



## Super Gear

*By Jennifer Swanson*

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Cutting-edge science; high-performance sports

How are the sports played by Michael Phelps, Serena Williams, Michelle Wie, and Usain Bolt related? Nanotechnology!

Take a close-up look at sports and nanotechnology, the cutting-edge science that manipulates objects at the atomic level. Nanotechnology is used to create high-tech swimsuits, tennis rackets, golf clubs, running shoes, and more. It is changing the face of sports as we know it.

Back matter includes a glossary, bibliography, list of resources, and index.

Perfect for 2016 Summer Olympics displays and celebrations.

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## **Super Gear By Jennifer Swanson Bibliography**

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## Editorial Review

From School Library Journal

Gr 6–9—This title provides a fascinating insight into the developing world of nanotechnology applications in sports. The opening chapter outlines concepts of molecular bonding, including an illustration of the crystalline structure of ice. The text then segues into a lucid explanation of the very different forces at work in extremely small carbon nanoparticles. Subsequent chapters examine changes wrought by nanotechnology in particular sports: football helmets that absorb more energy and could protect against concussion, shoes and track surfaces meant to improve running speed and reduce injury, golf clubs and tennis racquets that are stronger and lighter, and swimsuits designed in conjunction with NASA intended to reduce drag. The sports connections are tied to standout athletes, including swimmers Alia Atkinson and Michael Phelps, golfers Michelle Wie and Phil Mickelson, speed skater Shani Davis, and tennis champion Serena Williams. Sidebars and simple drawings illustrate important concepts in physical science, especially lift, turbulence, and drag. One "Super Fact" sidebar shows how a single-walled carbon nanotube is narrower than a human hair in the same proportion as the hair is to a typical house. A hitch is that the science is so new that some of the technology is unproven. A sidebar on Jamaican sprinter Usain Bolt concludes that the effect of his nanotech shoes on his speed is unknown. VERDICT A highly engaging introduction to an exciting aspect of cutting-edge, real-world science for STEM collections.—Bob Hassett, Luther Jackson Middle School, Falls Church, VA

## Review

Science teacher and writer Swanson tells the story behind nanotechnology's introduction and impact on sports. Swanson defines her subject as "the science of things at the nanoscale....Nano- means 'one-billionth,' so a nanometer is one-billionth of a meter" before going on to explore how nanotechnologists are proceeding from superfibers to discover still more inventive ways to apply the technology to fabrics and equipment. She hasn't found a really comfortable fit between her audience and her writing in this effort. She asks readers to field concepts such as molecular structure and the refractive qualities of nanoparticles on the dispersion of light, and she also belts out "Now that's tiny!" or "We're talking about some pretty small stuff!" The two don't jibe. Nor do her introductions to the chapters on various nanotech uses square with the material coming later in the chapter. "From swimming to biking to running, the fastest person to finish is the winner," she writes at the beginning of the chapter on "super suits" before going on to discuss "silicon nanofilaments" with "microscopic spikes." Swanson is splendid at explaining how nanotechnology works, and boxed asides help readers conduct experiments on drag, surface area, and such. But she can also go wrong. "There is no prize for being the best drafter." The best drafters are in the best position to win, which they then often do. Ask Apolo Ohno. Plenty of good science sunk by tone and blunders.

- *Kirkus Reviews*

Colorfully illustrated by photos, this book introduces "the science of the very small" as applied to sports equipment and clothing. While nanotechnology is discussed at length in the first chapter, readers may come away with a rather fuzzy idea of what a nanoparticle actually is. Still, the book provides plenty of intriguing facts about how the technology is changing sports equipment, from racing bikes to football helmets. One chapter considers how suits made of nanomaterials can lessen the effect of drag on swimmers and speed skaters. Another explores nanotechnology as applied to baseball bats, tennis rackets, and golf clubs. A third chapter looks at nanotech changes to runners' shoes, inside and out. Though the presentation of information about new, nano-improved sports equipment and clothing is largely positive, Swanson also discusses whether the use of nanotechnology has changed sports for the better. Only in a sidebar does she raise the broader question of safety concerns in a very general paragraph suggesting that more study is needed. An up-

to-date look at the intersection of technology and sports.

- *Booklist*

This title provides a fascinating insight into the developing world of nanotechnology applications in sports. The opening chapter outlines concepts of molecular bonding, including an illustration of the crystalline structure of ice. The text then segues into a lucid explanation of the very different forces at work in extremely small carbon nanoparticles. Subsequent chapters examine changes wrought by nanotechnology in particular sports: football helmets that absorb more energy and could protect against concussion, shoes and track surfaces meant to improve running speed and reduce injury, golf clubs and tennis racquets that are stronger and lighter, and swimsuits designed in conjunction with NASA intended to reduce drag. The sports connections are tied to standout athletes, including swimmers Alia Atkinson and Michael Phelps, golfers Michelle Wie and Phil Mickelson, speed skater Shani Davis, and tennis champion Serena Williams. Sidebars and simple drawings illustrate important concepts in physical science, especially lift, turbulence, and drag. One "Super Fact" sidebar shows how a single-walled carbon nanotube is narrower than a human hair in the same proportion as the hair is to a typical house. A hitch is that the science is so new that some of the technology is unproven. A sidebar on Jamaican sprinter Usain Bolt concludes that the effect of his nanotech shoes on his speed is unknown. VERDICT A highly engaging introduction to an exciting aspect of cutting-edge, real-world science for STEM collections.

- *School Library Journal*

The quest for improving sports performance shifts from locker room to lab as myriad ways of incorporating microscopic fibers and particles into sports clothing and equipment are invented. Swanson begins with a little fundamental math, introducing the term *nano* (used here as one billionth of a meter) and then launches into an overview of molecular bonds in general and the breakthrough discovery of carbon nano formations and their peculiar traits, particularly strength. Putting the basics astern, she focuses the remaining four chapters on swimsuits that cut down drag for swimmers; nanoparticles that strengthen baseball bats, tennis rackets, and golf clubs, while making them lighter; foam and spikes made from nano materials that may improve runners' and sprinters' shoes; and finally, the possibility that the fundamental challenge of human performance may actually be threatened by advanced nano technologies. The opening chapter on nano science is a trifle textbookish in tone, but it lays out the groundwork clearly for a middle grades audience; moreover, concepts are reinforced throughout the book by easy experiments presented in sidebars. In her closing notes, Swanson remarks on how sporting goods companies' protection of intellectual property rights forced her to rely on public information for her research, a fact which may account for several awkward distinctions between how this miracle technology is purported to work, yet sometimes doesn't. Glossary, source notes, and index are included, as well as a selected bibliography of articles available online, many of which may be within the grasp of interested readers.

- *Bulletin of the Center for Children's Books*

#### About the Author

Jennifer Swanson is a middle school science instructor for John Hopkins University's Center for Talented Youth, as well as the award-winning author of more than twenty nonfiction and fiction books for children, including several titles in the How Things Work series (The Child's World). She lives in Jacksonville, Florida.

#### Users Review

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**David Tillery:**

The book Super Gear gives you the sense of being enjoy for your spare time. You should use to make your capable far more increase. Book can being your best friend when you getting pressure or having big problem with your subject. If you can make reading through a book Super Gear to be your habit, you can get far more advantages, like add your current capable, increase your knowledge about many or all subjects. It is possible to know everything if you like open up and read a publication Super Gear. Kinds of book are several. It means that, science guide or encyclopedia or other people. So , how do you think about this publication?

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