Final Report
MicrobeWorld Radio and Communications Initiative
DE-FG02-05ER64028
08/01/04-7/31/2006

The funding of this grant has supported the consultant services of Finger Lakes Productions International (FLPI) for partial support of production and distribution of the MicrobeWorld daily radio/podcast series on behalf of the American Society for Microbiology. The $75,000 requested represents approximately 19% of the total annual production budget for 260 90-second radio features (5 days weekly x 52 weeks = 260). The $75,000 level of support entitles DOE to 50 program credits annually (approximately 19% of the total number of annual programs), editorial input, and representation on the MicrobeWorld Advisory Board.

The American Society for Microbiology (ASM) is sponsoring this series to increase awareness and appreciation of microbiology among the general public. The ASM Communications Director (Principal Investigator) and the ASM Project Manager are supported financially entirely by ASM. The ASM selects and provides story and background material to FLPI. Both ASM and FLPI interview scientists featured on the series. FLPI then prepares the scripts, which are reviewed and revised as necessary by members of the MicrobeWorld Advisory Board prior to FLPI's recording and distributing the CDs with monthly program compilations.

For the period November 7, 2005 to November 24, 2006, DOE received 56 program credits. Programs carrying DOE credit have been selected by our DOE Project Officer and close with the tagline "MicrobeWorld is made possible by the Genomics:GTL Program of the Department of Energy's Office of Science, www.sc.doe.gov."

Programs carrying DOE credit are listed below.

Story ID	Air Date	Programming Summary	First Name	Last Name	Institution	Funder
757	November 7, 2005	Basking in the Glow: This newly discovered microbe found in the depths of the ocean discredits the belief that photosynthesis only happens in the presence of the sun.	Robert	Blankenship	Arizona State University	DOE
579	November 8, 2005	Life in the Lost City: Microorganisms that thrive in a unique environment of towering hydrothermal vents in the Atlantic ocean may give clues to life in other solar systems.	Deborah	Kelley	University of Washington	DOE
637	November 9, 2005	In Harmony With Microbes: Humans have lived in harmony with microbes for eons, and one professor chews gum off the floor to prove the point.	James	Jay	University of Nevada - Las Vegas	DOE
781	November 10, 2005	Nanoarchaeum: This tiny organism that has fewer cells than any other	Michael	Madigan	Southern Illinois University	DOE

		microbe is cluing scientists in to what is really important to survive.			Carbondale	
780	November 11, 2005	Selenium Scrubbing: High concentrations of selenium that leach into ground water can be removed with the help of a filtration device made up of plant roots and microbes.	Michael	Schmidt	Medical University of South Carolina	DOE
768	December 12, 2005	Electrifying Geobacter Nanowires: Geobacter bacteria grow hair-like appendages that may be harvested and used in small electronic devices.	Derek	Lovely	University of Massachusetts - Amherst	DOE
747	December 13, 2005	Endosymbiosis: Life as we know it began when two bacteria formed the first complex community.	David	Stern	Boyce Thompson Institute	DOE
764	December 14, 2005	Indian Mustard for Selenium Removal: Special bacteria in the root systems of plants help reduce toxic levels of selenium found in soil.	Norman	Terry	University of California, Berkeley	DOE
771	December 15, 2005	Ocean Turquoise: The E. hux bacteria that drifts in the open sea can reflect sunlight and turn the color of the ocean surface into a brilliant cobolt blue.	Toby	Tyrell	University of Southampton	DOE
765	December 16, 2005	Plant Biofuels: Scientists are developing ways to make ethanol from common crops such as prairie grass with help from yeast.	Nancy	Nichols	USDA Agricultural Research Service	DOE
814	January 2, 2006	Bacterial Babble: Marine scientists have decoded the language of underwater plant life that allows bacteria to communicate with each other.	Ian	Joint	Plymouth Marine Laboratory	DOE
773	January 3, 2006	Boosting Bio-Control 1: The same technology used to map the human genome is now decoding the genes of friendly microbes that protect the roots of plants.	Ian	Paulsen	The Institute for Genomic Research	DOE
889	January 4, 2006	Boosting Bio-Control 2: How genetics is helping scientists discover new antibiotics common bacteria produce to help protect plants.	Joyce	Loper	U.S. Department of Agriculture - Agricultural Research Service	DOE
677	January 5, 2006	Bacteria Batteries: Given the right food source, microbes that generate electricity may someday be used to power small electronic devices like cell phones.	Charlie	Milliken	Medical University of South Carolina	DOE
766	January 6, 2006	Microbe Motion: As nanotechnology moves forward, scientists are studying how microbes may one day be used to power everything from miniature medical devices to computer chips.	Willow	DiLuzio	Harvard University	DOE
804	January 23, 2006	Soil Count: Scientists now know there are more soil bacteria that help make the ground fertile than previously thought.	John	Dunbar	Los Alamos National Laboratory	DOE
761	January 24, 2006	Return to Pangaea: Life similar to what may have existed on this	Valeria	Souza	Natural Autonomous	DOE

		super-continent millions of years ago can be found in a Mexican desert.			University of Mexico	
802	January 25, 2006	X-Ray Specs: A special machine allows scientists to peer inside bacteria.	Jeffrey	Gillow	Brookhaven National Laboratory	DOE
720	January 26, 2006	Bacteria and Arsenic in Groundwater: Certain iron-reducing bacteria in soil may release arsenic into well water.	Jennifer	Weldon	University of Maine	DOE
795	March 9, 2006	Rice Warmers: Rice paddies give off more than 66 million tons of the greenhouse gas methane every year, contributing significantly to global warming.	Ralf	Conrad	Max Planck Institute für terrestrische Mikrobiologie	DOE
892	March 20, 2006	Leftovers to Lights: By harnessing the power of Bacteria, researchers are attempting to turn table scraps into electricity.	Ruihong	Zhang	University of California, Davis	DOE
891	March 21, 2006	From Poisonous Gas to Clean Fuel: Finding a cheap way to chemically make hydrogen can hasten the use of hydrogen as a clean	Jonathan	Eisen	The Institute for Genomic Research	DOE
894	April 17, 2006	Economics of Ethanol: In the near future, filling our gas tanks with the clean burning fuel ethanol will be a feasible and economical reality.	Lee	Lynd	Dartmouth College	DOE
914	April 18, 2006	Methane-Making Microbes: An ancient microbe found at the bottom of a Greenland glacier is giving scientists clues to life on Mars.	Buford	Price	University of California, Berkeley	DOE
895	April 19, 2006	SAR11 in the Sea: Even though the smallest known free-living microbe provides nutrients algae needs to undergo photosynthesis, SAR-11 does not depend on the sun for energy.	Stephen	Giovanni	Oregan State University	DOE
935	May 15, 2006	Algae Clean Air: Scientists are currently designing a power plant that not only generates electricity, but incorporates algae to turn its carbon dioxide waste products into oxygen and biodiesel fuel.	David	Bayless	Ohio University	DOE
951	May 16, 2006	Microbe Managers for Toxic Clean up: By strategically combining a variety of microbes and providing the nutrients they need to survive, researchers are accelerating the time it takes to recycle toxic waste.	Ian	Thompson	The National Environmental Research Council (U.K.)	DOE
920	May 17, 2006	Bacterial Diversity: In addition to genetic inheritance, bacteria can acquire new genes through a process called horizontal gene transfer.	Hervé	Tettelin	The Institute for Genomic Research (TIGR)	DOE
949	June 12, 2006	Oil Grubbing Microbes: Scientists in upstate New York have discovered several bacteria that might be used to clean up oil spills.	Jeffrey	Lodge	Rochester Institute of Technology	DOE
950	June 13, 2006	Microbe Barrier: Without the help of some friendly microbes, commercial mining operations could jeopardize drinking water in nearby towns.	Jim	Field	University of Arizona	DOE

936	June 14, 2006	Disease-Free Fabric: Scientists have created a special nylon that may help prevent the spread of diseases in places like hospitals and airplanes.	Michael	Kelly	College of William and Mary	DOE
966	June 19, 2006	Bioluminescent Bioreporter: Bacteria engineered to light up in the presence of contaminants may someday alert us to the presence of harmful pathogens.	Steven	Ripp	University of Tennessee	DOE
893	June 20, 2006	Cow Power: In addition to providing milk and cheese to millions, bacteria from a cow's stomach may also be the next source of renewable electricity.	Ann	Christy	Ohio State University	DOE
937	June 21, 2006	Microbial Forensics: This exciting new field attempts to bridge the gap between science and law enforcement by tracking the source of harmful microbes used in biocrimes.	Ron	Atlas	University of Louisville	DOE
1073	August 7, 2006	Engineering Ethanol: Researchers believe they've hit upon a strategy to produce renewable, clean ethanol gas more efficiently by using plant waste.	Aida	Romero	Universidad Nacional Autónoma de México	DOE
1082	August 8, 2006	Katrina and the Mold: A look at one microbiologists personal experience with Hurricane Katrina and the mold that filled her house.	Joan	Bennett	Tulane University	DOE
1047	August 9, 2006	Uranium Clean-Up: By harnessing uranium-loving microbes, researchers are able to prevent the spread of this dangerous element in groundwater.	A. Lucie	N'Guessan	University of Massachusetts	DOE
1023	August 30, 2006	Environmental Metagenomics: Environmental metagenomics is allowing researchers to study the microbes they're unable to culture in the lab.	Jed	Fuhrman	University of Southern California	DOE
1084	August 31, 2006	From Genomes to Biomes: Researching genomes can reveal crucial information about the ecosystems in which they exist.	Edward	DeLong	Massachusetts Institute of Technology	DOE
1077	September 1, 2006	Rumen Has It….Cows are Electric: Researchers are making energy by combining microbes from a cow's stomach and plant waste in a microbial fuel cell.	Hamid	Rismani-Yazdi	Ohio State University	DOE
1086	September 4, 2006	Microbe Electric: Scientists have learned to harness power produced by a simple microbial fuel cell run off sewage and marine muck.	Derek	Lovely	University of Massachusetts	DOE
1045	September 5, 2006	Microbe Fuel Cell Design: Microbes may be great at producing power from many sources, but making them efficient can be a real challenge.	Kelly	Nevin	University of Massachusetts	DOE
1074	September 6, 2006	Electric Marine Sediment Microbes: Ocean buoys can now be powered by microbial fuel cells positioned in	Kelvin	Gregory	University of Massachusetts	DOE

		marine sediment.				
1056	September 7, 2006	Carbon Dioxide and Soil Microbes: Researchers are working to understand the role of soil microbes in global warming.	Issmat	Kassem	University of Toledo	DOE
1080	September 8, 2006	Categorizing Marine Viruses: Viruses do more than make us sick, they also play a big role in shaping marine communities.	Shannon	Williamson	J. Craig Venter Institute	DOE
1013	October 2, 2006	New approaches to microbial energy: In a world dependent on diminishing fossil fuels, microbes may be the key to the future.	Judy D.	Wall	University of Missouri	DOE
1100	October 3, 2006	Enzyme Power: Enzymes from fungi and bacteria are driving a new power initiative in the world of hydrogen fuel cells.	Kylie	Vincent	Oxford University	DOE
622	October 4, 2006	Global warming and the ocean food chain: Scientists have created a computer model that looks at the impact of global warming on the ocean's smallest life forms.	Andreas	Schmittner	Oregon State University	DOE
968	October 5, 2006	Powering up the soybean: Scientists hope that cracking the genetic code of the soybean will reveal clues to making it an environmentally and economically sound source of biofuel.	Edward "Eddy"	Rubin	Lawrence Berkeley National Laboratory	DOE
1093	October 6, 2006	Fuel up with biomass: Scientists are exploring ways to make ethanol out of run-of-the-mill agricultural waste.	Bruce	Dale	Michigan State University	DOE
1135	October 10, 2006	Microbiology versus intelligent design, Part II: To see evolution in action, one only needs to look at antibiotic resistance or DNA sequencing.	Stanley	Maloy	San Diego State University	DOE
617	November 20, 2006	Nuclear Microbes: Scientists are using bacteria to help decontaminate nuclear waste.	Mary	Neu	Los Alamos National Laboratory	DOE
1006	November 21, 2006	Corn Oil and Biodiesel Fuel: Researchers are working on technology that will allow them to extract oil from dried corn grain.	David	Winsness	GS Cleantech	DOE
1098	November 22, 2006	Microbe Powered Mini Fuel Cells: The search for a power source for spy drones the size of an insect is leading scientists to energy-producing microbes.	Ken	Nealson	University of Southern California	DOE
970	November 23, 2006	Cellulosic Ethanol: Corn is great for making ethanol, but growing corn takes a lot of land and fertilizer. Now, researchers want to make the same product from switchgrass and corn stalks.	Alexander	Farrell	University of California, Berkeley	DOE
1090	November 24, 2006	Termites Produce Alternative Fuel: Scientists are looking at gut bacteria that enable termites to digest wood and release hydrogen as a potential energy source.	Jared	Leadbetter	California Institute of Technology	DOE

MicrobeWorld is carried by more than 90 public radio stations and radio services, as listed below.

Radio Station Affiliates

Alaska
KTOO Juneau 104.3
KNOM Nome 96.1
KEUL South Central 88.9
KTNA Talkeetna 88.5

Alabama
WJAB Huntsville 90.9
WBCF-AM Florence

Arizona
KNNB Whiteriver 88.1

Arkansas
KHEL Rogers 97.3

California
KTDE Gualala 100.5
KRBH Redding 107.7*

Colorado
KEPC Colorado Springs 89.7
KVFC-AM Cortez 740

District of Columbia
WETA 90.9

Florida
KNEO Miami 1590
30A Radio Walton Beach 107.1

Georgia
WUOG Athens 90.5
WRFG Atlanta 89.3

Illinois
WEPS Chicago 88.9*
WRTE Chicago 90.5*
WQNA Springfield 88.3

Maine
WMEB Bangor 91.9

Massachusetts
WCCT Cape Cod 90.3*

Missouri
KCOZ Point Lookout 91.7

Mississippi
WMAH Biloxi 90.3
WMAE Booneville 89.5
WMAV Bude 88.9
WMAD Greenwood 90.9
WMPN Jackson 91.3
WUSM Laurel-Hattiesburg 88.5
WMAW Meridian 88.1
WMAV Oxford 90.3
WMAB Starkville 89.9

Nebraska
KZUM Lincoln 89.3

New Mexico
KENW Apache Springs 90.9
KENW Clayton 93.5
KENW Conchas Dam 88.3
KENW Des Moines 106.1
KENW Ft. Sumner 91.7
KENW Las Vegas 107.1
KENW Maljama 98.7
KENW Montoya 90.7
KENW Portales 89.5
KENW Quay 91.3
KENW Raton 104.7
KENW Roswell 91.1
KENW Roy 104.9
KENW Ruidoso 91.3
KENW Tucumcari 104.5
KENW Wagon Mound 92.1

New York
WETD Alfred 90.7
WEOS Ithaca 88.1
WUSB Long Island 90.1
WCVM Morrisville 1580 AM
WIPS-AM Ticonderoga 1230
WEOS Waterloo 90.3

North Carolina
WGWG Boiling Springs 88.3

Ohio
WHSS Cincinnati 89.5*

Oklahoma
KOCU Altus 90.1
KNSU Alva 91.5
KLCU Ardmore 90.3
KYCU Clinton 89.1
KCCU Lawton 102.9
KOKC Oklahoma City 1520
KRSC Tulsa 91.3

Pennsylvania
WKCV Scranton 103.5
WVYC York 99.7

South Carolina
WSSB Orangeburg 90.3

Texas
KACU Abilene 89.7
KENW Andrews 90.9
KEOM Dallas 88.5*
KTCU Dallas-Ft. Worth 88.7
KPFT Houston-Galveston 90.1
KENW Midland 99.5
KMCU Witchita Falls 88.7

Virgin Islands
WIUJ Virgin Islands 102.9

Washington
KSER Seattle/Tacoma/Everett 90.7

West Virginia
WHFI Lindside 106.7

Wisconsin
KUWS Ashland 102.9
WORT Madison 89.9
WMSE Milwaukee 91.7
KUWS Superior-Duluth (MN) 91.3

Canada
CJMQ Lennoxville, QC 88.9
CISE Wolseley, SA 93.0

Networks
Armed Forces Radio Network – 120 Stations

Internet Radio
Cypresscreekradio.net, FL*
RadioAlbany.com, NY
radio.nhcwx.com, FL
SnippetRadio.com

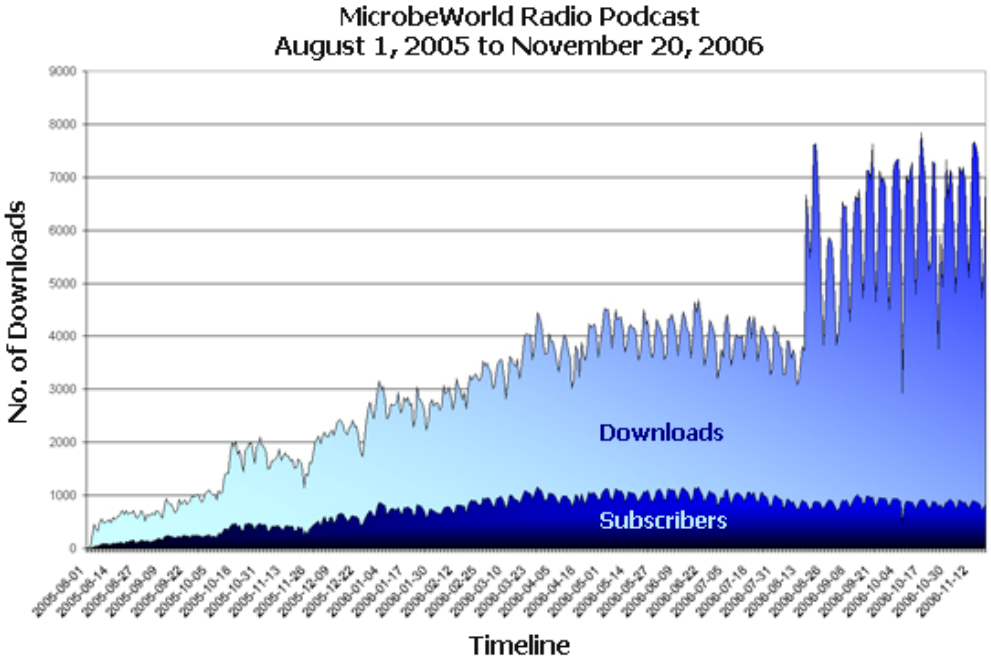
Reading Services for the Blind
Audio Vision, Yucaipa, CA
Connecticut Radio Info System, CT
Triad Information Reading Service, NC
InTouch Networks, NY
Radio Entertainment Network, USA

* High School/Youth-run Radio Stations
(7 Total)

MicrobeWorld episodes are also available as daily podcasts. They can be accessed through various podcast services and also through ASM's www.MicrobeWorld.org website, which has been redesigned this year. Data on the MicrobeWorld podcasts, which began on August 1, 2005, appear below.

MicrobeWorld Podcast Statistics*November 21, 2006

- Downloads to date = 1,278,485
- Average daily downloads (since inception) = 2,692
- Average daily downloads (last 3 months) = 5,414
- No. of subscribers on November 21 = 837**



* Feedburner.com
** Subscribers are people who elect to receive the podcast automatically everyday.

The MicrobeWorld.org site also features video podcasts of *Intimate Strangers: Unseen Life on Earth*, produced by ASM in 1999and partially supported by DOE.

The following comments are representative of the very positive (and unsolicited) feedback ASM has received:

"I wanted to show my support for the programs you have developed for both the audio and video podcasts of MicrobeWorld and Intimate Strangers respectively. As a college instructor teaching microbiology I found the audio podcasts interesting and informative but I am even more excited about the Intimate Strangers series you recently made available. I am encouraging my students to make use of these learning tools you are providing. Keep up the great work! It is wonderful." - Dr. Dexter Beck, Chattahoochee Technical College, Marietta, GA

"*I've been listening to MicrobeWorld for months now and absolutely love it! Every short podcast is filled to the brim with fantastic tidbits of information about our....MicrobeWorld*." — Anonymous, iTunes Reviews

"*The American Society of Microbiology is doing video podcasts! If that isn't cool, I don't what is. I'm really glad to see the microbiologists taking the lead in reaching out the public with cool new technology*." — Sandra Porter, "Discovering Biology in a Digital World," Weblog.

"*This is a great show. In one and a half minutes I learned more about science than all the biology classes I was forced into taking during high school.*" — Anonymous, ODEO.com

"This MicrobeWorld is a very well done podcast. Almost like professional radio, like CNN." — Anonymous, Podcastdirectory.com

"Out of all the science minute type of podcasts out there, the MicrobeWorld Rado show is probably the best produced of them all. Plus, they manage to breakdown complicated science topics into something nonscientists can understand and value. I've heard more "gee whiz" kind of stories from this show than from Earth and Sky, StarDate and the multitude of other science podcasts out there. Good job!" — Anonymous, Podcastalley.com

I have just started a podcast on Water and other Environmental Issues (http://H2Opodcast.com). I would like permission to link to the episodes of your podcast that are related to Environmental Issues. Your Podcast and others have made a tremendous impact on my life and I would like to give your site further exposure on the webs search engines by linking to your page. I will definitely give your show full credit and point people in the direction of your RSS feed.--Joseph Puentes, Durham, NC, email

I need not ask more for some quality information about microbiology. Even if you don't think you like microbiology, think again! This podcast makes learning about microorganisms fun and brief so that you can listen on the go. I highly recommend listening to this podcast. Thank you MicrobeWorld Radio for opening up the door into the microbe world for those of us who thought we had better things to do. God bless! --Classacalistic, iTunes Music Store

Everything you wanted to know about microbiology prior to your even knowing you wanted to know it.--Fantast'o'gyra, iTunes Music Store

Very accessible introduction to our wonderful miniscule distant relatives, with a wide variety of attractions & lots of home experiment suggestions! --KingBoy

Good fast reference for getting up to speed.-- nicky187

I especially love the Intimate Strangers video podcast. Why we need microbes, why they preceded and will succeed us. This picture comes from Episode two- "Solving the Puzzle" Note that mammals and plants share the tip of the upper right hand branch. The rest of the tree of life is taken up by bacteria, archae and other microbes. Turns out we share a great deal of genetic material and processes with plants. I was surprised. You, too? So now what do we eat?-- Lisuebie

Gotta love micro! Specially all the environmental bits! -- elbazimo

*Oh this is just wonderful! Is there anything more exciting than microbials? (No, I'm not kidding--*Dannim

*These videos are outstanding at explaining life that exists at the microscopic level. The content is simple enough for non-scientists to understand, yet covers the important concepts currently being discussed in microbiology. It contains interviews with the scientist in the field, actual images mixed with friendly cartoon characters. I look forward to each episode.--*Science Teacher, iTunes Music Store

*The content of these vid=casts is not to be missed by students of science of any age. Teachers at all levels should access this material frequently for use in the classroom and home. Way to go ASM! I am proud to be a member.--*BWE, iTunes Music Store

All video and audio podcasts are archived on the MicrobeWorld.org web site. Designed for science enthusiasts, students, teachers, parents and the general public, the updated site embraces new media from audio and video podcasts to RSS feeds and mobile “phonecasts.” A new “pop-up” flash podcast player allows people to listen to MicrobeWorld Radio audio news podcasts as they surf the web. The MicrobeWorld News RSS feed is updated with the latest in microbiology and life science-related news as it is published. And visitors can even subscribe or send the latest MicrobeWorld Radio episode to their cell phones.

MicrobeWorld also offers a comprehensive resources section for educators, parents, and students that includes experiments, lesson plans and tools for microbiology education. MicrobeWorld Radio's podcasts are currently being tied to the National Science Education Standards in a searchable database that educators can use to help initiate classroom discussions or build into curriculum. Over 300 pages deep, the site contains introductory information about the science of microbiology, career profiles and interviews with some of the world’s leading researchers, surprising and interesting facts about microbial life, and a comprehensive photo galley highlighting some of the most studied microorganisms.

The ASM is also piloting the use of the podcasts in innovative educational outreach programs. In partnership with Consolidated Edison of New York and the Center for Science Teaching and Learning, the podcasts are being used as focal points for curricula about environmental microbiology and alternative energy sources. Two curricula are being used in middle schools in Westchester County, New York. Depending upon the results of the pilot study, the curriculum programs may be expanded into more schools in the New York region. Two DOE-funded podcasts are being featured in this initial effort:

Bacteria Batteries (1-5-2006): Given the right food source, microbes that generate electricity may someday be used to power small electronic devices like cell phones.
http://www.flpradio.com/microbeworld/audio/060807-060901/060808.mp3

Katrina and the Mold (8-8-2006): A look at one microbiologist's personal experience with Hurricane Katrina and the mold that filled her house.
http://www.flpradio.com/microbeworld/audio/060807-060901/060808.mp3