

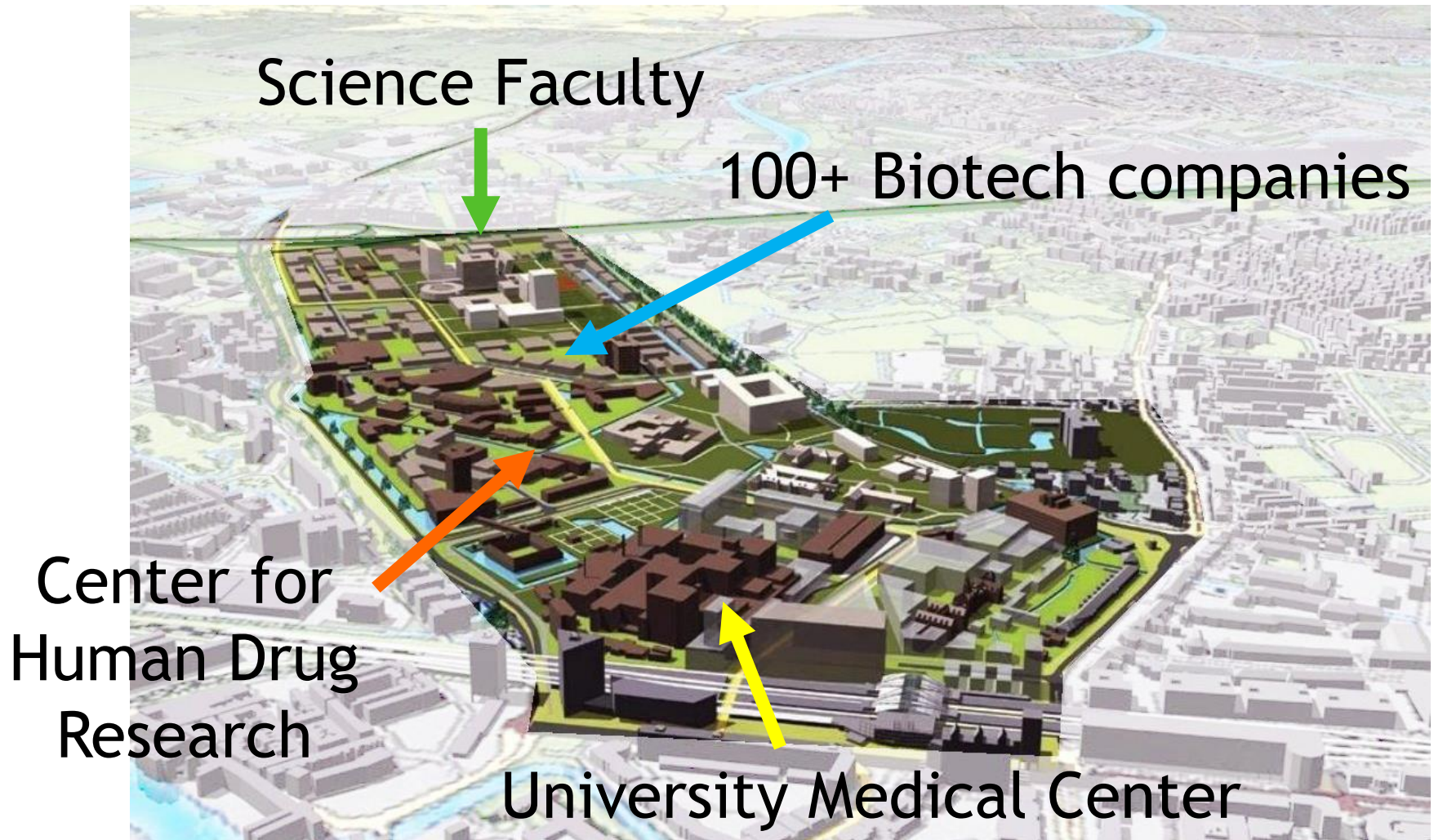
# ULLA Presentation

**Hubertus Irth**  
Scientific Director

Leiden Academic Centre for  
Drug Research

**Faculty of Science**  
**Leiden University**

# Location: Leiden BioScience Park



# LACDR Vision & Mission

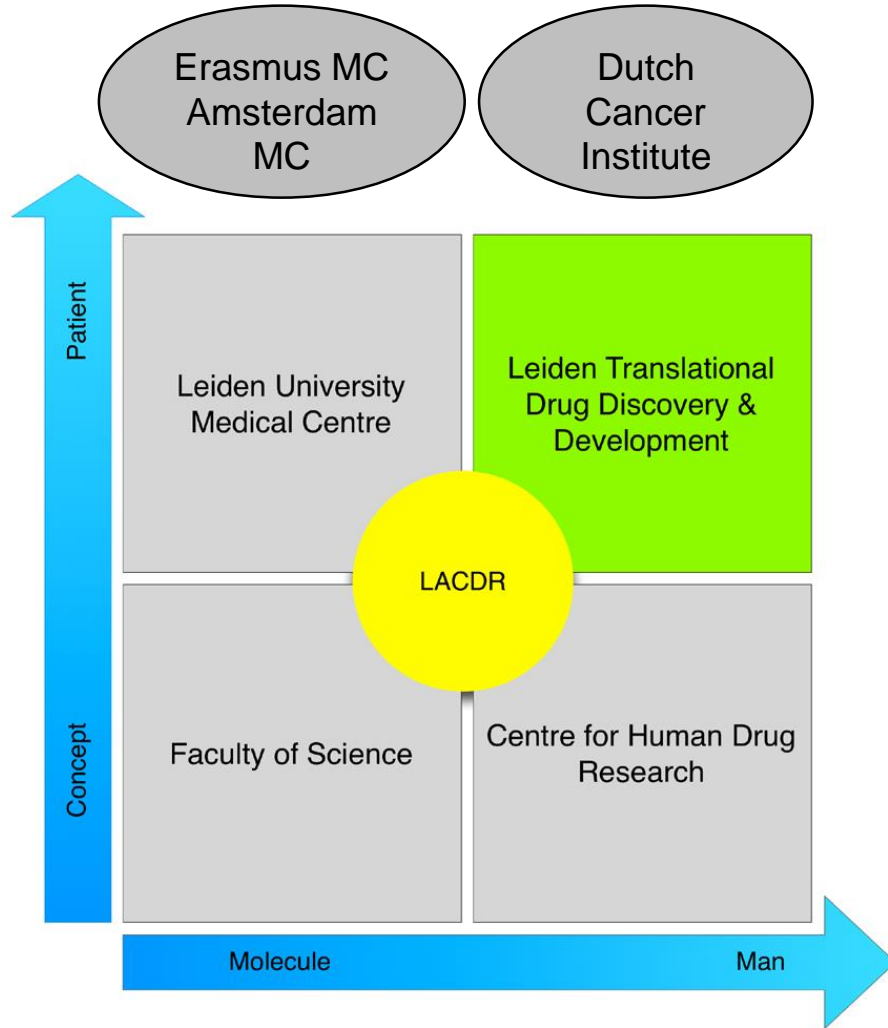
## Vision

To be at the frontline of the development of novel concepts in fundamental and translational drug research

## Mission

Discovery and optimization of drugs and personalised medicines  
Education and training of scientists who can further this cause

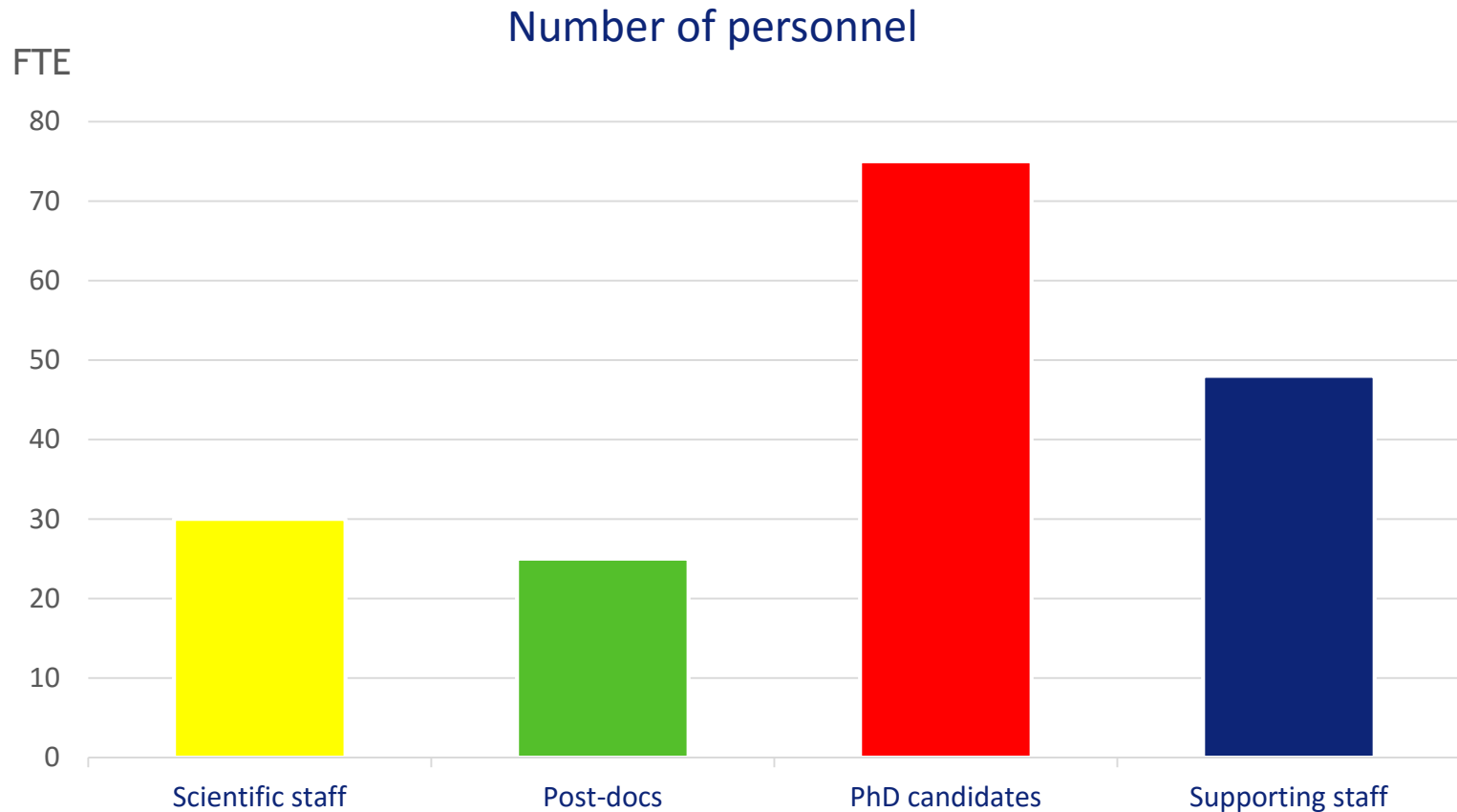
# Imbedding in Medical Delta environment



Strong partnerships via

- joint research programmes
- joint appointments
- sharing of key infrastructure

# LACDR Key Facts: Personnel



Ca. 170 employees, 15 Mio Euro annual turnover

# LACDR Research Divisions

Advancing innovative biopharmaceutical  
concepts to intervene in auto-immune-like  
disorders

BioTherapeutics

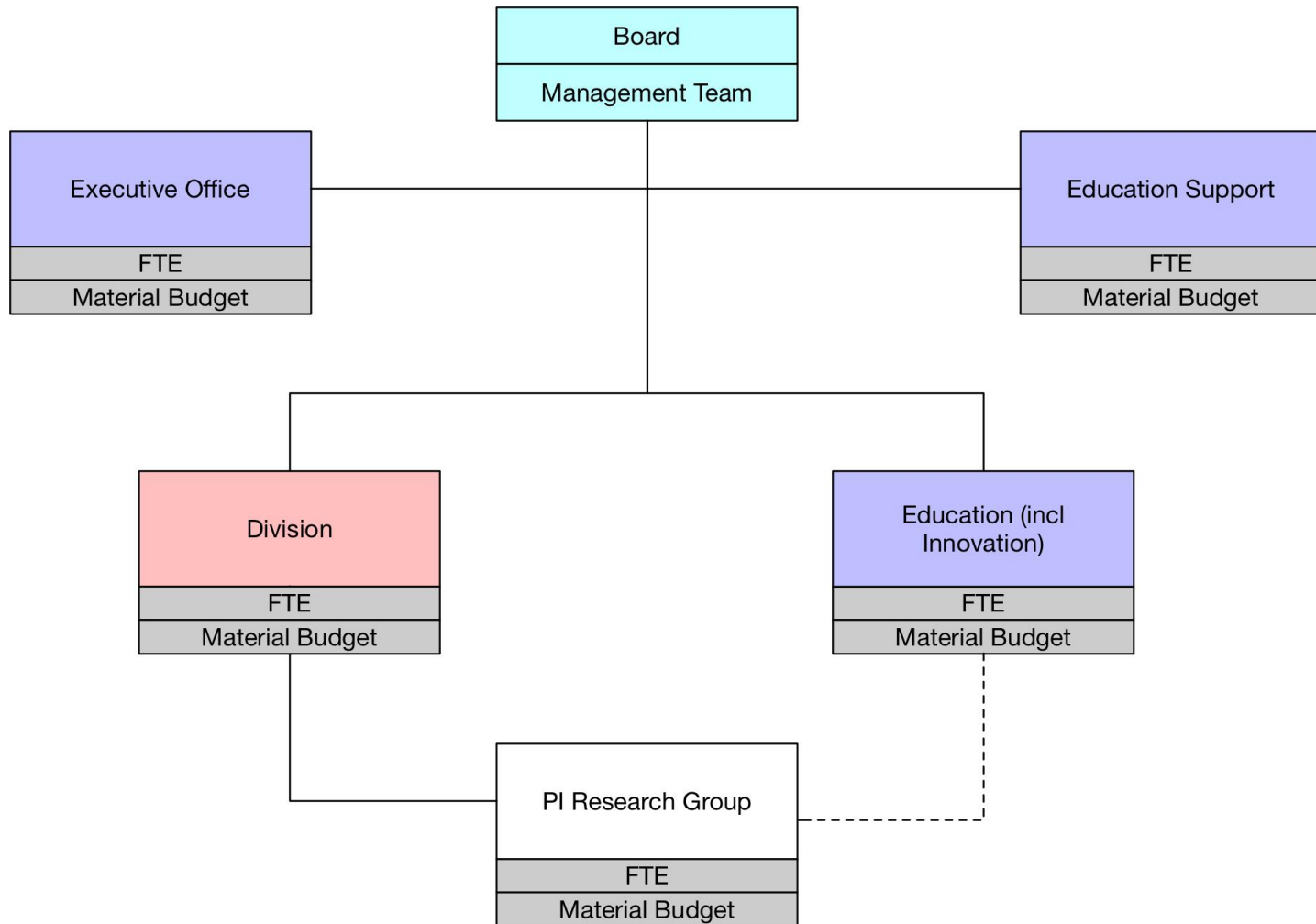
Drug  
Discovery &  
Safety

Optimizing the desired therapeutic  
effect and minimizing adverse  
reactions of the drugs of tomorrow.

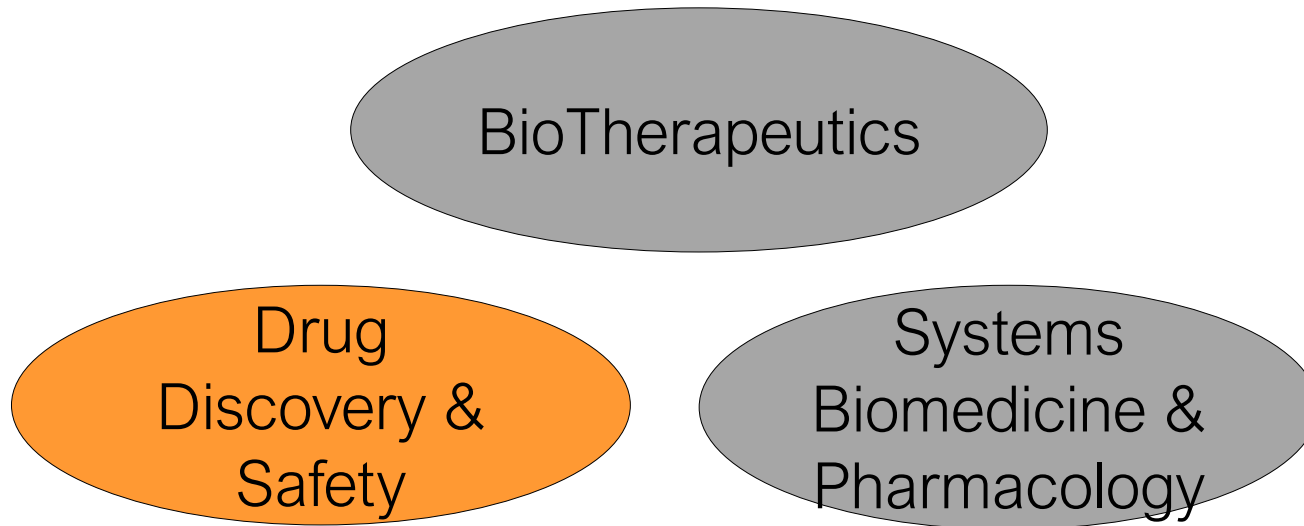
Systems  
Biomedicine &  
Pharmacology

Developing personalised medicine  
strategies and systems-based  
approaches in translational/clinical  
pharmacology

# Sep 2017: Formal implementation of new organizational structure

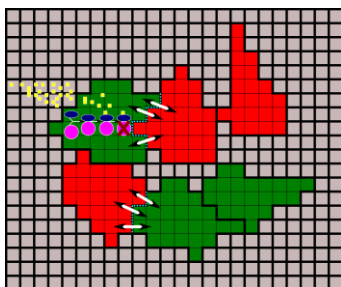


# LACDR Research Divisions

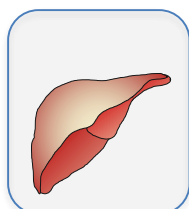


# Cluster Drug & Target Discovery: *integrated concepts for drug discovery cycle*

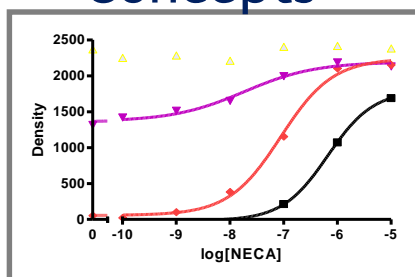
## 6. Computational Biology



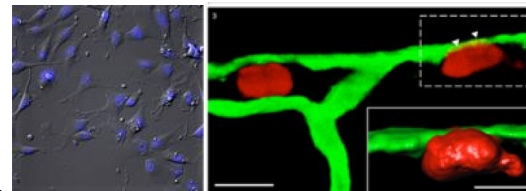
## 5. Drug Safety



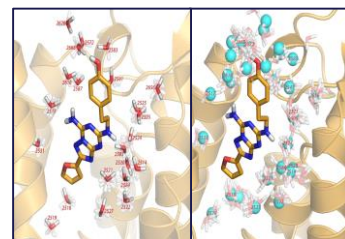
## 4. Receptor Concepts



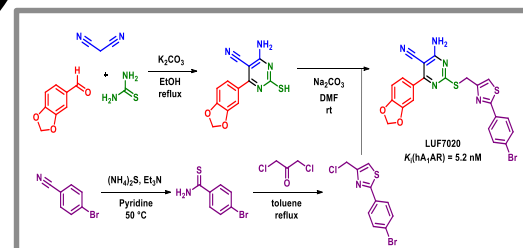
## 1. Drug Target Discovery



## 2. Computational Chemical Biology



## 3. GPCR Ligands



*Establish Concepts for  
Drug Discovery Cycle*

# PIs and their research lines

- Drug Safety Sciences

- Bob van de Water



- Better Ligands for GPCRs

- Ad IJzerman



- Cancer Drug Target Discovery

- Erik Danen



- Novel Receptor Concepts

- Laura Heitman



- Computational Biology

- Joost Beltman



- Computational Chemical Biology

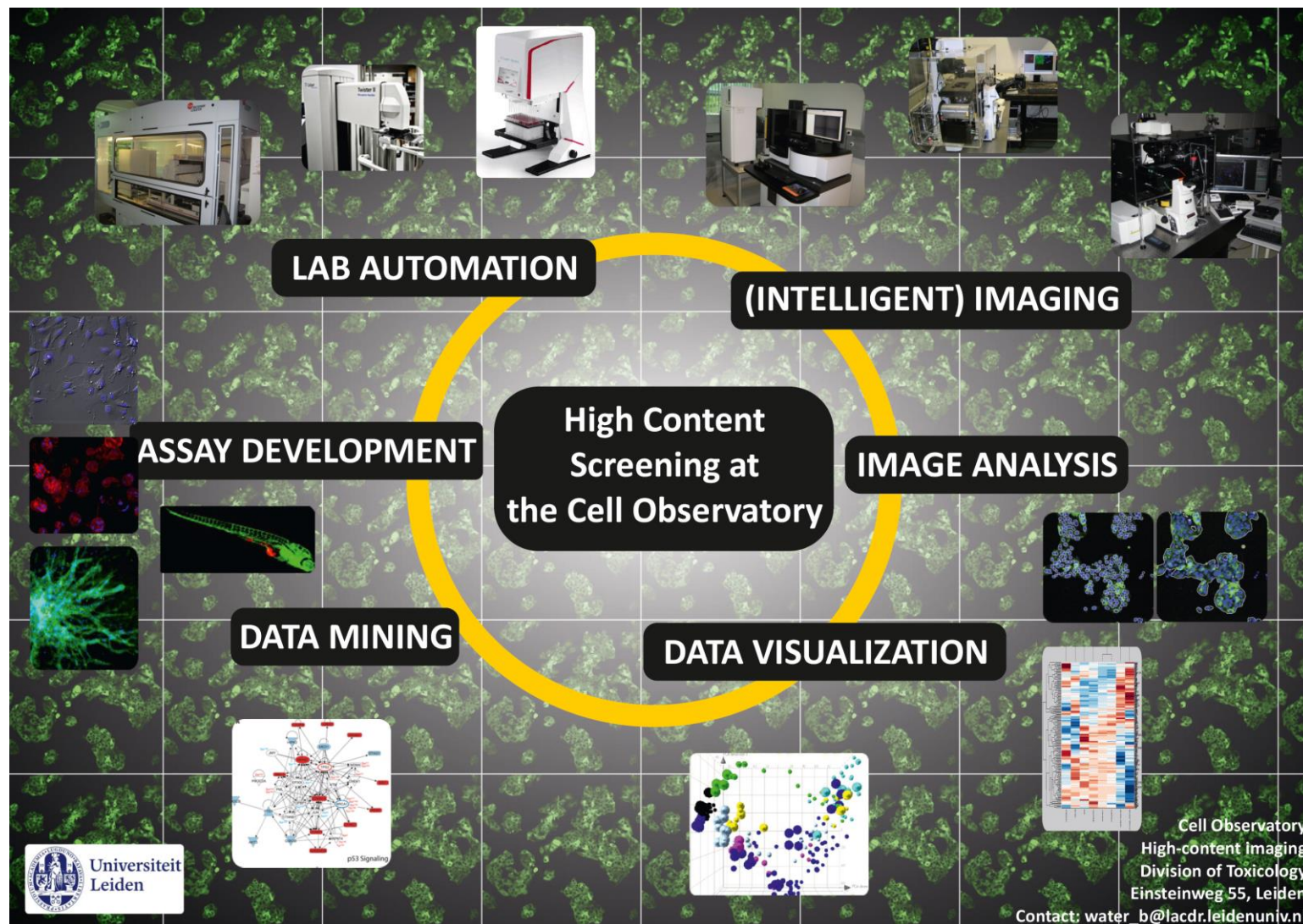
- Gerard van Westen



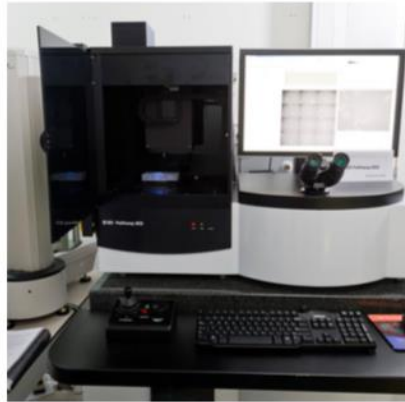
*Extraordinary professors:*

Jos Jonkers & Aroud Sonnenberg (Neth. Cancer Inst.), Herman van Vlijmen (Janssen)

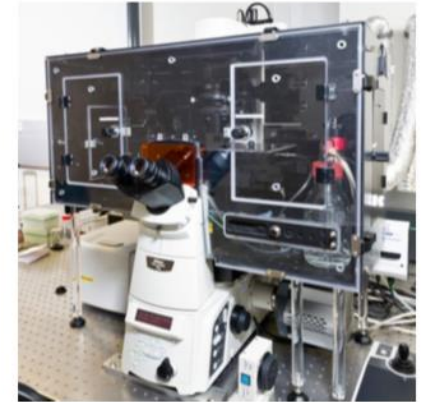
# LACDR Key Infrastructure: Cell Observatory



# Functional screening infrastructure Cell Observatory



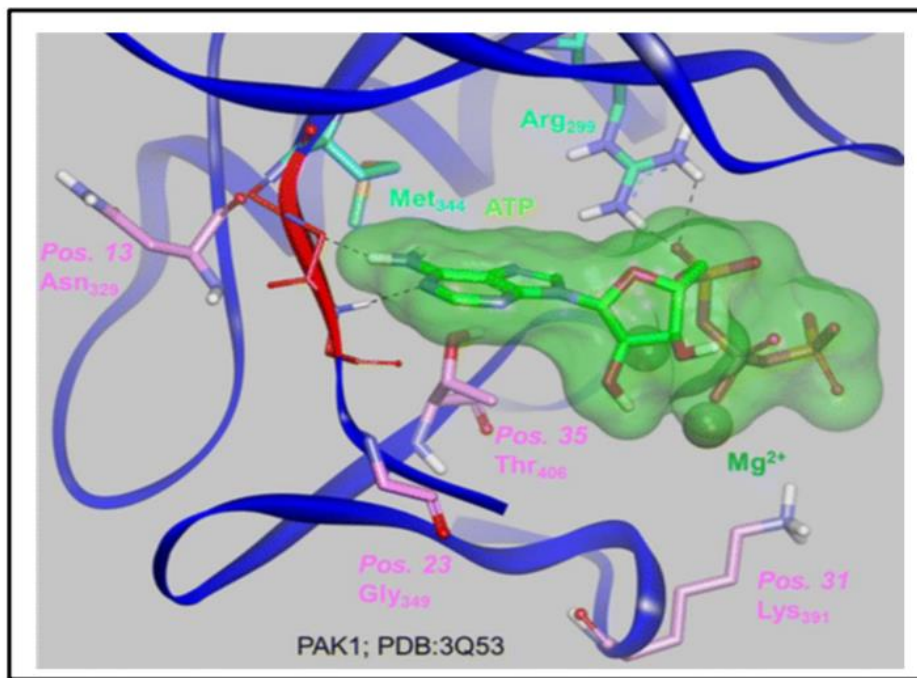
BD Pathway 855  
automated highthroughput  
epi microscope



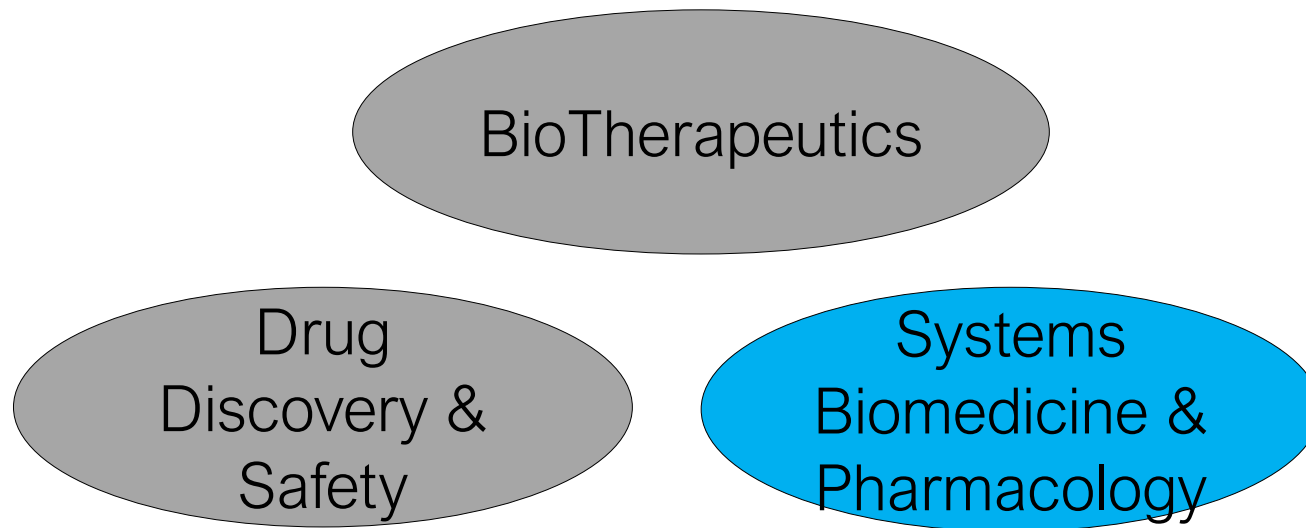
Nikon confocal / epi microscopes with incubators and automated stages,  
4 laser lines and GaAsP detectors

# LACDR Key Research Focus: Computational Sciences in Pharma

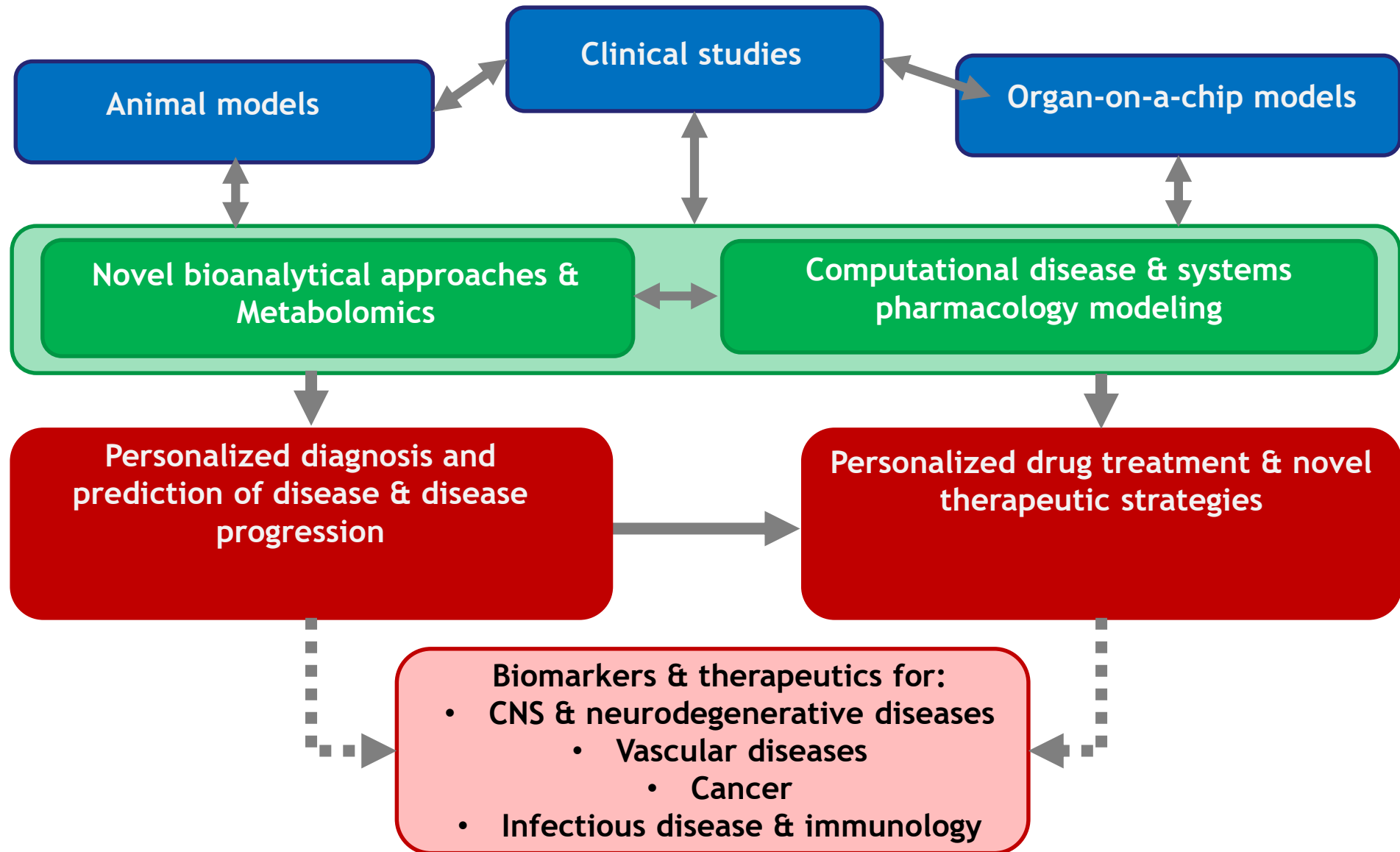
- We aim to apply **computational chemical biology** for the prediction of **drug-target interaction** as well as drug **efficacy** and **safety**
- 'Big Data' for precision medicine by combining cheminformatics and bioinformatics: e.g. cancer drug responses
- Structure-based and statistical methods: e.g. kinase inhibitor drug selectivity



# LACDR Research Divisions



# Mission: Systems pharmacology approaches to enable personalized medicine



# Division of Systems Biomedicine and Pharmacology

## Principal investigators



**Thomas Hankemeier**  
*Analytical  
Biosciences and  
Metabolomics*



**Liesbeth de Lange**  
*Quantitative and  
Translational  
pharmacology*



**Catherijne Knibbe**  
*Individualized  
drug treatment/  
Clinical  
pharmacology*



**Piet van der Graaf**  
*Systems  
Pharmacology*



**Rawi Ramautar**  
*Biomedical  
Microscale  
Analytics*



**Alireza Mashaghi**  
*Laboratory  
for Medical  
Systems  
Biophysics*



**Coen van Hasselt**  
*Quantitative  
Systems  
Pharmacology*

## Research & Education



**Elke Krekels**  
*Clinical  
Pharmacology*



**Isabelle Kohler**  
*Analytical  
Biosciences and  
Metabolomics*

## Extraordinary Professors



**Cornelia Van Duijn**  
*ErasmusMC*



**Koos Burggraaf**  
*CHDR*



**Henk-Jan Guchelaar**  
*LUMC*

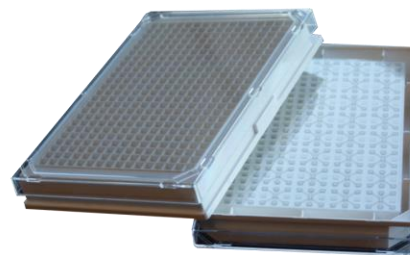
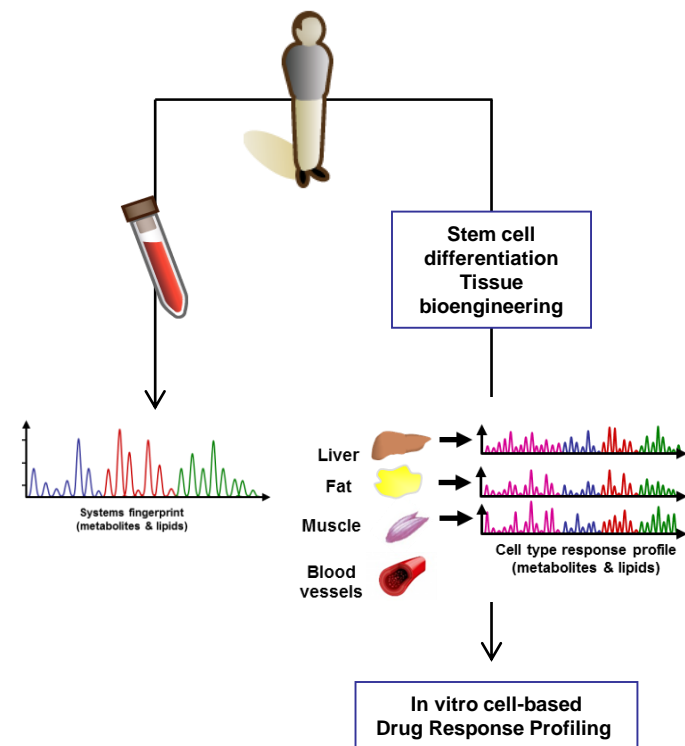
# LACDR Key Infrastructure: Metabolomics lab



12-04-2018: 3 Mio Euro funding from National Roadmap

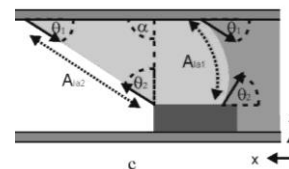
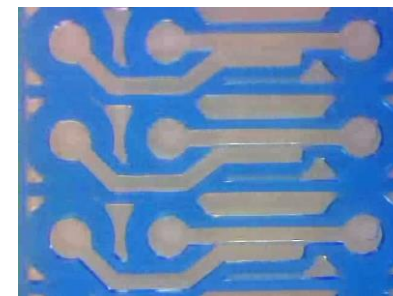
# From human to models | Organ-on-a-chip

**MIMETAS**  
the organ-on-a-chip company



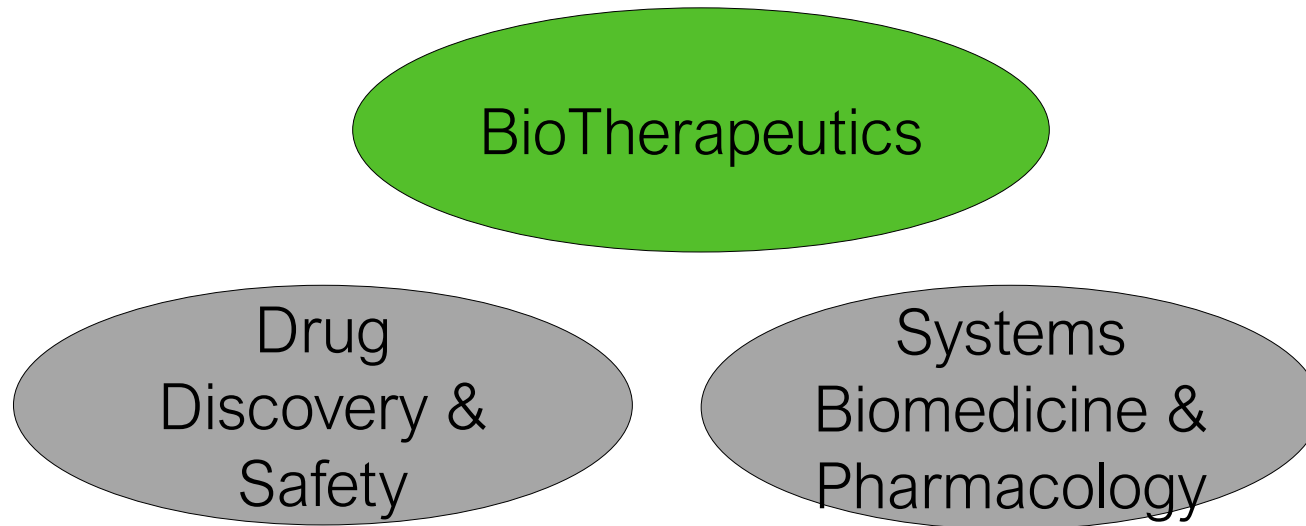
- Organ and tissue functionality
- Perfusion
- High throughput
- Low reagent consumption

- Fully passive liquid control
- Easy filling of any shape
- Liquid & gel patterning
- Gradient formation



*Vulto et al., Lab Chip 11 (2011) 1596*

# LACDR Research Divisions



# Research approach Cluster BioTherapeutics

Vaccine  
development



**Gideon Kersten**

Novel concepts for  
formulation, delivery  
and targeting



**Wim Jiskoot**

Innovative  
vaccines



**Bram Slütter**

Adaptive immune response CVD  
Novel biologics in humanized  
mouse models



**Johan Kuiper**

**TRANSLATION  
TO CLINIC**

Modulation of lipid  
Metabolism  
Drug delivery, cellular  
therapy

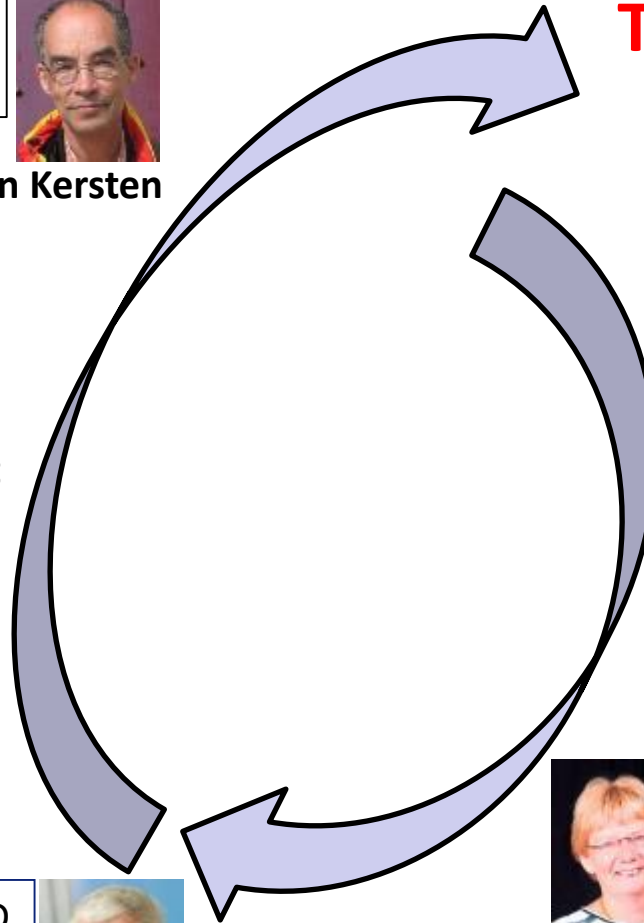


**Miranda van Eck**

Modulation of lipid  
metabolism in inflammatory  
skin disease  
Intradermal vaccine delivery



**Joke Bouwstra**



# Mission of the cluster BioTherapeutics

**Translate cutting edge research in complex immune based diseases into advanced targeted therapies based on biologics**

**Identify targets for therapy in complex immune based diseases**

Cardiovascular disease

Inflammatory skin disease

## **Translation**

From preclinical humanized mouse models of cardiovascular disease and from in vitro skin models to perform First-In-Humans clinical trials

**Therapy: focus is on biologics**

Therapeutic vaccines in atherosclerosis

Therapeutic proteins

## **Targeted**

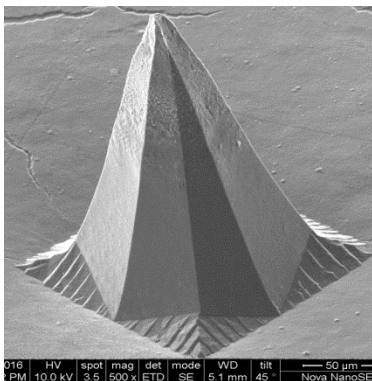
Specific delivery of biologics and vaccines (including route of administration)



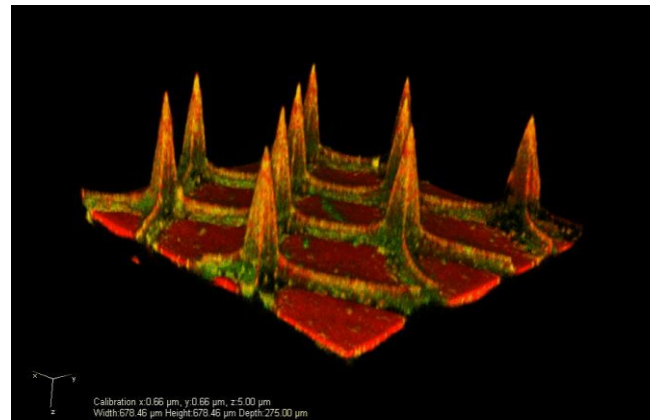
## Aim: improved vaccination by the intradermal route

- Approach: microneedles pierce the skin barrier and deliver the vaccine into the dermis
  - Dissolvable, vaccine coated and hollow microneedles are developed
  - Nanoparticles are used to improve the immune response
  - Vaccination without pain sensation

Microneedle that  
dissolves in the skin  
and releases antigen



IPV coated microneedle arrays,  
length of 200 µm



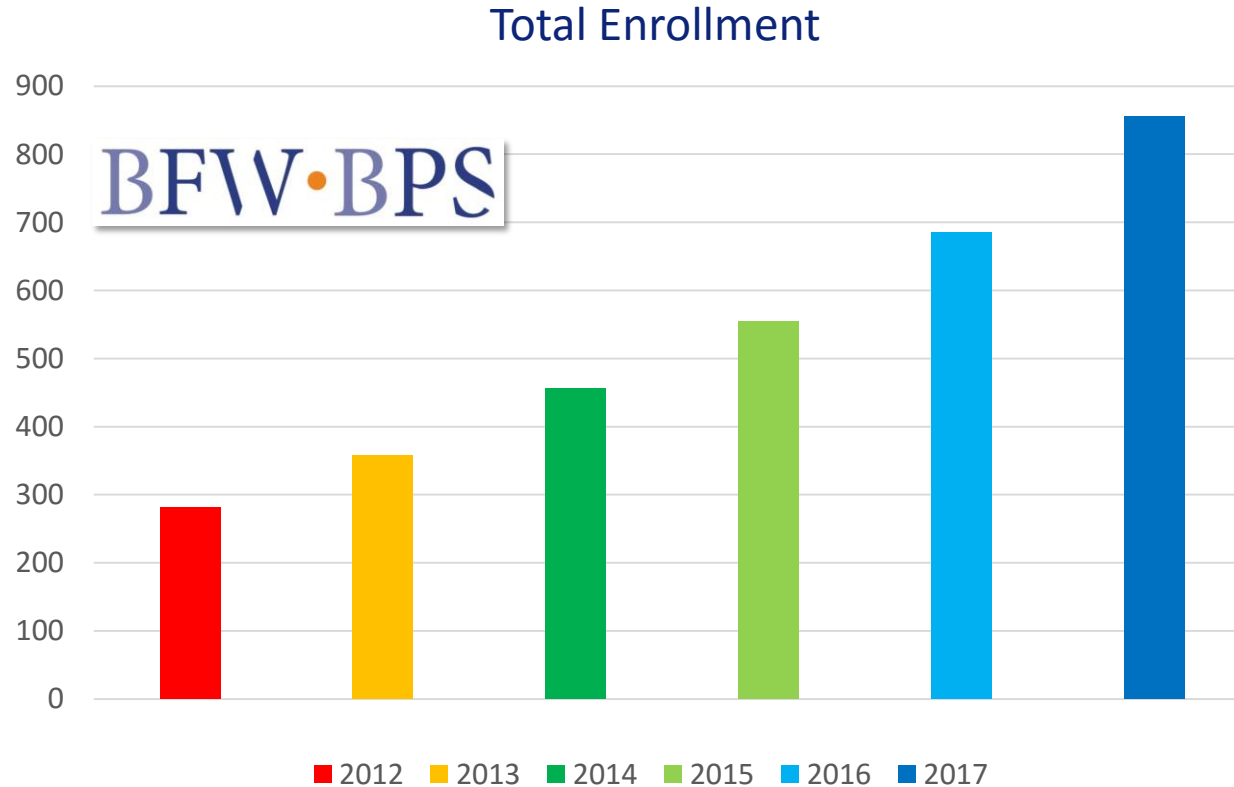
Hollow microneedle arrays  
injection depth variation (50-800  
mm)





- BSc programme Bio-Farmaceutische Wetenschappen (BFV)
  - Broad academic training in drug research
  - Limited specialisation (minor)
  - Stepwise and integrated Academic Learning in three study years
- MSc programme Bio-Farmaceutische Wetenschappen (BPS)
  - Deepening and specialisation
  - Preparation for labour market (60% → PhD)
- MSc programme Pharmacy
  - Jointly with LUMC

# Since 2014: Strong increase in student enrollment



Bio-Pharmaceutical Sciences has become an immensely popular education programme

# Leiden Bioscience Park - LACDR

