



Master program “Mind and Brain”

Berlin School of Mind and Brain

Humboldt-Universität zu Berlin

Summer Semester 2019

ALL TIMES ARE MEANT S.T. (SHARP)!

Monday	Tuesday	Wednesday	Thursday	Friday
	9:00 – 10:30 Dziobek Empirical Research Training (Brain Track)		9:00 – 10:30 Tutorial I & II: Neuroimaging	9:00 – 10:30 Dziobek Empirical Research Training (Mind Track)
10:00 – 11:30 Haynes Neuroimaging	10:45 – 12:15 Empirical Research Training (Brain Track)	10:30 – 12:00 Gaebler / Tromp Neuroscience beyond the Brain – From Embodiment to Virtual Reality (B)	11:00 – 12:30 Tutorial I & II: Neuroimaging	10:45 – 12:15 Empirical Research Training (Mind Track)
12:15 – 13:45 Knoeferle / Pulvermüller Language and the Brain	13:00 – 14:30 Dziobek Research Colloquium (B)	13:00 – 14:30 Bayer Social communication and emotion processing (B)	13:30 – 15:00 Filevich Neural bases of Metacognition (B)	13:15 – 14:45 Tutorial: Palleschi Language and the Brain
14:15-15:45 Tudge Basic Python (B)	13:15 – 14:45 Moore Writing and Argumentation (M)	15:00 – 16:30 Coelho Mollo Theories and Models in Science (M)	15:30 – 17:00 Tudge Applied Statistics (B)	15:15 – 16:45 Tutorial: Sofroni Ethics and Neuroscience
16:15 – 17:45 Tudge Advanced Python (B)	15:15 – 16:45 Coelho Mollo Philosophy of Artificial Intelligence (M)	17:00 – 18:30 Mahr Philosophy and Psychology of Memory (M/B)		
	18:15 – 19:45 Pauen Philosophical Colloquium (M)			

Block Course: Moore, Mindreading, Nativism and Cognitive Development (15 – 17 July 2019)

Comprehensive Course Calendar

Mandatory Lectures

Monday 10:00 – 11:30

start: 08 April 2019

Neuroimaging

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

venue: Ostertaghaus (House 4), Campus Nord, Philippstraße 12, 10115 Berlin, Lecture Hall 4

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 analyse their own studies.

Monday 12:15 – 13:45

start: 15 April 2019

Language and the Brain

Prof. Dr. Pia Knoeferle (Institut für deutsche Sprache und Linguistik, HU Berlin) / Prof. Dr. Dr. Friedemann Pulvermüller (Institut für Deutsche und Niederländische Philologie, FU Berlin)

venue: Ostertaghaus (House 4), Campus Nord, Philippstraße 12, 10115 Berlin, Lecture Hall 4

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.

Pulvermüller, 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 (Brain Track)

start: 16 (!) April 2019

Friday 9:00 – 12:15 (Mind Track)

start: 12 (!) April 2019

Empirical Research Training

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

venue: Invalidenstraße 110, 10115 Berlin, room 449

*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 – 12:30

start: 11 April 2019

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

Tutorial: Neuroimaging

Dr. Mareike Bayer (Berlin School of Mind and Brain), N.N., Prof. Dr. Carsten Finke (Berlin School of Mind and Brain)

venue: Computer Pool BCCN, Institut für Biologie, Philippstr. 13, House 2, 10115 Berlin

*Mind and Brain students **only!***

Friday 13:15 – 14:45

start: 26 April 2019

Tutorial: Language and the Brain

Daniela Palleschi (Berlin School of Mind and Brain Berlin)

venue: Rhoda-Erdmann-Haus, Philippstraße 13, 10115 Berlin, room 1023

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.

Together with the lectures, the tutorial will familiarize students with current research (questions) in the field of language and the brain.

Friday 15:15 – 16:45

start: 12 April 2019

Tutorial: Ethics and Neuroscience

Razvan Sofroni (Berlin School of Mind and Brain / Institut für Philosophie, HU Berlin)

venue: Rhoda-Erdmann-Haus, Philippstraße 13, 10115 Berlin, room 1023

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.

Elective Courses:

Focus MIND

Tuesday 13:15 – 14:45

start: 9 April 2019

Writing and Argumentation

Dr. Richard Moore (Berlin School of Mind and Brain / Institut für Philosophie, HU Berlin)

venue: Rhoda-Erdmann-Haus, Philippstraße 13, House 22, 10115 Berlin, room 1023 (ground floor)

MIND

The goal of this series of seminars will be to train students in the language and argumentation skills required for reading and writing philosophy. It is aimed at both philosophy students and, perhaps especially, graduate students from the non-philosophy cognitive sciences. Students will be trained not just in how to read and understand philosophical arguments, but to evaluate them critically, too. The goal will be to enable students to argue with philosophers on their own terms – capable not just of appropriating philosophers' ideas for their own work, but to be able and confident to critically accept or reject and develop these ideas too.

In the earlier parts of the course, we'll look at the nature of philosophical argument and key aspects of philosophical reasoning. Later we'll look at particular examples of philosophical argument in more detail, through close readings of a series of classic papers in the Philosophy of Mind by a range of authors including Lloyd, Fodor, Chomsky, Churchland and Jackson.

Course texts:

Some (but not all) of the readings in this course are taken from:

- Sinnott-Armstrong, W. & Fogelin, R. (2014). *Understanding Arguments* (9th edition, concise). Stamford, CT: Cengage.
- Beakley, B. & Ludlow, P. (eds.) (2006). *The Philosophy of Mind: Classical Problems/Contemporary Issues*. Cambridge, MA: MIT.

Tuesday 15:15 – 16:45

start: 9 April 2019

Philosophy of Artificial Intelligence

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

venue: Alte Nervenklinik, Bonhoefferweg 2 (Studenteneingang), Charité Campus Mitte, 10117 Berlin, Seminarraum Level 3

NB: The first session of this class on April 9 will take place at Invalidenstraße 110, 10115 Berlin, room 449!

MIND

In a seminal 1950 paper, Alan Turing asked: 'Can machines think?'. This seminar will revolve around ways to tackle this question. We will see how that seemingly straightforward question spawns several others: What are the requirements for an artificial system to count as intelligent? Which principles of organisation should guide its design? Are there different ways in which a system can be said to be intelligent? Can machines be conscious? Is artificial intelligence possible at all? We will focus on conceptual issues concerning the development of artificial intelligence, actual and potential obstacles to such a project, while also looking at attempts, past and present, at designing and building intelligent systems. We will moreover examine ethical and social issues that arise from the development of artificial intelligence.

Wednesday 15:00 – 16:30

start: 10 April 2019

Theories and Models in Science

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

venue: Rhoda-Erdmann-Haus, Philippstraße 13, House 22, 10115 Berlin, room 1023 (ground floor)

MIND

In this seminar we will take a close look at philosophical work on the nature and explanatory role of theories and models in science. We will tackle questions such as: What are scientific theories? How are they structured? What are scientific models and how do we gain knowledge from them? We will also examine the issue of scientific representation, aiming to shed light on the relationship between theories, models, and what they represent. The seminar is particularly suited to students that have some background in philosophy of science, and/or that have attended introductory courses on the topic.

Wednesday 17:00 – 18:30

start: 10 April 2019

The Philosophy and Psychology of Memory

Johannes Mahr (Central European University, Budapest)

venue: Rhoda-Erdmann-Haus, Philippstraße 13, House 22, 10115 Berlin, room 1023 (ground floor)

MIND / BRAIN

The study of memory has been central to psychology from its inception. However, the psychological study of memory has recently been reinvigorated by a series of surprising results from cognitive neuroscience and neuropsychology suggesting an intimate neurocognitive relationship between the human abilities to remember past events and to imagine future events. These results have also drawn attention from philosophers interested in questions which have already occupied early modern philosophers such as Hume and Locke: How can we distinguish memory from imagination? Are there necessary and sufficient conditions which would allow us to determine whether a given mental state is a memory? Is memory a natural kind?

In this course, we will explore both the empirical and the conceptual side of this literature. We will discuss findings from cognitive psychology, cognitive neuroscience and neuropsychology about the relationship between episodic memory and other capacities such as episodic future thinking, counterfactual imagination, perspective taking, dreaming and navigation and the question to what extent these capacities might be shared between humans and other animals. Moreover, we will look at how philosophers have made use of these results to suggest fundamental revisions to our everyday understanding of what memory is.

This class will be suitable for advanced students in the Philosophy of Mind and Psychology, and related disciplines within the cognitive sciences. It is not recommended to students with no background in this area of research.

Focus BRAIN

Monday 14:15 – 15:45

start: 15 April 2019

Basic Python

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

venue: Ostertaghaus (House 4), Campus Nord, Philippstraße 12, 10115 Berlin, Lecture Hall 4

BRAIN

*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.

Monday 16:15 – 17:45

start: 15 April 2019

Advanced Python

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

venue: Ostertaghaus (House 4), Campus Nord, Philippstraße 12, 10115 Berlin, Lecture Hall 4

BRAIN

*Mind and Brain master's and doctoral students **ONLY!***

This course builds on the introductory Python course. In order to participate in this advanced course, students should already be able to use Python for basic tasks, including: basic data types (integers, floats, strings, lists, tuples, dictionaries), functions and methods, conditional statements (if, else), iteration (for, while), manipulating and formatting text, and reading and writing text files. The new topics covered will include: creating Python modules, object-oriented programming, benchmarking, managing databases with SQL, and an introduction to machine learning. We will also learn new ways of making Python programs available to others, including publishing on GitHub. Finally, we will cover a few topics in greater depth in team project weeks. The content of these projects is somewhat open to discussion.

Wednesday 10:30 – 12:00

start: 10 April 2019

Neuroscience beyond the brain: from embodiment to Virtual Reality

Dr. Michael Gaebler (MPI for Human Cognitive and Brain Science, Leipzig) / Johanne Tromp (MPI for Human Cognitive and Brain Science, Leipzig)

venue: Invalidenstraße 110, 10115 Berlin, room 449

BRAIN

Humans constantly interact with the ever-changing environments around them. Even though the brain is important for mental processes, what we think and feel is also influenced by the rest of the body and by the situation we are in. For example, perception requires action, and interaction with the environment is crucial for cognition and emotion. Nevertheless, neuroscientific experiments are rarely interactive and typically do not measure bodily or situational parameters.

In our seminar, we assume that viewing, measuring, and analysing mental phenomena as embodied, embedded, extended, and enactive enables more complete neuroscientific experimentation. We also present and critically discuss virtual reality (VR) as a promising technology to extend the empirical basis and methodological development of the so-called 4E approach to the mind. VR offers an increased realism and more interaction as compared to classical lab settings while allowing for complete control over the experimental environment.

Over the semester, we will discuss several topics at the interface of brain, body, and environment. For example, how does our heartbeat influence what we perceive? How does the environment influence language comprehension? And, how can VR help to better investigate the neurophysiology of the mind? Participants will also get hands-on experience with VR, and they will have the opportunity to conceptualize and discuss a design for their own VR experiment.

Wednesday 13:00 – 14:30

start: 10 April 2019

Social communication and emotion processing – basic principles and clinical implications

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

venue: Rhoda-Erdmann-Haus, Philippstraße 13, House 22, 10115 Berlin, room 1023 (ground floor)

BRAIN

The class focuses on the perception of social and affective stimuli – on faces, language, and gestures, and how they are influenced by emotional content and by other socially relevant factors (e.g. attractiveness, trustworthiness). Furthermore, we will look how the perception of socially relevant information is affected in clinical conditions (e.g. autism spectrum conditions, depression, anxiety disorders). A focus will also be placed on understanding the (neuroscientific) methodology used in the papers (EEG, fMRI, psychophysiological measures).

Thursday 13:30 – 15:00

start: 11 April 2019

Neural bases of metacognition

Dr. Elisa Filevich (Bernstein Center for Computational Neuroscience / Institut für Psychologie, HU Berlin)

venue: Invalidenstraße 110, 10115 Berlin, room 449

BRAIN

Metacognition, or the brain's ability to monitor itself is a fascinating cognitive function. The seminar will look at recent studies identifying how metacognitive monitoring might be implemented in the brain. That is, we will focus on the neural mechanisms underlying different kinds of metacognitive monitoring. We will consider recent findings identifying neural correlates of metacognitive ability (at the structural and functional level) and aim to critically examine to what extent these results might contribute to explain the brain's meta-representational ability.

Thursday 15:30 – 17:00

start: 11 April 2019

Applied Statistics

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

venue: Invalidenstraße 110, 10115 Berlin, room 449

BRAIN

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.

BLOCK COURSES

15-17 July 2019, 9:00 – 17:00

Mindreading, Nativism, and Cognitive Development

Dr. Richard Moore (Berlin School of Mind and Brain)

venue: Invalidenstraße 110, 10115 Berlin, room 449

MIND

Mindreading (involving the application of a ‘theory of mind’, or ‘ToM’) is the ability to attribute sets of intentions, beliefs, and desires to others in order to predict and explain their behaviour.

While such reasoning comes easily to adults, a series of seminal developmental studies (e.g. Wimmer & Perner 1983) show that children younger than four struggle to attribute false beliefs to others when asked to make predictions about their behaviour. This has often been interpreted as showing that children younger than four do not have a concept of belief, and – by extension – that they do not understand that others have minds. However, when shown videos of others engaged in search behaviour (e.g. Onishi & Baillargeon 2005), measures of pre-verbal infants’ gaze suggest that they form accurate predictions about where others will look when their beliefs are false.

Children’s contrasting performance in these ‘implicit’ and ‘explicit’ measures of false belief understanding raises a number of philosophical questions about the nature of belief, and the conditions under which an understanding of belief should be attributed. Philosophers are currently divided into two camps. Nativists (including Peter Carruthers) argue that children possess a concept of belief from birth, but are unable to apply it in reasoning about others’ behaviour until they are older. Others (for example, Ian Apperly and Stephen Butterfill) argue that children’s mindreading abilities develop incrementally. At the end of their first year of life, they are able to attribute non-propositional ‘belief-like states’ to others, but do not acquire a full concept of belief until they have acquired language.

In this course, we will consider both empirical and philosophical arguments for and against the nativist hypothesis, with a view to better understanding the foundations of our knowledge of the minds of others. Will we also consider the question of whether animals – and chimpanzees in particular – are able to attribute minds to others.

- Apperly & Butterfill (2009) Do humans have two systems to track beliefs and belief-like states? *Psychological Review*, 116: 953–70.
- Low (2010) Preschoolers’ implicit and explicit false-belief understanding: relations with complex syntactical mastery. *Child Development*, 81(2), 597-615.
- Michael & Christensen (2016) Flexible goal attribution in early mindreading. *Psychological Review*, 123(2), 219.
- Onishi & Baillargeon (2005) Do 15-month-old infants understand false beliefs? *Science*, 308(5719), 255-258.
- Wimmer & Perner (1983) Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children’s understanding of deception, *Cognition*, 13: 103–28.

Colloquia:

Tuesday 18:15 – 19:45

start: 23 April 2019

Philosophical Colloquium

Prof. Dr. Michael Pauen (Department of Philosophy, HU Berlin)

venue: Berlin School of Mind and Brain, Luisenstraße 56, 10117 Berlin, room 220

MIND

The *bi-weekly* 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 Anja Papenfuss if you want to sign up for the colloquium: mb-admin@hu-berlin.de.

Tuesday 13:00 – 14:30

start: 16 April 2019

Research Colloquium

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

venue: Please contact mb-soccog@hu-berlin.de for information regarding the weekly changing venue.

BRAIN

If you have questions, please contact

Dr. Dirk Mende

mb-education@hu-berlin.de

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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).