Engaging current and future generations of genomic innovators

Offering classes, camps and internships

Communicating genomic discoveries

Bringing awareness of the benefits of genomics

Sparking genomic literacy

NATIONAL EDUCATIONAL OUTREACH
The POWER of genomics

Genomics research is:
• accelerating discoveries to promote human health
• improving sustainability of food, fuel and fiber resources
• answering complex questions about fundamental biology concepts

Impacting:
• patient care and healthy living choices
• crop yields, food supply and biofuel efficiency
• economic development and workforce expansion

Because of the wide-reaching impact of genomic discoveries and biotechnology applications, we all need to understand DNA, the role of genetics in disease, and the impact of biotechnology on agriculture, medicine and the environment.

We must help our society to become informed consumers of genomic information, while also developing the next generation of life sciences researchers and workforce. Over the last ten years, HudsonAlpha’s Educational Outreach team has crafted a successful pathway for reaching students, teachers, health care providers, patients and community members with opportunities for genomics education using hands-on classroom modules, in-depth school and workshop experiences and digital learning opportunities.

We welcome the opportunity to explore the ways in which we can make genomics education engaging. The following pages provide an idea of how you could partner with us to leverage our highly successful pathway for students and teachers in your region. For more information about each of the programs mentioned, please visit hudsonalpha.org/education.
A pathway to foster genomics learning across a lifetime

The opportunities for learning about genomics and its impact stretch from very young children to the oldest members of our society. We can help you build a unique learning pathway that reaches every age and educational level, nurturing the current and future workforce of life science laboratories and companies in your community.

More than 1.5 million individuals were impacted through HudsonAlpha Educational Outreach last year.

Implement a genomics learning pathway in your school, community or region and see the impact.

Contact us to find out how.

Dr. Adam Hott
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“Education is not the filling of a pail, but the lighting of a fire.”

hudsonalpha.org/education
Engage your learners with online games and digital resources

Imagine exploring a human cell in 3D on your phone or playing a computer game where you pack medical supplies for a long-term spaceflight, taking into consideration limited space and the health data of your crew members. HudsonAlpha has developed a suite of free digital activities – including both of the resources you have just imagined – and we can train you in implementing these activities in your schools or community.

1. **iCell**
   - An interactive simulation that allows users to explore and understand the inner workings of a typical animal, plant or bacterial cell using 3-D animation.

2. **Progress of Science Timeline**
   - Showcases the history of genetics and biotechnology discoveries.

3. **GenomeCache**
   - Explores the information contained in the human genome by walking through it.

4. **Touching Triton**
   - A web-based activity that uses long-term space exploration to build understanding of common complex disease risk, influenced by factors from family history, environment and genomic data.

5. **HudsonAlpha videos**
   - Feature educational video resources that explain complex genomics concepts.

6. **Genome Gateway**
   - Provides educational resources for patients and physicians as they apply genomic information to the practice of medicine.

Engage your learners with online games and digital resources

- **iCell**: 3 million downloads in 140 countries
- **Progress of Science Timeline**
- **GenomeCache**
- **Touching Triton**
- **HudsonAlpha videos**
- **Genome Gateway**

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Create unforgettable field trip experiences

Explore genetics concepts and foster interest in biotechnology careers through onsite and virtual field trips. Hands-on, laboratory-based onsite field trips at HudsonAlpha Institute for Biotechnology put high-tech biotechnology tools in the hands of your students and engage them in scientific thinking. Virtual field trips – available to anyone around the world with an Internet connection – extend genomics learning opportunities to any location by providing live video streaming interaction with science educators, biotech entrepreneurs and genomics researchers.

Contact us to learn more about creating a memorable onsite or virtual field trip!

Some of the examples of HudsonAlpha Virtual Field Trips:

1. Agricultural Genomics
2. Biotechnology in the Workplace
3. Cancer
4. DNA Sequencing and Beyond
5. Personalized Medicine
When school is out, keep science fun in session with summer camp programs that teach genetics and biotechnology concepts. Your young scientists could extract DNA or practice some basic genetic engineering. Campers could learn how the DNA code controls physical traits and investigate how changes to DNA may cause the symptoms of some genetic disorders. Amp up the camp experience with opportunities to use the equipment found in most science research labs like micro pipettes and centrifuges. End the week by creating glow-in-the-dark bacteria. The experienced educators at HudsonAlpha can help you create summer camps – like our popular basic and advanced middle school camps or our more in-depth camp for high school students – that teach genetics and biotech concepts to students in your community.

“I knew I had DNA in my body, but I didn’t know I have bacteria in my body, too, besides DNA. This camp made me want to be a scientist!”

– Alex Cazier
A 6th grader from Huntsville, AL
Immerse young biologists in real world experiences

Help your high school students picture themselves in a STEM career through a summer academy that offers hands-on, real-world experience with lab techniques. Working closely with successful scientists and experienced science educators, students in an intensive summer program – such as the Biotech Academy at HudsonAlpha – can learn about:

- Molecular biology
- Microbiology techniques
- Bacterial transformation
- Enzymatic reactions
- Restriction enzyme digestion and analysis
- DNA extraction, amplification and sequencing
- Bioinformatics
- Protein purification

“The thing I liked best about Biotech Academy is the diverse lab experience and wide range of experiments that we were able to do. The instructors explained each lab well, and I feel this experience has prepared me for future lab work.”
– Biotech Academy Graduate

Contact us to find out how to develop an immersive lab experience for high school students in your community.

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Give your students an opportunity to interact with STEM professionals and college students by bringing the equipment, materials and resources needed to perform lab experiments to high school classrooms in your area. This lab experience allows students and teachers to connect with local scientists who can answer questions about STEM career opportunities – a proven way to pique students’ interest in pursuing a STEM career.

Contact us to find out how to provide these interactive experiences in your schools.

“HudsonAlpha has made the most significant contribution to my classroom by providing me with up to date cutting edge information and the tools to bring that information to my students.”

– Teresa Gregory
2012 Outstanding Biology teacher in Alabama, Clay Chalkville High School, AL
Prepare the STEM workforce in your region

Help undergraduate and graduate students connect their classwork with real-world job experience through an internship program. You can provide opportunities ranging from in-depth laboratory research to biotechnology marketing and business strategy. These valuable internships help students develop their professional skills and experience exciting STEM career options. More than 250 students from 60 schools in seven states have completed a BioTrain internship at HudsonAlpha, and our interns have gone on to become computational biologists, media relations specialists and published authors in *Nature*.

Contact us to learn more about developing an STEM internship program in your community.

“I came out of my internship at HudsonAlpha with great appreciation for bioinformatics, and I’m excited about my future in science.”

– David Hinds  
Biology student at University of Alabama in Huntsville, AL
Provide educational opportunities for pre-health professionals

Offer students seeking a degree in the healthcare field an opportunity to immerse themselves in learning about clinical applications of genomics. Team up with our healthcare practitioners and educators to establish educational programs for students pursuing careers as nurses, physicians and genetic counselors. Find out how to leverage our in-house developed, hands-on activities and interactive lectures to provide educational opportunities and practical experience for pre-health professionals in your community.

Work with us to find out how to offer these valuable learning opportunities to your healthcare community and promote understanding of how genetics, genomics and biotechnology are being used in healthcare today.

“Seeing all the different projects the genetic counselors at HudsonAlpha are involved with expanded my understanding of what genetic counselors can do. As someone interested in research, education and direct patient care, being able to see how someone can work in all those areas as a genetic counselor was priceless!”

— Amy Donahue
Second year genetic counseling student at the University of Wisconsin in Madison, WI
Enable + Equip + Empower your educators

Offer your life science educators the opportunity for teacher professional development at HudsonAlpha. Our programs range from single-day workshops to ongoing classroom support. We provide ongoing training to more than 450 Alabama high school teachers who reach 50,000 students every year.

Contact us to learn more about our professional development offerings and how you can increase your educators’ comfort in discussing genetic concepts and terminology and the associated ethical, social and legal issues.

“I was totally blown away by my week at GTAC. The labs are engaging and current, and I left HudsonAlpha with a renewed zeal and love for genetics.”

— Lori Roberts
AP Biology Teacher,
Muscle Shoals High School, AL

Learn more about our professional development opportunities at
hudsonalpha.org/gtac
hudsonalpha.org/middle-school-gps
hudsonalpha.org/great-workshop

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Because genetics and biotechnology are continually advancing, it is challenging for science educators to stay informed on recent discoveries and how best to teach them in the classroom. Keep your educators confident in their classrooms. Provide them with publications that highlight too-new-for-textbooks progress in genetics research, and offer resources to help them navigate the genetics and biotechnology-related standards in your state’s biology curriculum.

Contact us today to find out how your educators can utilize HudsonAlpha’s annual Biotechnology Discoveries and Applications Guidebook to stay current on genetics discoveries.

Or learn more about how you can develop a resource for your state like our popular Field Guide to the Alabama Standards, which suggests ways to sequence activities in a high school biology class in order to enrich student sense-making.

“This Field Guide to the Alabama Standards is hands-down the most valuable resource available to Alabama Biology teachers. We all have to modify our teaching styles to meet the new course of study standards and this document serves as a “how-to” guide.”

— Nerissa DeRamus, EdS, Pre-AP Biology/AP Biology Teacher, Thompson High School in Alabaster City, AL
Provide empowering tools for educators and eye-opening experiences for students

Give your educators the resources to allow their students to experience science for themselves with hands-on classroom kits and activities. Offer these cutting-edge tools in your classrooms to cultivate a robust and highly trained future biotechnology workforce. These resources highlight topics such as:

- extracting DNA
- exploring chromosome behavior in cells
- diagnosing genetic disorders and using bioinformatics databases

Contact us to find out more about the kits and activities developed at HudsonAlpha.

“I love this ChromoSocks kit and so do my students. I also use it for mitosis and Mendelian genetics. The socks are a tactile way for the students to study the movement of the chromosomes.”
— Stephanie W.
High school Biology Teacher, Fairhope, AL

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Engage your community in genomics education

Foster a genomics-literate community with a public seminar series that engages community members of all ages in thinking about how biotechnology influences our daily decisions. After 10 years of offering a popular, sell-out educational course, we have streamlined a process for offering a live presentation with a simultaneous webinar.

**Biotech 101** introduces the field of biotechnology and the influence of genetics on human health and disease. Over the course of four weekly sessions, participants of all ages learn DNA basics and the relevance of genetics and genomics in medicine, agriculture and the environment. Each session includes a primer on a variety of basic genetic concepts followed by examples of these concepts in a research and/or commercial setting.

**Biotech 201** builds on the lessons of the 101 series by exploring a different topic in genetics and genomics research. Past topics have included the human microbiome, cancer, neuro-degenerative diseases, psychiatric and adult-onset disorders, agricultural genomics and technologies used for research, diagnosis and treatments.

Contact us today to find out how we can help you develop a public seminar series in your community, or find out how you can team up with us to offer a webinar event during our live presentations.