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# From Gecko Feet To Adhesive Tape

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Biological Micro- and Nanotribology  
How Things Work: Then and Now  
Morphology and Biology of Reptiles  
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Brain Weaver  
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## **RODERICK FRIDA**

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**Biological Micro- and Nanotribology** National Geographic Kids  
Whip spiders (Amblypygi) can be large and terrifying animals with strong, raptorial pedipalps and long antenniform first legs that can produce a span of as much as 60 cm. Others are small and scarcely span 5 cm. They all lead a secretive nocturnal life and are extremely dangerous to other arthropods and small vertebrates. In contrast to spiders and scorpions, they are of no commercial, economic or medical importance and they are difficult to study in the field because of their nocturnal habits, possible reasons why they have been greatly neglected until recently, by scientists and naturalists. Whip spiders represent an

old group that dates back to the Carboniferous period. Their partly primitive and partly derived morphological characters and habits make the study of these animals interesting, while observation of their behaviour greatly increases our knowledge and understanding of arachnids in general. In this book the author describes their morphology and systematics, their life history, their fascinating sensory biology, their complex mating dances and reproductive biology, and their ecology and distribution. Thus he has made a significant contribution to a better understanding of the morphology and biology of the Arachnida as a whole. Whip Spiders is an outstanding contribution to science and it will be of interest for anyone with an interest in Arachnida and for those keeping and breeding spiders.

**How Things Work: Then and Now** Springer Science & Business Media

Many creatures use adhesive polymers and structures to attach to inert substrates, to each other, or to other organisms. This is the first major review that brings together research on many of the well-known biological adhesives dealing with bacteria, fungi, algae, and marine and terrestrial animals. As we learn more about their molecular and mechanical properties we begin to understand why they adhere so well and with this comes broad applications in areas such as medicine, dentistry, and biotechnology.

**Morphology and Biology of Reptiles** Harper Collins

The intention of this book is that it should contain everything an engineer needs to know to be able to design and produce adhesively bonded joints which are required to carry significant loads. The advantages and disadvantages of bonding are given, together with a sufficient understanding of the necessary mechanics and chemistry to enable the designer to make a sound engineering judgement in any particular case. The stresses in joints are discussed extensively so that the engineer can get sufficient philosophy or feel for them, or can delve more deeply into the mathematics to obtain quantitative solutions even with elastoplastic behaviour. A critical description is given of standard methods of testing adhesives, both destructively and non-destructively. The essential chemistry of adhesives and the importance of surface preparation are described and guidance is given for adhesive selection by means of check lists. For many applications, there will not be a unique adhesive which alone is suitable, and factors such as cost, convenience, production

considerations or familiarity may be decisive. A list of applications is given as examples. The authors wish to increase the confidence of engineers using adhesive bonding in load-bearing applications by the information and experience presented. With increasing experience of adhesives engineering, design will become more elegant as well as more fitted to its products.

***The Gecko's Foot*** Springer Science & Business Media

Specifically dedicated to polymer and biopolymer systems, *Polymer Adhesion, Friction, and Lubrication* guides readers to the scratch, wear, and lubrication properties of polymers and the engineering applications, from biomedical research to automotive engineering. Author Hongbo Zeng details different experimental and theoretical methods used to probe static and dynamic properties of polymer materials and biomacromolecular systems. Topics include the use of atomic force microscopy (AFM) to analyze nanotribology, polymer thin films and brushes, nanoparticles, rubber and tire technology, synovial joint lubrication, adhesion in paper products, bioMEMS, and electrorheological fluids.

***Functional Vertebrate Morphology*** Bloomsbury Publishing

This book, based on the analogy between contact mechanics and fracture mechanics proposed by the author twenty years ago, starts with a treatment of the surface energy and tension of solids and surface thermodynamics. The essential concepts of fracture mechanics are presented with emphasis on the thermodynamic aspects. Readers will find complete analytical results and detailed calculations for cracks submitted to pressure distributions and the Dugdale model. Contact mechanics and the

contact and adherence of rough solids are also covered.

**Adhesion and Adhesives** Johns Hopkins University Press  
Though adult cognitive development has previously been thought to be unyielding and static, Brain Weaver offers new hope and empowerment to remain mentally vibrant for a lifetime. Doctors Newberg and Monti's team at Thomas Jefferson University's Marcus Institute of Integrative Health are at the forefront of research in brain functioning and applications of the most advanced understanding in real-world strategies to expand options for optimizing our complex neurophysiology. Their findings show that optimal brain health is achievable by successfully weaving together a tapestry of our bio-psycho-social-spiritual dimensions. Brain Weaver also coincides with a decades-long surge in the public's interest in whole-person treatments—body, mind and spirit evidence-based integrative therapies that include pharmaceuticals, electromagnetics, nutrition and meditation. Brain Weaver's timeliness is all the more important now to address a new paradigm for post-pandemic wellness that emphasizes our individual and collective responsibility for proactive healthcare

Biomimetic and Bioinspired Nanomaterials Academic Press  
In 1974 when I published my book, Biological Mechanism of Attachment, not many pages were required to report on the attachment devices of insect cuticles. As in most fields of research, our knowledge on this specific subject has simply exploded. Dr. Stanislav N. Gorb now describes the present day level of our knowledge, to which he has personally contributed so much, and a research team working on biological microtribology has gradually developed, also. With modern methods of

measurement it is possible to enter the structure - function relationship much more deeply, even down to a molecular level, which was not possible two and a half decades ago. It is a well known fact that, in biology, the more sophisticated the measuring method, the greater the achievement of biological fundamental research, and its resulting evidence. Our knowledge remains at a certain level until new methods once more permit a forward leap. Biological knowledge develops in the form of a stepped curve rather than linear, as reflected in the studies carried out on the attachment devices of insect cuticles.

**Biomimicry** Cherry Lake

The book series Nanomaterials for the Life Sciences, provides an in-depth overview of all nanomaterial types and their uses in the life sciences. Each volume is dedicated to a specific material class and covers fundamentals, synthesis and characterization strategies, structure-property relationships and biomedical applications. The series brings nanomaterials to the Life Scientists and life science to the Materials Scientists so that synergies are seen and developed to the fullest. Written by international experts of various facets of this exciting field of research, the series is aimed at scientists of the following disciplines: biology, chemistry, materials science, physics, bioengineering, and medicine, together with cell biology, biomedical engineering, pharmaceutical chemistry, and toxicology, both in academia and fundamental research as well as in pharmaceutical companies. VOLUME 7 - Biomimetic and Bioinspired Nanomaterials

*Polymer Adhesion, Friction, and Lubrication* Springer

Learn about how nature has inspired technological innovations

with this book on the similarities between gecko feet and a new adhesive tape. Integrating both historical and scientific perspectives, this book explains how gecko feet inspired the invention of an adhesive. Readers will make connections and examine the relationship between the two concepts. Sidebars, photographs, a glossary, and a concluding chapter on important people in the field add detail and depth to this informational text on biomimicry.

*Nanotribology and Nanomechanics II* Springer Science & Business Media

Repackaged with a new afterword, this "valuable and entertaining" (New York Times Book Review) book explores how scientists are adapting nature's best ideas to solve tough 21st century problems. Biomimicry is rapidly transforming life on earth. Biomimics study nature's most successful ideas over the past 3.5 million years, and adapt them for human use. The results are revolutionizing how materials are invented and how we compute, heal ourselves, repair the environment, and feed the world. Janine Benyus takes readers into the lab and in the field with maverick thinkers as they: discover miracle drugs by watching what chimps eat when they're sick; learn how to create by watching spiders weave fibers; harness energy by examining how a leaf converts sunlight into fuel in trillionths of a second; and many more examples. Composed of stories of vision and invention, personalities and pipe dreams, Biomimicry is must reading for anyone interested in the shape of our future.

[A Primer on Reptiles and Amphibians](#) John Wiley & Sons

A Primer on Reptiles and Amphibians is an innovative educational resource designed to forge a connection between the reader and

the creeping critters of the world. Turtles, frogs, lizards, salamanders, snakes, and crocodiles; these animals evoke fear and fascination. This primer dispels myths and unlocks mysteries surrounding these diverse survivors which have mastered virtually every habitat on Earth. Tragically, these animals now face pressures of unprecedented severity, but there is still time to make a difference if more of us work together. Micha Petty is an international award-winning Master Naturalist and wildlife rehabilitator. This critically-acclaimed debut volume is a collection of Micha's interpretive writings, carefully crafted to make learning easy for everyone. These bulletins display his passion for Conservation Through Education while covering topics such as living harmoniously with wildlife, physiology, natural history, observation, and conservation. Flip to any page to be instantly introduced to new facets of reptiles, amphibians, the perils they face, and how you can join the fight to save them.

[Bio-inspired Studies on Adhesion of a Thin Film on a Rigid Substrate](#) Springer Science & Business Media

The recent emergence and proliferation of proximal probes, e.g. SPM and AFM, and computational techniques for simulating tip-surface interactions has enabled the systematic investigation of interfacial problems on ever smaller scales, as well as created means for modifying and manipulating nanostructures. In short, they have led to the appearance of the new, interdisciplinary fields of micro/nanotribology and micro/nanomechanics. This volume serves as a timely, practical introduction to the principles of nanotribology and nanomechanics and applications to magnetic storage systems and MEMS/NEMS. Assuming some familiarity with macrotribology/mechanics, the book comprises

chapters by internationally recognized experts, who integrate knowledge of the field from the mechanics and materials-science perspectives. They cover key measurement techniques, their applications, and theoretical modelling of interfaces, each beginning their contributions with macro- and progressing to microconcepts. After reviewing the fundamental experimental and theoretical aspects in the first part, Nanotribology and Nanomechanics then treats applications. Three groups of readers are likely to find this text valuable: graduate students, research workers, and practicing engineers. It can serve as the basis for a comprehensive, one- or two-semester course in scanning probe microscopy; applied scanning probe techniques; or nanotribology/nanomechanics/nanotechnology, in departments such as mechanical engineering, materials science, and applied physics. With a Foreword by Physics Nobel Laureate Gerd Binnig Dr. Bharat Bhushan is an Ohio Eminent Scholar and The Howard D. Winbigler Professor in the Department of Mechanical Engineering, Graduate Research Faculty Advisor in the Department of Materials Science and Engineering, and the Director of the Nanotribology Laboratory for Information Storage & MEMS/NEMS (NLIM) at the Ohio State University, Columbus, Ohio. He is an internationally recognized expert of tribology and mechanics on the macro- to nanoscales, and is one of the most prolific authors. He is considered by some a pioneer of the tribology and mechanics of magnetic storage devices and a leading researcher in the fields of nanotribology and nanomechanics using scanning probe microscopy and applications to micro/nanotechnology. He is the recipient of various international fellowships including the Alexander von

Humboldt Research Prize for Senior Scientists, Max Planck Foundation Research Award for Outstanding Foreign Scientists, and the Fulbright Senior Scholar Award.

*Biological Adhesive Systems* Springer Science & Business Media

By employing a combination of approaches from several disciplines the authors elucidate the principles of a variety of biomechanical systems that rely on frictional surfaces or adhesive secretions to attach parts of the body to one another or to attach organisms to a substrate. This account provides an excellent starting point for engineers and physicists working with biological systems and for biologists studying friction and adhesion. It will also serve as a valuable introduction for graduate students entering this interdisciplinary field of research.

*Refuting Evolution* Creation Book Publishers

Bioadhesion is often defined as the state in which two materials, at least one of which is biological in nature, are held together for extended periods of time by interfacial forces. It is an area of active multidisciplinary research, where engineers, scientists-including chemists, physicists, biologists, and medical experts-materials' producers, a

Springer Handbook of Nanotechnology Belknap Press

The wave of the future has been around since the beginning of times: it's called Nature. Let inventor and entrepreneur Jay Harman introduce you to stunning solutions to some of the world's thorniest problems. Why does the bumblebee have better aerodynamics than a 747? How can copying a butterfly wing reduce the world's lighting energy bill by 80%? How will fleas' knees and bees' shoulders help scientists formulate a near-perfect rubber? Today an interdisciplinary and international group

of scientists, inventors and engineers is turning to nature to innovate and find elegant solutions to human problems. The principle driving this transformation is called biomimicry, and Harman shares a wide range of examples of how we're borrowing from natural models to invent profitable, green solutions to pressing industrial challenges. Aimed at a business audience, aspiring entrepreneurs, environmentalists and general science readers, *The Shark's Paintbrush* reflects a force of change in the new global economy that does more than simply gratify human industrial ambition; it teaches us how to live in harmony with nature and opens bright opportunities for a better future.

*Knowledge Stew* Cambridge University Press

J. Herbert Waite Like many graduate students before and after me I was There are so many species about which nothing is known, mesmerized by a proposition expressed years earlier by and the curse of not knowing is apathy. Krogh (1929) – namely that “for many problems there is Bioadhesion is the adaptation featured in this book, an animal on which it can be most conveniently studied”. and biology has many adhesive practitioners. Indeed, This opinion became known as the August Krogh Prin- every living organism is adhesively assembled in the ciple and remains much discussed to this day, particu- most exquisite way. Clearly, speci? c adhesion needs to larly among comparative physiologists (Krebs, 1975). be distinguished from the opportunistic variety. I think The words “problems” and “animal” are key because of speci? c adhesion as the adhesion between cells in the they highlight the two fundamental and complementary same tissue, whereas opportunistic adhesion might be the foci of biological research: (1) expertise about an

animal adhesion between pathogenic microbes and the urinary (zoo-centric), which is mostly observational and (2) a tract, or between a slug and the garden path. If oppor- mechanistic analysis of some problem in the animal’s life nistic bioadhesion is our theme, then there are still many history or physiology (problem-centric), which is usually practitioners but the subset is somewhat more select than a hypothesis-driven investigation. before.

**Contact, Adhesion and Rupture of Elastic Solids** Springer Science & Business Media

Part playful poetry, part nonfiction information, this kid-friendly introduction to biomimicry highlights the remarkable ways plants and animals have helped us solve some of our toughest engineering challenges. One well-known example of biomimicry is the invention of Velcro - inspired by the sticky burrs from a plant. Discover six more ways nature did first Back matter includes a glossary and a STEM challenge activity to use at home or in the classroom.

*Nature Did It First* Springer

The comprehensive reference and textbook serves as a timely, practical introduction to the principles of nanotribology and nanomechanics. Assuming some familiarity with macroscopic tribology, the book comprises chapters by internationally recognized experts, who integrate knowledge of the field from the mechanics and materials-science perspectives. They cover key measurement techniques, their applications, and theoretical modelling of interfaces, each beginning their contributions with macro- and progressing to microconcepts.

*Chemistry 2e* Springer

When a predator attacks, prey are faced with a series of 'if', 'when' and 'how' escape decisions - these critical questions are the foci of this book. Cooper and Blumstein bring together a balance of theory and empirical research to summarise over fifty years of scattered research and benchmark current thinking in the rapidly expanding literature on the behavioural ecology of escaping. The book consolidates current and new behaviour models with taxonomically divided empirical chapters that demonstrate the application of escape theory to different groups. The chapters integrate behaviour with physiology, genetics and evolution to lead the reader through the complex decisions faced

by prey during a predator attack, examining how these decisions interact with life history and individual variation. The chapter on best practice field methodology and the ideas for future research presented throughout, ensure this volume is practical as well as informative.

**Hansen Solubility Parameters in Practice** John Wiley & Sons  
In a village in old Hawaii, everyone is excitedly preparing gifts for the impending visit of the King and his family. A poor young girl wishes she had a special gift to give. With help from her fairy friends, she comes up with the perfect gift of aloha.

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