



## WELCOME TO LÜBECK

We are happy to cordially invite you to participate in our 8th annual workshop on "Low Flows in Medical Technology".

This year's workshop is a very specific one, because our partners from the EURAMET-project "Metrology for Drug Delivery" will present their results during the morning sessions. In the afternoon we will have several presentations from industry as well as from academia.

As during the previous years we invite you to submit posters. Companies are also invited to present.

Do not hesitate to contact us.

**Stephan Klein**  
 FH Lübeck  
 Medizinische Sensor- und Gerätetechnik  
 klein@fh-luebeck.de

## REGISTRATION

[www.msgt.fh-luebeck.de](http://www.msgt.fh-luebeck.de)

Please register for "Module 3" of Lübeck 2014 Summer Academy on Medical Technology. The workshop fee is 50,- EUR and includes all refreshments and a reception on September 23rd, 18:30.

## DIRECTIONS

Building 65 "Audimax"  
 Mönkhofer Weg 239, Lübeck



**DGBMT** DEUTSCHE GESELLSCHAFT FÜR BIOMEDIZINISCHE TECHNIK IM VDE

**Medisert** Technologie- und Wissenstransfer BioMedTec Wissenschaftscampus



# 8th Workshop Low Flows in Medical Technology

incl. 3rd Progress Meeting of EURAMET-Project "Metrology for Drug Delivery"

Module 3 of Lübeck 2014 Summer Academy on Medical Technology

**September 23rd / 24th 2014**  
 BioMedTec Sciencecampus Lübeck





## PROGRAM

### SEPTEMBER 23rd

18:30 Welcome Reception

### SEPTEMBER 24th

08:30 Registration, coffee, exhibition

#### Plenary Session

09:00 Opening / Welcome

09:20 Introductory Key Note: From Innovation to Market  
**Ron Kikinis**

#### Focus Session: Metrology for Drug Delivery, part 1

10:00 Overview 'Metrology for Drug Delivery'  
**Peter Lucas**

10:20 Motivation and Clinical Relevance  
'Metrology for Drug Delivery'  
**Annemoon Timmermann**

10:40 Primary Standards for Flow Rates from  
100 nL/min to 1 mL/min – Gravimetric Principle  
**Hugo Bissig**

11:00 Refreshments, exhibition

#### Focus Session: Metrology for Drug Delivery, part 2

11:30 Flow Source Based on Expansion Principle as  
Primary Standard for Flow Rates above 10 nL/min  
**Peter Lucas**

11:55 An Optical Measurement Method for  
Flow Rates above 10 nL/min  
**Martin Ahrens**

12:15 Assessment of Flow Meters and  
Drug Delivery Devices

**Elsa Batista**

12:35 Dosing Errors in Multi-Infusion  
**Roland Snijder**

13:00 Lunch, exhibition

#### Application, part 1

14:00 Effects of Applying Flow on Stem Cell  
Differentiation and Function  
**Martin Dufva**

14:30 Fast Techniques for Measuring Small Flows  
in Mass Production  
**Niklaus Schneeberger**

15:00 Microfluidics for Electrical Biochip Technology  
**Lars Blohm**

15:30 Refreshments, exhibition

#### Application, part 2

16:00 Metrological Methods for Low Volume Liquid  
Handling in Drug Delivery and In-Vitro Diagnostics  
**Peter Koltay**

16:30 Microfluids in Chemical and Biochemical  
Engineering Applications  
**Ulrich Krühne**

17:00 Flow Measurement for the Double-Actuator  
Pump mp6  
**Frank Bartels**

17:30 Get-together, refreshments, exhibition

## PRESENTERS

**Ron Kikinis**, Harvard Medical School, Boston and  
Fraunhofer Institute for Medical Image Computing MEVIS,  
Bremen and Lübeck

**Peter Lucas**, Dutch Metrology Institute, VSL, Delft,  
Netherlands

**Annemoon Timmermann**, University Medical Center,  
Utrecht, Netherlands

**Hugo Bissig**, Swiss Metrology Institute, METAS,  
Bern, Switzerland

**Martin Ahrens**, FH Lübeck, Germany

**Elsa Batista**, IPQ-Instituto Português da Qualidade,  
Caparica, Portugal

**Roland Snijder**, University Medical Center,  
Utrecht, Netherlands

**Martin Dufva**, Technical University of Denmark, DTU,  
Kongens Lyngby, Denmark

**Nikolaus Schneeberger**, Helbling Technik Bern AG,  
Bern, Switzerland

**Lars Blohm**, Fraunhofer-Institut für Silizium-  
technologie – ISIT, Itzehoe, Germany

**Peter Koltay**, Albert-Ludwigs-Universität,  
Institut für Mikrosystemtechnik, IMTEK, Freiburg

**Ulrich Krühne**, Technical University of Denmark, DTU,  
Kongens Lyngby, Denmark

**Frank Bartels**, Bartels Mikrotechnik GmbH,  
Düsseldorf, Germany