Invited Speakers

Allen Ehrlicher (Canada)
Roland Eils (Germany)
Ben Fabry (Germany)
John T. Fourkas (USA)
Kristian Franze (UK)
Peter Friedl (USA)
Diana Gonçalves-Schmidt (Germany)
Christina-Maria Horejs (Sweden)
Paul Janmey (USA)
Sarah Köster (Germany)
Wolfgang Losert (USA)
Lisa J. McCawley (USA)
Claudia Mierke (Germany)
Jung Joon Min (Korea)
Dietger Niederwieser (Germany)
Joachim Rädler (Germany)
Ralf Seidel (Germany)
Friedrich Simmel (Germany)
David M. Smith (Germany)
Michael Szardenings (Germany)
Kandice Tanner (USA)
Ana Texeira (Sweden)
Rebecca Wells (USA)
Stefan Zahler (Germany)

Important Dates

Deadline for Early Bird Registration:	July 31, 2016
Deadline for Regular Registration:	September 15, 2016
Deadline for Abstract Submission:	August 31, 2016
7th "Physics of Cancer" Symposium:	October 4 – 6, 2016

Conference Venue

Haus des Buches
Gerichtsweg 28
04103 Leipzig
Germany

Travel Information

Participants arriving by plane at Leipzig-Halle airport may take the train to the city center of Leipzig. In the city, you can easily reach the conference site via tram line 15 within Leipzig's public transport system *LVB*. The tram stop *Gutenbergplatz* is directly in front of the conference site. If you are traveling by car, you can reach Leipzig via autobahn *A9* (Berlin–Nuremberg) or *A14* (Halle–Dresden). Detailed travel instructions can be found on the conference website.

Contact

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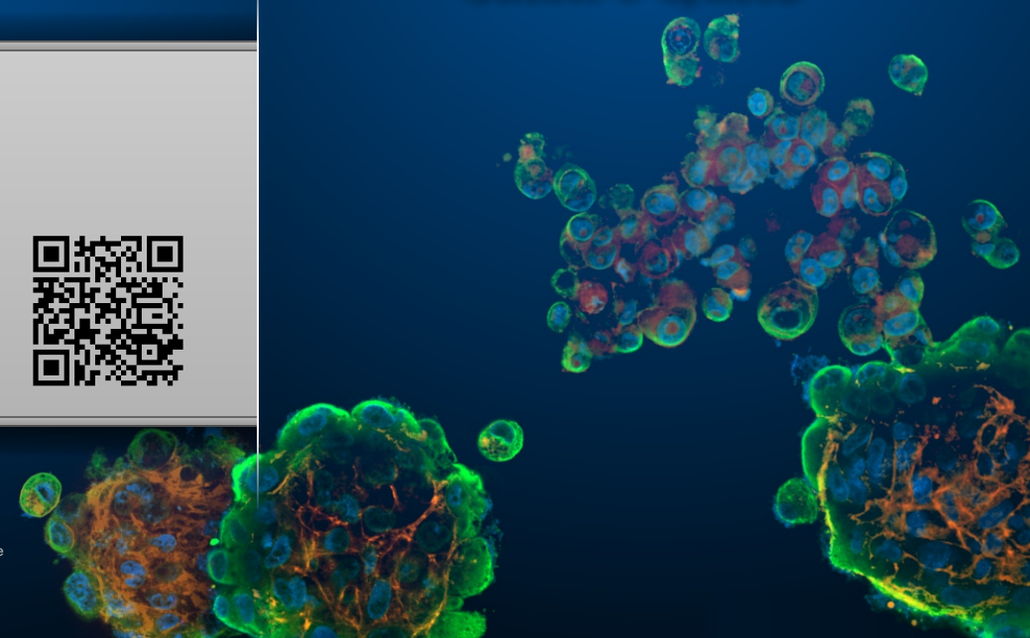
PoC

7th Annual Symposium
Physics of Cancer
Leipzig, Germany
October 4–6, 2016



The investigation of changes in physical properties of cells during malignant transformation is an emerging field in cancer research and cell biology. The annual "Physics of Cancer" symposium assembles researchers from the worldwide pioneering groups investigating the mechanisms underlying cancer progression. This year's meeting will take place in Leipzig, Germany from October 4 till October 6, 2016.

Topics Included

- Biomechanics (Biopolymers, Networks, Rheology, Cytoskeleton, Cell Shape)
- Forces, Motion, and Adhesion (Cell Motility, Assembly, Molecular Motors, Cell Division)
- Oncology
- Imaging

The scientific program consists of invited and contributed talks as well as a poster session. The detailed schedule for the three conference days will be announced in time on the conference website.

Join us for the 7th Annual "Physics of Cancer" Symposium

To register as a participant and to apply for a contributed talk or a poster, please fill the online forms on the conference website at conference.uni-leipzig.de/poc until September 15, 2016 (registration deadline) and August 31, 2016 (abstract submission deadline).

Background

What can we gain from viewing cancer pathogenicity through the eyes of basic physical mechanisms and concepts?

On the one hand, real-world biological systems – from cells to tissues to living organisms – encompass an enormous complexity that simply cannot be fully captured in an exact manner. On the other hand, there is no shortage of illustrations where the behaviors of even the most complexly interwoven biological systems can be capture by a simple physical approach:

Viewing blood cells purely in terms of their inherent viscoelastic character illuminates their function within organisms at different stages of their development [Ekpenyong *et al.* 2012]. Similarly, examining the retinas of the freshwater Elephantnose fish in terms of light propagation through photonic crystals has clarified fundamental questions evolutionary biology [Kreysing *et al.* 2012].

These simple insights can give us information and inspiration about the underlying nuts and bolts of how these complex systems function, react and interact with their surrounding environment.

The same holds true for picking out the key root causes when these complex systems go wrong - pathogenicity:

The chronic lung disorder asthma can be understood through considering epithelial cells analogously to a jamming transition of granular materials [Park *et al.* 2015]. Conversely, insights into the mechanism of kidney disease can be gained by an analysis of how mutation-driven changes to binding kinetics of a single protein affect force generation by cells [Ehrlicher *et al.* 2015].

Cancer is perhaps the most intriguing form of pathogenicity for this viewpoint since the broadly defined disease, arising from a vast array of root causes, is more often than not accompanied by a clearly defined set of physical commonalities:

- individual malignant cells become softer
- collections of malignant cells – tumors – become stiffer
- cells gain the capacity to generate higher forces on their surroundings
- malignant cells adhere less steadily to their neighbors
- the surrounding membrane of cells become softer

These examples and others, when linked together with a deep knowledge of biological mechanisms, have been significant in both uncovering and learning about some of the essential signatures and causes of cancer.

However, the story is still only halfway complete; beneath the study of cancer or any other deadly disease is the innate suggestion to use the knowledge gained in order to develop strategies for prevention, advanced detection and treatment. The knowledge must be applied, or it risks being a wasted effort. This is the impetus, the obligation and the challenge lighting the path ahead.

This is the goal of the 7th Annual "Physics of Cancer" Symposium. By bringing together exceptional researchers in the areas of quantitative cell biology, physical mechanisms of pathology, cancer biology, molecular design, diagnostic systems, and beyond, we aim to create a forum for the exchange of new ideas and formulation of new solutions.

We look forward to meeting you this October.

Organizing Committee

Josef A. Käs
(University of Leipzig, Germany)

Harald Herrmann
(German Cancer Research Center, Heidelberg, Germany)

David M. Smith
(Fraunhofer Institute IZI, Leipzig, Germany)

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