photo Research PR650 of the interior of the sphere on with the illumination on full power.

* ISO MPE Analysis
  * Light is UNDER ISO 2007 MPE Type 1 continuous limits
  * Type 1 continuous corneal irradiance UV weighted (5.4.1.1)
    * Value: 0.000, limit 0.400 (uWatts/cm2)
  * Type 1 continuous corneal irradiance UV unweighted (5.4.1.2)
    * Value: 0.016, limit 1000.000 (uWatts/cm2)
  * Type 1 continuous aphakic retinal illuminance weighted (5.4.1.3.a)
    * Value: 0.296, limit 220.000 (uWatts/cm2)
  * Type 1 continuous aphakic radiance weighted (5.4.1.3.b)
    * Value: 2.223, limit 2000.000 (uWatts/[sr-cm2])
  * Type 1 continuous corneal irradiance IR unweighted (5.4.1.3.b)
    * Value: 0.001, limit 20000.000 (uWatts/[sr-cm2])
  * Type 1 continuous thermal retinal illuminance weighted (5.4.1.3.a)
    * Value: 0.740, limit 700000.000 (uWatts/cm2)
  * Type 1 continuous thermal radiance weighted (5.4.1.3.b)
    * Value: 5.560, limit 5880000.000 (uWatts/[sr-cm2])
  * Assumed duration seconds 7200.0, hours 2.0

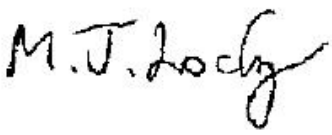
2	Declaration

Declaration by Departmental Non-Ionising Radiation Protection Supervisor (DNIRPS) for the department effecting the exposures.

I am satisfied that the type and degree of radiation exposure are appropriate for the research being undertaken, and that appropriate procedures are in place to minimize any associated risk.
A written risk assessment has been performed which concludes that risks to critical groups are acceptable.

Name of DNIRPS: Dr Mike Lockyer UCL Laser Protection Officer

Signature:



Date: 31.10.17

	Contact Tel: 02031088604 Email: m.lockyer@ucl.ac.uk

RISK ASSESSMENT FORM
FIELD / LOCATION WORK

The Approved Code of Practice - Management of Fieldwork should be referred to when completing this form
http://www.ucl.ac.uk/estates/safetynet/guidance/fieldwork/acop.pdf

DEPARTMENT/SECTION CEGE
LOCATION(S) B06, CHADWICK BUILDING
PERSONS COVERED BY THE RISK ASSESSMENT DANIEL GARSIDE

BRIEF DESCRIPTION OF FIELDWORK A participant will, in a dark room, look into an illuminated sphere, and use handheld sliders to vary the colour of a small circle inside the sphere until the participant is happy that this patch is a neutral colour (black/grey/white). Upon pressing a button to confirm such, a new colour will be presented, and the process shall start anew. This will continue for sessions of one hour.

Consider, in turn, each hazard (white on black). If **NO** hazard exists select **NO** and move to next hazard section.
If a hazard does exist select **YES** and assess the risks that could arise from that hazard in the risk assessment box.
Where risks are identified that are not adequately controlled they must be brought to the attention of your Departmental Management who should put temporary control measures in place or stop the work. Detail such risks in the final section.

ENVIRONMENT	**The environment always represents a safety hazard. Use space below to identify and assess any risks associated with this hazard**
e.g. location, climate, terrain, neighbourhood, in outside organizations, pollution, animals.	Examples of risk: adverse weather, illness, hypothermia, assault, getting lost. Is the risk high / medium / low ? Basement room B06 It will be dark, caution will be taken not to trip

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
☐	work abroad incorporates Foreign Office advice
☐	participants have been trained and given all necessary information
☐	only accredited centres are used for rural field work
☐	participants will wear appropriate clothing and footwear for the specified environment
☐	trained leaders accompany the trip
☐	refuge is available
☐	work in outside organisations is subject to their having satisfactory H&S procedures in place
☒	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

People not familiar with the room layout will be seated before lighting is turned off

EMERGENCIES	**Where emergencies may arise use space below to identify and assess any risks**
e.g. fire, accidents	Examples of risk: loss of property, loss of life

In case of fire or accident we should be able to quickly exit the environment in the same manor as a normal staff member would.

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
☐	participants have registered with LOCATE at http://www.fco.gov.uk/en/travel-and-living-abroad/
☐	fire fighting equipment is carried on the trip and participants know how to use it
☐	contact numbers for emergency services are known to all participants
☐	participants have means of contacting emergency services
☐	participants have been trained and given all necessary information
☐	a plan for rescue has been formulated, all parties understand the procedure
☐	the plan for rescue /emergency has a reciprocal element
☒	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

Participants will be made aware of the fire escape route.

EQUIPMENT	**Is equipment used?**	**Yes**	**If 'No' move to next hazard** **If 'Yes' use space below to identify and assess any risks**
e.g. clothing, outboard motors.	Examples of risk: inappropriate, failure, insufficient training to use or repair, injury. Is the risk high / medium / low ?		

The risks associated with the equipment to be used might be electrical or optical. Electrically, all items are low voltage and should not come anywhere near a participant. Optically, tests have been carried out before experiments take place to confirm that light levels are below the limits specified in 'Ophthalmic instruments - Fundamental requirements and test methods - Part 2: Light hazard protection (BS EN ISO 15004-2:2007)'

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
☐	the departmental written Arrangement for equipment is followed
☒	participants have been provided with any necessary equipment appropriate for the work
☒	all equipment has been inspected, before issue, by a competent person
☐	all users have been advised of correct use
☒	special equipment is only issued to persons trained in its use by a competent person
☐	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

LONE WORKING	**Is lone working a possibility?**	**No**	**If 'No' move to next hazard** **If 'Yes' use space below to identify and assess any risks**
e.g. alone or in isolation lone interviews.	Examples of risk: difficult to summon help. Is the risk high / medium / low?		

Low

CONTROL MEASURES	**Indicate which procedures are in place to control the identified risk**
☐	the departmental written Arrangement for lone/out of hours working for field work is followed
☐	lone or isolated working is not allowed
☐	location, route and expected time of return of lone workers is logged daily before work commences
☐	all workers have the means of raising an alarm in the event of an emergency, e.g. phone, flare, whistle
☐	all workers are fully familiar with emergency procedures
☒	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

There will be 2 people present or in close contact during all sessions.

FIELDWORK	**2**	May 2010

ILL HEALTH	The possibility of ill health always represents a safety hazard. Use space below to identify and assess any risks associated with this Hazard.
e.g. accident, illness, personal attack, special personal considerations or vulnerabilities.	Examples of risk: injury, asthma, allergies. Is the risk high / medium / low? Low

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
☐	an appropriate number of trained first-aiders and first aid kits are present on the field trip
☐	all participants have had the necessary inoculations/ carry appropriate prophylactics
☐	participants have been advised of the physical demands of the trip and are deemed to be physically suited
☐	participants have been adequate advice on harmful plants, animals and substances they may encounter
☐	participants who require medication have advised the leader of this and carry sufficient medication for their needs
☒	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

Should ill health occur, experiments can be stopped immediately.

TRANSPORT	Will transport be required	NO		Move to next hazard
		YES		Use space below to identify and assess any risks
e.g. hired vehicles	Examples of risk: accidents arising from lack of maintenance, suitability or training Is the risk high / medium / low? Above: NO			

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
☐	only public transport will be used
☐	the vehicle will be hired from a reputable supplier
☐	transport must be properly maintained in compliance with relevant national regulations
☐	drivers comply with UCL Policy on Drivers http://www.ucl.ac.uk/hr/docs/college_drivers.php
☐	drivers have been trained and hold the appropriate licence
☐	there will be more than one driver to prevent driver/operator fatigue, and there will be adequate rest periods
☐	sufficient spare parts carried to meet foreseeable emergencies
☐	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

DEALING WITH THE PUBLIC	Will people be dealing with public	No	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks
e.g. interviews, observing	Examples of risk: personal attack, causing offence, being misinterpreted. Is the risk high / medium / low?		

CONTROL MEASURES	Indicate which procedures are in place to control the identified risk
☐	all participants are trained in interviewing techniques
☐	interviews are contracted out to a third party
☐	advice and support from local groups has been sought
☐	participants do not wear clothes that might cause offence or attract unwanted attention
☐	interviews are conducted at neutral locations or where neither party could be at risk
☐	OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

WORKING ON OR NEAR WATER	Will people work on or near water?	No	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks

e.g. rivers, marshland, sea.

Examples of risk: drowning, malaria, hepatitis A, parasites. Is the risk high / medium / low?

CONTROL MEASURES **Indicate which procedures are in place to control the identified risk**

- ☐ lone working on or near water will not be allowed
- ☐ coastguard information is understood; all work takes place outside those times when tides could prove a threat
- ☐ all participants are competent swimmers
- ☐ participants always wear adequate protective equipment, e.g. buoyancy aids, wellingtons
- ☐ boat is operated by a competent person
- ☐ all boats are equipped with an alternative means of propulsion e.g. oars
- ☐ participants have received any appropriate inoculations
- ☐ OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

MANUAL HANDLING (MH)	Do MH activities take place?	No	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks

e.g. lifting, carrying, moving large or heavy equipment, physical unsuitability for the task.

Examples of risk: strain, cuts, broken bones. Is the risk high / medium / low?

CONTROL MEASURES **Indicate which procedures are in place to control the identified risk**

- ☐ the departmental written Arrangement for MH is followed
- ☐ the supervisor has attended a MH risk assessment course
- ☐ all tasks are within reasonable limits, persons physically unsuited to the MH task are prohibited from such activities
- ☐ all persons performing MH tasks are adequately trained
- ☐ equipment components will be assembled on site
- ☐ any MH task outside the competence of staff will be done by contractors
- ☐ OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

SUBSTANCES	Will participants work with substances	No	If 'No' move to next hazard If 'Yes' use space below to identify and assess any risks
e.g. plants, chemical, biohazard, waste	Examples of risk: ill health - poisoning, infection, illness, burns, cuts. Is the risk high / medium / low?		

CONTROL MEASURES **Indicate which procedures are in place to control the identified risk**

- ☐ the departmental written Arrangements for dealing with hazardous substances and waste are followed
- ☐ all participants are given information, training and protective equipment for hazardous substances they may encounter
- ☐ participants who have allergies have advised the leader of this and carry sufficient medication for their needs
- ☐ waste is disposed of in a responsible manner
- ☐ suitable containers are provided for hazardous waste
- ☐ OTHER CONTROL MEASURES: please specify any other control measures you have implemented:

OTHER HAZARDS	Have you identified any other hazards?	No	If 'No' move to next section If 'Yes' use space below to identify and assess any risks
i.e. any other hazards must be noted and assessed here.	Hazard: Risk: is the risk		

CONTROL MEASURES **Give details of control measures in place to control the identified risks**

Have you identified any risks that are not adequately controlled?		
	NO ☒	Move to Declaration
	YES ☐	Use space below to identify the risk and what action was taken

Is this project subject to the UCL requirements on the ethics of Non-NHS Human Research? Yes

If yes, please state your Project ID Number **9357/003**

For more information, please refer to: http://ethics.grad.ucl.ac.uk/

DECLARATION The work will be reassessed whenever there is a significant change and at least annually. Those participating in the work have read the assessment.

Select the appropriate statement:

- ☒ I the undersigned have assessed the activity and associated risks and declare that there is no significant residual risk
- ☒ I the undersigned have assessed the activity and associated risks and declare that the risk will be controlled by the method(s) listed above

NAME OF SUPERVISOR Stuart Robson

SIGNATURE OF SUPERVISOR  DATE 02/11/2017