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Trento June 13th-15th 2024

Sala Grande FBK
Via S. Croce, 77 – Trento



connect
BRAIN Vol. III

Theoretical and practical course on clinical and surgical applications
of structural and functional connectivity



ORGANISED BY

Department of Neurosurgery
Medical Education Service
Azienda Provinciale per i Servizi Sanitari, Trento, Italy

IN COLLABORATION WITH

Neuroinformatics Lab, Bruno Kessler Foundation, Trento, Italy
University of Trento, Italy

REQUESTED PATRONAGE

Health ministry
Autonomous Province of Trento (PAT)
Omceo Trento
Pezcoller Foundation
Italian Society of Neurosurgery (SINch)
Italian Association of Neuro-Oncology (AINO)



*Azienda Provinciale
per i Servizi Sanitari
Provincia Autonoma di Trento*

Introduction

The field of neurosurgery and neurology has undergone a remarkable evolution, closely paralleling the advancements in clinical and basic neurosciences worldwide. Specifically, neuro-oncology and surgery have fostered close collaborations with various disciplines such as neurophysiology, advanced imaging, neuroradiology, neuropsychology, and rehabilitation. These interactions have facilitated the development, testing, and daily utilization of both invasive and non-invasive techniques in our departments for the study and treatment of patients with brain tumors. The integration of our clinical and scientific worlds has never been more evident, emphasizing the critical importance of interdisciplinary expertise in planning safe and effective treatments and enhancing our understanding of the intricate wiring diagram of the human brain and the neural pathophysiology of brain tumors.

In 2015, ConnectBrain was established with the aim of providing a comprehensive course that caters to a diverse audience, including professionals from neurosurgery, neurology, neurophysiology, neuropsychology, rehabilitation medicine, and basic neurosciences. Building upon the success of the second edition in 2019, which attracted an international audience, we are proud to announce the launch of ConnectBrain Vol. III.

For this upcoming edition, we have meticulously assembled a distinguished international faculty comprising experts in the field. These esteemed individuals will enlighten us on the latest methodological advancements in the study of brain structure and function. Their valuable insights will enable us to gain a comprehensive understanding of these breakthroughs and explore their practical applications in the treatment of brain diseases.

Local scientific committee

Luciano Annicchiarico (Azienda Provinciale per i Servizi Sanitari, Trento)

Paolo Avesani, (NiLab, Bruno Kessler Foundation)

Barbara Cassone (CIMeC, University of Trento)

Ludovico Coletta (Bruno Kessler Foundation)

Francesco Corsini (Azienda Provinciale per i Servizi Sanitari, Trento)

Jorge Jovicich, (CIMeC, University of Trento)

Manuela Moretto (CIMeC, University of Trento)

Laura Vavassori (Azienda Provinciale per i Servizi Sanitari, Trento)

Course directors

Silvio Sarubbo

Luca Zigiotto

Department of Neurosurgery

Azienda Provinciale per i Servizi Sanitari (APSS), Trento, Italy

Theoretical Session

Thursday June 13th, 2024

Congress Venue Sala Grande - FBK
Via Santa Croce, 77 - Trento

08:30 - 09:00 Registration

09:00 - 10:00 Opening - Authorities

10:00 - 10:30 Lecture introduced by Silvio Sarubbo
(Department of Neurosurgery, APSS, Trento)
The brain before and the brain today
Stephanie Forkel (Radboud University, The Netherlands)

10:30 - 11:15 SESSION I

Introduction to advanced imaging

Chairmen: Annalisa Trianni (Department of Medical Physics, APSS, Trento),
Carlo Cosimo Quattrocchi (CISMed, University of Trento)

Principles of resting-state fMRI for human brain mapping

Bharat Biswal (Department of Radiology, New Jersey Institute of Technology, USA)

Techniques and limitations in tractography of the human brain white matter

Francois Rehault (University of Sherbrooke, Canada)

How to track the brain: tools

Paolo Avesani (Neuroinformatics Lab, Fondazione Bruno Kessler, Trento)

11:15 - 11:30 Discussion and Questions

11:30 - 12:00 Coffee Break

12:00 - 12:45 SESSION II

Applications of advanced functional mapping imaging in glioma

Chairmen: Yuri Bozzi (Center for Mind and Brain Sciences, University of Trento),
Giuseppe Della Pepa (Department of Neurosurgery, La Cattolica University, Rome)

Extracting brain networks by resting-state fMRI

Jorge Jovicich (Center for Mind Brain Sciences, University of Trento)

Anatomy and features of brain networks at resting state

Francesca Saviola (Center for Mind Brain Sciences, University of Trento)

Tools and principles for analysis of functional connectivity and brain plasticity

Ludovico Coletta (Neuroinformatics Lab, Fondazione Bruno Kessler, Trento)

12:45 - 13:00 Discussion and Questions

13:00 - 14:30 Lunch

Thursday June 13th, 2024

14:30 - 15:15 SESSION III

Evidences of brain connectivity

Chairmen: Carlo Miniussi (Center for Mind Brain Sciences, University of Trento),
Gianantonio Spina (Department of Neurosurgery, Pavia University-Hospital)

Dorsal and ventral pathways of the human brain by tractography

Laurent Petit (GIN-IMN, University of Bordeaux)

Exploring structural connection with BraDiPho

Laura Vavassori (Department of Neurosurgery, APSS, Trento)

Brain connections explored by TMS

Sandro Krieg (Department of Neurosurgery, University of Munich)

15:15 - 15:30 Discussion and Questions

15:30-16:15 SESSION IV

Invasive mapping

Chairmans: Alessandro Olivi (Department of Neurosurgery, La Cattolica University,
Rome), Giuseppe Barbagallo (Department of Neurosurgery, University of Catania)

Direct electrical stimulation of the human brain for awake surgery

Emmanuel Mandonnet (Lariboisiere Hospital, University of Paris 7 Diderot)

Intraoperative monitoring for asleep surgery

Andrea Szélenyi (Neurophysiology Unit, University of Munich)

Intraoperative monitoring for exploring supra- and infra-tentorial connections

Francesco Sala (Department of Neurosurgery, University of Verona)

16:15 - 16:30 Discussion and Questions

16:30 - 17:00 Coffee Break

17:00 - 18:00 Lecture introduced by Jorge Jovicich (Center for Mind Brain
Sciences, University of Trento)

The era of connectomics: the present and future for clinics

Michael D. Fox (Department of Neurology, Harvard Medical School,
Boston, MA, US)

18:00 Take home messages and closure

Friday June 14th, 2024

09:00 - 09:30 Lecture introduced by Silvio Sarubbo
The surgery of brain gliomas across a century
Hugues Duffau (Department of Neurosurgery, University of Montpellier, France)

09:30 - 10:15 SESSION V

Anatomical challenges in brain surgery

Chairmans: Maurizio Fornari (Department of Neurosurgery, Humanitas University),
Vincenzo Esposito (Department of Neurosurgery, University of Rome "La Sapienza")

Insula and temporal stem anatomy

Federico Pessina (Department of Neurosurgery, Humanitas University, Milan)

Perisylvian language networks

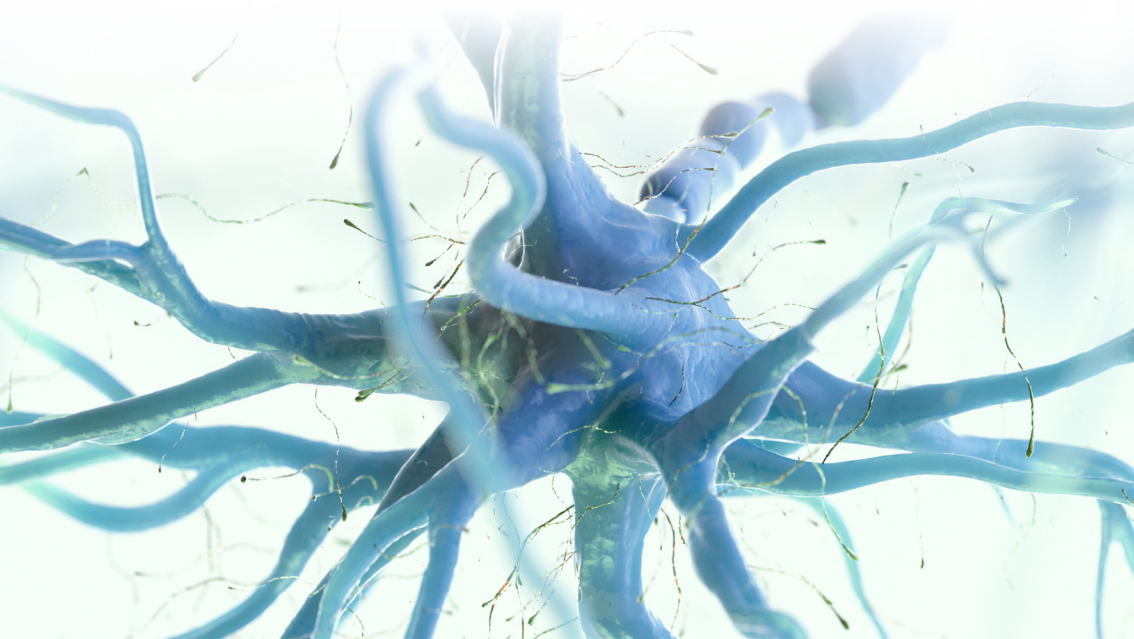
Alessandro De Benedictis (Bambino Gesù Pediatric Hospital, Rome)

Subpial dissection and the access to the insula of Reil

Michael Sabel (Department of Neurosurgery, University of Düsseldorf, Germany)

10:15 - 10:30 Discussion and Questions

10:30 - 11:00 Coffee Break



Friday June 14th, 2024

11:00 - 11:45 SESSION VI

Techniques for motor and cognitive mapping

Chairmans: Rocco Quatralè (Department of Neurology, APSS), Diego Garbossa (Department of Neurosurgery, University of Turin)

Motor and higher motor mapping in asleep and awake surgery

Lorenzo Bello (Department of Neurosurgery, University of Milan)

Monitoring higher cognitive functions in awake surgery

Marco Fontanella (Department of Neurosurgery, University of Brescia)

Outcomes and perspectives in glioma surgery

Tamara Ius (Department of Neurosurgery, University Rome "La Sapienza")

11:45 - 12:00 Discussion and Questions

12:00 - 12:30 Lecture introduced by Francesco Sala (Department of Neurosurgery, University of Verona)

Advancements in genetics and biology of brain tumors

Alessandro Quattrone (Department of Cellular Computational and Integrative Biology, University of Trento)

12:30-14:00 Lunch



Friday June 14th, 2024

14:00 - 14:45 SESSION VII

Cognitive testing and outcomes in brain tumor surgery

Chairmen: Filippo Flavio Angileri (Department of Neurosurgery, University of Messina),
Jacopo Bonavita (Department of Rehabilitation Medicine, APSS, Trento)

Neuropsychological testing and outcome

Luca Zigiotto (Department of Neurosurgery, APSS, Trento)

Novelties in intra-operative cognitive monitoring

Guillamme Herbet (Department of Neurosurgery, University of Montpellier, France)

Cognitive rehabilitation and brain plasticity

Lorella Battelli (Italian Institute of Technology, Trento)

14:45 - 15:00 Discussion and Questions

15:00-16:00 SESSION VIII

Standards and novelties in treatments of brain tumors

Chairmans: Mattia Barbareschi (CISMed, University of Trento),

Valentina Vanoni (Department of Radiotherapy, APSS)

*Neurosurgery and neuro-oncology: adapting medical treatments
and surgical strategies*

Marion Rapp (Department of Neurosurgery, University of Düsseldorf)

New frontiers in IDH-mutated gliomas treatment

Roberta Rudà (Department of Neurology, University of Torino)

New insights in the medical treatment of high-grade gliomas

Giuseppe Lombardi (Department of Oncology, Istituto Oncologico Veneto)

Radiotherapy and proton-beam therapy for treatment of intrinsic brain tumors

Dante Amelio (Department of Protontherapy, APSS, Trento)

16:00 - 16:30 Discussion and Questions

16:30 - 17:00 Coffee break

17:00 - 17:30 Lecture introduced by Emmanuel Mandonnet (Lariboisiere Hospital,
University of Paris 7 Diderot)

New insights in neuro-oncological surgery: technical and conceptual
Nader Sanai (Ivy Brain Tumor Center, Barrow Neurological Institute,
Arizona, US)

17:30 Take home messages and Closure

Saturday June 15th, 2024

Tutors: Laurent Petit, Alessandro De Benedictis, Paolo Avesani, Luca Zigiotta, Laura Vavassori, Stephanie Forkel, Francois Rheault, Jorge Jovicich, Francesca Saviola, Francesco Corsini, Luciano Annicchiarico, Manuela Moretto, Barbara Cassone, Ludovico Coletta.

INTRODUCTION

- 08:30 – 8:45 *Introduction of team and activities*
S. Sarubbo
- 08:45 – 9:00 *Presentation of clinical cases*
S. Sarubbo, L. Annicchiarico, F. Corsini
- 09:00 – 9:20 *Tools for the study of perilesional structural and functional organization and for neurosurgical planning*
L. Coletta, L. Vavassori, L. Zigiotta, M. Moretto, B. Cassone, F. Saviola, J. Jovicich, P. Avesani

SESSION I

- 09:20 – 09:40 *Anatomy exploration on virtual Klingler dissection: left IFOF, ILF, UF (clinical case 1)*
L. Vavassori, A. De Benedictis and F. Rheault
- 09:40 – 09:50 *Practical demonstration of virtual tracking: left IFOF, ILF, UF (clinical case 1)*
L. Petit, S. Forkel and L. Zigiotta
- 09:50 – 10:50 *Hands-on tracking of left IFOF, ILF, UF: clinical case 1*
- 10:50 – 11:10 Open coffee
- 11:10 – 11:40 *Language network extraction and map of DES-based semantic errors integration: clinical case 1*
M. Moretto, B. Cassone, L. Coletta
- 11:40 – 12:00 *Comments on result and functional considerations from the operating room*
S. Sarubbo and L. Zigiotta

SESSION II

- 12:00 – 12:20 *Anatomy exploration on virtual Klingler dissection: left AF, SLF anterior indirect, SLF posterior indirect (clinical case 2)*
L. Vavassori, A. De Benedictis and F. Rheault

Saturday June 15th, 2024

- 12:20 – 12:30 *Practical demonstration of virtual tracking: left AF, SLF anterior indirect, SLF posterior indirect (clinical case 2)*
L. Petit, S. Forkel and L. Zigiotta
- 12:30 – 13:00 *Hands-on tracking of left AF: clinical case 2*
- 13:00 – 14:00 Lunch
- 14:00 – 14:30 *Hands-on tracking of left SLF anterior indirect, SLF posterior indirect: clinical case 2*
- 14:30 – 15:00 *Language network extraction and map of DES-based phonemic errors integration: clinical case 2*
M. Moretto, B. Cassone, L. Coletta
- 15:00 – 15:20 *Comments on result and functional considerations from the operating room*
F. Corsini and L. Zigiotta

SESSION III

- 15:20 – 15:30 *Anatomy exploration on virtual Klingler dissection: pyramidal tract and FAT (clinical case 3)*
L. Vavassori, A. De Benedictis and F. Rheault
- 15:30 – 15:40 *Practical demonstration of virtual tracking: pyramidal tract and FAT (clinical case 3)*
L. Petit, S. Forkel and L. Zigiotta
- 15:40 – 16:40 *Hands-on tracking of pyramidal tract and FAT: clinical case 3*
- 16:40 – 17:00 Open coffee
- 17:00 – 17:30 *Motor/Visuo-spatial and speech arrest network extraction: clinical case 3*
M. Moretto, B. Cassone, L. Coletta
- 17:30 – 18:00 *Comments on result and functional considerations from the operating room*
F. Corsini and L. Zigiotta

CONCLUSIONS

- 18:00 – 18:15 Closure remarks
- 18:15 Certificates

- **Dante Amelio**
Department of Protontherapy, APSS, Trento
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- **Luciano Annicchiarico**
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