



**2006 Grand Prize Winner  
(\$25,000)**

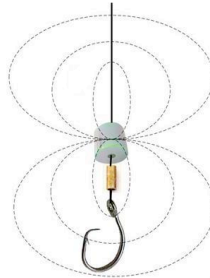
**DETECTING SHARKS WITH MAGNETS**

**Michael Herrmann**

United States



Michael Herrmann with a lemon shark in the Bahamas



Rare-earth magnet on a longline with surrounding magnetic field



Violent rousing behavior of a shark near a rare-earth magnet

*Winning Idea*

Mr. Herrmann's winning entry proposes a solution to reduce the bycatch of sharks on longlines, which has driven some shark species to the brink of extinction. Mr. Herrmann proposes taking advantage of sharks' unique biology in order to deter them from taking the bait of tempting hooks. Sharks are able to detect magnetic fields using special organs located on their snouts, and research has revealed that some species of shark are repelled by strong magnetic fields. Mr Herrmann placed small magnets just above the hooks on a longline, and preliminary trials using nurse sharks and lemon sharks revealed this technique to be successful in keeping the sharks away from the bait. The target fish were unaffected by the magnets.

The judges voted to award Mr Herrmann the grand prize because the concept sets out a novel approach to reducing shark bycatch, is based on sensory perception and addresses a problem which affects shark populations around the world. It will also benefit fishermen who want to fish more selectively to avoid sharks – as they will catch more of their target fish and will avoid losing hooks and bait to sharks.

*Shark Bycatch*

Pelagic longlines are the most widespread fishing gear and bycatch on longlines is a serious threat to sharks. Earlier this month, the World Conservation Union announced that 20 percent of shark species are close to extinction. Bycatch is a major contributor to the decline of many shark species.

Longline fishing gear consists of baited hooks hanging from a long drifting line suspended from buoys that rest on the surface of the water. Often, sharks are attracted by the baited hooks that are meant to catch tuna or swordfish which is problematic for both the shark and the fisherman. If a shark is accidentally caught on a hook in such a fishery it is often injured or killed while waiting to be released or during release and the fisherman loses time, money and gear on something he or she did not want to catch.

*The Winner*

Michael M Herrmann is a Research Associate at SharkDefense LLC, an American organisation. An electrical engineer by training, he is currently researching the effects of permanent magnetic fields in elasmobranchs at the Bimini Biological Field Station, South Bimini, Bahamas. Mr. Herrmann has designed underwater video systems, repellent delivery systems, and radio-controlled devices for the purposes of shark repellent tests. He oversees the capture, editing, and cataloging of all repellent testing conducted by SharkDefense. Mr. Herrmann is also a licensed private pilot, holds the Prometric A+ Certification, and is a high-brown belt in Tae Kwon Do.