## Neuro-psychology of cognitive impairment in minor and major neurocognitive disorders

**Teachers:** Martina Amanzio , Adriano Chiò , Leonardo Lopiano, Innocenzo Rainero, Sara Palermo

**Location:** see program

**Dates:** see program

**Program:**
The course is aimed at:
- Let students know the neuropsychology of cognitive dysfunctions along a continuum ranging from normal aging, to minor and major neurocognitive disorders.
- To provide a thorough neuropsychological knowledge of Mild Cognitive Impairment and cognitive frailty, Alzheimer's Disease, Frontotemporal Lobar Degeneration and Parkinson's Disease.
- To understand the mechanisms and consequences of cognitive impairment in motor neuron disease.
- To present the recent international guidelines to achieve the best diagnostic assessment.
- To foster in students skills about the executive dysfunction in reduced awareness of illness using a neurocognitive approach.

**Location and dates:**

Innocenzo Rainero
Sept X, 2020 (h XX-XX)            AULA via Cherasco 15, first floor
Sept X, 2020 (h XX-XX)            AULA via Cherasco 15, first floor


Martina Amanzio
Sept 18, 2020 (h 14-16)            Istituto Plana, Via Plana 10
Sept 25, 2020 (h 14-16)            Istituto Plana, Via Plana 10

Adriano Chiò
Sept X, 2020 (h 14-16)            AULA via Cherasco 15, first floor
Sept X, 2020 (h 14-16)            AULA via Cherasco 15, first floor


Leonardo Lopiano
Sept X, 2020 (h XX-XX)            AULA Magna, Via Cherasco 15
Sept X, 2020 (h XX-XX)            AULA Magna, via Cherasco 15

Sara Palermo
Oct 2, 2020 (h 14-16)            Istituto Plana, Via Plana 10

## Attachment: from cortical nuclei to clinical practice
## 7 hours

**Teachers:** Federico Amianto

**Location:** see program

**Dates:** January 2020

**Program:**
lessons of two hours and half on Monday/Tuesday (15.00-17.30).
1. neuroimaging research pertaining attachment cortical and subcortical nuclei
2. neuroimaging research exploring the development of attachment circuits in relation to parenting and early relationships
3. neuroimaging research in clinical population and its relevance for clinical issues

## "Motor neuron diseases: understanding the pathogenetic mechanisms to develop therapies"

### 3-day workshop

**Proponents:**

Marina Boido, Assistant Professor (RTDb), Dept. Neuroscience and Neuroscience Institute Cavalieri Ottolenghi
marina.boido@unito.it

Serena Stanga, Assistant Professor (RTDa), Dept. Neuroscience and Neuroscience Institute Cavalieri Ottolenghi
serena.stanga@unito.it;

**Location:** Lectures: Institute of Human Anatomy, C.so Massimo D'Azeglio 52, 10126, Torino; Practical s
Neuroscience Institute Cavalieri Ottolenghi (NICO) (www.nico@ottolenghi.unito.it), Regione Gonzole, 10 -
Orbassano (To) – IT

**Dates:** June 2020 (exact dates to be defined)

**Program:**

Motor Neuron Diseases are a group of neurological pathologies which affect motor neurons (MNs) causin
progressive degeneration. Being MNs responsible of voluntary muscle activity such as speaking, walking, breathi
swallowing, the phenotypical outcome of these diseases is incredibly disabling and responsible for premature death
proposed workshop we will focus on Amyotrophic Lateral Sclerosis (ALS), which is mostly sporadic and affects
around 40-60 years of age, and Spinal Muscular Atrophy (SMA), an hereditary disease affecting children and young
The 3-day workshop on Motor Neuron Diseases is proposed to PhD students and young Postdocs who aim to deep
topic, meet experts in the field, and create a collaborative network. The workshop foresees: seminars held by e
dynamic discussions and interactions with the speakers and the other attendees (Speed dating & NeuroBreak), a
session, an afternoon of practical activities on the bench and a social event.

**Speakers**:

- M. Boido, University of Torino and NICO
- A. Calvo, University of Torino *- to be confirmed*
- V. Crippa, University of Milano
- E. Di Schiavi, CNR Napoli *- to be confirmed*
- D. Ferrari, University of Milano *- to be confirmed*
- P. Konieczny, University of Valencia, Spain *- to be confirmed*
- M. Milanese, University of Genova
- T. Mongini, University of Torino *- to be confirmed*
- G. Nardo, Istituto Mario Negri, Milano
- D. Rossi, ICS Maugeri, Pavia
- R. Soler, University of Lleida *- to be confirmed*
- S. Stanga, University of Torino and NICO
- G. Viero, CNR Trento *- to be confirmed*

**Practical activities conducted by:**

- M. Boido, University of Torino and NICO
- S. Stanga University of Torino and NICO

| Titolo | Reasoning | 6 hours | Credits: 3 |
|---|---|---|---|

**Proponent:** Prof. Monica Bucciarelli

**Location:** Istituto Plana, via Plana 10, Aula E

**Dates:** January 28th and 29th 2020,   9.00 – 12.00

**Program:**

# Reasoning

The course will deal with both automatic and deliberate reasoning processes underlying everyday inferences and inferences in scientific contexts. It will be concerned with deduction and induction, as well as abduction, namely the classical method used in scientific research with the aim to infer the causes from the effects and thus building theories. Also, the course concerns typical reasoning errors such as biases and heuristics. Being aware of the mental representations and processes involved in reasoning is particularly relevant to reason correctly from the methodological point of view in the scientific domain.

# An introduction to Machine Learning for Neuroscience

**Teachers:** Luca Romeo, Andrea Cavallo

**Location:** Webex meeting

**Dates:** 16/03/2020 (6h) – 17/03/2020 (6h)

**Program:**
Nowadays, machine learning is applied in almost every field. Machine learning relies entirely on the data; the more the data, the more efficient machine learning is. The ever-growing quantity of data in the neuroscience field opens the realm of possibilities for machine learning to learn a clinical task and answer the clinical-related hypothesis. However, what is the added value that machine learning brings to an ordinary statistical analysis? How machine learning can be exploited to find discriminative information encoded in the data? How machine learning can be exploited to localize where the discriminative information is placed? In this workshop, we will try to answer these questions by focusing on the design and the application of machine learning approaches in order to answer specific clinical questions. The workshop will take place on two different days. For each day a theoretical session about machine learning methodologies will be followed by an interactive laboratory where the participants will apply machine learning methodologies in their clinical and experimental dataset.

H10.30-12.30: Theoretical session: Machine learning methodologies

H14.00-18:00: Laboratory session: Application of Machine learning methodologies

## The vestibular system: basic and clinical methodology of investigation

**Teachers:** Luigi F. Cuturi, Silvia Colnaghi, Andrea Cavallo

**Location:** Aula D – Istituto Plana. Via Plana, 10 - Torino

**Dates:** December 17th, from 9.00 am to 6.00 pm

**Program:**
When moving through space, for instance by walking or driving a vehicle, our brain processes several sensory inputs that inform us about the properties of our motion in order to accomplish successful spatial navigation. Sensory inputs as visual and auditory tell us how we move with respect to the surroundings whereas vestibular sensory information provides a reference of self-motion with respect to gravity. The vestibular system is composed by the semicircular canals and otolith organs that signal rotational and linear acceleration of the head respectively. Vestibular inputs are combined with the other sensory modalities to provide coherent perception of self-motion. In the present workshop, the main methodologies of investigation of self-motion perception will be presented with a particular attention to the study of vestibular perception from a behavioral and neurophysiological perspective. In the first part of the workshop, the focus will be on the methodologies employed in basic neuroscience research, providing the student with the most updated studies and advances in the field. The second part of the workshop will explore the clinical testing and implication of vestibular related dysfunctions. Hands-on will be provided.

# GLIAL CELLS-NEURON CROSSTALK IN CNS HEALTH AND DISEASE

**Proponents:**
Valentina Cerrato, PhD, Dept. of Neuroscience and NICO, UNITO
Enrica Boda, Ass. Prof. in tenure track (RTD-B), Dept. Neuroscience and NICO, UNITO
Annalisa Buffo, Associate Professor, Dept. Neuroscience and NICO

**Location:**
Lectures: Institute of Anatomy, C.so Massimo D'Azeglio 52, Turin;
Theoretical-Practical sessions (day 2): Neuroscience Institute Cavalieri Ottolenghi,
Regione Gonzole 10, Orbassano

**Dates:** 27-28-29 February 2020

**Program:**
Since their discovery, glia were thought for a long time only to support neurons passively. In line with this view, neurological and psychiatric disorders have long been interpreted as the exclusive consequence of abnormalities in neurons. We now appreciate that glia operate as master regulators of numerous aspects of CNS development and plasticity. Further, dysregulations of the glial cells-neuron crosstalk can be primarily involved in initiation and progression of several neuropathologies. The aim of this 3-day long workshop is to enable participants to enhance their knowledge on the functions of glial cells in health and disease. The program includes lectures on the newest conceptual and methodological approaches to study the role of glial cells in synaptic function, development and CNS disease. Participants will have the opportunity to present their own research projects and discuss ideas with leaders in the field. The program includes sessions devoted to research methodology and theoretical-practical training, that will allow participants to learn and practice state-of-the-art methods/techniques to study glia-neuron interactions.

## Neuroscience of Social Behavior                4 hours

**Proponent:** Olga Dal Monte

**Location:** Sala Saminari Palazzo Badini_via verdi 10

**Dates:**
Dicembre 11 2019, 14-16
Dicembre 12 2019, 14-16

**Program:**
The course aims to give students advanced theoretical and methodological knowledge on state-of-the-art research around the Neuroscience of Social Behavior. Our brains evolved to deal with increasing demands of social interactions. Social behaviors are reward driven, whether their motivating factors are physical rewards, such as food and sex, or more abstract rewards, such as vicarious experience and interpersonal reputation. Investigating how the brain computes social preferences and mediates prosocial and antisocial decisions can offer an ecologically valid and efficient way to understand the brain. In particular, studying how the brain computes social information during dynamic and contingent interactions will likely reveal novel insights into the neural mechanisms underlying social behavior. Elucidating these neural mechanisms will ultimately help treat social deficits in numerous psychiatric disorders. These topics will be discussed in both humans and animal models of human cognition by going over general neurobiological principles followed by several key examples from research studies that have influentially shaped the field

## Chemical Neuroanatomy: an introduction to the morphology studies of the Nervous System
## 4 hours   Credits:  XX

**Proponent:** Stefano Gotti

**Location:** Anatomy, Corso M. D'Azeglio 52

**Dates: I semester, January 2020**

**Program:** The nervous tissue: morphology of the nervous cells and glia cells; overview of the principal technics used in neuroanatomy: histochemistry, immunohistochemistry, combination of techniques, in situ hybridization, autoradiography, tracers…

## Neurosecretion and synaptic transmission
## 4 hours   Credits:  XX

**Proponents:** Andrea Marcantoni, Valentina Carabelli

**Location:** Corso Raffaello, 30

**Dates: July 2020**

**Program:** The course aims to define the main properties of chemical synapses of central neurons by taking into account different cell models represented by neurons and neuronal like cells
*4.1 – Chromaffin cells as a model for studying exo and endocytosis (V. Carabelli)*
*4.2 – Quantal detection of neurotrasmitter release (V. Carabelli)*
*4.3 – Calcium dependent synaptic modulation in central neurons (A. Marcantoni)*
*4.4 – Analysis of synaptic currents (A. Marcantoni)*

| Titolo   Introduction to R for Statistical Analysis | 15 hours |
|---|---|
| Credits:  XX | |

**Proponent:** Ugo Merlone

**Location:** University of Turin, Computer classroom (for the first class) afterwards students are urged to bring their own laptop with R and R Studio (both are free software)

**Dates:**  October-November 2019, 5 three-hour classes to be decided depending on students schedule and classroom availability

**Program:** R, importing data and exporting results, how to use R for descriptive analysis, statistical inference, regression. Classes can be either in English or Italian.

## The (Neuro)science of Bodily Self-Consciousness          5 hours 2 Credits

**Proponent:** Lorenzo Pia (3 hours) & Francesca Garbarini (2 hours)

**Location:** Sala Seminari, Palazzo Badini

**Dates:** January 14, 9-12 (Pia) and January 15 10-12 (Garbarini)

**Program:**
The course aims to give students advanced theoretical and methodological knowledge on state-of-the-art research around bodily self-consciousness. Indeed, recent multidisciplinary studies on the fields of neurology, artificial intelligence, psychology, virtual reality clearly have allowed opening new avenues to investigate the neurocognitive mechanisms underlying a fundamental sense of the bodily self in humans. During the lessons, we will present the most recent techniques (e.g., psychophysical paradigms, neuroimaging, lesion mapping, robotics etc.) to study the neural roots of the bodily-self body perception, cognition, and self-consciousness. This, allows to shed light on some of the key features of the topic as, for instance, the role of efferent/afferent signals or the contribute of self-location/first-person perspective.

The (Neuro)science of Bodily Self-Consciousness          5 hours 2 Credits

## Non-invasive brain stimulation for the study and the treatment of the brain
## 9 hours

**Proponent:** Raffaella Ricci

**Location:** Palazzo Badini/Plana

**Dates: seconda metà di settembre 2020**

**Program:** The course is aimed at providing the students with advanced theoretical and methodological knowledge on non-invasive brain stimulation and the possibilities of investigation offered by their combination with neuroimaging techniques. The course will focus on new perspectives and research approaches that have recently been proposed to understand the neural bases of cognitive functions also in relation to some of the main topics of cognitive psychology and neuropsychology. In addition, the use of brain stimulation as a potential tool of intervention for the treatment of brain pathologies will be presented. At the end of the course the students are expected to be able to critically discuss the state of the art, new thoughts and proposals in order to find innovative lines of research. Possible practical implementation of non-invasive brain stimulation will be also discussed.

## Success and science: nature or nurture?
## 6 hours

**Proponent:** Annalisa Buffo – Lecturer: Allegra Via (IBPM-CNR)

**Location:** TBD

**Dates: May 2020**

**Program:** Many people tend to think that good scientists are born, not made. In other words, that only talented people will have success in pursuing a career in science. But, is talent the actual driver of a research career?

Upon completion of your PhD, a question may arise: what next? Although it seems a natural progression to continue with further research, there are many other careers open to academics. So how do you know if research is the right career choice for you? The path to research is not easy and becoming a "good researcher" may be a great challenge. But…what is a "good researcher"? What are their characteristics? Do you think you have them? Or, is it possible to develop them? How can you overcome the challenges of becoming a "good researcher"?

Choices you will make during and at the end of your PhD, will determine many aspects of your future life. Much will depend on your interests and passion. However, being aware of pros and cons of a career in research, the skill set needed to undertake a scientific career and the limiting factors, may greatly facilitate the difficult task of making the best decisions for your life.