

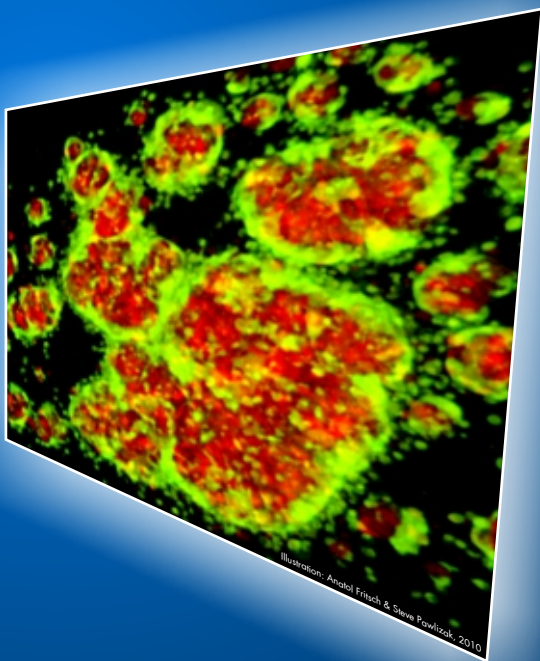
2nd Symposium
Physics of Cancer
Leipzig, Germany
October 13-15, 2011

POC

Program

Invited Speakers:

Ueli Aebi (Basel)
Andreas Bausch (Munich)
Annette Beck-Sickinger (Leipzig)
Michael Beil (Ulm)
John Condeelis (New York)
Allen Ehrlicher (Boston)
Jens Elgeti (Paris)
Martin Falcke (Berlin)
Stefan Grill (Dresden)
Jochen Guck (Cambridge)
Lars-Christian Horn (Leipzig)
Ralf Kemkemer (Stuttgart)
Wolfgang Losert (College Park)
Stuart Martin (Baltimore)
Claudia Mierke (Leipzig)
Ewa Paluch (Dresden)
Manfred Radmacher (Bremen)
Danijela Vignjevic (Paris)
Denis Wirtz (Baltimore)
Katarina Wolf (Nijmegen)
Mareike Zink (Leipzig)



Organizing Committee:

Josef A. Käs (Leipzig)
Sarah Köster (Göttingen)
Harald Herrmann (Heidelberg)

General Information

The 2nd "Physics of Cancer" symposium takes place in Leipzig, Germany from October 13th till 15th, 2011. The meeting aims to assemble scientists worldwide pioneering in the investigation of the physical mechanisms underlying cancer progression.

The scientific program consists of invited and contributed talks as well as a poster session. This booklet contains the schedule for the three conference days. Unfortunately, abstracts could not be included. For the detailed program including all abstracts, please visit our conference website:

www.uni-leipzig.de/poc/2011

Talks:

All talk sessions take place in the seminar building ("Seminargebäude", 4th floor, seminar room 420) at the campus "Augustusplatz" (see page 9). Contributed talks are allocated 15 min (including discussion), whereas invited talks are allocated 20 min plus 10 min discussion.

Posters:

The session for poster presentation is on Friday, October 14, 2011 at 19:00 at the Institute of Experimental Physics I (1st floor, room 331 "Aula") at the campus "Johannisallee/Philipp-Rosenthal-Straße" (see page 10).

Authors are asked to mount their posters already on October 13, 2011 between 09:00-12:00 or 19:00-20:30. In case you need help, please ask Bernd Kohlstrunk, (1st floor, room 302). The poster boards will be marked with the number according to the scientific program. The material necessary to mount the poster (pins or "Poster Strips") will be provided.

Organizing Committee

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Imprint

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14:00 – 14:15 *Welcome*

MATTHIAS SCHWARZ (Vice Rector for Research and Young Academics at the University of Leipzig)

Session I: Biomechanics - From Polymers To Networks and Cells

14:15 – 14:45 **Mechanobiology of the cytoskeleton and how it impacts on cell and tissue plasticity**

UELI AEBI (University of Basel, Switzerland)

14:45 – 15:00 **Substrate-ligand friction modulates traction force**

TILO POMPE (University of Leipzig, Germany)

15:00 – 15:30 **Tumor cells dissociation and peritumoral stromal rearrangement in squamous cell carcinoma of the uterine cervix**

LARS-CHRISTIAN HORN (University of Leipzig, Germany)

15:30 – 15:45 **Collective cell migration on structured surfaces**

FELIX SEGERER (LMU Munich, Germany)

15:45 – 16:15 **Polar cortex mechanics and cell shape stability during cytokinesis**

EWA PALUCH (Max Planck Institute of Molecular Cell Biology and Genetics, Germany)

16:15 – 16:45 *Coffee break*

16:45 – 17:15 **Cytoskeletal pattern formation: Self organization of driven filaments**

ANDREAS BAUSCH (Technical University Munich, Germany)

17:15 – 17:30 **Microfluidic drops as tunable bio-environments**

CHRISTIAN DAMMANN (University of Göttingen, Germany)

17:30 – 18:00 **Investigation of cellular mechanics by atomic force microscopy**

MANFRED RADMACHER (University of Bremen, Germany)

18:00 – 18:30 **Defined migration assays to study tumor cell migration**

RALF KEMKEMER (Max Planck Institute for Intelligent Systems, Germany)

Session II: Cells At Work: Forces, Motion and Adhesion

- 09:00 – 09:30 **Amplification of signaling pathways to actin polymerization and chemotaxis in breast tumor cells in vivo**
JOHN CONDEELIS (Albert Einstein College of Medicine of Yeshiva University, USA)
- 09:30 – 10:00 **Intracellular pattern generation - mechanics meets biochemistry**
STEFAN GRILL (Max Planck Institute of Molecular Cell Biology and Genetics, Germany)
- 10:00 – 10:15 **Dynamics of growing cell populations**
ANNA-KRISTINA MAREL (LMU Munich, Germany)
- 10:15 – 10:45 **Physical limits in cell migration**
KATARINA WOLF (Radboud University Nijmegen, Netherlands)
- 10:45 – 11:15 *Coffee break*
- 11:15 – 11:45 **The different phases of the force-velocity relation of motile cells**
MARTIN FALCKE (Max-Delbrück-Center for Molecular Medicine, Germany)
- 11:45 – 12:00 **Physical determinants of vascular network remodeling during tumor growth**
HEIKO RIEGER (Saarland University, Germany)
- 12:00 – 12:30 **From waves to motion: Physics approaches to characterize and control individual and collective cell migration**
WOLFGANG LOSERT (University of Maryland, USA)
- 12:30 – 14:30 *Lunch (organized for invited speakers only)*

Session III: Physical Oncology I

- 14:30 – 15:00 **Peptides Hormones: Tools and Drugs in Therapy and Diagnosis of Breast Cancer**
ANNETTE BECK-SICKINGER (University of Leipzig, Germany)
- 15:00 – 15:30 **Cytoskeletal filaments - new treatment targets in cancer?**
MICHAEL BEIL (University of Ulm, Germany)
- 15:30 – 15:45 **Mechanical cell phenotyping using microscopic imaging and computational modeling**
EVGENY GLADILIN (German Cancer Research Center, Germany)

- 15:45 – 16:15 **Feeling for cell function with light**
JOCHEN GUCK (University of Cambridge, UK)
- 16:15 – 16:45 *Coffee break*
- 16:45 – 17:15 **Tissue Simulations - Numerical methods for tissue growth**
JENS ELGETI (Institut Curie, France)
- 17:15 – 17:30 **Investigating the mechanics behind cellular compartmentalization and tumor spreading**
STEVE PAWLIZAK (University of Leipzig, Germany)
- 17:30 – 18:00 **Role of fascin in invadopodia formation and turnover of focal adhesions**
DANIJELA VIGNJEVIC (Institut Curie, France)

Poster Session

19:00 *The poster session takes place at the Institute of Experimental Physics I (Linnéstraße 5, 04103 Leipzig, 1st floor, room 331 "Aula") at the campus "Johannisallee/Philipp-Rosenthal-Straße" (see page 10). During the session snacks and finger food will be provided for all.*

- 1 **Spatial oscillations during reorganization of Physarum polycephalum protoplasmic droplets**
MARCUS HAUSER (Otto-von-Guericke University Magdeburg, Germany)
- 2 **Nanomechanical profile of tumorigenic transformation in human and mouse breast biopsies**
MARIJA PLODINEC (University of Basel, Switzerland)
- 3 **Online monitoring of cell adhesion in breast cancer cell lines treated with plant extracts**
NADJA ENGEL-LUTZ (University of Rostock, Germany)
- 4 **Identification of SEC62 as a new migration stimulating oncogene in human lung cancer**
MAXIMILIAN LINXWEILER (Saarland University, Germany)
- 5 **Modelling morphogenesis of glandular epithelia**
PETER BUSKE (University of Leipzig, Germany)
- 6 **Dynamics of Intermediate Filaments Confined in Microchannels**
BERND NÖDING (Georg August University of Göttingen, Germany)
- 7 **Malignancies in a Mouse Model Secondary to the Neutron Radiation Dosages Associated With Intensity-Modulated Radiation Therapy**
ALEX HERSKOVIC (Northwestern University, USA)

- 8 **Hydrodynamic deformation reveals two coupled timescales/modes of red blood cell relaxation**
THOMAS FRANKE (University Augsburg, Germany)
- 9 **Geometry, topology, and out-of-equilibrium dynamics in epithelial morphogenesis**
BENEDETTA CERRUTI (Institute for Cancer Research and Treatment, Italy)
- 10 **Cell encapsulation in alginate hollow spheres: A step towards true three dimensional cell culture**
BIBHU RANJAN SARANGI (Institut Curie, Paris)
- 11 **Tumor interstitial fluid pressure: a biophysical barrier hampering the uptake of macromolecular therapeutics**
MATTHIAS HOFMANN (Goethe University Frankfurt, Germany)
- 12 **Local membrane mechanical probing of neoplastic and non-neoplastic human cells**
DAN COJOC (University of Trieste, Italy)
- 13 **Non-invasive investigation of biomechanical properties in mice tumor xenografts via scanning acoustic microscopy**
RALPH PFLANZER (Goethe University Frankfurt, Germany)
- 14 **Some observations on the growth of tumors in hydrogel environments**
KRISTEN MILLS (Max Planck Institute for Intelligent Systems, Germany)
- 15 **Influence of calcium signaling on biomechanics of single suspended cells in the Optical Stretcher**
MARKUS GYGER (University of Leipzig, Germany)
- 16 **Blood vessel network remodeling during tumor growth**
MICHAEL WELTER (Saarland University, Germany)
- 17 **The Rho-GTPase-activating protein myosin IXb regulates cell migration and cell-cell communication**
YAN XU & ZHIJUN LIU (Westfalian Wilhelms University Münster, Germany)
- 18 **Formation of regular actin networks as general feature of entropic forces**
FLORIAN HUBER & DAN STREHLE (University of Leipzig, Germany)
- 19 **Biomechanical Features Of The Cell Nucleus During Optical Stretching**
ENRICO WARMT (University of Leipzig, Germany)

- 20 **The Automated Microfluidic Optical Stretcher**
ROLAND STANGE (University of Leipzig, Germany)
- 21 **Biomechanical analysis of primary breast cancer cells**
FRANZISKA WETZEL (University of Leipzig, Germany)
- 22 **On the interpretation of optically induced cell deformations – part I: temperature dependence**
TOBIAS KIEBLING & ANATOL FRITSCH (University of Leipzig, Germany)
- 23 **Influence of cell cycle stage on the optical deformability of cells**
SUSANNE RÖNICKE (University of Leipzig, Germany)
- 24 **Impact of jamming on collective cell dynamics**
KENECHUKWU DAVID NNETU (University of Leipzig, Germany)
- 25 **Insight into the cell-beam interaction in the Optical Stretcher**
STEFFEN GROSSER (University of Leipzig, Germany)
- 26 **Manipulation of cellular mechanics**
ANNA PIETUCH (Georg-August University Göttingen, Germany)
- 27 **Keratin-mediated repression of cell migration**
KRISTIN SELTMANN (University of Leipzig, Germany)

Session IV: Physical Oncology II

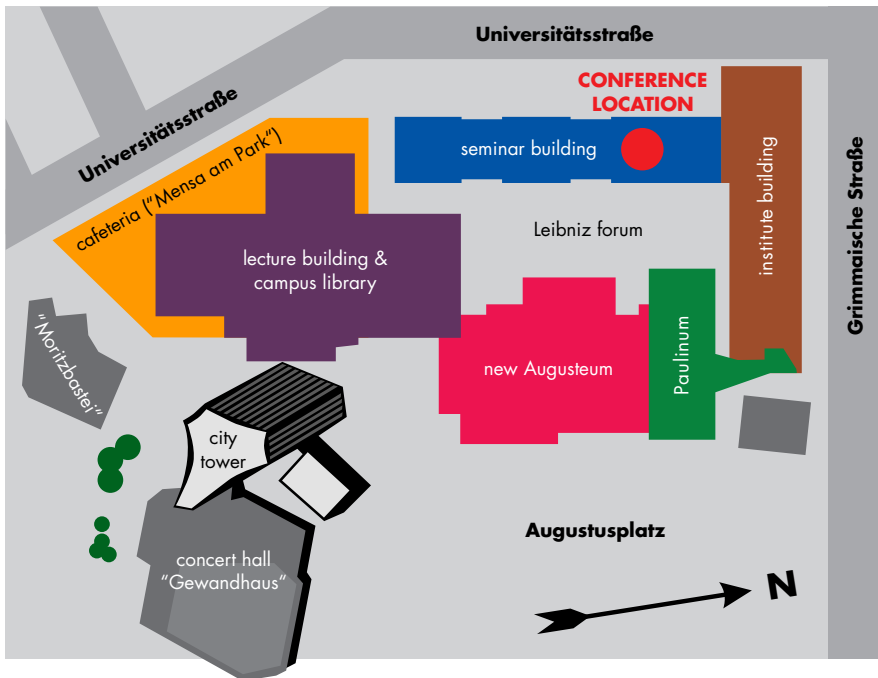
- 09:00 – 09:30 **Cancer Cell Motility in 3D**
DENIS WIRTZ (Johns Hopkins University, USA)
- 09:30 – 09:45 **Development of a novel biosensoric screening system for direct chemosensitivity testing on tumor biopsy material**
SARAH PÖNICK (Center for Biotechnology and Biomedicine, Germany)
- 09:45 – 10:15 **Exploring the impact of cell mechanics on cancer progression with the Microfluidic Optical Stretcher**
MAREIKE ZINK (University of Leipzig, Germany)
- 10:15 – 10:30 **How changes in cell mechanical properties induce cancerous behavior**
PARAG KATRINA (The University of Texas at Austin, USA)
- 10:30 – 11:00 **Cancer cells regulate biomechanical properties of human microvascular endothelial cells**
CLAUDIA MIERKE (University of Leipzig, Germany)
- 11:00 – 11:30 *Coffee break*
- 11:30 – 12:00 **Targeting the cytoskeletal physics of circulating breast tumor cells to reduce metastasis**
STUART MARTIN (University of Maryland, USA)
- 12:00 – 12:15 **Fingering instabilities and cellular pathways in epithelial tissues and their connection to tumor growth**
THOMAS RISLER (Institute Curie, Paris, France)
- 12:15 – 12:45 **Molecular Mechanotransduction: how forces trigger cytoskeletal dynamics**
ALLEN EHRLICHER (Harvard University, USA)
- 13:00 *Prospective end*

Campus "Augustusplatz"

All talk sessions will take place at the seminar building (Seminargebäude, 4th floor, seminar room 420) of the University of Leipzig.

University of Leipzig
Seminargebäude
Universitätsstraße 1
04109 Leipzig, Germany
4th floor, seminar room 420

The following map shows the location of the seminar building (blue) on the university campus in the city center at the "Augustusplatz".



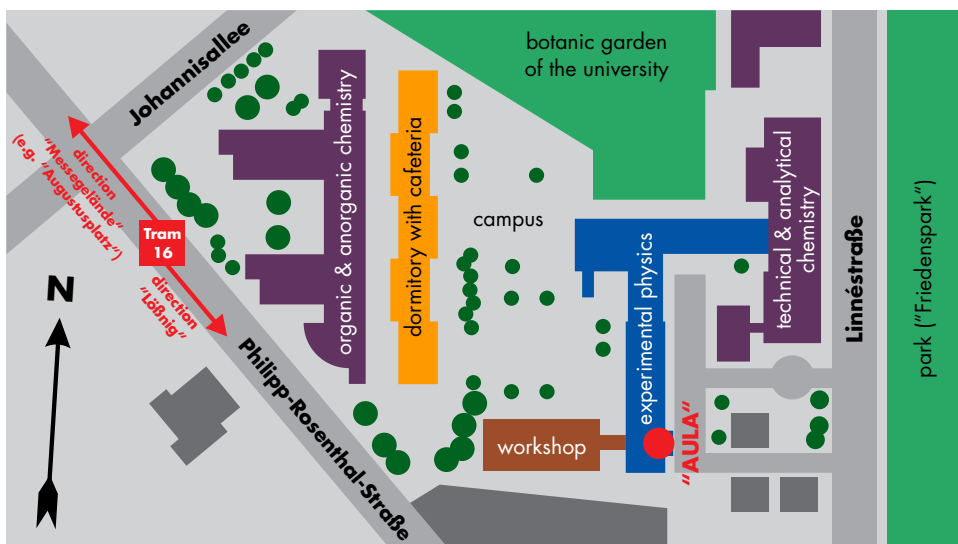
Campus "Johannisallee/Philipp-Rosenthal-Straße"

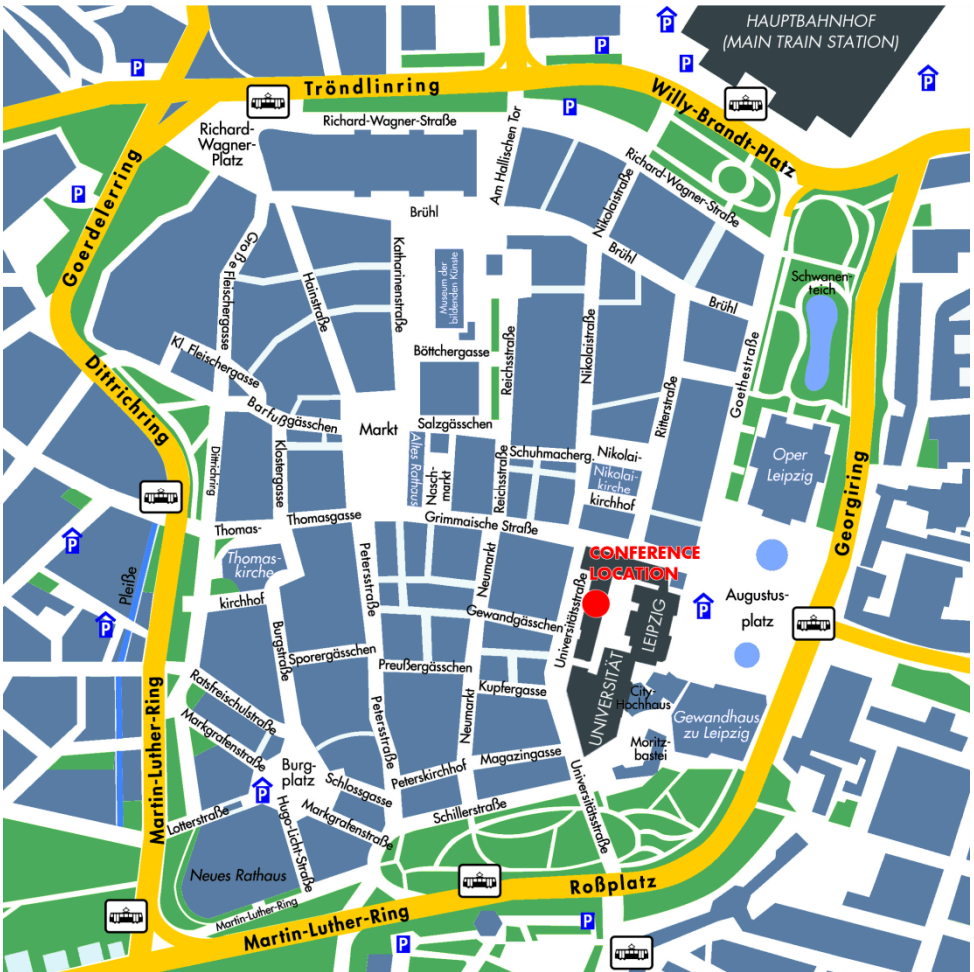
The poster session will take place at the Institute of Experimental Physics I (1st floor, room 331 "Aula") of the University of Leipzig.

University of Leipzig
Institute of Experimental Physics I
Linnéstraße 5
04103 Leipzig, Germany
1st floor, room 331 "Aula"

The easiest way to get from the campus "Augustusplatz" to the campus "Johannisallee/Philipp-Rosenthal-Straße" (and back) is to use tram line 16. You start either at stop "Augustusplatz" or at stop "Roßplatz" and travel in direction "Löbnig" until you arrive at stop "Johannisallee" (3 or 2 stops in total). On your way back, you have to travel in the opposite direction called "Messegelände".

The following map shows the location of the Institute of Experimental Physics I (blue) with its "Aula" on the university campus "Johannisallee/Philipp-Rosenthal-Straße".





Detailed view of the city center of Leipzig showing the main train station, the main building of the University at "Augustusplatz", car parking areas, and tram stops.

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