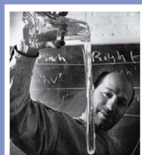
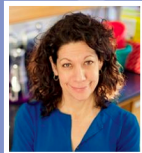


Our Presenters



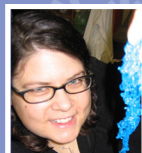
Howard Stone holds degrees in Chemical Engineering from the University of California at Davis and Caltech. He joined Harvard in 1989 and moved to Princeton University in 2009. His research is in the areas of fluid dynamics, materials science, and applied mathematics. He is the Donald R. Dixon '69 and Elizabeth W. Dixon Professor in Mechanical and Aerospace Engineering, (MAE) and the Chair of the MAE Department,



Bonnie Bassler is the Squibb Professor of Molecular Biology at Princeton University. Her research focuses on the molecular mechanisms that bacteria uses for intracellular communication, a process called quorum sensing. She is a member of the National Academy of Sciences, and was awarded Princeton University's President's Award for Distinguished Teaching in 2008.



Daniel Steinberg is the Director of Education Outreach for the Princeton Center for Complex Materials. He received his PhD in Geophysics from Binghamton University in 1992, and has worked at the NASA Goddard Space Flight Center, and at the Space Telescope Science Institute in Baltimore, where he has remotely steered the Hubble Space telescope. Dan currently runs many educational programs in materials science for students, teachers, and the public.



Kathryn Hollar is the Director of Educational Programs for the Harvard School of Engineering & Applied Sciences. She received her PhD in Chemical Engineering from Cornell University and BS degrees in Chemical Engineering and English from North Carolina State University. She works with teachers and students of all ages to increase public engagement in science and engineering.



Sergio Aclo is the Education Outreach Coordinator at the Princeton Center for Complex Materials. He previously taught elementary school as a Teach for America Corps Member, earned his MEd and JD from Penn State, and is currently a MA/MPA graduate student at Villanova University for Political Science and Public Administration.

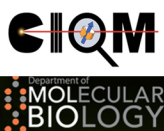


Daniel Rosenberg is part of the talented lecture demonstration team in the Science Center whose creativity is on display each day in the Harvard lecture halls to elucidate the principles of science. Daniel is a 1984 Harvard College graduate and a chemist. Daniel has also applied his passion for science in other venues such as the annual Ig Nobel Ceremony held on Harvard's campus.

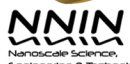


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Princeton University Center for Complex Materials Presents

2014 Holiday Lecture

Saturday, December 13
Princeton University Campus
McDonnell Hall, Room A02

— 10 am and 1 pm —



DNA

A Detective Story

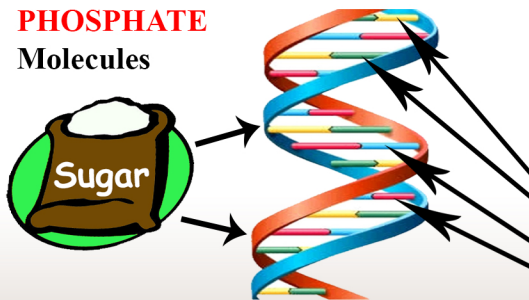
Fun Facts

DNA

Are you alive? Congratulations! You have DNA! DNA is the little building block of life that makes us who we are. The genetic coding in the DNA determines everything about us—from how tall we could be to the color of our eyes. However, DNA can be a tough subject to understand. Below are some facts to get you started!

DNA stands for
DeoxyriboNucleic Acid

The sides of the DNA ladder are made of **SUGARS** and **PHOSPHATE** Molecules



DNA is found
in **ALL**
living
things



DNA has a **double-helix** structure like a twisted ladder. The steps of the ladder are **bases**. There are four bases:

- █ **A ADENINE (A)** is a base.
- █ **T THYMINE (T)** is a base.
- █ **C CYTOSINE (C)** is a base.
- █ **G GUANINE (G)** is a base.

Erwin Chargaff discovered that bases always have the same **partner**.

CYTOSINE AND GUANINE
ADENINE AND THYMINE

**DNA Similarities: How similar are we to other living things?*

Other Humans: ~99.9%
Chimpanzee: ~98%
Cat and Dog: ~90%
Cow: ~80%
Mouse: ~75%
Fruit Fly: ~60%
Banana: ~50%



**According to some experts*

Our entire DNA sequence is called a **genome**...

...and there's about **3,000,000,000** DNA bases in our Genome!

That's about **10 TIMES** the population of everyone in the **United States!**



The roughly 3 billion DNA base pairs in each of our cells are **supercoiled** to fit into a very small space. When stretched out, all of the DNA in one cell is anywhere from **5 to 10 feet**....*but that's just ONE cell!*

So, if you unwrapped and linked all of the DNA in all of your cells, they would stretch out to **35 to 70 billion miles!**

That's enough to reach the sun **AT LEAST 380 times!**



Recent research suggests that there are about **37 trillion cells** in an adult human.

Some of the important people in the history of DNA include:

Gregor Mendel tested around **29,000 peas** and noticed that certain traits of pea plants followed patterns. This is now part of the **Mendelian Inheritance**, which is a description of how characteristics of some plants are passed on from their parent cells.



DNA was first isolated by **Friedrich Miescher**, who discovered a microscopic substances he called **"nuclein."**

Rosalind Franklin created a high quality **X-ray diffraction** photograph, which helped **James Watson, Francis Crick, and Maurice Wilkins** discover the **double-helix structure** of the DNA molecule.



Alfred Hershey and Martha Chase confirmed DNA's role in **heredity**. Their experiment provided evidence that it was DNA, and not a protein, that was the carrier of information.

