Grant Agreement number: **813986**

Acronym: **Syn2Psy**

Title: **Synaptic Dysfunction in Neuropsychiatric Disorders**

Report on network school 4

WP4 – D4.5 – D27

Date 05.05.2022

Contents

1. Document Information and Introduction

Deliverable Number	D4.5
Deliverable Title	Report on Network School 4 (NS4)
Work Package	WP4 – Training and Doctoral Programme
Lead Beneficiary	CNRS
Type	Report
Dissemination Level	Public
Due Date	05-05-2022
Actual Deliverable Date	28-02-2022
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Reviewed and Authorized	Ana Luísa Carvalho (coordinator)

Introduction

Network School 4 (NS4), under the title "**Advanced methods for imaging the brain: from nanoscopic to mesoscopic perspectives**" was held in Bordeaux from March 28th to April 1st (2022), at the Bordeaux Imaging Center (BIC), Centre Broca Nouvelle-Aquitaine. This training was organised by **Daniel Choquet** (Principal Investigator at IINS-Interdisciplinary Institute for Neuroscience), **Laurent Groc** (Principal investigator at IINS), **Eric Hosy** (researcher at IINS) and **Christel Poujol** (manager at BIC), with the participation of **Julien Kissenberger** (ZEISS).

NS4 was a one-week intensive course focused on advanced microscopy methods. Participants gained understanding of the theory and applications of Stimulated Emission Depletion (STED) microscopy, Single Molecule Localization microscopy (SMLM), Structured Illumination microscopy (SIM) and Expansion microscopy. ESRs learned the challenges and solutions to perform single molecule localization microscopy in depth within complex tissues, labelling strategies, pixel reassignement as an alternative to super resolution techniques, imaging of structural dynamics of brain microstructure and how to apply single particle techniques to neuroscience questions. Furthermore, during the practical sessions, the ESRs had the opportunity to learn, hands-on, technical aspects of Confocal, STED, SMLM, Expansion, Airy Scan, Pixel Reassignement, as well as data analysis.

NS4 was complemented with a workshop on career development provided by Nicolas Bourg, founder of Abbelight, under the topic "From research to a global recognized company, from PhD student to CTO and founder of Abbelight?"

To measure the overall course satisfaction, the students were asked to answer a satisfaction survey.

2. Programme

Network School 4

Advanced methods for imaging the brain:
from nanoscopic to mesoscopic perspectives

Date: Monday, March 28th to Friday, April 1st 2022

Location: Centre Broca – Interdisciplinary Institute for NeuroScience, 146 Rue Léo-Saignat, 33077 Bordeaux, France.

Organizers: Christel Poujol, Daniel Choquet, Eric Hosy, Laurent Groc – Interdisciplinary Institute for NeuroScience; With the participation of **Julien Kissenberger** – ZEISS.

Speakers: Stephane Bancelin, Rémi Galland, Eric Hosy, Valentin Nagerl, Matthieu Sainlos, Jean Baptiste Sibarita, Vincent Studer.
Interdisciplinary Institute for NeuroScience, UMR CNRS 5297
Centre Broca Nouvelle Aquitaine, Université Bordeaux

Fabrice Cordelières, Magali Mondin, Christel Poujol, Monica Fernandez Monreal.
Bordeaux Imaging Center, Pôle photonique
Centre Broca Nouvelle Aquitaine, Université Bordeaux

Programme (continued)

	Monday March 28th	Tuesday March 29th	Wednesday March 30th	Thursday March 31st	Friday April 1st
		CGFB Conference room	**CGFB Conference room**	**CGFB Conference room**	**BIC / IINS**
9h		**Introduction to STED Microscopy** *Stéphane Bancelin*	**Sample preparation: overview of fluorochromes and labelling strategies** *Matthieu Sainlos*	**SMLM: data analysis** *Jean-Baptiste Sibarita*	**Practical session** Expansion / Airy Scan / Pixel Reassignment / STED-2
		Introduction to single-molecule localization microscopy (SMLM) *Magali Mondin*	**Alternative Super Resolution techniques: Pixel reassignment Airy Scan - Live SR - ISM** *Vincent Studer*	**Structured Illumination Microscopy** *Aurélien Dauphin*	
					CGFB Conference room
		Challenges and solution to perform single molecule localization microscopy in depth within complex tissues *Rémi Galland*	**Expansion microscopy** *Monica Fernandez Monreal*	**Application: Unravelling synaptic molecular map with quantitative SIM microscopy** *Lydia Danglot*	**Practical session** Image visualization
		Lunch	Lunch	Lunch	Lunch
	CGFB North room	**BIC / IINS**	**BIC / IINS**	**BIC / IINS**	**BROCA Auditorium**
14h	**Introduction/ Presentation**	**Practical session** Confocal / STED / SMLM	**Practical session** Confocal / STED / SMLM	**Practical session** Expansion / Airy Scan / Pixel Reassignment / STED-2	
15h	**Tutorial from widefield microscopy to super resolution** *Magali Mondin – Christel Poujol*				**Round Table / Discussion / Presentations**
18h	**Wine Tasting**	**Application: STED imaging of structural dynamics of brain microstructure** *Valentin Nagerl*	**Application of single particle techniques to neuroscience questions** *Eric Hosy*	**From research to a global recognized company, from PhD student to CTO and founder of Abbelight?** *Nicolas Bourg*	

Programme (continued)

PRACTICAL SESSIONS

TP CONF:
Confocal microscopy on LEICA system
Centre Broca Nouvelle Aquitaine - BIC 1er étage

TP STED 1:
STED microscopy on ABERRIOR system
Centre Broca Nouvelle Aquitaine - IINS 1er étage

TP SMLM1 1:
dSTORM microscopy on LEICA system
Centre Broca Nouvelle Aquitaine - BIC 1er étage

TP SMLM 2:
DNA-PAINT microscopy on homemade system
Centre Broca Nouvelle Aquitaine - IINS 1er étage

TP STED 2:
STED microscopy on LEICA system
Centre Broca Nouvelle Aquitaine - BIC 1er étage

TP Airy Scan:
Airy Scan microscopy on LSM900 Zeiss system
Centre Broca Nouvelle Aquitaine - BIC 1er étage

TP Live SR or ISM
Live SR microscopy on spinning-disk
Centre Broca Nouvelle Aquitaine - BIC 1er étage

TP Expansion microscopy:
Expansion microscopy on confocal system
Centre Broca Nouvelle Aquitaine - BIC 1er étage

A la carte

TP: Image treatment
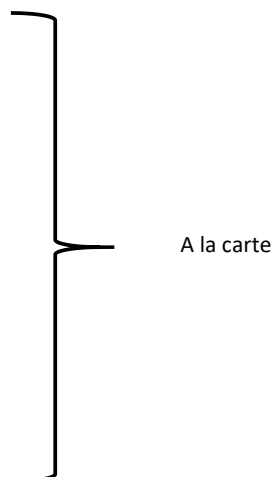
Day 1: March 29th

Session/TP	CONF	STED 1	SMLM 1	SMLM 2
Session 1 - 14h	Group 1	Group 2	Group 3	Group 4
Session 2 - 16h	Group 3	Group 4	Group 1	Group 2

Day 2: March 30th

Session/TP	CONF	STED 1	SMLM 1	SMLM 2
Session 1 - 14h	Group 2	Group 1	Group 4	Group 3
Session 2 - 16h	Group 4	Group 3	Group 2	Group 1

Day 3: March 31st

Session/TP	
Session 1 - 14h	Airy Scan / Live SR or ISM / Expansion / STED 2
Session 2 - 16h	A la carte

Day 4: April 1st

Session/TP	Airy Scan / Live SR or ISM /Expansion/ STED 2
Session 1 - 09h	A la carte
Session 2 - 11h	Image treatment

3. Attendees, trainers and speakers

Attendees

Orsolya Antal (ESR1)

Alessandro Chioino (ESR2)

Giuseppe Cammarata (ESR3)

Veronica Villeri (ESR4)

Marcos Sintes (ESR5)

Daniel Hunter (ESR6)

Elisa Corti (ESR7)

Laura Upton (ESR9)

Flavio Tomasi (ESR10)

Ágata Silván (ESR11)

Manuela Rizzi (ESR12)

Loredana Cumpana (ESR13)

Vanesa Salazar (ESR14)

Trainers and Speakers

Christel Poujol – BIC, Bordeaux, FR (organiser)

Eric Hosy – IINS, Bordeaux, FR (organiser)

Magali Mondin – BIC, Bordeaux, FR

Stephane Bancelin – IINS, Bordeaux, FR

Rémi Galland – IINS, Bordeaux, FR

Valentin Nagerl – IINS, Bordeaux, FR

Matthieu Sainlos – IINS, Bordeaux, FR

Vincent Studer – IINS, Bordeaux, FR

Monica Fernandez Monreal – BIC, Bordeaux, FR

Jean Baptiste Sibarita – IINS, Bordeaux, FR

Aurélien Dauphin – CurieCoreTech Cell and Tissue Imaging, Institut Curie, Paris, FR

Lydia Danglot – NeurImag, Institute of Psychiatry and Neuroscience of Paris, Paris, FR

Nicolas Bourg – CTO of Abbelight, FR

Figure 1 – ESRs during Network School 4 in Bordeaux.

4. Certificate of Attendance

Figure 2 – Certificate of attendance for Network School 4.

5. Course Satisfaction

The ESRs were asked to fill out a survey with questions regarding the relevance of the course topic, the quality of the talks and workshops, their expectations and objectives. Most of the students reported to be satisfied with this network school, rating the scientific talks and workshops with 4.1/5. ESRs considered that the course corresponded to their initial expectations (4.3/5) and that they had fulfilled their objectives for the course (4.1/5) (Figure 3). Comments included that the course "was amazing", the talks were excellent and that the interactions with BIC staff were great.
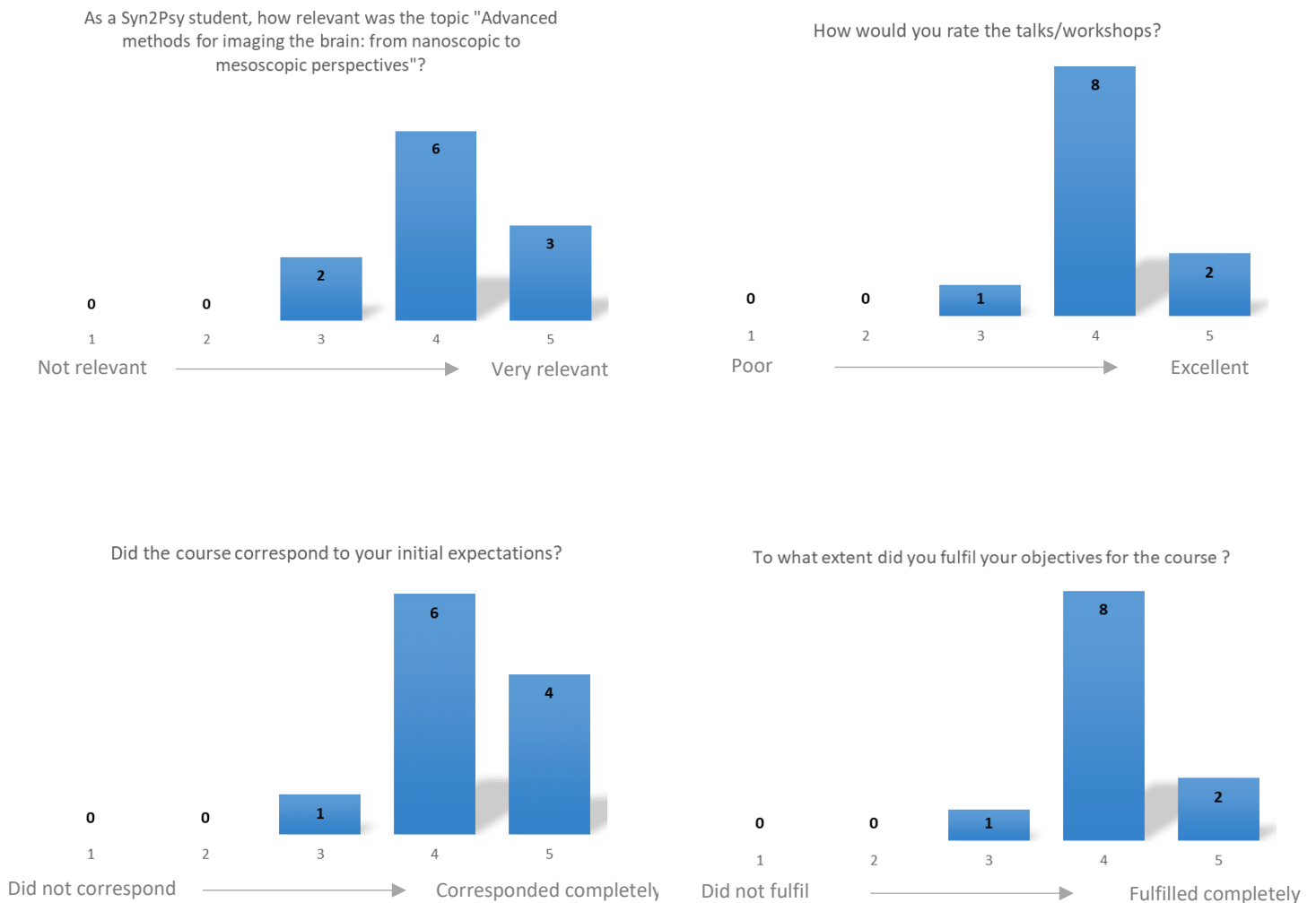
Figure 3 – Course Satisfaction questionnaire and results.

How likely are you to recommend this course?

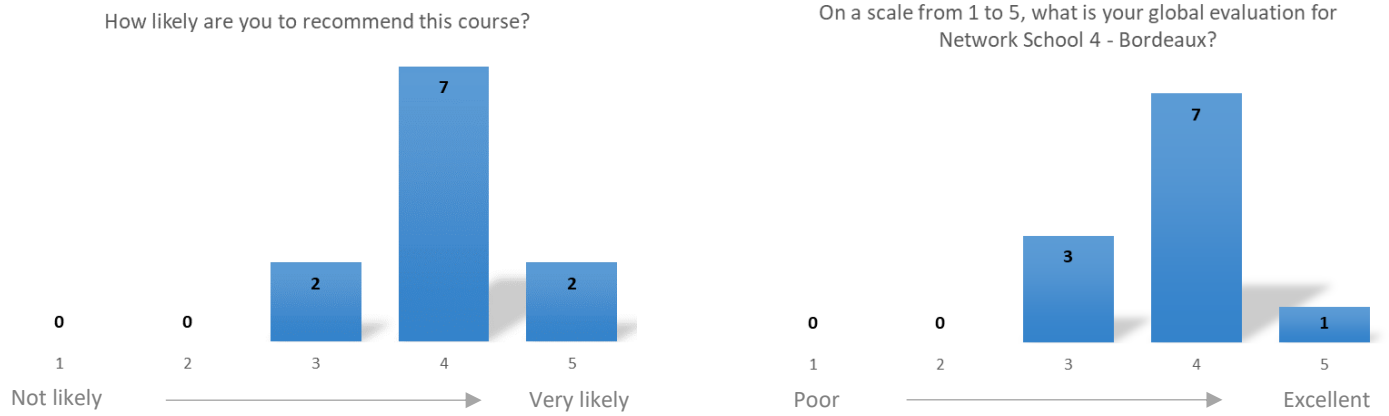On a scale from 1 to 5, what is your global evaluation for Network School 4 - Bordeaux?

Figure 4 – Course Satisfaction questionnaire and results (continued).