

## A4B Training School 1: Basics in protein production and bioanalytics

June 11th – June 22nd, 2018

The first A4B training school “**Basics in protein production and bioanalytics**” will be hosted at the University of Groningen from 11th to 22nd June 2018. An excursion on the 15th or 16th June will be part of the summer school, as well as a meeting of the A4B supervisory board and scientific advisory board on the 14th June.

### Location

**Rijksuniversiteit Groningen**, Antonius Deusinglaan 1, 9713 AV Groningen, The Netherlands  
6th floor of Building 3226 (ERIBA Building)

### Principal teachers

Prof. Dr. Alois Jungbauer ([alois.jungbauer@boku.ac.at](mailto:alois.jungbauer@boku.ac.at))

Prof. Dr. Hartmut Schlüter ([h.schlueter@uke.de](mailto:h.schlueter@uke.de))

Prof. Dr. Rainer Bischoff ([r.p.h.bischoff@rug.nl](mailto:r.p.h.bischoff@rug.nl))

Prof. Dr. Oliver Kohlbacher ([oliver.kohlbacher@uni-tuebingen.de](mailto:oliver.kohlbacher@uni-tuebingen.de))

Prof. Dr. Nico C. van de Merbel ([MerbelNicovande@prahs.com](mailto:MerbelNicovande@prahs.com))

| Day     | Time          | Topic   | Instructor                         | Location                  |
|---------|---------------|---|------------------------------------|---------------------------|
| June 11 | 9.00 – 10.30  | Welcome and introduction to the A4B network                                   | Rainer Bischoff & Hartmut Schlüter | 3215-0162                 |
|         | 10.30 – 10.45 | <b>Coffee break</b>   |                                    | Hall ADL1 (paintings)     |
|         | 10.45 – 12.00 | Legal framework of therapeutic protein production                             | Alois Jungbauer                    | 3215-0162                 |
|         | 12.00 – 13.00 | <b>Lunch break</b>  |                                    | Canteen UMCG              |
|         | 13.00 – 15.00 | Biophysical properties of proteins and impurities in context of manufacturing | Alois Jungbauer                    | 3111-0326 ( <b>ADL2</b> ) |
|         | 15.00 – 15.15 | <b>Coffee break</b>   |                                    | Hall ADL1 (paintings)     |
|         | 15.15 – 17.00 | Biophysical properties of proteins and impurities in context of manufacturing | Alois Jungbauer                    | 3111-0326 ( <b>ADL2</b> ) |
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|--|---------------|---|-------------------------------|-------------------------------------|
| June 12  | 9.00 – 9.45   | Lecture: Fundamentals of computer systems, Introduction to Unix (I)   | Oliver Kohlbacher             | 3215-0162                           |
| <b>Room for 24 persons</b>                                     | 9.45 – 10.30  | Hands-on: Fundamentals of computer systems Introduction to Unix (I)   | Marc Rurik, Oliver Kohlbacher | 3111-0224 ( <b>ADL2</b> ) (PC room) |
|  | 10.30 – 10.45 | <b>Coffee break</b>   |                               | Hall ADL1 (paintings)               |
|  | 10.45 – 11.15 | Lecture: Introduction to Unix (II)  | Oliver Kohlbacher             | 3215-0162                           |
|  | 11.15 – 12.00 | Hands-On: Introduction to Unix (II)   | Marc Rurik, Oliver Kohlbacher | 3111-0224 ( <b>ADL2</b> ) (PC room) |
|  | 12.00 – 13.00 | <b>Lunch break</b>  |                               | Canteen UMCG                        |
|  | 13.00 – 14.00 | Lecture: Introduction to Programming in Python (I)  | Oliver Kohlbacher             | 3215-0162                           |
|  | 14.00 – 15.00 | Hands-on: Introduction to Programming in Python (I)   | Marc Rurik, Oliver Kohlbacher | 3111-0224 ( <b>ADL2</b> ) (PC room) |
|  | 15.00 – 15.15 | <b>Coffee break</b>   |                               | Hall ADL1 (paintings)               |
|  | 15.15 – 16.00 | Lecture: Introduction to Programming in Python (II)   | Oliver Kohlbacher             | 3215-0162                           |
|  | 16.00 – 17.00 | Hands-on: Introduction to Programming in Python (II)  | Marc Rurik, Oliver Kohlbacher | 3111-0224 ( <b>ADL2</b> ) (PC room) |
|  |               |   |                               |                                     |
| June 13  | 9.00-10.30    | Lecture: Introduction to sequence comparison methods, databases and algorithms  | Oliver Kohlbacher             | 3215-0117 (PC room with beamer)     |
|  | 10.30 – 10.45 | <b>Coffee break</b>   |                               | Hall ADL1 (paintings)               |
| <b>Room for 32 persons, lectures in same room as practical</b> | 10.45 – 12.00 | Hands-on: Introduction to sequence comparison methods, databases and algorithms   | Marc Rurik, Oliver Kohlbacher | 3215-0117                           |
|  | 12.00 – 13.00 | <b>Lunch break</b>  |                               | Canteen UMCG                        |
|  | 13.00 – 14.00 | Lecture: Introduction to structural bioinformatics, visualization, threading and ab initio prediction of protein structures (I)   | Oliver Kohlbacher             | 3215-017                            |
|  | 14.00 – 15.00 | Hands-on: Introduction to structural bioinformatics, visualization, threading and ab initio prediction of protein structures (I)  | Marc Rurik, Oliver Kohlbacher | 3215-0117                           |
|  | 15.00 – 15.15 | <b>Coffee break</b>   |                               | Hall ADL1 (paintings)               |
|  | 15.15 – 16.00 | Lecture: Introduction to structural bioinformatics, visualization, threading and ab initio prediction of protein structures (II)  | Oliver Kohlbacher             | 3215-0117                           |
|  | 16.00 – 17.00 | Hands-on: Introduction to structural bioinformatics, visualization, threading and ab initio prediction of protein structures (II) | Marc Rurik, Oliver Kohlbacher | 3215-0117                           |
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| June 14                    | 9.00 – 10.00  | Lecture: LC-MS data analysis using OpenMS and KNIME (I)    | Oliver Kohlbacher             | 3215-0149             |
| <b>Room for 19 persons</b> | 10.00 – 10.30 | Hands-on: LC-MS data analysis using OpenMS and KNIME (I)   | Marc Rurik, Oliver Kohlbacher | 3215-137 (PC room)    |
|                            | 10.30 – 10.45 | <b>Coffee break</b>  |                               | Hall ADL1 (paintings) |
|                            | 10.45 – 12.00 | Hands-on: LC-MS data analysis using OpenMS and KNIME (II)  | Oliver Kohlbacher             | 3215-137 (PC room)    |
|                            | 12.00 – 13.00 | <b>Lunch break</b>   |                               | Canteen UMCG          |
|                            | 13.00 – 15.00 | Hands-on: LC-MS data analysis using OpenMS and KNIME (III) | Marc Rurik, Oliver Kohlbacher | 3215-137 (PC room)    |
|                            | 15.00 – 15.15 | <b>Coffee break</b>  |                               | Hall ADL1 (paintings) |
|                            | 15.15 – 17.00 | Hands-on: LC-MS data analysis using OpenMS and KNIME (IV)  | Marc Rurik                    | 3215-137 (PC room)    |
|                            |               |  |                               |                       |
| June 15                    | 9.00 – 10.30  | Relevant unit operations for up- and downstream processing | Alois Jungbauer               | 3215-0154             |
|                            | 10.30 – 10.45 | <b>Coffee break</b>  |                               | Hall ADL1 (paintings) |
|                            | 10.45 – 12.00 | Relevant unit operations for up- and downstream processing | Alois Jungbauer               | 3215-0154             |
|                            | 12.00 – 13.00 | <b>Lunch break</b>   |                               | Canteen UMCG          |
|                            | 13.00 – 15.00 | Basic scale up rules                                       | Alois Jungbauer               | 3215-0154             |
|                            | 15.00 – 15.15 | <b>Coffee break</b>  |                               | Hall ADL1 (paintings) |
|                            | 15.15 – 17.00 | Basic scale up rules                                       | Alois Jungbauer               | 3215-0154             |
|                            |               |  |                               |                       |

| Day     | Time          | Topic   | Instructor       | Location              |
|---------|---------------|---|------------------|-----------------------|
| June 18 | 9.00 – 10.30  | Examples of production of proteins in E. coli, yeast and mammalian cells      | Alois Jungbauer  | 3215-0165             |
|         | 10.30 – 10.45 | <b>Coffee break</b>   |                  | Hall ADL1 (paintings) |
|         | 10.45 – 12.00 | Examples of production of proteins in E. coli, yeast and mammalian cells      | Alois Jungbauer  | 3215-0165             |
|         | 12.00 – 13.00 | <b>Lunch break</b>  |                  | Canteen UMCG          |
|         | 13.00 – 15.00 | Principles of liquid chromatography – Introduction                            | Hartmut Schlüter | 3215-0165             |
|         | 15.00 – 15.15 | <b>Coffee break</b>   |                  | Hall ADL1 (paintings) |
|         | 15.15 – 17.00 | Principles of liquid chromatography – Basics – physicochemical background     | Hartmut Schlüter | 3215-0165             |
|         |               |   |                  |                       |
| June 19 | 9.00 – 10.30  | Principles of liquid chromatography: Instrumentation – Pump systems & columns | Hartmut Schlüter | 3215-0162             |
|         | 10.30 – 10.45 | <b>Coffee break</b>   |                  | Hall ADL1 (paintings) |
|         | 10.45 – 12.00 | Principles of liquid chromatography: Instrumentation – Detectors              | Hartmut Schlüter | 3215-0162             |
|         | 12.00 – 13.00 | <b>Lunch break</b>  |                  | Canteen UMCG          |
|         | 13.00 – 15.00 | Stationary phases: IEC, AC  | Hartmut Schlüter | 3215-0162             |
|         | 15.00 – 15.15 | <b>Coffee break</b>   |                  | Hall ADL1 (paintings) |
|         | 15.15 – 17.00 | Stationary phases: HIC, RP  | Hartmut Schlüter | 3215-0162             |
|         |               |   |                  |                       |
| June 20 | 9.00 – 10.30  | Stationary phases: MMC, SEC   | Hartmut Schlüter | 3215-0149             |
|         | 10.30 – 10.45 | <b>Coffee break</b>   |                  | Hall ADL1 (paintings) |
|         | 10.45 – 12.00 | Protein purification strategies   | Hartmut Schlüter | 3215-0149             |
|         | 12.00 – 13.00 | <b>Lunch break</b>  |                  | Canteen UMCG          |
|         | 13.00 – 15.00 | Quantification with liquid chromatography                                     | Hartmut Schlüter | 3215-0162             |
|         | 15.00 – 15.15 | <b>Coffee break</b>   |                  | Hall ADL1 (paintings) |
|         | 15.15 – 17.00 | Capillary Electrophoresis   | Gerard Rozing    | 3215-0162             |
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| June 21 | 9.00 – 10.30  | Binding assays                              | Martine Broekema   | 3215-0162             |
|         | 10.30 – 10.45 | <b>Coffee break</b>                         |                    | Hall ADL1 (paintings) |
|         | 10.45 – 12.00 | Immunogenicity assays                       | Martine Broekema   | 3215-0162             |
|         | 12.00 – 13.00 | <b>Lunch break</b>                          |                    | Canteen UMCG          |
|         | 13.00 – 15.00 | Sample preparation in protein analysis      | Rainer Bischoff    | 3215-0162             |
|         | 15.00 – 15.15 | <b>Coffee break</b>                         |                    | Hall ADL1 (paintings) |
|         | 15.15 – 17.00 | Protein mass spectrometry                   | Rainer Bischoff    | 3215-0162             |
|         |               |   |                    |                       |
| June 22 | 9.00 – 10.30  | Bioanalysis in drug development             | Nico van de Merbel | 3215-0154             |
|         | 10.30 – 10.45 | <b>Coffee break</b>                         |                    | Hall ADL1 (paintings) |
|         | 10.45 – 12.00 | Application of LC-MS in protein bioanalysis | Nico van de Merbel | 3215-0154             |
|         | 12.00 – 13.00 | <b>Lunch break</b>                          |                    | Canteen UMCG          |
|         | 13.00 – 15.00 | Validation and quality control              | Nico van de Merbel | 3215-0154             |
|         | 15.00 – 15.15 | <b>Coffee break</b>                         |                    | Hall ADL1 (paintings) |
|         | 15.15 – 17.00 | Good laboratory practice (GLP)              | Nico van de Merbel | 3215-0154             |
|         |               |   |                    |                       |