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**HFSP 25th Anniversary Meeting**

**Saturday, 5 July 2014**

**14th HFSP Awardees Meeting**

**Sunday, 6 – Wednesday, 9 July 2014**

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**Saturday 5th July**

**Registration**

12:00-14:00 Registration: Hotel Splendide Royal

**25th HFSP Anniversary Symposium on ‘Human Frontiers’**

Hotel Splendide Royal, Lugano, Switzerland

*Moderator*: Ernst-Ludwig Winnacker, HFSPO Secretary General

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| 14:00-14:10 | **Opening remarks**  Mauro Dell’Ambrogio, Swiss State Secretary for Education, Research and Innovation |
| 14:10-14:25 | **Statement from Japan**  Hirofumi Nakasone, Member of the House of Councillors, National Diet of Japan |
| 14:25-15:00 | **‘Architecture – recent projects’**  Mario Botta (Mendrisio, Switzerland) |
| 15:00-15:30 | ***Break*** |
| 15:30-17:00 | **Panel discussion on ‘Human Frontiers’**  *Moderator*: Adam Smith, Chief Scientific Officer of Nobel Media (London, UK)  *Guest speakers:*  Susan Hockfield, Massachusetts Institute of Technology, President Emerita and Professor of Neuroscience, Koch Institute for Integrative Cancer Research (Cambridge, USA)  Claude Nicollier, Swiss Federal Institute of Technology (Lausanne, Switzerland)  Torsten Wiesel, President Emeritus, The Rockefeller University (New York, USA) and former Secretary General of HFSPO  *Statements by the panelists will be followed by an exchange with the audience.* |
| 17:00-17:30 | **HFSPO President’s closing remarks and Nakasone Award Ceremony**  Hirokawa Nobutaka, HFSPO President, Graduate School of Medicine, University of Tokyo, Japan  Presentation to Uri Alon, Weizmann Institute of Science (Rehovot, Israel) |
| 18:15 | **Aperitif** |
| 19:00 | **Gala dinner hosted by the Government of Switzerland** |

**25th HFSP Anniversary Symposium on ‘Human Frontiers’**

*Background*

Guntram Bauer

Director of Science and Communications, HFSP

HFSP's mission is to support frontier research in the life sciences defined as research that enters new territory trying to answer significant questions and that has certain risks of failure associated with it. The word “frontier” may be associated with the exploration of the American West in the early 1800s (“Lewis and Clark”)[[1]](#footnote-1), the land beyond boundaries, the land of the unexpected and of unlimited opportunities. It takes enormous risks to step into the unknown and in this sense the “frontiers” are quite an appropriate goal for a research funding organization like HFSP.

Due to the rapid developments in modern biology the task of recognizing frontier research is quite a challenge for a funding agency like HFSP. Twenty-five years ago when HFSP was founded the frontiers of biology could be defined as molecular biology that started to impact genetics. Later on it was realized that molecular biology alone does not guarantee the necessary depth of engagement. From discoveries in the past quarter century we know that the boundaries of modern biology have become so broad that they require the integration of many fields such as computer sciences, chemistry, physics, mathematics and even engineering. Modern systems biology approaches rely heavily on mathematical formulations when trying to analyze a system level response as can be seen by the work of the 2014 Nakasone Award recipient Uri Alon who provided the mathematical concept of network motifs to characterize genetic circuits. A reductionist approach may tell us the future is in the numbers. But will that be sufficient to solve fundamental problems of mankind?

The next generation challenges are linked to understanding complexity and they are beginning to penetrate fields like the cognitive neurosciences, ecology and biodiversity, both of which have not found intensive support by HFSP in the past. Also the borderlines between epigenetics and the environment are becoming better defined, permitting us to pose clearer questions as to their respective relationships.

The purpose of this symposium is to draw on the panelists’ experience concerning the concept of funding frontier research. What is their view on the frontier? Are there common denominators between the life sciences and other fields of human endeavor, like architecture, space exploration and international relations? Is the research environment appropriately prepared for the new biology? Discussions and answers to these and related questions could help point towards preparing HFSP for the next 25 years.

*The 25th HFSP Anniversary Symposium will be recorded and the films will be published via the HFSP website. Participants who do not wish to be seen on film are advised to instruct the HFSP registration desk and the camera crew accordingly.*

**Sunday 6th July**

**Registration**

13:00-18:00 Registration: Grand Hotel Eden

18:00 **Welcome reception – Grand Hotel Eden**

*Informal welcome by HFSPO Secretary General, Prof. Ernst-Ludwig Winnacker*

**Monday 7th July**

8:45-9:00 **Opening remarks (Chair: Ernst-Ludwig Winnacker)**

*Prof. Nobutaka Hirokawa, President of HFSPO*

9:00-10:00 **HFSP Nakasone Lecture (Chair: Ernst-Ludwig Winnacker)**

**Design principles of biological circuits***Uri Alon, Weizmann Institute of Science, Israel*

10.00-10.15**Welcome address**

*Prof. Piero Martinoli, President of Università della Svizzera Italiana*

*10:15-10:45* ***Break***

**Oral Session 1 (Chair: Young-Joon Kim)**

10:45-11:05 **Bottom-up synthetic biology of bacterial cell division**

Zieske, K., Martos, A., Rivas, G., Kretschmer, S., *Schwille, P.*

11:05-11:25 **Folding of chromatin domains in response to hormone stimulation**

Kocanova, S., Jain, G., Baù, D., Goiffon, I.,Zhan, Y., Marti-Renom, M.A*.*, Dekker, J., *Bystricky, K*.

11:25-11:45 **Pseudo-temporal ordering of individual cells reveals dynamics and regulators of cell fate decisions**

*Cacchiarelli, D.*, Trapnell, C., Grimsby, J., Pokharel, P., Li, S., Morse, M., Lennon, N.J., Livak, K.J., Rinn, J.L., Lander, E.S., Mikkelsen, T.S.

11:45-12:05 **Tubulin acetylation alters the mechanics of microtubules**

Xu, Z., Schaedel, L., Portrand, D., Shida, T., Vignaud, T., Théry, M., *Nachury,* *M.V.*

12:05-12:25 **Characterization of conformational transitions in prion proteins using single-molecule techniques**

Raspadori*,* A., Vignali, V., Komi, Y., Maillard, R.A., Bustamante, C., Tanaka, M., Samorì, B., *Legname, G.*

*12:25-13:40* ***Lunch (University Cafeteria)***

**Oral Session 2 (Chair: Martin Reddington)**

13:40-14:00 **Single molecular, structural and biochemical insights into actin regulation in the malaria parasite**

Olshina, M.A., Bane, K., Wong, W., Webb, A., Infusini, G., Nebl, T.,Angrisano, F., Lepper, S., Catimel, B., Hanssen, E., Kovar, D.R., Frischknecht, F., *Baum, J.*

14:00-14:20 **Studying host-microbiota interactions by a novel metabolic labeling approach**

*Geva-Zatorksy, N*., Alvarez, D., Reading, N., Kasper, D.

**Poster Talks 1 (Chair: Paul De Koninck)**

14:20-14:25 **Length regulation of microtubule overlap during spindle elongation**

Johann, D., Goswami, D., Janson, M., *Kruse, K.*

14:25-14:30 **Genetic basis and ecological relevance of seed camouflage in desert sunflowers**

*Todesco, M.*, Heredia, S., Bercovich, N., Chu, J., Cheung, W., Rieseberg, L.H.

14:30-14:35 **The role of iron-sulphur clusters in DNA replication and repair**

*Gari, K.*

14:35-14:40 **Longitudinal in vivo live imaging of the generation of tumor cell heterogeneity**

*Kitano, M.*, Fraser, S.E.

14:40-14:45 **Reconstructing neural circuits with machine learning and social computing**

*Seung, S.,* Friedrich, R*.,* Yoshihara, Y*.*

14:45-14:50 **Bacterial cell growth mediated by the actin-like MreB cytoskeleton**

*Yao, Z.*, Cornilleau, C., Mirouze, N., Flores, P., Fromion, V., Carballido-López, R.

14:50-14:55 **Measuring and modeling the dynamics of the thermal memory of *C. elegans***

Nemenman*,* I., Palanski, K., Bartumeus, B., *Ryu*, *W.S*.

14:55-15:00 **Real-time *in vivo* imaging reveals rapid and continuous activity-dependent plasticity of sensory input to the mouse olfactory bulb**

*Cheetham, C.E.J*., Belluscio, L.

15:00-15:05 **The presence and function of a diffusion barrier in mammalian neural stem cells as a mechanism to segregate age**

*Moore, D.L.,* Pilz, G.A.,Barral, Y., Jessberger, S.

15:05-17:15 **Poster Session 1 (with refreshments)**

*Aula Magna*

**Invited Lecture (Chair: Ernst-Ludwig Winnacker)**

17:15-18:15 **A trick of the light? Plant nanostructures that influence animal behaviour**

*Beverly Glover, University of Cambridge, Botanical Gardens, UK*

19:00 **Dinner boat tour on Lake Lugano**

Boarding will begin at 19:00 and the boats will leave at 19:30.

**Tuesday 8th July**

**Oral Session 3 (Chair: Michael Purugganan)**

09:00-09:20 **Are roots in the dark?** **Combining field ecology, molecular biology and optical physics to understand the roles of photoreceptors in the roots of plants**

*Baldwin, I.T., Park, C-M.,* Oh, K., Oh,Y., Lee, H-J., Kim, S-G., Fragoso, V.

09:20-09:40 **Early endosomal trafficking is involved in cell polarity and auxin-dependent development in *Arabidopsis thaliana***

*Tanaka, H.,* Kitakura*,* S., Nodzynski, T., Kakimoto, T., Friml, J.

# 09:40-10:00 Network merging analysis of duplicate genome function in recently hybridized species in Switzerland

*Shimizu, K.K.*, Sese, J., Hay, A.

10:00-10:20 **Resource allocation diversity in *Arabidopsis* accessions**

*Rosas, U.*, Ruffel, S., Fan, A.H., Krouk, G., Li, Y., Banta, J., Purugganan, M.D., Coruzzi, G.M.

*10:20-10:50* ***Break***

**Oral Session 4 (Chair: Allan Herbison)**

10:50-11:10 **B-spectrin and the mechanical control of the sense of touch**

*Krieg, M.*, Dunn, A.R., Goodman, M.B.

11:10-11:30 **Dynamics of cell state transitions in early reprogramming and around the pluripotent state**

*Nachman, I*., Meissner, A.

11:30-11:50 **Discovery of a deterministic gene regulatory network inducing rapid neurogenesis in human stem cells**

*Busskamp, V.*, Lewis, N.E., Guye, P., Ng, A.H.M., Shipman, S.L., Byrne, S.M., Weiss, R., Church, G.M.

**Invited Lecture (Chair: Guntram Bauer)**

11:50-12:40 **The art of border crossings: reflections on scientific practice and the need for integrative multidisciplinarity**

*Angela Gronenborn, University of Pittsburgh, USA*

*12:40 – 13:50* ***Lunch (University Cafeteria)***

**Oral Session 5 (Chair: Salvatore Oliviero)**

13:50-14:10 **Epigenetic control of totipotency**

*Ishiuchi, T.,* Torres-Padilla, M.E.

14:10-14:30 **Understanding the interplay between genome organization and gene expression**

*Bienko, M.*, Crosetto, N., Teytelman, L., Klemm, S., Itzkovitz, S., van Oudenaarden, A.

14:30-14:50 **Clonal evolution and the role of cooperation between clones in carcinogenesis**

*Lyons, J.G.*, Lobo, E.P., Raviraj, V., Martin, D., Sou, P.W., Bryce, N., Payne, C.A., Delic, N.C., Halliday, G.M., Patel, V., Gutkind, J.S., Myerscough, M.R.

14:50-15:10 ***CLoNe* is a new method to target single progenitors and study their progeny in mouse and chick**

*García-Moreno, F.*, Vasistha, N.A., Begbie, J., Molnár, Z.

**Wednesday 9th July**

**Oral Session 6 (Chair: Sarah Teichmann)**

9:00-9:20 **Fitness tradeoffs in the pre-aggregation of biofilm-forming bacteria**

Melaugh, G., Kragh, K., Hutchison, J., Bjarnsholt, T., Gordon, V., *Allen, R. J.*

9:20-9:40 **Evolution of cooperation in bacterial biofilms**

*Drescher, K*., Nadell, C.D., Stone, H.A., Wingreen, N.S., Bassler, B.L.

9:40-10:00 **Why reinvent the wheel? Computational design of novel antibodies from natural fragments**

*Fleishman, S,J.*

10:00-10:20 **Water dynamics resolve the fate of CaCO3 nucleation and structure**

*Born, B.*, Gebauer, D., Ginsburg, A., Luong, T.Q., Havenith, M., Raviv, U., Cölfen, H., Sagi, I.

*10:20-10:50* ***Break***

10:50-11:10 **Deconstructing avian cone photoreceptors: a system of self-organizing optical microdevices**

*Corbo, J.C.*, Toomey, M.B., Enright, J.M., Lind,O., Wilby, D., Frederiksen, R., Riedl, K.M., Schwartz, S.J., Witt, C.C., Harrison, E.H., McGraw, K.J., Jiao, Y., Lau, T., Hatzikirou, H., Torquato, S., Cornwall,M.C., Meyer-Hermann, M., Roberts, N.W., Kelber, A.

11:10-11:30 **Scaling of adhesion in geckos: compliance, not area, explains how large geckos can climb**

*Irschick, D. J*., Cosby, A. J., Federle, W., King, D., Imburgia, M., Kuo, C., Gilman, C., Showalter, I.

11:30-12:30 **Meet the staff of HFSP**

*12:30-13:30* ***Lunch (University Cafeteria)***

**Oral Session 7 (Chair: Daniel Kiehart)**

13:30-13:50 **flyPAD: high throughput and temporal resolution feeding sensor for flies**

Itskov, P.M., Moreira, J.M., Lopes, G., Vinnik, E., Safarik, S., Dickinson, M.H., *Ribeiro, C.*

13:50-14:10 **Single-cell analysis reveals prominent classes within the planarian stem cell compartment**

*van Wolfswinkel*, *J.C.,* Wagner, D.E., Reddien, P.W.

14:10-14:30 **Edge orientation processing in first-order tactile neurons**

*Pruszynski, J.A*., Johansson, R.S.

**Poster Talks 2 (Chair: Hermann Gaub)**

14:30-14:35 **Clearing the corpses – the role of Axl tyrosine kinase in the phagocytosis of apoptotic cells by inflammatory macrophages**

*Zagórska, A.*, Través, P.G., Lew, E.D., Lemke, G.

14:35-14:40 **Magnetogenetics: remote stimulation of cells using nanoparticle heating**

*Pralle, A.*, Schüler, D., Parak, W., Knöpfel, T.

14:40-14:45 **Pathways and progression in cancers with symbiotic clones**

*Myerscough, M.R.*, Lobo, E.P, Lyons, J.G.

14:45-14:50 **The birth of the circadian clock**

Evental, N., Schyr, R., Shulha, H., Regev, A., Garber, M., Meshorer, E., *Kadener, S.*

14:50-14:55 **Determinants and evolution of the transcriptional feedback network and the cellular memory**

*Hsu*, *C.*, Jaquet, V., Becskei, A.

14:55-15:00 **Defining a *cis*-regulatory code for synovial joint development**

*Tschopp, P*., Ohba, S., Kan, A., McMahon, A.P., Tabin, C.J.

15:00-15:05 **Understanding neuronal individuality and control of neurite fusion in the nematode *Caenorhabditis elegans***

*Giordano, R.*, Hilliard, M.A.

15:05-15:10 **Deciphering the mechanisms of TDP-43 and FUS/TLS mediated neurotoxicity**

*Polymenidou, M.*

15:10-15:15 **The developmental origins of mental life: when and how does the brain first start to function as a unified organ?**

*Balaban, E.B.*, Vaquero, J.J.

15:15-17:30 **Poster Session 2 (with refreshments)**

*Aula Magna*

**Plenary Lecture (Chair: Ernst-Ludwig Winnacker)**

17:30-18:30**The myosin family of molecular motors: nature's exquisite nanomachines**

*James Spudich, Stanford University, USA*

**Closing Remarks**

*HFSPO Secretary General, Prof. Ernst-Ludwig Winnacker*

19:30**Farewell Dinner at the Lido di Lugano**

1. Lewis and Clark expedition, 1804-1806. He laid much of the groundwork for the expansion of the American West (see wikipedia.org/wiki/Lewis\_and\_Clark\_Expedition) [↑](#footnote-ref-1)