TENSS 2015 Final schedule

DAY	TIME SLOT	MAIN RESPONSIBLE	GROUPS	CONTENT
DAY 1	08:00 – 09:00			Breakfast
	09:00 – 10:00	Florin, Raul and Adam		Introduction to the course
	10:00 – 11:15	Florin Albeanu		Intro to Optics
	11:15 – 11:30			Coffee break
	11:30 – 13:00	Adriana Dabacan		Image formation with Lenses
	13:00 – 14:00			Lunch
	14:00 – 17:00	Adriana, Petr, Rob and Priyanka	ABCD	Simple microscopes : Lenses and image formation properties
	17:00 – 17:30			Coffee
	17:30 – 18:30	Priyanka Gupta		Koehler Illumination and Numerical aperture
	18:30 – 20:30	Adriana, Petr, Rob and Priyanka	ABCD	Bench-top koehler microscopes – depth of field and aperture
	20:30 – 21:30			Dinner
	21:30 – 23:00			
DAY 2	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 11:15	Priyanka Gupta		Recap – diffraction, resolution, numerical aperture, objectives
	11:15 – 11:30			Coffee break
	11:30 – 13:00	Florin Albeanu		Fluorescence: Wide-field epi-fluorescence, PSFs and resolution, dF/F, bleaching, ratiometry (dF/dR)
	13:00 – 14:00			Lunch
	14:00 – 16:00	Adam Kampff		Detecting signals: Noise, Cameras, PMTs and diodes, Introducing lab session on noise measurements
	16:00 – 16:15			Coffee break
	16:15 – 18:00	Adriana, Petr, Rob and Priyanka	ABCD	Convert bench-top koehler microscopes to epi-fluorescence
	18:00 – 18:15			Coffee break
	18:15 – 20:30	Adriana, Petr, Rob and Priyanka	ABCD	Noise measurements, measure PSFs using fluorescent beads
	20:30 – 21:30			Dinner
	21:30 – 23:00	Adriana, Petr, Rob and Priyanka	ABCD	Discussion, analysis, continue Labs
DAY 3	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 11:30	Juan Burrone		Fluorescent probes: GFP, calcium indicators vs. voltage dyes, synaptophluorins
	11:30 – 11:45			Coffee break
	11:45 – 13:00	Josh & Rob		Arduinos & Electronics Part I
	13:00 – 14:00			Lunch
	14:00 – 17:00	Adriana, Petr, Rob and Priyanka	ABCD	Image fixed brain slices on the bench-top fluorescence microscopes, Compare noise and PSFs on commercial Scientifica and Olympus microscopes (1-2 students per group can combine and do this together), In parallel, all groups analyze noise and PSF measurements, compile results and make presentations.

	17:00 – 17:30			Coffee break
	17:30 – 20:30	Adriana, Petr, Rob and Priyanka	ABCD	Acquire images of fluorescent samples - fish, slices etc. Continuation of analysis and making presentations.
	20:30 – 21:30			Dinner
	21:30 – 23:00			Student presentations (15 + 5 minutes): PSFs, noise characterization of wide-field microscopes
	23:00 onwards	Rob and Adam		Skywatch
DAY 4	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 12:00	Josh & Rob		Arduinos & Electronics Part II
	12:00 – 19:30			Free time to relax
	19:30 onwards			Dinner and party
DAY 5	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 11:30	Mark Hubener		Intrinsic Imaging - Principles and Intro to Lab session - practical aspects and comparison with wide field fluorescence imaging
	11:30 – 11:45			Coffee break
	11:45 – 13:00	Adam Kampff		Scanning and Confocal Microscopy; Intro to Lab session on scanning software
	13:00 – 14:00			Lunch
	14:00 – 16:00	Adriana, Petr, Rob and Priyanka	AB	Set up microscopes for intrinsic and widefield fluorescence imaging and determine optimal imaging parameters
			CD	Set up bench top scanners and simple beam alignment
	16:00 – 16:30			Coffee break
	16:00 – 20:30	Adriana, Petr, Rob and Priyanka	AB	Image intrinsic optical and fluorecence signals, analyze acquired signals
			CD	Write scanning software
	20:30 – 21:30			Dinner
	21:30 – 23:00	Adriana, Petr, Rob and Priyanka	ABCD	Continue respective lab sessions
DAY 6	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 12:00	Adriana, Petr, Rob, Mehrab and Priyanka	AB	Set up bench top scanners and simple beam alignment
			CD	Set up microscopes for intrinsic and widefield fluorescence imaging and determine optimal imaging parameters
	12:00 – 13:00			Early Lunch
	13:00 – 17:30	Adriana, Petr, Rob, Mehrab and Priyanka	AB	Write scanning software
			CD	Image intrinsic optical and fluorecence signals, analyze acquired signals
	17:30 – 18:00			Coffee break
	18:00 – 19:30	Adriana, Petr, Rob, Mehrab and Priyanka	ABCD	Continue respective lab sessions
	19:30 – 20:30			Early Dinner
	20:30 – 22:00		ABCD	Student presentations (15 + 5 minutes): Widefield imaging
	22:00 - 23:30	Adriana, Petr		Introduction to optogenetics and applications
DAY 7	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast

	10:00 – 11:00	Tom Flogel		Two-photon microscopes – the THEORY and applications in neuroscience
	11:00 – 11:15			Coffee break
	11:15 – 13:00	Adam Kampff Florin Albeanu	AB CD	Write X-Y- Z scanning and image acquisition software Building a two-photon microscope – general discussion on practical aspects and brief overview of commercially available setups
	13:00 – 14:00			Lunch
	14:00 – 17:00	Petr, Rob, Adam, Goncalo and Elena	AB CD	Write X-Y- Z scanning and image acquisition software Build your own two-photon microscope
	17:00 – 17:30			Coffee
	17:30 – 20:30	Petr, Rob, Adam, Goncalo and Elena	ABCD	Continuation of lab sessions
	20:30 – 21:30			Dinner
	21:30 – 23:00	Petr, Rob, Adam, Goncalo and Elena	ABCD	Continuation of lab sessions
DAY 8	08:00 – 09:00 09:00 – 10:00			Morning run/swim Breakfast
	10:00 – 10:30 10:30 – 11:30	Florin Albeanu Mike Hausser		One Photon patterned illumination - Intensity modulation Multiphoton patterned illumination - Phase modulation
	11:30 – 11:45			Coffee break
	11:45 – 13:00	Florin Albeanu Adam Kampff	AB CD	Building a two-photon microscope – general discussion on practical aspects and brief overview of commercially available setups Write X-Y- Z scanning and image acquisition software
	13:00 – 14:00			Lunch
	14:00 – 17:00	Petr, Rob, Adam, Goncalo and Elena	AB CD	Build your own two-photon microscope Write X-Y- Z scanning and image acquisition software
	17:00 – 17:15			Coffee
	17:15 – 20:30	Petr, Rob, Adam, Goncalo and Elena	ABCD	Continuation of lab sessions
	20:30 – 21:30			Dinner
	21:30 – 23:00	Petr, Rob, Adam, Goncalo and Elena	ABCD	Continuation of lab sessions
DAY 9	08:00 – 09:00 09:00 – 10:00			Morning run/swim Breakfast
	10:00 - 11:00	Na Ji		Adaptive Optics
	11:00 – 13:00	Mehrab N. Modi		in vivo 2p Lab imaging session
	13:00 – 14:00			Lunch
	14:00 – 17:00	Mehrab N. Modi		in vivo 2p Lab imaging session
	17:00 – 17:30			Coffee
	17:30 – 20:30	Mehrab N. Modi		in vivo 2p Lab imaging session
	20:30 – 21:30			Dinner
	21:30 – 23:30	Georg Keller		Demo of miniature head-mounted microscopes / make presentations
DAY 10	08:00 – 09:00 09:00 – 10:00			Morning run/swim Breakfast
	10:00 – 11:00	Sonja Hofer		Combining optical and ephys approaches to study functional connectivity and tuning of neuronal circuits
	11:00 – 13:00			Student presentations - multiphoton microscopy

	13:00 – 20:30			Picnic/Barbecue on the hills featuring Florian and LASERS
	20:30 onwards			Dinner and Party
DAY 11	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 11:30	Adam Kampff		Behavior module, clicker training and machine vision
	11:30-11:45			Coffee break
	11:45 – 13:15	Upi Bhalla		Biophysics of neurons - RC circuits, dipoles and impedance (Introduce 'cell in a dish' lab demo)
	13:15 – 14:15			Lunch
	14:00 – 17:00	Upi and Mehrab	AB	Cell in a dish: Bench top electronics and basics of electrophysiology
		Adam and Elena	CD	Animal behavior I - basic principles, clicker training, introduction to machine vision
	17:00 – 17:30			Coffee break
	17:30 – 20:30	Adam and Elena	AB	Animal behavior I - basic principles, clicker training, introduction to machine vision
		Upi and Mehrab	CD	Cell in a dish: Bench top electronics and basics of electrophysiology
	20:30 – 21:30			Dinner
	21:30 – 23:00	Tomas Hromadka		Introduction to patch clamp
DAY 12	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 11:00	Wolf Singer		Time as coding space in cortical processing
	11:00 – 12:00	Petr		Introduction to chronic extracellular recordings
	12:00 – 13:00			Early Lunch
	13:00 – 14:00	Balazs, Josh and Petr	AB	Tetrode making
			CD	Building Tetrode drives
	14:00 – 16:00	Tomas Hromadka	AB	In vivo patch clamp
		Balazs, Josh and Petr	CD	Building Tetrode drives
	16:00 – 16:15			Coffee break
	16:15 – 17:15	Balazs, Josh and Petr	AB	Building Tetrode drives
			CD	Tetrode making
	17:15 – 19:15	Balazs, Josh and Petr	AB	Building Tetrode drives
		Tomas Hromadka	CD	In vivo patch clamp
	19:15 - 20:30	Tomas, Balazs, Josh, Petr		Tetrode making, drive building, patching contd..
	20:30 – 21:30			Dinner
	21:30 – 23:00	Tomas, Balazs, Josh, Pet	ABCD	Tetrode making, drive building, patching contd..
DAY 13	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 13:00	Balazs, Josh and Petr	AB	Physiology I - familiarize with set-up and implanted animals, record single cell and local field data
		Goncalo	CD	Animal behavior II - machine vision
	13:00 – 14:00			Lunch
	14:00 – 17:00	Goncalo	AB	Animal behavior II - machine vision
		Balazs, Josh and Petr	CD	Physiology I - familiarize with set-up and implanted animals, record single cell and local field data
	17:00 – 17:30			Coffee break
	17:30 – 18:30	Balazs Hangya		Introduction to data analysis (filtering, spike sorting, PSTH)
	18:30 – 20:30	Balazs, Josh and Petr	ABCD	Analysis of acquired data (filtering, spike sorting, PSTH)
	20:30 – 21:30			Dinner

	21:30 – 22:30	Hannah Monyer		Inhibition in the brain: from individual neurons to complex systems effects
	22:30 – 23:30	Raul Muresan		Correlations and local field potentials
DAY 14	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 11:00	Georg Keller		Virtual reality and closed loop behaviors
	11:00 – 12:00	Georg, Goncalo		Virtual reality demo
	12:00 – 13:00			Early lunch
	13:00 – 16:00	Balazs, Josh and Petr	AB	Physiology II - recording from freely moving mice, optogenetic stimulation, spike sorting
		Goncalo, Josh	CD	Animal behavior III - Introduction to sensor/actuator modules
	16:00 – 16:30			Coffee break
	16:30 – 19:30	Goncalo, Josh	AB	Animal behavior III - Introduction to sensor/actuator modules
		Balazs, Josh and Petr	CD	Physiology II - recording from freely moving mice, optogenetic stimulation, spike sorting
	19:30 – 20:30		ABCD	Continue lab/analysis/presentation making
	20:30 – 21:30			Dinner
	21:30 – 22:30	Jonathan Whitlock		Place cells, grid cells, head direction cells. Approaches to understanding systems exemplified by navigation
	22:30 – 24:00		ABCD	Student Talks
DAY 15	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 20:30			Trip to Cluj and Turda
	20:30 – onwards			Dinner and Party
DAY 16	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 12:00	Tomas		Programming principles - interactive session
	12:00 – 13:00			Early lunch
	13:00 – 13:45	Danko Nikolić		Closed-loop experimentation and adaptability of the nervous system
	13:45 – 14:00			Coffee break
	14:00 – 16:15	Florin and the TAs	AB	Student Project design and setup
		Tomas	CD	In vivo patching
	16:15 – 20:30	Florin and the TAs	CD	Student Project design and setup
		Tomas	AB	In vivo patching
	20:30 – 21:30			Dinner
	21:00 – 23:00	Florin and the TAs		Student Project design and setup
DAY 17	08:00 – 09:00			Morning run/swim
	09:00 – 10:00			Breakfast
	10:00 – 11:00	Laszlo Acsady		Acute recording, cell type identification (juxta/tagging), anatomy. Approaches to understanding circuits examplified by thalamic networks.
	11:00 – 12:00	Francesco Battaglia		Large-scale array recordings, and using them to understand the hippocampus-prefrontal pathway
	12:00 – 13:00			Lunch
	13:00 – 18:00			Group Experiments
	18:00 – 20:30			Group Experiments
	20:30 – 21:30			Dinner
	21:00 – 23:00			Group Experiments

DAY 18	08:00 – 09:00		Running around
	09:00 – 10:00		Breakfast
	10:00 – 11:00	Goncalo	Behavior: Experimental control and ethological relevance
	11:00 – 12:00	Viviana Gradinaru	Clarity talk with demo samples
	12:00 – 13:00		Lunch
	13:00 – 18:00		Group Experiments
	18:00 – 20:30		Group Experiments
	20:30 – 21:30		Dinner
	21:00 – 23:00		Student presentations - group projects
DAY 19	08:00 – 09:00		Morning run/swim
	09:00 – 10:00		Breakfast
	10:00 – 11:45		Informal chalk board talks by students (10 + 5 minutes): Very brief intro to current research work and defend future proposals to use knowledge acquired at the course
	11:45 – 12:00		Coffee
	12:00 – 13:30		Informal chalk board talks by students continue
	13:30 – 14:30		Lunch
	14:30 – 16:00		Round up and feedback
	Evening onwards		Music, movies, swim and party