

NANO 101:

Introduction to Nanoscale Science,
Engineering, and Technology for Educators



Big Ideas

1. Nano is small and different
2. Nano is studying and making tiny things
3. Nano is new technologies
4. Nano is part of our society and our future

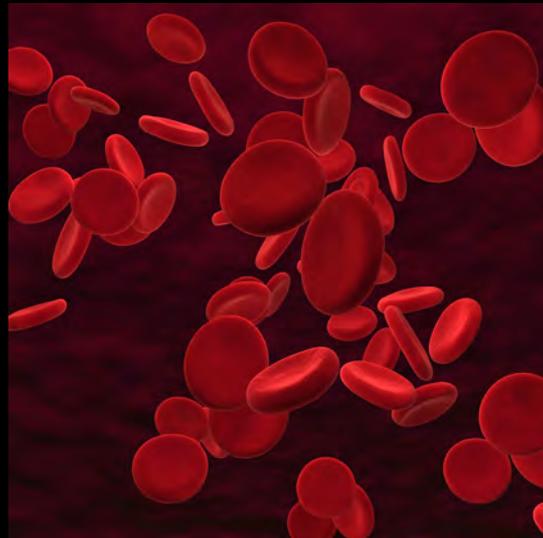
Nano is small and different

“Nano” means small:
a nanometer is a billionth of a meter



meters

iStockphoto



micrometers

iStockphoto



nanometers

iStockphoto

Nano is different: properties like color can change



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nanoComposix

Gold

Nano is different: chemical reactions are faster



Istockphoto



U.S. Chemical and Safety Board

Aluminum

Nano is different: surprising forces can dominate



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Gecko



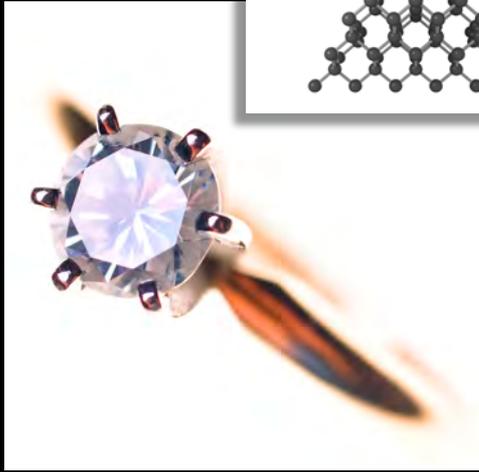
A. Dhinojwala, University of Akron



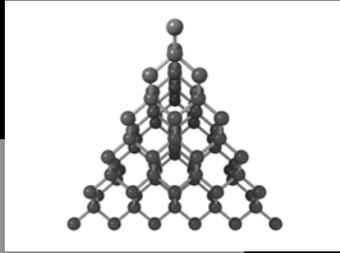
A. Kellar,
Lewis & Clark College

Nano is studying
and making tiny things

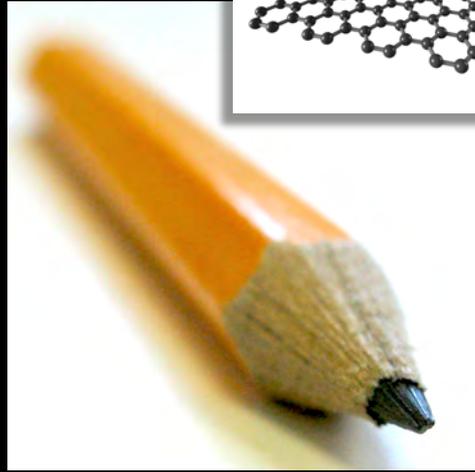
Everything is made of atoms



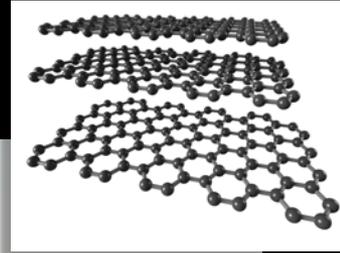
istockphoto



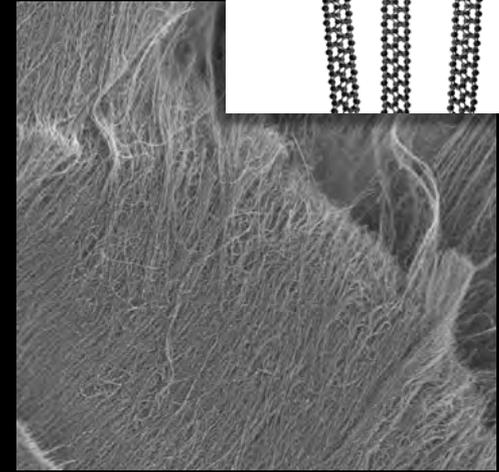
NISE Network



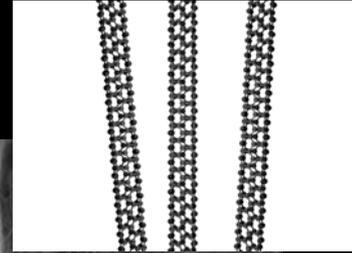
Sciencenter/NISE Network



NISE Network



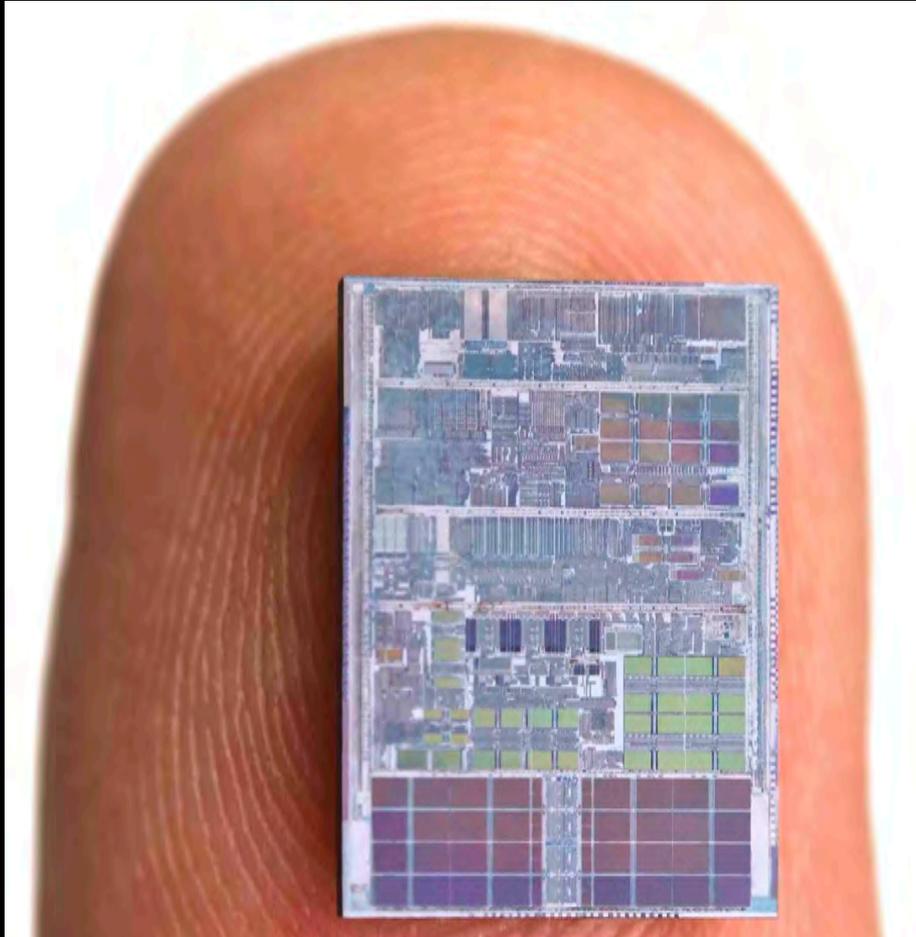
K. Molhave, Open Source Handbook of Nanotechnology



NISE Network

Carbon

Nanotechnologies



Computer chip



Liquid crystal display

iStockphoto

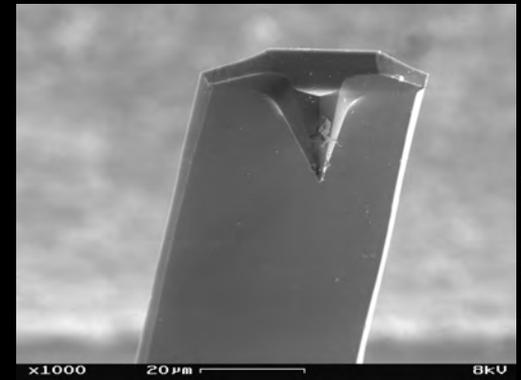
iStockphoto

Nano researchers use special tools and equipment



Cornell Nanoscale Science & Technology Facility / Charles Harrington Photography

Researchers in a clean room



SecretDisc, Wikimedia Commons

Atomic force microscope tip

Self-assembly in nature



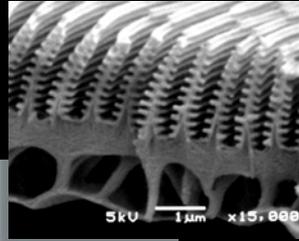
K. Libbrecht, www.snowcrystals.com

Snowflake

Nano is all around us— in nature and technology



Blue Morpho butterfly



S. Yoshioka,
Osaka University



Low-energy display

Qualcomm Technologies

iStockphoto

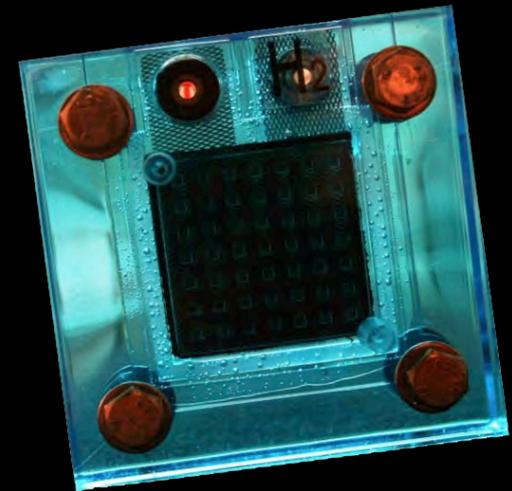
Nano is new technologies

Nano is helping us create new sources of energy



Konarka Technologies

Thin film solar cell



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Fuel cell

Nano is helping us provide access to clean water



Stellenbosch University Water Institute

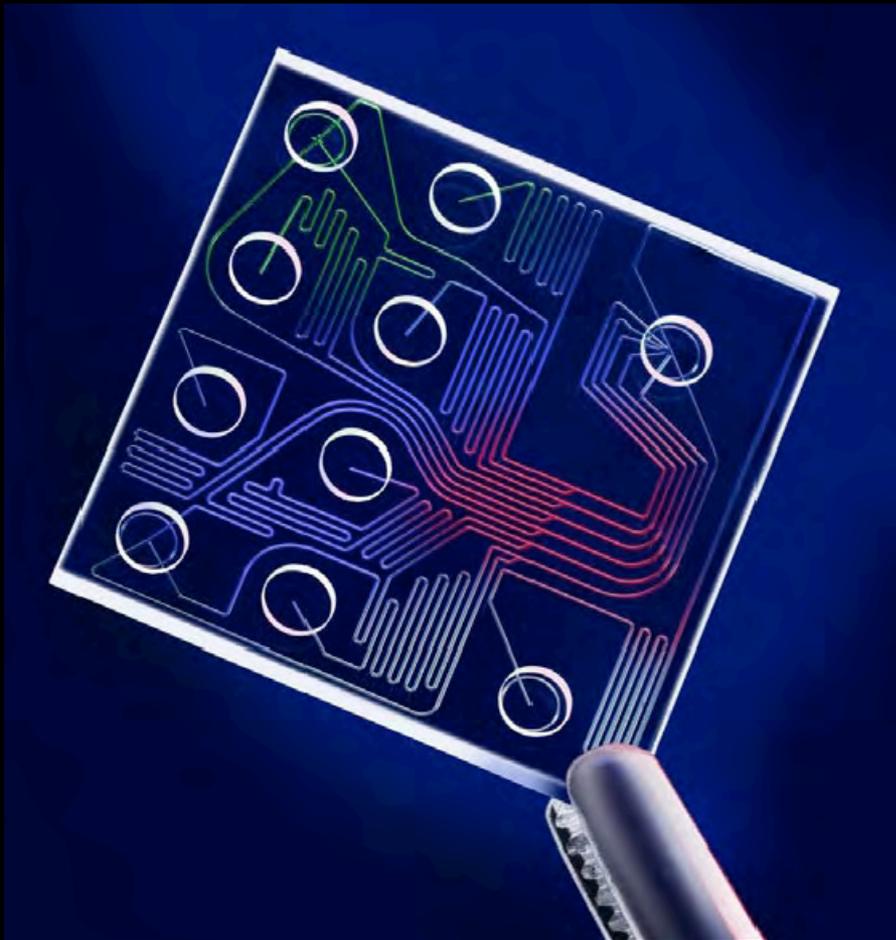


Lifesaver Systems

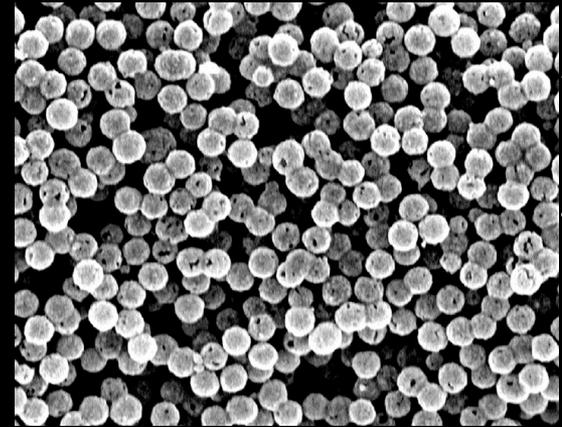
Filter with nano-sized pores

“Tea bag” water filter

Nano is helping us develop new medical treatments



Agilent



G. Koeing, University of Wisconsin-Madison

Gold nanoshells

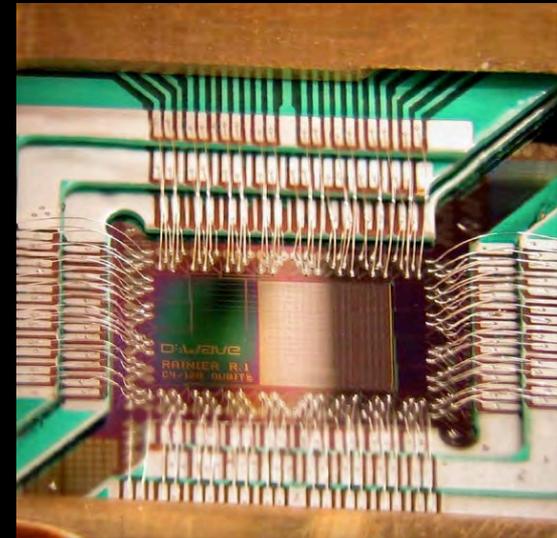
“Lab on a chip”

Nano is helping us develop innovative technologies



Dan Roam

Space elevator



D-Wave

Quantum computer

Nano is part of
our society and our future

Thinking ahead with technologies



Gasoline



Fire

Everyone has a role in shaping nanotechnology



Getty Images

Nanoparticle sunblock



Emily Maletz/ NISE Network

Nanosilver socks

Everyone has a role
in shaping nanotechnology



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Any opinions, findings, and conclusions or recommendations are those of the authors and do not necessarily reflect the views of the Foundation.