



Master program “Mind and Brain”

Berlin School of Mind and Brain

Humboldt-Universität zu Berlin

Summer Semester 2022

Monday	Tuesday	Wednesday	Thursday	Friday
10:00 – 11:30 Haynes et al. Neuroimaging	10:00 – 11:30 Brass Empirical Research Training (BRAIN Track)	10:00 - 11:30 Brass Research Colloquium (B)	11:00 – 12:30 Brass Empirical Research Training (MIND Track)	NEW 10:30 – 12:00 Haynes Neuroscience of volition and free will (B)
12:15-13:45 Knoeferle / Pulvermüller Language and the Brain	12:00 – 13:30 Brass Empirical Research Training (BRAIN Track)	NEW 10:15 – 11:45 Hipólito The Free Energy Principle (M)	13:00 – 14:30 Brass Empirical Research Training (MIND Track)	NEW 13:00 – 14:30 Haynes Principles and challenges of ‘brain reading’ (B)
	11:15 – 12:45 Dziobek Forschungs- kolloquium (in German)	NEW 14:15 – 15:45 Tutorial: Knechtges / Pataroyo Language and the Brain		NEW 16:15 – 17:45 Cabeza Memory and the Brain (B)
	14:30 – 16:00 Tutorial: Finke / Schultze- Kraft / Weber Neuroimaging		NEW 16:15 – 17:45 Hipólito Writing and Argumentation (M)	NEW 18:15 – 19:45 Tutorial: Sofroni Ethics and Neuro- science
18:15-19:45 Pauen Forschungs- kolloquium / Research Colloquium (M)	16:30 – 18:00 Tutorial: Finke / Schultze- Kraft / Weber Neuroimaging			

Block: 26 / 28 / 30 July 2022, 9:00 – 17:00: Richard Moore / Susana Monsó, Animal Minds (M)

Comprehensive Course Calendar

Mandatory Lectures

Monday 10:00 – 11:30

start: 25 April 2022

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 analyze their own studies.

Monday 12:15 – 13:45

start: 25 April 2022

Language and the Brain

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

venue: Bernstein Center for Computational Neuroscience, Philippstr. 13., 10115 Berlin, House 6, Lecture Hall (ground floor)

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 10:00 – 13:30 (BRAIN Track) start: 19 April 2022

Thursday 11:00 – 14:30 (MIND Track) start: 21 April 2022

Empirical Research Training

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

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

Mind and Brain students only!

In the empirical-experimental exercise students apply and deepen their basic knowledge of neurocognitive research methods. The objective of the class is to familiarize students with experimental research by providing "hands-on" experience in designing, conducting, analyzing, interpreting, and writing up one experimental 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. Identify relevant research problems in cognitive neuroscience
2. Formulate research hypotheses that can be empirically investigated
3. Design experimental neurocognitive studies
4. Understand the ethical implications of the research
5. Apply principles of open and reproducible science
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

Tuesday 14:30 – 18:00

start: 26 April 2022

Tutorial: Neuroimaging

Dr. Matthias Schultze-Kraft (Bernstein Center for Computational Neuroscience), Prof. Dr. Carsten Finke (Berlin School of Mind and Brain), Simon Weber (Bernstein Center for Computational Neuroscience),

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

Mind and Brain students only!

The participants will be split up in two groups who have double-sessions on alternating weeks.

Besides the Agnes registration participants are asked to register via Doodle and based on this Doodle registration two groups will be formed.

Friday **NEW** 18:15 – 19:45

start: 22 April 2022

Tutorial: Ethics and Neuroscience

Razvan Sofroni (Institut für Philosophie, HU Berlin)

NEW venue: Humboldt's main building, Unter den Linden 6, 10099 Berlin, room 1070

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.

Wednesday 14:15 – 15:45

start: 27 April 2022

Tutorial: Language and the Brain

Johanna Knechtges (FU Berlin) / Angela Pataroyo (HU Berlin)

NEW *venue: Sophienstraße 22A, 10178 Berlin, room 0.01*

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

Wednesday 10:15 – 11:45

start: 20 April 2022

The Free Energy Principle

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

NEW venue: *Institut für Biologie, Hannoversche Str. 27, 10115 Berlin, lecture hall 3*

NB: Do not use Alte Nervenlinik's main entrance! Please use the entrance for students (Studenteneingang) in the left side wing of the building. Walk up two flights of stairs. When leaving the staircase, you have to step through two doors. After the second door the entrance to the seminar room is immediately on your left.

MIND

Scientific evidence supports the idea that the brains are predictive machines, and they work that way to conserve energy. The Free Energy Principle (FEP) is claimed as a unified brain theory that solves different cognitive functions under the same formalism. The FEP is increasingly influential in many areas with special emphasis on neurobiology, computational neuroscience and philosophy of mind. While the FEP has strong associations with the Bayesian brain hypothesis and predictive coding models in neuroscience at the basis of prediction error minimization and predictive processing theories in philosophy of mind, it is not implied by them. What is it that makes the FEP relevant to the Bayesian brain accounts of cognition? In this course students will learn in detail about the FEP and its relations to the Bayesian brain to critically assess its value as a theory of the mind and brain. More specifically, students will learn the essential terminology of the FEP applied to biology and the brain, its formalisms and real-world applications in science and technology.

*Thursday **NEW** 16:15 – 17:45*

start: 21 April 2022

Writing and Argumentation

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

NEW venue: *Institut für Biologie, Hannoversche Str. 27, 10115 Berlin, lecture hall 3*

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, recognize, 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.

Block course: Tue, Thur, Sat 26 / 28 / 30 July 2022, 9:00 – 17:00

Animal Minds

Prof. Dr. Richard Moore (University of Warwick) / Prof. Dr. Susana Monsó (Universidad Nacional de Educación a Distancia, Spain)

venue: tba

MIND

This course will discuss recent research on the respects in which non-human animals can be said to have minds; and the cognitive capacities that can properly be attributed to them. We'll pay particular attention to recent 'minimalist' approaches to cognition. According to these, human cognition has historically been intellectualised, such that differences between human and animal minds have been overstated. Minimalist approaches attempt to advance the debate by means of a conceptual characterisation of the cognition functionally necessary for participation in certain behaviours. We'll discuss the extent to which minimalist approaches are theoretically adequate, support the development of compelling mechanistic accounts of cognition, and are appropriate for the characterisation of animal minds.

The course will begin with a discussion of the roles of parsimony in adjudicating claims about animal cognition. We'll then address in detail a series of recent debates about the attribution of particular kinds of cognition to non-human species, specifically 'Theory of Mind', language and communication, episodic memory and future thinking, normativity, tool use, numerical cognition, morality, and an understanding of death. The students will gain familiarity with the main arguments and empirical literature that support or undermine the attribution of these capacities to animals, as well as the ability to formulate their own views on the matter.

Participants will have to give short presentations of the papers discussed in class. For the presentations students have to sign up in the Moodle account of the course.

Light background reading:

Monsó, S. (2021). What animals think of death. Aeon.

Suddendorf, T. (2013). The gap: The science of what separates us from other animals. Constellation.

Some deeper background reading:

Andrews, K. (2020). The animal mind: An introduction to the philosophy of animal cognition. Routledge.

Butterfill, S. & Apperly, I. (2013). How to construct a minimal theory of mind. *Mind & Language*, 28(5), 606-637.

Lloyd, E. A. (2004). Kanzi, evolution, and language. *Biology and Philosophy*, 19(4).

Monsó, S. (2019). How to tell if animals can understand death. *Erkenntnis*.

Moore, R. (2017). Gricean communication and cognitive development. *The Philosophical Quarterly*, 67(267), 303-326.

Focus BRAIN

Friday 10:30 – 12:00

*start: **NEW** 29 April 2022*

Neuroscience of volition and free will

Prof. Dr. John-Dylan Haynes (Berlin School of Mind and Brain / Bernstein Center for Computational Neuroscience)

venue: tba

BRAIN

Philosophers, psychologists and brain scientists have long debated whether neuroscience has anything to contribute to solving the problem of free will. One finding by Benjamin Libet has played a central role in this debate. Certain brain signals can predict the outcome of “free” choices even before a person believes to be making up their mind. Some take this to imply that a decision can already be made by unconscious brain activity before a person subjectively believes to be making the decision, thus questioning whether the decision was indeed free. This has led to a long debate, especially regarding the question which characteristics of a decision are required for it to be considered free. Besides these conceptual questions, the findings have also been challenged on technical grounds, for example by questioning the nature of the choice-predictive brain signals and their deterministic nature. Some researchers now believe choice-predictive experiments are irrelevant for the problem of free will. Importantly, beyond Libet, there is a much wider body of psychological and neuroscientific findings that have potential implications for how free we should consider our decisions. This includes studies of sensory and value-based decision making, executive functions and control, volition, mental state decoding, studies of lay opinions (“experimental philosophy”) and many more. This seminar will give an overview of the key debates in this field with a wider view on the subfields of psychology and neuroscience that are frequently neglected in the free will debate. We will link up the scientific findings to conceptual issues of control and free will.

Friday 13:00 – 14:30

*start: **NEW** 29 April 2022*

Principles and challenges of ‘brain reading’

Prof. Dr. John-Dylan Haynes (Berlin School of Mind and Brain / Bernstein Center for Computational Neuroscience)

venue: Bernstein Center for Computational Neuroscience, Philippstr. 13., 10115 Berlin, House 6, Lecture Hall (ground floor)

BRAIN

Recent advances in human brain imaging and machine learning have made it possible to decode to some degree what a person is currently thinking. This field has received a lot of attention recently following the announcements of several high-tech companies to develop a powerful brain decoding device in the near future. However, it is unclear how much of this is scientifically feasible and how

much is speculation. Indeed, the decoding of mental states (sometimes referred to as “mind reading” or “brain reading”) has achieved higher levels of detail than researchers would have initially predicted, but it still has substantial limitations. This course will provide an overview of this field, both in terms of the philosophical and the scientific foundations, the potential applications and the ethical challenges. We will cover with the mind-body problem, machine learning and neural networks, neural coding, mathematical models, applications in clinical, forensic and commercial fields (brain computer interfaces, detection of consciousness, lie detection, neuromarketing), mental privacy, and whether mental state decoding leads to the perspective of sanctioning “thought crimes”. In the end the student should have a picture of the principles and also the challenges and limitations of the emerging field.

Friday NEW 16:15 – 17:45

start: 22 April 2022

Memory and the Brain

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

NEW venue: Humboldt’s main building, Unter den Linden 6, 10099 Berlin, room 1070

BRAIN

This seminar highlights recent research in cognitive neuroscience of memory, particularly in the domains of working memory, semantic memory, and episodic memory. The articles read during the course include functional neuroimaging studies with healthy individuals, as well as neuropsychological studies with brain-damaged patients. In each class, the instructor introduces a topic, the students present an article on the topic, and the article is discussed. The goal of the course is to help students think critically about theoretical and methodological issues in cognitive neuroscience of memory.

Colloquia:

Monday 18:15 – 19:45

start: 25 April 2022

Forschungskolloquium / Research Colloquium

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

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

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 research colloquium is held in English!

Tue 11:15 – 12:45

start: tba

Forschungskolloquium

Prof. Dr. Isabel Dziobek (Institut für Psychologie, HU Berlin)

venue: tba

BRAIN

Participation by appointment only. If you want to sign up for the colloquium, please contact psysekks@hu-berlin.de.

The Kolloquium is held in German!

Wed 10:00 – 11:30

start: 27 April 2022

Research Colloquium: Social Intelligence

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

venue: Philippstr. 13., 10115 Berlin, House 5, room 009 (Please ring the bell at the entrance)

House 5 is a small building located next to Bernstein Center (House 6) and Ostertag-Haus (House 4) on Campus Nord.

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

The Research Colloquium 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).