



Innovative  
Training  
Network

Grant Agreement number: **813986**

Acronym: **Syn2Psy**

Title: **Synaptic Dysfunction in Neuropsychiatric Disorders**

Network School 1(NS1)  
Report

WP4 – D4.2 – D24

Deliverable date: 17-10-2019

## Contents

Introduction-----	3
Poster-----	4
Programme-----	6
Attendees-----	9
Participation Certificate-----	11
Course Satisfaction-----	12

## Document Information

Deliverable Number:	D4.2
Deliverable Title:	Report on Network School 1 (NS1)
Work Package:	WP4 – Training and Doctoral Programme plan
Lead Beneficiary:	CNC
Type:	Report
Dissemination Level:	Public
Due Date:	31-10-2019
Actual Deliverable Date:	17-10-2019
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Reviewed and Authorized	Ana Luísa Carvalho (coordinator)

## Introduction

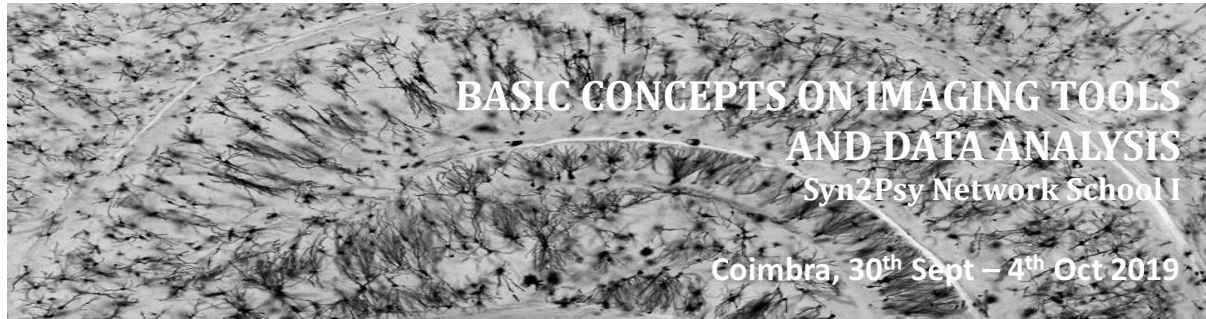
The Syn2Psy Network School 1 (NS1) with the title ‘**Basic Concepts on Imaging Tools and Data Analysis**’ took place at CNC, Coimbra, between the 30<sup>th</sup> of September and the 4<sup>th</sup> of October 2019.

The Syn2Psy NS1 was a one-week intensive microscopy course focused on the principles and high-end applications of quantitative fluorescence microscopy. Participants gained a theoretical understanding and hands-on experience on state-of-the-art equipment such as widefield microscopy, laser scanning and spinning disk confocal microscopy, multi-photon microscopy, deconvolution methods, and digital image processing and analysis.

The NS1 was organized between Luísa Cortes (CNC – Head of Microscopy Unit MICC) and Monika Marx (Senior Manager Application Sales Specialists - Carl Zeiss Microscopy GmbH). Apart from the training provided by the application specialists from ZEISS (Syn2Psy partner), Monica Marx and Soren Prag, the training was complemented by talks from invited speakers who are either managers of microscopy facilities from research intensive institutes (IMM -José Rino, CEDOC – Telmo Pereira, Achucarro – Jorge Valero, IBILI – Monica Zuzarte) or researchers experienced in using the microscopy techniques (Joana Ferreira, Ana Luísa Carvalho, Ângela Inácio). The talks included in NS1 were open to all CNC researchers. The course was finalized with a workshop by Anthony Newman (Elsevier, Netherlands) on ‘How to write a Great Research Paper, and Get it Accepted by a Good Journal’. As for evaluation, we prepared a 20 questions Exam (multiple choice and fill in sentences) which the students wrote during the last day of the course. To measure the overall course satisfaction, we asked the students to answer a 9 questions questionnaire.

Since this course had the capacity for 20 people we opened the course for applications from CNC researchers, by sending an internal email to the CNC mailing list with the course programme and the information that there were 6 slots available and that we would give preference to PhD students and postdocs. In total 9 people showed their interest in this course. One person was not considered since he was a master student. There were 2 people who cancelled their attendance due to unforeseen reasons. Finally the CNC participants consisted of a group of 3 Postdocs, 2 PhD candidates and an Assistant Professor.

## Posters

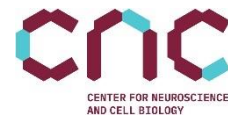


### Topics

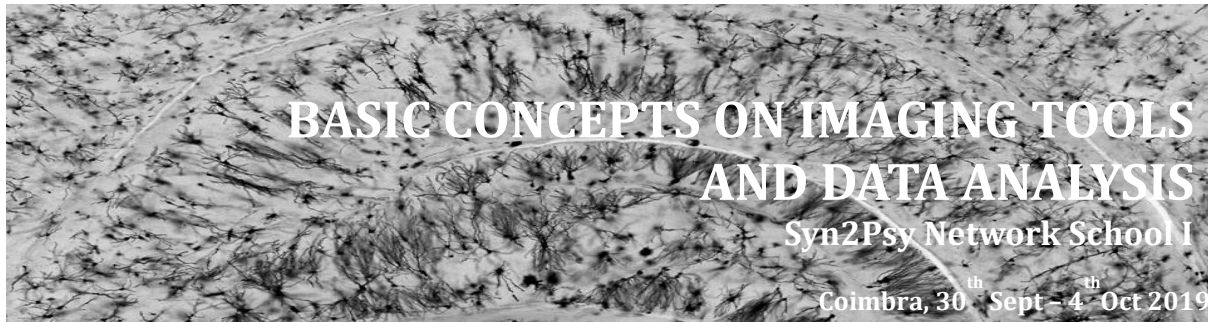
Multiphoton Microscopy  
Confocal Microscopy  
Super-resolution Microscopy  
Live Cell Imaging  
Deconvolution  
Imaging Analysis

### Speakers

Ana Luísa Carvalho | CNC, PT  
Ângela Inácio | CNC, PT  
Anthony Newman | Elsevier, NL  
Joana Ferreira | IINS, FR  
Jorge Valero | Achucarro, ES  
José Rino | IMM, PT  
Luísa Cortes | CNC, PT  
Mónica Zuzarte | IBILI, PT  
Monika Marx | Carl Zeiss, DE  
Soren Prag | Carl Zeiss, DE  
Telmo Pereira | CEDOC, PT



[www.syn2psy.eu](http://www.syn2psy.eu)



## OPEN TALKS SCHEDULE

CNC Auditorium | 2<sup>nd</sup> floor

### **Day 1: Monday, September 30<sup>th</sup>**

**10:00** | Fluorescence Microscopy - Basic Concepts | *Luísa Cortes* | CNC\*

**11:30** | Optical Sectioning Microscopy | *Soren Prag* | Carl Zeiss Microscopy

**14:00** | Live Cell Imaging: F-techniques | *José Rino* | IMM\*

**15:30** | Introduction to Super-resolution Microscopy | *Monika Marx* | Carl Zeiss Microscopy\*

### **Day 2: Tuesday, October 1<sup>st</sup>**

**09:00** | Multiphoton Microscopy | *Monika Marx* | Carl Zeiss Microscopy

**13:30** | High Speed Imaging | *Soren Prag* | Carl Zeiss Microscopy

### **Day 3: Wednesday, October 2<sup>nd</sup>**

**09:00** | Introduction to Image Analysis with FIJI | *Luísa Cortes & José Rino* | CNC & IMM

**13:30** | Macro Design in FIJI | *Jorge Valero* | Achucarro

**15:30** | Dendritic Spine Dynamics | *Ana Luísa Carvalho & Ângela Inácio* | CNC

### **Day 4: Thursday, October 3<sup>rd</sup>**

**09:00** | Deconvolution | *Telmo Pereira* | CEDOC

### **Day 5: Friday, October 4<sup>th</sup>**

**09:30** | How to write a great research paper – tutorial | *Anthony Newman* | Elsevier\*

**13:30** | **CNC Seminar** - Receptor dynamics and nano-organization: new facets of NMDAR functions | *Joana Ferreira* | IINS

**14:30** | Electron Microscopy in Biomedicine | *Mónica Zuzarte* | IBILI - FMUC

\* These seminars will be held at CNC Auditorium 1<sup>st</sup> floor

## Programme



### Basic concepts on imaging tools and data analysis

Syn2Psy Network School I

**Date:** Monday, September 30 - Friday, October 4, 2019

**Location:** CNC-Center for Neuroscience and Cell Biology, University of Coimbra, Portugal

**Organizers:** Luísa Cortes – CNC, PT; Monika Marx – ZEISS, DE

**Aims:** This course goals are to expose the students to state-of-the-art techniques in Microscopy (multiphoton imaging, high speed imaging, optical sectioning, live-cell imaging, super-resolution microscopy, electron microscopy). The course combines talks by researchers who are experts in the imaging techniques presented, with hands-on sessions in microscopy and image analysis. The students will learn to integrate the different techniques available with their applications.

#### **Day 1: Monday, September 30<sup>th</sup>**

**09:30** | Welcome

**10:00** | Fluorescence Microscopy – Basic Concepts | *Luísa Cortes* | CNC

**11:00** | Coffee Break

**11:30** | Optical Sectioning Microscopy | *Soren Prag* | Zeiss

**12:30** | Lunch Break

**14:00** | Live Cell Imaging: F-techniques | *José Rino* | IMM

**15:00** | Coffee Break

**15:30** | Introduction to Super-resolution Microscopy | *Monika Marx* | Zeiss

**16:30** | Network School Photo

**17:30** | End of Session

#### **Day 2: Tuesday, October 1<sup>st</sup>**

**09:00** | Multiphoton Microscopy | *Monika Marx* | Zeiss

**10:00** | Coffee Break

**10:30** | Microscopy Hands-on Sessions (I)

**12:30** | Lunch Break

**13:30** | High speed imaging | *Soren Prag* | Zeiss  
**14:30** | Microscopy Hands-on Sessions (II)  
**16:30** | Coffee Break  
**17:00** | Microscopy Hands-on Sessions (III)  
**19:00** | End of session

**Day 3: Wednesday, October 2<sup>nd</sup>**

**09:00** | Introduction to Image Analysis with FIJI | *Luísa Cortes & José Rino* | CNC & IMM  
**10:00** | Coffee Break  
**10:30** | Microscopy Hands-on Sessions (IV)  
**12:30** | Lunch Break  
**13:30** | Macro Design in FIJI | *Jorge Valero* | Achucarro  
**14:30** | Microscopy Hands-on Sessions (V)  
**15:00** | Coffee Break  
**15:30** | Dendritic Spine Dynamics | *Ana Luísa Carvalho & Ângela Inácio* | CNC  
**16:30** | Image Analysis Hands-on Sessions (I)  
**18:30** | End of Session

**Day 4: Thursday, October 3<sup>rd</sup>**

**09:00** | Deconvolution | *Telmo Pereira* | CEDOC  
**10:00** | Coffee Break  
**10:30** | Image Analysis Hands-on Sessions (II)  
**12:30** | Lunch Break  
**14:00** | Image Analysis Hands-on Sessions (III)  
**16:00** | Coffee Break  
**16:30** | Image Analysis Hands-on Sessions (IV)  
**18:30** | End of session

**Day 5: Friday, October 4<sup>th</sup>**

**09:30** | How to write a great paper - tutorial | *Anthony Newman* | Elsevier  
**12:00** | Lunch Break  
**13:30** | CNC Seminar | Receptor Dynamics and nano-organization: new facets of NMDAR functions *Joana Ferreira* | IINS  
**14:30** | Electron Microscopy in Biomedicine | *Mónica Zuzarte* | iCBR  
**15:30** | Image Analysis Hands-on Sessions (V)  
**17:30** | Evaluation  
**18:00** | Final remarks – Certificates Distribution

## Program Table

	Monday 30/09	Tuesday 01/10	Wednesday 02/10	Thursday 03/10	Friday 04/10
09:00		TALK 5	TALK 7	TALK 10	
	Welcome				How to write a great research paper - tutorial
10:00	TALK 1	CB	CB	CB	
11:00	CB	MICROSCOPY HANDS-ON	MICROSCOPY HANDS-ON	IMAGE ANALYSIS HANDS-ON	Lunch
12:00	TALK 2			IMAGE ANALYSIS HANDS-ON	
13:00	Lunch	Lunch	Lunch	Lunch	
14:00	TALK 3	TALK 6	TALK 8	IMAGE ANALYSIS HANDS-ON	CNC SEMINAR
15:00	CB	MICROSCOPY HANDS-ON	CB		TALK 11
16:00	TALK 4		TALK 9	CB	IMAGE ANALYSIS HANDS-ON
	Network School Photo	CB	IMAGE ANALYSIS HANDS-ON	IMAGE ANALYSIS HANDS-ON	
17:00		MICROSCOPY HANDS-ON		IMAGE ANALYSIS HANDS-ON	IMAGE ANALYSIS HANDS-ON
18:00			Final remarks		

## Hands-On Sessions

Participants were organized in 4 groups, and each group rotated through the different hands-on stations.

### Microscopy Stations

Station 1 | Axio Imager Z2 | Telmo Pereira & Luísa Cortes

Station 2 | Spinning Disk | José Rino

Station 3 | LSM 900 | Soren Prag

Station 4 | LSM 710 NLO | Monica Mark

### Image Analysis Stations

All | An overview of Fiji software | Luísa Cortes & José Rino & Jorge Valero & Telmo Pereira

Station 1 | Macro design | Jorge Valero

Station 2 | FRAP analysis in Fiji | José Rino

Station 3 | Deconvolution using Huygens Software | Telmo Pereira

Station 4 | Image analysis with Imaris software | Ângela Inácio

	Station 1	Station 2	Station 3	Station 4
Session I	G2	G3	G4	G1
Session II	G1	G2	G3	G4
Session III	G3	G4	G1	G2
Session IV	G4	G1	G2	G3



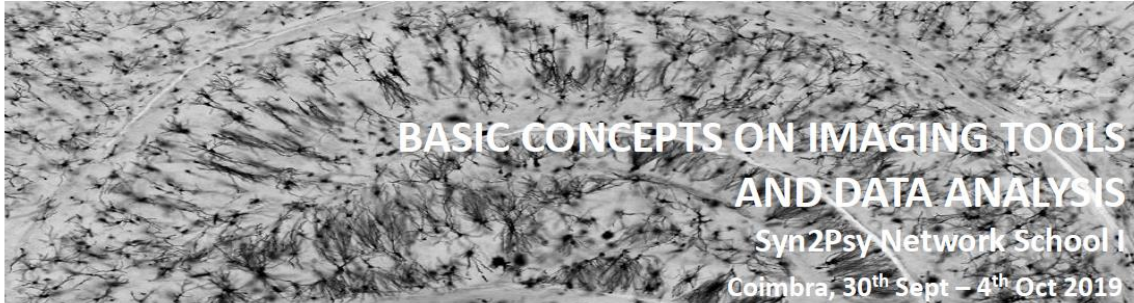
## Attendees

Students	Trainers and Speaker
Orsolya Antal (ESR1)	Luísa Cortes (CNC - Head of MICC)
Alessandro Chioino (ESR2)	Margarida Caldeira (CNC - MICC)
Giuseppe Cammarata (ESR3)	Tatiana Catarino (CNC - MICC)
Diogo Soares (ESR4)	Monica Marx (Senior Manager Application Sales Specialists - Carl Zeiss Microscopy)
Marcos Sintes (ESR5)	Soren Prag (Application Specialist - Carl Zeiss Microscopy)
Daniel Hunter (ESR6)	José Rino (IMM -Head Bioimaging Facility)
Elisa Corti (ESR7)	Telmo Pereira (CEDOC – Manager Microscopy Facility)
Elizabeth Brockman (ESR8)	Jorge Valero (Acucharro - Senior Researcher, Laboratory of Glial Cell Biology)
Laura Upton (ESR9)	Mónica Zuzarte (ICBR – electronic microscopy technician)
Flavio Tomasi (ESR10)	Joana Ferreira (IINS – Postdoc, Development and adaptation of neuronal circuits laboratory)
Ágata Silván (ESR11)	Ângela Inácio (CNC – Postdoc, Synapse Biology Laboratory)
Manuela Rizzi (ESR12)	Ana Luísa Carvalho (CNC - Professor, Head Synapse Biology Laboratory)
Loredana Cumpăna (ESR13)	Anthony Newman (Elsevier)
Vanesa Salazar (ESR14)	
Ermelindo Leal (Postdoc, CNC)	
Filomena Silva (Postdoc, CNC)	
Ana Simões (Postdoc, CNC)	
Vera Martinho (PhD candidate, CNC)	
Nazanin Andalibi (PhD candidate, CNC)	
Ramiro Almeida (Assistant Professor, CNC)	



**Figure 1:** Group photography taken at CNC, Coimbra University, during the Syn2Psy Network School 1.

## Participation Certificate



### DIOGO SOARES

Participated with success in the Syn2Psy Network School I, named:

#### **BASIC CONCEPTS ON IMAGING TOOLS AND DATA ANALYSIS**

that took place at CNC, Coimbra, 30th Sept – 4th Oct 2019.

**TRAINING CONTENT (25 hours):**

Multiphoton microscopy (LSM710 NLO)  
Confocal microscopy (LSM 900)  
Spinning-disk confocal microscopy (SD Cell Observer)  
Deconvolution with Huygens Software  
Imaging Analysis with Fiji / ImageJ  
Introduction to Imaris Software

LUISA CORTES

CERTIFICATE OF ATTENDANCE



## Course Satisfaction

The ESRs were asked to fill in a questionnaire with 9 questions to help the organisers infer the overall course satisfaction:

