Master program "Mind and Brain"

Berlin School of Mind and Brain

Humboldt-Universität zu Berlin

Summer Semester 2021

Monday	Tuesday	Wednesday	Thursday	Friday
10:00 – 11:30 Haynes et al. Neuroimaging	9:00 – 10:30 Lin Empirical Research Training (MIND Track) ---------- 10:00 - 11:30 Brass Research Colloquium (B)	10:00 – 11:30 Bayer Past, presence, and future of EEG research: From old friends to new trends (B)	9:00 – 10:30 Tutorial I & II: Neuroimanging	9:00 – 10:30 Lin Empirical Research Training (BRAIN Track)
10:00 – 11:30 Dziobek Research Colloquium(B)	10:45 – 12:15 Lin Empirical Research Training (MIND Track)	12:30 – 14:00 Tudge Applied Statistics (B)	10:45 – 12:15 Tutorial I & II: Neuroimaging	10:45 – 12:15 Lin Empirical Research Training (BRAIN Track)
12:15-13:45 Pulvermüller Language and the Brain	13:15 – 14:45 Brass The cognitive and social neuro-science of group conformity (B)	14:30 – 16:00 Hipólito Writing and Argumentation (M)	13:15 – 14:45 Tutorial: Sofroni Ethics and Neuroscience	13:15 – 14:45 Brass The influence of beliefs on cognition and behaviour (B)
14:15-15:45 Tudge Python (B)	15:15 – 16:45 Coelho Mollo Ethics of AI (M)		15:15 – 16:45 Hipólito Foundations and New Directions in Philosophy of Mind (M)	13:15 – 14:45 Tutorial: N.N. Language and the Brain
	18:15-19:45 Pauen Forschungs-kolloquium / Research Colloquium (M)		17:15 – 18:45 Cabeza Neurocognitive Mechanisms of Memory-Attention Interactions (B)	

Comprehensive Course Calendar

Mandatory Lectures

Monday 10:00 – 11:30 *start: 12 April 2021*

Neuroimaging

Prof. Dr. John-Dylan Haynes (Bernstein Center for Computational Neuroscience Berlin)

venue: Zoom

Mind and Brain students only!

The course provides an introduction to a number of key non-invasive research methods in structural and functional neuroimaging. Participating students will learn about the basics of functional MRI, EEG, and TMS including technological and physiological foundations, experimental design and basic and advanced statistical methods. The goal is to provide an understanding of functional neuroimaging that will allow students to design, perform and analyze their own studies.

Monday 12:15 – 13:45 *start: 12 April 2021*

Language and the Brain

Prof. Dr. Dr. Friedemann Pulvermüller (Institut für Deutsche und Niederländische Philologie, FU Berlin)

Online: tba

Language has been investigated from a range of perspectives. Linguists have described it as a formal system focusing on levels that range from phonology to syntax, semantics and pragmatics. Both linguists and psychologists worked on models focusing on the time course of linguistic processing, so that these psycholinguistic models could be tested in behavioral experiments. Most recently, neuro- and cognitive scientists have attempted to spell out the brain mechanisms of language in terms of neuronal structure and function. These efforts are founded in neuroscience data about the brain loci that activate when specific linguistic operations occur, the time course of their activation and the effects of specific lesions.

The lecture series will provide a broad introduction into these linguistic, psycholinguistic and neurolinguistics research streams and highlight a range of cutting-edge behavioral and neuroscience findings addressing a broad range of linguistic issues, including, for example, the recognition of words, the parsing of sentences, the computation of the meaning and of the communicative function of utterances. Language development and language disorders caused by disease of the brain will also be in the focus. To accommodate language processing, psycho- and neurolinguists make use of theoretical and computational models. The modeling approaches discussed range from theoretical models of the language system to language processing to (neuro-)computationally implemented models. The

experimental approaches under discussion will range from behavioral (reaction time studies, eye tracking) to neuroimaging methods (EEG, MEG, fMRI, NIRS) and neuropsychological ones (patient studies, TMS, tDCS).

Preparatory readings:

Knoeferle, P., & Guerra, E. (2016). Visually situated language comprehension. Linguistics and Language Compass, 10(2), 66–82. https://doi.org/10.1111/lnc3.12177

Munster, K., & Knoeferle, P. (2017). Situated Language Processing Across the Lifespan: A Review. International Journal of English Linguistics, 7(1), 1–13. https://doi.org/10.5539/ijel.v7n1p1

Pulvermüller, F., & Fadiga, L. (2016). Brain language mechanisms built on action and perception. In G. Hickok & S. L. Small (Eds.), Neurobiology of language (pp. 311-324). Amsterdam: Elsevier.

Pulvermuller, F. (2018). Neural reuse of action perception circuits for language, concepts and communication. Progress in Neurobiology, 160, 1-44. doi: 10.1016/j.pneurobio.2017.07.001

Tuesday 9:00 – 12:15 (MIND Track) *start: 13 April 2021*

Friday 9:00 – 12:15 (BRAIN Track) *start: 16 April 2021*

Empirical Research Training

Dr. Muyu Lin (Institut für Psychologie, HU Berlin)

venue: Zoom

Mind and Brain students only!

In the empirical-experimental exercise students extend their basic knowledge of neurocognitive research methods gained in the research methods lecture and tutorial series and deepen their knowledge of theoretical principles and practical applications of neurocognitive methods. The objective of the class is to familiarize students with experimental (as well as descriptive) research methods by providing "hands-on" experiences in designing, conducting, analyzing, interpreting, and writing up one experimental neurocognitive research study. The empirical-experimental exercise is concluded with a documented individual report on the empirical project following APA guidelines.

As a result of careful study and fulfillment of the course assignments, students should be able to:

1. Develop experimental research problems in cognitive neuroscience
2. Conduct reviews of the scientific literature relevant to a chosen research problem
3. Formulate research hypotheses
4. Design experimental neurocognitive studies
6. Execute experimental studies by collecting research data under carefully controlled conditions
7. Summarize and statistically analyze research data
8. Evaluate research results and draw conclusions pertaining to hypotheses
9. Communicate research studies in oral, written, and poster formats

Mandatory Tutorials

Thursday 9:00 – 12:15 *start: 15 April 2021*

Tutorial: Neuroimaging

Please note that there will be two alternating groups (group I & group II).

Dr. Mareike Bayer (Berlin School of Mind and Brain), Prof. Dr. Carsten Finke (Berlin School of Mind and Brain), Simon Weber (Bernstein Center for Computational Neuroscience),

venue: Zoom

Mind and Brain students only!

Thursday 13:15 – 14:45 *start: 15 April 2021*

Tutorial: Ethics and Neuroscience

Razvan Sofroni (Institut für Philosophie, HU Berlin)

venue: Zoom

The course will be concerned with issues at the intersection of neuroscience and philosophical ethics, comprising what has come to be known as *Neuroethics*. The course will be divided into two main sections. In the first half, we will deal with matters concerning what can be called the *ethics of neuroscience*: we will discuss a number of ethical questions that arise within and as a consequence of advances in neuroscience, like whether it is morally permissible to improve people's physical, cognitive and moral abilities through neuroenhancement. Going beyond questions of applied ethics, we will, secondly, take a closer look at what may be called the *neuroscience of ethics*, exploring potential implications of neuroscientific findings for a number of issues within moral philosophy. Among other things, we will discuss the relevance of neuroscientific discoveries for debates about free will and moral responsibility, both in general as well as in particular cases such as that of severe addiction. We shall also discuss which, if any, conclusions can be drawn from functional neuroimaging studies about the nature of moral thought. Finally, the course will offer plenty of opportunities to exercise and improve a number of key methodological competences required for serious research in the area of philosophical ethics.

Introductory Literature:
Farah, Martha J. (2002), Emerging Ethical Issues in Neuroscience, *Nature Neuroscience*, 5: 1123-1129.
Roskies, A.L. (2002), Neuroethics for the New Millenium, *Neuron*, 35:21-23.
Levy, N. (2012), Neuroethics. *WIREs Cogn Sci*, 3: 143–151.

Friday 13:15 – 14:45 *start: 16 April 2021*

Tutorial: Language and the Brain

N.N.

venue: Zoom

The tutorial will complement the lecture “Language and the Brain” by familiarizing students with current research questions regarding language and the brain, as well as the current methods and paradigms used to address these questions. The class will focus on group discussions of articles which investigate the underlying neuronal mechanisms of language, how humans use words to communicate ideas, how language may influence our perception, and current theories of embodied cognition.

Elective Courses:

Focus MIND

Tuesday 15:15 – 16:45 *start: 13 April 2021*

Ethics of AI

Dr. Dimitri Coelho Mollo (Berlin School of Mind and Brain)

venue: Zoom

MIND

Mind and Brain and Department of Philosophy students only!

In this seminar, we will examine some of the ethical issues raised by artificial intelligence applications, broadly understood. We will discuss questions pertaining to the ethical and social challenges posed by existing technology, with an eye especially to the ethics of algorithms and data science, autonomous systems, and automation, as well as challenges that may arise in connection with possible future developments in AI, involving for instance human enhancement and existential risks. The seminar will be discussion-based.

Wednesday 14:30 – 16:00 *start: 14 April 2021*

Writing and Argumentation

Inês Hipólito (Berlin School of Mind and Brain / Institut für Philosophie, HU Berlin)

venue: Zoom

MIND

Critical thinkers rigorously question ideas and assumptions rather than accepting them at face value. They seek to determine whether the ideas, arguments and findings represent the entire, accurate picture. In this seminar, we will specifically focus on developing skills in argumentation and writing. We will understand the links between ideas, recognise, build and appraise arguments, identify inconsistencies and errors in reasoning, reflect on the justification of assumptions, beliefs and values. We will do so by learning to apply and think according to the techniques of propositional logic. By the end of the seminar students should be able to approach (philosophical) problems in a critical and systematic way to work through and become more reflexive about theories and methods in their respective, multiple fields.

Thursday 15:15 – 16:45 *start: 15 April 2021*

Foundations and New Directions in Philosophy of Mind

Inês Hipólito (Berlin School of Mind and Brain / Institut für Philosophie, HU Berlin)

venue: Zoom

MIND

What is the nature and boundaries of mental activity? How can mental life be scientifically naturalized? Traditional philosophy of mind considers mental representations as resulting from informationally based processes implemented by the hardware (i.e., the brain). In the 1990s, philosophers of mind began calling this core assumption by questioning the claim that mental life reduces to representational computations in the brain. During the first half of the course, students will study and understand the central theoretical and methodological commitments of Computational Theory of Mind (CTM). During the second half of the course, students will be introduced to how in the past 20 years the application of Dynamical Systems Theory (DST) to investigations ranging from physiologically fundamental single-neuron activity and neuronal networks to behaviourally complex decision making and sensorimotor coordination, brings up a conceptualization of the mind that challenges the view of mental life as purely informationally-based.

Focus BRAIN

Mon 14:15 – 15:45 *start: 12 April 2021*

Python

Dr. Luke Tudge (Berlin School of Mind and Brain)

venue: Zoom

BRAIN

Strictly, Mind and Brain master's and doctoral students ONLY!

Python is a free, flexible and easy-to-use programming language. It has become a very popular tool in many fields of research, including cognitive science. Along with the Psychopy add-on, Python can be used to create psychophysical experiments. In this course, students will learn the basics of how to use Python and Psychopy. The main part of the course concerns Python itself, and covers writing basic commands, manipulating numbers and text, reading and writing data files, and gathering data from the internet. The final part of the course concerns creating experiments with Psychopy. Classes will be based around practical demonstrations and tasks. No previous knowledge of Python or other programming languages is assumed; the course is aimed at complete beginners. By the end of the course, students should have the necessary skills to program and run a simple visual experiment with Python, and to save, manipulate and display the resulting data.

Tuesday 13:15 – 14:45 *start: 13 April 2021*

The cognitive and social neuroscience of group conformity

Prof. Dr. Marcel Brass (Berlin School of Mind and Brain)

venue: Zoom

BRAIN

When we interact with other people, we often match our attitudes, beliefs and behaviours to that of the group. While there is an extensive literature on the social processes underlying group conformity, the cognitive and motor mechanism are less well understood. In the seminar, we will discuss classical research on group conformity but also more recent social- and neurocognitive research. Furthermore, we will discuss how group conformity contributes to rule violations in groups.

Wednesday 10:00 – 11:30 *start: 14 April 2021*

Past, presence, and future of EEG research: From old friends to new trends

Dr. Mareike Bayer (Berlin School of Mind and Brain/ Institut für Psychologie, HU Berlin)

venue: Zoom

BRAIN

Since the first reports of ERP (event-related potentials) components in the 1960s, EEG research has provided us with a unique window into the working brain. With its superior temporal resolution in the measurement of the brain's electrical activity, EEG / ERP research has played a key role in our understanding of neural functioning.

In the seminar, we will cover fundamental principles in EEG/ERP research, e.g., how looking at the brain's timing can inform us about human cognitive functioning. We will read seminal papers covering the most important ERP components and experimental paradigms, and learn how these findings shaped modern theories. After discussing source analyses and time-frequency analyses, we will also take a look at more recent advanced analyses techniques including machine learning and representational similarity analyses, which played a major role in the revival of EEG research in the last decade.

Wednesday 12:30 – 14:00 *start: 14 April 2021*

Applied Statistics

Dr. Luke Tudge (Berlin School of Mind and Brain)

venue: Zoom

BRAIN

Mind and Brain students only!

In this course, students will learn how to analyze data with statistical procedures, to report and visualize those analyses, and to interpret similar reports in the published literature. An introductory section of the course will provide some basic theoretical background on the two key concepts of probability and evidence, and how they can be quantified. After that, we will cover the most common statistical procedures typically encountered in an introductory statistics course, including *t*-tests, chi-square, correlation, regression, and analysis of variance. For each procedure, there will be a practical session in which students run the analyses themselves using the statistics software *R*, followed by a short homework assignment in which they report the results. No previous knowledge of statistics or of *R* is assumed. By the end of the course, students should have the necessary skills to analyze data from their own research projects.

Thursday 17:15 – 18:45 *start: 15 April 2021*

Neurocognitive Mechanisms of Memory-Attention Interactions

Prof. Dr. Roberto Cabeza (Institut für Psychologie, HU Berlin / Duke University)

venue: Zoom

BRAIN

The course provides an introduction to the cognitive and neural interplay between memory and attention processes. It covers both the effects of attention on memory and the effects of memory on attention, and considers both encoding and retrieval phases of memory. It includes the effects of divided attention, selective attention, bottom-up attention, and sustained attention on encoding, as well as retrieval phase phenomena such as memory-guided attention, memory-captured attention, and memory-based attentional control. The goal of the course is to help students think critically about theoretical and methodological issues in research on memory-attention interactions.

Friday 13:15 – 14:45 *start: 16 April 2021*

The influence of beliefs on cognition and behaviour

Prof. Dr. Marcel Brass (Berlin School of Mind and Brain)

venue: Zoom

Brain

Beliefs play a fundamental role in how we make sense of the world around us. They can be very abstract (e.g. religious or philosophical beliefs) but also very concrete, such as the belief that a vaccine is effective. In this seminar we will discuss empirical research that investigates the influence of beliefs on perception and cognition. This will cover different research domains, ranging from placebo effects to studies that investigate how high-level philosophical beliefs affect social and motor cognition.

Colloquia:

Mon 10:00 – 11:30 *start: 19 April 2*

Research Colloquium

Prof. Dr. Isabel Dziobek (Institut für Psychologie, HU Berlin / Berlin School of Mind and Brain)

venue: Zoom

BRAIN

Participation by appointment only. Please contact Ms Meri Lehmuskallio if you want to sign up for the colloquium: *mb-soccog@hu-berlin.de*

Tue 10:00 – 11:30 *start: 20 April 2021*

Research Colloquium: Social Intelligence

Prof. Dr. Marcel Brass (Berlin School of Mind and Brain)

venue: Zoom

Brain

The colloquium is open for advanced students who are interested in social and cognitive neuroscience.

Participation by appointment only. Please contact: mb-socintel@hu-berlin.de

Tuesday 18:15 – 19:45 *start: 20 April 2021*

Forschungskolloquium / Research Colloquium

Prof. Dr. Michael Pauen (Institut für Philosophie, HU Berlin / Berlin School of Mind and Brain)

venue: Zoom

MIND

The colloquium is open for advanced students and doctoral candidates who are interested in current debates in the philosophy of mind. We will discuss recent research papers as well as papers by the participants.

Participation by appointment only. Please contact Ms Anja Papenfuss if you want to sign up for the colloquium: mb-admin@hu-berlin.de

The course is held in English!

If you have questions, please contact

Dr. Dirk Mende

mb-education@hu-berlin.de

~~+49 (0)30 2093 - 89768~~ (Currently not available, please send an email! Thanks!)

NB: The lectures/courses which are flagged as "For Mind and Brain students only!" are for Mind and Brain students ONLY!

Please find information about the course requirements for student of other programs here:

http://www.mind-and-brain.de/master/external-students/

If you are a student of Humboldt-Universität zu Berlin, please register for our courses in the *Überfachlicher Wahlpflichtbereich* section of AGNES!

If you are a student of another university, please print out the Registration as guest auditor / visiting student form you find on our website: http://www.mind-and-brain.de/master/external-students/ **The form has to be signed by the lecturer of the class you plan to attend and the master's program coordinator (Dirk Mende).**