20-21-22 April 2022, University of Zurich, Campus Irchel

LS² Annual Meeting 2022

Life Sciences in the 2020s:
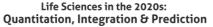### Quantitation, Integration & Prediction

University of Zurich UZH

YOUNG SCIENTISTS' SATELLITE MEETING PROGRAM

WEDNESDAY 20.04.2022

12:00 – 13:00
Lichthof area

REGISTRATION
Speakers and chairs should load their presentations. Lecture hall G60

12:30 – 13:00

WELCOME COFFEE

13:00 – 13:05
Lecture hall G60

WELCOME ADDRESS
Lydie Lane *(Chair of the LS² Annual Meeting 2022, University of Geneva & Swiss Institute of Bioinformatics - SIB)*
Didier Picard *(President of LS², University of Geneva)*

13:05 – 13:10

INTRODUCTION FROM CHAIRS
Lalita Oparija-Rogenmozere *(University of Basel)*
Ayokunle Araoyinbo *(University of Lausanne)*
Natalia Zajac *(Functional Genomics Center Zurich)*
Dotun Adeleye Adeyinka *(University of Fribourg)*

13:10 – 13:45
Lecture hall G60

KEYNOTE LECTURE
Simone Schürle *(ETH Zurich)*
Chair: **Natalia Zajac** *(Functional Genomics Center Zurich)*
"A fantastic voyage: engineering micro-and nanorobots for medicine"

13:45 – 14:40
Lecture hall G60

Scientific Symposium I
Selected speakers from abstracts
Chair: **Ayokunle Araoyinbo** *(University of Lausanne)*
10' talks (8'+ 2' Q&A)

Joana Pereira *(University of Basel)*   **e-poster # 08**
"What is hidden in the darkness? Seeking new families in natural unknown proteins"

Zeynep Kabakci *(University of Zurich)*   **e-poster # 34**

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"Meiotic pairing of homologous chromosomes in Drosophila spermatocytes is maintained by a complex composed of a cleavable module derived from cohesin and non-cohesin proteins"

David Rodriguez Crespo　　　　　　**e-poster # 44**
(University of Fribourg)
"The zinc-finger transcription factor LSL-1 allows expression of the germline transcriptional program by antagonizing heterochromatin proteins in C. elegans"

Misako Yamazaki *(University of Zurich)*　　**e-poster # 45**
"PRIMA: a method to discriminate single-nucleotide variations rapidly and cost-effectively"

Raquel Rouco *(University of Geneva)*　　**e-poster # 47**
"Characterising Shox2 regulatory trajectories during embryonic development"

14:40– 15:10　　　　**COFFEE BREAK**

15:10 – 15:55　　　**Scientific Symposium II**
Lecture hall G60　　　<u>*Selected speakers from abstracts*</u>
　　　　　　　　　　Chair: **Dotun Adeleye Adeyinka** *(University of Fribourg)*
　　　　　　　　　　　　　　　10' talks (8'+ 2' Q&A)

Seraina Bartetzko *(University of Bern)*　　**e-poster # 57**
"CRISPR-Cas mediated endogenous opsin activation in ON-bipolar cells for vision restoration"

Saurabh Thapliyal *(University of Fribourg)*　　**e-poster # 74**
"Integrated sensory state of two thermosensory neurons control temperature-dependent behavioral states in C. elegans"

Yan Zhou *(University of Geneva)*　　**e-poster # 85**
"In Situ Assessment of Hepatic Glutamate Dehydrogenase Activity Provides Novel Insights into Amino Acid Metabolism"

Michael Schmitz *(University of Zurich)*   **e-poster # 93**
"PRIMA: a method to discriminate single-nucleotide variations rapidly and cost-effectively"

15:55 – 16:20   **COFFEE BREAK**

16:20 – 17:20
Lecture hall G60   **DISCUSSION PANEL**
The challenges of an international scientific career and the most important skills learnt as PhD students or young postdocs to pursue an academic vs industry career

Chairs: **Lalita Oparija-Rogenmozere** *(University of Basel)*

Panellists:
Jenny Prange *(CSO & CO-Founder of Muvon-Therapeutics)*
Paulin Jirkof *(3R Coordintaor of the University of Zurich, representative of the UZH as node coordinator of the Swiss 3RCC)*
Pedro H. Iménez Silva *(Senior Scientist at University of Zurich. Institute of Physiology)*
Markus Britschgi *(Section Head Neural Signalling at Roche)*

17:20 – 17:30   **Closing Remarks**

17:30 – open end   **MEET & GREAT APÉRO WITH SPEAKERS**

Detailed program

DAY ONE

THURSDAY 21.04.2022

08:15 – 09:00
Lichthof area

REGISTRATION, WELCOME COFFEE
Speakers and chairs of the morning sessions should load their presentation. Lecture hall G30

09:00 – 09:10
Lecture hall G30

WELCOME ADDRESS
Lydie Lane *(Chair of the LS² Annual Meeting 2022, University of Geneva & Swiss Institute of Bioinformatics - SIB)*
Didier Picard *(President of LS², University of Geneva), University of Geneva)*

9:10 – 9:50

PLENARY LECTURE I: KEYNOTE LECTURE
Marnix H. Medema *(Wageningen University. NL).*
Chair: **Lydie Lane** *(Chair of the LS² Annual Meeting 2021, University of Geneva & Swiss Institute of Bioinformatics - SIB)*

"Computational omics of plant and microbial biosynthetic diversity: from natural product discovery to microbiome ecology"

Plants, fungi and bacteria produce a wealth of specialized metabolites, which are of great importance from both ecological and clinical perspectives. Due to the accelerated accumulation of omics data, computational methods have become more and more important to identify these molecules and to assess their biological activities. Here, I will highlight the work performed in my research group on using these approaches to accelerate natural product discovery, as well as to study microbe-microbe and host-microbe interactions in human, plant and animal microbiomes. Specifically, I will discuss the use of computational approaches to investigate biosynthetic diversity across large numbers of genomes, and integrative genome/transcriptome/metabolome mining to associate gene clusters to molecules and ecological functions in order to elucidate the molecular basis of microbiome-associated phenotypes.

09:50 – 10:20
Lecture hall G30

PLENARY LECTURE I: PRIX SCHLÄFLI
Gregor Weiss *(ETH Zurich. CH)*
Introduced by **Roman Ulm** *(University of Geneva)* & **Anne Jacob** *(SCNAT)*

"The role of uromodulin filaments in urinary tract infections - cryoET from in vitro to patient samples"

Urinary tract infections (UTIs) caused by uropathogenic Escherichia coli (UPEC) belong to the most common bacterial infections in humans. A crucial infection step is the adhesion of type 1-piliated UPEC to mannosylated glycoproteins on uroepithelial cells. Uromodulin (UMOD) is the most abundant protein in human urine and forms long homopolymeric filaments that antagonize UPEC adhesion, however, little was known about its structure and protective mechanism.By using an integrative approach of glyco-mass spectrometry, light microscopy, cryo-focused ion beam milling and cryo-electron tomography (cryoET), we resolved the architecture of UMOD filaments and could show how UMOD serves as a multivalent antagonist against UPEC adhesion directly in patient samples. CryoET and subtomogram averaging revealed that UMOD filaments are composed of a zigzag-shaped core module formed by the zona pellucida (ZP) domains and laterally protruding arms consisting of the N-terminal UMOD segment. We further demonstrate that UMOD forms a loose network of filaments around individual piliated bacteria and mediates the aggregation of bacteria by a dense mesh. These higher order structures likely prevent UPEC adhesion to the urinary epithelium and favor efficient clearance by micturition, representing a previously unrecognized aspect of UMOD biology. Analyzing fresh urine from patients with an acute UTI by light microscopy and cryoET confirmed our in vitro results and corroborated UMOD's universal protective mechanism against pathogens. This demonstrates the power of cryoET to assess the molecular basis of a disease directly in patient samples.

10:20 – 10:35

Special Plenary Short Talk
Alexandre Reymond *(President Center for Integrative Genomics, Universität Lausanne)*
"Personalized Health"
Organized by the Forum for Genetic Reseach. SCNAT.

10:35 – 11:00

COFFEE BREAK & INDUSTRY EXHIBITION

11:00 – 12:50
Lecture hall G30

Special Plenary Session
"PIs of Tomorrow – The Future of Swiss Research"

Adam Gosztolai *(EPF Lausanne)*
"Wired to move: understanding motor control in the age of connectomics"

Magali Humbert *(University of Lausanne)*
"Lysosomes and Chemotherapy Resistance Mechanisms in Acute Myeloid Leukemia"

Juan Carrillo *(University of Fribourg)*
"Assessing the effect of the Miocene global warming in the evolution tropical mammals"

Alicia Michael *(Friedrich Miescher Institute for Biomedical Research)*
"How do transcription factors interpret and shape the eukaryotic genome?"

Chairs:
Shalu Jhanwar *(University of Basel)*
Mehdi Badaouim *(University of Geneva)*
Amado Carreras *(University of Geneva)*
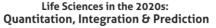**Paola Martinez Murillo** *(University of Geneva)*

Jury:
Nicola Aceto *(ETH Zurich)*
Alexis Jourdain *(University of Lausanne)*
Stefanie Jonas *(ETH Zurich)*
Miriam Stoeber *(University of Geneva)*
Joshua Payne *(ETH Zurich)*
Mackencie Mathis *(EPF Lausanne)*

12:50 – 14:15

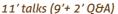### LUNCH & INDUSTRY EXHIBITION

Grab your food and visit our booths!!

Speakers and chairs of the afternoon sessions should load their presentation. Lecture hall G30
Food for participants will be provided from 12:50 to 13:50.
Catering for industry representatives will be open from 12:20

13:00 – 15:00
Room F70
Downstairs

Feedback Session PIs of Tomorrow
For jury, chairs, and finalists only
Lunch bags will be delivered into the room

14:15 – 16:00
Lecture hall G30

Plenary Short Talks from Abstracts
Selected speakers from abstracts
11' talks (9'+ 2' Q&A)

opnMe | Boehringer Ingelheim

Peter Methys Degen *(University of Bern)*   **e-poster # 07**
"Resampling methods as a means to improve the reproducibility of differential expression results in RNA-Seq research"

Laia Simó Riudalbas *(EPF Lausanne)*   **e-poster # 19**
"Transposon-activated POU5F1B promotes colorectal cancer growth and metastasis"

Fabio Steffen *(University of Zurich)*   **e-poster # 20**
"Drug response profiling for high-risk childhood leukemia"

Matteo Negroni *(University of Fribourg)*   **e-poster # 43**
"The social circulatory system and metabolic division of labor in superorganismal ant colonies"

Tatjana Kleele *(EPF Lausanne)*   **e-poster # 63**
"Dissecting mitochondrial fission using live-cell super-resolution microscopy"

Irma Querques *(University of Zurich)*   **e-poster # 92**
"An ATPase filament bridge: how a transposon and CRISPR stick together"

Florian Hubrich *(ETH Zurich)*   **e-poster # 94**

"Ribosomal lipopeptides defined by diverse side-chain N-acylation"

Matteo Zoia *(University of Bern)*   **e-poster # 36**
"A gene desert required for regulatory control of pleiotropic expression and embryonic survival"

Maria Natalia Rojas Velázquez   **e-poster # 76**
(University of Bern)

"Loss of protein stability and function caused by a single point mutation (P228L) in the Cytochrome P450 Oxidoreductase"

16:00 – 16:35   **LS² Research Slam**
Lecture hall G30   *Selected speakers*

4' talks   *Jackson ImmunoResearch Europe Ltd*

Margot Riggi *(University of Utah)*   **e-poster # 04**
"3D molecular animations for communication and research"

I collaborate with researchers to create information-rich, compelling 3D animations that capture their current hypotheses on diverse molecular and cellular processes. These have broad applications in scientific communication, education and outreach, but the making of an animation can also feedback into the research process, serving as a powerful thinking tool and inspiring new experiments.

Sim Sakong *(EPF Lausanne)*   **e-poster # 13**
"Target search dynamics of Sox transcription factors"

How TFs recognize their motifs via electrostatic interactions is analogous to how my boyfriend finds me via my shirt color, at a party where everyone dresses in blue but I am wearing a red shirt. While I only recognize a person with their face, he would easily find me with the color of my shirt. If I wore in blue, it would take much longer for the search. This is how the electric attraction accelerates TF target search, as the blue means negatively charged and the red is the opposite.

Andrea di Luca *(University of Fribourg)*   **e-poster # 12**
"Conformational ensembles of E-Syts reveal key aspects of their lipid transport function"

The best way to understand how an engine works is to look at it during function, not at its blueprints! That's why we take 'static' pictures of our proteins and 'make them move' with the help of computer simulations. Sprinkle a bit of data analysis and voilà, a deeper understanding of protein function is served. Pretty cool, right?

Dina Hany *(University of Geneva)*   **e-poster # 17**
"Targeting purine biosynthesis, a novel therapeutic approach to overcome tamoxifen resistance in breast cancer"

Is it too crowded? Can't see the culprit? Bring your scissors and fetch the screen with a magnifier. CRISP CRISP!! I got him! The guy inside the factory making a lot of building blocks. Stop him! Stop cancer!

Sriraksha Srinivasan *(University of Fribourg)* **e-poster # 31**
"Estimating the accuracy of the MARTINI model towards the investigation of peripheral protein–membrane interactions"

Some proteins love to kiss membranes and run away without lingering around for long, making it hard for us to catch them and evaluate their kissing mechanism; hence, we use computers to simulate them and capture them in this short-lived act of romance frame by frame and pass on the obscure secret of who kissed whom, when, where, and why.

Samarpan Maiti *(University of Geneva)*   **e-poster # 66**
"Reduced Hsp90 levels cause cytoplasmic dilution and proteostatic collapse"

Size matters! Don't be stressed out. Feel the heat, grow it bigger and respond

accordingly. Statutory Warning! Don't dilute the protein content.

Daniel González *(University of Zurich)*   **e-poster # 70**
"FASN-dependent de novo lipogenesis is required for brain development"

The brain needs lots of lipids, in fact it is the second highest lipid-containing organ in our body: 50% of its dry-weight is fats. Lipids are essential for our cells structure and our tissues to have correct morphologies. When we remove the protein in charge of making lipids, we cause huge changes. In both a developing mouse and human brains, lack of fatty acid supply, causes disorganisation of cells processes and their polarity. To sum up, no lipids, no structure, no brain.

Irina Bregy *(University of Bern)*   **e-poster # 91**
"Cryo-electron tomography of the TAC: a journey deep into the trypanosome"

Some may say our love for Mr. Trypsli went a bit overboard when we started freezing him to preserve his beauty. But hey, look where it got us: we now have pictures of the internal organs of a unicellular organism. And our dear Mr. trypsli will be remembered as the parasite with the hairiest basal body discovered to date!

16:35 – 17:30   **COFFEE BREAK & INDUSTRY EXHIBITION**
Speakers and chairs of the symposia should load their presentation on the corresponding lecture hall.

17:30 – 19:30   **PARALLEL SYMPOSIA SESSION I**

17:30 – 19:30   **Advances in Translational Pharmacology**
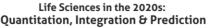*Lecture hall G95*   *Organized by the Swiss Society of Experimental Pharmacology (SSEP)*

17:30 – 17:35   *Introductory words from chair:* **Georgia Konstantinidou**
(University of Bern)

17:35 – 18:00   <u>*Invited speaker*</u>
Andrea Alimonti *(Università della Svizzera italiana. Institute of Oncology Research. CH)* **– ONLINE TALK**
"From pro-senescence to senolitics compounds for cancer therapy"

<u>*Selected speakers from abstracts*</u>
10' talks (8'+ 2' Q&A)

18:00 – 18:10   **Dina Hany** *(University of Geneva)*   **e-poster # 17**
"Targeting purine biosynthesis, a novel therapeutic approach to overcome tamoxifen resistance in breast cancer"

18:10 – 18:20   **Chiara Pozzato** *(University of Bern)*   **e-poster # 18**
"Combined inhibition of ERK5 and CDK5 synergistically suppresses cell proliferation and induces cell death in non-small cell lung cancer"

18:20 – 18:30   **Suzanne S. Sahraoui** *(University of Geneva)*   **e-poster # 42**
"Validation of a novel tool for small molecule target identification in cytosolic and organellar sub-proteomes of Trypanosoma brucei under in-vivo conditions"

18:30 – 18:50   <u>*Industry talk*</u>
Menorca Chatuvedi *(Medicinal Chemistry, Boehringer Ingelheim)* & **Markus Koester** *(Director Discovery Research, Coordination Germany, Boehringer Ingelheim)*
"How open innovation can help you to address relevant translational questions in research? Insights from opnMe.com, the crowdsourcing portal of Boehringer"

18:50 – 19:15   <u>*Invited speaker*</u>
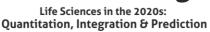**Chiara Ambrogio** *(University of Torino. IT)*
"Targeting KRAS: achievements and drawbacks"

19:15 – 19:25   *Questions to the speakers*

19:25 – 19:30   *Closing remarks*

17:30 – 18:30
Lecture hall G60
Implication of the Circadian Clock in Sleep and Mood Regulation
Organized by the LS² Section Physiology

17:30 – 17:35
Introductory words from chairs: **Andrea Brenna** *(University of Fribourg)* & **Katrin Wendrich** *(University of Fribourg)*

17:35 – 18:00
Invited speaker
Urs Albrecht *(University of Fribourg. CH)*
"Clock components, behavioral despair and light"

Selected speakers from abstracts
15' talks (12'+ 3' Q&A)

18:00 – 18:15
Gaëlle Botton-Amiot *(University of Fribourg)* **e-poster # 69**
"Associative learning and dopamine signalling in the sea anemone Nematostella vectensis"

18:15 – 18:30
Daniel González *(University of Zurich)* **e-poster # 70**
"FASN-dependent de novo lipogenesis is required for brain development"

18:30 – 19:30
Lecture hall G60
Host-Parasite Interactomes
Organized by the Swiss Society of Tropical Medicine and Parasitology

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SSMTP
SSTMP

18:30 – 18:35
Introductory words from chairs: **Pascal Maeser** *(The Swiss Tropical and Public Health Institute)* & **Carmen Faso** *(University of Bern)*

18:35 – 18:55
Invited speaker
Lucienne Tritten *(University of Zurich.CH)*
"Excretory/secretory molecules of helminth parasites: identifying the most important stars in the galaxy"

Selected speaker from abstracts

15' talk (12'+ 3' Q&A)

18:55 – 19:10   **Maria Masid Barcon** *(EPF Lausanne)*   **e-poster # 97**
"Systems biology approaches allow studying host-parasite interactions and drug targets"

19:10 – 19:30   *Invited speaker*
Nicolas Brancucci *(Swiss Tropical and Public Health Institute. CH)*
"Exploiting host interactions of malaria parasites to identify transmission-blocking drugs"

17:30 – 19:30   **From Genotype to Phenotype: Quantify, Integrate**
Lecture hall G40   **and Predict**
Organized by the LS² Section Systems Biology

17:30 – 17:35   *Introductory words from chairs:* **Yolanda Schaerli** *(University of Lausanne)* & **Benjamin Towbin** *(University of Bern)*

17:35 – 18:05   *Invited speaker*
Judith Zaugg *(EMBL. DE)*
"Systems epigenetics and gene regulation - towards predictive models"

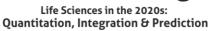*Selected speakers from abstracts*

10' talk (8'+ 2' Q&A)

18:05 – 18:15   **Sofía Barbieri** *(University of Geneva)*   **e-poster # 30**
"Prediction of PLK-1 and MEX-5 gradient formation in the C. elegans embryo: combining experiments with computational modelling"

18:15 – 18:25   **Simon Blanchoud** *(University of Fribourg)*   **e-poster # 32**
"In-lab breeding of Botrylloides diegensis requires a suitable marine microbiome"

18:25 – 18:35	**Serina Robinson**	**e-poster # 52**

(Swiss Federal Institute of Aquatic Science and Technology)
"Complex ribosomally synthesized and post-translationally modified peptides from uncultivated microbes"

18:35 – 18:45	**Coralie Dessauges** *(University of Bern)*	**e-poster # 96**

"Optogenetic interrogation of ERK dynamics reveals sources of MAPK signaling robustness"

18:45 – 18:55	**Omid Oftadeh** *(EPF Lausanne)*	**e-poster # 98**

"A computational workflow to reconstruct interaction networks in microbial communities"

18:55 – 19:25 	<u>Invited speaker</u>
Joshua Payne *(ETH Zurich. CH)*
"Genotype-phenotype maps of gene regulation"

19:25 – 19:30 	*Closing remarks*

19:30 – 20:30 	**GET-TOGETHER APÉRO**
networking & industry
exhibition

DAY TWO

FRIDAY 22.02.2022

08:15 – 08:50
Lichthof area

REGISTRATION

Speakers and chairs of the morning sessions should load their presentation. Plenaries in Lecture hall G45. Symposia in the corresponding lecture halls.

08:50 – 09:00
Lecture hall G45

WELCOME ADDRESS

Lydie Lane *(Chair of the LS² Annual Meeting 2021, University of Geneva & Swiss Institute of Bioinformatics - SIB)*

09:00 – 09:30
Lecture hall G45

PLENARY LECTURE III: LELIO ORCI AWARD

Markus A. Rüegg *(Biozentrum. University of Basel)*
Introductory words by **Pierre Cosson** *(University of Geneva)*

"Investigations of the neuromuscular system: From molecular mechanisms to promising treatments for disease"

The largest organ of the human body is skeletal muscle, accounting for up to 50% of the entire body mass. Muscle mass and function is tightly controlled and can be lost as a consequence of pathological damage to the neuromuscular system, immobility or aging. My laboratory has studied mechanisms involved in the development and maintenance of the neuromuscular system over several decades. In particular, we are interested in how the synapse between motor neurons and muscle fibers is formed and maintained. In one of our projects, we hypothesized that extracellular matrix proteins with essential functions at the nerve-muscle synapse could be engineered to replace the function of laminin-α2, the loss of which causes a rare, early-onset muscular dystrophy. Using transgenic mouse models of the disease, we indeed demonstrated that expression of the engineered proteins strongly ameliorated the muscular dystrophy. Most strikingly, lifespan of treated mice reached more than two years whereas non-treated mice usually die within the first 4 months of life. These experiments serve as the basis for our current efforts to translate this approach into clinics using adeno-associated virus-mediated gene therapy.
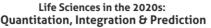
09:30 – 10:00   **COFFEE BREAK & INDUSTRY EXHIBITION**

10:00 – 12:00   **PARALLEL SYMPOSIA SESSION II**

10:00 – 12:00   **Computational and AI-Driven Drug/Vaccine**
Lecture hall G95   **Discovery**
Organized by the LS² Section Biophysics

10:00 – 10:05   *Introductory words from chairs:* **Beat Fierz** *(EPF Lausanne)*
& **Aleksandra Radenovic** *(EPF Lausanne)*

10:05 – 10:30   *Invited speaker*
Bruno Correia *(EPF Lausanne. CH)* *– ONLINE TALK*
"Building functional proteins by computational design"

Selected speakers from abstracts

10' talk (8'+ 2' Q&A)

10:30 – 10:40   **Nirvana Caballero** *(University of Geneva)*   **e-poster # 11**
"Phase separation in membranes due to matter exchange"

10:40 – 10:50   **Andrea Di Luca** *(University of Fribourg)*   **e-poster # 12**
"Conformational ensembles of E-Syts reveal key aspects of their lipid transport function"

10:50 – 11:00   **Sim Sakong** *(EPF Lausanne)*   **e-poster # 13**
"Target search dynamics of Sox transcription factors"

11:00 – 11:10   **Eleonora Secchi** *(ETH Zurich)*   **e-poster # 14**
"Biofilm streamers' formation: viscoelasticity and biochemical composition at play"

11:10 – 11:20   **Maria Bikaki** *(ETH Zurich)*   **e-poster # 95**
"Structure determination of protein-RNA complexes of SARS-CoV-2 by Cross-Linking of Isotope-labelled RNA and tandem Mass Spectrometry (CLIR-MS)"

11:20 – 11:30   *Industry talk*

Roman Renger (LUMICKS)
"Single-molecule analysis to assess biomolecular interactions across scales"

11:30 – 11:55   *Invited speaker*
Igor Stagljar *(University of Toronto. CA)*
"Drugging the Undraggable Proteins in Cancer Using Artificial Intelligence and Two Novel Live-Cell Based Technologies"

11:55 – 12:00   *Closing remarks*

10:00 – 11:30   **Biochemistry in 2020s: Quantitation, Integration and**
Lecture hall G45   **Prediction**
Organized by the LS² Section Molecular & Cellular Biosciences

10:00 – 10:05   *Introductory words from chairs:* **Daniel Legler** *(Biotechnologie Institut Thurgau)* & **Marcus Thelen** *(Università della Svizzera Italiana)*

10:05 – 10:30   *Invited speaker*
 Ivana Gasic *(University of Geneva. CH)*
"Autoregulated control of tubulin mRNA stability"

Selected speakers from abstracts
10' talk (8'+ 2' Q&A)

10:30 – 10:40   **Paolo Armando Gagliardi** *(Univ. of Bern)*   **e-poster # 61**
"Collective ERK/Akt activity waves orchestrate epithelial homeostasis by driving apoptosis-induced survival"

10:40 – 10:50   **Andrii Kuklin** *(ETH Zurich)*   **e-poster # 64**
"Cross-talk of the cytoprotective transcription factors Nrf2 and NF-kB controls hepatocyte proliferation"

10:50 – 11:00   **Shuang Peng** *(University of Bern)*   **e-poster # 49**

"RHOH acts as an intracellular brake on the actomyosin-mediated organelle transport limiting effector functions of neutrophils"

11:00 – 11:10 **Mehdi Badaoui** *(University of Geneva)* **e-poster # 48**
"HuR promotes bacterial adhesion to the cystic fibrosis airway epithelium by stabilizing Vav3 mRNA"

11:15 – 11:25 *Questions to speakers*

11:25 – 11:30 *Closing remarks*

10:00 – 12:00 **Handling large-scale Complex Datasets: Integration,**
Lecture hall G40 **Modeling, Prediction**
Organized by the LS² Intersection Bioinformatics

10:00 – 10:05 *Introductory words from chair:* ***Katja Bärenfaller***
(University of Zurich & Swiss Institute of Bioinformatics)

Invited speakers
10:05 – 10:30 **Catherine Jutzeler** *(ETH Zurich. CH)*
"Comprehensive modeling and evaluation of spinal cord injury recovery"

10:30 – 10:42 **Carlos- Andrés Peña-Reyes** *(HEIG-VD. CH)*
PERPHECT: Using Deep Learning for BacterioPhage Genomic Edition"

10:42 – 11:30 *Selected speakers from abstracts*
7' talk (6'+ 1' Q&A)

Adriano Rutz *(University of Geneva)* **e-poster # 09**
"The LOTUS Initiative: Integrating Natural Products to the Wikidata Knowledge Base"

Sriraksha Srinivasan *(University of Fribourg)* **e-poster # 31**
"Estimating the accuracy of the MARTINI model towards

the investigation of peripheral protein–membrane interactions"

Roman Vetter *(ETH Zurich)*   **e-poster # 40**
"A data-based biomechanical model to predict neural tube folding"

Constance Ciaudo *(ETH Zurich)*   **e-poster # 46**
"Integrative analysis allows a global and precise identification of functional miRNA target genes in mESCs"

Rudy Rizzo *(University of Bern)*   **e-poster # 68**
"Uncertainties for quantification of metabolites in Magnetic Resonance Spectroscopy: deep learning vs. model fitting"

Evangelia Vayena *(EPF Lausanne)*   **e-poster # 101**
"Analysis of Salmonella Typhimurium growth in the mouse intestine using metabolic network reconstruction"

11:30 – 11:55   <u>Invited speaker</u>
Milena Sokolowska *(University of Zurich. CH)*
"Machine learning successfully detects COVID-19 patients prior to PCR results and predicts their survival based on standard laboratory parameters"

11:55 – 12:00   *Closing remarks*

12:00 – 13:20   **LUNCH & INDUSTRY EXHIBITION**
Grab your food and visit our booths!!

Food for participants will be provided from 12:00 to 13:00.
Catering for industry representatives will be open from 11:30
Speakers and chairs of the morning sessions should load their presentation. Plenaries in Lecture hall G45. Symposia in the corresponding lecture halls.

13:20 – 15:20   **PARALLEL SYMPOSIA SESSION III**

13:20 – 15:20   **Computational Approaches for Biological Imaging**
Lecture hall G95   *Organized by the LS² Intersection Microscopy*

13:20 – 13:25   *Introductory words from chair:* **Arne Seitz** *(EPF Lausanne)*

13:25 – 13:45   *Invited speakers*
 Anna Kreshuk *(EMBL - DE)*
"*Microscopy image segmentation with machine learning*"

13:45 – 14:05   ***Mackenzie Mathis*** *(EPF Lausanne)*
"*Deep learning for neuroscience: from cells to behavior*"

Selected speakers from abstracts
10' talk (8'+ 2' Q&A)

14:05 – 14:15   **Chen Zhang** *(EPF Lausanne)*   **e-poster # 53**
"*New D-amino acid derivatives enable dSTORM imaging of bacterial peptidoglycan biosynthesis*"

14:15 – 14:25   **Talia Bergaglio** *(Empa)*   **e-poster # 54**
"*Machine Learning Augmented Red Blood Cell Imaging And Analytics*"

14:15 – 14:25   **Willi Stepp** *(EPF Lausanne)*   **e-poster # 55**
"*Event-driven acquisition for content-enriched microscopy*"

14:25 – 14:35   **Adam Gosztolai** *(EPF Lausanne)*   **e-poster # 71**
"*LiftPose3D, a deep learning-based approach for transforming two-dimensional to three-dimensional poses in laboratory animals*"

14:35 – 14:45   *Invited speaker*
Florian Jug *(Fondazione Human Technopole. IT)*
"*Microscopy Image Restoration and Downstream Analysis - recent improvements and hopes for the future*"

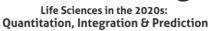*14:45 – 14:55*   *Questions to the speakers*

14:55 – 15:00   *Closing remarks*

13:20 – 15:20   **Cell Biology in the 2020s: Dynamics, Quantitation,**
Lecture hall G60   **Integration and Prediction**
Organized by the LS² Section Molecular & Cellular
Biosciences

13:20 – 13:25   *Introductory words from chairs:* **Daniel Legler** *(Biotechnologie Institut Thurgau)* & **Marcus Thelen** *(Università della Svizzera Italiana).*

13:25 – 13:50   *Invited speaker*
Olivier Pertz *(University of Bern. CH)*
"Self-organization of MAPK signaling dynamics in epithelial cellular ecosystems"

Selected speakers from abstracts
10' talk (8'+ 2' Q&A)

13:50 – 14:00   **Orsolya Barabas** *(University of Geneva)*   **e-poster # 50**
"How genes jump: molecular strategies for broad dissemination of antibiotic resistance across bacterial genomes"

14:00 – 14:10   **Ida Calvi** *(University of Geneva)*   **e-poster # 33**
"The PP1 phosphatase GSP-2 orchestrates polarity establishment in C. elegans"

14:10 – 14:20   **Kaushik Bhattacharya** *(University of Geneva)* **e-poster # 58**
Fine-tuned Hsp90 levels define the threshold of mammalian life

14:20 – 14:30   **Jakub Kralik** *(University of Bern)*   **e-poster # 72**
"Evaluation of optogenetic vision restoration in mouse model of retinitis pigmentosa using multi-electrode arrays"

14:30 – 14:50   <u>*Industry talk*</u>
Markus Uhrig *(OLS – OMNI Life Sciences)*
"A novel benchtop approach for high-yield, improved viability and long-term cultivation of 3D cell models"

14:50 – 15:15   <u>*Invited speaker*</u>
Anne-Claude Gavin *(University of Geneva. CH)*
"Cellular communication: lipids on the membrane"

15:15 – 15:20   *Closing remarks*

13:20 – 15:20   **Combining Proteomics and Genomics for Advanced**
Lecture hall G40   **Precision Medicine**
Organized by the LS² Section Proteomics

13:20 – 13:25   *Introductory words from chair:* **Oliver Rinner** *(Biognosys).*

           <u>*Invited speakers*</u>
13:25 – 13:50   **Jonathan Woodsmith** *(Indivumed. DE)*
"Integrative Multi-omic analysis using the IndivuType Database"

13:50 – 14:10   **Fabienne Meier-Abt** *(University of Zurich. CH)*
"The proteogenomic landscape of chronic blood cancers"

14:10 – 14:30   **Christopher Clark** *(University of Zurich. CH)*
"Integrative multi-omics to investigate cerebral and systemic biological pathway alterations with clinical

relevance in Alzheimer's disease"

14:30 – 14:50	<u>*Open questions to speakers - Roundtable*</u> **Eike von Leitner** *(Indivumed. DE),* **Fabienne Meier-Abt**, *(University of Zurich. CH),* **Christopher Clark** *(University of Zurich. CH),* **Jonathan Woodsmith** *(Indivumed. DE) & **Oliver Rinner** (Biognosys. CH)*

<u>*Selected speakers from abstracts*</u>

10' talk (8'+ 2' Q&A)

14:50 – 15:00	**Ferdinando Cerciello** *(Univer. Hospital Bern)* **e-poster # 89** *"Targeted proteomics based blood biomarkers for malignant pleural mesothelioma"*
15:00 – 15:10	**Deena Pedrioli** *(University of Zurich)* **e-poster # 90** *"ADP-ribosylome analyses advances our understanding of PARPs and ADP-ribosylation in diverse biological samples"*
15:10 -15:20	**Elena Barletta** **e-poster # 88** *(Swiss Institute of Bioinformatics)* *"Mass spectrometry-based identification of allergen proteins involved in seafood-related allergic reactions"*
15:20 – 16:00	**COFFEE BREAK & INDUSTRY EXHIBITION**
16:00 – 16:30 *Lecture hall G45*	**PLENARY LECTURE V: FRIEDRICH MIESCHER AWARD** **Paul Guichard** *(University of Gemeva)* *Introductory words by Daniel Legler (Biotechnologie Institut Thurgau)* *"The centriole architecture: from molecular assembly to diseases"*

The centriole (also called basal body) is an evolutionary conserved organelle that is typically 500 nm long and 250 nm in diameter and composed of about 100 different proteins, all in multiple copies. How these proteins are organized at the level of the centriolar architecture is poorly understood and only a fraction of these

proteins have been clearly studied and precisely localized. Moreover, a clear molecular overview of the centriolar structure and assembly is currently lacking. I will present the latest work from my laboratory that uses several approaches such as in vitro reconstruction, in situ cryo-tomography and high resolution molecular mapping using U-ExM to address these fundamental questions.

16:30 – 17:10
Lecture hall G45

PLENARY LECTURE VI: KEYNOTE LECTURE
Nevan Krogan *(University of California San Francisco. US)*
Chair: **Lydie Lane** *(Chair of the LS² Annual Meeting 2022, University of Geneva & Swiss Institute of Bioinformatics - SIB)*

"Host Factor Targeted Drug Discovery for SARS-CoV-2 Through an International Collaboration" – ONLINE TALK

The novel coronavirus SARS-CoV-2, the causative agent of COVID-19 respiratory disease is evolving during the current pandemic. New variants show enhanced replication and the potential to evade therapeutic antibodies. In the near future, variants may even evade first generation vaccines. The currently approved direct acting antiviral remdesivir targets the viral RNA-dependent RNA polymerase which is subject to rapid evolution as it is encoded by the viral RNA genome. In order to develop therapeutic approaches which act in a pan-coronavirus manner we and our colleagues at the QBI Coronavirus Research Group (QCRG) have mapped the human proteins (host factors) which multiple Coronaviruses rely on for replication. Through a rapid drug repurposing effort we have identified zotatifin, a clinical eIF4A inhibitor as a host factor targeted therapeutic. Zotatifin which is based on the natural product rocaglamide A works as a molecular glue to trap eIF4A on its target, the (+) RNA viral genome. Other examples of targeting essential host factors, including those for immune evasion will be discussed.

17:10 – 17:50
Lecture hall G45

AWARD CEREMONIES
Announcement of LS² Honorary Member: **Marcus Thelen** *from Università della Svizzera italiana.*

Prizes:
- *PIs of Tomorrow: jury and public*
- *Best Research Slam Talk*
- *Best Short Talk in plenary session*
- *Best Short Talk in YSS*

- *Best Short Talk in Mycroscopy Symposium*
- *Best Short Talk in Pharmacology Symposium*
- *Exhibition Lottery draw*

17:50 – 18:00
Lecture hall G45

CLOSING REMARKS & ACKNOWLEDGMENTS

Lydie Lane *(Chair of the LS² Annual Meeting 2022, University of Geneva & Swiss Institute of Bioinformatics - SIB)*
Didier Picard *(President of LS², University of Geneva)*
Patrick Mathias *(Vice-President LS², Friedrich Miescher Institute for Biomedical Research)*