Future of Biomedical Research: Are we ready?
& BBS General Assembly 2017

Date: November 14, 2017, Time: 14:30-17.00
Venue: Novartis Campus Basel, WSJ-Fabrikstr-6-U2-Auditorium

Following the successful seminar on advanced analytics in September, the BBS presents a seminar on machine and deep learning featuring applications. The seminar aims also to address the question what this all means for us as biometricians. **A lively discussion is guaranteed!** It will be followed by our 2017 BBS general assembly.

Scientific committee: Dominik Heinzmann (Roche), Achim Guettner (Novartis), Amanda Ross (Swiss TPH), Uli Burger (Roche)

The seminar is free of charge. For registration however please send an informal e-mail to Laurence Guillier (laurence.guillier@roche.com) or Barbora Martinec (barbora.martinec@roche.com).

Program *(abstracts next page)*:

14:30-14:35	Welcome, Dominik Heinzmann, BBS council member
	Chairs: Achim Guettner (BBS), Amanda Ross (BBS)
14:35-15:10	**Applications of Machine Learning and Deep Learning** *Damian Roqueiro, Senior Researcher Machine Learning and Computational Biology Lab ETH Zurich*
15:10-15:30	**Machine learning when the ground truth isn't truth and privacy is a problem – case study from the Assess MS project** *Jonas Dorn, Digital Health, Novartis*
15:30-15:45	**Big clinical data: What should biometrician do with it?** *Uli Burger, Biostatistics Product Development, Roche*
15:45-16:00	Panel discussion
16:00-17:00	General Assembly BBS 2017
17:00	**Closure of event**

We look forward to your participation!

Kind Regards,

Dominik Heinzmann, Achim Guettner (on behalf of the BBS)

ABSTRACTS

14:35-15:10 **Applications of Machine Learning and Deep Learning**

Damian Roqueiro, Senior Researcher Machine Learning and Computational Biology Lab ETH Zurich

The talk will consist of a high-level introduction to machine learning (ML), highlighting applications of ML in our daily lives and focusing on a breakthrough technology like self-driving cars as a driver example. The core of the talk will center around applications of ML to biological experiments and to discuss how the MLCB lab has used the concept of testability to tackle the problem of "significant pattern mining". In the final part of the talk we will discuss preliminary results of deep learning methods when applied to processing unstructured data in medical records.

15:10-15:30 **Machine learning when the ground truth isn't truth and privacy is a problem – case study from the Assess MS project**

Jonas Dorn, Digital Health, Novartis

The goal of the Assess MS project is to provide a consistent and sensitive assessment of physical disability in multiple sclerosis, as current clinical tools suffer from low inter- and intra-rater consistency. We have developed a recording device including the Microsoft Kinect camera that records patients performing neurological assessment movements on both color and 3D video with the intent to train a machine learning algorithm to assess these videos similar to an experienced neurologist. However, this poses to practical challenges: how to train a machine learning algorithm on low-reliability ground truth, and how to use the video information if non-clinicians are not allowed to see the videos.
We have overcome the challenges by developing a method for deriving consistent ground truth from inconsistent individual judgments, and by using autoencoders to extract the essential information for research from the video data while preserving patient privacy.

15:30-15:45 **Big clinical data: What should biometrician do with it?**

Uli Burger, Biostatistics Product Development, Roche

Big data enter the field of clinical research today in two ways: With larger registries and more accessible patient health records large datasets including data from thousands of patients become more and more available. In addition, we are also entering the time of high dimensional clinical data where we have thousands of data points per patient. Both developments together change the way the role clinical data analysis is perceived today by many stakeholders. There is a lot of hope associated with the availability of such big data that it could make clinical research much more efficient, in the field of personalized medicine and beyond. It sometimes even seems that advanced analytics will take over what more classical statistics has done before and the sexy job of a biostatistician would be replaced by the one for a data scientist. This talk will outline the developments behind and will highlight its potential impact on clinical development as well as for biostatistics.

16:00-17:00 General Assembly BBS 2017

At the end of this meeting we will also have our BBS assembly 2017. The assembly will provide a report of the BBS president Uli Burger on all BBS and ROeS activities and an overview on the financial situation by the treasurer. Finally some positions on the BBS board needs to be filled again. A detailed agenda for the assembly will follow separately.