

# Communication

126 <sup>GT</sup>L

## Communicating Genomics:GTL

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Project Web Site: [genomicsgtl.energy.gov](http://genomicsgtl.energy.gov)

**Project Goals: Help build the critical multidisciplinary community needed to advance systems biology research for DOE energy and environmental missions and foster industrial biotechnology. The Genome Management Information System (GMIS) contributes to DOE Genomics:GTL program strategies and communicates key GTL scientific and technical concepts to the scientific community and the public. We welcome ideas for extending and improving communications and program integration to represent GTL science more comprehensively.**

### Accelerating GTL Science

For the past 18 years, we have focused on presenting information regarding DOE genome programs and the national and international Human Genome Project to a wide variety of audiences. Our goal always has been to help ensure that investigators could participate in and reap the genomic revolution's scientific bounty, new generations of students could be trained, and the public could make informed decisions regarding complicated genetics issues. Since 2000, GMIS has built on this experience to communicate about the Office of Science's Genomics:GTL program and its payoffs for DOE missions.

GTL systems biology research is a departure from traditional scientific methodology into a new territory of complexity and opportunity requiring contributions of interdisciplinary teams from the life, physical, and computing sciences and necessitating unprecedented integrative approaches. Because each contributing discipline has its own perspective, effective communication is highly critical to the overall coordination and success of GTL. Part of the challenge is to help groups speak the same language, from team and research-community building and strategy development through program implementation and reporting of results to technical and lay audiences. Our mission is to inform and foster participation by the greater scientific community and administrators, educators, students, and the general public.

Specifically, our goals center on accelerating GTL science and its applications. They include the following:

- Encourage information sharing, strategy development, and communication among scientists and across disciplines to accomplish synergies, innovation, and increased integration of knowledge. A new research community centered around the advanced concepts in GTL is emerging.

- Help reduce duplication of effort.
- Increase public awareness about the value of understanding microbial and plant capabilities important for solutions to national and global challenges.

Since 2004–2005, we have worked with DOE staff and teams of scientists to develop and disseminate the GTL roadmap. Tasks included helping to organize workshops, capture workshop output, and conduct the myriad activities associated with creating a technical document of the roadmap's size and importance. The science program described in this roadmap, a planning and program-management tool, was favorably reviewed by the National Academy of Sciences. In 2005 and 2006, as part of the bioenergy mission goal set forth in the GTL roadmap, we helped to organize the Biomass to Biofuels workshop and produce the report *Breaking the Biological Barriers to Cellulosic Ethanol*. The workshop and its output were jointly sponsored by the DOE Office of Science GTL program and Office of Energy Efficiency and Renewable Energy.

For outreach and to increase program input and grantee base, we identify venues for special GTL symposia and presentations by program managers and grantees. We also present the GTL program at meetings of such organizations as the American Association for the Advancement of Science, American Society for Microbiology, Society for Industrial Microbiology, American Society of Plant Biologists, American Chemical Society, National Science Teachers Association, National Association of Biology Teachers, and Biotechnology Industry Organization. Examples of other venues at which we present are the Plant and Animal Genomes meeting and the DOE Science Bowl.

We mail some 1600 packages of technical and educational material each month to requestors and furnish handouts in bulk to meeting organizers hosting genomics educational events. We continue to create and update handouts, including a primer that explores the impact of genomics on science and society and flyers on careers in genetics and other relevant issues. We supply educational materials in print and on the web site about ethical, legal, and social issues (called ELSI) surrounding the increased availability of genetic information.

All GTL publications are on the public web site, which includes an image gallery, research abstracts, and links to program funding announcements and individual researcher sites. Additional enhancements are being developed and implemented, including specific pages for DOE missions that will be impacted by the GTL program and its Bioenergy Research Centers. In addition to the GTL web site, we produce such related sites as Human Genome Project Information, Microbial Genome Program, Microbial Genomics Gateway, Gene Gateway, Chromosome Launchpad, and the CERN Library on Genetics. Collectively, our sites receive nearly 16 million hits per month. Over a million text-file hits are received each month during nearly 400,000 user sessions lasting 13 minutes—well above the average time for web visits. We are leveraging this activity to increase visibility for the GTL program.

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# Ethical, Legal, and Societal Issues

127 <sup>GTL</sup>

## Science Literacy Project for Public Radio Journalists

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**Project Goals: The Science Literacy Project is designed to give mid-career reporters and producers—both general assignment journalists and those who specialize in reporting on environmental, health, and technology issues—intense training via weeklong workshops basic science, science reporting and the creative use of radio to communicate science stories.**

In this new era reporters have a greater responsibility than ever to explain science's accelerating advances and their profound social implications to the general public. While many journalists are still learning the basics of human genetics, reporters need to understand much more—from cell mechanics and the workings of DNA to the regulation of gene expression and the activity of proteins. Only then can they explain these crucial developments clearly and accurately to the public.

To help radio journalists meet this challenge, SoundVision Productions has established its Science Literacy workshops. These weeklong workshops are designed to give mid-career reporters and producers—both general assignment journalists and those who've specialized in reporting on environmental, health, and technology issues—intense training in both science reporting and the creative use of radio to communicate science stories. Given today's rapidly changing media environment, participants also learn the most effective ways to use new media from online reporting to podcasts.

Previous Science Literacy workshops were held in Boston and San Francisco, and a future workshop will be held in Austin, Texas. The goal of the workshops is to shrink the widening knowledge gap between the scientific community and the general public by increasing the quality and number of science stories on the radio. To achieve this, we hope to increase the number of reporters who can report accurately on complex scientific research and discoveries and their social implications.

SoundVision selects twelve public radio producers and reporters to attend each workshop. To compete for one of the slots, applicants must have contributed frequently to news or public affairs programs on national, regional or local public radio outlets and represent stations and national or regional programs that reach broad audiences. We place a high priority on including journalists from rural and minority-controlled stations and networks, and the recruitment and selection processes are designed to encourage ethnic, racial and gender diversity.

Each Science Literacy workshop is built around roughly twenty presentations by scientists, science journalists, scientific researchers and radio production professionals. Participants learn basic science, the ethics of science reporting, special techniques for presenting complex scientific content on radio, and the unique limitations and advantages of radio production. Workshops feature field trips and informal gatherings with scientists. The workshops explore the interactions of DNA, RNA, and proteins and the machinery of the cell; recent discoveries about the most basic elements of life; nonpathogenic microbes, and the interactions between genes and the environment. Workshops focus on ethics in the post-human-genome-project era, including new questions about the relationship

\* Presenting author

between science and business, the impact of highly patented science on society and the risks and responsibilities of manipulating life. In the workshops, leaders teach participants how scientific and journalistic methods differ and show them how to interview scientists, explore new research, spot and handle scientific controversies and fact check stories on tight deadlines. As a result, participants return to their stations confident and excited about tackling complex scientific stories.

“I am a better reporter because of what I learned at that workshop,” one said. “I use what I learned there almost every day.”

We originally thought that the Science Literacy Project would conclude after a few workshops, but interest exploded beyond our greatest expectations. Word of our workshops has spread just as journalists have come to realize how much they need to learn about science reporting. As a result, SoundVision has received far more inquiries and applications than we can accommodate for the remaining workshop and we hope to expand the project.

At first, while reporters and producers clamored to take part, news directors and editors didn't seek the science literacy training. But in the face of accelerating scientific discoveries and controversies, more news directors and editors applied to the program and they made up one quarter of the participants at our last workshop. Having news directors and editors at the same workshop with producers and reporters has given each group a greater understanding of the other's needs.

The Science Literacy Project also includes a web site that provides transcripts and selected audio from the training sessions, “tip sheets,” and online resources. We continue to support participants in pursuing complex science stories for their communities by providing follow up teleconferences.

The project was evaluated by Rockman *et al*, a well-established San Francisco evaluation firm with expertise in evaluating media projects and assessing the impact of training on journalistic practice. Evaluations before the workshop helped us tailor presentations to participants' needs. During the workshops, in a new addition to our daily evaluations, we asked participants after each presentation to list the key scientific concepts they had just heard about to find out which scientific information stayed with them. In our review two months after the project we learned that news directors and editors wanted basic information about a broad range of subjects at the workshops, while producers and reporters preferred studying fewer issues in greater depth and we're working to meet both needs. We were also pleased to learn that many participants went back to their stations and gave their own workshops using some of our handouts. Most important, at the end of the Science Literacy workshops, participants returned to their home stations confident that they could handle complex scientific stories well.

128 <sup>GTL</sup>**The DNA Files®****Bari Scott\*** (bariscot@aol.com)

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**Project Goals: The DNA Files will include five hour-long, nationally distributed public radio documentaries and five short features that will run on National Public Radio. The project will include outreach components that promote science journalism in public radio and the ethnic media, engage the public in series-related events, and contribute to science education and journalism across a broad spectrum of platforms.**

SoundVision's highly acclaimed series *The DNA Files*® has demonstrated that complex scientific issues can be made clear and exciting to listeners with little science background. *The DNA Files*, hosted by John Hockenberry, will continue to show the importance of cutting-edge science in everyday life while expanding its audience to include more minority and rural listeners. We'll increase the series' impact in schools, museums, news outlets and beyond through our growing network of outreach services, media projects, and learning programs along with our expanding web site and proposed podcasts.

*The DNA Files* will include five hour-long, nationally distributed public radio documentaries and five short features that will run on National Public Radio. The series will explore revolutionary developments in toxicogenomics and individualized medicine, comparative genomics, neurogenetics, climate change, and food biotechnology. These complex and crucial subjects will be presented in a clear engaging style that makes them live for the general audience. Listeners will hear from scientists, government officials and corporate spokespeople as well as everyday citizens who have direct personal experience with the world of genetic research.

*The DNA Files* will also include outreach components that promote science journalism in public radio and the ethnic media, engage the public in series-related events, and contribute to science education and journalism across a broad spectrum of platforms. The outreach and education services include:

**Media Support and Training**

To help make science clear and relevant to a diverse population, *The DNA Files* will make a variety of resources available to journalists and media outlets. SoundVision will provide radio producers around the country with talk show discussion topics targeted to specific ethnic communities as well as general audiences and lists of experts whom reporters can use as sources for *DNA Files*-related programming and news reports. We'll also offer *The DNA Files Style Book* outlining best practice for scientific journalism online and send out short news alerts to reporters and editors to identify news stories related to *The DNA Files* 3 documentaries.

Finally, we will extend the series' impact by prompting local media outlets to create series-related stories and projects that are targeted to their specific audiences. To that end, SoundVision will work with stations to develop local programming that will position them as innovative science resources in their markets. At this point, twelve stations are taking part in the project, including Alabama Public Radio which plans to produce five sound-rich features for local broadcast during *Morning Edition*

and *All Things Considered* and five television news features produced for the local PBS station. They also plan to coordinate stories with local newspapers and develop a full-featured dedicated web presence, making sure the content and distribution methods of these stories are relevant to younger and minority audiences.

### Educational Programs

San Francisco's world renowned Exploratorium Science Center will translate the documentaries' content into museum activities. The workshop activities will be disseminated to science centers around the country. The nationally respected museum of science education will also develop three interactive, hands-on teaching modules to extend the influence of *The DNA Files* beyond the air-waves. These modules will be available online and will also provide our station partners and other interested stations with a powerful, easy-to-use tool they can modify for their community programs.

### Online Media: The Digital World

In response to the changing media landscape, *The DNA Files* is exploring new ways to expand our use of computer technology to create and distribute programs. To facilitate research, *The DNA Files* team has created an in house "Intranet" and uses Encode software to collect, organize and disseminate research materials for producers and staff. We are continuing to expand our information-packed multimedia web site by providing online "toolkits" to help reporters, editors, museum directors, teachers, and home-schooling parents build articles and lesson plans around *The DNA Files*. The site will include in-depth articles related to each of the five documentaries; background information and research for editors and reporters; a library of links to related web sites, and *The DNA Files Style Book*. *The DNA Files'* improved website will support public radio programming and museum and school programs that can stimulate public interest in science long after the series airs.

### Evaluation

An independent firm will evaluate *The DNA Files* by conducting online user surveys and interviewing listeners to gauge their understanding and retention of the project's key themes. An evaluation of the original *The DNA Files* series concluded: "the style and format were highly effective in raising comprehension and awareness of the content among the focus group participants." *DNA Files* producers had, they said, "established an effective, appealing model for blending traditional and nontraditional public radio science formats with valuable awareness-building content."

*The DNA Files* has won numerous awards, including the George Foster Peabody Award, the Alfred I. DuPont-Columbia University Award, the American Association for the Advancement of Science Journalism Award, the Robert Wood Johnson Foundation Award, the American Institute of Biological Sciences Broadcast Award, and the Society of Professional Journalists Excellence in Journalism Public Service Broadcast Award.