IMAX® 3D Production Notes

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the Smithsonian Institution and IMAX
PRESENT

In Association With
The National Science Foundation

A
Mandalay Media Arts
Production

Galapagos

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Music Composed and Produced by
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Al Giddings

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Executive Producers
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Andrew Gellis
Peter Guber
Barry Clark

Written By
David Clark
Barry Clark

Produced and
Directed By
Al Giddings
David Clark

Galapagos

SECTION 1

SYNOPSIS

Traveling to the equator and across the Pacific Ocean, you arrive in the spectacular world of the Galápagos archipelago by air and by sea, just as every other species that has come before you during the past few million years. Islands that appear as moonscapes with hardened swirls of black lava rock are in stark contrast to others that cradle lush green vegetation in their highlands.

Giant Galápagos tortoises, marine iguanas, and unusual birds all appear tame and even curious about your presence. Sea lion pups frolic with you in tidal pools, and schools of hammerhead sharks swim above, as you dive into the depths of the waters surrounding the islands.

A group of inquisitive moray eels emerge from their cave near an underwater lava tube to look at you, jaws gaping, just as you are looking at them. Descending into the darkness of the ocean in a high-tech submersible, you gaze at luminescent sea cucumbers, brilliantly colored crustaceans, and species of animals no human has seen before.

You are with an explorer — a scientist from the Smithsonian Institution on an expedition. You are voyaging in an ever-changing environment, seeking out the mysteries of biodiversity on your own planet. You are a witness to the magnificence of the Galápagos. And as soon as you observe this wonderfully diverse tapestry of life, you realize that it becomes a part of who you are.

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The Smithsonian Institution and Imax Ltd. take you on a fantastic voyage to a strange world hidden within our own. Uncover mysteries of the deep. Explore caverns buried beneath the earth and sea, and engage extraordinary wildlife previously unknown to humankind, all through the magic and persuasive power of The IMAX Experience®.

Part adventure, part scientific expedition, part personal quest, this non-fiction film takes us on a journey with marine biologist Dr. Carole Baldwin from the Smithsonian Institution's **National Museum of Natural History** during her first trip to the Galápagos. Travelling to the terrestrial world of the islands which were first chronicled for science over 160 years ago by Charles Darwin, the audience dives with Dr. Baldwin and Ecuadorian naturalist Mathias Espinosa into the largely unknown waters surrounding the volcanic archipelago to explore the natural wonders of a realm that is a true living natural science laboratory.

Through the IMAX® 3D Experience the film reveals a world that is still relatively new and evolving --- a place which provides scientists with a window into the past and to a frontier for exploration. Along with other scientists, Dr. Baldwin utilizes the expedition's high-tech equipment, descending to depths of 3000 feet [915 m] underwater, to study biodiversity and the processes of evolution as part of an on-going effort by scientists to understand the forces which may ultimately affect the survival of our own species.

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PRODUCTION INFORMATION

The Galápagos represent an archipelago of 19 islands and 42 islets draping the equator, over 600 miles [965 kilometers] west of the coast of Ecuador. Their stark landscapes show clear evidence of the violent physical forces that originally created the islands approximately three million years ago — forces which continue to change them. The relatively few animal species which have come to inhabit this brave new world are remarkable for their tenacity and for the ways in which they have adapted and continue to evolve and survive in their isolated island home.

The eight-week expedition to the Galápagos was launched by the Smithsonian Institution's National Museum of Natural History. Using Harbor Branch Oceanographic Institution's Research Vessel *SEWARD JOHNSON* as the mother ship and their high-tech submersible, *JOHNSON-SEA-LINK* to probe the vast ocean, the research team deployed technology that is far ahead of the relatively crude instruments that Charles Darwin had at his disposal during his famous 1835 visit to the region. In addition to studying biodiversity and the processes of evolution, the scientists also gathered data as part of the continuing quest to understand how changing weather patterns might affect this and other ecosystems around the world.

Shot on location in the Galápagos and in its surrounding waters, the film was made with additional funding from the National Science Foundation, and with the gracious participation of The Charles Darwin Foundation and The Charles Darwin Research Station, as well as The Galápagos National Park Service and the government of Ecuador.

A Smithsonian Institution and Imax Ltd. presentation of a Mandalay Media Arts Production, *Galapagos* is co-produced and directed by renowned undersea director-cinematographer Al Giddings and veteran documentary filmmaker David Clark, who previously teamed for the record-setting large-format film *Whales* and the two-hour Discovery Channel special *Galápagos: Beyond Darwin*. David Clark and Barry Clark wrote the treatment and narration for the film. Laurence P. O'Reilly, Andrew Gellis, Peter Guber, and Barry Clark are the executive producers.

Galapagos serves as the signature film for the Smithsonian Institution's state-of-the-art IMAX 3D theater which was opened at the National Museum of Natural History in Washington, D.C in 1999. After an exclusive opening engagement at that theater, the film will be released to IMAX theaters worldwide beginning in fall, 1999. The film is being distributed by Imax Film Distribution and is available for both giant-screen IMAX and IMAX 3D theaters.

ABOUT THE EXPERIENCE

"The undersea world in the Galápagos is really unparalleled," says co-director/producer/cinematographer Al Giddings, who is a leading underwater cinematographer and filmmaker with a legendary career that has spanned over thirty years. "The ocean currents carry cold water as well as warm, tropical water to the area to create a very provocative and exotic undersea arena. We see animals that are native to cold waters at one end of the island chain and wonderful tropical animals at the other end. It's a place that is full of surprises, and, for the underwater camera, it offers images the likes of which no one has seen before."

"The IMAX® 3D medium is incredibly experiential," says co-director/producer/writer David Clark. "One of the most wonderful things about this format is that it puts the audience close to animals that they would never be able to approach on their own. All of our efforts in getting close to the animals on land and underwater gives the audience an incredible experience of being among the wildlife."

"Natural history and wildlife is always interesting to see, but if you're seeing it on a little television screen or on a flat movie screen, it's not the same as seeing it on a seven-story IMAX screen with 12,000 watts of SurroundSound," continues Clark. "I think that anybody who wants to really experience Galápagos has got to do it in 3D."

"The IMAX 3D Experience offers film audiences an incredibly immersive experience that is really unparalleled," says executive producer Andrew Gellis, who is also Senior Vice President, Film for IMAX Ltd. "The underwater realm is such a perfect environment for 3D filming, as we saw with our very successful 3D film *Into The Deep*. Children and adults alike try to reach out towards the screen... they try to touch the fish that appear right in front of them. You can truly sense the joy of the experience of being underwater when you are immersed in 3D technology ."

"I'm really excited about sharing the passion I have for the underwater world with millions of people who can experience it and *feel* it with this film," says Dr. Carole Baldwin, the young marine biologist from the Smithsonian Institution's National Museum of Natural History whose adventure in science provides a guiding through-line to the audience's experience in *Galapagos*.

"Many people have never put on scuba gear or even snorkeling gear to go underwater," says Baldwin. "With this film, they can not only see what it looks like

under there, but they can also feel what it's like to be with all these fishes, to swim with hammerhead sharks, encounter spotted moray eels face-to-face, swim through schools of fish and a column of young, silvery barracuda. I think it's a great gift to give people who won't have the opportunity to do it themselves."

"It's really exciting when you see a shark swimming right over your head," notes Dr. John McCosker, the Chief Scientist for the expedition and a veteran of 10 underwater expeditions to the Galápagos. "The IMAX Experience suspends disbelief. You think you're underwater. I wish everybody would get sprayed down with water when they walk into the theater because that's the only thing that is missing."

"The IMAX medium can take you to places that you could never travel to in any other fashion," notes executive producer Laurence P. O'Reilly, who works for the Smithsonian Institution's National Museum of Natural History. "Very few people on this planet will ever have the opportunity in their lifetime to go down in a submersible, but this film allows everyone to have that experience."

"I think this film has a great appeal for family audiences," says Clark. "Children really seem to key into watching wildlife. I think kids are going to squeal and revel in this film when they see a big yellow land iguana that's 40-feet tall on the screen, eating a cactus in their face."

"There are a couple of sequences in the film with young sea lions, which are sort of like underwater cocker spaniel puppies, if you will," adds Giddings. "These guys have great big eyes and are wonderfully playful, and they are all over Carole, and into the camera lens as well. I think some of the kids in the audience will be ducking when the sea lion pups head straight for the camera, and it'll seem like they're heading straight into the audience."

"One of the things I was most impressed with in the Galápagos, was the tameness of the animals," Dr. Carole Baldwin says. "In Charles Darwin's Diary of the Voyage of the Beagle, he had written a section about the tameness of the birds. We saw many examples of this during the trip. We had a blue-footed boobie and a red-footed boobie land on the ship, and I was able to pick them up and help them get off of the boat. One night, early in the trip, we had a Galápagos owl land on the bow and, approaching carefully, we were able to get within about a foot of it. What I found was that the fish also seemed to be unafraid of humans."

"We have had hawks come and land on the end of the camera when we were trying to take their picture," explains McCosker. "It's the same thing underwater with the fish. There are very few places on Earth that are so magical as this... perhaps the Antarctic, Galápagos and a few places left in East Africa. The animals are so tame, and that's why it's so special to me. As humans, we are the visitors... they own the place and we're just merely taking a quick visit in their environment."

"One of the times that I was scuba diving, I had my face down in the sand, and I was picking up little fishes," recalls Dr. Baldwin. "I looked up and I found myself literally face-to-face with a huge moray eel. That was a scary moment for me because eels don't often come out of their hiding place like that. But this one was just swimming around like most other fish do. In subsequent dives we encountered many more spotted moray eels face-to-face."

"We also encountered big schools of Jacks," notes Baldwin. "In the Caribbean, if there are divers in the water, large pelagic fishes such as Jacks stay really far away. But these Jacks came so close that I literally was able to reach out and pet one. It was just amazing because it shows that there haven't been people here to spear or shoot at the fish, and so they haven't developed any fear of man."

"Normally, when you film real wild animals in their natural habitat, doing what they do, you can be hundreds of yards away from them filming with a telephoto lens and it still looks great," notes David Clark. "For the IMAX 3D medium, in order for the 3D elements to be strong, you need your subject within 15 feet [4.5m] of your camera. Since the animals in Galápagos are so tame, in many cases we were filming within five to seven feet [1.5m to 2.1m] of our subjects, which is a tremendous privilege. Ultimately, it provided a great advantage for the audience in enhancing their experience of 'being there.'"

Discussing the approach to the film, Al Giddings says, "Although the film documents Dr. Carole Baldwin and other scientists doing very real work in science, we really wanted to live this very exciting adventure and experience this wonderful place through the eyes, emotions and experiences of Dr. Carole Baldwin as a young marine biologist." "Although we were trying to make exciting images and tell the story in a creative way using a lot of theatrical format techniques, this is still a non-fiction film and it takes on a really unique power from that approach," Giddings continues. "We had real emotions and real experiences. This was Carole's first time in the Galápagos and you saw the excitement in her eyes. It was her first opportunity to dive in a submersible, and her first time to work in 2,000 and 3,000 feet [610m and 915m] of water. That was all real-time stuff and, in fact, was the core and fiber of what we wanted to connect with."

"I had a lot of questions and worries about getting into the sub the first time," relates Dr. Carole Baldwin. "I was wondering 'How am I going to handle it?' 'Am I going to freak out or be claustrophobic?' I've done a lot of collecting in shallow waters using scuba gear but I had never had the opportunity to get into a submersible and explore the deep beyond 200 feet [61m]. But I loved it. When I came out of my very first sub

dive I was bubbling over like a six-year-old. I was so excited. I came out yelling, 'I'm in love with this sub and I want one of my own!' It's such a marvelous way to get into a world that we really can't explore any other way."

"When you're down in the submersible you are in another world," says Baldwin. "After the half-hour descent, most of the places where we landed were sandy with large boulders, and the sub would hover just off of the bottom. As it moved forward, it really felt as though we were in a space shuttle floating over the surface of the moon. You want to just jump out and touch things and pick things up. But because of the incredible pressure, if you tried to do that you'd be crushed instantly. In fact, just for fun we'd write things on polystyrene cups and attach them to the outside of the sub to see what the pressure at 3,000 feet [915m] would do to them. And when we returned to the surface, a normal size drinking cup would be reduced to about 1 1/2 inches [3.8cm] in height."

"Most other submersibles are like a box of rocks that just fall straight to the bottom and go clunk and then motor along the ocean floor," says Chief Scientist Dr. John McCosker. "But the unique buoyancy control system of Harbor Branch Oceanographic Institution's *JOHNSON-SEA-LINK* allows it to fly like a helicopter underwater. In doing so, it can chase even fast-swimming fish and capture them for study using the suction devices and claws and scoops on the submersible. There are always some fish that get away, but this submersible also has video cameras that allow us to take films of those."

"When we were using the video camera to film fish, we used the four red lasers extending from the camera, which were designed and built by Harbor Branch, to focus on a subject," explains Baldwin. "If you look at the lasers from outside of the submersible, they look like long red arrows shooting out into the water. And on film, the effect looks like something from a Sci-Fi film."

"During most of the submersible dives, we would descend and do some filming with the sub, and when our series of shots was completed, the submersible would continue down to spend two to three hours of discovery and research for the science program of the expedition to move forward," explains Al Giddings. "Harbor Branch's *JOHNSON-SEA-LINK* is a very exotic sort of inner-space vehicle that is just magic in its capabilities. It is really unparalleled in the visibility that is permitted to the pilot and the observer in the five-inch thick acrylic sphere, in the vehicle's ability to work efficiently at such depths, and in its ability to collect animals using the siphon system and claws and grapples to pick and choose samples from the deep sea.

"The uniqueness of this film is in featuring this very wonderful submersible as a vehicle for discovery and what images and experiences that permits, what information it brings to light for our understanding of the environment we are such a part of yet know relatively so little about."

"This non-fiction film sets out to tell the real story of the Galápagos, and the real story of the on-going adventure of science," explains executive producer/writer Barry Clark, who, along with Al Giddings and executive producer Peter Guber, is one of the principals of the producing company, Mandalay Media Arts.

"The Galápagos are magical in the eyes of science," continues Clark. "They are some of the newest islands on Earth, having been recently formed within the last few million years. They are especially interesting to scientists because they are new and still in the process of formation, they have been isolated by their distance from the mainland and therefore their ecosystems have remained relatively unspoiled. They are also a place where animals have arrived relatively recently and therefore one can see what happens when new lands are colonized."

"When you compare the Galápagos with some other areas, you realize there are not vast forms of life in the island chain," explains executive producer Laurence P. O'Reilly. "It's not like a tropical rain forest where there are hundreds and thousands of species all bumped together. In some respects, Galápagos is a very stark place. But that starkness in some ways allows filmmakers to profile the animals that *are* there because one sees them and is able to understand them in sharper contrast."

"If people know something about the Galápagos, it is usually in reference to Charles Darwin's brief visit to the region and how he saw and studied the finches and various life forms on land, eventually leading him to create his Theory of Evolution by Natural Selection," continues O'Reilly. "Part of what this film is trying to do is to show that there were and are also evolutionary adaptations that can be perceived in the water."

"There are so many animals in the Galápagos that just don't occur elsewhere," notes Dr. Carole Baldwin. "I think Charles Darwin could have figured out his ideas about natural selection and evolution based on the underwater world just as easily as he did with his observations on land. Yet we had so much technology available to us on this expedition that he didn't have. He didn't have scuba gear or even a simple mask, fins and snorkel. I think Darwin would be so overwhelmed by what we're doing now in science."

"Oceanic islands such as the Galápagos are so important for studying the evolutionary relationships among fishes," says Dr. Baldwin. "You know that all of the fishes that are there either swam that great distance to the islands, if they were big sharks or tunas, or they drifted to the area during the very young pelagic larval stages, as with the smaller things... primarily the coral reef fishes and a lot of the deep water fishes. Everything else evolved there. It's fascinating to an evolutionary biologist to go

to a place and know that everything you're seeing was either transported there or evolved from something that did. In that respect, it's like a mecca for biologists."

"Another exciting aspect about working with the Harbor Branch *JOHNSON-SEA-LINK* submersible on this expedition is that, even though it can go down to 3,000 feet [915m], it can also explore the 400 to 1000 foot range [approximately 120m to 305m] that we can't access with conventional scuba gear," continues Baldwin. "That is shallow enough that you still see a great diversity of fishes and a lot of life there, but it's another largely unexplored area. Most people that have access to subs don't want to stop at the 400 to 1000 foot [120 to 305 meter] level... they want to go down to the limit. There are different life forms that evolve and live at different depths and strata of the ocean, and so each area offers new possibilities for discovery and understanding of the natural world."

"During the expedition, we made basically two types of scientific discoveries," explains Baldwin. "One of them was discovering over a dozen of what we believe to be new species of marine life. To be certain of our findings, we have to take the specimens back to our labs and compare them with other organisms and with written descriptions of previously discovered species. Among others, we believe that we discovered a new species of wrasse from about 400-500 feet [approximately 120 to 150 meters], a new species of sea bass from approximately 1000 feet [305 meters], and a new species of cat shark from around 2000-foot [610 meter] depths."

"The second type of discovery was finding specimens in the Galápagos of known species that had never been reported in the Galápagos," Baldwin continues. "These types of finds are always interesting because it probably means that animals are still arriving in the Galápagos. Some examples that we collected for the first time on this

expedition were very shallow water fishes which means that they probably haven't just been missed in the past but instead are new recruits to the Islands."

"One important thing to understand about our work in science is that we don't just see a fish and say, 'Aha! That's a new species!'" remarks Baldwin. "Careful observation and comparison with other species is required. Charles Darwin became an expert at this comparative process and it was what helped him to notice slight differences in beak shapes of the finches. Still, when you get your hands on something that you're pretty sure no one else has seen, it's an incredible feeling. It makes you think about life and the origins of life."

"One of the hopes for *Galapagos* is to show that science is an adventure and it's an exciting one," notes Laurence P. O'Reilly. "There are researchers and scientists in the Smithsonian Institution's National Museum of Natural History who are travelling all over the world and doing what they love to do. It becomes a life-long quest and a process of discovery. For every answer that these people get, they have new questions, and they are very bright and stimulating people. Dr. Carole Baldwin represents many different scientists who are doing very exciting work. Hopefully, kids who are 11 and 12 will see the film and realize when they are thinking about their careers that these kinds of opportunities are available to them as well."

"People might think 'The Smithsonian Institution must have collected all of the specimens on Earth by now,' and that 'Darwin has written his treatise, so it must all be over,'" says David Clark. "But that's not the case at all. There's so much out there to be discovered. Every time we have come to the Galápagos, the scientists with our expeditions have found new species and new information. Dr. Carole Baldwin did very much what Darwin did in breaking new ground and in identifying things that science

didn't know about. It was one of those unique times in natural history filmmaking when there's something new in science happening before your eyes."

"The ultimate aim of the scientific expedition was to seek to understand the processes of evolution and the checks and balances that maintain bio-diversity of life in the Galápagos, and to understand how bio-diversity might be threatened in other ecosystems around the world," explains executive producer/writer Barry Clark. "Unlike the 19th century biologists who sought new species in order to create a catalogue of life, scientists now are looking to see how the puzzle fits together. It's a kind of a status check on the health of the ecosystems of the planet. Scientists working in many different parts of the world are all putting together the pieces of this giant picture. They are on the front lines of a very important mission that can make the difference between our own survival or extinction. We are a surprisingly vulnerable species and the race is on to see if scientists can provide evidence about the chain reactions that might be set off in our own biological support system... and to do so before we self destruct."

"I think that in a place like the Galápagos, it's easy to show people how wonderful and precious and beautiful the natural world is," says Dr. Carole Baldwin. "When we look at oceanic islands that represent the only place certain species occur, we know that if we were to destroy those species, then they will have come and gone and we will never see them again. In the Galápagos, animals suffer enough from natural forces and disasters such as El Niño without having humans interfere to cause even more damage."

"As with any natural history film that I work on, I always hope that it will excite people about the undersea world," says Al Giddings. "The oceans are a vital part of the health of this planet. I always hope that people will be inspired, excited and motivated

to think about proper ocean ethics and to be concerned about conservation issues related to the oceans."

"People have varying ethics, concerns and feelings about the natural world," notes David Clark. "I think if you celebrate the wonder of the natural world and share that with an audience in films such as *Galapagos*, then Nature has a way of speaking for itself. People get the message and they understand. As a filmmaker, you don't have to tell them to conserve the world. With IMAX 3D technology, you can experience how special a place like Galápagos really is, and by being within it, it becomes part of you."

ABOUT THE FILM

GENESIS OF THE PROJECT

Galapagos serves as the signature film for the new IMAX® 3D theater which was recently opened [July 1999] at the Smithsonian Institution's National Museum of Natural History.

"The Smithsonian Institution is the largest museum-based research institution in the world," explains executive producer Laurence P. O'Reilly. "We have over 120 scientists travelling literally all over the world to collect specimens and conduct research. We have one of the largest collections in the world as well, with about 120 million specimens. Amongst the seven scientific departments covered, we have about 5 million specimens in our Botany collection, about 35 million specimens in our Insect Entomology collection, and we have some objects in our Paleontology collection which date back to 4 1/2 billion years ago, literally to the time when it is estimated that the Earth was being formed."

"In addition to research and collections, the third part of our work at the National Museum of Natural History is in public outreach and education," O'Reilly continues. "This museum has between 6 and 8 million visitors per year, and that is almost twice as many visitors than any other natural history museum in the world. Our education program is always seeking ways to communicate information about science and about our collections, and we envision the co-production of films as a way to extend our educational outreach beyond the walls of the museum in Washington, D. C. to reach audiences all over the world."

"The film medium offers a much more dynamic process for education and understanding than static displays or dioramas," notes O'Reilly. "When you watch a film, you have the opportunity to see the behavior of animals in their natural habitat. And large-format films offer an even more involving experience with impressive size that has very clear detail and rich colors. Having our own theater allows us to offer an extraordinary new kind of learning experience as a complement to our other exhibits and collections.

"The study of evolution and biodiversity is sort of a commitment to life, if you will," O'Reilly says. "These days, children, more so than any other group, are becoming more concerned about the world. It's getting more populated and resources are being used up at a substantial rate. By doing taxonomic research we are mapping out the history of life on the planet. It's research about what is out there and how it fits in with the evolutionary history of other plants and animals and things in the world, to determine the current state of the planet."

"There are practical applications for this research that have great significance to people around the world," O'Reilly says. "It's not this strange notion of a scientist sitting in his office talking about obscure things. The comparison of different specimens

collected over time can offer proof to us now about how diseases are transmitted, why species might be disappearing and how we might possibly countermand some of the actions we as humans are taking that could affect our own survival."

"By choosing the Galápagos as a film location, we were able to focus, in a more intense way, on the subjects of evolution and biodiversity," explains O'Reilly. "IMAX 3D technology allows people to experience being underwater with the scientists who are discovering new things every time they venture down with the submersible, and that is very exciting."

"Since the very successful release of the IMAX film *Into The Deep*, we had a strong desire to make another underwater 3D film, and to advance the language of underwater 3D work by putting people into the film," says executive producer Andrew Gellis. "When the Smithsonian Institution's National Museum of Natural History was making plans for a film to anchor their new IMAX 3D theater, we knew it was a good opportunity to be supportive in a co-production with them."

"Audiences have affirmed that they love the way the IMAX 3D Experience takes them to places they would never get to on their own, and 200 feet [60 meters] below the ocean in a chain of islands that is 600 miles [965 kilometers] into the Pacific is certainly one of those places," Gellis says. "We decided to do an underwater natural history film that unfolds through the eyes of a researcher having her first opportunity to journey to the Galápagos in the footsteps of other biologists, including the famous Charles Darwin."

"Al Giddings and David Clark had partnered for a large-format film, *Whales*, and had also filmed a wonderful documentary for the Discovery Channel which was filmed in the Galápagos," notes Gellis. "They were very knowledgeable about the area and about working with Harbor Branch Oceanographic's vessels, scientists and crews, and

they had been proponents of filming the Galápagos underwater realms in large format. We encouraged them to go the next step into the IMAX 3D Experience."

"Using IMAX 3D technology to film in the Galápagos is a very exciting combination for a film, and one that offers a real challenge and exciting possibilities," says co-director/producer/cinematographer Al Giddings. "I think people will be enchanted with the experience. The film has a wonderful mix of some of the provocative things you find topside, and some underwater images that will be a real surprise."

"Large format films offer the most exciting movie-going experiences in the world," enthuses co-director/producer/writer David Clark. "They have the largest film negative and the largest screen and the largest sound system, and they offer superlative clarity of detail. It just blows you away. And since the wildlife in Galápagos is so tame and in-your-face, we knew that IMAX technology would be the perfect medium to capture it."

"Compared with traditional features, large-format is a fairly new medium," notes David Clark. "After a handful of years, there have been 15 IMAX 3D films made. The early efforts were done on sets or in studios and very little pure natural history has been attempted, so everything we did on this film was ground-breaking and help to establish it as a benchmark film."

"My first exposure to the Galápagos was over 20 years ago while I was working with Bob Ballard from Woods Hole Oceanographic Institute," explains Al Giddings. "Using the deep-sea submarine *ALVIN*, we did deep diving 400 miles [645 kilometers] from the Galápagos, working the deep-sea hot-water vents at about 8,750 feet [2667 meters] and discovering new life forms. Those chemosynthetic vents were first discovered very near to the Galápagos... so from two miles [3.2km] deep to inner tidal

areas, the Galápagos are just unparalleled in the mix of animals and the really provocative and exotic nature of what you find there."

After subsequent trips to the Galápagos, Giddings recalls that he read an article which marine biologist Dr. John McCosker had written for the California Academy of Sciences quarterly, entitled "The World Darwin Never Saw." Giddings loved that title and wrote a treatment for a film based on the idea, but then became involved with other feature film underwater cinematography for such landmark films as *The Abyss*. Four years ago he finally teamed with David Clark to produce the two-hour documentary *Galapagos: Beyond Darwin*, and it became the third highest-rated show in the 10-year history of the Discovery Channel.

While Giddings and Clark were beginning preparation for *Galapagos*, executive producers Peter Guber, Al Giddings and Barry Clark joined forces to create the non-fiction production entity, Mandalay Media Arts. The Company has embarked upon the creation of an ambitious slate of non-fiction films, using the cutting-edge technology of high-definition television to focus on a thrilling approach to natural history films and specials.

"High definition television and the The IMAX 3D Experience are very parallel in the sense that high-definition aims to create immersive cinematic experiences in the home, and The IMAX 3D Experience creates the most immersive cinematic experience in a theater," explains executive producer/writer Barry Clark.

"Mandalay Media Arts was formed with the commitment to be an innovative company," Barry Clark continues. "We are not just putting different content into these media, we are seeking to create a different way of engaging the audience in the motion picture."

"With our IMAX 3D work on this film, in a way, we are extending a series of experiments that began with *Wings of Courage* and *Across the Sea of Time*, films which have gone beyond simply the thrill effect of 3D technology, towards seeking to engage the audience in a personal one-on-one encounter," notes Barry Clark. "We worked to take the medium to its next logical level... to do a dramatic, emotional, engaging and immersive film that deals with a very human adventure, set in a significant and dramatic place, using extraordinary technology."

THE PRODUCTION

Deciding upon their creative approach to telling the story for the IMAX® 3D medium, executive producer/writer Barry Clark and co-director/producer/writer David Clark wrote a treatment for the film, and also drew upon scientific research and the knowledge and experience from Al Giddings' and David Clark's previous work in the Galápagos.

"Al Giddings is in a class all by himself," says David Clark. "From his work on the theatrical side of features such as *Titanic*, *The Abyss*, and *The Deep*, to some of the greatest natural history filmmaking for National Geographic and others... he is such a special person and so good at what he does. And even though he's in the big leagues of dramatic feature films, his passion is with natural history. He really loves this more than anything else."

"I have enjoyed a very rich and exciting career doing underwater images, primarily because it was such a process of discovery," Al Giddings says. "When I first started filming, anything that we did underwater was totally new. I was involved in

filming whales and white sharks for the first time. It has been 30 years of 'firsts.' And it happens a half dozen times a year... I'm continually dazzled by what I'm exposed to."

"I've done a lot of diving with the Russian submersibles Mir I and Mir II... two submersibles that are certified to 20,000 feet [6,100 meters], which is about four miles [six and a half kilometers]," relates Giddings. "During the making of *Titanic*, I've also spent 400 hours in those submersibles with dives of up to 21 hours. I've done lots of diving in the Woods Hole Submarine *ALVIN*, working the hot water vents on *Dive to the Edge of Creation* at 7,000 to 10,000 feet [2,100 to 3,050 meters]. So diving itself is not the concern for me. At this point in my career, I'm more focused on trying to make great images, to have the ability to turn the camera around on the submarine itself, and push buttons and change lenses and roll film."

"Al Giddings and I have enjoyed collaborating on previous films and we work very well together as a team," notes David Clark of his shared duties in directing and producing. "Al Giddings is 'Mr. Underwater,' and is truly one of the best there is. He does all of the underwater work, the submersible and scuba work. I'm a top-side filmmaker, concentrating on the land portion of filming and all of the science that's happening with the expedition. It's a very good complement. It is expensive to film in a remote place, so with two crews shooting simultaneously, it really maximizes our efforts and we could get twice the amount done in half the time. And we had an ideal platform to work from with the Harbor Branch Research Vessel *SEWARD JOHNSON.*"

"In addition to being based on the *R/V SEWARD JOHNSON,* we also had a second large boat working with us," explains Al Giddings, speaking of the mid-sized *Daphne* upon which the crew created a winch and hoist system to assist in launching the underwater housing for the IMAX 3D camera. "At times David would pursue some of the topside images and our underwater unit would break off and go film near another

island. In the evenings, we'd talk back and forth on the radio. It was an interesting and productive formula for efficiency."

Bearing in mind the documentary nature of the film that they were setting out to make, the filmmakers laid out their objectives for what they hoped to capture on film, with an understanding that in the making of natural history films, nature often offers its own surprises.

"One of the nice things about the Galápagos is that the various species of animals are particular to specific islands," notes David Clark. "With many wildlife films, you are continually guessing where you might find the subjects you are trying to film. But in Galápagos, you know that the frigate birds are on one island and the land iguanas are on another. Galápagos has such specialized wildlife, that at least their location is pretty predictable."

Both David Clark and Al Giddings began directing principal photography on location on June 12, 1998. Giddings' work with the underwater unit was conducted simultaneously with the major portion of the expedition, and was completed by July 26. After the mooring of the *R/V SEWARD JOHNSON* in the port of Puerto Ayora on Santa Cruz Island to prepare the ship for its voyage back to Florida via the Panama Canal, Clark then led the topside unit to continue filming on Santa Cruz until August 5, 1998.

"IMAX 3D technology is so new that there were only two IMAX 3D cameras in the world, and during our filming in 1998 we had them both in the Galápagos," says David Clark.

Despite extensive planning for the expedition and the filming, the filmmakers found themselves subjected to the effects of an El Niño season that drastically changed the very environment they where capturing. The impact was so great that it ultimately necessitated a return visit for six weeks of additional filming in early 1999.

"During the filming and the expedition, we were confronted with an extensive impact from the 1998 El Niño phenomenon," observes David Clark. "With the warmer water, the currents were stronger and the visibility in the water wasn't as good as usual. Many of the bird colonies that we would have normally seen in great masses had abandoned the area to go to other places where the water was cooler. The marine iguana population was down since they were not getting the green algae, on which they feed, on the rocks underwater."

"Warmer water does not carry as much oxygen and does not have enough nutrients to support as many fish," says Mathias Espinosa, an Ecuadorian naturalist/guide who has worked with Dr. John McCosker and Al Giddings on several of their trips to the area. Espinosa served as one of the naturalist guides for the production, assisting Al Giddings to track the changing locations of pelagic — oceanic, open water — animals, as well as appearing in the film with Dr. Carole Baldwin during her exploration on land and underwater.

"Many of the fish had spread out and some of the large pelagic fish went very deep in search of a food source," continues Espinosa. "On land, the sea lion population decreased and the marine iguanas and all of the sea birds were affected."

"During my first trip to the Galápagos, I didn't realize that I really hadn't seen the islands as they typically are," notes Dr. Carole Baldwin. "Though we returned only seven months later, it was remarkable what changes had occurred. The green algae was everywhere on the volcanic rocks in the shallow water along the coasts. The marine iguanas were abundant and sea lions were everywhere. The water was cool and there were more and different kinds of fishes, and huge schools of them."

"From a natural history standpoint, it was important to return for more filming," explains David Clark. "By February, 1999, the effects of La Niña were being felt, and

with it the cold water had brought back the algae as well as many of the larger animals such as the hammerhead sharks. They were closer to the surface and accessible to our cameras, and the water was clearer and much better for our filming purposes."

"I found it heartening to see things recovering so well," notes Baldwin. "It was remarkable to see, first hand, the incredible struggle for survival that the wildlife has, and how the animals are constantly confronted with environmental change."

TECHNICAL CHALLENGES AND TRIUMPHS

"The 3D cameras usually don't move underwater, but Al Giddings made a lot of innovations in the viewing system of the IMAX® 3D camera and the way that it was ballasted and handled underwater," explains David Clark. "He created ways to make it possible for him to operate it alone and still make really dynamic shots to enhance the 3D experience."

"Dive instructors smile when I tell them I think the finest diving team in the world is an odd number under three," Giddings says wryly. "After that, it just gets complicated with more people, more bubbles, more breathing and more sound."

"Since we're trying to get great stuff with a particular animal, I prefer to work alone," continues Giddings. "For example, if we were working with sea lions and there were three of four people in the water, it would just split the focus of the animals. They have a tendency to respond to an assistant or to swim with somebody that was not part of the storyline we were filming. I have a full face mask with a wireless com system. Everybody has a pickup device so they can hear me underwater and it's very easy to let people know what is going on. Most often, once we get the camera in place, I just wave them off and go to work."

"When you are filming in 3D, there are a fair amount of technical challenges, such as considering foreground and background, and the converging points of focus for the lenses," Giddings explains. "Yet the biggest and toughest challenges of filming an underwater IMAX 3D film was in figuring out how to handle and operate the camera, which weighs 1700 pounds [770 kilograms], and to maneuver the camera in a natural history configuration... trying to do moving shots and drift with the current, trying to get to the sharks and other animals when you need four or five people just to help you get the camera to the shooting position. With the enormity of the camera itself, coupled with the large casing that was needed to withstand water seepage and the pressure at

lower depths, it would take 10 people to get the camera into the water and then between two and five of us to get it to the bottom."

"Before our first trip in 1998, I had engineered a couple of flotation tubes that I could inflate with my dive-tank regulator in order to create buoyancy on a particular part of the camera," explains Giddings. "I could make the camera neutral and then wave off the other guys and try for the shot."

"There were some bizarre things that happened," says Giddings. "Some times, I would make a 10-foot [3-meter] long sort of dolly shot and then cut, but the camera would keep going. It would take me about another 10 feet [3 meters] before I could sort of recover and get back to try for the shot again."

"In the Galápagos, there are some very significant currents, and the only way to deal with it was to drop in up-current and then drift through an area that I thought was particularly interesting and hope we would get a shot," continues Giddings. "We'd get one pass and we'd be gone because there was no way to turn that camera around,

even in a quarter-of-a-knot current. A couple of times, just to stay in place with a mild current, we took a big fishhook with 10 feet [3 meters] of line and hooked onto some boulders on the bottom. The camera would hang in the current and I'd be sort of like a gunner behind it."

"There was no way that you could tilt with the camera once you had it set a certain way," says Giddings. "There was so much mass to it, and it was also very heavy at the bottom of the casing. If I wanted to do silhouettes, we would have to ballast the camera by physically moving the weight on the outside of the casing so that the camera was pointed toward the sun. To shoot level with the bottom, we would have to change the ballast again, and to shoot looking down we had to commit an entire dive to just shooting at that angle."

"Several of the lenses did not have controls, so I couldn't change the aperture," says Giddings, referring to the cinematographer's need to set the camera's aperture for various or changing light levels near the filming subjects. "So, I would have to jump in the water and take a light reading, then come back up to the surface and have the camera set for that particular light situation. We would close it up and commit to one dive at that setting."

"Reloading film into the camera also took about an hour and a half," Giddings recalls. "The underwater housing's dome port alone is 700 pounds [317 kilograms], so everything was moved with an electric winch. It took five guys to open the camera casing where the camera sits in three pieces that are bolted together. The bolts were backed off and then it took three people to pull the front end back and slide it on skids. A film change was a big deal, so you couldn't say, 'Wow! There's a whale shark under the boat... let's go!' It was not a quick-draw system."

"It was a challenge to mix all of the technical aspects of filming with the IMAX

3D camera with a desire to film a natural history subject, namely animals, that really weren't tuned into what it was that we were trying to achieve," says Giddings. "The animal would swim over my head, but the camera was possibly set to shoot in a different direction... it made for a tough formula. In any format, animals are difficult to film because, naturally, you don't have any control over them as subjects."

The Camera That Got Away... Almost

"At times, in order to maximize diving time, we used a 2,500 foot [762 meter] film magazine," Giddings says. "Since the 2,500 foot load is about 15 pounds [6.8 kilograms] heavier than the 1,000-foot [305-meter] magazine load, we needed to fool with weights to create the right balance. I wore about 50 pounds [23 kilograms] of weight and no fins and I shot most everything on the bottom, walking around."

"One night I went to the bottom and since I was really heavy with my own weights, I just pulled the camera to the bottom and put it down," recounts Giddings. "The submersible was already in place to make a shot. But I noticed that one of its lights needed trimming, so I turned to the submersible, I trimmed the light and then turned around. And the camera was gone. I thought one of the guys had moved it until I saw them coming with large HMI lights. I suddenly realized that, whereas the previous week the camera had been 10 pounds [4.5 kilograms] heavier from the larger film magazine, it was now lighter and had actually floated up and over the submersible. I looked up and even though it was nighttime, I could see the reading light on the camera's dials. I went roaring to the surface and jumped in the Zodiac. About 30 yards [27 meters] away that camera was just floating peacefully on the surface. But the story is certainly a clue to how every dive presents a new challenge... with a different weight, angle, setup, balance, load and lens. And then you find and film the animals."

"During the months leading up to the second trip to the Galápagos, Al Giddings was able to design and configure four underwater thrusters attached to the underwater camera housing," explains David Clark. "Even though the entire unit is a 1700 pound beast, when the thrusters were attached to it Al was able to fly it faster than anyone was able to swim. With a flick of a switch he could turn it into any orientation and swim into schools of sharks and through schools of fish. The innovation provided some of the most exciting footage of the film since it takes the audience through the 3D realm."

"With the new dive propulsion vehicle that Al created, he could go against the very strong currents and have many more choices about where he wished to film," says Dr. Carole Baldwin. "It was easier to go along with him for filming. It was so much fun to hang onto his scuba tank and ride along together."

"The experience of swimming among a school of hammerhead sharks was both exhilarating and frightening," explains Baldwin. "We went to the Darwin arch at the northernmost island and dove down 50 feet [15 meters] to a rock pinnacle where the hammerheads are known to congregate. Al Giddings dropped me off at the pinnacle and propelled the camera unit away so he could get shots of the sharks between us... suddenly I realized that I was surrounded by these enormous animals, and there was no one else beside me!"

"It was remarkable how close the hammerheads came to me," continues Baldwin. "I think one of the sharks came within two or three feet of me before it turned off. These are big, robust animals... 200 to 500 pounds [90 to 225 kg.] and up to 12 feet [3.6 meters] long. There were 50 or 60 of them around me and probably more than 100 in the area. You don't see them feeding in the shallow water and you trust that they are going to remain docile. But when they get close to you, you wonder…but you also cannot help but be impressed with how they look…especially with the bizarrely shaped

head. When they are approaching you, you can see that the front of the head is tapered down to a thin edge, like an airplane wing, which makes it hydrodynamically feasible for them to have such an unusual protuberance."

"Darwin Island is the most northern island in the archipelago and it is the real jewel for some of the larger animals such as hammerhead sharks and the spotted moray eels that we encountered," notes Clark. "I think even Al Giddings and his crew were surprised at the curious behavior of the eels that we filmed."

"Moray eels are typically reclusive animals that only dart out of their hiding places to get food," explains Baldwin. "Yet in the Galápagos, the spotted moray eels were out swimming around. One of Al Giddings' crew wanted to see if we could congregate some of them for a better filming experience. During a test dive, we put some fish heads in a bag and we went down to about 100 feet [30 meters]. Within minutes, there were five or six of these big eels all over the bag, and that probably increased to 10 or 12 very quickly."

"These are large, snake-like creatures that are two to three feet [one meter] in length," says Dr. Baldwin. "They have very sharp teeth and they are constantly opening and closing their mouths to breathe and to smell... which is their principal sense... and it looks very menacing when they are right in front of your face. A couple of times, they got the bait bag away from me and I heard Al Giddings on the buddy phone telling me, 'Carole... don't let the eels have the bait.' After ten minutes of that, my heart was pounding and I pushed off of the bottom and 6 eels were still hanging onto this bag. At about 10 feet [3 meters] from the bottom, they finally let go."

"To film the scene with them, I was supposed to enter the area where they had been congregating and shine my light on them," relates Dr. Baldwin. "But every time I

approached the pile of rocks where the eels were, they would leave the rocks and come towards me! A couple of times, there were two or three of them right at my face mask,

and I was trying to push them away gently, being careful not to make sudden movements that could startle them." Even when I was diving for purely scientific study, they were very curious and tended to come right at my face…perhaps attracted by the bubbles from the breathing regulator.

"Al Giddings and I also swam through a school of barracuda," continues Dr. Baldwin. "These were juveniles, approximately one to two feet [0.45 meters] long. Al went through first and turned around to film my approach. They completely encircled me and I was spinning around in this swirling, 30-foot [9 meter] column of silvery fish, with all their eyes looking at me. I knew they were barracuda and I probably should have been a little more concerned about it, but it was so mesmerizing. The sheer numbers of fishes in the schools in the Galápagos is remarkable."

LARGE FORMAT AND 3D ASPECTS

"The payoff to working through the various challenges of production is that IMAX® 3D technology makes these films exciting to see," notes Giddings. "Very often, in The IMAX 3D Experience, people reach up and feel as if they can actually touch the subject or look around it. To a great degree, it simulates what we actually see with our eyes and then some, because we have the ability to change the lenses slightly and to change the point at which the focus converges between the two images."

"The IMAX 3D system is unique in that you have two different rolls of large-format film traveling through the camera system simultaneously," explains Giddings. "There are two lenses that are about the same distance apart as your eyes

[approximately 2.85 inches, or 7.23 centimeters], and those lenses make two images in sync at the same time. When the two strips of film are projected simultaneously, it gives you the extra dimension."

Explaining more about the differences between traditional feature film technology and cameras and the IMAX technology, stereographer William Reeve says, "The size of the frame of the film negative for large-format film is 10 times as large as that of the 35mm frame for traditional feature films. So, with Iarge format films you have 10 times the visual information. With the 3D technology, you double the information again which is what makes the finished image even sharper and clearer."

"To understand about the technical challenges that face filmmakers who are filming with IMAX 3D cameras, there is an experiment you can do yourself," says Reeve. "Hold your finger about a foot [about 30 centimeters] from your face and focus on it, and then make a conscious effort to realize what is in the background. Since your focus is converging on your finger, the background likely becomes a double image and is separated. Because of this fact, when we're filming we always need to be careful about the limits of divergence of the background because we could make the film uncomfortable or unwatchable for audiences."

"Filming with the camera IMAX 3D is unlike working in any other format," says David Clark. "You're always shooting with fairly wide lenses. For the 3D effect to work, you have to be close to your subject... within five to twenty feet [one-and-a-half to six meters]. You also need to keep the camera moving so that there is an ever-changing background around the main object on screen because that helps to quickly create better depth and dimensional perspective. Yet, in order to have the camera moving you need to place it on a crane or on a dolly track."

"A traditional movie camera weighs between 40 and 50 pounds [15kg — 18.5kg] when it is fully loaded with a film magazine," explains Andrew Kitzanuk, topside director of photography for the 1998 expedition. "But the IMAX 3D camera by itself, without the underwater casing, weighs about 240 pounds [90kg].

"We chose to use a giraffe crane, which is the smallest and lightest portable crane available," says David Clark. "The crane still has to be beefy enough to take a 240-pound [109 kilogram] camera as well as the camera operator sitting beside it, and that means using 1,700 pounds [770 kilograms] of lead ballast to balance it. Now imagine having to shuttle equipment from the *R/V SEWARD JOHNSON* to an island inhabited only by marine iguanas and some other animals. There were no roads, there was no electricity, and with our small crew of 13 people we had to carry the camera and the crane and the lead ballast all by hand to our location. It was very challenging."

"In addition to Al Giddings' configuration for a new dive-propulsion system for the underwater camera housing, we had another technical benefit during our second trip with a newly-completed hot head attachment for the camera crane on land," explains David Clark, speaking about his work with Reed Smoot, top-side cinematographer for the early 1999 filming trip.

"This device allows the camera to move in any orientation without the camera operator being physically beside it on the end of the crane," continues Clark. "It enables the camera to move straight up and down and over cliffs in a situation where you couldn't have a person to operate the camera. It also enables you to hang the camera lower than the crane itself, to get really close to the ground and to move across the ground. Even though this is a very heavy piece of equipment weighing

approximately 400 pounds [181 kg] and was very precarious to maneuver in and out of small boats and onto rocky shores, we were able to accomplish some unimaginable angles with it that you would have to see to understand how it was done."

"With the hot head device, we were able to follow Dr. Carole Baldwin as she rappelled off of the side of a volcanic cliff, and then look down below to a tidal pool with sea lions pups," continues Clark. It's great to be able to keep the camera and the action moving in an IMAX film, and this was another device that helped us to accomplish this in very exciting ways."

"Dr. Baldwin and Ecuadorian naturalist guide Mathias Espinosa also rappelled deep down into a lava tube to explore and search for fossils," explains Clark. "During the continuing formation of the islands, sometimes the surface of a lava flow cools and hardens, while layers underneath keep flowing, forming giant conduits for the molten lava. Eventually the hot lava is cut off at the source and the last of it flows down and out, leaving the empty tunnel."

"There is a short sequence in the film where Dr. Baldwin dives in an underwater lava tube, and so we were also showing the surface counterpart," notes Clark. "It helps to reinforce the idea that the Galápagos are volcanic islands. Since they are volcanic, fossils do not accumulate because there is no sediment to accumulate in. However, the lava tubes are one of the few places in the islands where there is a fossil record of sorts. Cave-dwelling owls killed birds, rodents and small animals and then regurgitated and deposited their remains on the floors of these lava tubes. They have been covered up over the centuries and that creates a fossil record of sorts."

Since the Galápagos is protected as part of Ecuador's Galápagos National Park, the use of generators as a portable means of creating electricity for lighting was not permitted anywhere.

"Filming in a natural environment creates a challenge in maintaining the continuity of the look and the lighting for the film," says 1998 cinematographer Andrew Kitzanuk. "The lenses for this medium are slower and they demand a lot of light. The amount of detail you see in a 70mm 3D film is such that you just can't leave anything to chance. When you project a film in IMAX 3D, you also lose another degree of light because the audience is wearing polarized glasses."

Kitzanuk and his crew used enormous reflectors, bouncing light from the sun onto their subjects. Yet the Galápagos' physical location contributed another challenging factor for the filmmakers to consider with lighting.

"Filming on the equator and in the middle of summer, the sun was in a very high arc all day," explains David Clark. "So we went to our locations at daybreak to allow for our long set up times, and then we would shoot until noon. We would either go back to the ship and wait to return at 3 or 4 o'clock to take advantage of the better lighting condition, or, on some islands, we would use that time to trek our equipment across the lava rock to our second set up for the day."

"The film for an IMAX camera film negative is actually a 65 millimeter negative with 15 sprocket perforations in the sides, so the image of each frame is about the size of a credit card," continues 1999 cinematographer Reed Smoot. "The film is moving at about 330 feet [92 meters] per minute, and in three minutes it uses about USD$3,000 worth of film. It's a bit nerve-wracking when you hear the film going through the camera and you're waiting for a reaction from an animal you are filming. It's very daring to shoot natural history in this format."

"We'd get set up with our reflectors and be bearing down on an iguana and then, after two hours of set up, the little iguana could just walk out of our frame before we got the full shot," says David Clark. In a similar instance, the crew set up to film a

magnificent frigate bird, which puffs up the brilliantly red pouch of its chest in a grand display during a mating ritual. Despite the readiness of the IMAX 3D crew, the bird did not seem to wish to perform. But Dr. John McCosker got an idea. He grabbed a red baseball cap from the gaffer on set and began waving the hat beside the camera's lens. As the bird saw the red hat, it took the movement and color as some form of challenge, and the frigate bird began to display his magnificence, quite assuredly on cue.

The producers also enjoyed the expert assistance of Ecuadorian naturalist guide Mathias Espinosa. Commenting about her co-star in the film, Dr. Carole Baldwin states, "Mathias was such a professional, and was so knowledgeable about the Galápagos and the natural history of the area. He is a dive instructor with his own shop, Scuba Iguana, which he operates with Jack Nelson out of Nelson's renowned Hotel Galápagos. Mathias knew the dive sites and helped out in every way he could with the camera and with locating the animals we were looking for on land and underwater."

"You couldn't ask for anyone better," notes David Clark of Espinosa. "He is also an active environmentalist and cares very much about his country and about the conservation of the natural environment."

Representatives from the Charles Darwin Foundation and the Charles Darwin Research Station, as well as representatives from the Galápagos National Park Service and the Government of Ecuador, provided invaluable assistance to the production by working for several months to obtain permission and permits for the production to film in the protected area of the Galápagos.

Based in the Galápagos Islands, the Charles Darwin Research Station is the operational arm of The Charles Darwin Foundation. The Foundation was established in

1959, one hundred years after the publication of Darwin's "The Origin of the Species," under the auspices of the Ecuadorian Government, UNESCO and the World Conservation Union — formerly known as the International Union for the Conservation of Nature and Natural Resources (IUCN).

The Charles Darwin Research Station itself is located in wild, natural terrain about two kilometers from the port village and tourism center of Puerto Ayora on Santa Cruz Island. The Station has an extensive physical plant, with terrestrial laboratories, a marine laboratory, an herbarium, a library with scientific reference collections, a tortoise and iguana rearing center, nature trails, and a lecture hall, visitor center, staff offices, workshops, dormitories, and staff housing and dining hall.

The tortoise breeding and rearing program is one of the programs that the C.D.R.S. operates with its principal partner — the Galápagos National Park Service — to assist young giant tortoises to obtain the size necessary for their own survival against predators such as feral dogs and pigs — foreign species introduced during the last century by human visitors and settlers.

Since their discovery in 1535, the Galápagos Islands have been famed for their namesake — the giant tortoise (*Geochelone elephantopus*). The word "galápago" in Spanish means "saddle" and refers to the carapace, or shell, of these huge reptiles. Giant tortoises now occur only in Galápagos and on Aldabra atoll in the Indian Ocean. Weighing up to 595 pounds [270 kilograms], these huge, slow-moving animals reach maturity at 20 to 30 years. If they survive the difficult first few years of life when food scarcity is the major obstacle for them, they can live for over 100 years. They have few natural enemies, but are threatened by humans and their introduced animals.

The 14 subspecies of Galápagos tortoises all evolved from a common ancestor. Nine of these evolved separately, on individual islands. The remaining five are from the large island of Isabela — each geographically confined to one of the island's five major volcanoes. Today, three of the subspecies are extinct. Sadly a fourth subspecies, from Pinta Island, is represented by only one surviving male, nicked "Lonesome George."

"These are great reptilian, edge-of-time kind of creatures that may live to 150 years of age," notes David Clark. The giant tortoises feed on grasses as well as Otoy [*Xanthosoma sagittifolium*] and Porotillo [*Erythrina poeppigiana*] leaves when they are in the Highlands of Santa Cruz Island.

"With the passing of the 1998 El Niño, there had been quite a bit of rain in the highlands on Santa Cruz," Clark continues. "The grasses had come back and the giant tortoises also moved up to the area. This was very fortunate for us in that we were able to film these magnificent and unique creatures in their natural habitat... and a fitting completion to the filming for *Galapagos*."

"Editing a film for the IMAX screen can be a grueling process," observes stereographer William Reeve. "A cut from an establishing shot to a close-up can be very jarring to an audience. So we try to design shots that flow from an establishing shot into a close-up all in one move, and within that, a great amount of storytelling can be done. The film frame visually presents an enormous volume of information to the audience. For example, if we took a 15/70 film frame and put it on the best laserdisc recording medium, and then showed it on a high-resolution monitor, we'd still only be seeing one percent of the information that's on an IMAX screen."

Editing work for *Galapagos* began during the post-production period, and was completed in Toronto.

“I think audiences will be very excited, not only by the fact that they are seeing images the likes of which they’ve never seen before, but also that they are projected on an IMAX 3D screen and in a way that is visually stunning and unique,” concludes Al Giddings.

“We tried to incorporate all of the things that enthusiasts of the Galápagos enjoy seeing,” says David Clark. “We see the land iguanas and the frigate birds, as well as the sea lions and giant tortoises. And we’re also showing the undersea side, the marine iguanas, as well as the massive schools of fish and the hammerheads and moray eels and delicate sea cucumbers... to really see and experience the Galápagos like never before.”

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SECTION 2

ABOUT THE SUBMERSIBLE JOHNSON-SEA-LINK

"The SEWARD JOHNSON was really designed from the ground up to support deep ocean work and oceanography, and it's a fabulous vessel," says Al Giddings, speaking about the research and filming vessel owned and operated by Harbor Branch Oceanographic Institution, a non-profit marine research organization based in Fort Pierce, Florida. With berthing quarters that house a total of 45 crew — including the IMAX® 3D topside and underwater crews as well as the ship and submersible crew members — R/V SEWARD JOHNSON served as the completely self-contained operations base and living quarters for the 50 day expeditions. "The real core of the ship's systems is the wonderful submersible which is housed at the stern of ship," adds Giddings.

"The JOHNSON-SEA-LINK II is one of two vehicles of its class that Harbor Branch Oceanographic Institution owns and operates," explains Don Liberatore, Head of Submersible Operations and sub pilot for this mission. "It's a 14-ton [12.7 metric ton] underwater vehicle dedicated for marine science use. It is comprised of many components, but the most significant is the forward cockpit which is enclosed with a clear acrylic bubble, or sphere, which allows extraordinary visibility for the pilot and the scientific observer."

"There is also an aft observation chamber with sizeable (8 inch / 20.3 cm diameter) portholes and exterior lighting that allows for two additional people to observe," says Al Giddings. "The R/V SEWARD JOHNSON has a fine launch system which lifts the

submersible off of the deck and racks back to then lower it over the stern, allowing for launches in fair seas."

"The JOHNSON-SEA-LINK is a free-swimming, battery-operated vehicle," continues Don Liberatore. "Once we put it in the water there are no cables or wires attached and it is completely autonomous. After we are released during the launch, we go down and work, collecting samples and gathering data that the scientists need. We have a tower that penetrates through the bottom of the R/V SEWARD JOHNSON which transmits and receives all the communications to and from the submersible. The JOHNSON SEA-LINK is tracked from the surface ship's bridge so it knows our position at all times. Once we come back up, the surface ship R/V SEWARD JOHNSON recovers us again."

"In the past, scientists have been limited to using scuba equipment for doing research," says Dr. John McCosker. "It helps you to go down to about 200 feet [60 meters], but even at that depth it's cold and dark. In 1995, I had the opportunity to use the Harbor Branch submersible to go down to 3,000 feet [915 meters] and was able to capture a new species of fish every time we went down. It is so unique to be on planet Earth and to be able to catch a new vertebrate every time you go swimming, so to speak."

"The fish and other specimens that we collect using the JOHNSON-SEA-LINK couldn't have been collected in any other way," says Liberatore. "In Galápagos, the ocean floor is largely comprised of exposed volcanic rock and is often very rugged, so you can't trawl with a net. You have to get down there on top of the sample, hovering to get close to the rocks yet still being able to get back out again."

"The R/V SEWARD JOHNSON also has various labs on board, some of which are portable containers that are put onto the rear deck," explains Al Giddings. "Some of the

labs are reconfigured for photographic missions, depending on what the ship is doing. As you move forward into the superstructure of the ship you find technical workshops for electronic maintenance, and a mechanical shop with lathes. There are two really fine research labs, and for our expedition one of them was a wet lab in which we had an aquarium. R/V SEWARD JOHNSON also has berthing areas below and a large main galley."

"In addition to the cranes on deck which help to put packages over the side of the ship, there is also a Remotely Operated Vehicle on the starboard side, which is really more for safety than for research," continues Giddings. "Should the submarine become entangled or have any problems on the bottom, the sub's crew could launch this ROV. It has a power cable to the surface and has mounted video cameras and cutters and clippers. You can use the ROV's thrusters to 'fly' it as a remote vehicle, taking it down to 4,000 foot [1,220 meter] depths to rescue an entangled submarine."

A DIVE IN THE JOHNSON-SEA-LINK II

"A typical dive in Harbor Branch Oceanographic Institution's JOHNSON-SEA-LINK II is preceded by a dive meeting which is heralded by three bells that you can hear anywhere on the R/V SEWARD JOHNSON," explains director/producer/ underwater cinematographer Al Giddings. "Don Liberatore (Head of Harbor Branch Submersible Operations), or whoever the sub pilot is for the sub dive, will go through the mission to state how many hours are anticipated in the water and on the ocean bottom. Then, the Chief Scientist or myself, or whoever will be riding in the forward compartment with the pilot, speaks about what it is we want to accomplish."

"When the meeting finishes, everybody goes to the stern of the ship and the four people that are diving... the two in the aft compartment and the two up front, get into the submersible," continues Giddings. "There is another briefing by the pilot to go through safety measures and to explain how to contact the surface should something happen to him. He also explains how to bring the submersible to the surface, which can also be done from the aft chamber. The hatch is then closed and the count-down process begins, very similar to a launch of a mini-NASA shuttle."

"The JOHNSON-SEA-LINK is then picked up by a tremendous hydraulic lift system that suspends the 14-ton [12.7 metric ton] submersible from a giant aluminum A-frame structure," Giddings explains. "The submersible is jacked slowly backwards until it is hanging off of the stern."

"During the launch procedure, the ship has a little weigh-on, meaning that she's making a little forward speed," says Al Giddings. "The submersible goes down into the water and is just about half-submerged and then they pop the connector loose so that the ship and the submersible are no longer tied together. Immediately the submersible is swept back away from the ship so there's no chance of a wave driving the submersible into the stern of the ship."

"The submersible then usually moves out a hundred yards from the R/V SEWARD JOHNSON," continues Giddings. "There is another check, with the submersible communicating with the mother ship to obtain permission to dive. When permission is granted, the pilot floods down and the JOHNSON-SEA-LINK descends at a rate of about 100 feet- [30 meters] per-minute. For the 3,000 foot [915 meter] depth, that is about a 30-minute drop. During the making of Titanic, we had about a 2 to 3 hour free-fall in the water

column at about 100 feet- [30 meters] per-minute, so that gives you a bit of an idea of the depths we are talking about."

"After the seal is established and the permission to dive is given and the ballast tanks are filling with water, the sub slowly starts descending," explains Dr. Carole Baldwin. "As we sink in the water column, one of the things I'm looking at is the depth and the temperature of the water, trying to see where temperature drops occur. You go through various stages as you go down into colder and colder water. The other thing I watch is to see how deep you can still have some perception of light above you. It's amazing that even down to about 1,200 feet [365 meters] in places, if you look up, you can actually detect some surface light. Below about 1,200 feet [365 meters] it's totally dark."

"Once it gets completely black, you know that you are entering the deep sea," Dr. Baldwin says. "The sub makes all kinds of noises from the sonar and the different machinery and shifting of the structure. Going down in the dark in the submersible feels very much like living a page out of a science fiction story."

"When the submersible arrives on the bottom, the pilot tells the mother ship 'I'm on the bottom, copy,'" Giddings says. "The pilot then reports the visibility, water temperature, and checks a number of systems. Then he is finally given the green light to go on with the mission to start collecting fish, doing images, using the pan-and-tilt camera system, or to record sound."

"As we are descending, we can turn on the lights on the outside of the submersible and start looking at organisms that live in the water column," Dr. Baldwin explains. "There are just wonderful things down there... big pulsing jellyfish and pelagic sea cucumbers and

beautiful iridescent ctenophores. It's just fantastic. When you get to the bottom of the ocean floor, it's another world."

"Once we're given clearance, we start cruising around the bottom and looking for specimens we want to collect," continues Dr. Baldwin. "The JOHNSON-SEA-LINK has a whole variety of gadgets that we can use to collect things. The most common instrument that we use for collecting fishes is the suction tube, which is at the end of a long arm that actually has an elbow and a wrist.

"The JOHNSON-SEA-LINK also has a claw that we can use to pick up big fishes or sand dollars or sea urchins or starfish," adds Dr. Baldwin. "And there's a scoop which allows us to dig into the sediment and pull up things. Farther up on the submersible is a collection device that is called the 'upper critter getter' which is used primarily to collect organisms that are in the water column, such as jellyfishes and pelagic squid."

"There are many fishes down there that are either too big or too fast-swimming for us to catch," notes Dr. Baldwin. "But the submersible has cameras to obtain video footage or still photographs of things to have as a record of those specimens that we might not be able to bring up to the surface."

"Every time I go down in the submersible, it's magic," says Chief Scientist Dr. John McCosker. "Every time I look out the window and see something that I can't recognize I get very excited. And Harbor Branch's Don Liberatore is a fabulous pilot... he's really the best. I would say, 'Don, get that one,' and he'd chase it with the sub. And ultimately, he'd get almost anything we pointed to. It's such an exciting experience to a professional biologist... we'd be just like kids chasing fish."

"The maximum dive time for the sub dives we did was about three-and-a-half hours," Dr. Baldwin explains. "With the descent to 3,000 feet [915 meters] taking about 30 minutes and the ascent at the same rate, we had about two-and-a-half hours of time on the bottom. It seems like you just get down there and start collecting and the ship calls you on the radio and says 'Okay, it's time to wrap it up down there.' And I always felt like I could just stay there forever."

"In addition to time spent exploring the bottom, one of the most wonderful things about the sub trips was the experience of the ascent from the bottom," says Dr. Baldwin. "As the sub comes up from the bottom and through the water column, it runs into little gelatinous organisms, and when they are bumped they luminesce. If all of the lights inside and outside of the sub are turned off, it becomes an incredible light show. It's like seeing billions of fireflies... or like it's just snowing luminescence. It is absolutely mesmerizing. There are all of these tiny lights around you. And then, every now and then, the sub might hit something larger because you would see this big starburst of light. It is truly a magical, extraordinary, and enchanted voyage."

* * *

THE EXPEDITION SCIENTISTS

"In the role of the scientist who would be the central focus and one of the narrators for the expedition, we wanted someone who was really going to be genuinely enthusiastic about what he or she was doing," explains David Clark, discussing the selection of Dr. Carole Baldwin. "There are not a lot of female marine scientists, although their ranks are growing, yet we felt it was important to choose someone who could be a role model to a new generation of upcoming scientists. Dr. John McCosker works from the California Academy of Sciences in San Francisco and is our Chief Scientist for the expedition. He suggested several possible candidates and we set about to interview them."

"The first thing I said to David Clark when he walked through the door was 'Dave, I've convinced myself that I'm the right person for this project. Now, all I have to do is convince you.' And I suppose I did it," recalls Dr. Carole Baldwin, smiling as she recalls her original meeting with Clark at her work place in the Smithsonian Institution's National Museum of Natural History.

"Carole is so enthusiastic and charismatic and we knew she was just perfect for the film," notes David Clark. "She had done a lot of diving and collecting in the Caribbean but had never been to Galápagos before, and she had never been in a submersible either."

"I grew up in coastal South Carolina and I was in love with the ocean ever since I was a little girl," says Baldwin. "I think my earliest memories are of my father picking me up and literally throwing me into the waves of the ocean. I would come swimming back

out, but I think maybe my heart stayed there. I remember walking on the beach and listening to the waves crashing onto the shore. All of the things that would come out of the ocean just fascinated me. Horseshoe crabs kind of looked like they came from the age of dinosaurs, and some times they would just cover the beach. There would be big jellyfish and so many intriguing organisms that would wash up or that we'd see while snorkeling or digging in tide pools, and I knew that there was another world out there."

"I grew up watching Jacques Cousteau films on television," continues Baldwin. "I remember thinking that the clear blue water he was diving in was nothing like the murky water off of South Carolina. And in the back of my mind I figured that there were such places you could go and actually get in the water and see things. From watching television programs I also knew about Al Giddings and his incredible reputation, but I would have never, ever thought that I'd have an opportunity to work with him."

"Al Giddings is an absolutely wonderful man to work with," says Dr. Baldwin. "When we were scuba diving we had a remote sound system, and I wore a little earpiece on my mask strap so I could hear him talking to me as he was filming. And he would tell me 'Swim left, Carole. Swim up,' and 'Pan the light over the camera. He was so willing to pat you on the back and give you encouragement when you finished a dive with him. I think Al is great."

"Carole is particularly articulate and bright, and she's a really fine scientist," says Giddings of Baldwin.

"David Clark is also a fun guy and so well organized and very optimistic," notes Baldwin. "He kept us all together and always helped us to keep our goal in mind of making a really good movie in addition to the scientific study we were doing."

Dr. Baldwin also has praise for her colleagues on the expedition. "Dr. John McCosker was the Chief Scientist for the expedition. It was his tenth trip to the Galápagos, so he had a lot of knowledge about the fish fauna. And I can see why he loves it, because it is so exciting to be continually finding new things. Every time we dropped to the bottom we realized that we were in a spot of the world that nobody had ever seen."

"Dr. Dave Pawson is also from the National Museum of Natural History at the Smithsonian Institution and he studies Echinoderms such as starfish and brittle stars and sea cucumbers," continues Dr. Baldwin, who herself has worked at the N.M.N.H. for six years in a museum specialist position in the department of Vertebrate Zoology. "Both Dave and John are so funny, and when you get them together nobody can keep a straight face. Both have considerable submersible experience, and It was especially educational for me when we would share the submersible rides together. There are two compartments in the submersible, and each holds two people. The smaller chamber at the back has portholes that you can look out of on either side of the sub. Everyone wanted to ride up front in the bubble, of course, so instead of drawing straws, we worked out a rotation that made it fair for everybody."

Dr. Baldwin has done field work in the Caribbean at the Smithsonian Institution's research station in Belize, Central America, and has also done work in the Tonga Islands of the South Pacific. In her full-time research position at the N.M.N.H., she works as a systematic ichthyologist, which is someone who studies the diversity and classification of fishes.

"When a new species is described, one representative specimen of the new species is labeled a 'holotype' and is deposited into the Museum's type collection," explains Dr. Baldwin. "The Smithsonian Institution has some of the largest Type collections in the world. Natural history collections are used to document what species occur in different places. A collection is sort of like a library. Every jar of fish that comes in is given a catalogue number and a label listing when the fish was collected and where and by whom. If a species goes extinct, then we at least have an actual representative of that species in the collection. As well, if a scientist collects a fish and wants to see if his species is the same as one already described, he can actually go to the Smithsonian and look at Type specimens of other species to compare his material. In this way, the collection is used by scientists all over the world."

"Collecting specimens often involves underwater work," says Dr. Baldwin. "We use scuba gear to collect shallow water shore fishes. We try to document the biodiversity of the coral reefs and the coastal areas around the world. The emphasis right now for many scientists that study tropical marine fishes is in the Indo-Pacific region, because there are still so many places that need to be studied. Our collections at the Smithsonian actually have very few specimens from the Galápagos."

"It is interesting to note that if Darwin had only come to the Galápagos, he wouldn't have figured out his theory," says Dr. Baldwin, illustrating the point that comparative study is necessary to gain true perspective. "Darwin had to be able to compare the things he found in the Galápagos to specimens he found in other places to know that what he had was truly unique."

"Galápagos is a very important place for anyone studying evolutionary biology," states Chief Scientist Dr. John McCosker, who had worked with Al Giddings and David

Clark on their previous documentary, *Galápagos: Beyond Darwin*. "Animals that have traveled in various means from the mainland to the islands have gotten marooned there. They have been acted upon by natural selection and have evolved into unique and different species. That endemism, or uniqueness, of Galápagos animals underwater, is very similar to the uniqueness of the Galápagos finches or of the giant tortoises. As marine biologists, we're just trying to catch up with what the field biologists have discovered and documented with the animals that live on land and above the sea."

"Even with numerous dives, we have only sampled a tiny fraction of the ocean bottom," Dr. Baldwin says. "And it's staggering to consider the fact that most of the ocean is not bottom. There is all of that water between the surface and the bottom and it is characterized by varying levels of light and temperature and pressure. There are years' worth of exploration to be done. Even before our mission was over, I was already scheming of ways that I could get back down into the submersible to do more exploration."

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Section 4

BIOGRAPHIES

SCIENTISTS

For **DR. CAROLE BALDWIN** (Herself), *Galapagos* incorporates many firsts; her first time in a feature film, her first dive in a submersible and her first expeditions to Galápagos.

She has held a Museum Specialist position in the Department of Vertebrate Zoology, Division of Fishes at the Smithsonian Institution's National Museum of Natural History since 1992. Most of her previous research expeditions have been conducted in the Caribbean at the Smithsonian Institution's research station in Belize, Central America, and she has worked in the Tonga Islands of the South Pacific.

Dr. Baldwin was born in South Carolina and developed an early love for the ocean while living near the seashore and exploring along the beaches and amongst tidal pools. Before entering her Junior year of High School, her family moved to southwest Virginia and Carole's focus shifted to sports and the possibility of a career in physical education.

Upon entering James Madison University, her interest in the ocean and natural sciences was reawakened by an enthusiastic biology teacher, who was a botanist. Since J.M.U. was in the Shenandoah Valley and not on the coast, the University did not have a program in marine biology and so Dr. Baldwin earned a general bachelor of science degree in Biology. She then moved to South Carolina where she attended the College of Charleston, earning her Masters of Science in Marine Biology. In 1992, Dr. Baldwin

received her Ph.D. in Marine Science from the College of William and Mary's School of Marine Science at the Virginia Institute of Marine Science in Gloucester Point.

A summer job as a research assistant working with larval fish at the Charleston Marine Lab led Dr. Baldwin to the beginning of her career with a position at the Smithsonian Institution. Since then, she has published over two dozen articles concerning her specialties, and is a member of many prominent scientific societies, as well as being on the editorial board of Copeia — the journal of the American Society of Ichthyologists and Herpetologists. Dr. Baldwin is also on the Steering Committee of the Caribbean Coral Reefs Ecosystems Program of the National Museum of Natural History. In 1997, she developed a N.M.N.H. Senate of Scientists' Spotlight on Research Series presentation, "Bizarre Beginnings Beneath the Sea: A Little Fish Story."

As a systematic ichthyologist — someone who studies the diversity and classification of fishes — Dr. Baldwin's research interests are focused on the evolutionary relationship of fish, especially on the phylogeny of tropical-marine and deep-sea fish based on cladistic analyses of larval and adult morphology, the significance of morphological adaptations in planktonic fish larvae, the early life-history strategies of fish, and biogeography.

DR. JOHN McCOSKER (Himself — Chief Scientist) most recently was featured in Al Giddings and David Clark's television documentary *Galapagos: Beyond Darwin*, and has worked with both filmmakers on other documentary projects. He has served as an advisor for BBC Television's *The World Around Us a*nd for The Walt Disney Cable Network's *The Nature of Things*. His research was featured in the BBC and *NOVA* television special *Jaws, The True Story*.

Since 1995, Dr. McCosker has held the position of Senior Scientist at the California Academy of Sciences, which is based in San Francisco, California. He joined the Cal Academy in 1973 as Superintendent of the Steinhart Aquarium and then served as the Aquarium's Director from 1976 through 1994. From 1988 through 1989, and again in 1995, he worked as the California Academy of Sciences' Interim Executive Director.

He has participated in or led research projects and expeditions to the Antarctic, Australia, southeast Asia, the Pacific Islands, Central and South America, the Galápagos and Israel. He is an expert in ichthyology (the branch of zoology that deals with fish), and, after extensive study and 10 expeditions to the Islands, is one of the foremost experts on the Galápagos.

His research interests include; the evolution and behavior of snake eels and moray eels, the evolution and community structure of eastern Pacific reef fish assemblages, the biology and systematics of Galápagos shore fish, and the biology of the white shark and the coelacanth.

Dr. McCosker earned his bachelor of arts from Occidental College in Los Angeles in 1967, and then received his Ph.D. from Scripps Institution of Oceanography in La Jolla, California in 1973. He is also a trustee of the Ocean Trust Foundation, the Bolinas Lagoon Foundation and the Oceanic Society. He is author or co-author of 180 technical and popular articles as well as five books and monographs.

From 1996 to 1998, **DR. DAVID PAWSON** (Himself) served as the Associate Director for Science at the Smithsonian Institution's National Museum of Natural History. He also worked as Acting Director of the Museum from 1995 through 1997. He began his association with the Smithsonian Institution in 1964 as an Associate Curator, later

becoming Curator and then Senior Research Scientist. Dr. Pawson began his career as a Lecturer in Zoology at Victoria University in New Zealand.

Throughout his career, Dr. Pawson has collected around isolated islands including the Galápagos, Hawaii, New Zealand, Ascension, Bermuda, South Georgia, Deception and several Caribbean islands. His field work has included use of diving apparatuses and oceanographic vessels in the Pacific, Atlantic and Antarctic. He has made over 200 dives in manned marine submersibles to depths in excess of 13,000 feet [3962 meters]. He has published over 200 articles and book chapters.

Dr. Pawson's research is involved in marine biology; especially deep-sea animals of bathyal and abyssal depths, the ecology and systematics of sea urchins and sea cucumbers, genetic and environmentally-induced abnormalities in sea urchins, biogeography of isolated oceanic islands, and Antarctic biology.

MATHIAS ESPINOSA (Himself) has been working as a naturalist guide and diveguide in the Galápagos since 1988. Along with Jack Nelson, Espinosa opened the diveshop Scuba Iguana in 1996, and conducts over 700 dives per year. Espinosa is the only scuba Instructor trainer in Galápagos (one of only two in Ecuador), and has logged over 5000 dives. He is also an underwater video and camera expert and has worked with numerous underwater photographers and with documentary and motion picture production companies.

Espinosa is a pioneer diveguide in Galápagos and has worked to find and map divesites, as well as succeeding in having several designated as recognized natural sanctuaries. He is active in conservation and natural history eduction in Galápagos and

is an active environmentalist, working to combat illegal fishing in the Galápagos National Park.

Born in Germany to German and Ecuadorian parents, Espinosa was schooled in Munich, where he graduated in 1987 with a degree in Journalism. The following year he traveled to Galápagos, learning about the islands and their plants and animals first-hand as he studied and began to work as a naturalist guide. From 1991 through 1996, he served as operations manager for Aggressor fleet. He has also worked as a guide for exclusive private yachts such as Independence, Charade, and Starship Millennium, among others.

FILMMAKERS

During the past three decades, **AL GIDDINGS** (Co-Director/ Producer/ Underwater Cinematographer) has earned a reputation as one of the most creative and talented director-producer-cinematographers in the entertainment industry. Never settling for off-the-shelf technology, Giddings is constantly designing innovative camera, lighting and optical systems in all film and video formats, from IMAX technology to high definition television.

Teaming with David Clark, Giddings recently co-directed and co-produced the acclaimed large-format feature film *Whales*, as well as the two-hour Discovery Channel television documentary *Galapagos: Beyond Darwin*, which became the third-highest rated program in the Discovery Channel's 10-year history. Collaborating with director/producer David Clark, Giddings was also director/producer/cinematographer for the Discovery Channel's *Secrets of the Humpback Whale*.

Along with executive producer Peter Guber and executive producer/writer Barry Clark, Giddings is a founding partner of the non-fiction production entity Mandalay Media Arts, which produced *Galapagos* for the Smithsonian Institution and Imax Ltd.

Giddings is well known in the entertainment industry for his underwater directing and shooting of highly-acclaimed films such as *The Deep* and the James Bond classics *For Your Eyes Only* and *Never Say Never Again*. He pushed underwater film techniques and technology with ground-breaking innovations as director of underwater photography for *The Abyss* — a film which was nominated for an Academy Award® for outstanding cinematography. He also recently served as co-producer/director of underwater photography for the 1997 blockbuster spectacular *Titanic*.

In addition to numerous other feature film credits, Giddings has also directed and filmed the chilling under-ice sequences in *Damien: Omen II* and The Walt Disney Company's *Never Cry Wolf*.

Giddings has directed *Blue Whale: Largest Animal on Earth* for ABC's World of Discovery, which, along with *Shark Chronicles* and *Mysteries of the Sea* each earned him Emmy Awards. He has also received the George Foster Peabody Award for *Dive to the Edge of Creation* which he filmed for National Geographic. He also has directed and filmed dozens of films for television, including specials on the *ANDREA DORIA*, the North Pole, deep-sea volcanoes, the great whales and great white sharks.

Giddings' topside cinematography produced spectacular white-water sequences for the CBS mini series *Dream West*. He has produced and directed *Oceanquest*, a five-part NBC ocean adventure series which captured the number one slot in prime-time ratings. Giddings and his company, Images, Inc., produced two one-hour specials: *In*

Celebration of Trees, which was made for the Discovery Channel, and *Titanic: Treasure of the Deep*, which was hosted by Walter Cronkite for CBS. His video *Ocean Symphony* won the American Film Institute's highest award.

Most recently, Giddings was director/producer/cinematographer for Turner Original Production's high-definition special *Truk Lagoon: Underwater Odyssey*. His upcoming production work will include specials in high-definition television with Mandalay Media Arts.

Born and raised in the San Francisco Bay area of California, Giddings became interested in diving as a teenager. He built his own diving suit and purchased one of the first aqualungs that became available during the 1950s. Giddings explored and photographed underwater life along the California coast, selling some of his early print work to magazines. During the 1960s, he engineered and manufactured many underwater camera systems and lighting units and began producing underwater documentary films. Since then, he has directed and produced countless undersea feature films, television specials and commercials.

DAVID CLARK (Co-Director/Producer/Writer) is a two-time Emmy Award winner and has been producing and directing documentary films for over two decades. He recently teamed with Al Giddings to co-direct and co-produce the acclaimed large-format feature *Whales*, as well as the two-hour television documentary *Galapagos: Beyond Darwin* and *Secrets of the Humpback Whale*, both for the Discovery Channel. Clark also recently produced the three-hour mini series *Invisible Places*, also for the Discovery Channel.

As a supervising producer, Clark's credits include the one-hour National Wildlife Production/Disney TV special *An African Love Story*, with Hume Cronyn and Jessica Tandy, and four one-hour environmental documentaries broadcast on TBS entitled *World of Audubon*. For the latter series, he also personally produced four specials; *Galapagos: My Fragile World*, *Grizzly & Man: Uneasy Truce*, *Danger at the Beach*, and *Caribbean Cool*.

For PBS, Clark has produced and directed two one-hour episodes in a six-part series entitled *Sea Power: A Global Journey*. For the Discovery Channel, he has also produced the Emmy Award-nominated special *Tales of Wood and Water*, and 12 segments for Discovery's *Invention* series.

Between 1986 and 1990, Clark produced the National Geographic Explorer segments *Monterey Bay Aquarium*, *Big City Bike Messengers*, *Chesapeake Bay Skipjacks*, *Flying On Ice*, *Kamikaze* and *Falcons Soaring*, as well as the hour-long documentary *Cameramen Who Dared*. From 1983 through 1985, he worked as a staff producer and director for the PBS series *Smithsonian World*. Other producing credits include segments for ABC's *Gettin' Over* and *Code 1*.

As an associate producer and sound recordist, Clark worked on the National Geographic specials *Yukon Passage* and *Dive to the Edge of Creation* — where he first worked with Al Giddings — CBS's *1974 America's Cup*, *The Grandest Prize* and the Network's *Body Human* series, as well as NBC's *Lifeline* series. He received his Emmy Awards for sound recording for *Save the Panda* and *Dive to the Edge of Creation*.

Throughout his career, Clark has worked on all continents. Films which he has either produced or directed have received Emmy Award nominations, the Outdoor

Writer's Association Four Star Award, as well as top honors at the American, CINE, Columbus, Houston, Ohio, Missoula, and San Francisco film festivals.

Clark received his bachelor of fine arts degree in Film & Television, cum laude, from New York University. An early love for non-fiction films lead him into documentary filmmaking working as a sound recordist, eventually moving into producing and directing. In 1988, he formed his own production company, David Clark, Inc.

LAURENCE P. O'REILLY (Executive Producer) is the Co-Director of the Discovery Center Project at the Smithsonian Institution's National Museum of Natural History in Washington, D.C. In his position, O'Reilly also serves as Executive Producer for the forthcoming large-format films for the new theatre. He joined the National Museum of Natural History in 1984 as Assistant Director for Exhibits, managing a staff of 50 people involved in all aspects of exhibit development including; planning, budgeting, contracting, research and content development, design and engineering, and construction and installation. He also oversaw the development of major temporary exhibits in the areas of the arts, culture and natural science. In the mid-1980s, he began working on the development of the Discovery Center Project as a means to enhance the educational outreach of the museum.

O'Reilly earned his bachelor of arts degree in English from Boston College in 1973, and began his career with a 10-year association with Museum Services Division, Design and Production, Inc. which was based in Lorton, Virginia.

ANDREW GELLIS (Executive Producer) joined Imax Corporation in 1996 as Senior Vice President, Film, and has since been in charge of all development, and

production activities for the Company. He has executive produced and written the enormously popular IMAX® 3D film *T-REX: Back to the Cretaceous*, and has also executive produced *The IMAX® Nutcracker*, *Mission To Mir* and *The Hidden Dimension*.

Prior to joining Imax, Gellis had a four year affiliation with Sony Corporation where he initially served as an executive consultant/production executive at Sony Pictures Entertainment, developing a business plan and strategy for the Company's entrance into large-format filmmaking. Under the Columbia Pictures umbrella, Gellis wrote and produced the highly-acclaimed large format 15/70 3D film *Across the Sea of Time* for the flagship Sony IMAX Theater at Lincoln Square in New York City.

Gellis previously had produced the Destination Cinema large-format documentary *Hidden Hawaii* in 1990. His first venture into large-format film was with the large format project *Niagara: Miracles, Myths & Magic*, a film he supervised in his role as production vice-president at Cinema Group, where he worked from 1986-87.

As head of his own production company, Andrew Gellis Productions, Inc., he has developed, written and produced film projects in all formats. He was the executive producer of *Grandview, U.S.A.*, which starred Patrick Swayze and Jamie Lee Curtis.

A Harvard alumnus, Gellis began his career at the J. Michael Bloom Agency where he founded the literary department on both coasts. In addition to serving as a production executive at CBS Films, Inc., he has also been a studio-based producer at Twentieth Century Fox.

PETER GUBER (Executive Producer) has created an unparalleled record of success and a legendary reputation as an executive skilled at discovering properties, nurturing talent and shaping box office hits as head of Columbia Pictures in the early

1970s and later as CEO of Sony Pictures from 1989 to 1995. As an independent motion picture producer, he also has been responsible for the creation of some of the most critically acclaimed, commercially successful films of all times including *The Deep*, *Midnight Express, American Werewolf in London, Rain Man, Flashdance*, *Witches of Eastwick*, *The Color Purple*, *Tango And Cash*, *Gorillas in the Mist* and *Batman*. His personal film endeavors have grossed more than three billion dollars and earned more than fifty Academy Award® nominations.

Today, as Chairman of Mandalay Pictures, he oversees a fast growing multi-media company engaged in the creation of an aggressive slate of motion pictures such as *Donnie Brasco*, *I Know What You Did Last Summer*, *Seven Years in Tibet* and the upcoming *Sleepy Hollow*, plus innovative ventures in the fields of prime time television with four series on network and cable. In addition, Mandalay Sports Entertainment consists of professional baseball and hockey teams.

Guber, along with Al Giddings and Barry Clark, is also a founding partner of Mandalay Media Arts. The Company is a powerful new player in the arena of non-fiction films and television production dedicated to the creation of provocative, ground-breaking programming for the exciting new world of high-definition television and giant-screen, large format films. Previously, while helming Sony Pictures, Guber also founded and oversaw the development of that Studio's large-format filmmaking division.

BARRY CLARK (Executive Producer/Writer) is one of the world's most prolific producers in the fast-growing field of non-fiction television, and has pursued an award-studded career that has embraced all of the major genres of reality-based programming. During the past 15 years he has produced numerous series and specials for PBS, TBS,

and the major U.S. networks, plus more than 30 hours of prime-time programming for the Discovery Channel, including *Hunters*, one of the highest-rated series in the history of the Channel.

Barry Clark, along with Peter Guber and Al Giddings, is a founding partner of Mandalay Media Arts. He is also Chairman and Co-Founder of the biennial Jackson Hole Wildlife Film Festival and is a pioneer in the application of high-definition television to natural history filmmaking.

Through Telenova Productions — of which Clark is President — he recently produced the seminal and award-winning HDTV special *Jaguar: Year of the Cat* for PBS, NHK and Canal Plus, and, most recently, the forthcoming two-hour HDTV special *Sahara: Seasons in the Sand*.

Also through Telenova, Clark has produced several series for the Discovery Channel, including the four-part series *Outlaws and Lawmen*, *Secrets of the Deep*, and *Dive to Adventure*. For PBS, Telenova has produced numerous acclaimed specials for the *Nature* series, including *Monkeys on the Edge*, and *Under the Emerald Sea* (which Clark produced with Jack McKenney Productions). In cooperation with The World Bank, Telenova has produced a 20-minute film *A Question of Value*, for presentation at the ECO-92 Summit in Rio, and, in the following year, the films *Rondônia: The End Of The Road* and *Orangi: The Streets of Hope*.

Clark received a degree in physical chemistry from McGill University in Montréal, Canada, and pursued graduate studies in chemical physics at Harvard University. He entered the film industry in 1963, producing and directing an award-winning theatrical short-feature entitled *A lá Mod*. In the late 1960s, Clark worked with Jim Henson in New

York as head of production for Henson Associates, and in 1968 he coproduced, with Henson, the one-hour special *Youth 68* — a documentary noted for pioneering the use of electronic matting in broadcast television.

In the early 1970s, Clark wrote and directed more than thirty episodes of the half-hour prime-time access series *Animal World* and *The Challenging Sea* for Bill Burrud Productions, and, for Wolper Productions, wrote and produced the pilot for *Animal Gazette*. From 1972 through 1975, Clark worked at Walt Disney Productions where he wrote seven episodes of the *Wonderful World of Disney* anthology series. Later in the 1970s, Clark wrote and directed *The Wild World*, an award-winning series of five two-hour television specials on the state of the natural world, and he directed and produced two multi-part series of one-hour specials; *American Chronicles* and the award-winning *The American Diary*.

During the 1980s, Clark wrote and directed several episodes of the ABC science and nature series *Encyclopaedia Britannica Presents*, several episodes of the CBS magazine-format series *Special Edition*, and the HBO special *Eleanor Roosevelt: An Uncommon Woman*. He also produced 24 episodes of the half-hour series *The Secret World*. In the late 1980s, Clark founded Telenova Productions.

MARK ISHAM (Score) is a Grammy® and Emmy® Award-winner and Academy Award®-nominee for his memorable scores and solo projects. Isham won a Grammy for his self-titled 1990 album, and earned his Emmy for the main title theme to *EZ Streets*. He has received Academy® and Grammy Award nominations for his score for *A River Runs Through It*. He has also composed the film scores for Robert Redford's *Quiz Show*,

Jodie Foster's *Nell* (for which he received a Golden Globe nomination) and Sidney Lumet's *Night Falls on Manhattan*.

His other motion picture credits include *October Sky*, *Varsity Blues*, *At First Sight*, *Breakfast of Champions, Last Dance*, *Fly Away Hom*e, *The Education of Little Tree*, *The Gingerbread Man*, *Afterglow*, *Kiss the Girls*, *Home for the Holidays*, *Losing Isaiah*, *Mrs. Parker and the Vicious Circle*, *The Getaway*, *Romeo is Bleeding*, *Short Cuts*, *Of Mice and Men*, *Little Man Tate*, *Reversal of Fortune*, *Timecop*, *Mrs. Soffel,* as well as *The Moderns*, for which he won the Los Angeles Film Critics Award for Best Score.

Named one of the "Top Three Composers of the 80s" by the American Film Institute, Isham's feature films number over 50 with many having been made into soundtrack albums.

In addition to writing the themes for the television series *Nothing Sacred* and *Michael Hayes*, as well as contributions for the mini series *From the Earth to the Moon*, Isham is also responsible for the twice Emmy-nominated theme for *Chicago Hope*.

In the 70s, Isham recorded and/or toured with acts like the Beach Boys, Pharaoh Sanders and Van Morrison. Throughout the 80s, he also contributed to albums by such artists as Suzanne Vega, XTC, Was (Not Was), David Sylvian and Tanita Tikaram. Most recently the trumpeter was featured on the albums of The Rolling Stones, Joni Mitchell, Willie Nelson, Bruce Springsteen, Kenny Loggins and with Lyle Lovett on the soundtrack album for *Quiz Show*. Isham has been nominated for seven Grammy Awards, including three for his compositions for children's recordings in the acclaimed Rabbit Ears series; *The Emperor's New Clothes,* narrated by Sir John Gielgud, *Thumbelina*, narrated by Kelly McGillis, and *The Emperor and The Nightingale*, narrated by Glenn Close.

Born in New York, Isham began his musical career as a trumpet player, first in classical and then in jazz. After his family moved to California, he played trumpet in the Oakland and San Francisco Symphonies and with the San Francisco Opera Orchestra. He went on to play in various jazz and rock bands and, in his early 20s, he forged into electronic music, becoming a renowned synthesizer programmer. Yet trumpet remained Isham's primary focus as he established parallel careers as a classicist, jazz stylist, rock accompanist and solo instrumentalist. He began his feature film career in 1983 with synthesizer work and composition for *Never Cry Wolf*.

The multi-talented writer, actor, director, producer **KENNETH BRANAGH** (Narrator) has narrated the 24-hour CNN documentary series *Cold War*, as well as the series *Great Composers*, *Cinema Europe: The Other Hollywood*, *Universal Horror*, and *Anne Frank Remembered*. He has most recently completed a voice performance for Dreamworks' forthcoming animated feature *The Road to El Dorado*.

In 1989, Branagh exploded into international cinematic circles after directing, writing, and starring in a visceral and dynamic screen version of Henry V. The film won dozens of honors, garnering Branagh Academy Award® nominations for Best Director and Best Actor, as well as a National Board of Review Award, the European Actor of the Year Award, the D. W. Griffith Award for Best Director and a New York Critics Circle Award, among others.

Branagh went on to direct and star in the noiresque thriller *Dead Again*, the Academy Award®-nominated short *Swan Song*, and directed, starred in and produced the comedy *Peter's Friends* (winning the Evening Standard Peter Sellers Award for

comedy), an acclaimed screen adaptation of Much Ado About Nothing, and the horror hit *Mary Shelley's Frankenstein*. Branagh's 1996 screen version of Hamlet, which he adapted, directed and starred in, drew more awards, including an Academy Award® nomination for Best Adapted Screenplay.

His other film credits include starring roles in Oliver Parker's *Othello*, Al Pacino's *Looking for Richard*, Lesli Glatter's *The Proposition*, Robert Altman's *The Gingerbread Man*, Woody Allen's *Celebrity*, Barry Sonnenfeld's *Wild, Wild West*, as well as in *The Theory of Flight*, and Danny Boyle's forthcoming *Alien Love Triangle*. He has most recently adapted, directed and starred in *Love's Labour's Lost*.

Branagh's feature credits as a writer/director also include the romantic comedy *In The Bleak Mid-Winter*, which won the prestigious Osello d'Oro at the Venice Film Festival in 1995, and which opened the 1996 Sundance Film Festival.

Born in Belfast, and raised in Reading, U.K., Branagh studied at the Royal Academy of Dramatic Arts. In early 1982, only six weeks after leaving RADA, he made an acclaimed professional and West End debut in Julian Mitchell's *Another Country*.

Within two years, he joined the Royal Shakespeare Company, landing the title role in *Henry V*, amongst other starring roles. He began directing and writing productions and, in 1987 through 1994 — along with fellow actor David Parfitt — he created the Renaissance Theatre Company. Branagh's early film roles included *A Month in the Country*, *High Season* and *Swing Kids*.

ANDREW KITZANUK, CSC (top-side Director of Photography) has become one of the most sought-after directors of photography for large-format and 3D films. He has

worked as director of photography for more than 20 large-format films, including 11 productions for Imax Corporation and most of the IMAX® 3D features made to date.

He most recently served as director of photography for the IMAX 3D film *T-REX: Back to the Cretaceous*, as well as for *Across the Sea of Time* for the flagship Sony IMAX Theater at Lincoln Square in New York City.

His other credits include the large-format films *Africa, the Serengheti*, *Imagine*, *Titanica*, *Flight of the Aquanaut*, *Rolling Stones at the Max*, *Echoes of the Sun*, and *The Last Buffalo*. His debut on the IMAX screen was the large-format film *Beavers*, which was produced in 1988.

Kitzanuk became a staff member of the National Film Board of Canada in 1974, beginning a 13-year affiliation with the renowned organization. Beginning as a camera assistant, he eventually earned the reputation as one of the National Film Board's finest directors of photography. He filmed over 30 NFB productions including documentaries, short dramas and feature films.

In 1987, Kitzanuk joined the handful of filmmakers in the world who were venturing into the new medium of large-format filmmaking.

REED SMOOT (top-side Director of Photography) most recently completed photography on the forthcoming large-format 3D feature *Journey Of Man* for Sony Pictures/Cirque du Soleil, and previously directed, photographed and co-produced the large-format film *The Great American West*.

As a specialist in the production and photography for large-format films, Smoot's credits include *Grand Canyon: The Hidden Secrets*, *To Be An Astronaut* and

Yellowstone, as well as several films which have received Academy Award® nominations; NOVA/WGBH's *Special Effects*, and the Short Subject films *The Rainbow War* and *Ballet Robotique*. He has also recently served as director of photography for National Geographic's *Mysteries of Egypt*, and he was one of five large-format cinematographers selected to film the Nagano Winter Olympics for the production *Olympic Glory*.

Over the past 25 years, Smoot has served as director of photography on dozens of feature films for television and theatrical releases, including *Homeward Bound: The Incredible Journey*, *The Windwalker*, *Russkies*, the critically acclaimed mini series *The Long Hot Summer*, as well as the Academy Award®-winning documentary feature *The Great American Cowboy*.

In Memory of:

NOEL ARCHAMBAULT (Stereographer, Camera Operator) was involved in virtually all of the large-format 3D films shot to date, and served as stereographer and camera operator for *T-REX: Back to the Cretaceous*, *The IMAX® Nutcracker*, *The Hidden Dimension*, *L5: First City In Space* and *The Last Buffalo*.

Archambault studied film at Simon Fraser University where he developed a 16mm 3D camera system which he used to shoot *George Norris in Depth*, winning several student film awards. He began his career with the National Film Board of Canada working as part of the camera team on *Transitions*, the first large-format 3D film ever made, which debuted at Expo '86 in Vancouver, Canada.

After serving as first assistant camera on *Niagara: Miracles, Myths & Magic*, he joined forces with Imax Corporation to further 3D research, and helped design a new IMAX 3D camera. He became stereographer and camera operator for Imax's *Echoes of the Sun* and the 3D feature *The Last Buffalo*, which both premiered at Expo '90 in Osaka.

As location director and camera operator, Archambault directed portions of the backstage and on-stage shots for *Rolling Stones: At The Max*, and was cameraman on Sony Pictures Classics' 3D features *Across the Sea of Time* and *Wings of Courage*.

He also worked as director of photography for selected sequences of the Academy Award® nominated large-format feature *Cosmic Voyage*, and as director of photography and stereographer for the large-format films *Imagine* and *Into the Deep*. His other credits included the films *Echoes of the Sun*, *Flight of the Aquanaut* and *The Secret of Life on Earth*, as well as *Concierto por la Terra*, *Shooting Star*, *Safari 3D* and several traditional-format music videos.

ABOUT THE PRESENTATION AND PRODUCTION ENTITIES

The National Museum of Natural History is part of the **Smithsonian Institution**, which is a museum, education and research complex of 16 museums and galleries, and the National Zoo. It is the largest museum complex in the world, and it is one of the world's leading scientific research centers, with facilities in eight States and in the Republic of Panama.

The Smithsonian Institution celebrated its 150th anniversary in 1996. Its museums report more than 25 million visits a year with an additional three million estimated visitors at the National Zoo. The total number of objects in the Institution's national collections is

estimated at more than 140 million, of which only a small percentage is on display at any one time.

Founded in 1967, **Imax Corporation** has consistently delivered the world's premiere cinematic experiences. In 1997, Imax was awarded the sole Academy Award® for Scientific and Technical Achievement by the Academy of Motion Picture Arts and Sciences. The award recognized Imax's innovation in creating one of the world's best film capture and projection systems as well as Imax's acceptance as part of the entertainment mainstream.

There are more than 195 IMAX® theatres in 25 countries, with a backlog of more than 80 theatre systems scheduled to open in 15 new countries during the next few years. Over 500 million people have seen an IMAX presentation since the medium premiered in 1970. In 1999, more than 70 million people worldwide are expected to attend an IMAX theatre. IMAX has forged strategic alliances and relationships with some of the most prominent corporations in the world including The Walt Disney Company, Famous Players Inc. (a subsidiary of Viacom, Inc.) and Loews Cineplex Corp.

Mandalay Media Arts is the non-fiction programming production entity launched in 1997 by partners Peter Guber, Al Giddings, and Barry Clark.

In addition to its production activities, Mandalay Media Arts has an ambitious slate of non-fiction HDTV (high-definition television) projects in production and development.

Its initial outing in the HD medium is the upcoming two-hour PBS special *Sahara: Seasons in the Sand*, which recently wrapped 11 months of principal photography in North Africa. Also in production is a 90-minute special for Showtime, celebrating the

musical performances of African-American artists in film. Another high-definition project, tentatively titled *The Primal Contract*, is currently in development with Australia-based Beyond International and PBS station WETA. This four-part series — to be filmed around the world using new HDCAM high-definition camcorders — will explore the long and ambivalent relationship between humans and other animals. Also in development with London-based TransAtlantic Films and TV New Zealand, is a three-hour special on the Silk Road, which explores the past, present and future of this magical route linking East and West.

Founded in 1985, **America Online, Inc**., based in Dulles, Virginia, is the world's leader in interactive services, Web brands, Internet technologies, and e-commerce services. America Online, Inc. operates: two worldwide Internet services, America Online, with more than 18 million members, and CompuServe, with approximately two million members; several leading Internet brands including ICQ, AOL Instant Messenger and Digital City, Inc.; the Netscape Netcenter and AOL.COM portals; the Netscape Navigator and Communicator browsers; AOL MovieFone, the nation's #1 movie listing guide and ticketing service; and Spinner Networks and NullSoft, Inc., leaders in Internet music. Through its strategic alliance with Sun Microsystems, the Company develops and offers easy-to-deploy, end-to-end e-commerce and enterprise solutions for companies operating in the Net Economy.

The **National Science Foundation** (NSF), which provided major funding for *Galapagos*, was created in 1950 as an independent U.S. government agency to promote and advance progress in engineering and science research and education in the United

States. NSF invests more than $3.3 billion per year in almost 20,000 grants for research and education projects in engineering, science, and technology. NSF is the only federal agency whose mission covers science and engineering research – as well as education at all levels – across all fields. NSF manages all U.S. research done in Antarctica. Established by the National Science Foundation Act of 1950, NSF is overseen by a 24-member National Science Board and a Director, each appointed by The President. NSF's mission is to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense. Its mission includes enhancing public understanding of science and public literacy in science. Among many other activities, NSF is authorized by legislation to: (1) Strengthen scientific and engineering research potential and education programs at all levels, and appraise impacts of research upon industial development and the general welfare; (2) maintain a register of scientific and technical personnel, provide a central clearinghouse of data on scientific and technical resources in the United States, and provide a source of information for policy formulation; (3) determine the total amount of federal money received by organizations for the conduct of basic and applied scientific and engineering research and for the construction of associated facilities; and (4) recommend and encourage the pursuit of national policies for the promotion of basic research and education in the sciences and engineering.

The Charles Darwin Foundation for the Galápagos Islands was established in 1959, one hundred years after the publication of Darwin's "The Origin of the Species," under the auspices of the Ecuadorian Government, UNESCO and the World

Conservation Union — formerly known as the International Union for the Conservation of Nature and Natural Resources (IUCN).

The Charles Darwin Foundation is an international, non-profit organization which was created to help conserve the Galápagos Islands and their unique flora and fauna. Its approximately 100 members are a mixture of scientists, conservationists, Ecuadorian Government officials, and interested private citizens who share an interest in conserving the Galápagos.

Under an agreement with the Ecuadorian Government — renewed in 1991 for a second 25-year period — the C.D.F. advises and assists the Government on the conservation of Galápagos. The Foundation operates the Charles Darwin Research Station (C.D.R.S.) in the Galápagos Islands, and has the office of the Secretary General in Quito.

The Charles Darwin Research Station is located in wild natural terrain about two kilometers from the port village and main tourism center of Puerto Ayora, on Santa Cruz Island. The C.D.R.S. multi-national team is comprised of permanent staff, volunteers and students — about 100 people in total on three islands; Santa Cruz, Isabela and San Cristobal — and can also draw on the expertise of Foundation members around the world as well as from the frequent visiting scientists.

The Station's principal partner, the Galápagos National Park Service, is the government institution responsible for the Galápagos National Park. By conducting applied research on key problems affecting the Galápagos ecosystem, the C.D.R.S. assists the Park Service in design, planning and implementation of conservation programs.

The partnership between the two institutions has produced some highly successful programs, such as: the captive breeding of endangered tortoises and iguanas; the eradication of introduced mammals in certain islands; the rescue of near-extinct plants; and important advances towards effective conservation of the marine environment, which recently has been subject to mounting stresses.

Current areas of conservation research by the Charles Darwin Research Station include: improvement of reptile breeding and tortoise health; methods to counter threats to endangered birds; monitoring and protection of endangered plants; methods to control introduced plants; monitoring and control of introduced insects; marine biodiversity studies and biological studies of exploited marine species; and fisheries and ecological monitoring.

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A
Mandalay Media Arts
Production

Galapagos

Narrated by
Kenneth Branagh

Music Composed and Produced by
Mark Isham

Director of Underwater Photography
Al Giddings

Directors of Topside Photography
Andrew Kitzanuk, CSC
Reed Smoot

Executive Producers
Laurence O'Reilly
Andrew Gellis
Peter Guber
Barry Clark

Written By
David Clark
Barry Clark

Produced and
Directed By
Al Giddings
David Clark