Cognitive Neuroscience of Fear: From Animal to Human Models
Summer 2016, Session II
Week I: Copenhagen, Tuesday June 14 – Friday June 17
Week II: Study Tour to Munich, Monday June 20 - Friday June 24
Week III: Copenhagen, Monday June 27 – Friday July 1
Time: 10-13 daily
Location: DIS, TBA

Pre-Requisites: One year of biology and one year of chemistry at the university level.
(Note: One semester of chemistry can be substituted with one semester of an Introductory Neuroscience Course)

Instructor:
Bettina Hornbøll
Founder of CogniCation; cognitive communication. Ph.D.Candidate in neurobiology doing imaging of the effect of serotonin during emotion processing in the brain, while challenging participant’s natural serotonergic levels. The project has been conducted at Danish Research Center for Magnetic Resonance (DRCMR) and Center for Integrated Molecular Brain Imaging (CIMBI). M.Sc. Neurobiology (University of Copenhagen, 2006). B.A. Biology (University of Copenhagen, 2004). With DIS from 2012.

DIS Contacts
Anette Birck, Program Director
Science & Health Program Office, Vestergade 10-B12

Course Description:
This course reviews research investigating the neural bases for human mental processes with a focus on the cognitive explanation of fear, as well as the methods used. Throughout the course students will gain an overview of the most accepted and scientifically acknowledged methods available to study cognitive processes, both in animal and human models. The course will illustrate the cause-and-effects of fear on an anatomical and functional level, as well as demonstrate the physiological, psychological, and evolutionary aspects of fear.

This syllabus is subject to change.
Learning Objectives:
After completion of this course the student will be able to:
- Explain functioning of the brain in general terms, from neurons to nuclei, and in particular with respect to the fear system
- Explain psychological and physiological and evolutionary aspects of fear
- Explain the foundations for a neuroscience project
- Distinguish various neuroscience methods on a theoretical level
- Evaluate scientific neuroscience literature, in regards to methods used

Learning Objectives:
The objectives of the study tour is:
• To showcase examples of research, treatment, and education within emotion (and fear) research
• To show examples of novel research methods and findings with both laboratory and clinical relevance
• To explore and learn more about other societies in Europe present and in a historical perspective

Expectations for study tours
• Participate in all activities
• Engage in discussions, ask questions, and contribute to achieving the learning objectives
• Respect the destination, the speakers, DIS staff, and your fellow classmates
• Represent yourself, your home university and DIS in a positive light

Approach to Teaching:
The course will be taught with a dynamic approach where the students are expected to participate in an interactive way, by contributing with questions, opinions, and explanations.

Course Components:
Expectations of Students & Code of Conduct
• Laptops are not allowed to be open in the classroom unless agreed upon for specified tasks such as article reading and or for discussion purposes (Tasks will be agreed upon in each class)
• Reading must be done prior to the class session
• Since class participation is a component of the final grade, you will need to be present and participating to receive full credit. Your grade will be deducted for unexcused absences and lack of participation. And remember to be in class on time!
• Classroom etiquette includes being respectful of one another’s opinions; listening to others and entering a dialogue in a constructive manner

Policies
• Disability resources: Any student who has a need for disability accommodations should contact to coordinate this. Upon DIS approval, students should inform the instructor of accommodations within the first week of class.
• **Attendance:** You are expected to attend all DIS classes when scheduled. If you miss multiple classes, the Director of Office of Academic Support and Director of Housing and Student Affairs will be notified and they will follow-up with you to make sure that all is well. Absences will jeopardize your grade and your standing at DIS. Allowances will be made in cases of illness, but in the case of multiple absences, you will need to provide a doctor’s note.

• **Extensions:** There will be no extensions. Any exceptions must be accompanied by prior agreement with me. Late work will not be accepted. It will not be possible to make a do-over of any written assignments.

• **Academic Honesty:** DIS expects that students abide by the highest standards of intellectual honesty in all academic work. DIS assumes that all students do their own work and credit all work or thought taken from others. Academic dishonesty will result in a final course grade of “F” and can result in dismissal. The students’ home universities will be notified. DIS reserves the right to request that written student assignments be turned in in electronic form for submission to plagiarism detection software. See the Academic Handbook for more information, or ask your instructor if you have questions.

**Study Tour to Munich (Monday June 20 – Friday June 24):**

The tour to Munich will give an insight to the course, by way of visiting research facilities who are working with some of the newest, as well as more classical methods within the field of Fear research. The visit will allow for personal interaction with researchers, in some of the leading research institutes in the world such as Max Planck Institute, and the Ludwig Maximilian University. Finally we will naturally explore being in the very place where WWII began.

**Evaluations and Grading:**

**Engagement and Participation:**

Since class engagement is a major component of the course, you will need to be present and actively engaged in the activities to receive full credit.

**Group presentation and discussion in class**

The presentations should have a logical and clear structure, provide relevant background information, explain the methods used, present the original data in a clear and interesting way, briefly discuss the findings in relation to previous research, and state the conclusions and perspectives of the results. The background information should include a short introduction to fear in general and an overview of the research topic in question.
Presentation: (group grade – 10%)
Only to be made by the ONE group presenting

Structure

- Presentation in class
- Followed by a scientific discussion with the class after your presentation, where you will answer questions from the class related to your research paper

Content

- Present scientific article (see ‘course schedule’ to find the article you are presenting): Method, main findings/points of paper, conclusion.
- Implement your answers to questions from other group into the presentation.
- Why is this article important for this area of research
- Relate the findings to the theme
- Why is this an important/interesting field of science?
- Manage scientific discussion.

Questions for presenting group (5%)
Each member of the group responsible for asking questions to the presenting group will upload a minimum of one question, ONE WEEK in advance of the group presentation.

The questions should relate to the material presented by the group.

Debate team for group presentation (5%)
This group should come to class as prepared as the presenting group. The group will be the debate team who will be charge of facilitating a discussion, by asking questions to the group about the material presented. The debate group will also make sure that the questions asked one week in advance have been thoroughly answered, as well as make sure the presenting group clearly and thoughtfully answers any questions that arise in class.

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<tr>
<th>Presentation date</th>
<th>Presenting group</th>
<th>Question group</th>
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Study tour assignment:
Each student will write a 4-5 page scientific paper focusing on combining academic visits with methodology and research articles/publications. The purpose is to give practice and experience on researching a scientific concept/mechanism/disorder (mental/neurological) related to “Cognitive Neuroscience of Fear”. You will find relevant literature and make scientific conclusions based the academic visit as well as results published in peer reviewed primary literature.
More fulfilling information will be given in class prior to all parts of the assignment.
Final exam:
At the end of the course, there will be an accumulative exam, covering the entire course.

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<th>Engagement &amp; Participation</th>
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<td>Group presentation of research paper (Group grade)</td>
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To be eligible for a passing grade in this class you must complete all of the assigned work.

Required Texts:

There will be readings from the following textbook, available in the compendia:

In addition peer reviewed scientific articles, all relating to the neuroscience methods covered in the course. These articles are in the course compendia.

Recommended material:


b) [http://www.thehumanbrain.info](http://www.thehumanbrain.info) is a web page in relation to a book of the same name, and contains all kinds of interesting and useful information about the human brain.
Schedule

**Note:** Schedule is subject to change if necessary with as much notice as possible.

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*Cognitive Neuroscience of Fear: From Animal to Human Models* | DIS
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**Week 2:**

**Study tour Munich**

**June 20 – June 24**

**Week 3:**

## Class 6
**Tuesday June 28**

- **Patrick Fisher**
- **Neurobiology of fear**
- Including 30 min break

- **Compendium**

  

## Class 7
**Wednesday June 29**

- **BEH 10 – 11.30**

  - **Fear learning**
    - Group presentation and class discussion:
      - **Group2**: Presenting
      - **Group3**: Supply questions for presenting group to implement one week in advance
      - **Group4**: Opponents in class

    - The presentation will be graded according to the scientific content of the presentation, as well as the content of the scientific debate with the class after the presentation

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  - **Cognitive regulation of fear**
    - Group presentation and class discussion:

  **Compendium**


  **Compendium**

| Class 8 | Thursday, June 30 | BEH 10 – 11.30 | **PTSD**

Group presentation and class discussion:
- **Group 4**: Presenting
- **Group 1**: Supply questions for presenting group to implement **one week in advance**
- **Group 2**: Opponents in class

The presentation will be graded according to the scientific content of the presentation, as well as the content of the scientific debate with the class after the presentation.

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**Phobia**

Group presentation and class discussion:
- **Group 4**: Presenting
- **Group 1**: Supply questions for presenting group to implement **one week in advance**
- **Group 2**: Opponents in class

The presentation will be graded according to the scientific content of the presentation, as well as the content of the scientific debate with the class after the presentation.

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| Class 9 | Friday, July 1 | BEH | **Final Exam**

**Recommended reading:**
Reference list (textbook or found in the compendia)


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