# *ETHICS REVIEW APPLICATION FORM FOR*

# *SUPERVISED AND SPONSORED RESEARCHERS*

(For use by graduate students, post-docs, residents, external investigators, and visiting professors/researchers)

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| **SECTION A – GENERAL INFORMATION** |

1. **TITLE OF RESEARCH PROJECT**

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| --- |
| Provide the title for your proposed project |

**2. INVESTIGATOR INFORMATION**

**Investigator:**

|  |  |
| --- | --- |
| Title: | Name:  |
| Department (or organization if not affiliated with U of T):  |
| Mailing address:  |
| Phone:  | Institutional e-mail:  |

**Level of Project:**

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| --- |
| Student Research: Doctoral ☐ Masters ☐  |
| Post-Doctoral Research ☐ Visiting professor/External researcher ☐ Course Based ☐  |
| CBR/CBPR Other ☐ (specify:) |

**Supervisor/Sponsor (must be a UofT faculty member with research privileges):**

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| --- | --- |
| Title: | Name:  |
| Department |
| Mailing address:        |
| Phone:        | Institutional e-mail:  |

**Co-Investigators:**

Are co-investigators involved? Yes ☒ No ☐

|  |  |
| --- | --- |
| Title: | Name: |
| Department (or organization if not affiliated with U of T):  |
| Mailing address:  |
| Phone:  | Institutional e-mail:  |

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| Title: | Name:  |
| Department (or organization if not affiliated with U of T):  |
| Mailing address:  |
| Phone: | Institutional e-mail:  |

 ***Please append additional pages with co-investigators’ names if necessary.***

1. **UNIVERSITY OF TORONTO RESEARCH ETHICS BOARD:**

Social Sciences, Humanities and Education ☒ Health Sciences ☐ HIV/AIDS ☐

To determine which Research Ethics Board (REB) your application should be submitted, please consult: <http://www.research.utoronto.ca/about/boards-and-committees/research-ethics-boards-reb/>

1. **LOCATION(S) WHERE THE RESEARCH WILL BE CONDUCTED:**

(a) If the research is to be conducted at a site requiring administrative approval/consent (e.g., in a school), please include all administrative consent letters. It is the responsibility of the researcher to determine what other means of approval are required, and to obtain approval prior to starting the project.

University of Toronto ☒

Hospital ☐ specify site(s)

School board or community agency ☐ specify site(s)

Community within the GTA ☐ specify site(s)

International ☐ specify site(s)

Other ☐ specify site(s)

(b) For all off-campus research, whether in the local community or internationally, the researcher should consult with the [Framework on Off-Campus Safety](http://www.cie.utoronto.ca/safety-abroad/Framework-on-Off-Campus-Safety.aspx), [Guidelines on Off-Campus Safety](http://www.cie.utoronto.ca/safety-abroad/Off-Campus-Safety-Guidelines.aspx), and [Guidelines on Safety in Field for institutional requirements](http://www.ehs.utoronto.ca/Assets/ehs%2BDigital%2BAssets/Guidelines%2Bon%2BSafety%2Bin%2BField%2BResearch.pdf).

(c) **The University of Toronto has an agreement with the Toronto Academic Health Sciences Network (TAHSN) hospitals regarding ethics review of hospital-based research where the University plays a peripheral role. Based on this agreement, certain hospital-based research may not require ethics review at the University of Toronto. If your research is based at a TAHSN hospital, please consult the following document to determine whether or not your research requires review at the University of Toronto.** <http://www.research.utoronto.ca/faculty-and-staff/research-ethics-and-protections/humans-in-research/> - “Administrative review” heading toward the bottom of the page.

**5. OTHER RESEARCH ETHICS BOARD APPROVAL(S)**

(a) Does the research involve another institution or site? Yes ☐ No ☒

(b) Has any other REB approved this project? Yes ☐ No ☒

If **Yes**, please provide a copy of the approval letter upon submission of this application.

If **No**, will any other REB be asked for approval?

Yes ☐       (please specify which REB) No ☒

**6. FUNDING OF THIS PROJECT**

(a)

|  |  |  |
| --- | --- | --- |
| Funding Status | Source and Type | Details |
| Funded ☐ | Agency:       | Fund #: 4      (6 digits)  |
| Agency:       | Fund # :4      (6 digits) |
| Applied for funding ☐ | Agency:       | Submission date:        |
| Agency:       | Submission date:       |
| Unfunded ☐If unfunded, please explain why no funding is needed:  |

**7. CONTRACTS AND AGREEMENTS**

(a) Is this research to be carried out as a contract or under a research agreement?Yes ☐ No ☐

If yes, is there a University of Toronto funding or non-funded agreement associated with the research? Yes ☐ No ☐

If **Yes,** please append a copy of the agreement with of this application.

Is there any aspect of the contract that could put any member of the research team in a potential conflict of interest? Yes ☐ No ☐

 If yes, please elaborate under #10.

(b) Is this a Division 5, Health Canada regulated clinical trial that involves drugs, devices or natural health products?

Yes ☐ No ☒ (if so, the application must be reviewed by the full board)

**8. PROJECT START AND END DATES**

Estimated start date for the component of this project that involves human participants or data:

Estimated completion date of involvement of human participants or data for this project:

**9. SCHOLARLY REVIEW:**

1. Please check one:

1. ☐ The research has undergone scholarly review by thesis committee, departmental review committee, peer review committee or some other equivalent (Specify review type – e.g., departmental research committee, supervisor, CIHR, SSHRC, OHTN, etc.):
2. ☐ The research will undergo scholarly review prior to funding

(Specify review committee – e.g., departmental research committee, SSHRC, CIHR peer-review committee, etc.):

1. ☐ The research will not undergo scholarly review (Please note that all research greater than minimal risk requires scholarly review)
2. If box I or II above was checked, please specify if:

☐ The review was/will be specific to this application

☐ The review was/will be part of a larger grant

The review will be performed by Departmental Research Committee

**10. CONFLICTS OF INTEREST**

(a) Will the researcher(s), members of the research team, and/or their partners or immediate family members:

 (i) Receive any personal benefits (e.g., financial benefit such as remuneration, intellectual property rights, rights of employment, consultancies, board membership, share ownership, stock options, etc.) as a result of or in connection with this study? Yes ☐ No ☐

 (ii) If **Yes**, please provide further details and discuss how any real, potential or perceived conflicts of interest will be managed during the project. (Do not include conference and travel expense coverage, or other benefits which are considered standard for the conduct of research.)

(b) Describe any restrictions regarding access to or disclosure of information (during or at the end of the study) that have been placed on the investigator(s). These restrictions include controls placed by the sponsor, funding body, advisory or steering committee.

(c) Where relevant, please explain any pre-existing relationship between the researcher(s) and the researched (e.g., instructor-student; manager-employee; clinician-patient; minister-congregant). Please pay special attention to relationships in which there may be a power differential – actual or perceived.

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| **SECTION B – SUMMARY OF THE PROPOSED RESEARCH** |

**11. RATIONALE**

Describe the purpose and scholarly rationale for the proposed project. State the hypotheses/research questions to be examined. The rationale for doing the study must be clear. Please include references in this section.

Provide a rationale for your proposed projects

**12. METHODS**

(a) Please describe all formal and informal procedures to be used. Describe the data to be collected, where and how they will be obtained and how they will be analyzed.

The subject will be asked to lie on a long narrow table for up to two hours while the MRI system gathers information. During this time, she/he will be exposed to a magnetic field and radiofrequency. She/he will hear repetitive tapping noises and will be required to wear earplugs or earphones to reduce the noise.

The subject may be asked to either passively attend to or actively respond in one or more of the following experimental conditions:

Include a list of experimental conditions

Include only if you wish to use eyetracking in the future:

We may want to monitor subjects’ eye fixation/movement during the experiment. The eye tracker uses a small video camera to record an image of the eyes and reports to the experimenter a continuous stream of numbers that indicates eye position. To make the eye visible to the camera in the dark, a small infrared light is used to illuminate the eye. Infrared is invisible to human eyes, so the subject will not see the light. The power of this light is a tenth below the safety standard for chronic exposure for human eyes. However, because infrared light can increase the evaporation rate of tears, it may result in a dryness sensation (the same dryness sensation when you first move to a place with a dry climate). Blinking will eliminate the dryness sensation. Alternatively, the subject may need to use eye drops.

Describe additional behavioral data that may be collected.

Our scans are not clinical and are not intended for diagnostic or therapeutic purposes. There is a possibility, however, that the MRI technologist could observe suspicious abnormalities (e.g. cyst, tumour, and tissue damage caused by a stroke) in the structural scans. In this case, the MRI images will be sent to a neuroradiologist for blind review. In the event the neuroradiologist detects an abnormality, the Center staff will contact the participants.

(b) Attach a copy of all questionnaires, interview guides and/or any other instruments.

(c) Include a **list of appendices** here for all additional materials submitted (e.g., Appendix A – Informed Consent; Appendix B – Interview Guide, etc.):

Appendix A – Informed Consent

Appendix B – Screening Form

Appendix C - Provide your own recruitment flyer and additional materials if needed

Appendix D - Toronto Neuroimaging Facility Protocol

**13. PARTICIPANTS, DATA AND/OR BIOLOGICAL MATERIALS**

(a) Describe the participants to be recruited list the eligibility criteria, and indicate the estimated sample size (i.e. min-max # of participants). Where applicable, please also provide a rationale for your choice in sample size and/or sample size calculation.

Participant will be subjected to MR screening conditions, as defined in the MRI screening form (Appendix B) and Toronto Neuroimaging Facility Protocol (Appendix D). Critically, participants will not have any metal implant or metal object in his or her body and should not be pregnant.

Provide information about your population:

E.G.: Any healthy adult person (over 19 years old) with no history of neurological or psychiatric disease can participate in this project.

OR

Participants will be restricted to right-handed individuals and participants under 35 years of age because handedness and aging have well-established impacts on brain organization.

Include information about your planned annual sample size

(b) Where the research involves extraction or collection of personally identifiable information, please describe the purpose, from whom the information will be obtained, what it will include, and how permission to access the data is being sought. (Strategies for recruitment are to be described in section #15.)

Personal information as assessed by the MRI safety screening form will be stored in locked file cabinets with access limited to the principal investigator, co-investigators and their direct staff. Access to the identifying information records will be limited to the scientific research personnel, including the senior staff members and their direct employees. All research personnel have been or will be instructed in participant confidentiality.

Include additional details if needed.

(c) Is there any group or individual-level vulnerability related to the research that needs to be mitigated (for example, difficulties understanding informed consent, history of exploitation by researchers, power differential between the researcher and the potential participant)? If so, please provide further details below.

(d) If your research involves the collection and/or use of biological materials (e.g. blood, saliva, urine, teeth, etc.), please provide details below. Be sure to indicate how the samples will be collected and by whom.

**14. EXPERIENCE OF INVESTIGATORS WITH THIS TYPE OF RESEARCH**

(a) Please provide a brief description of previous experience by (i) the principal investigator/supervisor or sponsor, (ii) the research team and (iii) the people who will have direct contact with the participants. If there has not been previous experience with this type of research, please describe how the principal investigator/research team will be prepared.

Include details about PI’s and research team’s experience with MRI research.

If inexperienced personnel will be involved in the research (e.g. new graduate students) include this text:

For those individuals who have not had previous experience (e.g. graduate students or research assistants) training will be provided by the principal investigator and/or experienced researchers and personnel. This will involve going through the relevant testing procedures, initial assistance in participant recruitment, and sitting in on neuroimaging sessions until the inexperienced research team member is sufficiently confident and skilled to conduct data acquisition sessions.

**15. RECRUITMENT OF PARTICIPANTS**

Where there is recruitment, please describe how, by whom, and from where the participants will be recruited. Where participant observation is to be used, please explain the form of insertion of the researcher into the research setting (e.g., living in a community, visiting on a bi-weekly basis, attending organized functions). If relevant, describe any translation of recruitment materials, how this will occur and whether or not those people responsible for recruitment will speak the language of the participants.

Example Text:

Potential participants will be recruited either in answer to the enclosed flyer (Appendix C), or through the student research pools. Recruitment flyers will be posted around the University of Toronto St. George Campus on public bulletin boards. We will be recruiting healthy adults from the UofT community

**Attach a copy of all posters, advertisements, flyers, letters, e-mail text, or telephone scripts to be used for recruitment as appendices.**

**16. COMPENSATION

Please see U of T’s** [**Compensation and Reimbursement Guidelines**](http://www.research.utoronto.ca/wp-content/uploads/2010/01/Guidelines-for-Compensation-and-Reimbursement-of-Research-Participants-Approved-Feb-16-11.pdf)**.**

(a) Will participants receive compensation for participation?

 FinancialYes ☒ No ☐

 In-kind Yes ☐ No ☒

 Other Yes ☒ No ☐

(b) If **Yes**, please provide details and justification for the amount or the value of the compensation offered.

Example text:

Participants will receive $20 per hour for their participation. This is a standard compensation for participation in fMRI studies.

Some of the participants will be laboratory personnel who volunteer (i.e., they are not required) to participate in the proposed sequence testing experiments. Lab personnel will be instructed that their participation is entirely voluntarily. Some lab members will choose to serve as participant to test the sequence parameters that will be used in their own or other lab members’ experiments.

(c) If **No**, please explain why compensation is not possible or appropriate.

(d) Where there is a withdrawal clause in the research procedure, if participants choose to withdraw, how will compensation be affected?

Compensation will not be affected if participants choose to withdraw from the study at any point after arriving for the study.

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| **SECTION C –DESCRIPTION OF THE RISKS AND BENEFITS OF THE PROPOSED RESEARCH** |

**17. POSSIBLE RISKS**

(a) Please indicate all potential risks to participants as individuals or as members of a community that may arise from this research:

(i) Physical risks (e.g., any bodily contact or administration of any substance): Yes ☒ No☐

(ii) Psychological/emotional risks (e.g. feeling uncomfortable, embarrassed, or upset):Yes ☐ No☒

 (iii) Social risks (e.g., loss of status, privacy and/or reputation): Yes ☐ No ☒

(iv) Legal risks (e.g., apprehension or arrest, subpoena): Yes ☐ No ☒

(b) Please briefly describe each of the risks noted above and outline the steps that will be taken to manage and/or minimize them.

There are risks associated with MRI scanners if metal objects enter the scanner room.This includes biomedical devices such as pacemakers and aneurysm clips, prostheses, and other metallic objects embedded in the body such as bullets, shrapnel, and any metal fragments from working around metal. All other metallic objects must also be removed from the subject prior to entering the magnet room to prevent them from becoming a projectile or being pulled by the magnet. Full subject screening and removal of metal objects prior to scanning will alleviate these risks.

The effects of the scan on a fetus are unknown and, therefore, we will not perform the examination during pregnancy.

The magnitude of temperature increase during MRI scanning is minimal and within FDA guidelines. The MRI scanner has in place a means to ensure that energy deposition is sufficiently low to stay well within these guidelines for temperature increases. Additionally, in rare cases, contact with the conductive materials such as wires or other metallic objects, or skin-to-skin contact that forms conductive loops may result in excessive heating and burns during the experiment. The operators of the MRI scanner will take steps, such as using foam pads when necessary, to minimize this risk. Tattoos with metallic inks can also potentially cause burns. The risk of these burns will be minimized by instructing participants to immediately report any heating or burning sensations during a scan in progress. The experimenters will terminate the session if participants report any of these sensations.

Other potential discomforts (claustrophobia due to the confined MRI environment, back pain due to the need for participants to lie still, loud noise from the scanner) will be minimized using standard procedures: (1) appropriate subject screening; (2) maintaining constant contact with the participant during scanning in order to make them more comfortable or to stop the scan if required in the event of significant discomfort; (3) the use of ear plugs and noise attenuating headphones

Include only if you plan on using eye tracking in future research:

When the eye-tracker system is used, another concern is associated with the infrared light. The infrared light is emitted from the eye tracker at very low amperage (class 1 laser) and causes no damage to the eye. However, it might cause discomfort due to creating dryness sensation in the eyes. We will instruct the participant to blink to eliminate the dryness sensation. If the participant still feels uncomfortable, the usage of the eye-tracking system will be terminated.

**18. POSSIBLE BENEFITS**

* Describe any potential direct benefits to participants from their involvement in the project
* Describe any potential direct benefits to the community (e.g., capacity building)
* Comment on the potential benefits to the scientific/scholarly community or society that would justify involvement of participants in this study

There are no guaranteed benefits from participation.

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| **SECTION D – INFORMED CONSENT**  |

**19. CONSENT PROCESS**
(a) Describe the process that will be used to obtain informed consent and explain how it will be recorded.  Please note that it is the quality of the consent, not the form that is important. The goal is to ensure that potential participants understand to what they are consenting.

(b) If the research involves extraction or collection of personally identifiable information from or about a research participant, please describe how consent from the individuals or authorization from the data custodian (e.g., medical records department, district school board) will be obtained.

A copy of the consent form will be provided to the participant. During the consent process, every section of the consent form will be carefully reviewed with the participant of the study by one of the study personnel. The risks and benefits will be explained and an emphasis will be placed that the study is STRICTLY voluntary and they may withdraw at any time without further explanation. Upon completion of the review, the study personnel will then ask the participant if they need any clarification, or have any questions. If the participant requires further discussion with others, a copy of the consent form will be provided to the participant whereby they are allowed to take it with them and review it with others prior to signing.

All personnel involved in the project have substantial experience acquiring MRI data from participants. All testers will be well-trained by the time they begin collecting data.

**20. CONSENT DOCUMENTS**(a) **Attach an Information Letter/Consent Form**

For details about the required elements in the information letter and consent form, please refer to our informed consent guide (<http://www.research.utoronto.ca/wp-content/uploads/documents/2014/10/GUIDE-FOR-INFORMED-CONSENT-V-Oct-2014.pdf>**)**

**Additional documentation regarding consent should be provided such as:**

* + **screening materials introductory letters, letters of administrative consent or authorization**

(b) If any of the information collected in the screening process - prior to full informed consent to participate in the study - is to be retained from those who are later excluded or refuse to participate in the study, please state how potential participants will be informed of this course of action and whether they will have the right to refuse to allow this information to be kept.

**21. COMMUNITY AND/OR ORGANIZATIONAL CONSENT, OR CONSENT BY AN AUTHORIZED PARTY**

(a) If the research is taking place within a community or an organization which requires that formal consent be sought prior to the involvement of individual participants, describe how consent will be obtained and attach any relevant documentation. If consent will not be sought, please provide a justification and describe any alternative forms of consultation that may take place.

(b) If any or all of the participants are children and/or individuals that may lack the capacity to consent, describe the process by which capacity/competency will be assessed and/or, the proposed alternate source of consent.

(c) If an authorized third party will be used to obtain consent:

i) Submit a copy of the permission/information letter to be provided to the person(s) providing the alternative consent

ii) Describe the assent process for participants and attach the assent letter.

**22. DEBRIEFING and DISSEMINATION**

(a) If deception or intentional non-disclosure will be used in the study, provide justification. Please consult the [Guidelines for the Use of Deception and Debriefing in Research](http://www.research.utoronto.ca/wp-content/uploads/2009/09/Deception_and_Debriefing_Guidelines.pdf)

(b) Please provide a copy of the written debriefing form, if applicable.

(c) If participants and/or communities will be given the option of withdrawing their data following the debriefing, please describe this process.

Prior to beginning the experiment, participants will be informed both verbally and in writing that they have the right to withdraw from the study at any time with no penalty whatsoever. If a participant chooses to withdraw, he or she may immediately discontinue the study. The participant will then be fully compensated.

(d) Please describe what information/feedback will be provided to participants and/or communities after their participation in the project is complete (e.g., report, poster presentation, pamphlet, etc.) and note how participants will be able to access this information.

Participants will be told that that they can contact XXXXX if they wish to be informed of the results of the study after its completion. On doing so, participants will be provided with a brief summary of the results. XXXXX contact information will be on the consent form.

 **23. PARTICIPANT WITHDRAWAL**

(a) Where applicable, please describe how participants will be informed of their right to withdraw from the project and outline the procedures that will be followed to allow them to exercise this right.

Prior to beginning the experiment, participants will be informed both verbally and in writing that they have the right to withdraw from the study at any time with no penalty whatsoever. If a participant chooses to withdraw, he or she may immediately discontinue the task. The participant will then be fully compensated and given a complete debriefing.

(b) Indicate what will be done with the participant’s data and any consequences which withdrawal may have on the participant.

Incomplete data from a participant who withdraws will be destroyed. There will be no consequences from withdrawing for the participant.

(c) If participants will not have the right to withdraw from the project at all, or beyond a certain point, please explain. Ensure this information is included in the consent process and consent form.

NA

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| **SECTION E – CONFIDENTIALITY AND PRIVACY** |

**24. CONFIDENTIALITY**

Data security measures must be consistent with UT's [*Data Security Standards for Personally Identifiable and Other Confidential Data in Research*.](http://www.research.utoronto.ca/wp-content/uploads/documents/2013/05/datasecurity1.pdf) All identifiable electronic data that is being kept outside of a secure server environment must be encrypted.

(a) Will the data be treated as confidential? Yes ☒ No ☐

(b) Describe the procedures to be used to protect the confidentiality of participants or informants, where applicable

Each participant will be assigned to a unique ID number. All data will be identified by the ID numbers only, and stored digitally. Only the individual investigators can link subject name and ID. For all scientific uses, the data will be displayed without identifying information. Further, the data will only be viewable using special purpose computer hardware and software, so that unauthorized viewing of the data will be complicated. Data will be archived in digital form and stored in a locked office and on a password protected and encrypted file server. Consent forms will be kept confidentially in a secured cabinet in a locked office. Paper score sheets will not identify participants by name, only by participant ID number.

Include additional details if needed.

(c) Describe any limitations to protecting the confidentiality of participants whether due to the law, the methods used, or other reasons (e.g., a duty to report)

**25. DATA SECURITY, RETENTION AND ACCESS**

(a) Describe how data (including written records, video/audio recordings, artifacts and questionnaires) will be protected during the conduct of the research and dissemination of results.

Imaging data and digitally transcribed behavioral data will be archived on a password protected secure file system and kept indefinitely. Included details about behavioural data and how it will be stored. Consent forms and MRI screening forms will be stored securely in a locked filing cabinet for up to three years beyond the completion of the study.

Describe how paperwork with identifying information will be stored:

E.G.: Any other physical paperwork containing identifying information, demographic information and/or prescreening information will be converted to an anonymized and secure digital format, and original sheets will be destroyed within 3 days of original data capture.

 (b) Explain how long data or samples will be retained. (If applicable, referring to the standard data retention practice for your discipline) Provide details of their final disposal or storage. Provide a justification if you intend to store your data for an indefinite length of time. If the data may have archival value, discuss how participants will be informed of this possibility during the consent process.

Example storage policy

Imaging data and digitally transcribed behavioral data will be kept indefinitely in anonymized form. This time will allow the researchers to revisit the data in the future if necessary should future research necessitate a reanalysis of the data. All participants will be informed that any data collected from them will be anonymized and stored securely. Consent forms and MRI screening forms will be securely maintained in physical form for up to three years beyond the date of the completion of the study, for compliance with Canadian and US research regulations. Physical paper containing identifying information, demographic information and/or prescreening information will be converted to an anonymized and secure digital format, and original sheets will be destroyed within 3 days of original data capture.

(c) If participant anonymity or confidentiality is not appropriate to this research project, please explain.

(d) If data will be shared with other researchers or users, please describe how and where the data will be stored and any restrictions that will be made regarding access.

Participants will be asked if they authorize the MRI facility to use their data in future research within the MRI research facility in the Department of Psychology. If they consent to this data sharing, deidentified MRI data files (files that are anonymous and which cannot be linked back to the participant in any way) will be made available to other researchers within the facility. These files will only be made available to researchers who are affiliated with the scanning facility and the files will be stored on password protected secure files systems.

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| **SECTION F – LEVEL OF RISK AND REVIEW TYPE** |

See the [*Instructions for Ethics Review Submission Form*](http://www.research.utoronto.ca/faculty-and-staff/research-ethics-and-protections/humans-in-research/) for detailed information about the Risk Matrix.

**26. RISK MATRIX: REVIEW TYPE BY GROUP VULNERABILITY and RESEARCH RISK**

1. Indicate the Risk Level for this project by checking the intersecting box

 **\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_**Research Risk**\_**\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Group Vulnerability Low Medium High**

**Low** **1** ☒ **1** ☐ **2** ☐

**Medium** **1** ☐ **2** ☐ **3** ☐

**High** **2** ☐ **3** ☐ **3** ☐

(b) Explain/justify the level of research risk and group vulnerability reported above:

The group vulnerability is low because participants will be healthy adults from the UofT community, and this group is not considered to be vulnerable.

We will ensure that research risk is low by following MRI safety protocols. These protocols are described in detail in Appendix D. To briefly summarize:

1. We will screen the participant before the MRI scan to guarantee there are no metal objects within the participant and that the participant is not claustrophobic or pregnant. This screening process will mitigate the risk of physical harm that could be caused by metal implants or metal projectiles, as well as discomfort caused by claustrophobia and the unknown consequences of MRI on the unborn fetus.
2. We will maintain constant contact with the participant during the MRI scan and will terminate the session in the event of significant discomfort. This will minimize the chance of physical discomfort and tissue heating.
3. We will use ear protection to reduce the MRI acoustic noise.
4. We will use foam pads and cushions to make the participant more comfortable and minimize the risk of burning.

**(Please note that the final determination of Review Type and level of monitoring will be made by the reviewing University of Toronto REB)**

Based on the level of risk, these are the types of ethics review that an application may receive:

 **Risk level = 1: Delegated Review; Risk level = 2 or 3: Full Board Review**

**For both delegated and full reviews (SSH&E, HS, or HIV)**, please submit one electronic copy of your application and all appendices (e.g., recruitment, information/consent and debriefing materials, and study instruments) as a **single** Word document or a pdf. *Do not submit your entire research proposal.* Please ensure that the electronic signatures are in place and e-mail to **new.ethics.protocols@utoronto.ca**

**The deadline for delegated review (SSH&E or HS) is EVERY Monday, or first business day of the week, by 4 pm. Information about full REB meeting and submission due dates are posted on our website** ([SSH&E](http://www.research.utoronto.ca/about/boards-and-committees/research-ethics-boards-reb/), [HS](http://www.research.utoronto.ca/about/boards-and-committees/research-ethics-boards-reb/) or [HIV](http://www.research.utoronto.ca/about/boards-and-committees/research-ethics-boards-reb/)).

**HIV REB reviews all applications at full board level but applies proportionate review based on the level of risk.**

**All other submissions (e.g., amendments, adverse events, and continuing review submissions) should be sent to** **ethics.review@utoronto.ca**

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| **SECTION G – SIGNATURES** |

 **27. PRIVACY REGULATIONS**

**My signature as Investigator, in Section G of this application form, confirms that I am aware of, understand, and will comply with all relevant laws governing the collection and use of personally identifiable information in research.** I understand that for research involving extraction or collection of personally identifiable information, provincial, national and/or international laws may apply and that any apparent mishandling of personally identifiable information must be reported to the Office of Research Ethics.

For U of T **student researchers**, my signature confirms that I am a registered student in good standing with the University of Toronto. My project has been reviewed and approved by my advisory committee or equivalent (where applicable). If my status as a student changes, I will inform the Office of Research Ethics.

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| --- |
| Signature of Investigator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:      |

\*\*\*For **Graduate Students**, the signature of the Faculty Supervisor is required. For **Post-Doctoral Fellows** and **Visiting Professors or Researchers**, the signature of the Faculty Sponsor is required. In addition to the supervisor/sponsor, the chair or the dean of the UoT sponsor’s/supervisor’s department is required to approve and sign the form\*\*\*

As the UofT **Faculty Supervisor** of this project, my signature confirms that I have reviewed and approve the scientific merit of the research project and this ethics application submission. I will provide the necessary supervision to the student researcher throughout the project, to ensure that all procedures performed under the research project will be conducted in accordance with relevant University, provincial, national or international policies and regulations that govern research involving human subjects. This includes ensuring that the level of risk inherent to the project is managed by the level of research experience that the student has, combined with the extent of oversight that will be provided by the Faculty Supervisor and/or On-site Supervisor.

As the UofT **Faculty Sponsor** for this project, my signature confirms that I have reviewed and approve of the research project and will assume responsibility, as the University representative, for this research project. I will ensure that all procedures performed under the project will be conducted in accordance with all relevant University, provincial, national or international policies and regulations that govern research involving human participants.

|  |
| --- |
| Signature of Faculty Supervisor/Sponsor Date:  |

As the **Departmental Chair/Dean**, my signature confirms that I am aware of the [requirements for scholarly review](http://www.research.utoronto.ca/wp-content/uploads/2012/08/Chair-Reps-on-Protocol-REPAC-approved-April-2012.pdf) and that the ethics application for this research has received appropriate review prior to submission.

In addition, my administrative unit will follow guidelines and procedures to ensure compliance with all relevant University, provincial, national or international policies and regulations that govern research involving human participants. My signature also reflects the willingness of the department, faculty or division to administer the research funds, if there are any, in accordance with University, regulatory agency and sponsor agency policies.

|  |
| --- |
| Print Name of Departmental Chair/Dean (or designate) :      Signature of Departmental Chair/Dean: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:      (or authorized designate)  |

**Appendix A**

**Consent form**



Name of Participant

**CONSENT TO PARTICIPATE**

 **IN MRI SCANNING SESSION**

**Pilot Study**

**Investigator: Ali Golestani, PhD**

You are being invited to take part in a research study that involves magnetic resonance imaging (MRI). Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is unclear or if you would like more information.

Procedures

During the scanning session you will be asked to lie down on a table. Foam pads will be placed around your head to limit head movement during the study. The table will then be slid into the magnet.

While in the scanner, you will be asked to lie still for approximately X hours, during which time several scans will take place. For obtaining some of the images, you don’t have to do any specific task, other than relaxing while keeping your head and body still. During some of the scans you may be asked to:

Describe tasks. E.G.:

* Passive watching or listening to stimulus information (e.g., visually presented checkerboard patterns, visually or auditorally presented words
* Watching or listening to stimuli and making a response (e.g., button or verbal response) about the type of stimuli seen or heard
* Moving specific regions of his/her body (e.g., tapping his/her fingers)
* Cognitive activity such as imagining moving parts of his/her body or moving through space (e.g. mentally following a map) or mental arithmetic

Occasional breaks of one to two minutes will be provided. During this time, you will remain in the scanner, but you can communicate with the MRI technologist.

If using eye tracking:

You may be asked to participate in a research study examining eye tracking during different

tasks. The eyetracker monitors your eye movements by monitoring you eyes with a

video camera while you are performing a task. Your eye will be illuminated with

an infrared LED (like that used in TV remote controls). The amount of infrared

illumination at your eye is less than the amount outside on a sunny day, and ten to a hundred

times less than the recommended chronic (long-term) exposure levels.

You may be asked to participate in a research study examining eye tracking during different tasks. The eye-tracker monitors your eye movements by monitoring your eyes with a video camera while you are performing a task.

Risks and Inconveniences

The risks involved in this fMRI study are minimal, and are limited to the risks present during routine MRI examinations. When near an MRI scanner, there is a potential for the powerful magnetic field to attract ferromagnetic metallic objects toward the magnet. For this reason, you will be carefully screened for previous exposure to metallic fragments or clips that may be inside your body. Similarly, you will be asked to place all metallic and magnetic objects in your possession (e.g. keys, jewelry, credit cards) in a locker outside the magnet room.

While you are lying in the scanner, you will often hear beeping and knocking noises, some of which may be loud, that are produced by the scanning equipment. Disposable earplugs will be provided to diminish the noise.

You will always be able to communicate with the scanner operator throughout the study. Before and after individual scans, there will be breaks during which you will be able to talk with the operator through an intercom system. During a scan, the equipment noise will make it difficult to use this intercom, but you will also have at all times a signal bulb that you can squeeze to let the operator know that you would like speak to them. If you ever squeeze this, the operator will immediately stop the scan, and you will be able to use the intercom once again. If at any time you feel uncomfortable or unwilling to continue, no matter what the reason, you can request to immediately stop the study, and the operator will remove you from the scanner. The operator can observe you from the next room at all times during the study, so we would also stop the scan if we ever see you in any obvious distress. Because you will not be physically restrained in the scanner, you could even pull yourself out if necessary; however, we ask that you instead use the intercom or squeeze bulb to tell us to remove you.

The bore of the magnet is a small space and some people may feel claustrophobic. Most participants rapidly grow accustomed to the space, but please let us know if you feel uncomfortable, and remember that you can always choose to leave the scanner at any time.

While the scanner is operating, there is a small chance that the rapidly changing magnetic fields could cause peripheral nerve or muscle stimulation. Only a small percentage of participants ever experience this stimulation, which is felt as a slight tingling sensation or a muscle twitch, most likely in the upper arms or torso. While these sensations may be startling, they are not dangerous or a health risk and they have no lasting consequences. The sensations will immediately stop at the instant when the scan ends. If these sensations are distracting or even uncomfortable, please squeeze the signal bulb to alert the scanner operator. You will then have the opportunity to choose to withdraw from the study or perhaps to continue the study using different scan settings that should avoid further stimulation.

In rare cases, contact with the conductive materials such as wires or other metallic objects, or skin-to-skin contact that forms conductive loops may result in excessive heating and burns during the experiment. The operators of the MRI scanner will take steps, such as using foam pads when necessary, to minimize this risk. Tattoos with metallic inks can also potentially cause burns. Any heating or burning sensations during a scan should be reported to the operators immediately and they will discontinue the scan.

To reduce potential back or neck pain due to lying still in the scanner, cushions and pads designed to better disperse your weight for the scan duration will be used under your knees and neck and around your body.

Although there is no known or anticipated risk to a fetus, you will not be allowed to participate in the study if there is any possibility you are pregnant. Beyond the risks described above, there are no known long-term physical risks associated with fMRI studies.

If using eye tracking.

When the eye-tracker system is being used, your eye will be illuminated with an infrared LED (like that used in TV remote controls). Infrared is invisible to human eyes, so you will not see the light. The amount of infrared illumination at your eye is less than the amount outside on a sunny day, and ten to a hundred times less than the recommended chronic (long-term) exposure levels, so it will not cause any harm to your eyes. However, because infrared light can increase the evaporation rate of tears, it may result in a dryness sensation. Blinking will eliminate the dryness sensation. If at any time you are uncomfortable, simply let the experimenter(s) know, and they will turn off the eye-tracking hardware.

Incidental findings

The magnetic resonance imaging (MRI) scan you will receive during the course of this study is for research purposes only. It is not a clinical scan intended for diagnostic or therapeutic purposes. The Brain Imaging Facility is a research center. It is NOT a clinical MRI facility in a hospital. There are no neuroradiologists at the Brain Imaging Facility, therefore the staff are unable to make any medical comments about your scan. Should you want to know if your scan is normal or abnormal, the staff will not be able to tell you. In the rare event someone on the research team suspects an anomaly, data will be sent to a neuroradiologist for examination. You have the right to decline this evaluation

There is a chance, however, that, in the course of this research scanning protocol, we observe an anomaly (e.g. tumor or cyst) in one or more of the MRI images. If this happens, your images will be sent to a trained radiologist for further investigation and you may be informed of the results. An anomaly does not necessarily indicate the presence of any disorder. Because our MRI scans are for research purposes only, they may be inadequate for the purpose of clinical diagnosis. Additionally, as researchers, we are not trained to clinically interpret MRI data. However, we feel it is important to inform you of any observations, as we cannot rule out the possibility that this anomaly may require medical advice. If you prefer not to be informed of anomalous findings, you must check the box below.

 I prefer NOT to be informed of any anomalous findings.

General confidentiality.

Only the main investigator will be able to link your name to your data. Anonymous data (without your name) may be presented at research meetings and published in research journals. In addition, anonymous images may be provided to third parties (such as the manufacturer of the scanner) for use in connection with its product development and marketing activities.

The research study you are participating in may be reviewed for quality assurance to make sure that the required laws and guidelines are followed. If chosen, (a) representative(s) of the Human Research Ethics Program (HREP) may access study-related data and/or consent materials as part of the review. All information accessed by the HREP will be upheld to the same level of confidentiality that has been stated by the research team.

Benefits

You will receive no direct benefit from participation in this study. However, in exchange for your participation, you will be paid $20/hr for participation in a scanning session. A "session" includes all preparation in addition to actual scan time. If a session is terminated early due to participant discomfort, scanner malfunction or other unforeseeable event, you will nonetheless be paid for the session.

In addition to financial remuneration, you may also draw satisfaction from the knowledge that information generated by this study may help promote better understanding of how the human brain is organized and functions. This knowledge may eventually lead to improvements in the diagnosis, treatment and cure of neurological and psychiatric illness.

Future Research

I authorize the MRI facility to contact me about future research within the MRI research facility in the Department of Psychology. If I agree, a researcher may contact me and tell me about the research. At that time, I can decide whether or not I am interested in participating in a particular study.

 I agree to be contacted about research studies conducted at the MRI facility.

 I authorize the MRI facility to use my data in future research within the MRI research facility in the Department of Psychology.

Consent

* I understand that there may be no direct benefit to me from my participation in this study other than the monetary payment as described above.
* I understand that my participation will not cost me anything other than the time and effort involved.
* I understand that this is not a clinical scan and cannot be reliably used for diagnostic purposes.
* I understand that the information obtained from this study will be confidential. It will be available to the investigators performing the study. My identity will remain anonymous in any publications resulting from this study.
* I understand that by signing this agreement, I do not waive any legal rights or release University of Toronto or its agents from liability.
* I understand that this consent is voluntary and I may withdraw from this study at any time without penalty.
* I understand that the research study I am participating in may be reviewed for quality assurance to make sure that the required laws and guidelines are followed. If chosen, (a) representative(s) of the Human Research Ethics Program (HREP) may access study-related data and/or consent materials as part of the review. All information accessed by the HREP will be upheld to the same level of confidentiality that has been stated by the research team
* I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of Research Ethics at the University of Toronto by telephoning (416) 946-3273 or by sending email to ethics.review@utoronto.ca.
* I understand that if I wish further information regarding this research study I may contact Study PI, by telephoning (XXX) XXX-XXXX or by sending email to XXXXXXX

I hereby give my consent to participate in this research.

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Signature of Participant Name of Participant (print)

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Signature of Investigator Name of Investigator (print)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date

*\*\* Remember- Original consent forms must kept by the labs; copies can be filed with the PNI in the filing cabinet in the participant waiting room.*

**THIS PAGE MUST BE PROVIDED TO THE SUBJECT**

Please keep this sheet in case you have any questions about this research project.

1. TITLE OF RESEARCH:

2. For answers to any questions you may have about this research, contact:

 PRINCIPAL INVESTIGATOR:

Include PI Contact inforamtion

3. For answers to any questions you may have about your rights as a research subject, contact:

Office of Research Ethics

Phone: (416) 946-3273

Email: ethics.review@utoronto.ca

**Appendix B**

**Screening form**



**Include a recruitment flier. E.G.:**



**Brain Imaging Study**

**Details:**

The study consists of a single session of up to 2 hours where you respond to different tasks presented on a computer screen, while being scanned in a magnetic resonance imaging (MRI) scanner. You will be compensated $20/hr for participation.

**Location:**

Toronto Neuroimaging Facility

**Eligibility**

You are eligible to participate if you:

* Are between ages of 18 to 55
* Do not have metal implants
* Are not claustrophobic
* Are not pregnant
* Do not have any history of psychiatric or neurological diseases.

**Contact:**

To learn more about this study or to participate, please contact:

Ali Golestani, PhD

Phone: (416) 978-7133

Email: golestani@psych.utoronto.ca

**Appendix D**

**Toronto Neuroimaging Facility Protocol**

**Policies Concerning Human Research at the**

**Brain Imaging Research Facility at University of Toronto**

This document describes policies and procedures for human participant safety along with data management at the Brain Imaging Facility.

**MRI Background**

MRI is a widely used imaging modality for investigational research in human participants because of its extreme flexibility, the capability to evaluate anatomic, physiologic and functional information and because it is non-invasive and does not use ionizing radiation. There is a vast field of literature investigating the bio-effects of the electromagnetic fields produced by MRI systems and the subsequent effect on the human body. These findings indicate that in the absence of ferromagnetic foreign bodies, implants and other biomedical devices, there is no evidence of hazard to human subjects within an MR environment. The MRI system at the Brain Imaging Facility operates at field strength of 3.0 T. Field strengths up to 8 Tesla have been used for human research since the late 1990’s and field strengths up to 3 Tesla have been used for clinical and research purposes since the mid 1990s and are thought to be less hazardous than a comparable x-ray computed tomography (CT) examination.

**MRI Specific Risks**

Despite being considered as having minimal, if any, health hazards, there are some important safety considerations associated with MRI scanning.

**Current Canadian Guidelines:**

The Health Protection Branch of the then Department of National Health and Welfare of Canada published ‘Guidelines on Exposure to Electromagnetic Fields from Magnetic Resonance Clinical Systems’ in 1987. It was stated that their exposure guidelines reflected ‘minimal, if any, health hazard’, --- and that ‘exceeding the limits specified are not necessarily hazardous, but a careful individual evaluation should be done as the presently available scientific data are not sufficient for providing general recommendations.’ The exposure limits for ‘Patients’ are as follows:

a) Static magnetic field: 2 T.

b) Time-varying magnetic fields: 3T/sec

c) RF magnetic field: which does not cause an increase of body temperature (core or rectal) of more than 0.5C and of any part of the body of more than 1C.

These guidelines are now considered to be severely outdated, particularly with respect to the static field strength. Health Canada has allowed the import of dozens of 3T MRI scanners, falling back on the expertise of the US FDA.

**Current US and EU Guidelines for Human MRI Exposure:**

The US FDA first provided guidelines for MRI patient exposure in 1982 setting the ‘safe’ static magnetic threshold at 2 T adding further guidelines in 1988 to limit tissue heat induction and acoustic exposure. Harmonized guidelines were established by the EEC member states in 1994 incorporating the FDA recommendations. In July 2003, the US FDA released a new document – “Criteria for Significant Risk Investigations of Magnetic Resonance Diagnostic Devices” - superseding the previous document – “Guidance for Magnetic Resonance Diagnostic Devices – Criteria for Significant Risk Investigations”, issued in September 1997 recommending the main static magnetic field strength, increase from 4 Tesla to 8 Tesla for most populations. The US FDA deems magnetic resonance diagnostic devices do not pose a significant risk when used under any of the operating conditions described below.

The US FDA classified risks of MRI scanning into four categories:

a) Acoustic Noise Levels,

b) Gradient or Time-varying Magnetic Fields,

c) Radiofrequency (RF) Magnetic Fields, and

d) Static Magnetic Fields.

a) Acoustic Noise

The acoustic noise associated with MRI imaging is related to the mechanical movement of the gradient coils during the scanning process.

FDA Guidelines: "The acoustic noise levels associated with the device must be shown to be below the level of concern established by pertinent Federal Regulatory or other recognized standards setting organizations. If the acoustic noise is not below the level of concern, the sponsor must recommend steps to reduce or alleviate the noise perceived by the human subject." Current FDA guidelines follow the regulations of the International Electrotechnical Commission (IEC) Standard 601-2-33, which stipulate that for MR equipment used in medicine, hearing protection is required when the system can produce acoustic sound levels above 99 dB and that the protection should be able to reduce noise levels to below 99 dB. The FDA has approved systems for which noise levels have been quantified, ranging up to 105 dB RMS for scanners operating at field strengths of 1.5 Tesla. It is important to note that the static magnetic field strength is only one factor, and not necessarily the most important one, in determining acoustic noise. Among the factors listed above, the design and construction of the gradient coils plays a major role in the noise level that MRI scanning produces. Therefore, noise levels are not necessarily greater when scanning at 3.0 T compared with 1.5 T field strengths. It is nevertheless possible that, in some circumstances, our system could produce noise levels higher than 99 dB, as do many systems operating at lower field strengths. The acoustic noise levels perceived by human subjects when undergoing MRI examination in our 3.0 Tesla magnet constitutes a non-significant risk; specifically, our system will not be operated in a way that will present more noise to human subjects than is approved or recommended by the FDA.

*Ensuring Safety From Acoustic Noise:* As suggested by the FDA, we will take steps to reduce or alleviate the noise levels experienced by human subjects in this protocol. This will be accomplished by one of two commomethods:

i. Use of disposable earplugs

ii. Use of acoustically shielded headsets

b) Peripheral Nerve Stimulation

The time-varying magnetic fields used in MRI can, in some instances, induce stimulation of peripheral nerves, thereby producing sensations such as 'twitching' or 'tingling'. In very rare instances, this nerve stimulation can be painful. Nerve stimulation is particularly likely when human subjects are physically positioned in a way that increases the likelihood of inducing stimulation, such as with hands clasped or arms folded. It should be noted that the parameter of interest here, dB/dt (the rate of change in the magnetic field per unit time), is not a function of the strength of the static magnetic field, so evaluating risk in a 3T MRI scanner involves the same considerations as evaluating other MRI systems operating at lower magnetic field strengths (i.e., the same issues apply to all the commercially available, FDA approved scanning systems). Thus, it is the gradient system only that needs to be evaluated to determine the risk of producing nerve stimulation.

FDA Guidelines: The FDA Guidance of 1995 was developed specifically to consider the fact that many clinical systems were capable of exceeding levels of dB/dt that could produce nerve stimulation. It was originally considered that a warning level should be implemented to guard against peripheral nerve stimulation, but the FDA finally concluded that: '... this warning level is not considered critical since there are no harmful effects associated with mild peripheral nerve stimulation’. The current guidelines therefore include monitoring procedures to help avoid painful peripheral nerve stimulation, and without specific dB/dt limitations. Summary of Risks: The gradients used in our 3.0 Tesla MRI system will typically be operated at levels below those considered to be negligible according to FDA guidelines. Our system, like most commercially available, FDA-approved systems, does have the capacity to exceed this level, but it will include the same safeguards that are included in other FDA-approved clinical systems. Furthermore, policies and procedures will be implemented according to FDA guidelines to avoid the possibility of painful peripheral nerve stimulation. Therefore, in all circumstances the system will be operated in a way that poses non significant risk to the participant.

*Ensuring Safety from Peripheral Nerve Stimulation*

i. The gradient switching times and strengths is automatically monitored by software on the system.

ii. All MR operators will receive special training to prevent peripheral nerve stimulation.

iiii. Before any scanning procedure that might stimulate peripheral nerves, an operator will

- Inform the participant that peripheral nerve stimulation may occur

- Describe the nature of the sensation to the participant

- Instruct participants not to clasp their hands, since this may create a conductive loop which will increase the possibility of stimulation

- Maintain constant verbal contact with the participant

- Instruct participants to inform the MR operator if they experience discomfort or pain

- Terminate the scan if the participant complains of discomfort or pain

- Complete a report of any incidents involving severe discomfort or pain, including a description of the associated circumstances (imaging parameters, dB/dt value, level of pain, etc.), and submit this report immediately both to the REB and to the MRI Safety Committee

c) Tissue Heating

MRI scanning induces some heating of body tissues. This specific absorption rate (SAR) that determines heating is the amount of radiofrequency (RF) energy deposited (typically by a coil or “helmet”-like apparatus placed over the human subject’s head) per unit volume of tissue per unit time. RF energy in MRI examinations is not a function of the strength of the static magnetic field. Rather, the Specific Absorption Rate (SAR) for RF radiation is related to the amplitude of RF power, the duration of the RF pulse, the type of RF coil used, the frequency of RF radiation, the resistivity of the tissue, the configuration of the anatomical region being examined, and several other parameters

FDA Guidelines: "The following are levels of concern at which the reviewer shall exercise appropriate actions to ensure that the safety of the device is substantially equivalent to a predicate device: A) If SAR 0.4 watts per kilogram (W/kg) whole body; and if SAR 8.0 W/kg spatial peak in any 1 gram of tissue; and if SAR 3.2 W/kg averaged over the head: below level of concern. Or B) If exposure to radiofrequency magnetic fields is insufficient to produce a core temperature increase in excess of 1°C and localized heating to greater than 38°C in the head, 39°C in the trunk and 40°C in the extremities: below level of concern. The parameter SAR cited above must be shown to fall below either of the two levels of concern by presentation of valid scientific measurement or calculation evidence sufficient to demonstrate that SAR is of no concern." It should be noted that this guideline is based on the calculation of a system that has no thermoregulatory response, and thus it is a very conservative estimate compared with the temperature change that would be experienced in any living human subject. Normal diurnal temperature variations in humans, for example, are about +/-1°C from the normal set point 37°C, and healthy people with normal thermoregulatory responses can easily dissipate any excess (or, in this instance, deposited) heat by increasing their peripheral blood flow or sweat rate. Thus, the heating effect of MRI with the SARs used in accord with these guidelines is extraordinarily unlikely to cause any acute effects in healthy human subjects. Summary of Risks: Because all experiments performed on the 3.0 Tesla system will comply with FDA guidelines with regard to SAR, and because appropriate RF power safety checks are in place, the criterion for classification of NSR is satisfied.

*Ensuring Safety from Tissue Heating Risks*

The magnitude of temperature increase during MRI scanning is minimal. Increases are always within FDA guidelines, which include core temperature increases less than 1°C, as well as localized heating to less than 38°C in the head, 39°C in the trunk, and 40 °C in the extremities. Our 3.0 Tesla system has in place a means to monitor RF power levels and ensure that energy deposition is sufficiently low to stay well within these guidelines for temperature increases. First, a "system security" unit is employed to integrate the output of the RF amplifiers. This integration takes into account the amplitudes and duty cycle of the transmitter. If system security detects an output that might exceed the guidelines noted above, it automatically shuts down the entire RF power system. Secondly, all pulse sequences are evaluated, based on calculations and sound scientific measurements, to ensure that SAR remains within FDA-approved guidelines, prior to their use in humans. Any experiment performed on our 3.0 Tesla system will comply with all FDA guidelines with regard to RF power deposition. Proper and routine monitoring of all RF electronics (e.g., coils, transmitters, system security, etc.) will be performed on a regular basis. All pulse sequences will be evaluated (by calculation and by valid scientific measurement) prior to use in humans.

d) Static Magnetic Fields

The possible risks of static magnetic fields have received much attention in the lay press, but scientific consensus on these risks has yet to be fully reached. The FDA has deemed that systems operating at 8.0 Tesla or less do not pose a significant risk. Moreover, experience with tens of thousands of studies over the past decade, and with multiple human investigations carried out at higher field strengths over this period, have not revealed risks of exposure to higher static magnetic fields. The most significant risk associated with static magnetic fields is that ferromagnetic objects, such as aneurysm clips or heart valves, can interact with the magnetic field of an MRI scanner, causing the device to malfunction or to move, and injuring the human subject. For some human subjects, rapid head movement while in the magnetic field may cause dizziness, vertigo, or a metallic taste in their mouth.

FDA Guidelines: “Studies conducted at 8T or less are not considered significant risk" (FDA Center for Devices and Radiological Health, memorandum 7-14-03).

*Summary of Risks:* This category of risk applies to work conducted around superconducting magnets of any kind (including standard clinical diagnostic MRI units). It is not unique to our 3.0 Tesla facility. The MRI facility will maintain a safety policy to safeguard human subjects and staff members from these incidental risks. Systems with static magnetic field less than 8 Tesla have been considered to represent a non-significant risk (NSR) by the FDA. The static magnetic field of our system (3.0 Tesla) is therefore to be classified as posing NSR to human subjects.

*Ensuring Safety from Static Magnetic Field Risks*

The minimization of risks associated with the static magnetic field of 3.0 Tesla is mainly related to incidental risks (see below). These risks are the same as in other commercially available systems, and like other MRI centers, our facility will incorporate a complete range of procedures, including:

i Assure the security of the restricted access area.

ii Entrance doors to the MRI department will be kept closed at all times.

Access to the MRI suite will be tightly controlled, allowing access for only personnel and human subjects who have legitimate reason to be there. Doors to the MRI suite will be securely locked.

* Entryways to the MRI suite will be labeled with clear visible signs warning of the presence of the magnetic field and the exclusion from entry by individuals with implanted metal objects such as prostheses, pins, clips, IUD’s, pacemakers, etc.
* The MRI operator will conduct careful screening of potential participants before they enter the magnet room (appended at the end of this document).

e) Incidental Risks

The physical confinement and isolation produced by the scanner could cause mild to moderate emotional distress, although in our extensive past experience, participants generally tolerated the procedures remarkably well. All participants will be able to communicate directly with the operators to inform them of any emotional or physical distress during the scanning procedure. If they wish, the scan will be terminated immediately and the participant will be removed from the scanner.

f) Ensuring Data Safety

All MRI data will be stored behind firewalls at facility.

g) Scanning of Children

We will develop additional procedures for scanning children once the initial set of policies are approved. These policies will go through REB approval and be amended to these documents.

**Incidental findings**

The Brain Imaging Facility is a research facility at University of Toronto. The Brain Imaging Facility is part of the College of Arts & Sciences, and is not affiliated with the medical school or the University Health Network hospital. MRI scans are undertaken for research purposes only and not for diagnostic or therapeutic purposes. The Brain Imaging Facility does not have medical or radiological staff that interprets MRI scans, thus no information regarding normal or abnormal findings will be routinely provided to research participants or their physicians. Variations from expected brain morphology can be seen in many research participants undergoing MRI scans. In light of such variations, and given the rapidly increasing number of research MRIs conducted, significant ethical questions about responsibilities and procedures for detecting and disclosing incidental findings have been raised. Variations may or may not have medical implications.

There is no national requirement to have every research scan read by an outside neuroradiologist. However, in recognition of the fact that, on occasion, potential incidental findings may need to be investigated medically, research participants will be informed of that possibility in a best-faith effort. Specifically, if a potential anomaly is detected, data will be sent to a neuroradiologist for screening. The neuroradiologist will determine if the observed abnormality merits further investigation. If the neuroradiologist determines that further investigation is warranted the PI or a designated member of the facility staff will contact the participant and inform him or her of the finding.

All investigators conducting human research who plan to use the Brain Imaging Facility must obtain REB approval for their research protocol. Under no circumstances will such an investigator be allowed to use the facility without submitting proof of REB approval and approved REB application and research protocol. The REB application include an explicit description the tasks that the participant will complete, as well as the procedures for handling all findings, including incidental findings. The informed consent document shall contain an explicit description of the limits of communication with the participant with respect to scan findings and follow up responsibilities. All participants have the right to be informed of the strengths and limitations of the research team in identifying, interpreting, or communicating findings.

Mandatory Language for Informed Consents:

“The magnetic resonance imaging (MRI) scan you will receive during the course of this study is for research purposes only. It is not a clinical scan intended for diagnostic or therapeutic purposes. The Brain Imaging Facility is a research center. It is NOT a clinical MRI facility in a hospital. There are no neuroradiologists at the Brain Imaging Facility, therefore the staff are unable to make any medical comments about your scan. Should you want to know if your scan is normal or abnormal, the staff will not be able to tell you. In the rare event someone on the research team suspects an anomaly, data will be sent to a neuroradiologist for examination. You have the right to decline this evaluation.”