

Integration of Expert Knowledge for Interpretable Models in Biomedical Data Analysis

Tentative schedule (updated Sunday, June 26, 22:30)

June 26 – July 1, 2016

Dagstuhl Seminar 16261, <http://www.dagstuhl.de/16261>

Dear Seminar Participants,

Below is a tentative program for the seminar, keeping in mind that the goal is NOT to have the participants give many individual talks about work already accomplished but rather, introduce and discuss current ideas and limitations in translational medicine and then have focused discussions to identify concrete areas and projects where computational scientists can work with clinicians and medical researchers to make a real difference in patient care and treatment efficacy. Given the mix of people who are participating, we have identified three theme areas for the first three days. On each of these three days we will have talks by keynote speakers who will outline problem areas where such collaborations can flourish. In the afternoon on days 1 and 2 and in the morning of day 4, we are hoping to have further, in-depth discussions and (ideally) analysis of real data in a tutorial setting to go over each theme in detail. We hope that these sessions will be seeds for genuine collaborations among the participants in the near future. The agenda for the afternoon on the fourth day and the morning of the fifth day is left open. It will be determined based on how the earlier sessions go. Opportunities will be provided for short presentations introducing unsolved problems, views and visions.

Please come prepared to ask and be asked difficult questions – such as: “In what way is this relevant to patient care?” “How does any of this apply to real data in translational medicine?”

If you have real clinical data which you want to apply machine learning or visualization methods to, please bring it with you. One of the ways the afternoon sessions can be focused is to help you find patterns in your data!

Program:

Monday, June 27

Biomedical data analysis: The clinical perspective

09:00 - 09:20 **Opening**
Self-Introduction of Participants

09:20 – 10:05 **Dr. W. Kimryn Rathmell.** Vanderbilt Ingram Cancer Center, Nashville, TN, USA: *Integrating and interpreting – omic features to reveal and define the complexity of human cancer*

10:05 – 10:30 – Tea/Coffee

10:30 - 11:15 **Dr. Shridar Ganesan.** Rutgers Cancer Institute of New Jersey, New Brunswick, NJ, USA: *Optimal classification of human cancer: How many kinds of breast cancer are there?*

11:15 -12:00 **Dr. Kerstin Bunte.** Computer Science & Institute of Metabolism and Systems Research, University of Birmingham/UK: *Current problems in metabolomics and related areas*

12:15 – 14:00 Lunch

14:00 – 15:00 Summary of themes identified in plenary talks. Identification of key themes and problems, assignment of participants to discussion groups regarding these topics.

15:00 – 15.30 Coffee/Tea

15:30 – 17:15 Participants have in-depth discussions of themes in separate breakout sessions. Each session led by a plenary speaker.

17:15 – 18:00 Plenary group leaders summarize discussions from breakout sessions to all participants.

18:00 – 19:30 Dinner

19:30 - 21:00 Tutorials/work on data/free time (continued)

21:00 – 24:00 Continue informal discussions over wine, cheese, beer.

Tuesday, June 28

Biomedical data analysis: The machine learning perspective

09:00 - 09:15 **Announcements**

09:15 -10:00 **Barbara Hammer,** University of Bielefeld: *Relevance and causal relation in machine learning*

10:00 – 10:30 – Tea/Coffee

10:30 -11:15 **Paulo Lisboa**, John Moores University, Liverpool, UK: *Accuracy is not enough: interpretation of machine learning models*

11:15-12:00 **Peter Tino**, University of Birmingham, Birmingham UK:
Learning in model space: generative models and inference

12:15 – 14:00 Lunch

14:00 – 15:00 Summary of themes identified in plenary talks. Identification of key themes and problems, assignment of participants to discussion groups regarding these topics.

15:00 – 15.30 Coffee/Tea

15:30 – 17:15 Participants have in-depth discussions of themes in separate breakout sessions. Each session led by a plenary speaker.

17:15 – 18:00 Plenary group leaders summarize discussions from breakout sessions to all participants.

18:00 – 19:30 Dinner

19:45 – 21:00 **Short evening talks**

Hossein Khiabani: Statistical Inference and dimensionality reduction in evolutionary tree spaces

Gert-Jan de Vries: Information richness and missing data in clinical studies for heart failure

21:00 – 24:00 Continue informal discussions over wine, cheese, beer.

Wednesday, June 29

Biomedical data analysis: Visualization and other themes

09:00 - 09:10 **Announcements**

09:10 - 10:00 **Timo Ropinski**, University Ulm, Germany: *Visual computing and visual analysis of complex data sets*

10:00 – 10:30 Tea/Coffee

10:30 – 12:00 **Short talks**

Gunther Weber: Visual Exploration of Brain Connectivity

Klaus Mueller: Visual Analytics and Causal Reasoning with high-dimensional data

12:00 **Group photo**

12:15-14:00 Lunch break

14:00-14:45 **Jeffrey Rathmell**: Tracking T-Cell Metabolism

15:00-ca. 21:00 Social event, wine tasting, **bus departs 15:00**

Thursday, June 30

Short talks

- 9:00 – 10:00 **Saurabh Laddha:** Integrative genomics analysis identifying molecular subtypes of lung cancer
- Röbbe Wünschiers:** Choice from noise: Modelling Biology
- 10:00 – 10:30 Coffee/Tea
- 10:30 – 11:30 **Anupama Reddy:** Integrative multi-omics data collaboration: bladder cancer data set, first results of machine learning analyses
- 11:30 - 12:00 **Dietlind Zühlke:** Interactive machine learning for cancer research
- 12:15 - 14:00 Lunch
- 14:00 - 16:00 **Pietro Lio':** Multidim. methods to integrate biological data
Thomas Wischgoll: Cardiovascular disease: from data generation to analysis
- 16:00 - 16:30 Coffee/Tea
- 16:30 - 18:00 Discussions
- 19:45 - 21:00 t.b.a.