



## PRESIDENT AND FALCON HELP LIGHT UP THE BRAIN

Glowing and fluorescent deep-sea creatures could reveal how the mind works.

Bright bioluminescent and fluorescent proteins found in marine life, when attached to human cells, become light-emitting markers that could help map the brain.

President Obama's newly announced 'Brain Activity Map' project, gives impetus to the quest for understanding the human mind.

Alzheimer's and other diseases of the mind, along with cancer, could benefit from tracing otherwise invisible nerve damage.

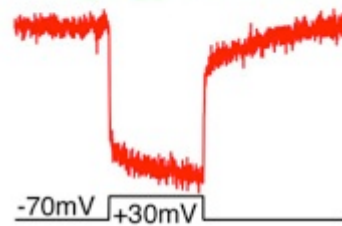
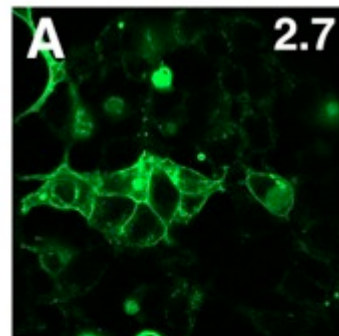
Searching for the right bioluminescent organisms in the sea are Professor David Gruber at the City University of New York's Baruch College and Vincent Pieribone of The John B. Pierce Laboratory of Yale University.

They plan to send a Saab Seaeye Falcon ROV into the coral ecosystems deep in the mesophotic zones - first off the Florida coast, then in the Solomon Islands and the Red sea. They plan to study the biology of the deep coral reefs systems to better understand their ecology and genetics as well as to isolate novel glowing proteins.

The 1000 metre rated Falcon DR will be packed with the most advanced filming equipment ever fitted to an ROV.

Hollywood grade camera technology, used making movies like 'Avatar', as well as low-light cameras that can see in the dark, will be matched to single-mode fibre optics and a gigabyte Ethernet to give the fastest, highest grade, images possible.

David Gruber's team have collaborated with Professor Chris Roman and Brennan Phillips at the University of Rhode Island and Saab Seaeye engineers to develop new systems that will advance ROV observation technology considerably.



**Fluorescent proteins,  
when attached to human cells,  
light up in the brain**  
(Vincent Pieribone's Image courtesy of the  
National Center for Biotechnology Information  
(NCBI) – PubMed)



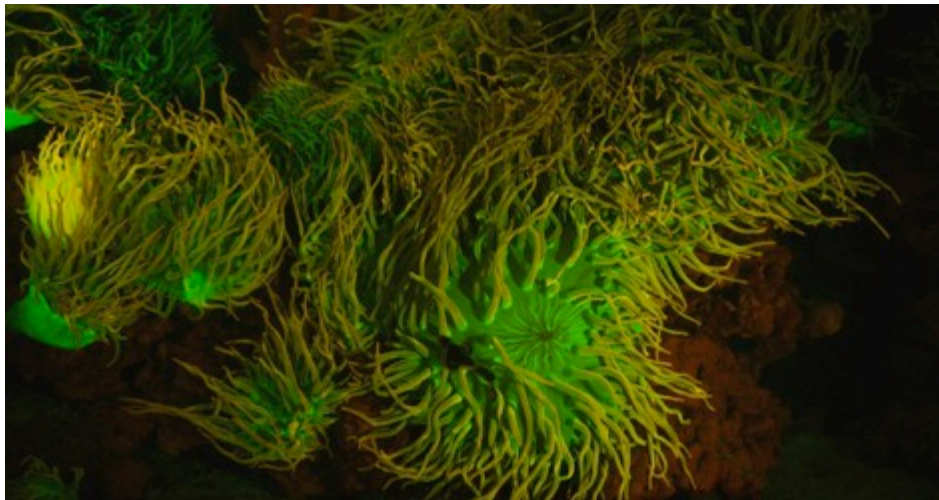
**The Falcon DR will be fitted with Hollywood-grade camera technology to capture bioluminescent and fluorescent images**

Adding and changing equipment on the Falcon is made easy with the ROV's distributed intelligence control system that allows up to 128 different devices to be fitted and changed as needed.

Its advanced system architecture is one reason why David Gruber chose the Falcon explaining: "Its creative design means we can push the limits".

The other reason for choosing such a small but technologically advanced ROV, is that a typical deep exploring ROV is too bulky to operate and poses a hazard to coral, whereas the Falcon DR can be manhandled from a small boat and manoeuvred below the water with delicate precision.

Supported by the National Science Foundation, David Gruber and his multi-university team have carried out initial research from diving in shallower depths but now need to explore deeper coral populations using an ROV.



**A biofluorescent anemone imaged with scientifically-filtered blue LED lighting and a modified 5K underwater camera that will both be outfitted on the Falcon (Image courtesy of David Gruber/Vincent Pieribone)**

Along with some deep corals, around 80 per cent of deep-sea marine life emit light, including jellyfish, squid and krill. The bioluminescence from these living organisms fulfils different purposes, from luring prey, to attracting a mate.

Imbedding mammalian cells with the genes for light-emitting and fluorescing proteins provides the potential for living cells to be studied noninvasively, without probing of the brain.

David Gruber says that the value of this development embodies the spirit of interdisciplinary research and collaboration between Saab Seaeye, marine biologists, neuroscientists and underwater engineers.

The scientists hope to contribute to President Obama's Brain Activity Map project by offering the kind of technological advance that neuroscientists believe will give a better understanding of the brain in a safer and less intrusive way.



**Dr David Gruber**  
**Assistant Professor of Biology &**  
**Environmental Science**  
**City University of New York**

**Saab Seaeye** is the world's largest manufacturer and market leader in electric ROV systems and hybrid underwater vehicles. Markets include offshore energy, defence forces, marine science and hydro-engineering.

More information contact:

David Gruber  
City University of New York  
+01 646 660 6236  
[david.gruber@baruch.cuny.edu](mailto:david.gruber@baruch.cuny.edu)  
<http://faculty.baruch.cuny.edu/dgruber>

Matt Bates  
Saab Seaeye Ltd.  
+44 (0)1489 898000  
[matt.bates@saabgroup.com](mailto:matt.bates@saabgroup.com)  
[www.seaeye.com](http://www.seaeye.com)