

Neurofly

SAINT-MALO
FRANCE 2022

Official program



www.neurofly2022.org

Detailed Program

(K = Keynote (Plenary lecture), T = Talks)

Tuesday September 6th, 2022

16h00 - 16h15 (Opening remarks)

16h15 - 17h45 (Session-1) **Emerging Technologies**

Chairman : Johannes Seelig and Nikolaos Konstantinides

16h15 - **T1** SEELIG Johannes (*Max Planck Institute, Bonn, Germany*)

Methods for investigating the dynamics of sleep and memory circuits

16h30 - **T2** BOURGEAT Samuel (*EPFL, Lausanne, Switzerland*)

High-throughput Drosophila brain morphometrics based on micro-computed tomography of a fly head.

16h45 - **T3** NG Kristal (*King's College London, United Kingdom*)

Investigating cargo transport and the cytoplasmic biophysical properties of neurons during ageing *in vivo*.

17h00 - **T4** KONSTANTINIDES Nikolaos (*CNRS, Institut Jacques Monod, Paris, France*)

Development and evolution of neuronal diversity in the insect visual system.

17h15 - **T5** CATTENOZ Pierre (*IGBMC, Strasbourg, France*)

Characterisation of the transcriptomic and epigenetic signatures of glia and neurons across development.

17h30 - **T6** MCLACHLAN Alex (*University of Cambridge, United Kingdom*)

Virtual Fly Brain - A hub for Drosophila melanogaster neural anatomy, imaging data & connectomics.

17h45 - 18h00 (Coffee Break)

1800 - 19h00 : **P1** Plenary lecture 1 : **Daniel Kronauer** (*Rockefeller University, USA*)

Differentiation, Communication, and Collective Behavior in Ant Societies

19h00 - Welcome Reception

Wednesday September 7th, 2022

09h00 - 09h45: **P2** Plenary lecture 2: **Thomas Pr at** (*ESPCI, Paris, France*)

The dual role of glia-neuron interactions for long-term memory: energy supply and regulation of redox homeostasis

09h45 - 10h30 (Session 2: part-1) (**Brain Homeostasis & Metabolism**)

Chairwoman: Anissa Kempf (*University of Basel, Switzerland*)

09h45 - **T7** SCHOLZ Henrike (*University of Cologne, Germany*)

The internal energy supply influences stability of food related memories

10h00 - **T8** RAUN Nicholas (*Dalhousie University, Canada*)

Mushroom body specific epigenetic programming by trithorax supports the metabolic demand of long-term memory

10h15 - **T9** PAVLOWSKY Alice (*ESPCI Paris, France*)

Motile mitochondria are required for associative long-term memory formation

10h30 - 11h00 (Coffee Break)

11h00 - **T10** DURA Jean-Maurice (*Institut de G n tique Humaine, Montpellier, France*)

Neuron-glia crosstalk in neuronal remodeling: role of the chemokine-like Orion in glial cell phagocytic transformation

11h15 - **T11** MARIANO Vittoria (*University of Lausanne, Switzerland*)

CYFIP drives brain metabolic changes to control night sleep

11h30 - **T12** KEMPF Anissa (*University of Basel, Switzerland*)

Metabolic control of the sleep homeostat

11h45 - 12h30 (Session 3: part-1) **Brain Evolution & Ecology**

Chairwoman : Marta Moita (*Champalimaud Centre, Lisbon, Portugal*)

11h45 - **T13** CAVEY Matthieu (*IBDM, Aix-Marseille University, France*)

Evolutionary divergence in sugar valuation shifts *Drosophila suzukii* oviposition choice towards ripe fruit

12h00 - **T14** SPROSTON Connor J (*King's College London, United Kingdom*)

Sculpting neuronal hemilineages with combinatorial pro-apoptotic RHG gene expression and the evolution of network motifs in flightless flies

12h15 - **T15** B. LEIT O Alexandre (*Champalimaud Centre, Lisbon, Portugal*)

One neuron, many brains: testing the effect of genetic background on the action of single neurons.

12h30 – 14h00: Lunch (on site) (included in the registration)

14h00 - 14h45 (Session 3: part-2) **Brain Evolution & Ecology**

Chairwoman : Marta Moita (*Champalimaud Centre, Lisbon, Portugal*)

14h00 - **T16** SHAHANDEH Michael (*University of Lausanne, Switzerland*)

Genetic and neuronal mechanisms of circadian plasticity loss in the equatorial endemic *Drosophila sechellia*

14h15 - **T17** CHATTERJEE Abhishek (*INRAE, Versailles, France*)

Unexpectedly rich coding capacity of the pheromone-sensitive ORNs

14h30 - **T18** JOYCE Michaela (*Imperial College London, United Kingdom*)

Do all Drosophilids count sheep? A cross species investigation of *Drosophila* sleep

14h45-15h30: **P3** Plenary lecture 3: **Alicia Hidalgo** (*Birmingham Univ., United Kingdom*)

Brain switch: degeneration, plasticity, regeneration

15h30 - 16h00 (Coffe Break)

16h00 - 17h30 (Session 4) **Neural Development**

Chairwoman: Margaret Su-chun Ho (*Shanghai Tech University, China*)

16h00 - **T19** SALECKER Iris (*Ecole Normale Supérieur, Paris, France*)

A dialog with neurons helps visual system astrocytes to find their shape in *Drosophila*

16h15 - **T20** LAPRAZ François (*Université Côte d'Azur, Nice, France*)

The NetrinB Pathway Controls Laterality of the *Drosophila* Brain

16h30 - **T21** SENAPATI Tarosi (*University of Queensland, Australia*)

PI3K links cellular defects in the Dscam2 mutant with memory formation

16h45 - **T22** SOBRIDO-CAMEAN Daniel (*University of Cambridge, United Kingdom*)

Transient experiences in late embryogenesis specify trajectories of neuronal development altering network properties

17h00 - **T23** AGI Egemen (*Freie Universität Berlin, Germany*)

Visual map formation without target-dependent guidance in *Drosophila*.

17h15 - **T24** Marzano Marco (*University of Münster, Germany*)

Metabolic regulation of dendrite pruning

17h30 - 20h00: Poster Session-1 (even number)

Free Diner (not included in the registration)

Thursday September 8th, 2022

09h00 - 09h45: **P4** Plenary lecture 4: **Robin Hiesinger** (*Freie Universität Berlin, Germany*)
Visual Map Formation in Drosophila

09h45 - 10h45 (Session 5 part-1) **Neural Circuits & Synapses**
Chairman: Suewei Lin (*Academia Sinica, Taipei, Taiwan*)

09h45 - **T25** DAS Gaurav (*SP Pune University Campus, Pune, India*)
Neurotransmitters involved in toxin-induced emesis are conserved between flies and mammals

10h00 - **T26** JOVANIC Tihana (*University Paris-Saclay/CNRS, France*)
Neural circuit mechanisms of state-dependent modulation of sensorimotor decisions

10h15 - **T27** WALTER Alexander (*University of Copenhagen, Denmark*)
Neurotransmitter release sites adapt on millisecond and minute timescales for presynaptic plasticity

10h30 - **T28** DE QUEIROZ Bruna (*Université Côte d'Azur, Nice, France*)
The role of local RNA regulation in long-term memory formation.

10h45 - 11h15 (Coffe Break)

11h15 - 12h15 (Session 5: part-2) **Neural Circuits & Synapses**
Chairman: Suewei Lin (*Academia Sinica, Taipei, Taiwan*)

11h15 - **T29** MOHYLYAK Iryna (*ICM, Paris, France*)
CG7101/dTZAP encodes conservative transcriptional regulator of mitochondrial biology required for axonal outgrowth, circuit connectivity and behavior.

11h30 - **T30** LIN Suewei (*Academia Sinica, Taipei, Taiwan*)
Functional feedback circuits in the adult Drosophila mushroom body

11h45 - **T31** CROSET Vincent (*Durham University, United Kingdom*)
Gliotransmission of D-serine promotes thirst-directed behaviors in Drosophila

12h00 - **T32** PARNAS Moshe (*Tel Aviv University, Israel*)
A paradigm shift in GPCR recruitment and activity: GPCR Voltage Dependence Controls Neuronal Plasticity and Behavior

12h15 - 14h00 Lunch (on site) (included in the registration)

14h00-14h45: **P5** Plenary lecture 5: **Annette Schenck** (*Radboud Uni, Nijmegen, Netherlands*)
Translational studies into Autism and Intellectual Disability disorders – of mechanisms and treatment strategies

14h45 - 15h45 (Session 6: part-1) **Brain Disorders**
Chairman : Juan A. Navarro (*Incliva Health Research Institute, Valencia, Spain*)

14h45 - **T33** ZIEGLER Anna (*University of Münster, Germany*)
Ceramide Synthase at the Knot of Neurodegeneration

15h00 - **T34** NAGOSHI Emi (*University of Geneva, Switzerland*)
Role of circadian clocks in dopaminergic neurodegeneration

15h15 - **T35** HODGE James (9717) (*University of Bristol, United Kingdom*).
DYRK1A (minibrain) kinase inhibitor mediated rescue of Drosophila models of Alzheimer's disease-Down Syndrome phenotypes.

15h30 - **T36** DOURLLEN Pierre (*University of Lille, France*)
The Alzheimer susceptibility gene BIN1 induces isoform-dependent synaptotoxicity and neurodegeneration through early endosome defects.

15h45 - 16h15 (Coffee Break)

16h15 - 17h15 (Session 6: part 2) **Brain Disorders**

16h15 - **T37** LOWE Simon (*UCL Queen Square Institute of Neurology, United Kingdom*)
Pathological enhancement of BK potassium channel function during a narrow neurodevelopmental window disrupts motor control

16h30 - **T38** PETRAUSKAS Arnas (*Trinity College Dublin, Ireland*)
Structured and disordered regions of Ataxin-2 contribute differently to the specificity and efficiency of mRNP granule formation

16h45 - **T39** LLOBET ROSELL Arnau (*University of Lausanne, Switzerland*)
The NAD⁺ precursor NMN activates dSarm to trigger axon degeneration in Drosophila.

17h00 - **T40** PALGI Mari (*Tallinn University of Technology, Estonia*)
Daughterless in health and disease

17h30 - 20h00 : Poster Session-2 (odd number)

Free Diner (not included in the registration)

Friday September 9th, 2022

09h00 - 09h45: **P6** Plenary lecture 6: **Silke Sachse** (*Max Planck Institute, Jena, Germany*) From brain to behavior: Dissecting olfactory circuits in *Drosophila*

09h45 - 10h45 (Session 7: part-1) **Sensory Systems**
Chairwoman: Marion Silies (*Mainz University, Germany*)

09h45 - **T41** BONTONOU Gwénaelle (*University of Lausanne, Suisse*)
Origin of a novel olfactory sensory neuron population

10h00 - **T42** WADDELL Scott (*Oxford University, United Kingdom*)
Multisensory learning binds modality-specific neurons into a cross-modal memory engram

10h15 - **T43** GUR Burak (*JGU Mainz, Mainz University, Germany*)
Implementation of stable contrast computation in the visual circuits

10h30 - **T44** WERNET Mathias (*Freie Universität, Berlin, Germany*)
Parallel processing of visual cues from the optic lobes towards the central complex

10h45 - 11h15 (Coffee Break)

11h15 - 12h00 (Session 7: part-2) **Sensory Systems**

11h15 - **T45** MUNRO Anna (*University of Manchester, United Kingdom*)
Essential elements of radical pair magnetosensitivity in *Drosophila*

11h30 - **T46** MANGIONE Fredérica (*The Francis Crick Institute, London, United Kingdom*)
Co-option of epidermal cells for touch sensing

11h45 - **T47** SEEDS Andrew (*Campus University of Puerto Rico, Puerto Rico*)
Somatotopic organization among parallel sensory pathways that promote a grooming sequence in *Drosophila*

12h00 - 12h15 (short session : Commercial/Industrial/Sponsors) (5 min. each)

12h00 - 12h05 - Benjamin Kottler (BFK-Lab, United-Kingdom)

12h05 - 12h10 - Yawen Chen (WellGenetics, Taiwan)

12h10 - 12h15 - Bill Budenberg (Zantiks, United-Kingdom)

12h15 - 12h20 - To be confirmed (Drobot, Taiwan)

12h20 - 12h25 - Diego Galagovsky (Sci-flies)

12h25 - 12h45: NeuroFly Business meeting (Who's next ?)

12h45 - 14h00 Lunch (on site)

Afternoon: Social events (both included in your registration fee)

- **Tourist visit (by walk) Friday afternoon (Saint-Malo old town)**

- **19h00 – 01h00 (Gala Diner)**

Saturday September 10th, 2022

09h30 - 10h15: P7 Plenary lecture 6: **Christian Klambt** (*University of Münster, Germany*)
Glia affects speed and precision of neuronal conductance by control of axonal diameter, position of voltage-gated ion channels and myelin formation

10h15 - 11h15 (Session 8 part-1) **Behavior**
Chairwoman : Carolina Rezaval (*Birmingham University, United Kingdom*)

10h15 - **T48** SAVAS Doruk (*Brown University, USA*)
Circuit Epistasis Analysis Reveals a Neural Pathway for Light Avoidance in Drosophila Larvae

10h30 - **T49** SUNILKUMAR Ajay (*University Paris-Saclay/CNRS, France*)
CRY's 'spooky action at a distance' is sufficient for the daily profile of bimodal activity

10h45 - **T50** RIBEIRO Inês M.A. (*Max Planck Inst. for Biol. Intelligence, Munich, Germany*)
A multi-input optic glomerulus guides diverse visual behaviors.

11h00 - **T51** PERISSE Emmanuel (*University of Montpellier, CNRS, INSERM, France*)
Differential coding of absolute and relative aversive value in the Drosophila brain.

11h15 - 11h45 (Coffee Break)

11h45 - 12h45 (Session 8: part-2) **Behavior**
Chairwoman : Carolina Rezaval (*Birmingham University, United Kingdom*)

11h45 - **T52** ZARIN Aref (*Texas A&M University, USA*)
The Kinematic and Neuromuscular Basis of Drosophila larval escape revealed by EM connectome and high-speed volumetric imaging

12h00 - **T53** KIM Seong-Jin (*GIST, Gwangju, Korea*)
The seminal galactoside activates nutrient-sensing neurons in the brain and promotes fertility in Drosophila melanogaster females

12h15 - **T54** CAZALE-DEBAT Laurie (*University of Birmingham, United Kingdom*)
A neural mechanism underlying action-selection under sensory conflict

12h30 - **T55** BENGOCHEA Mercedes (*ICM, Paris, France*)
Numerical discrimination in Drosophila melanogaster

12h45 (Closing Remarks)

Talk presentations

T002

High-throughput *Drosophila* brain morphometrics based on micro-computed tomography of a fly head

BOURGEAT Samuel
EPFL SV BMI GR-JAKSIC (Switzerland)

Co-authors: S. BOURGEAT¹, P.M. REIS², F. DERVENI², A.M. JAKSIC¹

¹ EPFL SV BMI GR-JAKSIC² Flexible Structures Laboratory, Institute of Mechanical Engineering, École polytechnique fédérale de Lausanne, Switzerland

Topic: Technological Innovation

Key words: Natural variation, genetic basis, brain volume, brain morphology

Abstract:

From genomics to connectomics, the fruit fly has helped us build better and more precise comprehension of the functioning of the nervous system.

However, our knowledge of the genetic basis of natural variation in brain size and morphology is still incomplete, while it can help us shed light onto the genetic architecture of this trait and the evolutionary potential of the behaviours it may affect.

Quantifying subtle natural genetic diversity of brain morphology is challenging because brain morphology is malleable to not only genetic, but also developmental and environmental factors that are difficult to control. To overcome this issue, we developed a high-throughput and sensitive imaging method to quantify brain morphology of diverse fly lines from the *Drosophila* Genetic Reference Panel (DGRP) reared in tightly controlled environmental conditions.

In our method, we use a micro-computed tomography scanner with a multiple-sample-holder system to image up to 12 whole fly heads per day at a 3 micron/pixel resolution. To unbiasedly capture the full range of morphological diversity of fly brains we first reconstruct a 3D model of heads and manually segment the brains for a range of diverse DGRP lines. This segmentation data is used to train a convolutional neural network which is then used to automatically and unbiasedly segment brains from all available DGRP lines. We then extract the volumes as well as morphology of the brains using topological data analysis. By using a topological variable called persistence entropy we can summarise, cluster and classify topological features of brains based on their morphological similarities. Our quantification method could capture genetic variation underlying brain's shape and size. The mapping of those phenotypic variations onto the variation in DNA sequence of all DGRP lines will enable us to identify and characterize the genetic variation influencing brain morphology and size.