# GROUNDBREAKING IMAX® FILM GOES INSIDE THE MIND OF TOUR DE FRANCE CYCLISTS

## LATEST NEUROSCIENCE RESEARCH FEATURED ON THE GIANT SCREEN WITH *WIRED TO WIN: SURVIVING THE TOUR DE FRANCE*

*Partners HealthCare, the National Science Foundation and Ortho-McNeil Neurologics, Inc. team up to excite young people about science and cultivate next generation of researchers*

(BOSTON, MA)[INSERT DATELINE] As the Tour de France cyclist navigates a sharp turn on a high-speed descent in the Pyrenees Mountains, a sudden cry of warning alerts him to a danger in the road ahead. All at once, we zoom straight toward the rider, into his ear with the sound, along the auditory canal and then, changing scales, into a strange world of web-like filaments shimmering with pulses of electrochemical energy. Premiering on December 5, 2005, *Wired to Win*: *Surviving the Tour de France*, a Giant Screen IMAX® film that combines dramatic images from the centennial Tour de France with spectacular computer-generated and medical imagery, is the centerpiece of an ambitious, multi-component project designed to generate new enthusiasm for science and stimulate a popular understanding of brain biology.

Produced by the non-profit **Partners HealthCare System**, the parent organization of Harvard-affiliated teaching hospitals, physicians and researchers, *Wired to Win* draws upon an unprecedented team of scientists, filmmakers and educators to present an engaging and striking new portrait of the human brain to the general public. Funded in part by a grant from the **National Science Foundation**, and sponsored by **Ortho McNeil Neurologics**, **Inc**., *Wired to Win* is designed to extend the scientific expertise, research and educational mission of Partners HealthCare through a film that is both entertaining and educational.

“What we now know about the brain, how it works and the intimate connections between brain function and every single thing we do is unbelievable,” says Dennis J. Selkoe, M.D., one of the film’s science advisors and the Vincent and Stella Coates Professor of Neurologic Diseases at Harvard Medical School and the founder of the Partners Program of Excellence in Alzheimer’s and Neurodegenerative Diseases. “*Wired to Win* very cleverly illustrates how a healthy brain works, and how cyclists in the Tour de France use the mind – not those equally impressive leg muscles – to integrate a huge amount of information to execute a plan to beat the competition.”

“*Wired to Win* is designed to engage the public in understanding brain science, inspire the next generation of researchers, and illustrate the advances of neuroscience research and its practical applications,” says Valentine Kass, program director, Informal Science Education, National Science Foundation. “By combining the excitement of large format film, the thrill of the Tour de France, and the wonder of the human brain, *Wired to Win* creates a stimulating educational experience and achieves all of these important goals, which are critical to this country's competitive advantage in the sciences."

"Our sole focus is on pioneering neurological solutions that change people’s lives," said Neal Fowler, president, Ortho-McNeil Neurologics, Inc., the film’s Presenting Sponsor. “We are honored to join Partners HealthCare and the NSF in supporting this groundbreaking educational platform that will captivate and stimulate youth around the world by transforming the way we learn about brain biology.”

**The Film**

Using the specially designed 70mm IMAX® format famous for its larger-than-life images, a world-class production team captured the breathtaking scenery and dramatic real life storyline of the Tour de France during the 100th anniversary of the famous race. Led by Principal Investigator and Senior Producer **JoAnna Baldwin Mallory**, the director of the Office of New Ventures at Partners HealthCare, the film team included Academy Award-Nominated Film Director **Bayley Silleck**, Line Producer and Editor **Myles Connolly** and First Assistant Director and Co-Writer **Daniel Ferguson**.

The Tour de France has been filmed before in smaller formats, but the logistical complexity of following the fast-moving event has made capturing 70mm images exceedingly difficult. For years, numerous IMAX® films featuring the world's largest annual sporting event had been proposed, but had never reached completion for a variety of reasons – financial and logistical. To overcome the challenges, the *Wired to Win* team employed a crew of more than 50, used four cameras, and invested in elaborate research and development prior to the start of the centennial race. Multiple vehicles and gryro-scopic mounts were tested, including a redesigned BMW motorcycle equipped with a Libra Head to maintain the stability of the IMAX® camera. The camera itself was then operated remotely from a helicopter – something never attempted before. Other scenes were shot from 60-foot cranes positioned along the route.

"Making a giant-screen documentary during an event over which we had no control was beyond complex," admits Silleck. "But, the diverse techniques, the nearly 26 days of shooting and the excitement of the crew about this project and its potential resulted in some of the most spectacular images ever taken of the Tour de France, not to mention an incredible human story."

*Wired to Win: Surviving the Tour de France* tells the true story of two riders in the legendary bike race – Australian **Baden Cooke**, and his French teammate **Jimmy Casper** – as they attempt to compete in the grueling three-week-long event. Narrated by British thespian **Alfred Molina** (*Spiderman 2*, *Frida*), the film follows Baden, Jimmy and the other elite athletes over the towering peaks of the Alps, through the knotted villages of Provence, and the cobblestone streets of Paris, as they try to avoid danger, deny crushing pain and fatigue, control their emotions, seize fleeting moments of opportunity, and stay highly motivated. Powering each of them, of course, is the source of universal ambition and ability: the human brain, presented here as a dynamic engine of possibility.

**The Science**

The film team relied upon an impressive group of neuroscientists, psychiatrists, and neuroanatomists to effectively and accurately depict the role of the brain during this grueling test of endurance. Among the film's major science advisors were Bruce M. Cohen, M.D., Ph.D., President and Psychiatrist-in-Chief at McLean Hospital and Director of the McLean Brain Imaging Program; Gary L Gottlieb, M.D., M.B.A., President of Brigham and Women's Hospital and Professor of Psychiatry at Harvard medical School; Martin A. Samuels, M.D., Neurologist-in-Chief and Chairman, Department of Neurology, Brigham and Women's Hospital and Professor of Neurology, Harvard Medical School and Dennis J. Selkoe, M.D. (see above).

"Each neuroanatomy sequence had input from specialists in the appropriate fields," says Baldwin Mallory. For example, in a sequence where a rider must avoid sudden danger on a downhill mountain switchback, the team relied on the research and advice of Dr. Joseph E. LeDoux, Principal Director for New York University's Center for the Neuroscience of Fear and Anxiety. Other sequences employed the expertise of neuroscientists with the Dana Alliance for Brain Initiatives (Kathleen M. Foley, M.D., Director of the WHO Collaborating Center for Pain Research and Education at Memorial Sloan-Kettering Cancer Center; Bernice Grafstein, Ph.D., Vincent and Brooke Astor Distinguished Professor of Neuroscience Office, Cornell University Medical College; Myrna Weissman, Ph.D., Professor of Epidemiology and Psychiatry and Chief of the Division of Clinical and Genetic Epidemiology, New York State Psychiatric Institute).

"We worked closely with the film team to explain how the brain interacts with the body, which parts of the brain are involved in each of its functions, and how best to illustrate what brain activity looks like. We also worked to clarify how the intense actions of the tour riders are replicated in the daily life of our brains," says Dr. Cohen.

For example, in a sequence on pain, the narrator tells us: "Pain is not where we think it is. Not even in a cyclist's leg." During this sequence, the scientists explained to the film team how specialized nerves send electrical signals up the spinal cord to the sensory strip of the cortex, the area that allows the rider to locate the source of the pain. Meanwhile, another part of the cortex (the anterior cingulate) tells the rider how bad the pain is. In addition to guiding the team toward the correct terminology to explain how the experience of pain is constructed and deconstructed in the brain, the scientific advisors took great care to ensure that the images on screen were neuroanatomically accurate.

"This whole process was an unusual collaboration among scientists who understand the brain in the most nuanced of ways, and filmmakers who want to communicate that understanding in a way that is accessible to the general public," says Gottlieb. "It was meaningful to translate these functions that take place unseen in our bodies every day into words and images that are compelling to the viewer. *Wired to Win* manages to capture the thrill a scientist can experience every day when he or she puts together yet another piece of the amazing puzzle of brain function."

**Computer Generated Imagery**

Seamlessly integrating the excitement of the Tour de France and the latest understanding of neuroscience are elaborate computer animation sequences made possible through the use of innovative film, digital and medical imaging technologies. Created by **nWave Digital**, a Brussels-based worldwide leader in large-format, high-resolution computer graphics, these images transport audiences into the inner recesses of some of the brain's most complex structures.

Each of the seven neuroanatomy sequences required for the film, were designed by two certified medical illustrators, Rob Flewell and Ron Mathias, who drafted detailed storyboards intended to guide nWave animators. Working in collaboration with senior science editors Matthew P. Frosch, Ph.D, M.D., (Assistant Professor of Pathology, Harvard Medical School and Massachusetts General Hospital), and Constanza Villalba, Ph.D., the illustrators ensured the eventual computer animated sequences would be both medically accurate and visually dynamic. Digital artists at nWave used actual surgical planning data sets from Brigham and Women's Hospital and anatomical models from Zygote Media Group 3D. The result is a degree of photo-realism rarely seen in the IMAX® format.

"Though others have created images of the brain and brain function before, none of this work has been done for the giant screen medium before," says Mark Katz, President of **nWave Pictures Distribution**. "The format allows us to show precise portions of the nervous system in greater detail then ever before; and advances in technology make it possible for us to move back and forth from live action to computer generated images."

In one of the most memorable CG scenes from the film, the entire human body is constructed before our eyes – beginning with the different components of the brain, following with the nerves and concluding with the skeleton, internal organs and muscles. In the final shot, a fully formed computer generated body segues seamlessly into a live-action rider in the race.

"This early film scene that builds an understanding of the various parts of the human brain and how it connects with the rest of the nervous system really sets the stage for the whole film from a science perspective," adds Dr. Selkoe. "Even when the computer generated images are not on screen, there is an understanding of the greater drama of what is going on behind the scenes in the rider's mind as a result."

*Wired to Win* took full advantage of recent developments in medical imaging technologies that record brain activity in real time in response to specific external or internal stimuli. Drawing on the expertise of Partners' facilities and research, the film employed Positron Emission Tomography (PET) and Magneto-encephalography (MEG), as well as MRI images from the Athinoula A. Martinos Center for Biomedical Imaging. In addition, Functional Magnetic Resonance Imagery (fMRI) provided by Dartmouth College was used to create stunning, audience-immersing imagery of the brain in action.

**Educational Materials**

Led by Director of Print Materials **Sharon Simpson**, the *Wired to Win* team has created one of the most ambitious public outreach campaigns ever mounted for a giant screen film, including 5 original print pieces for teachers, other educators, and students grades 4-12, a brochure for families, mini classroom posters, educational lobby kiosks, and a website (www.wiredtowinthemovie.com), along with reference materials prepared by the Dana Alliance for Brain Initiatives.

"We know that *Wired to Win* is an exciting film to watch," says Simpson. "What we wanted to ensure was that the excitement kids felt when they zoomed along through the brain with the computer generated images would last beyond the movie and translate into a further interest in the science."

The *Wired to Win* website uses key segments of the film as a launching pad for a range of original scientific background materials and fun, interactive learning activities. A particular highlight will be a "guided tour" of the brain. Visitors to the site will have the opportunity to discover attributes of brain anatomy and function, while exploring topics such as perception, thought, emotion, memory, language and culture.

**Public Programs**

To further extend the reach of the film, and impact the ongoing conversation around science education, several affiliated public programs targeting educators, community leaders and young people will occur after the film's release. In 2006, a *Wired to Win* National Educator's Symposium will bring together science center educators, classroom teachers and representatives of community organizations to share ideas and strategies with neuroscientists, neuroscience literacy experts, and educational development professionals in order to develop creative and unique programs for their own communities and to broaden the educational impact of the film. In addition, a separate *Wired to Win* Science Communications Conference will provide a groundbreaking international forum examining the subject of science policy, as well as how the scientific community and leading communicators inform the public about scientific discovery and the process of scientific research.

## Production Notes and anecdotes

PROJECT BEGINNINGS

When **JoAnna Baldwin Mallory** took on the role of director of the Office of New Ventures at **Partners HealthCare**, one of the largest bio-medical research organizations in the US, she began searching for an appropriate and ambitious project that would extend Partners professional educational mandate to public science education. With extensive experience in the world of public television, she had just completed involvement in the 5-part PBS series "The Secret Life of the Brain", and quickly came to recognize a unique opportunity to take the subject to another level. "I was already aware how dynamic the field of neuroscience had become in the preceding decade," says Baldwin Mallory. "Upon coming to Partners, I realized what an important role Partners scientists have had in exploring and expanding the frontiers".

With approval from Partners leadership, she began developing Wired to Win – this time with an approach suited to the giant screen as opposed to a television screen -- and approached the **National Science Foundation** for funding at both the planning and production phases of the project. However, before she could secure production funding for the film, Baldwin Mallory needed a hook -- a dramatically compelling and visually appropriate backdrop. Enter Peter Frumkin, veteran producer and writer of several PBS programs. "Peter was the one who first proposed the concept of using the Tour de France to explain how the brain works. It just seemed perfectly suited to the IMAX® format."

**Bayley Silleck**, director of several films for the giant screen (*Cosmic Voyage, Lost Worlds: Life in the Balance, On The Wing*), was equally intrigued, though he knew little about professional cycling. "It's kind of embarrassing, really. I didn't realize it was a team sport…that there was actually an incredible amount of strategy involved – it's like chess on bikes. When you get to know some of the riders, and you learn how hard it is just to finish the race, let alone win anything, it's almost impossible not to get emotionally invested."

COLLECTIVE BRAIN POWER

With funding secured from NSF, word spread quickly about an IMAX® film to be shot during the Centenary Tour de France (2003 marked the 100th anniversary of the race). The filmmakers soon found themselves astonished at how popular the concept seemed to be, especially among other filmmakers. **Rodney Taylor**, (Kodak Vision Award recipient, and Director of Photography on *Alaska: Spirit of the Wild, Loch Lomond: Legend of the Loch, Country Music: Spirit of America*) was one of the first to call. "I've followed the Tour since the days of Greg LeMond. I still have all the old tapes. For years, I had dreamed about getting an IMAX® camera in the race...and the great thing about this concept was that it wasn't just another sports film. It was a film about the power of the human brain, so that gave it a much broader appeal."

Line Producer and Picture Editor **Myles Connolly** *(Everest, Dolphins, The Magic of Flight*) also revealed himself to be a long-time Tour fanatic, as did most of the fifty-nine members of the crew who took part in the 3-week shoot. "We brought in experts in the world of large format, but also people from outside the industry who we knew would bring a dynamism to the subject," says Connolly. "Rodney insisted we have a steadicam with us, so we booked Larry McConkey (*Kill Bill, The Sopranos, Mission Impossible*)."

McConkey is one of the top steadicam operators in the world, working frequently with Martin Scorsese and Brian DePalma (for cinephiles, the long tracking shot in *Goodfellas* is Larry's handiwork). The team also hired 2nd Unit Directory of Photography Larry Blanford *(XXX, Minority Report*) and helicopter pilot Fred North (*The Bourne Identity, A Very Long Engagement*). Apart from shooting the aerials on the film, Blanford and North would be called on to fill another, slightly more unusual role.

"We knew we wanted to get cameras in with the riders, to put the audience in the race," says Taylor, "We couldn't use a car, or even a 3-wheel vehicle. It would have taken up too much space on the road. The only thing that was going to work was a motorcycle, but where we were going to put the camera operator and focus puller was still anybody's guess."

Taylor, along with Libra technician Jon Philion made extensive tests using a remote control system in a car, but found the system unreliable in a race where over 30 motorcycles and hundreds of vehicles flight for space on roads where even sheep negotiate for the right of way. Keeping the motorcycle in line of sight at all times would take something more radical.

When Taylor finally relayed his solution to Silleck, there was a long pause on the other end of the phone. "You think we're going to be able to put a helicopter in the air for every hour we have a motorcycle on the ground just to follow?"

Taylor's response was direct. "There's no other way."

Both IMAX® 15-perf 70mm. and Iwerks 8-perf 70mm. cameras were tested on the motorcycle rig, but eventually Taylor came to prefer the look of the 40mm lens on the former. This meant that after just 2 minutes and 45 seconds of filming, the helicopter was forced to land and meet the motorcycle in a nearby field or tennis court, reload, and then try frantically to get back in the race.

Patrice Diallo, the unflappable motorcycle driver took to wearing a big orange X on his helmet so pilot North could spot him easily from the air, The team used six separate radio frequencies from the French military: one to control the Libra Head, one for the video playback, one to focus, one to adjust the aperture, one to turn the camera on and off, and one to communicate. Well, sort of…

"The scenario went a little something like this," recalls Diallo, a sly Gallic grin spreading across his tanned features, "I would wait for the race commissioners to give me permission to enter the peloton, then ride up alongside the rider they wanted a shot of, and would radio Peggy [North], the aerial coordinator. She was behind the riders in a car, trying to stay as close as possible without upsetting anyone. I never spoke to the guys in the air. I just got into position, and Peggy radioed Fred and Larry to tell them to start the camera."

"It was madness," admits Taylor. "Trying to make a real documentary during a high risk event over which we had no control…was by far the most complicated experience of my entire life."

For Silleck and the rest of the crew, each day was an emotional rollercoaster, as news from the four camera crews trickled in. "A typical day might see one crew getting a shot that perfectly matched the storyboards, while another had a blown circuit board and didn't get anything," recalls co-writer and 1st Assistant Director **Daniel Ferguson**, "sometimes, we succeeded in getting a shot, but no one was quite sure if we got the right rider. I remember one day where we got a shot at the starting line, and then raced 120 miles through every back road to avoid the traffic and make it to the finish line before the riders, only to have a camera jam on arrival!"

ADAPTING TO REAL LIFE

Months prior to the start of the race, a core team scouted the entire 3400 kilometer (2110 mile) route, noting every interesting church, vineyard, gorge, hilltop village the racers would pass on their way through France (the route of the race changes each year). "After 3 weeks of scouting, and probably far more wine and cheese than anyone wants to consume in a lifetime, we were able to submit GPS references for every camera position to the race organizers (**Amaury Sport Organization**)," says Ferguson. "The first thing A.S.O. told us was that due to the number of people on the roads during the race, most of the camera positions would have to be held up to 96 hours in advance to ensure we wouldn't lose our place!"

"There was so much pressure with every shot," says Director Silleck. "We ended up putting spotters every 50 meters down the mountain roads with walkie-talkies to follow a particular rider. It's nearly impossible to isolate one guy out of 200, but you only get one take per camera per day, so you better get it right!"

There were other issues, like the perfect field of sunflowers that wilted the day the peloton was scheduled to pass, or the well-intentioned, but solidly inebriated German fan who insisted on helping the crew by sticking his finger directly in front of the lens to point out specific riders, or the massive crash on the first day that would completely change the storyline of the film. (*WARNING SPOILER AHEAD*: One of the protagonists, **Jimmy Casper**, was among the injured and ended up dropping out nine days later). For Silleck,

Baldwin Mallory and the rest of the team, this only added to the film's authenticity. "You can plan everything, but at a certain point, you have to recognize that you're making a documentary, and you need to adapt when things change," points out Silleck.

In a sense, this is perhaps the central theme of *Wired to Win: Surviving the Tour de France*. As the command center of the nervous system, the human brain is unparalleled in its flexibility, changing throughout our lives with experience, and allowing us to adapt to different circumstances.

## A HEAD IN THE RACE

With the spectacle of the Tour de France on film, the team's next challenge was to integrate the dramatic arc with an equally compelling scientific one. "We knew from the start that we didn't want this to be a textbook approach to neuroscience," clarifies Baldwin Mallory. "The science had to flow naturally from the drama, from the human story. We wanted to move seamlessly from live-action to computer generated imagery of the inner workings of the brain."

For the neuroanatomical sequences, the team took advantage of Partners internal expertise, augmented by external science advisors across the country. Besides providing insight, relevant literature and images to better orient the filmmakers, one of the advisors, Matthew P. Frosch, Ph.D, M.D., (Assistant Professor of Pathology, Harvard Medical School and Massachusetts General Hospital) insisted that writers Silleck and Ferguson participate in the dissection of a human brain.

"I was a bit taken a back at first," says Ferguson, "There we were, dressed in blue smocks at the MGH morgue, holding something that weighed no more than three pounds and yet held the secrets of someone's personality. It was so much more beautiful and delicate than I imagined. I felt like saying to Matt [Frosch], you really don't have to do this for us. We're only filmmakers!" Dr. Frosch, however, insisted: "Part of my job is teaching neuroanatomy to med students and graduate students, so the chance to extend that to families and children in a way that they can grasp it was very exciting."

"We had so much expertise on the neuroscience sequences," says Silleck, "and everyone was so passionate about the subject matter, just as the live-action crew had been about shooting the Tour de France. I think everyone felt we were doing things that had never been visualized before, that we really were breaking new ground." Indeed, when another of the film's advisors, Dennis J. Selkoe, M.D., (Vincent and Stella Coates Professor of Neurologic Diseases, Harvard Medical School) saw the first tests of animated neurons on the dome of the Boston Museum of Science, he exclaimed, "That's exactly what I had always imagined it looked like!"

## Film Synopsis

A jumpy-home movie shows a six-year old boy learning to ride his first bicycle with help from his father. The Narrator tells us that with each moment, each new experience stimulates growing networks of cells in our brains. "We used to think these changes happened only in childhood, but now we know that our brains never stop developing – wiring and rewiring themselves with every experience and every challenge." After several initial failed attempts and even crashes, the boy begins to show improvement and confidence. Finally, he is riding alone in a seaside park, amazed at his own accomplishment.

Cut to a spectacular full-screen aerial descending the steep eastern escarpment of the Col d'Aubisque in Southern France. As the camera drops down the mountainside, we discover a ribbon of cyclists and vehicles streaming down a narrow, twisting, corniche road. This, says the Narrator, is the legendary Tour de France – a 3400-km, three-week bicycle race that has been called the world's most grueling sports event, and the ultimate test of the human brain.

Australian pro cyclist Baden Cooke and his French teammate Jimmy Casper are two of the 200 riders competing in the legendary race. Just to finish in Paris, they will need to avoid danger, deny crushing pain and fatigue, control their emotions, seize fleeting moments of opportunity, and stay highly motivated – and it's the brain that controls all of this.

As the tightly-packed peloton speeds towards the first sprint finish of the Tour, a sudden crash of one rider sets off a horrific chain-reaction, and nearly 100 riders are taken down. Jimmy Casper is one of the most severely injured. To everyone's astonishment, he opts to continue in the race for as long as he can. Meanwhile, Baden, one of the few unaffected by the crash, manages to win his first ever stage victory, thus becoming one of the favorites to win the coveted sprinter's green jersey.

As the race unfolds, the destinies of Baden and Jimmy divide. Jimmy wants desperately to help his team by remaining in the race, while Baden becomes the unexpected team leader. As the race traverses the Alps and the Pyrenees, the film combines spectacular live-action footage with cutting edge computer graphics and medical imagery to demonstrate how each brain responds to experience and challenge in ways we're only just beginning to understand.

"Our goals may not be those of pro athletes, says the Narrator as the remaining riders reach Paris at the end of the punishing three weeks, "but we're all wiring ourselves to win. Any activity that challenges us, and gives us a sense of purpose, will nourish and strengthen our brains."

The film ends as it began, with the home movie of the 6-year old boy riding his two-wheeler triumphantly on his own. "We fall, we get up, we learn," says the Narrator, "Powered by the human brain, there is no end to what we may achieve."

## Key Facts

### *The Production*

- The film was produced by Partners HealthCare System's office of New Ventures as part of its public education and outreach initiative.
- Major funding for the film came from the National Science Foundation and from Presenting Sponsor Ortho McNeil Neurologics, Inc.
- The film took five years to make with project-related programs continuing to roll out for two years after the film's release.
- This was the first IMAX® film ever to feature the Tour de France.
- Four cameras were used to film the Tour (2 IMAX® cameras, one Iwerks 8/70mm camera, and one 35mm camera).
- Cameras were mounted on steadicam rigs, cranes, trucks, cars, motorcycles and helicopters.
- Filming took place in France, Spain and the Eastern United States.
- 60 crew members worked on the Tour de France shoot.
- To get the camera inside the Tour de France peloton (main body of riders), the IMAX® camera was mounted on the back of a redesigned BMW motorcycle and operated by remote control from inside a helicopter 2000 feet overhead.
- To operate the camera by remote control, six separate radio frequencies were required: on/off, the gryo-stabilized Libra head, focus, aperture, communication and pan and tilt of the camera.
- The film team had to select every camera position two months prior to the start of the race and submit corresponding GPS points for each to the race organizers.
- Hotels for the crew were booked six months prior to the start of the race as they fill up so quickly.

### *Computer Generated Imagery*

- Writers Bayley Silleck and Daniel Ferguson were asked to take part in a dissection of a human brain as part of their preparation for work on the script.
- Certified medical illustrators Rob Flewell and Ron Mathias worked for five months on the storyboards with Partners HealthCare advisors for the neuroanatomy sequences.
- To create realistic looking models of the human bodies, muscles, organs and the nervous system, computer animators at nWave Digital used a Surgical Planning Dataset from Brigham and Women's Hospital and anatomical models from Zygote Media Group 3D.
- Much of the computer animation of the brain is based on functional magnetic resonance imagining (fMRI), a technology that allows scientists to visualize the brain's activity in real time.

### *The Tour de France*

- The Tour de France was first held in 1903 (2003 marked the Centennial Tour). The inaugural race consisted of six stages for a total of 2,428km (1,509 miles).
- The course changes every year, with several stages taking place in neighboring countries. Since 1968, it always finishes on the Champs Elysees in Paris.
- The race lasts for three weeks, and usually consists of a prologue, 20 daily stages and two rest days.
- Each stage averages 160 kilometers (100 miles) and lasts five to six hours.
- Each year, 20-22 teams start the Tour, with nine riders per team.
- On average, 50 riders do not finish the race every year.
- Each team has one or two designated leaders (usually riders with the ability to win one of four special jerseys).
- The Jerseys:
    - The Yellow Jersey is worn by the overall race leader (rider with the lowest cumulative time).
    - The Green Jersey is worn by the best sprinter (rider who collects the most points by winning the short sprints throughout the Tour).

  - The Polka-dot/King of the Mountains Jersey is worn by the best climber (rider who collects the most mountain points by being the first to reach the summit).
  - The White Jersey (otherwise known as the Yellow Jersey for Youngsters) is worn by rider under the age of 26 with the lowest cumulative time.

- Riders can also win glory for their team/sponsor by winning one of the daily stages.
- Other riders on the team will often "work" for the leaders by protecting them from the wind, and carrying food or drink for them.
- Each team has two cars that follow the riders. Inside each is a "directeur sportif" (coach), who listens to live radio and sometimes live TV. He communicates to riders through radio (riders wear an ear-bud). Riders can also talk into the radio.
- Mechanics ride in the back of the team car on the right hand side so they can jump out quickly for a rapid repair.
- By sheltering from the wind behind another, a cyclist gains an aerodynamic advantage that allows for up to 40% less effort in pedaling to maintain the same speed as the person in front. This technique is also called drafting.
- Fans paint the names of their favorite riders on the roads.
- It is estimated that over 21 million people line the route of the race over three weeks.
- The Tour is broadcast in 170 countries and viewed by nearly two billion people, making it the 3rd most popular sporting event in the world after World Cup Football and the Olympics. As these other events are held once every four years and two years respectively, the Tour de France is the most popular annual sporting in the world.
- The race is owned and organized by A.S.O. (Amaury Sport Organization) in Paris.
- The sole carrier of the international live signal is France Television. France TV helicopters follow the peloton and beam live images from camera operators on the backs of motorcycles around the world.
- There are several commissioners who monitor the race and control the traffic of motorcycles and cars, but also watch for illegal behavior by the riders (hanging on the back of team cars, riding recklessly).
- Riders shave their legs because it makes "road rash" (scrapes and cuts) easier to clean, and makes massage more comfortable.
- Lance Armstrong (USA) has the record both for the most Tours won (7), and for the fastest average time. In 2003, he finished the race with an average speed of 40.940 kilometers per hour (25.44 mph). He covered 3,400km (2,100 miles) in 83 hours 41 minutes and 12 seconds.
- Every year sees its share of nasty crashes, especially in the early stages when riders are nervous.
- Riders who crash within the last kilometer of the stage are credited with the finishing time of the group that they were with when they crashed (in the case of a bunch sprint, this is usually the time of the winner).
- The Tour has its own doctor who follows the race and administers treatment to anyone still well enough to continue riding! Ambulances also follow the riders for more serious injuries.
- Four riders have died on the Tour. The most recent was in 1995 when Fabio Casartelli (ITA) crashed while descending the Portet d'Aspet in the Pyrenees.

***Key Cycling Terms:***

*Attack* – a sudden acceleration by a rider hoping to gain an advantage over his rivals.

*Breakaway* refers to a cyclist or group of cyclists riding off the front of the pack. If they are far down on the overall standings, they may be "allowed" to fight for the stage win, but if a real challenger gets into the group, rivals will chase him down.

*Broom Wagon* is the vehicle at the very back of the peloton that "sweeps up" any rider who abandons or fails to finish within the allotted time on a particular day.

*Domestique* is a support rider who ferries food and drinks from the team car to other riders protects the team leader or chases down rivals. On flat stages, climbers often do the job of domestiques. On mountain stages, sprinters take over these duties.

*Hors catégorie* - a climb that is "beyond categorization," an incredibly tough climb.

*Lanterne rouge* - meaning "red lantern", the name for the overall last-place rider.

*Peloton* (where the English word "platoon" comes from) is the main group of riders in the race.

***Relevant brain facts (taken mostly from the film script):***

- The human brain weighs three pounds and has the consistency of gelatin.
- Recent discoveries in neuroscience have revealed that the brain is capable of generating new nerve cells (neurons) throughout our lives, and not just in childhood, as once thought. This plasticity enables the brain to adapt, to learn from the environment and from experience, even in some circumstances to compensate for damage or injury.
- When we learn through repetition, we are forming and strengthening connections between neurons in the brain. These networks get stronger or weaker with use.
- The brain is packed with an estimated 100 billion nerve cells (neurons) and an even greater number of glial cells. Each neuron can connect with up to 10,000 others.
- Relatively little is known about glial cells, although they outnumber neurons by nine to one. It was initially thought that these were mere support players to neurons in the brain, but recent studies reveal that they may be just as critical to thinking and learning as neurons.
- Neurons don't actually touch one another. They send messages across tiny gaps called synapses.
- There are more synapses in the brain than there are estimated stars in the Milky Way galaxy.
- Messages travel through a neuron as electrical signals, but messages pass between neurons as chemical signals (neurotransmitters).
- These chemicals bind with receptors on the dendrites of receiving neurons and can change what the next cell does.
- There are many kinds of neurotransmitters with unique functions. However, a neurotransmitter's effect depends on the receptor (and perhaps glial cells), so one type of neurotransmitter can have a different effect depending on which part of the brain it activates.
- Most chemical medication works by changing the neurotransmitters to achieve a desired effect (moderate pain, reduce stress, ease movement, alleviate depression).
- Emerging knowledge of the brain through medical imaging suggests that even though different parts of the brain specialize in different tasks, they work together to create experience.
- Just to be able to see requires at least 20 different areas of the brain.
- Functional magnetic resonance imaging is a research technology that allows scientists to see what areas of the brain are active when a subject is asked to perform a specific task.
- The brain is the head of the nervous system. Electric signals are passed back and forth from brain to body through the spinal cord at speeds up to 200 miles (300 kilometers) an hour.
- The human brain is unique in that it has a highly convoluted (folded) neo-cortex, the bumpy-grey, 1/8 of an inch thick outer layer of tissue surrounding the cerebrum. It is in the neo-cortex that consciousness seems to arise.
- Pain exists only in the brain. Specialized nerves send warning signals up the spinal cord to an area on the cortex called the somatosensory strip. Each part of the body is represented along the strip and sized according to its relative sensitivity. When a signal gets here, we know only the pain is.
- When pain signals reach another part of the cortex (the anterior cingulate), the pain takes on an emotional quality – unpleasantness.
- The release of endorphins in the brainstem works to reduce pain and stress throughout the nervous system by blocking incoming pain signals in the spinal cord and reducing the unpleasantness sensation in the cortex.
- Endorphins never completely eliminate the warning signals. Doing so could risk even greater damage to the body.
- We are only consciously aware of a fraction of what enters the brain from the senses based on what we are paying attention to.

- Blocking out sensory stimuli from our attention is a form of survival in order to reduce the clutter of everyday life and allow healthy functioning.
- The pre-frontal cortex is the area where we think, plan and are aware of who we are. It is the part of the brain most connected to the other parts.
- Certain frightening sounds cause the amygdala to set off the body's automatic response system even before the sound has been processed in the cortex.

## Sound bytes from Producer and Director

***JoAnna Baldwin Mallory – Producer (JBM)***
***Bayley Silleck – Director (BS)***

Interviewer: Why is Partners HealthCare producing an IMAX® film?

**JBM**: We train doctors. When we talked about extending that mission to looking at Partners as an institution that also engages public science education, not just professional education, we received a great deal of support at the top.

Interviewer: Why not Lance Armstrong?

**JBM**: We wanted to create a cohesive story where celebrity wasn't what people expected when they walked into the theater.

**BS**: We do have some great shots of Armstrong in the race and on the winner's podium, but he's definitely not the focus of the film. At the same time, people looking for him won't be disappointed. The film certainly shows his amazing athletic prowess and the respect he commands in professional cycling.

Interviewer: Why did you choose the Tour de France?

**BS**: We chose the Tour de France to show how the human brain works because behind every great athlete is a great mind. It has all the elements: a dramatic visual backdrop, and requires an enormous amount of that intangible thing we call willpower. It's also a great metaphor for the brain's perpetual activity.

**JBM**: When most people think of the power of the human brain, they think of scientists or writers or engineers, but we wanted to make it apparent that the human brain is central to everything we do, whether it's painting or participating in an athletic competition.

**JBM**: We're interested in how the athletes experience the Tour – at what the human brain brings to this enterprise in terms of vision, memory – all levels of brain function.

**BS**: Every few thousandths of a second your brain is making a decision on what to do and then sending out messages to the motor cortex and then to the muscles and the nerves. There are a lot of competing influences in the riders' brains at the Tour de France. It is your 'self' through willpower or volition that to some extent decides which those committees you're going to listen to at any given moment.

## Key Organizations

***Partners HealthCare, Producing entity***

Partners HealthCare System is recognized internationally for its breakthrough scientific and medical research. Partners was founded in 1994 by Massachusetts General Hospital and Brigham and Women's Hospital -- according to US News & World Report, two of the ten top-ranked academic medical centers in the United States. Partners HealthCare System encompasses almost a dozen Harvard University-affiliated academic medical centers, research institutions, and community hospitals. Partner's combined research program attracted $848.6 million in research revenue in 2004, with additional committed research funding totaling $1.9 billion.

***National Science Foundation, Funding agency***

The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity and welfare; and to secure the national defense." The NSF is the funding source for approximately 20 percent of all federally supported basic research conducted by America's colleges and universities. The agency is the major source of federal funding for mathematics, computer and social sciences.

The NSF *Informal Science Education (ISE) program* invests in projects that develop and implement informal learning experiences designed to increase interest, engagement, and understanding of science, technology, engineering, and mathematics by individuals of all ages and backgrounds, as well as projects that advance the theory and practice of informal science education.

***Ortho-McNeil Neurologics,Inc. Presenting sponsor***

Ortho-McNeil Neurologics, Inc. focuses exclusively on providing solutions that improve neurological health. The company currently markets products for Alzheimer's disease, epilepsy, and acute and preventive migraine treatment. Ortho-McNeil Neurologics, Inc. in conjunction with internal and external research partners, continues to explore new opportunities to develop solutions for unmet HealthCare needs in neurology. The company has more than 1,000 employees and is headquartered in Titusville, NJ.

***nWave Pictures Distribution, Film distributor***

nWave Pictures Distribution was established in August 1998 to handle the global distribution, sales and marketing of all nWave Pictures' original large format productions as well as acquired third party projects. nWave Pictures Distribution is headed by Mark Katz, a large format distribution veteran of over 18 years.

Headquartered in Brussels with offices in Connecticut and sales and marketing support in California, Brussels and Tokyo, nWave Pictures Distribution specializes in 2-D/3-D film and multi-platform distribution strategies of the company's internally produced films as well as third-party properties. Of the 325 giant screen theaters in the world (IMAX®, Iwerks, etc.) more than 275 have played nWave-distributed films.

***nWave Digital, Computer Animation studio***

nWave Digital, a division of nWave Studios (Brussels, Los Angeles & New York), is an award-winning 3D animation and visual effects company specializing in digital imagery. Founded in 1993 by animator Anthony Huerta and producer Caroline Van Iseghem, the company first established itself as the premiere animation studio for the creation of ride films for the motion simulator market. Today, as part of nWave Studios, nWave Digital has become a key player in the giant screen film industry while continuing to create spectacular imagery for feature films, television and advertising. From traditional 35mm film effects, logo animations and promos to 70mm 2D and 3D films, nWave Digital aims to entertain and impress audiences. The company's work has been featured in such giant screen films as *Special Effects: Anything Can Happen*, *Amazon*, *The*

*Mysteries of Egypt, Thrill Ride: The Science of Fun, 3-D Mania: Encounter in the Third Dimension, Alien Adventure, Haunted Castle, The Human Body* and the newly released *Wild Safari 3D.*

***Amaury Sports Organization (A.S.O.), Tour de France owners & organizers***

Amaury Sport Organization belongs to the French press group, E.P.A (Philippe Amaury Publications), which owns the newspapers and magazine publications l'Equipe, France Football, l'Equipe Magazine, Vélo Magazine, Le Parisien and Aujourd'hui in France. The group has also developed an audio-visual branch, with the creation of l'Equipe TV, and new technologies with the web-sites www.lequipe.fr and www.leparisien.fr, to such an extent that it is today one of the key figures in the French media world.

A.S.O., created in September 1992, is specialized in the organization of renowned sports events, such as the Tour de France, the Paris-Dakar and the Paris Marathon. Over the last few years, the company has expanded, having intensified its activities in the domain of cycling (Paris-Nice, Tour of Qatar, Tour du Faso) and taken up new disciplines, such as golf (the Open de France, the oldest tournament on the European continent) and equestrian sports (creating for the occasion a yearly event christened R.I.D.E : Rencontres Internationales des Disciplines Equestres).

Behind the range of internationally renowned and recognized events, Amaury Sport Organization is focused on a precise goal: the design and management of spectacular top flight competitions respecting the sporting code of values and ethics, with long-term dedication.

A.S.O. is an enterprise organized in terms of professional skills. From the competition design, in conjunction with sports federations and official institutions, to the development of partnership programs, logistics, the media, publishing, Internet, public relations, and the production and commercialization of television programs, A.S.O. marshals all the skills required for creating and organizing major sporting events or smaller sports gatherings. Each of these events benefits from logistics and methods adapted to its position in the sporting calendar, with a commitment to permanent quality and perfect organization.

Cycling, athletics, mechanical sports, golf and equestrian sports, five domains in which the A.S.O teams' passion for sport is fully reflected.

## Biographies

### *Alfred Molina, Narrator*

Alfred Molina was born in 1953, in London, UK, of a Spanish father and an Italian mother. He studied at the Guildhall School of Music and Drama, London. His stage work includes two major Royal National Theatre productions, Tennessee Williams' "The Night of the Iguana" (as Shannon) and David Mamet's "Speed the Plow" (as Fox), plus a splendid performance in Yasmina Reza's "Art" (his Broadway debut), for which he received a Tony Award nomination in 1998. He made his film debut in *Raiders of the Lost Ark* (1981) and got a good part in *Letter to Brezhnev* (1985) (as a Soviet sailor who spends a night at Liverpool), but his movie breakthrough came two years later when he played Kenneth Halliwell, the tragic lover of Joe Orton, in Stephen Frears' *Prick Up Your Ears* (1987). He was also outstanding in *Enchanted April* (1992), *The Perez Family* (1995) (as a Cuban immigrant), *Anna Karenina* (1997) (as Levin), and *Chocolat* (2000) (as the narrow-minded mayor of a small French town circa 1950s, who tries to shut down a chocolate shop).

He gained a good amount of weight to play the huge Diego Rivera in *Frida* (2002) and then slimmed down to play Dr. Octopus in *Spider-Man 2*(2004). He can be seen in the upcoming *The Da Vinci Code* (2006) as Bishop Aringarosa. Alfred was twice nominated for Broadway's Tony Award: in 1998 as Best Actor (Play) for "Art," and in 2004 as Best Actor (Musical) for portraying Tevye in a revival of "Fiddler on the Roof."

### *Phil Liggett and Paul Sherwen, Tour de France Commentators*

Known for their dry humor and witty commentary by English-speaking cycling fans around the world, Phil and Paul grew up outside of Liverpool England. Phil, the older of the two, began his career as a zookeeper with a strong interest in competitive cycling. In 1967, he was offered a pro contract with a Belgian team, but chose journalism instead (Phil claims it was Eddy Merckx who put the fear of God into him). He has been broadcasting the Tour de France and other cycling races to audiences for 33 years.

At the 1985 Paris-Nice race, Phil approached 7-time Tour de France rider Paul Sherwen on the eve of his retirement and offered him a job as co-commentator. The two have been a duo ever since, commentating for CBS, NBC, ESPN, and now OLN in America, ITV in Britain, and SBS in Australia. Entire fan websites exist devoted to their witty banter and repartee (http://www.liggettfan.com), and a recent book of "Liggettisms" was published in 2005 (*Dancing on the Pedals: The Found Poetry of Phil Liggett, the voice of cycling*).

Phil has also commentated for the BBC at the 1984 Summer Olympics, as well as the Winter Games in the '90s. He is Editor of the magazine Cycle Sport, as well as president of the Cyclists' Touring Club. In 2005, Phil became a Member of the Order of the
British Empire (MBE) and invested by the Queen in November for his services
to cycling. In his free time, Phil is an avid naturalist.

Paul's periodic extracurricular activities include working as PR director for the Motorola cycling team, and translating interviews for Lance Armstrong before Armstrong spoke French. He now splits his time between his commentating duties and running a gold mine in Uganda, where he and his family live.

### *Baden Cooke, Featured Pro-cyclist*

Baden was born in Benalla, Victoria, Australia, and won his first bike race at the age of 11. He says that he knew he wanted to ride the Tour de France from that moment onwards. In 1995, he won a silver medal in the Australian road race Championships, and subsequently became a member of the Australian National team (under 23).

In 2000, he began his professional career with Mercury. His victories with Mercury include 3 stages of the Herald Sun Tour in Australia, overall winner of the San Diego Criterium, and winner of the points classification in the Tour de l'Avenir.

In 2002, he moved permanently to France and joined la Française des jeux for 3 seasons. It was with this team that Baden experienced the highlight of his career in 2003 when he won a stage in the Tour de France and the overall points (green) jersey in a dramatic finish on the Champs Elysees. He currently rides for Belgian team Unibet.com.

***Jimmy Casper, Featured Pro-cyclist***

Born in Mont Didier, France, Jimmy Casper became a pro cyclist at the relatively young age of 19. He made headlines in 1999 by winning several sprints in the Tour of Germany, leading the French media to demand his presence in the Tour de France later that year. Jimmy agreed with his Française des jeux coach to ride only 10 stages of "la Grande Boucle", and achieved notable results in early sprints.

An injury in 2000 caused him to miss an entire season, but in 2001, he won stages in the Tour de Sud, Tour de Poitou-Charente and Tour Méditerranéen, and finished the Tour de France for the first time (in 144th position).

2002 and 2003 saw Jimmy forced to abandon the Tour on Stages 16 and 9 respectively, due to injuries sustained in earlier crashes. In 2004, he switched teams to Cofidis: Crédit par telephone, and finished the race for the second time in his career. His dream of winning a stage in the Tour de France still eludes him.

***JoAnna Baldwin Mallory, Senior Producer, Principal Investigator***

Ms. Baldwin Mallory began her career in documentary film production over eighteen years ago when she created and oversaw production of *Out of the Past*, an award-winning eight-hour public television series on archaeology, which premiered in primetime on PBS. Ms. Baldwin Mallory subsequently developed and directed *Telling the Story: The Media, the Public, and American History*, the first national convocation of celebrated documentary and feature filmmakers, and historians, including filmmaker Ken Burns, historian Simon Schama, and veteran Hollywood producer Michael Hausman among others as featured keynote speakers.

Ms. Baldwin Mallory is a long-standing member of the public television community in the United States and has held positions at stations WGBH, Boston, and WQED, Pittsburgh. Most recently, she served as a department head in a five-year tenure at flagship public television station WNET, New York, where she created and developed the first humanities programming initiative for the station, which attracted nearly $3 million from The National Endowment for the Humanities and other funders. In addition, she also secured and administered over $45 million for WNET signature series, limited series and new media projects.

She has been a featured speaker at PBS meetings, The National Humanities Center, Showbiz Expo, and other professional gatherings, and has served as a media reviewer for various funding agencies, including the National Science Foundation and the National Endowment for the Humanities.

Ms. Baldwin Mallory entered large-format film production when she joined in partnership with producer/director Bayley Silleck in the development of *Lost Worlds: Life in the Balance.* With Mr. Silleck, she developed all aspects of the project design, including one of the most ambitious educational and public programming initiatives ever mounted for a large-format film. In her current role as Director of the office of New Ventures for Partners HealthCare, she is responsible for developing new media opportunities and related educational projects, including *Wired to Win*, and *Genome*, another giant screen IMAX® film currently in development.

***Bayley Silleck, Director, Co-Writer***

Academy-Award nominee Bayley Silleck has worked in the film industry for 30 years, starting with four years in Metro-Goldwyn-Mayer's European production office, and seven years with Francis Thompson Inc., the Oscar-winning pioneers in multi-screen and large screen presentations. As producer, director and writer, Silleck has made over 30 films, ranging from television documentaries such as *Exploring the Deep Ocean and Imperial Stone: The Art of Rome*, to giant-screen IMAX® films such as *On the Wing* for the Smithsonian's

National Air and Space Museum. Silleck also wrote, directed and produced the first-ever Showscan 70mm 3-D film, *Concerto for the Earth*, for the Pavilion of the Environment at Expo '92 in Seville, Spain.

In 1997, Silleck wrote, co-produced and directed the Academy-Award nominated IMAX® film *Cosmic Voyage* for the Smithsonian and the Motorola Foundation, and in 2001, he directed the IMAX® film *Lost Worlds: Life in the Balanc*e for Primesco International. He is a three-time recipient of major grants from the National Science Foundation. Bayley is a voting member of the Academy of Motion Picture Arts and Sciences, as well as the Director's Guild of America and the Writer's Guild of America.

***Myles Connolly, Line Producer, Picture Editor***

Myles Connolly grew up in Southern California, a stone's throw from the film industry in Hollywood. As the grandson of screenwriter Myles Connolly, Sr., (a close collaborator of director Frank Capra,) the younger Connolly found that movies were in his blood.

After studying film at the University of California, he spent time working in Hollywood before making the leap to the giant screen. He has been a producer, writer or editor on more than 20 large format documentaries, including some of the industry's most successful. His efforts have helped garner numerous awards, including 2 Academy Award® nominations in the Short Documentary category. He lives in Laguna Beach, California with his wife Jeanette.

***Daniel Ferguson, Co-Writer, Associate and 1st Assistant Director***

In his capacity as Associate and First Assistant Director, Daniel Ferguson worked closely with director Bayley Silleck in the planning of individual shots and production logistics for the multiple-camera shoots on *Wired to Win*. His duties included scheduling and organizing, as well as communication with cyclists and other cast members. As co-writer along with Mr. Silleck, he undertook an in depth study of neuroscience and acted as a key liaison between scientific advisors and computer animators at nWave Digital.

Prior to *Wired to Win*, Daniel worked as Line Producer on the large format film *Lost Worlds: Life in the Balance* and served as Distribution Manager for Primesco Communications (*Wolves, Bears, India: Kingdom of the Tiger*) for 4 years. He has also worked on television documentaries for National Geographic Television, feature films and music videos throughout Europe, Asia and North and South America.

***Rodney Taylor, Director of Photography***

Rodney Taylor was born and raised on the coast of North Carolina, and studied film at the University of North Carolina. He began his career shooting live sports for ESPN, ABC, TBS, and others, and in 1988 he moved to Los Angeles and began working as an assistant on IMAX® films and features. Taylor has gone on to be a successful cinematographer for numerous features, IMAX® films, and documentaries and has been shooting for over 20 years.

Taylor's most recent work is the upcoming feature *Home of the Giants* starring Haley Joel Osment and *Swimmers* (Sundance 2005 and winner - Seattle 2005) for whom Taylor first worked on the film *Riders* in 2001. In 1999 Taylor received the International Cinematographers Guild Film Showcase Award for his work on the 35mm short film *Grind*. He was also the 2nd unit DP on Michael Apted's *Enough,* and has operated on such shows as HBO's *Carnivale* and *Six Feet Under* as well as *24* for Fox.

In 2003, Taylor received the Kodak Vision Award for his excellence in the IMAX® format. His versatile IMAX® credits include the Academy Award®-nominated *Alaska: Spirit of the Wild*, the groundbreaking drama *Loch Lomond: Legend of the Loch,* Disney's *Ultimate X, Michael Jordan: To The Max,* and most recently *Ride with Cowboys*.

***Phil Marshall, Composer***

Phil attended the University of Irvine, majoring in Research Psychology and Music Composition. His feature film credits range from the highly acclaimed *Endless Summer II, Always* and *Nell* to a seven film collaboration with composer Angelo Badalamenti on the psychological thrillers *The Beach, Arlington Road, Secretary* and recently *A Very Long Engagement* for Warner Independent Features. Phil is currently working on *Blind Guy Driving* for James Keach.

On the television side, Phil has scored over twenty films for the Disney Channel, three films for the Family Channel, *American Daughter* for Lifetime and the top rated legal drama *Law & Order: Crime and Punishment* for producer Dick Wolf.

Phil's talents don't just lie in the film composing ranks. He's won a producing Grammy for BB King's album "Deuce's Wild" and wrote a Guitar Concerto for Classical guitarist Christopher Parkening. When his not composing or playing guitar, Phil can be found participating in extreme sport competitions. He is a two time National Sailing Champion and competed professionally on surfing and windsurfing tours.

***Sharon Simpson, Director of Print Materials***

Founder and principal of New York City-based SJS Projects, Sharon Simpson has more than a decade's experience working nationally for leading museums and cultural institutions as a writer, project manager, and consultant, developing award-winning interpretive products for many audiences-from preschoolers to research scientists to the general public. An educator and a producer, Sharon is accomplished in all media and has worked on a wide range of types and scales of project. Her recent clients include the American Museum of Natural History in New York, the Exploratorium in San Francisco, the New York Hall of Science, the Seattle Science Center, and the Museum of Science and Industry in Chicago. Sharon developed and produced the print and online educational outreach materials for the large-format film *Lost Worlds: Life in the Balance*.
Partners HealthCare System

***Jos Claesen, Visual Effects Supervisor, Animator nWave Digital***

After completing studies in Film Direction at the RITCS and Advertising and Television, at SHIVKV, two well known Flemish Universities, Jos went to work for Little Big One (LBO) a high-end computer graphics company. There, he created *Devil's Mine Ride* with producer Ben Stassen. After the huge success and numerous awards for this film, he left LBO in 1993 to help establish a new company, TRIX. There he created and animated many more successful ride simulation films including *Cosmic Pinball, Dracula's Haunted Castle, Kid Coaster, Grand Prix Raceway* and *Moontree Mission*.

As Visual Effects Supervisor for nWave Digital, Jos is particularly adept in the seamless integration of 3D animation and live action. His mastery of 2D and 3D software programs combined with a film and television background enables him to find solutions to complex compositing problems.

***Lynn Cohen, CGI Producer, nWave Digital***

After graduating Emerson College, Boston (1983), Lynn worked for various production companies in New York including GLYN/NET and Peter Corbitt and Co. where she produced broadcast and non-broadcast programs for clients including American Express, Children's Television Workshop, SONY & The SCI-FI Channel.

Upon arriving in Brussels in 1994, she landed at MG productions producing television commercials and corporate films. Given her extensive travel experience, Lynn was responsible for coordinating live shoots involving crews and travel. In 1998, she joined TRIX and today as part of nWave Digital she is responsible for the coordination and production of 3D animation and visual effects. Lynn is particularly adept at bridging the gap between the creative team and clients.

***Partners Internal Scientific Advisors***

**Bruce M. Cohen, M.D., Ph.D**.
President and Psychiatrist-In-Chief, McLean Hospital
Director of the McLean Brain Imaging Program
Director of the Stanley Research Center and the Molecular Pharmacology Laboratory
Professor of Psychiatry at Harvard Medical School

**Gary L. Gottlieb, M.D., M.B.A.**
President, Brigham and Woman's Hospital
Professor of Psychiatry at Harvard Medical School

**Martin A. Samuels, M.D., FAAN, MACP**
Neurologist-in Chief and Chairman, Department of Neurology,
Brigham and Women's Hospital
Professor of Neurology, Harvard Medical School

**Dennis J. Selkoe, M.D.**
The Vincent and Stella Coates Professor of Neurologic Diseases
Harvard Medical School, Co-Director, Center for Neurologic Diseases, Department of Neurology, Brigham and Women's Hospital

***Senior Science Editors***

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Associate Neuropathologist, Massachusetts General Hospital
Assistant Professor of Pathology, Harvard Medical School

**Constanza Villalba, Ph.D.**

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University of Washington

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Faculty of Medicine, University of Toronto

**Kathleen M. Foley, M.D.**
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Professor of Neurology, Neuroscience, and Clinical Pharmacology at Cornell University Medical College
Director of the WHO Collaborating Center for Pain Research and Education at Memorial Sloan-Kettering Cancer Center

**Bernice Grafstein, Ph.D.**
Professor of physiology and biophysics, Department of Physiology,
Vincent and Brooke Astor Distinguished Professor of Neuroscience Office
Cornell University Medical College

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**Joseph E. LeDoux, Ph.D.**
Principal Director, Center for the Neuroscience of Fear and Anxiety,
Center for Neural Science, New York University

**Patricia McGlashan**
First Hand Learning, Inc.

**Carrie MacNabb**
University of Minnesota

**John J. Ratey, M.D.**
Associate Clinical Professor of Psychiatry, Harvard Medical School

**Robert L. Savoy, Ph.D.**
Director of fMRI Education, Harvard Medical School
Instructor in Radiology, Athinoula A. Martinos Center for Biomedical Imaging

**Myrna M. Weissman, Ph.D.**
Professor of Epidemiology in Psychiatry, College of Physicians and Surgeons and the School of Public Health at Columbia University
Chief of Clinical-Genetic Epidemiology at the New York State Psychiatric Institute

## Internet resources

***The Film***

www.wiredtowinthemovie.com (Official Film Website)

www.partners.org (Partners HealthCare System)

www.nwave.com (nWave Pictures Distribution)

www.bigmoviezone.com (Giant screen film industry website)

***The Brain***

www.dana.org (Dana Foundation)

www.web.sfn.org (Society for Neuroscience)

www.faculty.washington.edu/chudler/neurok.html (University of Washington)

***The Tour de France***

www.letour.fr (Official Tour de France website)

www.torelli.com/home.html?http://www.torelli.com/raceinfo/tdf/tdfhistory.shtml&1 (excellent, comprehensive history of the Tour de France)

www.answers.com/topic/tour-de-france

www.cyclingnews.com
www.cyclingnews.com/road/2003/tour03/ (2003 Tour de France)

www.velonews.com
www.velonews.com/tour2003/ (2003 Tour de France)

***Baden Cooke and Jimmy Casper***

www.baden-cooke.com

www.velopalmares.free.fr/casper.htm

www.active.com/story.cfm?story_id=11102&sidebar=676&category=tdf2004_peloton

# Full credits

a Partners Healthcare project

with support from the National Science Foundation

and Ortho McNeil Neurologics

**WIRED TO WIN: SURVIVING THE TOUR DE FRANCE**

| | |
|---|---|
| Narrator | Alfred Molina |
| Director | Bayley Silleck |
| Senior Producer | JoAnna Baldwin Mallory |
| Writers | Bayley Silleck |
| | Daniel Ferguson |
| Story Concept by | Peter Frumkin |
| Music Composed and Conducted by | Philip Marshall |
| Editor | Myles Connolly |
| Directory of Photography | Rodney Taylor |

PARTNERS HEALTHCARE SYSTEM

| | |
|---|---|
| Scientific Advisors | Bruce M. Cohen, M.D., Ph.D. |
| | Matthew P. Frosch M.D., Ph.D. |
| | Gary L. Gottlieb, M.D., M.B.A. |
| | Martin A. Samuels, M.D., Ph.D. |
| | Dennis J. Selkoe, M.D. |

PROJECT PRINCIPALS

| | |
|---|---|
| Executive-in-charge of Production | Allen Peckham |
| Project Director and Principal Investigator | JoAnna Baldwin Mallory |
| Project Coordinator | Sandra Mori |

PARTNERS LEADERSHIP

| | |
|---|---|
| Board Chairman | Jack Connors, Jr. |
| President and Chief Executive Officer | James J. Mongan, M.D. |
| Chief Operating Officer | Thomas P. Glynn, Ph.D. |
| Vice President, Finance | Peter K. Markell |
| General Council | Brent L. Henry, Esq. |

FEATURED CYCLISTS

| | |
|---|---|
| Jimmy Casper | Baden Cooke |
| Mikel Artetxe | Pierre Bourquenoud |
| Mikel Astarloza | Inigo Charreau |
| Stéphane Augé | Bekim Christiansen |
| Walter Bénétau | Jean Paul Chuela |
| Jérôme Bernard | Médéric Clain |
| Paulo Longo Borghini | Stéphane Goubert |
| Tyler Hamilton | Aurnaud Coyot |
| Rene Haselbacher | Jose Enrique Gutierrez |
| Sébastien Hinault | Nicolas Portal |
| Nicolas Jalabert | Nicholas Roche |
| Roberto Laiseka | Franck Schleck |
| Thomas Liese | Oscar Sevilla |
| Andreas Matzbacher | Nicki Sorensen |
| Juan Miguel Mercado | Bruno Thibout |
| Jakob Piil | Kurt Van de Wouwer |
| | Matt Wilson |

## CAST

| | |
|---|---|
| Baby | David de Pietro |
| Mother | Gail Simeone |
| Young Children | Maeve Sherwood |
| | Grady McGowan |
| Young Boy on Bike | James Flynn, Jr. |
| Father | John Stackpole |
| Older Sister | Sheridan Kimball |
| Older Brother | Gabe Straight |
| Phil Liggett | Himself |
| Paul Sherwen | Himself |
| Neuroscientists | Florence Richard |
| | Stéphane Morlet |
| Training Partners | Stanley Casper |
| | Ben Clarson |
| Podium Girl | Céline Treille |
| Press Photographer | Denys Clément |
| TV Photographer | Stéphane Theret |
| Moto Photographer | Alain Girbal |
| Team Personnel | Daniel Fusberti |
| | Yann Meulmemanns |

## PRODUCTION

| | |
|---|---|
| Line Producer | Myles Connolly |
| Production Controller | Heidi August |
| Production Mangers | François Mallard |
| | Marta del Rio |
| | Patrick Genin |
| | Laura Vidiella |
| Unit Managers | Jean Manuel Vignau |
| | Thierra May |
| | Steve Oare |
| Unit Assistant | Christelle Bladinières |
| | |
| Associate & 1st Assistant Director | Daniel Ferguson |
| Production Supervisor | Greg Eliason |
| 2nd Unit Director/DOP | Larry Blanford |
| 1st Assistant Directors | Jérôme Zajdermann |
| | Franck Ciochetti |
| 2nd Assistant Directors | Carol Lecacheur |
| | Ana Gallardo |
| | Boris Debove |
| 3rd Assistant Directors | Patxi Belly |
| Production Coodinators | Rhonda Edmonds |
| | Lorena Mascarell |
| | |
| Additional Cinematography | Matthew Williams |
| DOP/35mm | Philippe Ros |
| Camera Operators | Steve Ford |
| | Vincent Jeanot |
| | Scott Hoffman |
| Steadicam Operators | Larry McConkey |
| | Dan Kneece |
| 1st Camera Assistants | Fred Weigle |
| | Scott Smith |
| | Dylan Reade |
| | Cyrille Liberman |
| | Tim Lovasen |
| 2nd Camera Assistants | David Aim |
| | Bob Settlemire |
| | Stuart MacFarlane |
| | Arnaud Gabriel |
| | Jean-Marie Delorme |
| 3rd Camera Assistants | Daniel Ferrell |
| | Frederick Page |
| | Jon Williams |

| | |
|---|---|
| Helicopter Pilots | Fred North |
| | Luc Poullain |
| Aerial Coordinator | Peggy North |
| Aerial Camera Systems | Benoît Dentan |
| Gyron Operator | Jim Swanson |
| Gyron Technician | Steve Desbrow |
| Fuel Truck Drivers | Jean Patrick Deya |
| | Olivier Crozat |
| Key Grips | Jim Sanfilippo |
| | Didier Koskas |
| Best Boy Grips | Kelly Flood |
| | Ken Metz |
| | Tim Driscoll |
| | Micheal Diieso |
| Additional Grips | Jean Chesneau |
| | Laurent Martin |
| | Cédéric Poisson |
| | Philippe Mourier |
| | Brian Pitts |
| | Jordi Galán |
| | Antonio Vega |
| Grip Driver | Dave Puopolo |
| Libra iii/IV Technician | Jon Philion |
| Gaffers | Daniel Murphy |
| | Martial Negre |
| Best Boy Electricians | Rafa Ramirez |
| | Larsen Barka |
| | Enrique Cantero |
| | Cristúbal Marin |
| | Juan Osuna |
| 3rd Electric | Michael Decristofaro |
| Electric Driver | Zachary Lazar |
| Generator Operator | Ojamel Sadelli |
| Sound Recordists | Tim White |
| | Rick Patterson |
| | Boris Zapata |
| | Steven Ghouti |
| Key Wardrobe | Emma Scaife |
| | Fairlie Myers |
| | Georgette Reynes |
| Wardrobe Assistants | Andrea Kelley |
| | Mollie Martin |
| | Julie Sudre |
| Make-up/Hair | Jeni Zaharian |
| | Alain Luzy |
| | Evaristo |
| Art Directors | Axel Nicolet |
| | Christophe Sartori |
| | Rob Engle |
| | Jeffrey Schneider |
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| | Bruno Dumont |
| | Fito Hernandez |
| | Daniel G. Blanco |
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| | Gérard Tubau |
| Location Managers | Yann Thomas |
| | Kiko Gonzalez |
| | Luis Servitje |
| Transportation Captain | Nathalie Anselme |
| Camera Car Drivers | Rolf Huser |
| | Jean Claude Bagot |
| | Pierre Bodin |

| | |
|---|---|
| Moto Pilots | Patrice Diallo |
| | Maurice Trullin |
| Pro Team Support | Frédéric Bassy |
| Daillies Runners | Jean-Jacques Morpurgo |
| | David Camus |
| Catering/Cantine | Catering Rafael |
| | Catering Séguinière |
| | Barcove Gourmet |
| Casting | Corinne Art |
| | Boston Casting |
| | Arana Agence Hotesse |
| | Bernard Pichot |
| | Laia Gray |
| | Carles Sanchez |
| Location Assistant | Mirentxu Belly |
| Local Fixer | Yannick Garin |
| Location Scout | Emmanuel Cloutour |

DRIVERS

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| Arnaud Boussac | German Gonzalez |
| Francis Cadillon | Bernard Hollaender |
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| Writers | Joy Brewster |
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| | Jordan Brown |
| Project Coodinator | Monica Philippo |
| Image Research and Acquisition | Tina Gaud |
| Educational Consultants | Gretchen Walker |
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| Marketing Coordinator | Mary Jane Dodge |
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| Assistant to the Director | Siri Silleck |
| Set Medic | Kim Quam |
| Storyboard Artist | Mark Michelon |
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| | Philippe Giband |
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| | Jeremy Advocat |
| Elite Link International | Hugo Kamerling |
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| Arrow Travel | Gary Gupta |
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| | Marie Mabardi |
| | Lisa McEachern |
| Rome Voyages | Eric Lubroso |

PRODUCTION ASSISTANTS

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| Luca Anton | Arnaud Kaiser |
| John Abt | Cameron Keiber |
| Belinda Bernardo | Scott Masterson |
| Benoît Boulet | Erik Mygrant |
| David Camus | Carles Servitje |
| Audrey Ferrier | Olivier Soury |
| Matt Harrington | Antoine St. Maur |
| Mike Judge | |

VISUAL EFFECTS

| | |
|---|---|
| 3D Animation & Visual Effects by | nWave Digital |
| Executive Producer | Ben Stassen |
| CGI Producer | Lynn Cohen |
| Visual Effects Director | Jos Clasen |
| Character Modeling, Set-up & Animation | Yvan Verhoeven |
| | Bruno Dekeijser |
| Editing & Compositing | Frédéric Robert |
| Modeling, Texturing & Mapping | Eric Paquet |
| First Assistant | Frédéric Convert |
| 2D Artist | Virginie Dellisse |
| Technical Support | Joel Labby |
| | Michaël Maree |
| Film Recording | Ken Semer |

| | |
|---|---|
| Medical Illustrations and Storyboards by | Rob Flewell, CMI<br>Ronald L. Mathias, CMI |
| 3D Human Anatomy provided by | David Dunston, Zygote Media Group, Inc. |
| 3D Brain Atlas provided by | Surgical Planning Lab -<br>Brigham and Women's Hospital<br>Micheal Halle, Director of Visualization |
| fMRI Studies provided by | John Darrell Van Horn, Ph.D., M.ENG.<br>fMRI Data Center, Dartmouth College |
| Research Assistant | Adam C. Riggall |
| MRI images provided by | Athinoula A. Martinos Center for<br>Biomedical Imaging<br>Bruce R. Rosen, M.D., Ph.D.<br>A. Gregory Sorensen, M.D. |
| Body Scans by Eyetronics | Desi Vanrintel<br>Marc Proesmans |
| Geodata provided by | Jorg Mohnen, Wavegen/Terratracer, Inc. |
| Geodata Processing | Terratracer, Inc. |
| IGN Photogrammertry & 80-Alti Courtesy of | Institut Géographique National, Paris |
| NASA Landsat & NASA-NGA Shuttle Radar Topography Mission Data Courtesy of | NASA-NGA JPL-Caltech, Pasadena, CA |
| Visual Effects by | Sassoon Film Design |
| Visual Effects Supervisor | Tim Sasson |
| Line Producer | Greg Bartlett |
| Art Director | Jennifer Bastien |

POST SOUND

| | |
|---|---|
| Sound Editorial provided by | Soundelux |
| Supervising Sound Editor | Andrew Decristofaro, MPSE |
| Sound Effects Supervisor | Michael Payne |
| Dialogue Editor | John C. Stuver, MPSE |
| Background Editor | David Esparza |
| Foley Editor | Kerry Carmen-Williams |
| Assistant Editor | Patrick Cusack |
| Mixing Facilities | Wilshire Stages |
| Re-Recording Mixers | Ken Teaney, CAS<br>Marshall Garlington |
| Recordist | Martin Schloemer |
| Foley Artists | Shawn Kennelly<br>Vince Nicastro |
| Sound Facility Coordinators | Paul Rodriquez<br>Dan Medina |

POST PRODUCTION

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|---|---|
| 1st Assistant Editor | James Manke |
| Assistant Editor | Neil Buttermore |
| Post Production Supervision | DKP, 70MM Inc.<br>Ralph Milliken<br>Scott Price<br>J. Todd Baillere<br>Annie Toth |
| Negative Conforming | Nancy Paweski<br>German Nunez |
| Digital Scanning, Imaging & Film Recording | Daniel Rapo<br>Craig Rogers<br>Scott Crafford |
| Music Mixer | William Pearson |
| Music Editors | Barbara McDermott<br>Joe E. Rand |
| 65mm Lab Services | Fotokem Film & Video<br>Gulliver Laboratoire |
| Lynbrook Productions | Andrew Oran<br>Simone Appleby |
| Color Timing | Dan Muscarella |
| Hazeltine Timing | Kristen Zimmerman |

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| | Rene Ruilova |
| IMAX Corporation | Mike Hendricks |
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| National Science Foundation | Valentine Kass |
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| Filmmakers' Collaborative | |
| French Production Services provided by | Virtuosity |
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| Auberge du Bon Puits | Orbea Bicycles |
| SCI Guillot Abondance | Carrera by Safilo |
| Cervélo Bicycles | Frank Trajber |
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| La famille Casper | Eurosport France |
| Commission du Film Pyrénées Atlantiques | Outdoor Life Network |
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Rehabilitation Hospital of the Cape and Islands

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*"Use Your Head - Wear a Helmet"*

Some scenes were re-enacted in the making of this film



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For Nancy Stone