Name and Title: Morgan Barense, Associate Professor and Canada Research Chair
Department: Psychology

TITLE OF RESEARCH PROJECT: Why (and How) Does the Brain Forget

OBJECTIVES AND METHODOLOGY:
Amnesia, meaning loss of memory, can be a devastating consequence of brain damage or disease. Individuals with severe amnesia are unable to form new memories and cannot integrate information from the past to understand the future. As such, they live from moment to moment in an eternal present. Although research has told us much about what areas in the brain are important for forming new memories, we still do not fully understand why people with amnesia forget new information so quickly. Recent exciting findings suggest that there may be a fundamental problem with the way amnesics perceive the world around them, and that this deficit in perception may partially underlie their deficit in memory. Students working on this project will investigate this possibility further, and in doing so, will provide new insights into the nature of the amnesic syndrome. In addition, students may have the opportunity to contribute to experiments that are testing novel rehabilitative strategies to alleviate memory loss.

The primary methodology involves computer-based memory tests. During some of the tests, participants’ eye-movements will be simultaneously recorded. Initially the research will be conducted in healthy control populations, but will subsequently be adapted for use in patients who have memory disorders and in fMRI neuroimaging experiments.

DESCRIPTION OF STUDENT PARTICIPATION:
Students are considered full members of the laboratory and will have the opportunity to participate in the research project in a number of ways:

1) Students will engage in literature review and discussions regarding memory and perception. ROP students are valuable members of the laboratory and thus regular attendance at lab meetings is required.

2) Students will have the opportunity to contribute to the design of their experiments and will assist with data collection and participant recruitment. Participants may be young adults (e.g., PSY100 students) or older adults recruited through the Adult Volunteer Panel. Opportunities for testing memory-impaired clinical populations may be available.
3) Students will assist with data entry and statistical analysis, which will include training on EXCEL and SPSS. Opportunities for computer programming training (e.g., MATLAB or Python) also exist.

4) Students will gain valuable training in effective scientific communication (e.g., writing research reports, preparing data for publication, and oral presentations).

For all aspects of the project, students will work closely with the faculty supervisor. The skills gained by working on this project will provide important experience to prepare for graduate school and beyond.

**MARKING SCHEME** (assignments with weight and due date):

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi-weekly journal and/or documentation of research process. These worklogs are to be emailed to lab manager, direct graduate student or postdoc supervisor, and Prof Barense. We will provide the student with a template. They are due every two weeks.</td>
<td>10%</td>
</tr>
<tr>
<td>First half of term participation in day-to-day lab duties. Active participation in the lab and the specific research project is the most important element of the ROP experience. This is measured by attendance and contribution to weekly lab meetings, and conducting research in an efficient, effective, and professional manner. The grade for this component will be provided to the student by the halfway-point in the term.</td>
<td>20%</td>
</tr>
<tr>
<td>Lab meeting presentation to propose project. This short presentation (approximately 10-15 minutes) will be given during lab meeting and will describe the research the student is planning to conduct. This presentation will be given before the halfway point in the term.</td>
<td>15%</td>
</tr>
<tr>
<td>Lab meeting presentation to describe findings. This short presentation (approximately 10-15 minutes) will be given during lab meeting and will describe the results from the student’s research project. This presentation will be given by the last week of term.</td>
<td>15%</td>
</tr>
<tr>
<td>Final paper. Students will produce a final report (approximately 10 pages) which follows the format of a scientific paper, including an Abstract, Introduction, Methods section, Results section and Discussion. The final paper is due during the exam period.</td>
<td>20%</td>
</tr>
<tr>
<td>Second half of term participation in lab duties. As with lab duties for the first half of term, this includes attendance and contribution to weekly lab meetings, and conducting research in an efficient, effective, and professional manner. In addition, where applicable, it will include the ROP FORUM presentation.</td>
<td>20%</td>
</tr>
</tbody>
</table>
Name and Title: Dirk Bernhardt-Walther, Assistant Professor  
Department: Psychology  

TITLE OF RESEARCH PROJECT:  Cooperation as an Input in Production  

Number of 299Y Spots: 2  
Number of 399Y Spots: 2  

OBJECTIVES AND METHODOLOGY:  
The objective of this experimental study is to better understand how people cooperate psychologically and economically to solve tasks.

Economists usually attribute benefits from collaboration to either returns to specialization or to spill-over effects. However, sometimes people work together whose skills appear to be substitutes not complements. For example, pilot and co-pilot are by design substitutes for each other in flying an airplane. But, according to chief engineer for safety at Boeing Earl Weener, "if you have two people operating the plane cooperatively, you will have a safer operation than if you have a single pilot flying the plane and another person who is simply there to take over in case the pilot is incapacitated."

Such cooperation between pilot and co-pilot relies on the pilots’ aviation expertise and training on one hand, and the process of jointly problem solving on the other hand. In our experiment, we focus on the problem-solving process. We ask subjects to solve tasks that are easily understood and do not require prior knowledge or experience yet may be simple or difficult to solve.

We measure performance both in terms of number of tasks solved correctly and, in the time, taken to completion. We determine the benefit of collaboration by comparing the performance of individual subjects with the performance when two subjects work together. Moreover, we record the subjects’ communication with each other and, using an eye tracker, we record their eye movement. Analyzing this data, we can describe the subject’s behavior and characterize the nature of their collaboration. Varying the task then allows us to describe the value different forms of collaboration contribute in different settings.
DESCRIPTION OF STUDENT PARTICIPATION:
I am looking for motivated and driven students who are interested in experimental economics and/or in the overlap between psychology and economics. A commitment to high-quality work, strong communication, organizational, and critical thinking skills are essential. Prior experience with running experiments or with data analysis are beneficial.

The student(s) will participate in the research project in a number of ways:
1) The student(s) will engage in a review of the relevant literature.
2) After receiving appropriate training and instructions, the student(s) will coordinate, schedule, and run experiments.
3) The student will assist with data cleaning and data analysis.
4) The student will gain experience in writing economic research. The student will be involved in preparing presentations and in the write-up of the results, including additional library research, writing specific sections of the paper, as well as reading and commenting on drafts of the paper.

For all aspects of the project, students will work closely with the faculty supervisor. The skills gained by working on this project will provide important experience to help prepare both for future research projects (e.g., thesis) and for graduate school.

MARKING SCHEME (assignments with weight and due date):
The final grade will be based on
- ongoing participation in and contribution to the research project. This includes participation in regular meetings with the project team, as well as reliable and professional communication will all team members. (20%)
- coordinating, scheduling, and running the experiments in an efficient, effective, and professional manner. (20%)
- two short (approximately 10 minutes) presentations students are expected to give to the faculty supervisor; one to provide an overview of the project and demonstrate the student’s understanding of the related literature and the project’s contribution (given no later than Dec 7th, 2019) and one to present the project’s findings (given no later than April 1st, 2020). (10% each)
- a final report (approximately 6-8 pages) which follows the format of a scientific paper, including an Introduction, a literature review, analysis, results and discussion (40%).
OBJECTIVES AND METHODOLOGY:
Consider for a moment the range of images that one might categorize as a picture of a forest. These images may have a wide variety of characteristics, many of which could overlap with other categories of images (e.g. beaches or mountains). However, when we see a forest, we can immediately categorize it without the need to first recognize individual trees and then infer the forest. Humans are remarkably adept at this seemingly difficult perceptual categorization process, and for good reason—recognizing the essence of a scene (often called “scene gist”), provides important context for subsequent more detailed analysis of our visual environment.

In our lab we are exploring the computational, cognitive and neural mechanisms of natural scene perception. This project in particular explores computational aspects of natural scene perception, such as spatial frequency analysis of scenes, algorithmic analysis of line strokes by artists, or programming of new experimental paradigms in Matlab and Psychophysics toolbox. This project exists at the intersection of computer science, engineering, psychology, and cognitive neuroscience.

DESCRIPTION OF STUDENT PARTICIPATION:
We are looking for motivated and reliable students who are interested in computation as applied to cognition and perception. Depending on their interests and prior experience, students will have the opportunity to be involved in:

1. Programming new experiments for behavioral testing, eye tracking, fMRI or MEG,
2. Computational analysis of images,
3. Computational manipulation of images that are to be tested in behavioral experiments,
4. Aiding with conducting behavioral or neuroimaging experiments (fMRI, MEG),
5. Computational analysis of data, including fMRI, MEG and eye tracking data,
6. Writing research reports and preparing data for publication.

The students will be involved in the write-up of the data, including additional library research, writing specific sections of the paper, as well as reading and commenting on drafts of the paper.
All students are expected to participate in and contribute to weekly lab meetings. For all aspects of the project, students will work closely with senior lab members (faculty supervisor, postdoc, graduate students). They will gain detailed experience with a variety of software (Matlab, Python, Photoshop, Illustrator, R, AFNI, FreeSurfer) and hardware (eye tracker, psychophysics setups) that is relevant for this research. The skills gained by working on this project will provide important experience to help prepare both for future research projects (e.g., thesis) and for graduate school.

**MARKING SCHEME (assignments with weight and due date):**

30% of the grade will be based on participation in the lab. This includes attendance and contribution to weekly lab meetings, and conducting research in an efficient, effective, and professional manner. To monitor progress, students are expected to keep a research journal/work log to record lab activities every week.

In addition to this, students are expected to give two short (approximately 10 minutes) presentations to the lab (worth 10% each): one to propose your project (given by 30 November, 2019 at the latest) and one to present your project’s findings (given by April 1st, 2020).

Finally, students are expected to produce a final report (approximately 6-8 pages) which follows the format of a scientific paper, including an Introduction, Methods section, Results section and Discussion (worth 50%), with the following weightings and due dates:

- **10%:** Introduction, including discussion of relevant literature, due by November 30th, 2019
- **15%:** Methods section: due January 31st, 2020
- **25%:** Results and discussion section, due April 1st, 2020
OBJECTIVES AND METHODOLOGY:
Consider for a moment the range of images that one might categorize as a picture of a forest. These images may have a wide variety of characteristics, many of which could overlap with other categories of images (e.g. beaches or mountains). However, when we see a forest, we can immediately categorize it without the need to first recognize individual trees and then infer the forest. Humans are remarkably adept at this seemingly difficult perceptual categorization process, and for good reason—recognizing the essence of a scene (often called “scene gist”), provides important context for subsequent more detailed analysis of our visual environment.

In our lab we are exploring the computational, cognitive and neural mechanisms of natural scene perception. This project in particular explores natural scene perception using behavioral and neuroimaging experiments. In behavioral tests with manipulated images of natural scene we test which image features are critical for observers’ ability to categorize natural scenes. We measure how participants distribute their attention over natural scenes by tracking their eye movements. Using functional magnetic resonance imaging and magnetoencephalography, we explore the role of various brain areas in scene categorization. In collaboration with OCAD we explore the role of these perceptual processes for the perception of visual arts in collaboration with OCAD.

DESCRIPTION OF STUDENT PARTICIPATION:
We are looking for motivated and reliable students who are interested in cognitive neuroscience and cognitive psychology to participate in lab duties. Depending on their interests and prior experience, students will have the opportunity to be involved in:

1. Setting up and administering behavioral experiments,
2. Conducting eye tracking experiment,
3. Aiding with conducting neuroimaging experiments (fMRI, MEG),
4. Literature research,
5. Scoring and analyzing data, including fMRI, MEG and eye tracking data,
6. Writing research reports and preparing data for publication.
The students will be involved in the write-up of the data, including additional library research, writing specific sections of the paper, as well as reading and commenting on drafts of the paper.

All students are expected to participate in and contribute to weekly lab meetings. For all aspects of the project, students will work closely with senior lab members (faculty supervisor, postdoc, graduate students). They will gain experience with software (Matlab, Python, Photoshop, Illustrator, R, AFNI, FreeSurfer) and hardware (eye tracker, psychophysics setups) that is relevant for this research. The skills gained by working on this project will provide important experience to help prepare both for future research projects (e.g., thesis) and for graduate school.

**MARKING SCHEME (assignments with weight and due date):**
30% of the grade will be based on participation in the lab. This includes attendance and contribution to weekly lab meetings, and conducting research in an efficient, effective, and professional manner. To monitor progress, students are expected to keep a research journal/work log to record lab activities every week.

In addition to this, students are expected to give two short (approximately 10 minutes) presentations to the lab (worth 10% each): one to propose your project (given by 30 November, 2019 at the latest) and one to present your project’s findings (given by April 1st, 2020).

Finally, students are expected to produce a final report (approximately 6-8 pages) which follows the format of a scientific paper, including an Introduction, Methods section, Results section and Discussion (worth 50%), with the following weightings and due dates:

- 10%: Introduction, including discussion of relevant literature, due by November 30th, 2019
- 15%: Methods section: due January 31st, 2020
- 25%: Results and discussion section, due April 1st, 2020
TEXT OF RESEARCH PROJECT: Computational Models of Cognitive Development

OBJECTIVES AND METHODOLOGY:
In recent years, probabilistic computational models using Bayesian analysis have been successfully applied to a wide range of inference and reasoning problems faced by young children, including word and category learning, cause and effect learning, trust in social informants, and making mentalistic inferences about other’s goals, intentions and beliefs. Probabilistic computational models using Bayesian inference are a natural way to approach understanding how prior biases and different sources of evidence contribute to children’s behavior. The general methodology of this approach is to look at cognition in terms of abstract computational problems, identify the optimal solution to those problems, and compare that solution to human behavior. In particular, the first step involves considering the assumptions and capacities of learners. Bayesian models work by using Bayes’ rule as a normative model of how an idealized learner with some pre-existing expectations or biases about how the world works, can update their beliefs, in light of new data.

DESCRIPTION OF STUDENT PARTICIPATION:
This project is for dedicated and motivated students interested in gaining research skills and experience to help prepare both for future research projects (e.g., thesis) and for graduate school. Students will work closely with the faculty supervisor and lab manager, as well as other lab members and will be involved in all aspects of the research process. Students will be expected to attend and participate in regular (weekly or bi-weekly) lab meetings and to spend approximately 10 hours a week working in the lab.
1) Participating in lab meetings, including discussion of current research issues and projects in the lab, discussion of the theoretical motivations of the models and empirical studies students are working on, and discussion of the findings of other empirical and theoretical papers
2) Assisting with a variety of necessary research tasks in the lab, particularly developing computer-based experiments using Amazon Mechanical Turk and survey software such as Qualtrics, Inquisit, or PsyTurk. This may also involve creating custom web experiments using Javascript and HTML, interacting with SQL databases to retrieve and store data, and writing scripts to preprocess data.
3) Assisting with the development of computational models of cognition. This will include programming (generally in MATLAB, R or Python).
MARKING SCHEME (assignments with weight and due date):

**Evaluation of participation in lab work over term.** This includes attendance and contribution to lab meetings, and conducting research in an efficient, effective, and professional manner including consistent attendance and timely completion of programming and experiment design when required. December 2, 2019 and April 1, 2020 40% of total mark.

**Lab Journal.** Students are expected to keep a research journal/work log to record lab activities every week including lab hours, tasks and progress, research ideas, and comments on discussions and assigned articles. In particular, this also includes documentation of experiment and model development, and clearly commented and well-documented code. Journal and interim research report (contained within journal) due November 8, 2019, and whole journal submitted again on April 1, 2020 for grading: 20% of total mark.

**Final Project Report.** Students will prepare a scientific poster for presentation at the annual Faculty of Arts and Science Undergraduate Research Forum in March OR write a final paper (approximately 6-8 pages) in the form of a scientific article (mid-March, after Research Forum): 20% of total mark.

**Lab meeting presentations.** Students are expected to give a short (approximately 15 minute) presentation to the lab each term. 20% of total mark.
Name and Title:  Dr. Daphna Buchsbaum
Department:  Psychology

TITLE OF RESEARCH PROJECT:  How Do Social Context and Physical Knowledge Influence Causal Learning In Dogs?

Number of 299Y Spots:  1                                   Number of 399Y Spots:  1

OBJECTIVES AND METHODOLOGY:
All animals live in a causally complex world, where they must learn not only to predict the consequences of events, but also to act causally on the world themselves. How do animals learn these kinds of causal relationships, especially when the world presents them with sparse, ambiguous data or with multiple, conflicting sources of evidence? This ongoing research project builds on previous research with children and monkeys to investigate the causal reasoning abilities of pet dogs. Dogs provide an interesting comparison, because they may have better social cognition skills than monkeys, but poorer understanding of the physical world. To address this, we present pet dogs with a series of puzzle-boxes that dispense treats. Having observed a human demonstrator acting on the puzzle-boxes, dogs have an opportunity to interact with the boxes themselves. The actions that they copy can tell us something about their understanding of cause and effect, and how different social and physical cues influence this. Testing takes place in our lab at U of T and several offsite locations (e.g. dog training facilities).

DESCRIPTION OF STUDENT PARTICIPATION:
This project is for dedicated and motivated students interested in gaining research skills and experience to help prepare both for future research projects (e.g., thesis) and for graduate school. Students will work closely with the faculty supervisor and lab manager, as well as other lab members and will be involved in all aspects of the research process. Students will be expected to attend and participate in regular (weekly or bi-weekly) lab meetings and to spend approximately 10 hours a week working in the lab (or on lab-related tasks). This should include regular availability on at least 1 weekend day every week. Due to the nature of scheduling participants some flexibility is required. Students will participate in the research project in some of the following ways:
1) Participating in lab meetings, including discussion of current research issues and projects in the lab, discussion of the theoretical motivations of the studies students are working on, and discussion of the findings of other empirical papers
2) Assisting with experimental data collection, working and handling with pet dogs
3) Assisting with a variety of necessary research tasks in the lab such as coding video data, stimuli creation, data entry, recruiting and scheduling participants
4) Assisting with data analysis and preparing data for publication
5) Students with a programming background may be given the option of assisting with the development of computational models of cognition and of computer-based experiments

**MARKING SCHEME (assignments with weight and due date):**

**Evaluation of participation in lab work over term.** This includes attendance and contribution to lab meetings, and conducting research in an efficient, effective, and professional manner including consistent attendance and timely completion of programming and experiment design when required. December 2, 2019 and April 1, 2020 40% of total mark.

**Lab Journal.** Students are expected to keep a research journal/work log to record lab activities every week including lab hours, tasks and progress, research ideas, and comments on discussions and assigned articles. In particular, this also includes documentation of experiment and model development, and clearly commented and well-documented code. Journal and interim research report (contained within journal) due November 8, 2019, and whole journal submitted again on April 1, 2020 for grading: 20% of total mark.

**Final Project Report.** Students will prepare a scientific poster for presentation at the annual Faculty of Arts and Science Undergraduate Research Forum in March OR write a final paper (approximately 6-8 pages) in the form of a scientific article (mid-March, after Research Forum): 20% of total mark.

**Lab meeting presentations.** Students are expected to give a short (approximately 15 minute) presentation to the lab each term. 20% of total mark.
Name and Title: Dr. Daphna Buchsbaum
Department: Psychology

Title of Research Project: Are Children Sensitive to Information Received from Others in a Social Learning Task?

Number of 299Y Spots: 1 Number of 399Y Spots: 1

Objectives and Methodology:
Learning from others is a rich source of information for children, but children must also have strategies to assess the quality of the information they receive. Children are often faced with complex social learning problems, where they receive information from multiple people, who may themselves have shared information, and who may provide information that conflicts with each other, or with the child's own perceptions. In this study, we examine how children learn from groups of people who may differ in the source and quality of their knowledge. This is an important question not only for understanding the mechanisms underlying children's social learning abilities, but also for understanding how and when ideas and behaviours spread through populations, leading to cultural change.

Description of Student Participation:
This project is for dedicated and motivated students interested in gaining research skills and experience to help prepare both for future research projects (e.g., thesis) and for graduate school. Students will work closely with the faculty supervisor and lab manager, as well as other lab members and will be involved in all aspects of the research process. Students will be expected to attend and participate in regular (weekly or bi-weekly) lab meetings and to spend approximately 10 hours a week working in the lab (or on lab-related tasks). This should include regular availability on at least 1 weekend day per week. Due to the nature of scheduling participants some flexibility is required. Students will participate in the research project in some of the following ways:
1) Participating in lab meetings, including discussion of current research issues and projects in the lab, discussion of the theoretical motivations of the studies students are working on, and discussion of the findings of other empirical papers
2) Assisting with experimental data collection, working with young children
3) Assisting with a variety of necessary research tasks in the lab such as stimuli creation (including both physical toys and story books and computer programs and displays), data entry and coding, recruiting and scheduling participants
4) Assisting with data analysis and preparing data for publication
5) Students with a programming background may be given the option of assisting with the development of computational models of cognition and of computer-based experiments

Marking Scheme (assignments with weight and due date):
**Evaluation of participation in lab work over term.** This includes attendance and contribution to lab meetings, and conducting research in an efficient, effective, and professional manner including consistent attendance and timely completion of programming and experiment design when required. December 2, 2019 and April 1, 2020 40% of total mark.

**Lab Journal.** Students are expected to keep a research journal/work log to record lab activities every week including lab hours, tasks and progress, research ideas, and comments on discussions and assigned articles. In particular, this also includes documentation of experiment and model development, and clearly commented and well-documented code. Journal and interim research report (contained within journal) due November 8, 2019, and whole journal submitted again on April 1, 2020 for grading: 20% of total mark.

**Final Project Report.** Students will prepare a scientific poster for presentation at the annual Faculty of Arts and Science Undergraduate Research Forum in March OR write a final paper (approximately 6-8 pages) in the form of a scientific article (mid-March, after Research Forum): 20% of total mark.

**Lab meeting presentations.** Students are expected to give a short (approximately 15 minute) presentation to the lab each term. 20% of total mark.
RESEARCH OPPORTUNITY PROGRAM
299Y/399Y PROJECT DESCRIPTIONS 2019-2020
FALL/WINTER

Name and Title: Alison Chasteen, Professor
Department: Psychology

TITLE OF RESEARCH PROJECT: Stereotyping, Prejudice, and Discrimination

Number of 299Y Spots: 3 Number of 399Y Spots: 2

OBJECTIVES AND METHODOLOGY:
I am interested in prejudice and stereotyping, both from the perceiver’s and the target’s perspective. In my lab my students and I are pursuing several interrelated questions, including:

1. How do combinations of group identities (e.g., race and gender) influence perceivers’ reactions?
2. How do people respond to individuals who have ambiguous group memberships (e.g., biracial people, people with concealable stigmas)?
3. How do people’s future group identities (e.g., age group identity) influence their reactions to others?
4. How do stereotypes and prejudice affect stigmatized individuals?
5. What is the experience of people who do not clearly belong to particular social groups (e.g., biracial people)?

The primary methodology that my students and I use to investigate these questions involves both computer-based and paper-and-pencil tasks. Common tasks in these types of studies include priming techniques, filling out measures of inter-group prejudice, and completing cognitive tasks such as memory tasks and choice reaction time tasks.

DESCRIPTION OF STUDENT PARTICIPATION:
Students who do projects in my lab are active, involved members of our research team. They attend weekly lab meetings and are involved in discussions not only about their own research project but about other research going on in the lab. Below are specific ways that ROP299 students participate in research in my lab:

1. Conduct literature searches and read background literature in order to help contribute to the development of the study design
2. Assist with data collection by running human subjects
3. Help with data entry and data analysis, which will include training on EXCEL and SPSS
4. Give presentations about their project at the weekly lab meeting
5. Write a paper or conference-style poster about the experiment that they worked on
For all aspects of the project, students will work closely with the faculty and graduate research team. It is expected that the skills students develop from working on this project will help to prepare them both for working on future research projects (e.g., independent study or thesis) and for graduate school.

**MARKING SCHEME (assignments with weight and due date):**

- Lab Presentations: 20 % total: 1 project proposal presentation given by Nov. 30, 2019 at latest (10%), 1 project results presentation given by April 1, 2020 (10%).
- Data collection, entry, and analysis: 40%. Completed throughout the 2019-20 Fall/Winter terms.
- Final written manuscript or conference-style poster: 40%. Due April 1, 2020
Name and Title: Laura Corbit, Assistant Professor
Department: Psychology

TITLE OF RESEARCH PROJECT: Molecular Evolution of Visual Transduction Genes

Number of 299Y Spots: 2
Number of 399Y Spots: 2

OBJECTIVES AND METHODOLOGY:
Predictive learning allows us and other animals to use information in the environment to anticipate and prepare for biologically significant events and is therefore highly adaptive. Equally important is the ability to update previously learned associations when confronted with new information and environmental contingencies. While substantial research implicates dopamine in initial learning about events, recent research from our lab has shown that updating this learning, notably when previously available reward is now omitted, involves noradrenaline. Using rodent models, our lab is currently investigating the role of noradrenaline in signaling reward prediction errors and how this activity translates into new learning. We use a combination of behavioural tasks and pharmacological tools to study how changes in noradrenaline correspond to changes in learning. This work has important implications for understanding not only normal learning processes but also failures to flexibly control behaviour under changing conditions that characterize a number of neuropsychiatric diseases.

DESCRIPTION OF STUDENT PARTICIPATION:
We are looking for enthusiastic students seeking hands on laboratory experience. Students will work closely with Dr. Corbit and graduate students or post-docs and, depending on interest and experience, will be involved in:

1. Literature review
2. Attending and participating in lab regular lab meetings
3. Assisting with data collection for behavioural experiments
4. Assisting with histological analyses
5. Assisting with data entry and analyses
6. Writing research report

MARKING SCHEME (assignments with weight and due date):

Interim report (10%): Students will complete a 2-page interim report describing their research project. Due Nov. 15, 2019.

Lab participation (30%): This includes consistent and timely completion of lab work and attendance at

Lab journal (10%): Students will keep a record of weekly activities and submit this for grading by April 1, 2020.

Presentation (20%): Students will give a 30-minute presentation of their project findings during lab meeting prior to April 1, 2020.

Project report (30%): Students will write a final paper (8-10 pages) in the form of a scientific article OR prepare a scientific poster. This is due by April 1, 2020.
RESEARCH OPPORTUNITY PROGRAM
299Y/399Y PROJECT DESCRIPTIONS 2019-2020
FALL/WINTER

Name and Title: Wil Cunningham, Professor
Department: Psychology

TITLE OF RESEARCH PROJECT: Social Neuroscience

Number of 299Y Spots: 1
Number of 399Y Spots: 1

OBJECTIVES AND METHODOLOGY:
Our lab is interested in four fundamental research topics:

1) Emotion and cognition: After over a hundred years of psychological study, we lack consensus regarding the very definition of emotion. We argue that considering emotion as a type of cognition (viewed broadly as information processing) may provide an understanding of the mechanisms underlying domains that are traditionally thought to be qualitatively distinct.

2) Attitudes and preferences: How does the human mind create representations of value? This ubiquitous act of assigning positive or negative valence is crucial for survival, whether it involves guiding behaviour toward or away from an immediate significant object or anticipation of future rewards and punishments in goal pursuit.

3) Goals: How do people maintain and select goals, and how do they navigate between competing goals in their environment? Within this line of research, we are particularly interested in how people understand and calculate the affordances of the environment to select the most optimal goals at any given moment.

4) Stereotyping and prejudice: How do peoples’ prejudices and stereotypes influence how they view members of different social groups? Our work seeks to understand how these biases are represented and used, with special attention paid to how they can be reduced by shifting goals and contexts.

The primary methodology that our lab uses involves computer-based tasks, behavioural, electroencephalogram (EEG) and functional magnetic resonance imaging (fMRI) technology. Common tasks in these types of studies include priming techniques, navigating environments with competing goals, assessing attitude strength, choice reaction time tasks, and more.

DESCRIPTION OF STUDENT PARTICIPATION:
Students involved in the lab are expected to participate in lab meetings and participate in discussion regarding their own research project and other projects taking place in the lab. ROP students typically spend approximately 10 hours per week in the lab. There are several specific tasks that ROP students will have the opportunity to complete in the lab:
1) Reading background information on social affective neuroscience and conducting literature searches
2) Assist with data collection by running human subjects (for online, behavioural, EEG, or fMRI studies)
3) Assist with data entry and analyses in programs such as R
4) Participate in lab meetings
5) Present a poster of research findings at the ROP Undergraduate Research Forum in March 2020
6) Write a final report on the research project and results found

These tasks will allow students to participate in an active research team with graduate students and the principal investigator. Students will develop important research skills that will prepare them for success in future research endeavors (e.g. independent research projects and graduate school).

MARKING SCHEME (assignments with weight and due date):
1. **Interim report** (10%): Due November 13, 2019: the student will complete a 2-page interim report detailing their research experience thus far.
2. **Lab journal** (15%). Due December 4, 2019 (5%) and final journal (5%) due on March 20, 2020: the student will keep a journal documenting their participation in the lab, progress on their research project, research ideas, and any challenges and solutions to their project that they may encounter.
3. **Participation in lab meetings** (15%). Completed throughout the 2019-2020 academic year: students will attend lab meetings and participate in discussion.
4. **Data collection, entry, and analysis** (30%). Completed throughout the 2019-2020 academic year: students will collect data and conduct analyses in programs/statistical software such as R.
5. **Final written manuscript** (30%). Due April 2, 2020: students will write a final scientific report consisting of an introduction methods section, results, and discussion (6-8 pages).
Name and Title: Gillian Einstein  
Department: Psychology

TITLE OF RESEARCH PROJECT: Attitudes of Undergraduates to Female Genital Cutting

Number of 299Y Spots: 1  
Number of 399Y Spots: 1

Objectives and methodologies:
The objective of this study is to gain a better understanding of how undergraduate students perceive female genital cutting (FGC). To carry out this study, a qualitative survey will be created and administered to students in the psychology 100 course. The survey will aim to collect information on what students know about FGC, and what their opinion is on the practice.

Description of student participation:
The student will be trained to carry out and draft literature searches. They will be trained to write an ethics protocol and recruit participants including, explaining the project to them, and asking if they are interested in taking part. The student will also be involved in the creation of the survey measure to be implemented and administering it. The student will gain experience in writing research reports and preparing data for publication. The student will also be involved in the write-up of the data, including additional library research, writing specific papers, as well as reading and commenting on drafts of the paper. Finally, through mandatory attendance at lab meetings (times for which will be established once individual time tables are known) students will learn to ask questions and present their work as well as papers in the literature relevant to their work.

Marking Scheme:
Half the grade (50%) will be based on participation in the lab and the other half, on writing. Participation in the lab includes attendance and contribution to weekly lab meetings (30%). In addition to this, students are expected to give two short (approximately 20 minutes) presentations to the lab (worth 10% each): one on a paper relevant to their part of the project and one to present their project’s findings. Writing assignments include keeping a journal outlining progress on the project and any pitfalls as well as solutions (20%). Finally, students are expected to produce a final report (approximately 8 pages) using the format of a scientific paper, including an Introduction, Methods section, Results section and Discussion due at the end of the term (worth 30%).
DUE DATES:
Lab Meetings: Every week throughout the term
Presentation 1: December 4 (within the last 3 weeks of Fall classes)
Presentation 2: April 4 (within the last 3 weeks of Winter classes)
Lab Journal: December 4 & April 4 (for one full grade)
Final report: April 4
Name and Title: Gillian Einstein
Department: Psychology

TITLE OF RESEARCH PROJECT: Interaction of Genes, Estrogens and Memory

Number of 299Y Spots: 1 Number of 399Y Spots: 1

Objectives and methodologies:
The objective of this study is to gain a better understanding of how genes interact with estrogens to affect memory. Both menopausal women and women on hormonal birth control will be recruited and their memories tested using neuropsychological tasks. Estrogens will be measured or taken into account depending on menstrual phase. Saliva will be collected for the analysis of relevant genes. The data analysis will determine possible correlations between genes, memory, and hormonal status.

Description of student participation:
The student will be trained to carry out and draft literature searches. The student will also be involved in the analysis and write-up of the data, including additional library research, as well as reading and commenting on drafts of the paper. The student will gain experience in analyzing data, writing research reports and preparing data for publication. Finally, through mandatory attendance at lab meetings (times for which will be established once individual time tables are known) students will learn to ask questions and present their work as well as papers in the literature relevant to their work.

Marking Scheme:
Half the grade (50%) will be based on participation in the lab and the other half, on writing. Participation in the lab includes attendance and contribution to weekly lab meetings (30%). In addition to this, students are expected to give two short (approximately 20 minutes) presentations to the lab (worth 10% each): one on a paper relevant to their part of the project and one to present their project’s findings. Writing assignments include keeping a journal outlining progress on the project and any pitfalls as well as solutions (20%). Finally, students are expected to produce a final report (approximately 8 pages) using the format of a scientific paper, including an Introduction, Methods section, Results section and Discussion due at the end of the term (worth 30%).

DUE DATES:
Lab Meetings: Every week throughout the term
Presentation 1: December 4 (within the last 3 weeks of Fall classes)
Presentation 2: April 4 (within the last 3 weeks of Winter classes)
Lab Journal: December 4 & April 4 (for one full grade)
Final report: April 4
NAME AND TITLE:  Gillian Einstein  
DEPARTMENT:  Psychology  

TITLE OF RESEARCH PROJECT:  Sleep Disturbance Following Natural or Surgical Menopause  

NUMBER OF 299Y SPOTS:  1  
NUMBER OF 399Y SPOTS:  1  

OBJECTIVES AND METHODOLOGIES:  
The objective of this project is to better understand the effects of hormones on sleep in menopausal women. Sleep disturbance is commonly reported following natural menopause, and while loss of ovarian hormones has been implicated in this symptom, the different facets of sleep impacted by hormone loss is poorly understood. Additionally, while women that undergo early surgical menopause report more severe sleep disruptions than those that go through natural menopause, no study has compared menopause type on sleep using polysomnography. For this study, sleep measures will be collected from women without their ovaries and compared to women of the same age who still have their ovaries but went through natural menopause. Polysomnography, which involves collecting physiological measures of brain activity, breathing and heart rate while participants sleep will be used to measure sleep architecture (e.g. sleep stages) and arousability during the night. Since sleep impacts memory, this project will also involve examining the association between sleep disruption and performance on memory tests.  

DESCRIPTION OF STUDENT PARTICIPATION:  
The student will be trained to carry out and draft literature searches. They will be trained to contact prospective control participants from an established list of potential participants, explain the project to them, and ask if they are interested in taking part. Given the students' level of maturity and interest, they may also be trained to administer cognitive tests to the non-clinical populations. The student will assist with sleep scoring according to the American Academy of Sleep Medicine (AASM) guidelines, data entry and statistical analysis using Excel and SPSS. The student will gain experience in writing research reports and preparing data for publication. The student will also be involved in the write-up of the data, including additional library research, writing specific papers, as well as reading and commenting on drafts of the paper. Finally, through mandatory attendance at lab meetings (times for which will be established once individual time tables are known) students will learn to ask questions and present their work as well as papers in the literature relevant to their work.  

MARKING SCHEME:  
The majority of the grade (50%) will be based on participation in the lab. This includes attendance and contribution to weekly lab meetings, and keeping a journal outlining progress on the project and any pitfalls as well as solutions.
In addition to this, students are expected to give two short (approximately 20 minutes) presentations to the lab (worth 10% each): one on a paper relevant to their part of the project and one to present their project’s findings. Finally, students are expected to produce a final report (approximately 8 pages) using the format of a scientific paper, including an Introduction, Methods section, Results section and Discussion due at the end of the summer term (worth 30%).

**DUE DATES:**
Lab Meetings: Every week throughout the term
Presentation 1: December 4 (within the last 3 weeks of Fall classes)
Presentation 2: April 4 (within the last 3 weeks of Winter classes)
Lab Journal: December 4 & April 4 (for one full grade)
Final report: April 4
Name and Title: Dr. Michael Mack (Assistant Professor)
Department: Psychology

TITLE OF RESEARCH PROJECT: The Mutual Interaction of Attention and Memory in Category Learning

Number of 299Y Spots: 1 Number of 399Y Spots: 1

OBJECTIVES AND METHODOLOGY:
How do we learn effectively such that knowledge is not only retained for the long term, but can also be flexibly adapted when learning goals change? Answering this question requires understanding a number of core cognitive processes: attending to key information, evaluating sampled information in light of prior knowledge stored in memory, and updating knowledge with new information. By integrating the neuroscience of memory and attention with formal psychological learning models, our lab is investigating both how attention is guided by prior knowledge in new learning and how new conceptual knowledge is formed through the interaction of attention and memory. Experimental studies in the Mack Lab target both of these questions by asking how the neural machinery of attention is tuned during successful learning and how memory structures in the brain are influenced by dynamic learning goals in forming new knowledge. Our lab utilizes a combination of behavioural, eye-tracking, and neuroimaging paradigms, as well as mathematical modeling.

DESCRIPTION OF STUDENT PARTICIPATION:
The Mack Lab is looking for motivated students who are interested in gaining research skills in computational cognitive neuroscience. Programming experience and computational skills are preferred but not mandatory. Depending on prior experience, students may be involved in a variety of tasks:
1. Developing stimuli for experiments
2. Assisting with preparing experimental scripts for online experiments
3. Assisting with data collection for behavioural, eye-tracking, and neuroimaging experiments
4. Assisting with analyzing behavioural, eye-tracking, and neuroimaging data
5. Writing research reports
6. Attending and participating in regular lab meetings

Students are expected to spend approximately 10 hours per week in lab working on research tasks. Students will gain experience with experimental and statistical software, such as Matlab, Python, R, Inquisit, and learn how to run behavioural and eye-tracking experiments.

MARKING SCHEME (assignments with weight and due date):
Final marks will depend on four factors:
1. **In-lab participation and work:** Students’ overall research performance will be evaluated according to attendance and participation in lab meetings, efficient and timely completion of assigned research tasks, and professional conduct. December 1, 2019 and April 1, 2020; 40% of total mark.

2. **Lab journal:** Students are expected to keep a weekly log of their research in a lab notebook hosted on the lab's Basecamp account. The notebook should document all experimental design and analysis decisions, as well as updates on data collection. The lab journal, with an interim progress report included in the journal, should be turned in on December 1, 2019. The journal should be submitted again on April 1, 2020; 20% of total mark.

3. **Final project report:** Students will prepare a scientific poster for presentation at the annual Faculty of Arts and Science Undergraduate Research Forum in Spring 2020 OR write a final paper (approximately 6-8 pages) in the form of a scientific article. Either option is due April 1, 2020. 20% of total mark.

4. **Lab meeting presentations.** Students are expected to give a short (approximately 15 minute) presentation during lab meeting by April 1, 2020. 20% of total mark.
Name and Title: Rebecca Neel, Assistant Professor
Department: Psychology

TITLE OF RESEARCH PROJECT: Prejudice, Stigmatization, Motivation, and Social Invisibility

Number of 299Y Spots: 3  Number of 399Y Spots: 3

OBJECTIVES AND METHODOLOGY:
Stigmatization and prejudice occur across human societies. But despite their near-universal presence, stigmatization and prejudice can take many forms, from active avoidance or aggression, to inattention and indifference. This project seeks to understand why stigmatization emerges, in what form, and when. Using experimental and correlational social psychological methods, we examine how a person’s motivations (to stay safe, find a romantic partner, do well in school) and beliefs (about what ourselves and others are like) shape who they stigmatize. The project also examines how people manage being stigmatized by others.

We are focusing on questions like:
1. What leads a group to be socially invisible – that is, ignored, forgotten, and treated with indifference?
2. Why are groups sometimes socially invisible and at other times subjected to negative prejudice and active discrimination?
3. How do people manage being a target of prejudice and discrimination vs. being invisible?

We conduct both correlational and experimental studies, primarily on computer-based tasks. Our study methods include eyetracking, priming techniques, memory tests, questionnaires, and measures of behavior.

DESCRIPTION OF STUDENT PARTICIPATION:
Students who work in my lab get hands-on experience in conducting social psychological science. In weekly meetings, we discuss recent findings from the lab, generate and refine ideas for new studies, develop methodology to test ideas, and discuss professional development topics like applying to graduate school.

Students’ participation consists of the following:

1) Conduct literature searches and read background literature
2) Help with study material generation, which may include working with photoshop and face morphing software
3) Assist with participant recruitment and data collection from human subjects, which may include training on eyetracking software

4) Help with data entry and data analysis, which will include training on EXCEL, SPSS, and/or R

5) Write a paper or conference-style poster about the experiment that they worked on

6) Attendance at weekly lab meetings

Students work closely with and receive mentoring from the faculty member and graduate students. The ideal student for this position is motivated, conscientious, interested in learning about prejudice, stigmatization, stereotyping, and/or social motivation, and looking to build their research skills.

**MARKING SCHEME (assignments with weight and due date):**

60%: Running research participants and other data-related tasks (e.g., literature reviews, pilot testing studies, developing stimuli, data entry) – ongoing throughout the Fall/Winter semesters

20%: Participation in weekly lab meetings – ongoing throughout the Fall/Winter semesters

5%: Interim reflection paper, due December 4th (the last day of classes in the Fall semester)

5%: Undergraduate Research Forum presentation, to take place in the middle of the Winter semester at a date set by the organizers (in 2019, this was March 20th)

10%: Final scientific paper or poster on the project, due April 3rd (the last day of classes in the Winter semester)
PROJECT DESCRIPTIONS 2019-2020
FALL/WINTER

Name and Title:  Jay Pratt, Dr.
Department:  Psychology

TITLE OF RESEARCH PROJECT:  Examining Sequential Dependencies in Visual Attention

Number of 299Y Spots:  1

OBJECTIVES AND METHODOLOGY:
At any given moment in time, the visual field contains much more information than the human brain can process. To overcome this problem, the human attentional system selects portions of the visual field to determine which information is passed onto visual processing and which information will be ignored. This selection is critical for us to interact with our environment and is typically accomplished by shifting the focus of our attention to specific regions of the visual field. How does the attentional system determine which regions to focus attention on and what regions to ignore? In general, two answers have been put forward. One answer is bottom-up or externally-driven; certain events in the visual field (sudden changes in luminance, the abrupt appearance of new objects, the sudden onset of motion in an existing object) automatically capture attention at the location of the visual event. The other answer is top-down or internally-driven; we actively filter events in the visual field and only allocate attention to the events that fit with our current goals or strategies. There is little doubt that both of these processes play an important role in determining where attention is at any given point in time. However, there is another process that may exert a major force in the allocation of attention that operates independently from bottom-up and top-down processes. This process is known as sequential dependency; simply stated, it is the effect of a prior “thing” (object, event, feature) on a subsequent “thing”. In understanding the allocation of attention, it is the effect that attending to a specific object or event has on how attention is allocated to future objects and events. To test for sequential dependencies, we will conduct a series of experiments in which we will manipulate the features of an initial peripheral stimulus (e.g., a red circle, or red square, a blue circle, or blue square) in relation to a second peripheral stimulus (e.g., a red circle). Reaction time responses to both stimuli will be recorded, along with eye movements. By varying the amount of feature overlap and the time delay between the two stimuli, it will be possible to determine how much of the response performance to the second stimulus (which reflects where attention is allocated in the visual field) can be accounted for by sequential dependencies beyond the traditional interpretations involving bottom-up and top-down attentional processes. All of the equipment needed for completion of this study is available in the laboratory.

DESCRIPTION OF STUDENT PARTICIPATION:
The student will be involved in all aspects of the study:
  a)  Literature review – full review of the topic area
  b)  Experimental design of experiments – development of methods and procedures
c) Building/programming the experiments – the option is available to learn some computer coding skills

d) Data collection – testing human participants

e) Data analysis – learning to use statistical and graphical analysis software

f) Written report of study – full research report in research journal format

**MARKING SCHEME** (assignments with weight and due date):

20% - ROP journal (Feb 9, 2020)

40% - Laboratory work (literature review, data collection, statistical analysis) (April 3, 2020)

40% - final written report (April 3, 2020)
Name and Title: Nick Rule  
Department: Psychology

TITLE OF RESEARCH PROJECT: Social Perception and Cognition

Number of 299Y Spots: 3  Number of 399Y Spots: 3

OBJECTIVES AND METHODOLOGY:
People form impressions of each other in just a fraction of a second. Even cues as minimal as isolated, individual facial features (e.g., a pair of eyes) are enough to allow one to judge a great deal of information about a person. This project explores various phenomena related to how it is that we quickly and accurately form impressions about other people. Students will work on computer-based and interpersonal interaction experiments in which we will collaboratively work to understand the cues related to judgments of others’ group membership and career success. Some tests will involve monitoring participants’ eye-movements during their perceptions or measuring their physiological responses (possibly including fMRI). A particular emphasis will be given to the role of cultural differences in judgment and perception.

DESCRIPTION OF STUDENT PARTICIPATION:
Students will have the opportunity to participate in the research project in a number of ways:

1) Students will engage in literature review and discussions regarding social perception and cognition. Attendance at regular lab meetings to learn about other research being conducted is the lab is required.

2) Students will assist with experimental design and preparation, which will include training in Photoshop and related stimulus-generation graphics programs.

3) Students will assist with data collection and recruitment of participants from the psychology department’s participant pool, as well as the greater Toronto community.

4) Students will assist with data entry and statistical analysis, which will include training on any or all of EXCEL, SPSS, and R.

5) Students will gain experience in writing research reports and preparing data for publication. The student will be involved in the write-up of data, including additional library research, writing specific sections of the paper, as well as reading and commenting on drafts of the paper.

6) For all aspects of the project, students will work collaboratively with other lab members (graduate students, post-docs, research assistants, lab manager, and principal investigator). The skills gained by working on this project will provide important experience to help prepare both for future research projects (e.g., thesis) and for graduate school.
MARKING SCHEME (assignments with weight and due date):
The majority of the grade will be based on participation in the lab. This includes attendance and contribution to weekly lab meetings, and conducting research in an efficient, effective, and professional manner; as documented via 24 weekly reports worth 3% each (12 reports in Summer worth 6% each). In addition to this, students are expected to give two short presentations to the lab (worth 8% each): one to propose the project by the last day of classes in the first term semester and one to present the project’s findings by the last day of classes in the second term. Finally, students are expected to produce a final report (approximately 8 pages), which follows the format of a scientific paper, including an Introduction, Methods section, Results section and Discussion (worth 12%) due no later than the last day of classes in the second term.

Dates for Fall/Winter ROPs (ideally, 3 from 299, 3 from 399):
Sept 13 – Report 1 due
Sept 20 – Report 2 due
Sept 27 – Report 3 due
Oct 4 – Report 4 due
Oct 11 – Report 5 due
Oct 18 – Report 6 due
Oct 25 – Report 7 due
Nov 1 – Report 8 due
Nov 15 – Report 9 due
Nov 22 – Report 10 due
Nov 29 – Report 11 due
Dec 4 – Final Presentation and Final Paper due
Jan 10 – Report 12 due
Jan 17 – Report 13 due
Jan 24 – Report 14 due
Jan 31 – Report 15 due
Feb 7 – Report 16 due
Feb 14 – Report 17 due
Feb 21 – Report 18 due
Feb 28 – Report 19 due
March 6 – Report 20 due
March 13 – Report 21 due
March 20 – Report 22 due
March 27 – Report 23 due
April 3 – Report 24, Final Presentation, and Final Paper due
Name and Title: Dr. Meg Schlichting, Assistant Professor  
Department: Psychology

TITLE OF RESEARCH PROJECT: How Does the Developing Brain Remember?

Number of 299Y Spots: 1  
Number of 399Y Spots: 1

OBJECTIVES AND METHODOLOGY:
Recent research suggests that in the healthy young adult brain, related memories can become connected to form so-called integrated memories that span specific experiences. These memories are supremely flexible in that they can support our ability to make new decisions that do not depend on just one isolated experience; yet, they might also distort our experiences by pulling together or pushing apart memories according to their complex relationships. How and when in development does this tendency emerge? Due to immaturity of the underlying brain structures (including most notably the hippocampus and prefrontal cortex), it might be the case that memories formed by children and adolescents are qualitatively different from those formed by adults—namely, memories might go from being rigid but veridical in childhood to flexible yet distorted in adulthood. The proposed research project will further investigate this possibility, lending key insights into how the nature of memories might shift over the course of development.

The primary methodology involves computer- and paper-based tasks in which we will measure participants’ accuracy, response time, and/or mouse movements to assess their memory. Initially some research will be conducted in young adults and will subsequently be adapted for use in children or adolescents and/or for brain imaging experiments (functional/structural MRI or NIRS).

DESCRIPTION OF STUDENT PARTICIPATION:
We are looking for ambitious and dedicated students who are looking to gain hands-on research experience in a developmental cognitive neuroscience laboratory. Students will dedicate 10 hours per week to lab-related work and should have regular availability on at least one weekend day. Due to the fluctuating demands of participant scheduling and testing, some flexibility in hours is desirable. Students will work closely with their research mentor (e.g., a graduate student, postdoctoral fellow, advanced undergraduate or lab manager) and/or the faculty supervisor and be involved in various stages of the research process, including some of the following activities:

1) Participating in lab meetings, including discussion of the student’s research focus in the lab, discussion of other projects and research issues in the lab, and discussion of theoretical questions and the findings of empirical papers.
2) Recruiting and scheduling child, adolescent, and adult participants in experiments and assisting with behavioural and/or MRI data collection. It is highly desirable that interested students are comfortable working with children and adolescents.

3) Contributing to experimental design, data analysis, and results interpretation.

4) Developing computer programming skills (e.g., using MATLAB or Python) by creating experimental tasks and/or analyzing data. Some students may gain exposure to fMRI data analysis packages. Prior computer programming experience is preferred but not mandatory.

5) Gaining valuable scientific communication skills by writing research reports, preparing data for publication, and giving oral presentations.

MARKING SCHEME (assignments with weight and due date):

Lab participation (40%): A substantial portion of the grade will be based on participation in the lab. This includes attendance and contribution to weekly lab meetings, and conducting research in an efficient, effective, and professional manner. Students will be expected to keep a weekly log of hours and activities, to be turned in to the faculty supervisor for grading halfway through, deadline December 1, 2019 and at the end of the program, deadline April 1, 2020. Students will receive regular feedback as to their performance in the lab through individual meetings with the faculty supervisor.

Midterm report (10%): Students will write a 2-page midterm report detailing their research experience up to this point by the deadline December 1, 2019.

Presentation (20%): Students will give a 20-minute presentation of the project findings at lab meeting by the deadline April 1, 2020.

Final project (30%): Students will either prepare a scientific poster for presentation at the annual Faculty of Arts and Science 299 Research Fair OR write a final paper (approximately 6-8 pages) in the form of a scientific article. The paper should include Introduction, Methods, Results, and Discussion sections. Turn in your poster or paper via email to the faculty supervisor by the deadline April 1, 2020.
Name and Title: Christina Starmans, Assistant Professor
Department: Psychology

TITLE OF RESEARCH PROJECT: Children’s Understanding of Moral Conflict and Temptation

Number of 299Y Spots: 1
Number of 399Y Spots: 1

OBJECTIVES AND METHODOLOGY:
We all make numerous moral decisions every day. Some of these decisions are so easy they barely register as choices. Without much thought, we easily help our loved ones, stop at red lights, and refrain from murder. Other moral decisions are more difficult. We often know the right thing to do, and part of us wants to be that good person, but we also feel tempted to do the wrong thing: to cheat on our taxes or our spouses, lie to avoid trouble, or to skip out on a promise. Who is the better person: the one who acts morally while tempted or the one whose heart is pure?

In a series of ongoing studies, we are investigating children’s and adults’ moral reasoning about inner conflict and temptation. The experience of inner moral conflict is a core component of moral behavior and moral judgment. If people were not both tempted to act immorally, and motivated to act morally, there would be little need for society to develop a moral framework, or for humans to have evolved a moral psychology. Thus, a complete understanding of moral reasoning will require a thorough understanding of how the internal struggle between the desire to act morally and the temptation to act immorally affects moral judgments.

DESCRIPTION OF STUDENT PARTICIPATION:
This project is for dedicated and motivated students interested in gaining research skills and experience to help prepare both for future research projects (e.g., thesis) and for graduate school. Students will work closely with the faculty supervisor and other lab members and will be expected to attend and participate in regular lab meetings and to spend approximately **10 hours a week** working in the lab (or on lab-related tasks). This should include regular availability on at least **1 weekend day per week**. Students will participate in the research project in some of the following ways:

1) Participating in lab meetings, including discussion of current research issues and projects in the lab, discussion of the theoretical motivations of the studies students are working on, and discussion of the findings of other empirical papers

2) Assisting with experimental data collection, working with young children

3) Assisting with a variety of necessary research tasks in the lab such as stimuli creation (including both physical props and story books and computer programs and displays), data entry and coding, recruiting and scheduling participants
4) Assisting with data analysis and preparing data for publication

5) Assisting with the development of online computer-based experiments

**Desirable Skills and Experience**. Students should be enthusiastic and self-motivated, able to pay attention to fine details, and comfortable interacting with both children and adults. In order to accommodate the schedules of parents and children, students will need to have blocks of 3-4 hours at a time regularly available for research during day time hours (weekdays and weekends). Experience working with children either formally or informally is highly desirable.

**MARKING SCHEME** (assignments with weight and due date):

**Lab participation & journal (40%)**. This includes attendance and contribution to lab meetings, and conducting research in an efficient, effective, and professional manner. To monitor progress, students are expected to keep a research journal/work log to record lab activities every week including lab hours, tasks and progress, research ideas, and comments on discussions and assigned articles. This journal will be submitted every two weeks. The student will receive regular feedback as to his/her performance in the lab.

**Literature Review Spreadsheet (20%)**. Students will contribute on an ongoing basis to a literature review spreadsheet listing and briefly summarizing articles relevant to the experiments they are involved with. Review: December 1, 2019; Final submission April 1, 2020

**Lab meeting presentations (20%)**. Students are expected to give two short (approximately 15 minute) presentations to the lab each term.

**Final Project Report (20%)**. Students will prepare a scientific poster for presentation at the annual Faculty of Arts and Science 299 Research Fair OR write a final paper (approximately 6-8 pages) in the form of a scientific article. April 1, 2020.
Name and Title: Christina Starmans, Assistant Professor
Department: Psychology

TITLE OF RESEARCH PROJECT: What Aspects of Self-Contribute to Moral Rights and Responsibilities?

Number of 299Y Spots: 1 Number of 399Y Spots: 1

OBJECTIVES AND METHODOLOGY:
Humans are often given an elevated moral status compared to other entities like animals or robots. Killing a human is usually seen as worse than killing an animal, and owning animals comes with greater responsibility than owning robots. However, there has long been debate amongst philosophers and legal scholars regarding the basis for these judgments and the extent to which they are correct. The objective of this line of research is to investigate how attributing various aspects of a self to an entity affects the moral rights and responsibilities afforded that entity, as well as investigating the developmental origins of reasoning about moral status.

DESCRIPTION OF STUDENT PARTICIPATION:
This project is for dedicated and motivated students interested in gaining research skills and experience to help prepare both for future research projects (e.g., thesis) and for graduate school. Students will work closely with the faculty supervisor and other lab members and will be expected to attend and participate in regular lab meetings and to spend approximately 10 hours a week working in the lab (or on lab-related tasks). This should include regular availability on at least 1 weekend day per week. Students will participate in the research project in some of the following ways:
1) Participating in lab meetings, including discussion of current research issues and projects in the lab, discussion of the theoretical motivations of the studies students are working on, and discussion of the findings of other empirical papers
2) Assisting with experimental data collection, working with young children
3) Assisting with a variety of necessary research tasks in the lab such as stimuli creation (including both physical props and story books and computer programs and displays), data entry and coding, recruiting and scheduling participants
4) Assisting with data analysis and preparing data for publication
5) Assisting with the development of online computer-based experiments

Desirable Skills and Experience. Students should be enthusiastic and self-motivated, able to pay attention to fine details, and comfortable interacting with both children and adults. In order to accommodate the schedules of parents and children, students will need to have blocks of 3-4 hours at a time regularly available for research during day time.
hours (weekdays and weekends). Experience working with children either formally or informally is highly desirable.

**MARKING SCHEME (assignments with weight and due date):**

**Lab participation & journal (40%).** This includes attendance and contribution to lab meetings, and conducting research in an efficient, effective, and professional manner. To monitor progress, students are expected to keep a research journal/work log to record lab activities every week including lab hours, tasks and progress, research ideas, and comments on discussions and assigned articles. This journal will be submitted every two weeks. The student will receive regular feedback as to his/her performance in the lab.

**Literature Review Spreadsheet (20%).** Students will contribute on an ongoing basis to a literature review spreadsheet listing and briefly summarizing articles relevant to the experiments they are involved with. Review: December 1, 2019; Final submission April 1, 2020

**Lab meeting presentations (20%).** Students are expected to give two short (approximately 15 minute) presentations to the lab each term.

**Final Project Report (20%).** Students will prepare a scientific poster for presentation at the annual Faculty of Arts and Science 299 Research Fair OR write a final paper (approximately 6-8 pages) in the form of a scientific article. April 1, 2020.
Name and Title: Suzanne Wood, Assistant Professor, Teaching Stream
Department: Psychology

TITLE OF RESEARCH PROJECT: Study Drug Usage Rates and Attitudes Among U of T Students

Number of 299Y Spots: 1   Number of 399Y Spots: 1

OBJECTIVES AND METHODOLOGY: “Study drugs” refer to stimulant medications typically prescribed for individuals with Attention Deficit Hyperactivity Disorder or a variety of sleep disorders, but that are used without a prescription. A number of studies have characterized study drug usage rates at universities within the US and UK. While there is data on stimulant use in students through Grade 12 in Ontario, there is little data on the use of these drugs by U of T students. The present study will build upon previous work in the lab investigating usage rates at U of T, as well as individual factors that may contribute to the decision to use. Questionnaires and interviews will be used to better characterize the use of study drugs at U of T. Attitudes of students who hold prescriptions for stimulants will also be investigated.

DESCRIPTION OF STUDENT PARTICIPATION: Students who would be a good fit for this project will be motivated, conscientious, and independent thinkers. Students will work directly with the professor who heads the lab, as well as fellow undergraduate researchers – there are no graduate students or post-docs, so be ready to take on a great deal of responsibility. Weekly attendance at lab meetings is mandatory. Students will be expected to actively contribute to all aspects of the project, with attempts to best fit the interests and previous experience of the student (lit review, interview guide, questionnaire development and analysis, participant recruitment, etc.).

MARKING SCHEME (assignments with weight and due date):
Lab participation (30%): attendance and active participation in weekly lab meetings, literature review, data collection, data analysis, among other related tasks - April 1, 2020

Lab presentations (20%): two presentations during lab meeting (10% each) – one is a discussion of a journal article relevant to the project (during fall term), one is a summary of the project findings (winter term) - April 1, 2020

Interim report (10%): a 2-page interim report detailing the research experience up to this point - November 15, 2019

ROP journal (10%): a journal recording meetings, progress, research ideas, challenges and successes - April 1, 2020

Final report (30%): a scientific journal-style write up of the year’s project - April 1, 2020