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Bionik-Die Natur bietet  
zahlreiche geniale Ideen  
u. Lösungen, die sich in der  
Praxis bestens bewähren

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Bionik - die genialsten  
Erfindungen der Natur  
*InnovationsDialog Bionik:*  
*\ "Bionik - Chancen und*

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Maschinenbauer in der  
Bionik? Wie es dazu kommt,  
erfahrt ihr hier! Synektik

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egg the lost egg bedtime

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story  
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wendet sich an Studenten,  
Fachleute und  
Wissenschaftler und liegt

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somit im Niveau deutlich ber  
den blichen Sachb chern zur  
Bionik. In einem  
umfangreichen allgemeinen  
Teil zeigt der Autor, was  
Bionik ist, wie sie sich  
entwickelt hat, wie man  
Fragen stellt und was Bionik



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leisten kann. Darauf folgen  
detaillierte Darstellungen  
von 40 ausgewählten  
Beispielen aus den  
verschiedensten  
technologischen Bereichen.  
Die vielfältigen Facetten  
dieser interdisziplinären

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Wissenschaft fügen sich in  
diesem anspruchsvollen Werk  
puzzleartig zu einer  
"Biostrategie in die  
Zukunft" zusammen.

Honey bee colonies  
demonstrate robust adaptive

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efficient agent-based communications and task allocations without centralized controls – desirable features in network design. This book introduces a multipath routing algorithm for packet-

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switched telecommunication networks based on techniques observed in bee colonies.

The algorithm, BeeHive, is dynamic, simple, efficient, robust and flexible, and it represents an important step towards intelligent networks

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that optimally manage resources. The author guides the reader in a survey of nature-inspired routing protocols and communication techniques observed in insect colonies. He then offers the design of a

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scalable framework for nature-inspired routing algorithms, and he examines a practical application using real networks of Linux routers. He also utilizes formal techniques to analytically model the

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performance of nature-  
inspired routing algorithms.  
In the last chapters of the  
book, he introduces an  
immune-inspired security  
framework for nature-  
inspired algorithms, and  
uses the wisdom of the hive

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for routing in ad hoc and sensor networks. Finally, the author provides a comprehensive bibliography to serve as a reference for nature-inspired solutions to networking problems. This book bridges the gap between



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natural computing and  
computer networking. What  
sets this book apart from  
other texts on this subject  
is its natural engineering  
approach in which the  
challenges and objectives of  
a real-world system are

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identified before its solution, nature-inspired or otherwise, is discussed.

This balanced exposition of the book makes it equally suitable for telecommunication network designers and theorists, and

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computer science researchers engaged with artificial intelligence, agents, and nature-inspired techniques.

The book 'BiLBIQ: A biologically inspired Robot with walking and rolling

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Locomotion' deals with implementing a locomotion behavior observed in the biological archetype Cebrennus villosus to a robot prototype whose structural design needs to be developed. The biological

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sample is investigated as far as possible and compared to other evolutionary solutions within the framework of nature's inventions. Current achievements in robotics are examined and evaluated for

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their relation and relevance to the robot prototype in question. An overview of what is state of the art in actuation ensures the choice of the hardware available and most suitable for this project. Through a constant

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consideration of the achievement of two fundamentally different ways of locomotion with one and the same structure, a robot design is developed and constructed taking hardware constraints into account.

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The development of a special leg structure that needs to resemble and replace body elements of the biological archetype is a special challenge to be dealt with. Finally a robot prototype was achieved, which is able



# Read Book Bionik Grundlagen Und Beispiele to walk and roll - inspired by the spider Cebrennus villosus.

The book presents an outline  
of current activities in the  
field of biomimetics and  
integrates a variety of

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applications comprising  
biophysics, surface  
sciences, architecture and  
medicine. Biomimetics as  
innovation method is  
characterised by  
interdisciplinary  
information transfer from

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the life sciences to  
technical application fields  
aiming at increased  
performance, functionality  
and energy efficiency. The  
contributions of the book  
relate to the research  
areas: - Materials and

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structures in nanotechnology  
and biomaterials -  
Biomimetic approaches to  
develop new forms,  
construction principles and  
design methods in  
architecture - Information  
and dynamics in automation,

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neuroinformatics and  
biomechanics Readers will be  
informed about the latest  
research approaches and  
results in biomimetics with  
examples ranging from bionic  
nano-membranes to function-  
targeted design of

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tribological surfaces and  
the translation of natural  
auditory coding strategies.

Bionics means learning from  
the nature for the

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development of technology.  
The science of "bionics"  
itself is classified into  
several sections, from  
materials and structures  
over procedures and  
processes until evolution  
and optimization. Not all

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these areas, or only a few, are really known in the public and also in scientific literature. This includes the Lotus-effect, converted to the contamination-reduction of facades and the shark-shed-



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effect, converted to the resistance-reduction of airplanes. However, there are hundreds of highly interesting examples that contain the transformation of principles of the nature into technology. From the

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A large number of these examples, 250 were selected for the present book according to "prehistory", "early-history", "classic" and "modern time". Most examples are new. Every example includes a printed

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page in a homogeneous arrangement. The examples from the field "modern time" are joint in blocks corresponding to the sub-disciplines of bionics.

There is a wide consensus

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about the necessity of sustainable development. There is also a consensus that wide areas of our economy, industry, and technology and the life styles in industrialized countries are not susta-

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able. Science and technology are widely regarded as (main) causes for this situation. Issues in this context comprise the generally low resource efficiency, an increased and mostly undebated

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technological power, an -  
creased invasiveness of  
modern technologies,  
increasing amounts and -  
versity of pollutants, and  
high technological risks. On  
the other hand science and  
technology are also regarded

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as (main) solution providers towards more sustainability. Thus the question is which type of science and technology is rather a part of the problem, and which type is rather a part of the solution? 'Learning from

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nature' may give some orientation in this context. B- mimetics and bionics are widely regarded as being a part of the solution.

This book provides the readers with a timely guide



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to the application of biomimetic principles in architecture and engineering design. As a result of a combined effort by two internationally recognized authorities, the biologist Werner Nachtigall and the

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architect Göran Pohl, the book describes the principles which can be used to compare nature and technology, and at the same time it presents detailed explanations and examples showing how biology can be

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used as a source of inspiration and “translated” in building and architectural solutions (biomimicry). Even though nature cannot be directly copied, the living world can provide architects and

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engineers with a wealth of analogues and inspirations for their own creative designs. But how can analysis of natural entities give rise to advanced and sustainable design? By reporting on the latest

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bionic design methods and using extensive artwork, the book guides readers through the field of nature-inspired architecture, offering an extraordinary resource for professional architects, engineers, designers and

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Urban planners, as well as  
for university teachers,  
researchers and students.  
Natural evolution is seen  
throughout the book as a  
powerful resource that can  
serve architecture and  
design by providing

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innovative, optimal and  
sustainable solutions.

Der Begriff „BIONIK“ wird  
gerne als Kunstwort  
gekennzeichnet,  
zusammengesetzt aus BIologie  
und TechNIK. Bionik stellt

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einerseits ein Fach dar, in dem geforscht und ausgebildet wird, und kennzeichnet andererseits eine Sichtweise, nämlich die des „Lernens von der Natur für die Technik“. Darüber sind in der Zwischenzeit



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neben populär  
wissenschaftlichen Werken  
eine Reihe von Fachbüchern  
erschienen. Werner  
Nachtigall hat darin mit der  
2. Auflage seines bei  
Springer erschienenen Buchs  
„BIONIK – Grundlagen und

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Beispiele für Ingenieure und Naturwissenschaftler“ einen Meilenstein gesetzt. In diesem Buch kennzeichnet er die Untergliederung des Fachs und bespricht detailliert dessen Forschungsgegenstände.

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Dagegen fehlte bislang eine Darstellung, die sich mit den erkenntnistheoretischen Grundlagen wie mit der pragmatischen Vorgehensweise der Bionik systematisch befasst, die ja mit der ihr eigenen Prinzip-Abstraktion

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zwischen der belebten Welt als Vor-Bild und der technischen Umsetzung als Abbild vermitteln will. Das vorliegende Werk schließt diese Lücke mit drei großen Abschnitten: Biologische Basis: Erforschen,

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Beschreiben, Beurteilen. –  
Abstraktion biologischer  
Befunde: Herausarbeiten  
allgemeiner Prinzipien. –  
Umsetzung in die Technik:  
Prinzipvergleich,  
Konzeptuelles,  
Vorgehensweise.

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Design in engineering and science has often been inspired by nature. This has been more evident in recent years, after a period during which our civilization thought in terms of taming

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rather than working in harmony with nature. The consequences of that approach are still with us and have resulted in a world increasingly homogenized, lacking in biodiversity and with increased pollution.

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Mankind has been slow to learn and even slower to apply the lessons that nature offers, in spite of the urgency of our predicament. This book contains papers presented at the fourth International



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Conference on Comparing  
Design in Nature with  
Science and Engineering .

The emphasis of this Volume  
is on engineering and  
architectural applications  
and on biomimetics,  
reflecting in some measure

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current interest in finding environmentally friendly solutions which also optimize the use of natural resources. The contributions have been arranged into the following topics:

Biomimetics; Shape and Form

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in Engineering Nature;  
Nature and Architectural  
Design; Natural Materials  
and Surfaces; Complexity;  
and Education.

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6b2b61479e76b1983462a  
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