

www.beutenberg.de

"An investment in knowledge pays the best interest."

Benjamin Franklin (1706–1790),
Scientist, Inventor and Philosopher

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timespin – Digital Communication GmbH
www.timespin.de

Chemistry

Life sciences

Physics

Incubators

Beutenberg
Campus e.V.

THE BEUTENBERG CAMPUS IN JENA – Life Science and Physics in Focus

November 1846: The young mechanic Carl Zeiss sets up his workshop in Neugasse 7 in Jena. He makes lenses and microscopes and successfully sells his products to students. With the physicist Ernst Abbe, the think tank grows and within a few decades one of the largest German companies in the optical industry has been established.

November 1938: The young medic and bacteriologist Hans Knöll sets up a microbial laboratory at "Firma Schott & Genossen" and thereby starts the biotechnological research in Jena. Methods for bacterial filtration and for extracting natural products from bacteria and fungi are developed. Hans Knöll nursed a vision of founding a big Biomedical Research Centre on the Beutenberg, at the outskirts of Jena.

Today this vision has come true. Research, development and marketing run in ten institutes and two incubators, using the latest methodology. The biotechnology is as well represented as the microscopy techniques, nano-optical concepts and new laser applications. Life Science meets Physics! In two Leibniz- and two Max Planck Institutes, scientists are busy studying global elemental cycling, ecology, genomics, proteomics and molecular medicine. The Incubators are presently hosting more than 50 companies, which use ideas and discoveries to develop new products beneficial for the public.

The unique quality feature of the Beutenberg Campus is that the scientists within the many special topics in Physics and Life Science benefit from sharing methodology. Biology, biochemistry, virology, genetics and ecology on the one hand, and microsystem technology, precision engineering, optics, sensorics and information technology on the other, are linked together to improve the dissection of cellular structures and molecular communication in increasingly automated systems. The so-called Bioinstrumentation Concept was developed with the goal to connect the technical and scientific strengths of biotechnology and precision tool building in Jena.

This concept has been fruitful. Lenses became confocal imaging systems and bacterial filters became processor-controlled bio-fermentors. The numbers of co-workers have increased enormously over the decades. Presently around 1900 persons work at the Beutenberg Campus, about half of which are scientists. Many of the individual projects are funded by additional grants from external sources. In December 1998 the association, Beutenberg-Campus Jena e.V., was founded, as a platform for further development of innovative strategies and cooperation between the different institutes at the Campus. In this booklet we provide a brief introduction to the research facilities at the Beutenberg Campus and hope we succeed in making you interested in learning more about our research and concepts.

...where **LIFE SCIENCE**
meets **PHYSICS**



MAX PLANCK INSTITUTE FOR CHEMICAL ECOLOGY (MPI-CE)

Chemistry: The Oldest Language
in the World



Ecologists, Entomologists,
Chemists and Biochemists,

Physiologists and Geneticists study the
molecular interactions between plants,
pathogens and beneficial organisms.

www.ice.mpg.de



Parasites attack
a plant-eating caterpillar
– to the benefit of the
attacked plant.

INSTITUTE OF PHOTONIC TECHNOLOGY (IPHT)



Research for
Innovative Systems

Optical technologies
and microsystem

technologies, for application in the areas of
photonic instrumentation, sensor and
measurement technologies as well as
fibre optics.

www.ipht-jena.de



Glowing quartz tube:
internal coating for
fibre mould.

LEIBNIZ INSTITUTE FOR NATURAL PRODUCT RESEARCH AND INFECTION BIOLOGY – HANS KNÖLL INSTITUTE (HKI)



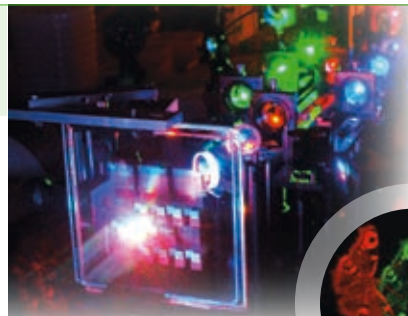
Natural Products – Mediators
of biological Communication.

Top-level natural product research
associated with infection biology of
human pathogenic fungi.

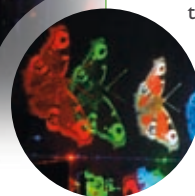
www.hki-jena.de



A glance at the
bio pilot plant



Laser projection system for generating
colour pictures, based on
microlithographically fabricated
computer generated holograms.



FRIEDRICH SCHILLER UNIVERSITY JENA – INSTITUTE OF APPLIED PHYSICS (IAP)

Exploring the light –
for application as a tool in
the development of novel
optical devices.



Institute of Applied Physics

www.iap.uni-jena.de

MAX PLANCK INSTITUTE FOR BIOGEOCHEMISTRY (MPI-BGC)



Biogeochemical cycling of the elements at a global scale.

Research on the complex interactions between global biogeochemical cycling, climate, land use and diversity of organisms.

www.bgc-jena.mpg.de



A view of the high voltage generator of the ^{14}C -accelerator.



LEIBNIZ INSTITUTE FOR AGE RESEARCH – FRITZ LIPMANN INSTITUTE (FLI)



Research for Healthy Ageing.

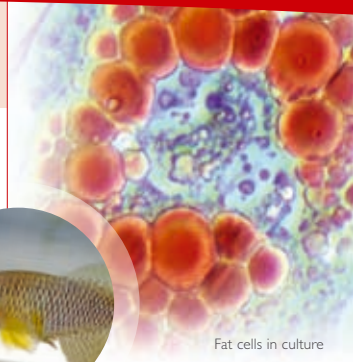
Resolving molecular mechanisms of ageing and age associated illness.

With a life expectancy of twelve weeks, the Turquoise killifish (*Nothobranchius furzeri*) is the most short-lived vertebrate.

www.fli-leibniz.de



Fat cells in culture



TECHNOLOGY AND INNOVATION PARK JENA (TIP)



Founder's Spirit creates economic power.

Business start-up in the dynamic interface between science and economy.

www.tip-jena.de



Squid-sensor assembly



JENA UNIVERSITY HOSPITAL, DEPARTMENT OF VIROLOGY AND ANTIVIRAL THERAPY (IVAT)

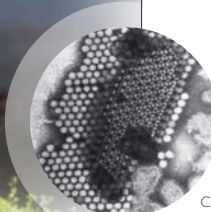
Successfully fighting virus with

- basic research in molecular biology
- *in vitro* and *in vivo* tests
- clinical trials



Coxsackievirus

www.med.uni-jena.de/virologie



FRAUNHOFER INSTITUTE FOR APPLIED
OPTICS AND PRECISION ENGINEERING (IOF)



Tailored Light –
Licht nach Maß
From Design to
System

Optical Systems Technology for controlling
light – from generation, via guiding and
manipulation to application.

www.iof.fraunhofer.de



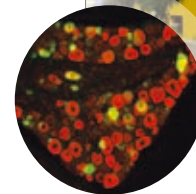
EUV "Schwarzschild"
objective for 13.5 nm.



FRIEDRICH SCHILLER UNIVERSITY JENA –
CENTER FOR MOLECULAR
BIOMEDICINE (CMB)



Institute of Biochemistry and Biophysics
- Chair of Biochemistry
- Chair of Biophysics
Institute of Molecular Cell Biology



At the interface of Biology
and Medicine.

Investigating communication
processes in cells and organisms

Interaction model of a
Tumorsuppressor-p53-
proteine complex with
DNA.

www.cmb.uni-jena.de



BIOINSTRUMENTATION CENTRE (BioCentiv)

BioCentiv
GmbH



Your steppingstone
to success.

We accommodate and facilitate young
businesses active in life sciences.
...join us at the centre.

www.biocentiv.com



JENA SCHOOL FOR MICROBIAL COMMUNICATION (JSMC)

Structured graduate education awarded within the German Excellence Initiative

JSMC offers outstanding young scientists excellent conditions for an interdisciplinary research training centered around 'Microbial Communication'. The JSMC network combines numerous institutes of the University of Jena, non-university research institutions, and regional companies. Three international Research Training Groups are embedded in the JSMC. In addition, PhD fellowships are granted by the JSMC to excellent graduate students from all over the world to carry out research projects at the unexplored interfaces between traditional scientific disciplines.

www.jsmc.uni-jena.de

RESEARCH TRAINING GROUPS UNDER THE UMBRELLA OF JSMC



International Leibniz Research School

for Microbial and Biomolecular Interactions

Research focus on interactions between microorganisms, on interactions of pathogens with hosts, and on network analysis.

www.ilrs.hki-jena.de



International Max Planck Research School

The Exploration of Ecological Interactions with Molecular and Chemical Techniques



Emphasis on ecological interactions and chemical signaling between organisms under natural conditions.

<http://imprs.ice.mpg.de>



GRADUATE SCHOOL OF EXCELLENCE

Friedrich Schiller University of Jena

DFG Research Training Group

Alteration and Element Mobility at the Microbe-Mineral Interface



Research on microbe-mediated mineralogical processes such as bio-mineralization and transport of metals, jointly conducted by Geologists, Chemists and Microbiologists.

www.gk-alteration.uni-jena.de

ABBE SCHOOL OF PHOTONICS



International graduate program in the field Optics/Photonics in cooperation with international research and education institutes: Master of Science in Photonics, PhD in Photonics, Training & Photonics lab. Large Grant program in Public Private Partnership

www.asp.uni-jena.de



LEIBNIZ GRADUATE SCHOOL ON AGEING AND AGE-RELATED DISEASES

What are the mechanisms behind senescence and the development of age-related diseases?

Study and Research in Molecular Biology, Molecular Genetics, Cell Biology, Developmental Biology, Neurobiology, Structural Biology, Biophysics and System Biology.



www.fli-leibniz.de/phd



BEUTENBERG CAMPUS JENA E.V.

Beutenberg Campus e.V. is a non-profit association of managing directors from the campus institutes and start-up centres. It is supporting cooperation between the institutes and communicates a comprehensive and generally understandable picture of the scientific and technical activities to the public. The campus association also communicates the common interest of its members to the politically responsible representatives of the City, the State, the Country, the European Union and worldwide.

Since its establishment in 1998, the association has participated in exhibitions and tradeshows and purposefully presented excellent science to an interested, broad and diverse audience, nationally and abroad. Excellent scientists present their findings, concepts and hypotheses in regular symposia. In the first "Long Night of Science" in Jena, all campus doors were opened to welcome more than 2 500 interested citizens. The Campus Association annually grants its most talented young young scientists the Beutenberg Science Award in Life sciences and Physics.



The Long Night of Science.



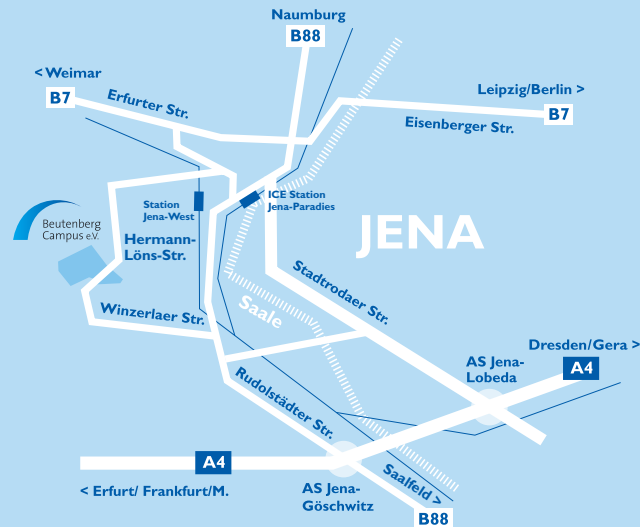
Winners of the Beutenberg Science Award in 2008. (Photo: Matthias Funke)



The Chairman of the Campus Association, Prof. Wilhelm Boland, and the Principal of the Friedrich Schiller University Jena, Prof. Klaus Dicke, involved in conversation with campus visitors.



1. Max Planck Institute for Biogeochemistry
2. Max Planck Institute for Chemical Ecology
3. Institute for Photonic Technology
4. Friedrich Schiller University Jena – Institute of Applied Physics
5. Wacker Biotech GmbH
6. Technology and Innovation Park Jena
7. Fraunhofer Institute for Applied Optics and Precision Engineering
8. Abbe Centre Beutenberg
9. Friedrich Schiller University Jena – Center for Molecular Biomedicine Jena University Hospital, Department of Virology and Antiviral Therapy
10. BioCentiv GmbH – BiolInstrumentation Centre
11. Leibniz Institute for Age Research – Fritz Lipmann Institute
12. Leibniz Institute for Natural Product Research and Infection Biology – Hans Knöll Institute



In November 2005, Beutenberg Campus, Jena was selected as one of “365 Locations in the Land of Ideas”, a countrywide competition under the patronage of the German President Horst Köhler.

Germany
Land of Ideas



Selected Location 2006



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Cover Air Photo:

"Balloon team" Jena