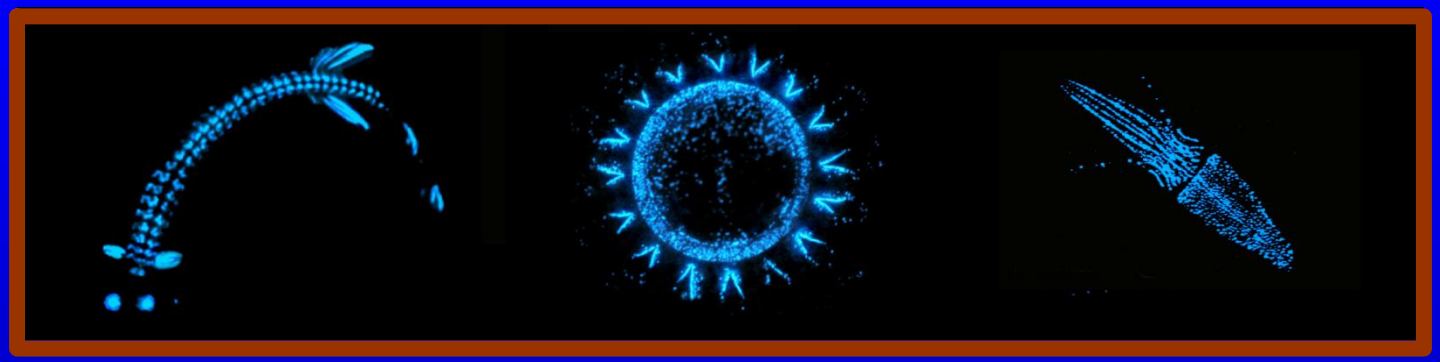
Secret Lights in the Sea



Edie A. Widder, Ph.D.

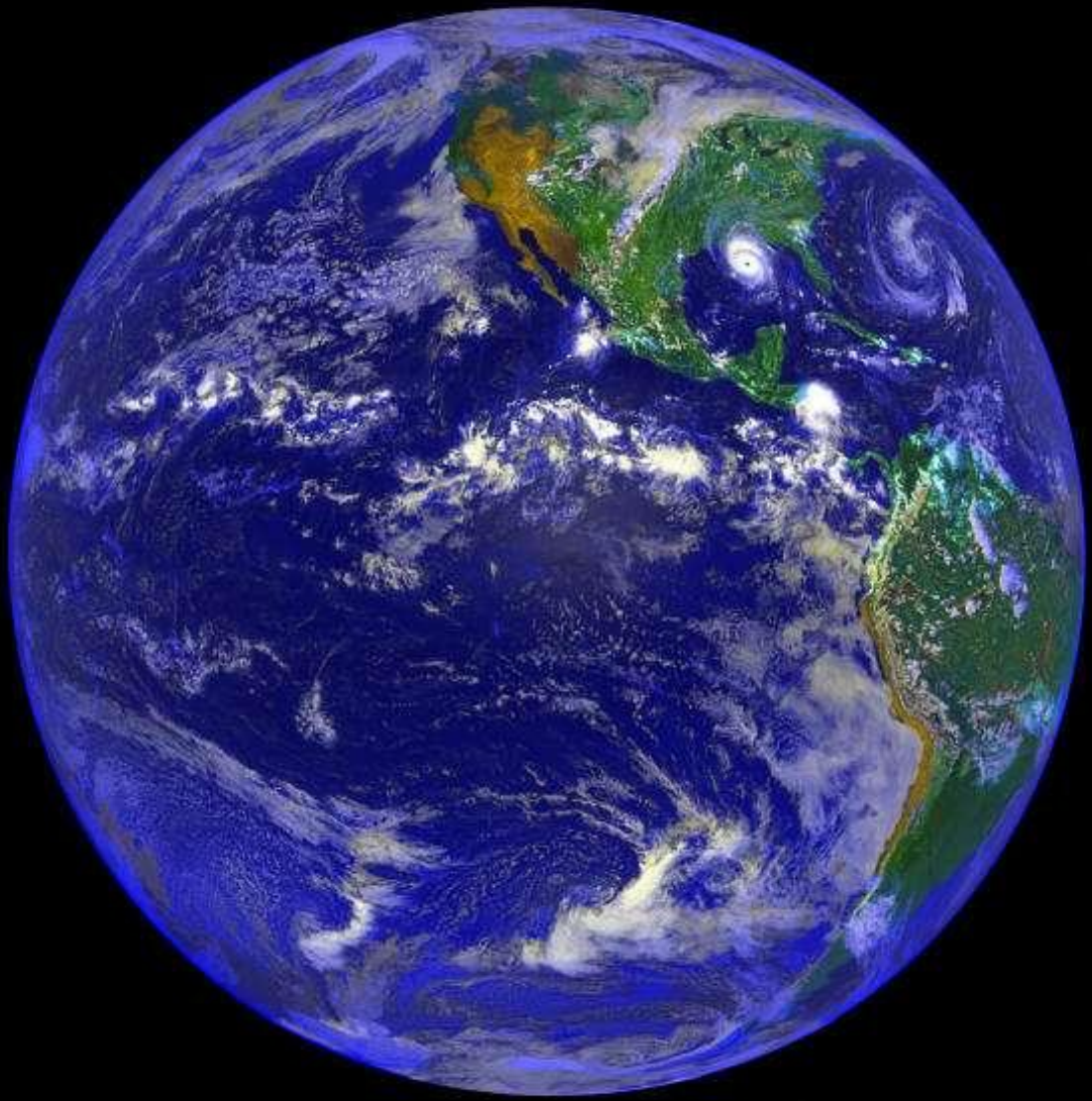
President & Senior Scientist

Ocean Research & Conservation Association

Fort Pierce, Florida

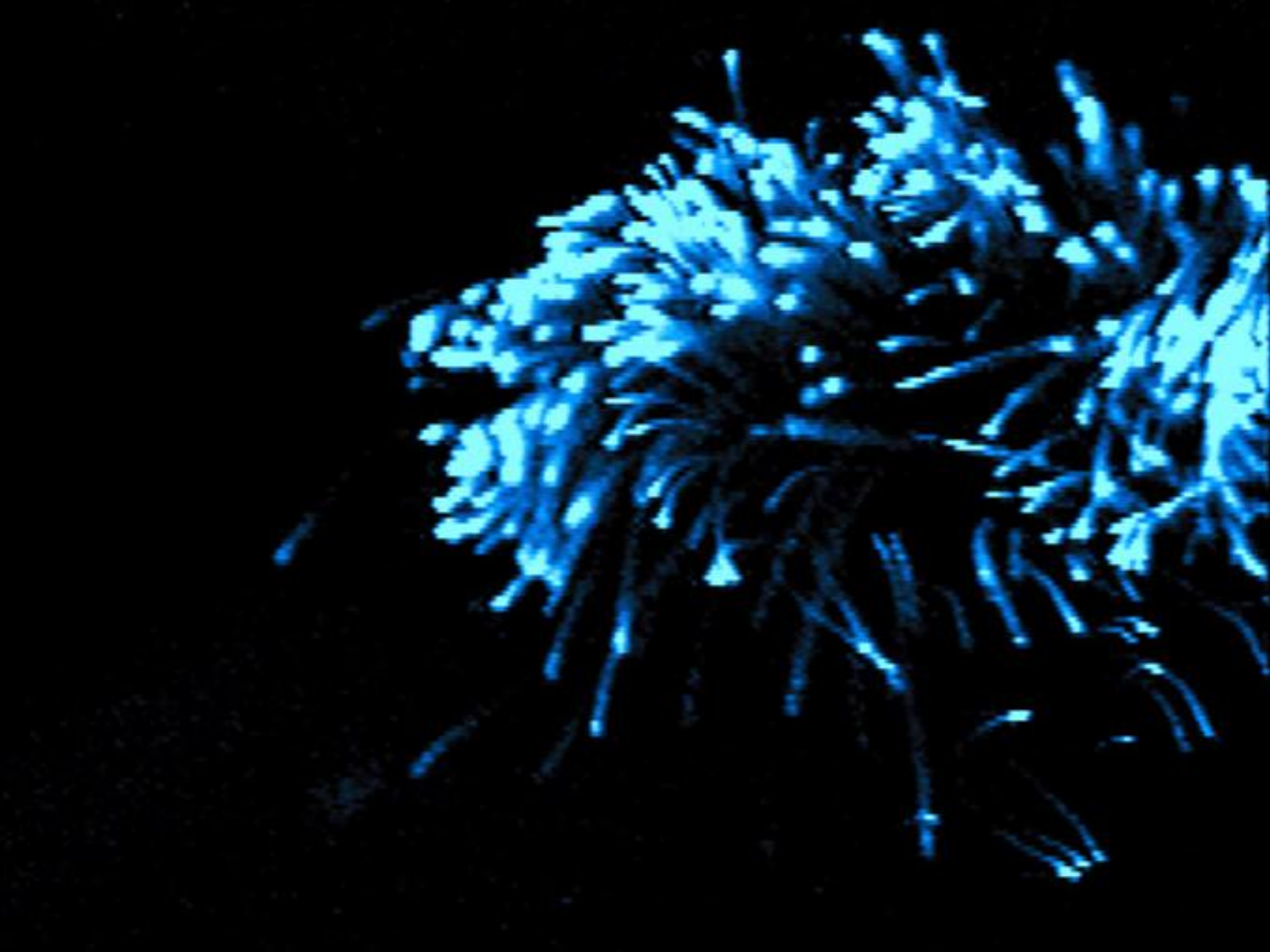
www.oceanrecon.org

ORCA




USC MARINE RESEARCH


WASP
OCEANEERING
OCEANEERING

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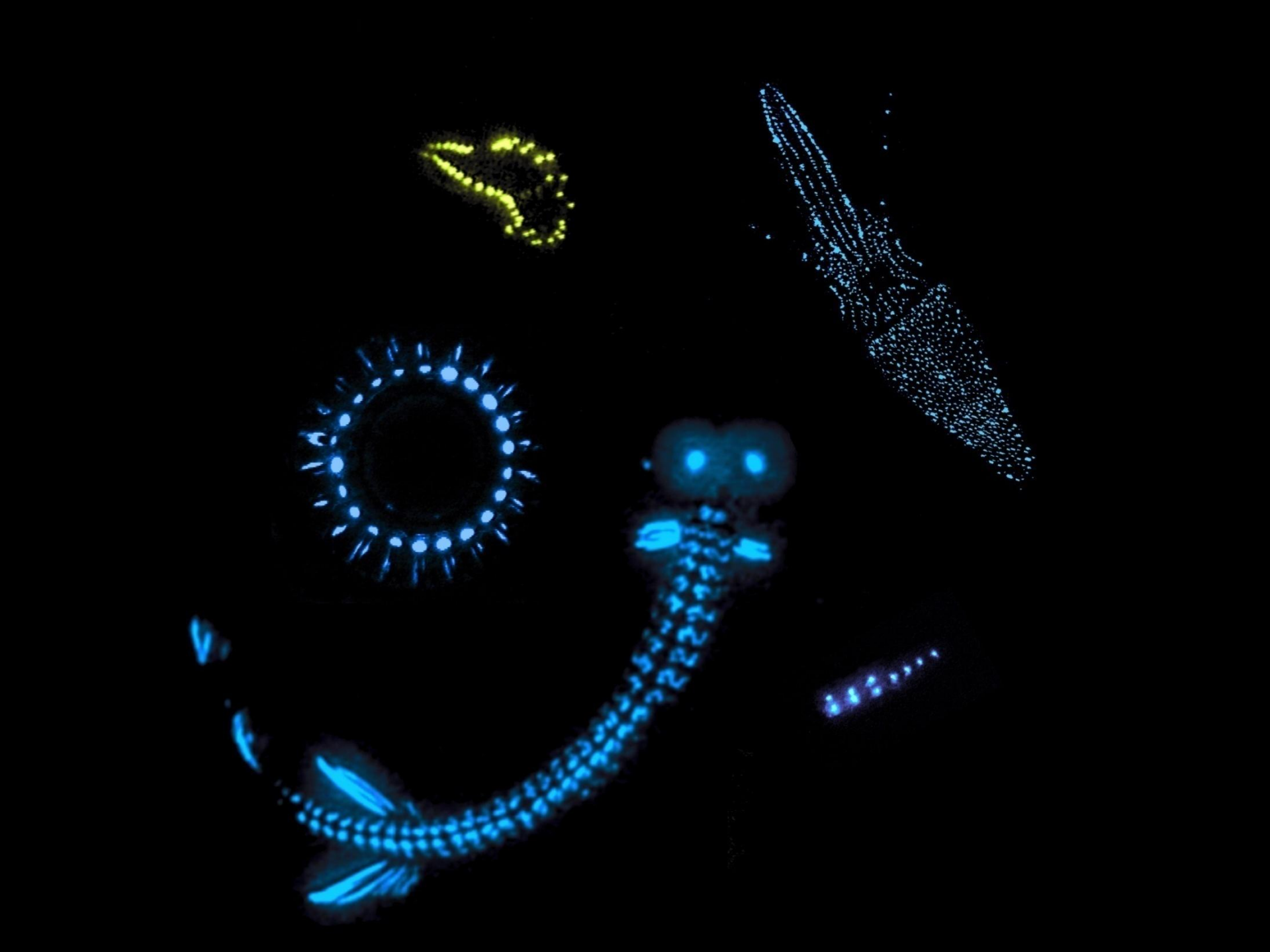
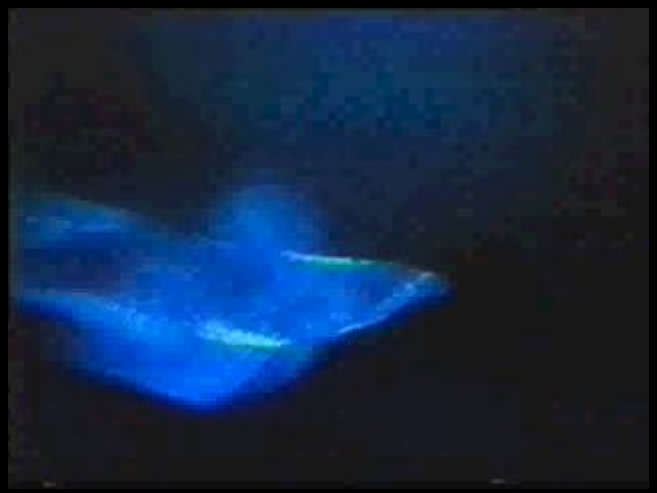
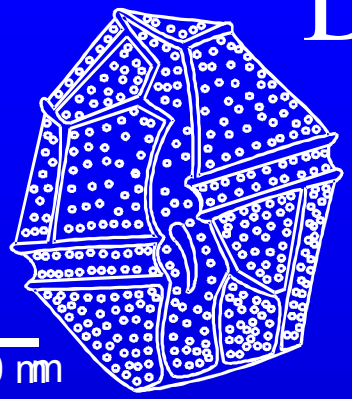


Dolphin swimming through bioluminescent plankton



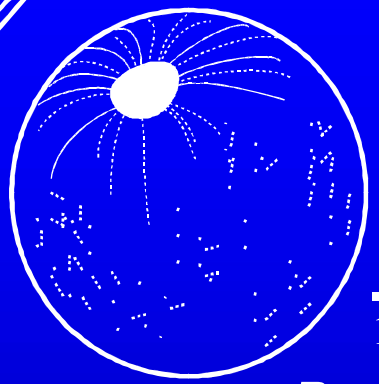
Dinoflagellates



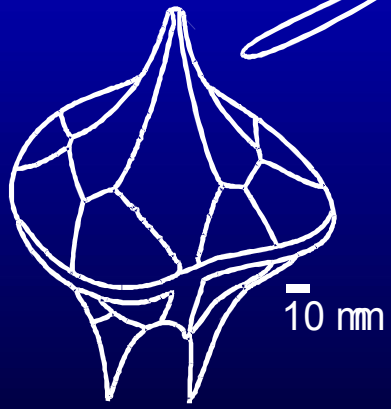
Lingulodinium polyedrum

Ceratium fusus

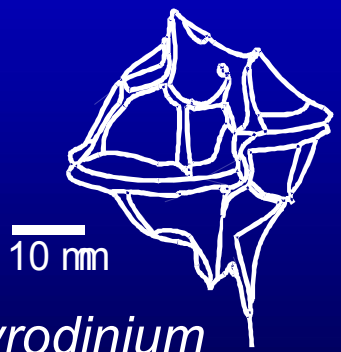
10 mm



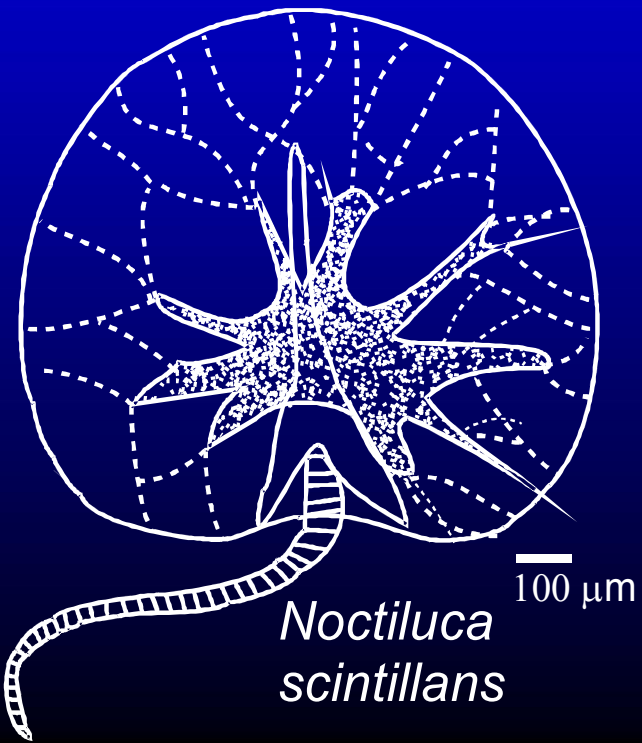
Pyrocystis noctiluca



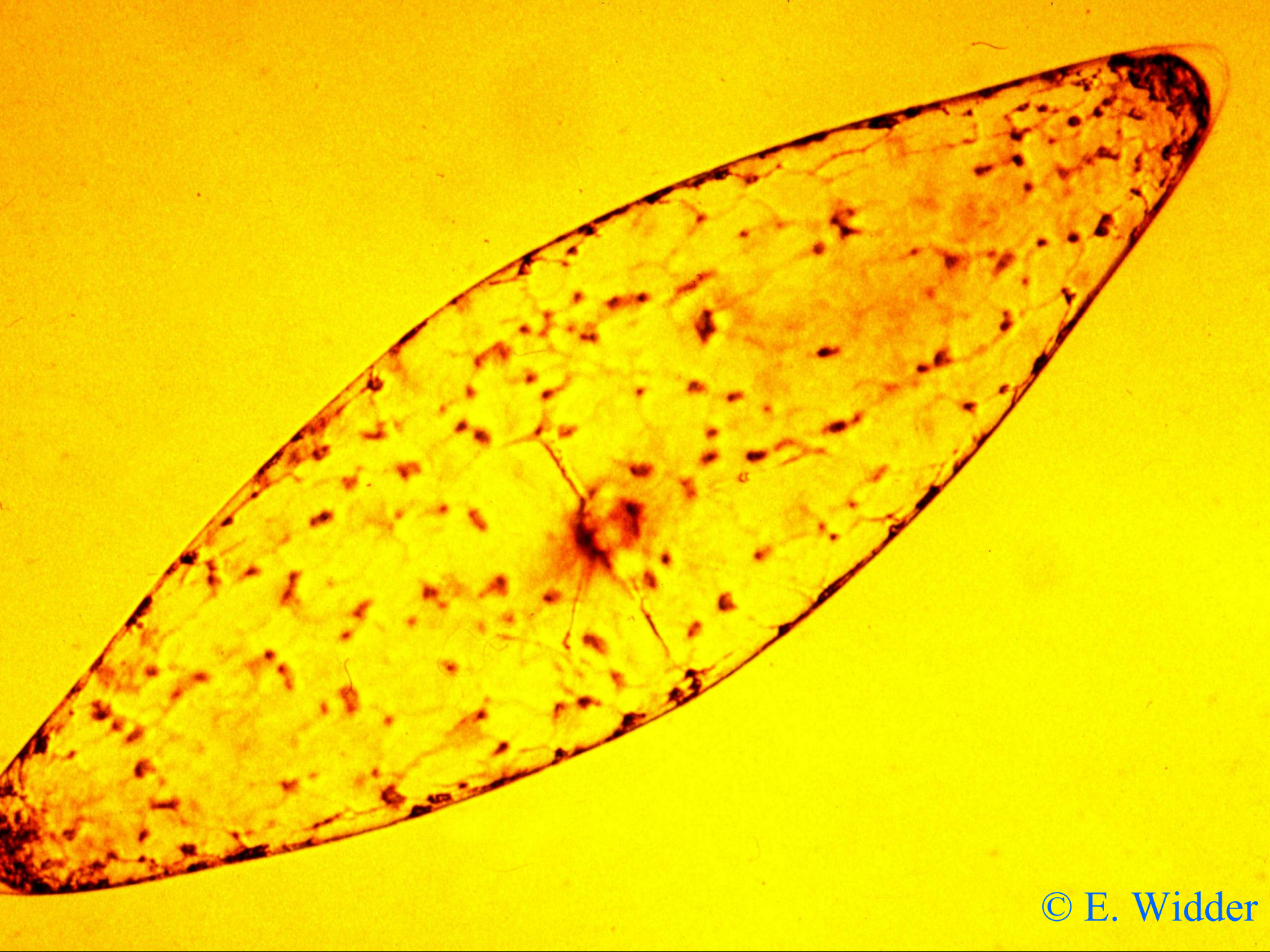
Protoperidinium depressum

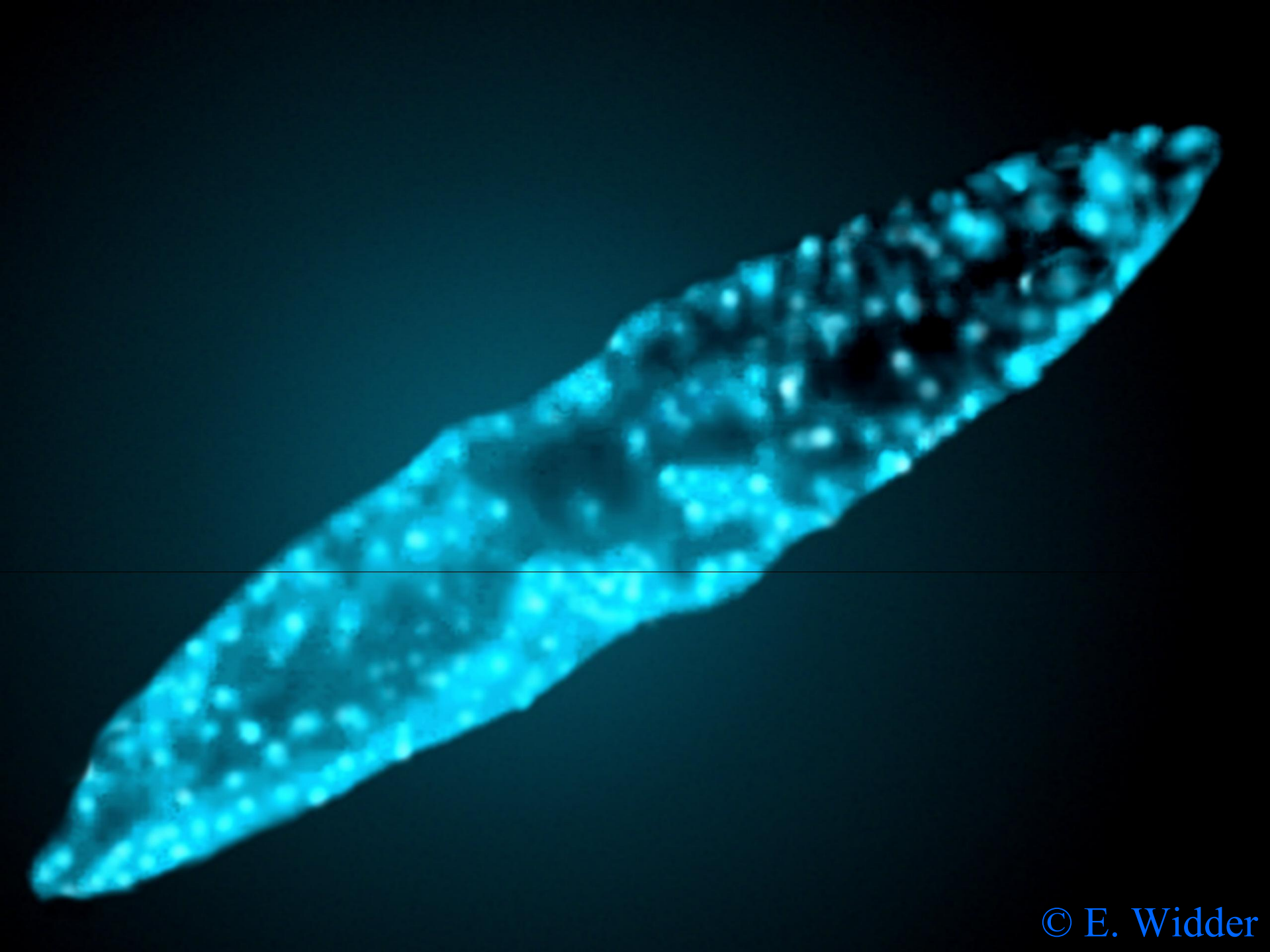


Pyrodinium bahamense



Noctiluca scintillans

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Functions of Bioluminescence:

- Finding food
- Attracting mates
- Defense

www.divernet.com/ biolog/0900flash.htm


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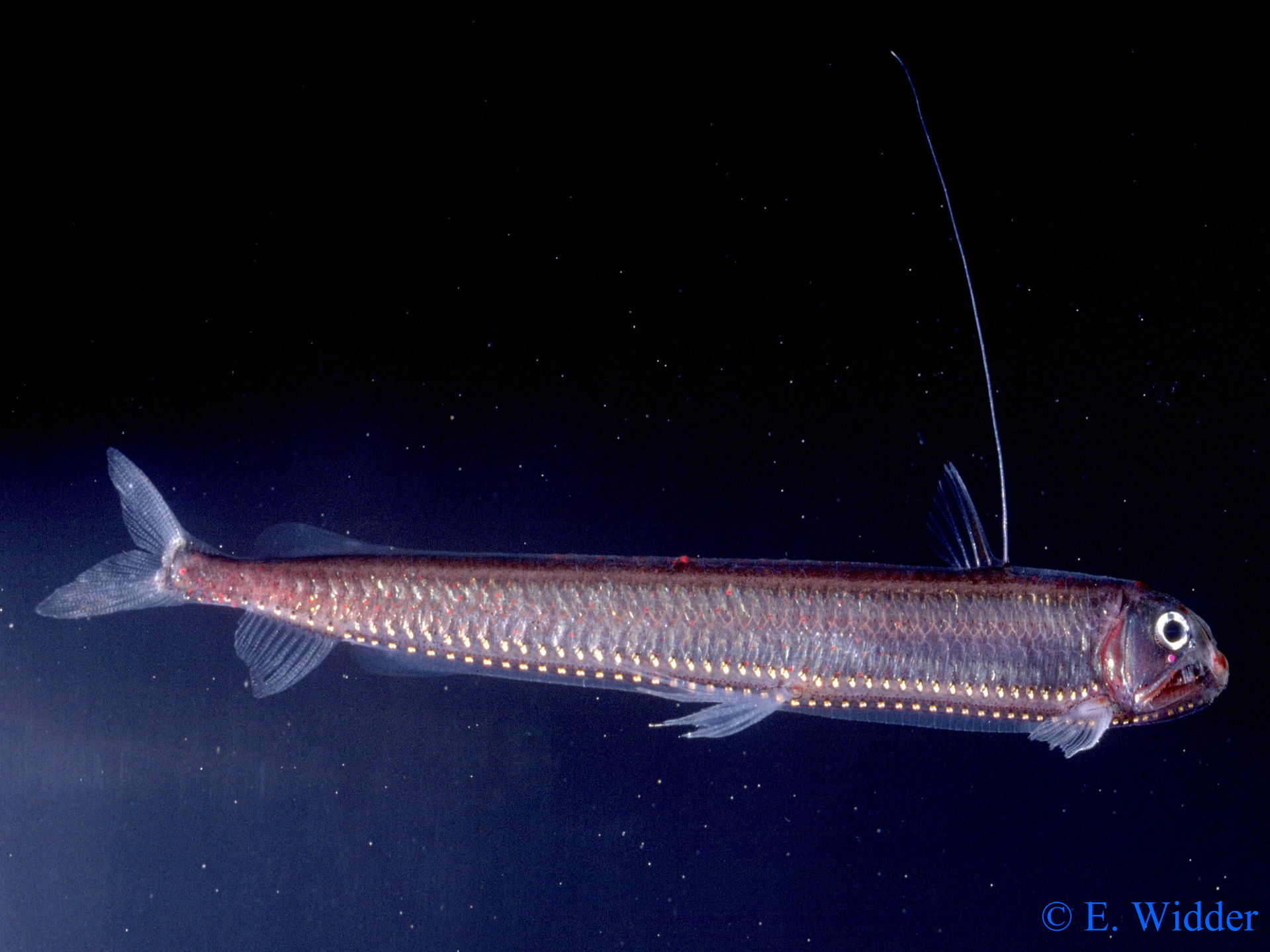
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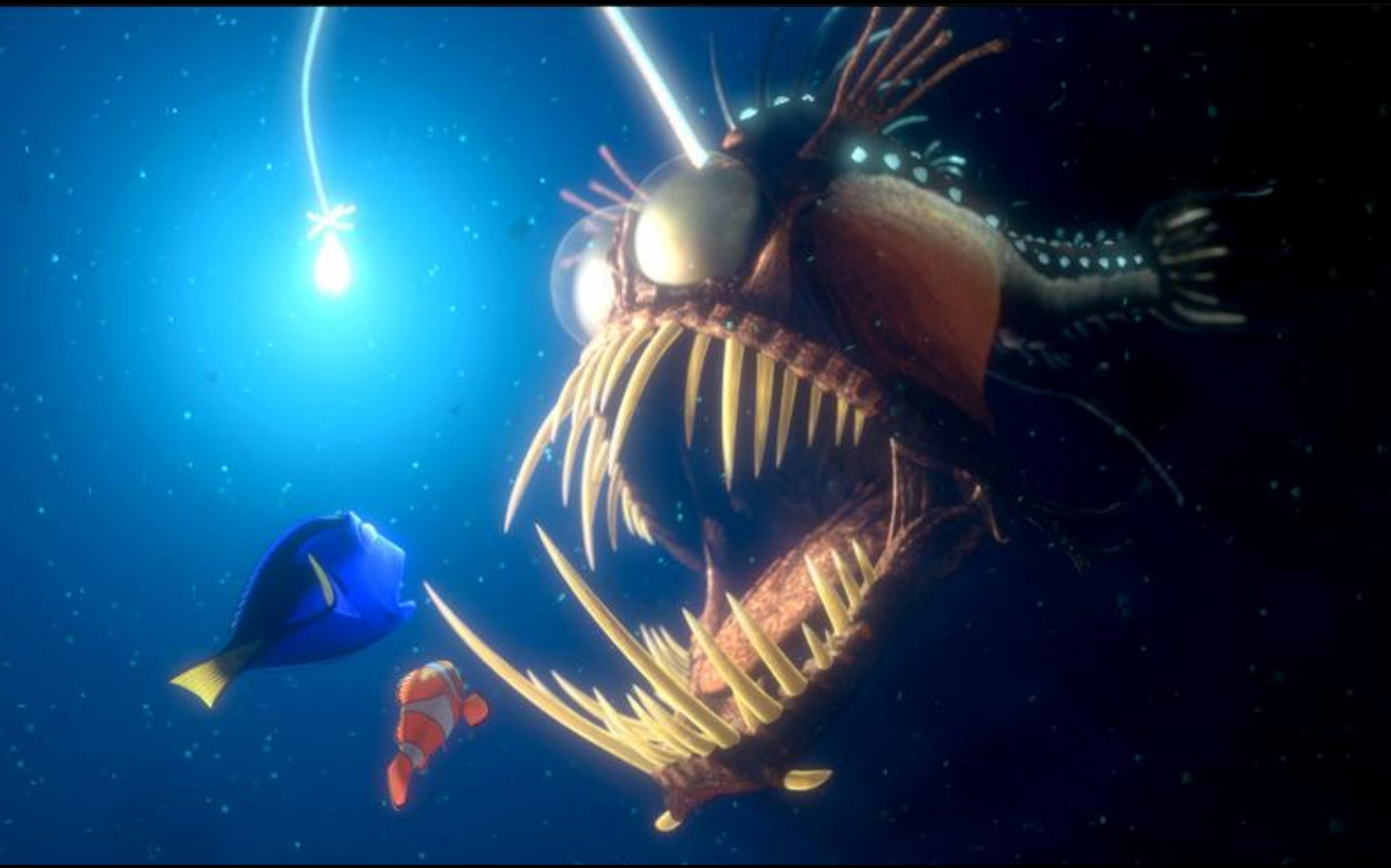


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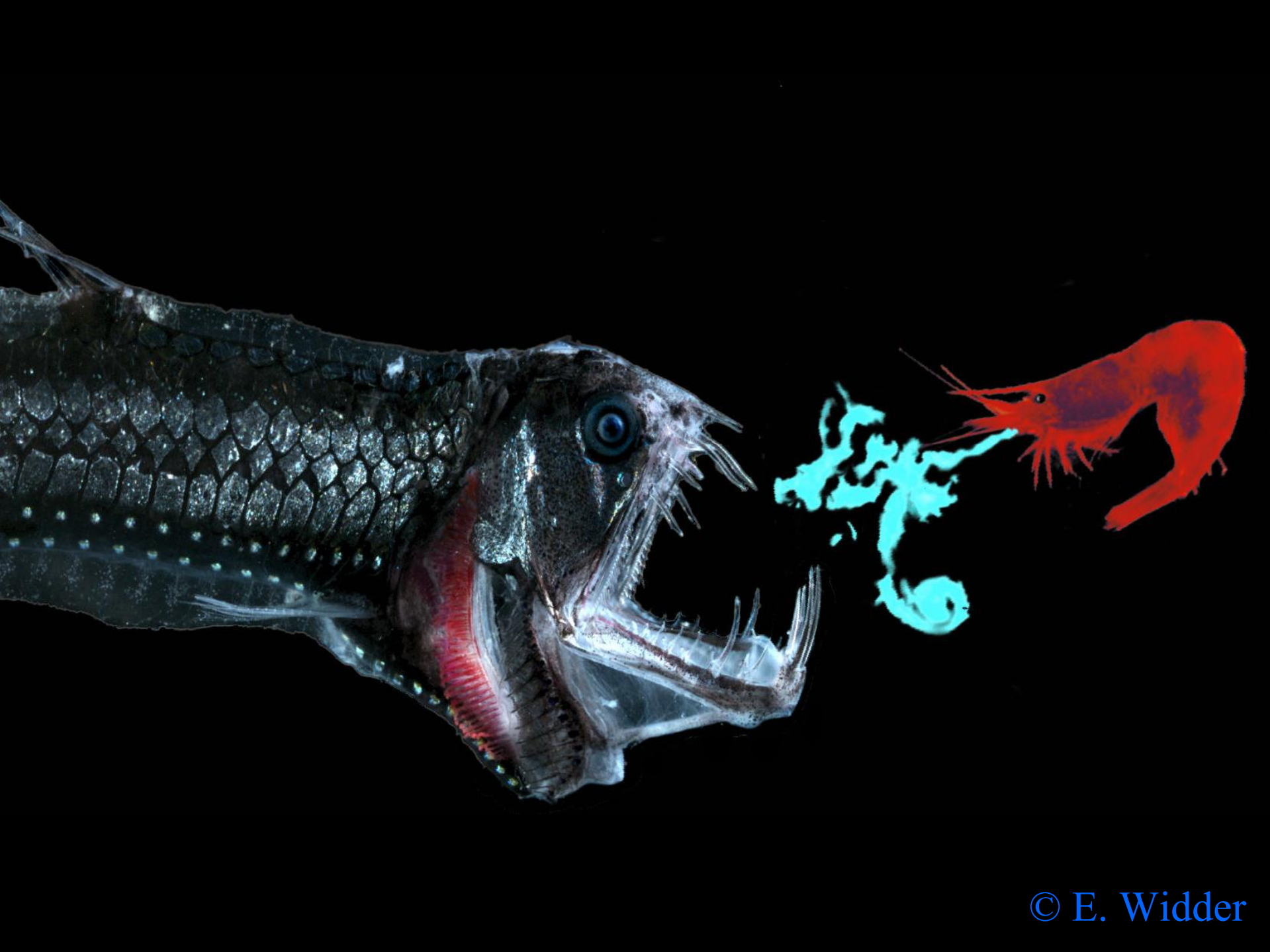
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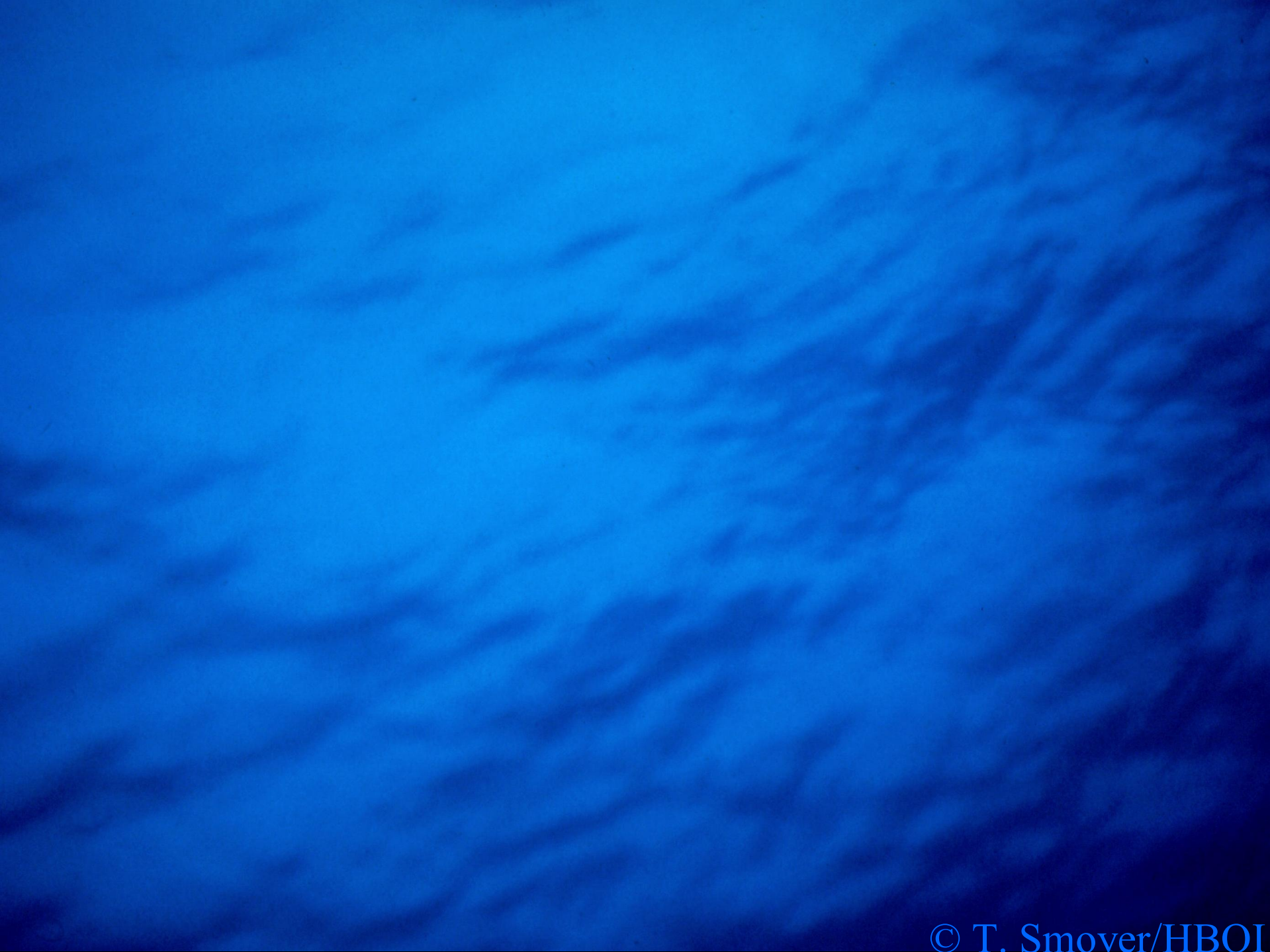
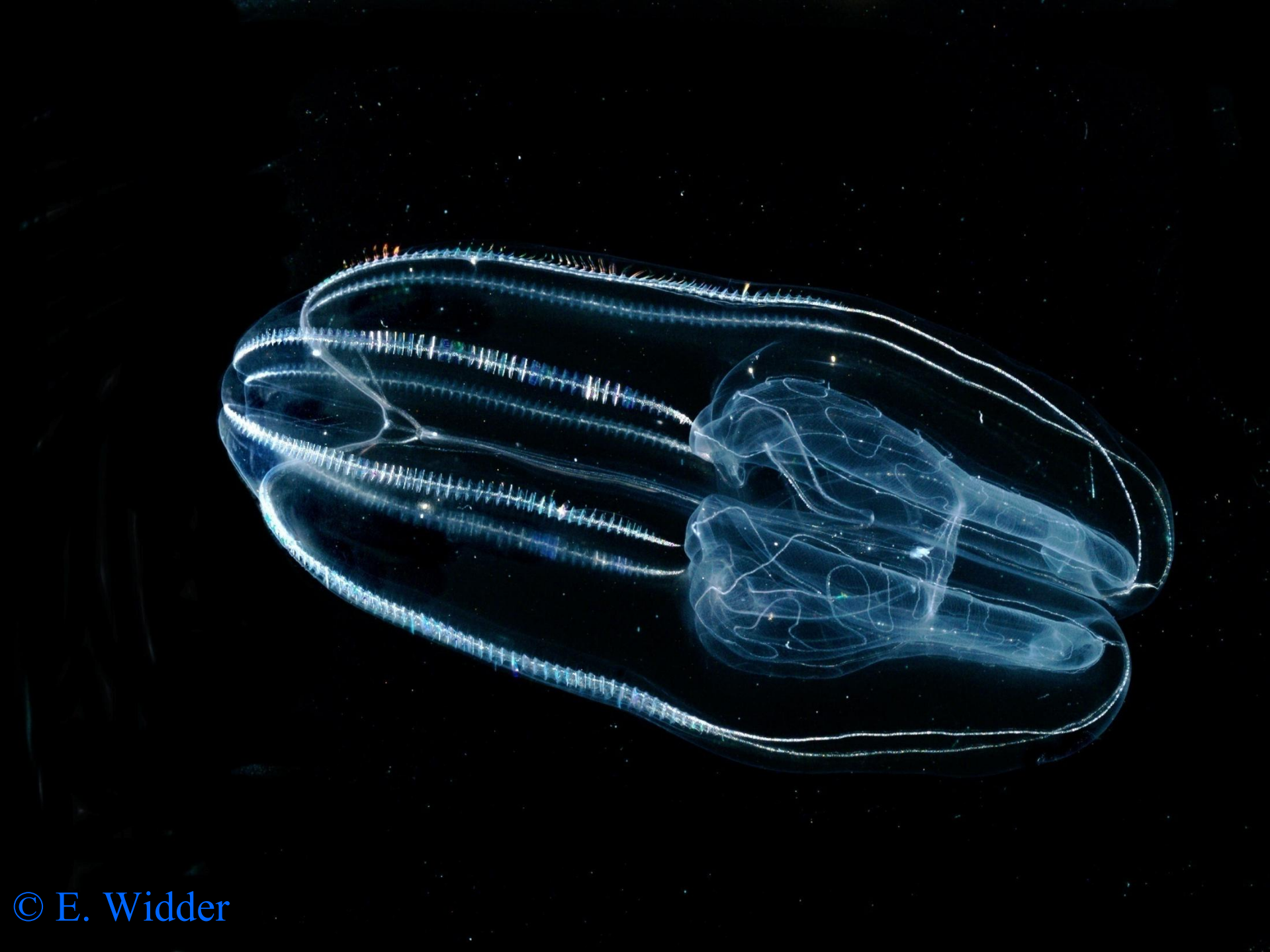
Shining tubeshoulder: *Searsia koefoedi*


© E. Widder

Functions of Bioluminescence:

- Finding food
- Attracting mates
- Defense
  - Blinding and distraction
  - Camouflage


© T. Smover/HBOI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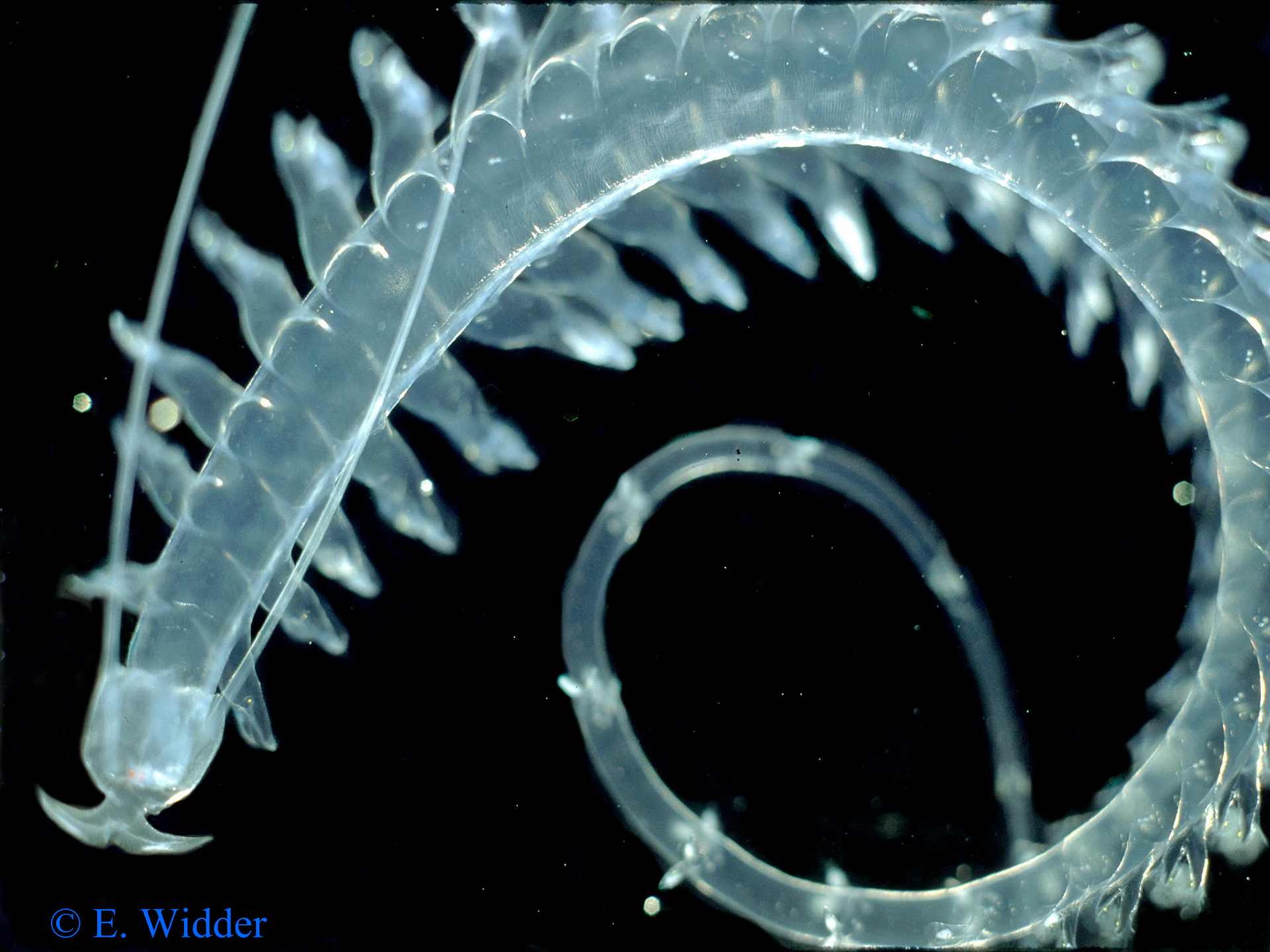


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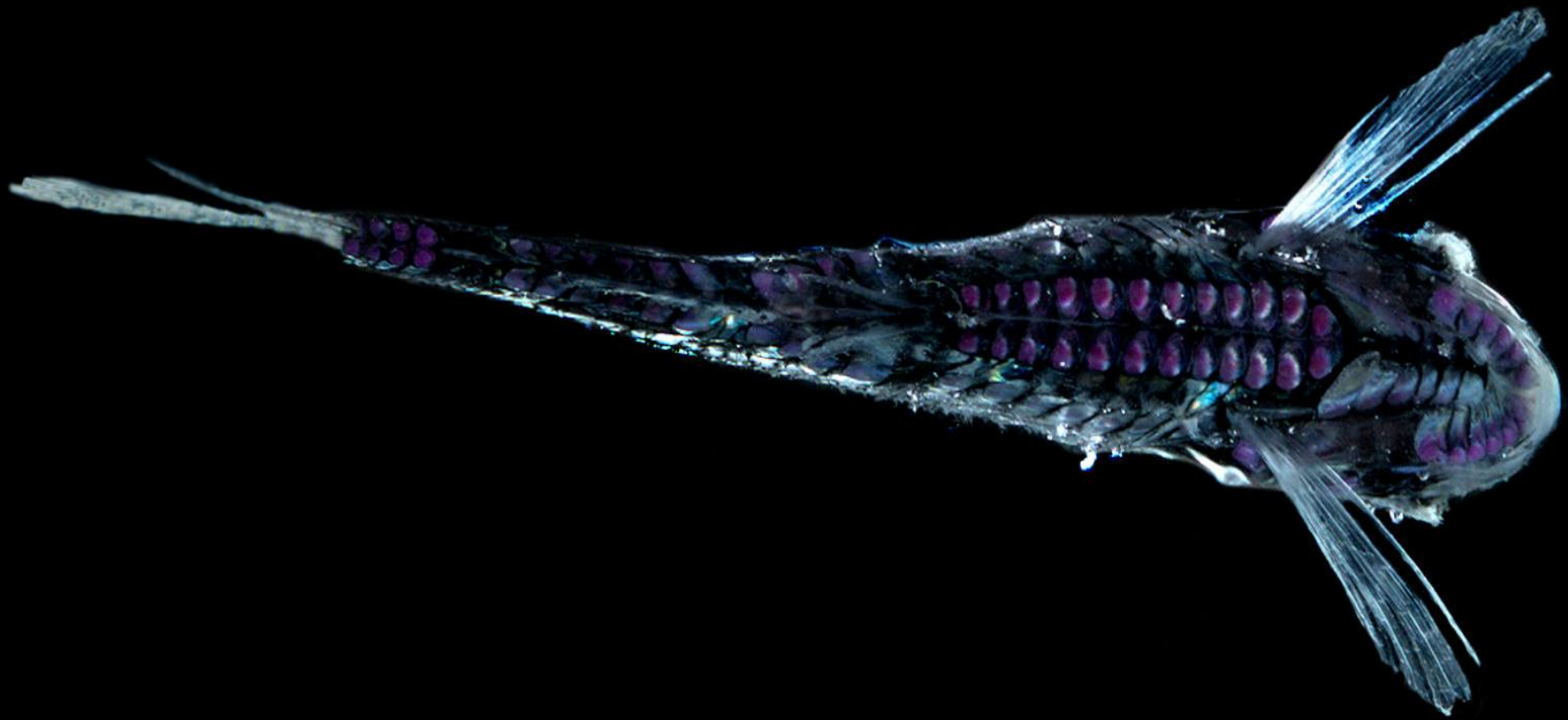
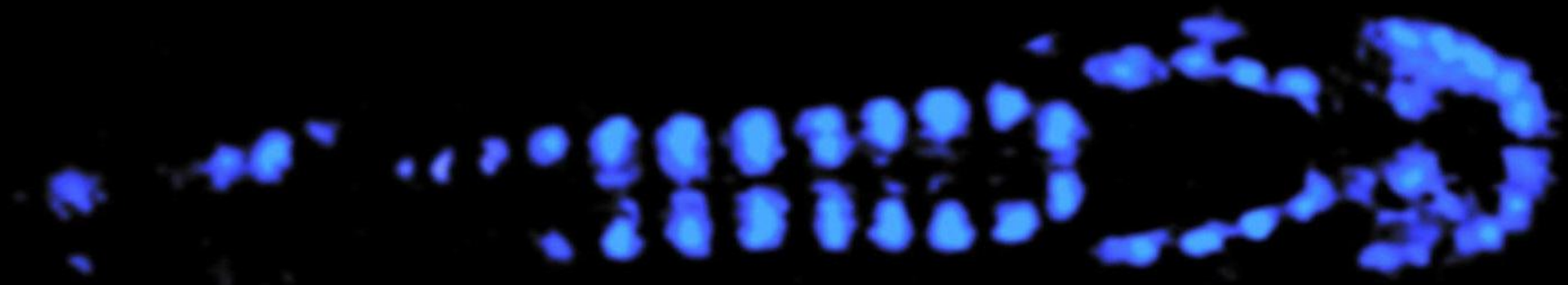
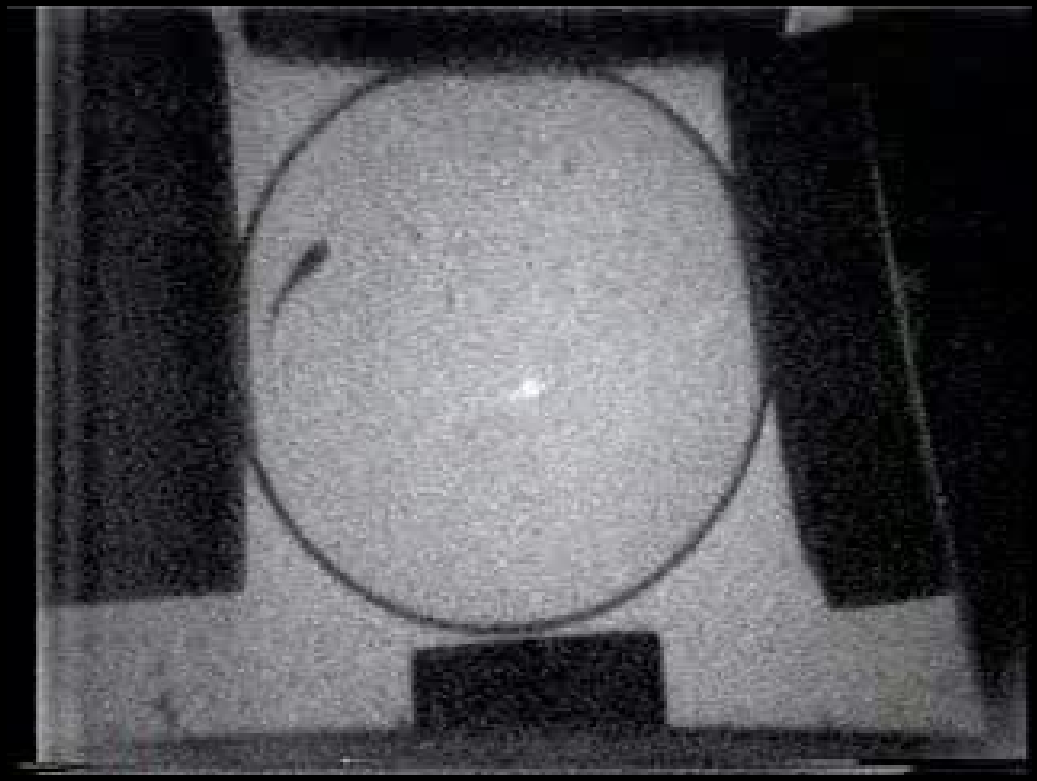




Counterillumination

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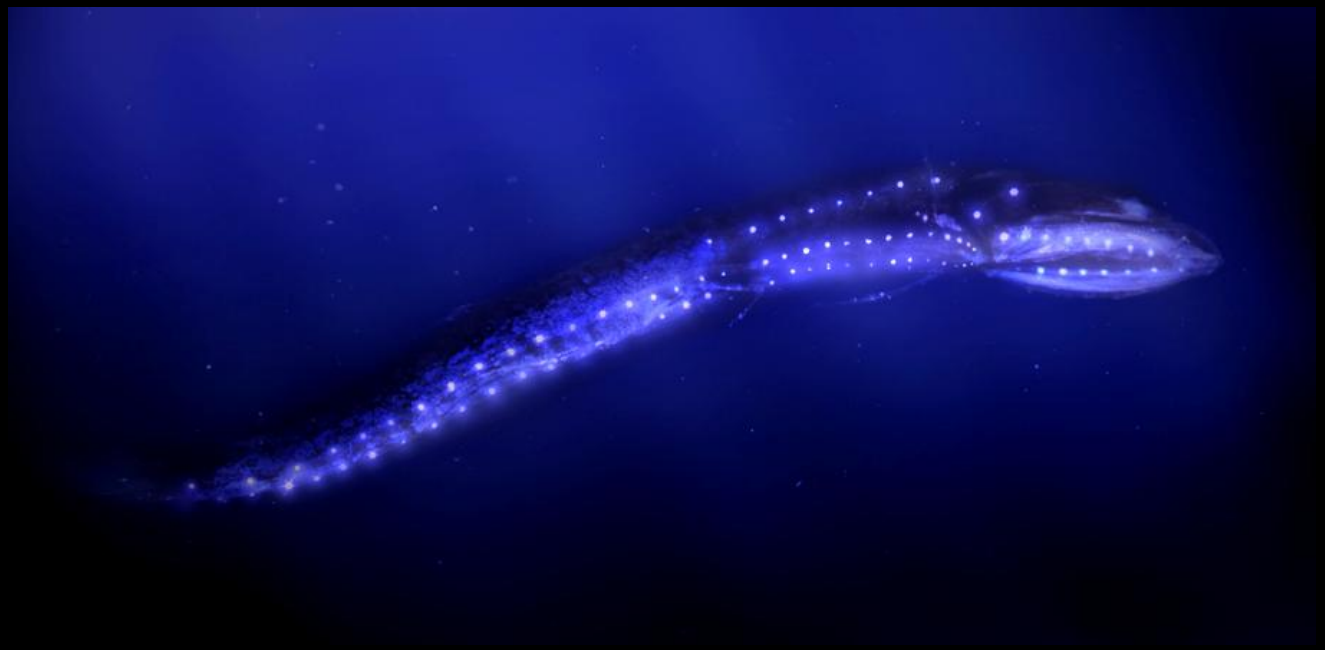


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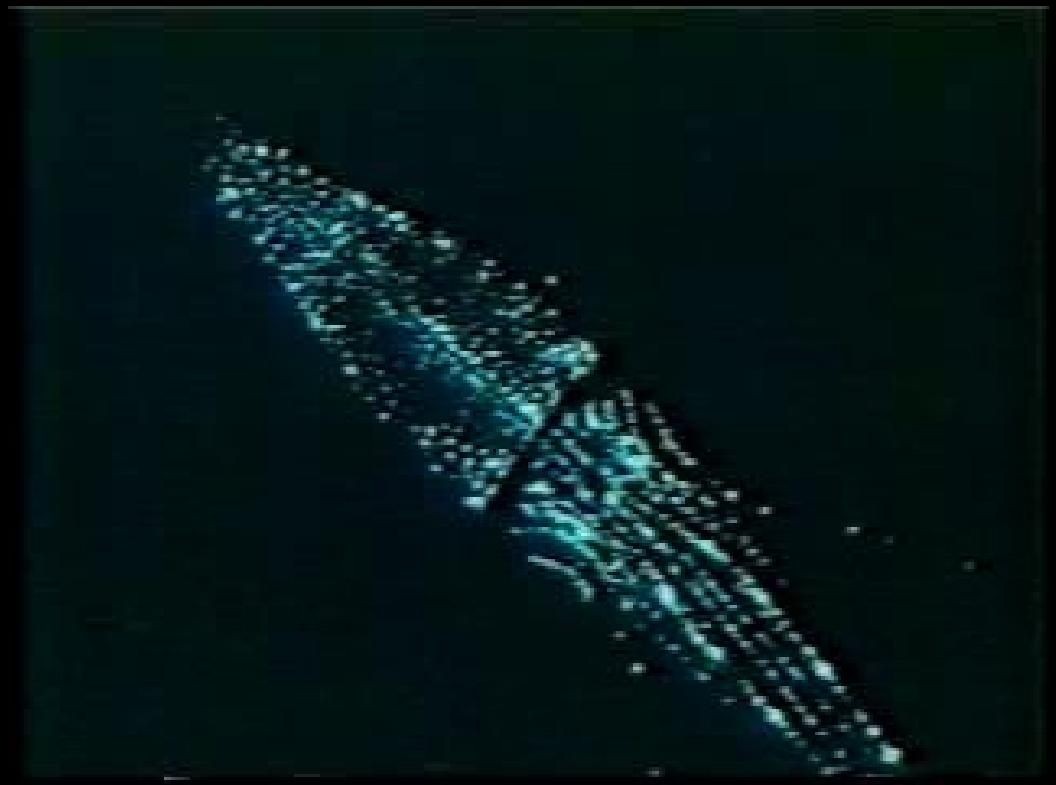
Abralia veranyi



Functions of Bioluminescence:

- Finding food
- Attracting mates
- Defense
  - Blinding and distraction
  - Camouflage
  - Burglar Alarms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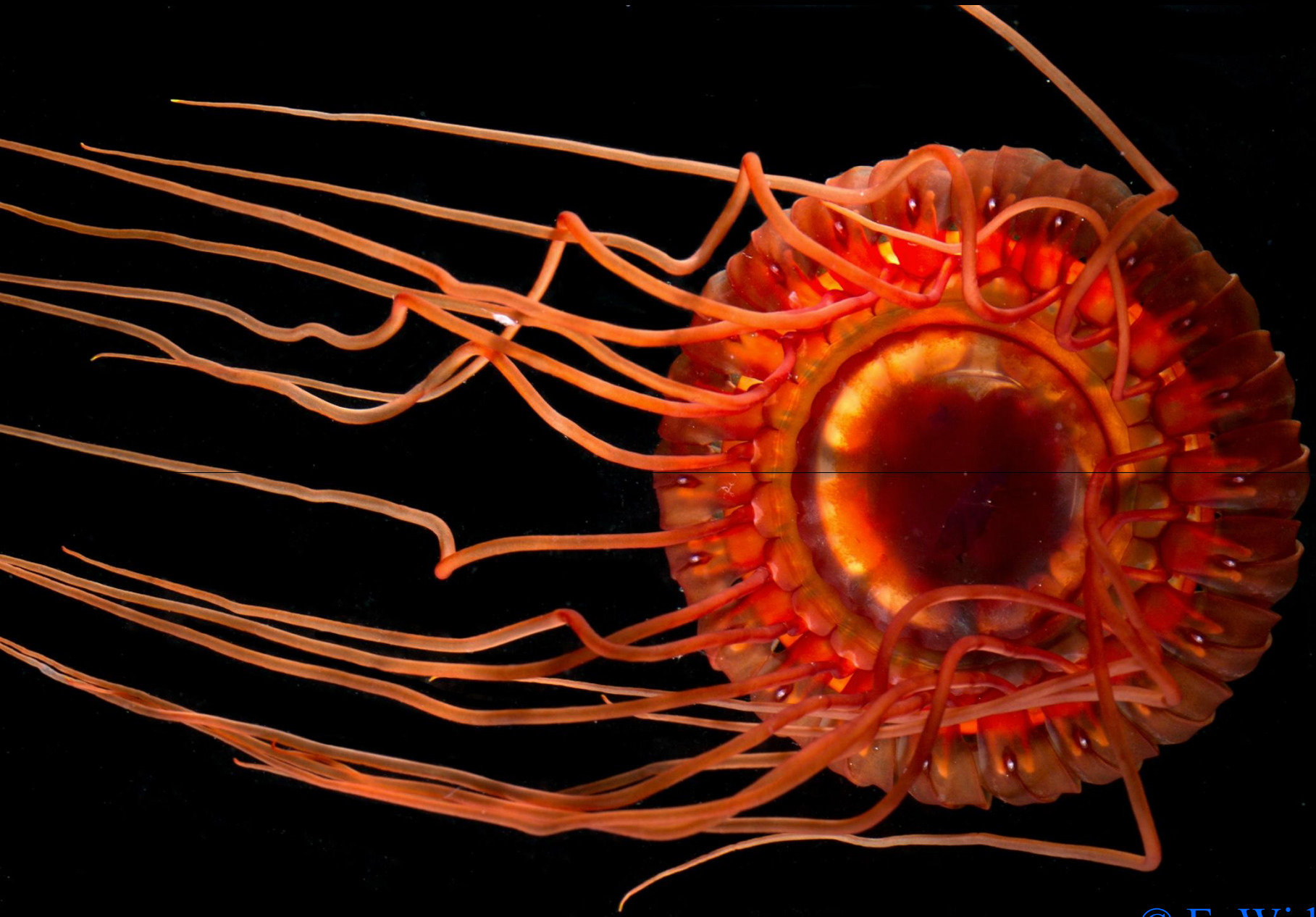
Black dragonfish: *Melanostomias bartonbeani*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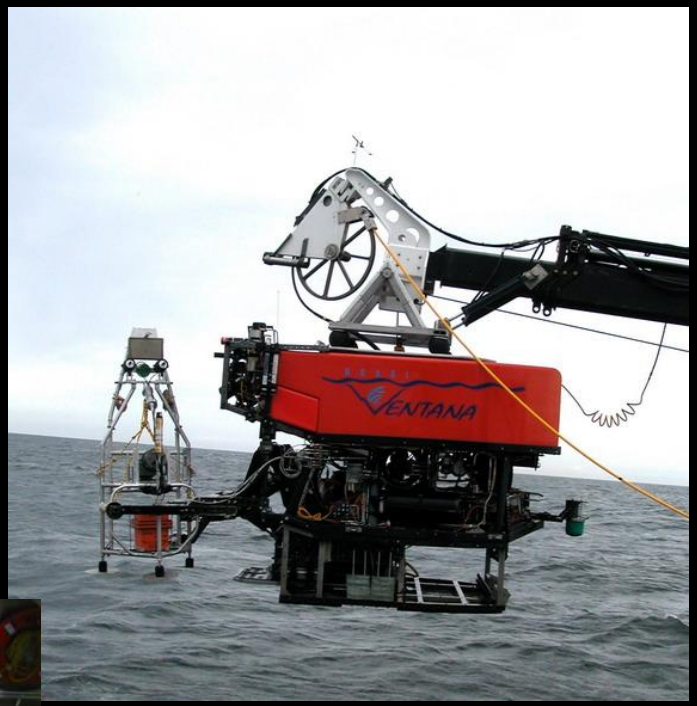
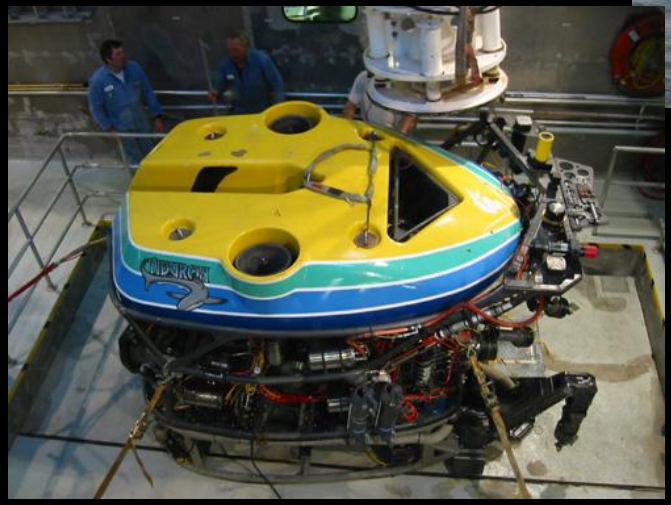
Deep-sea jellyfish: *Atolla wyvillei*

Deep-sea exploration platforms are noisy and use bright lights

JSL submersible – electric
w/ hydraulic capabilities

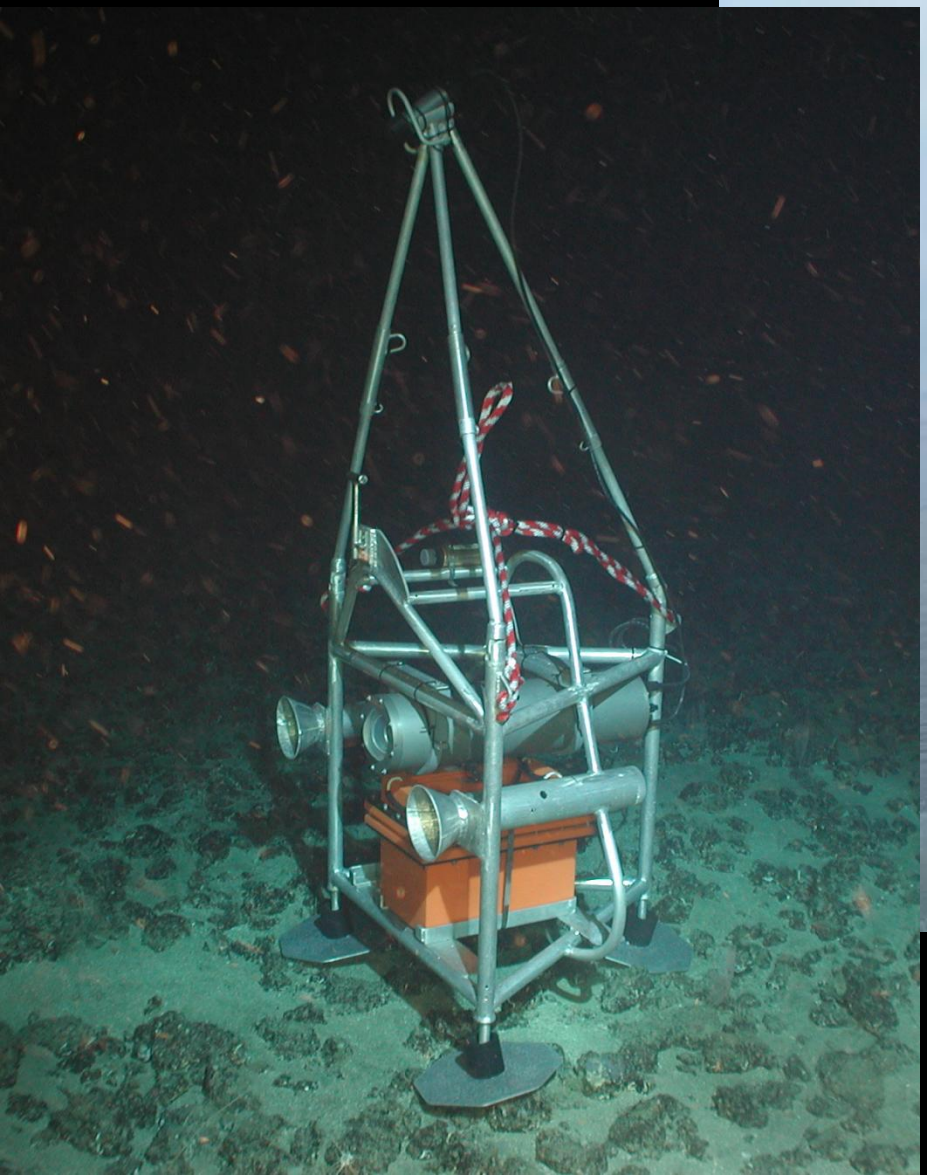


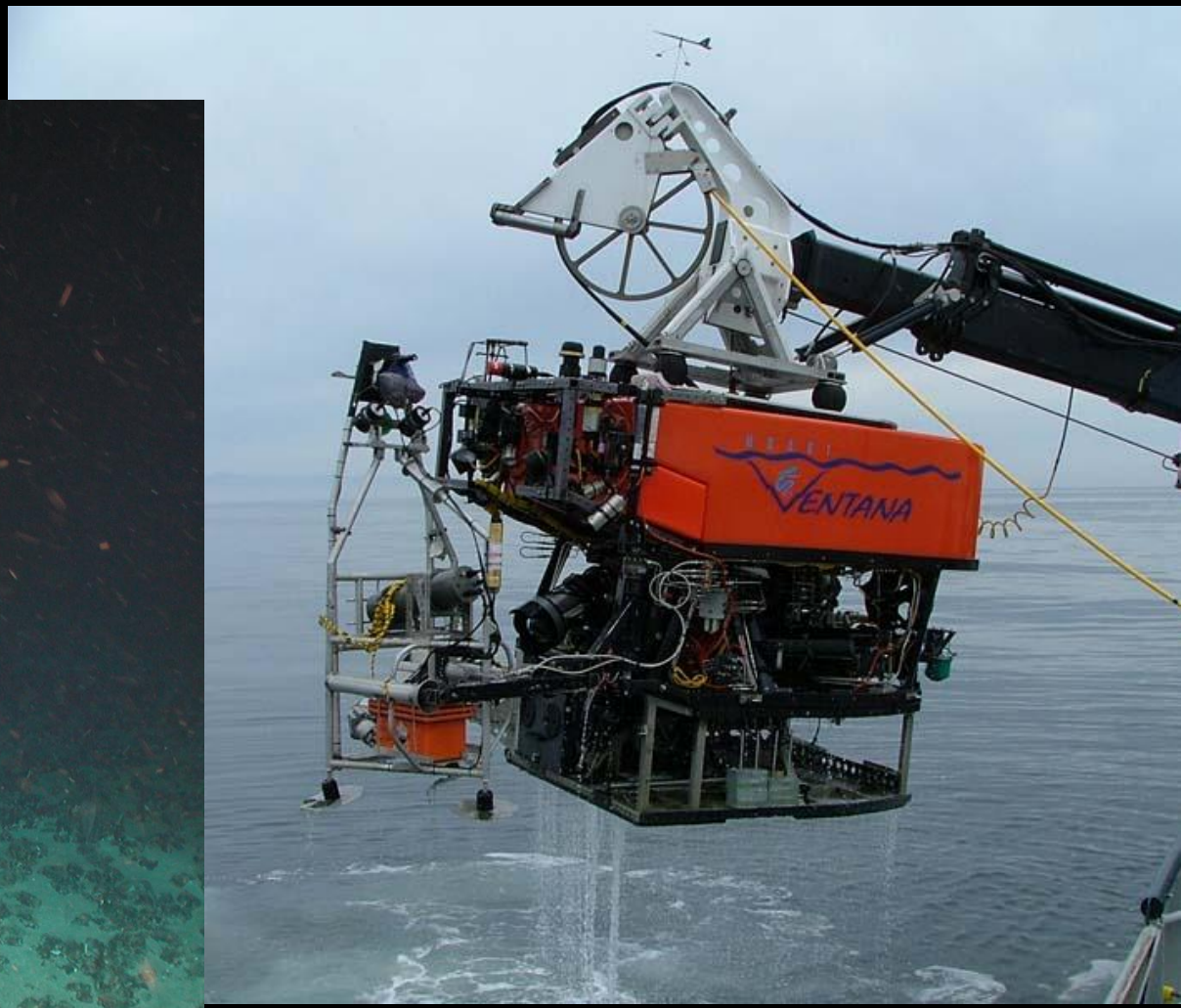
ROV Ventana – hydraulic



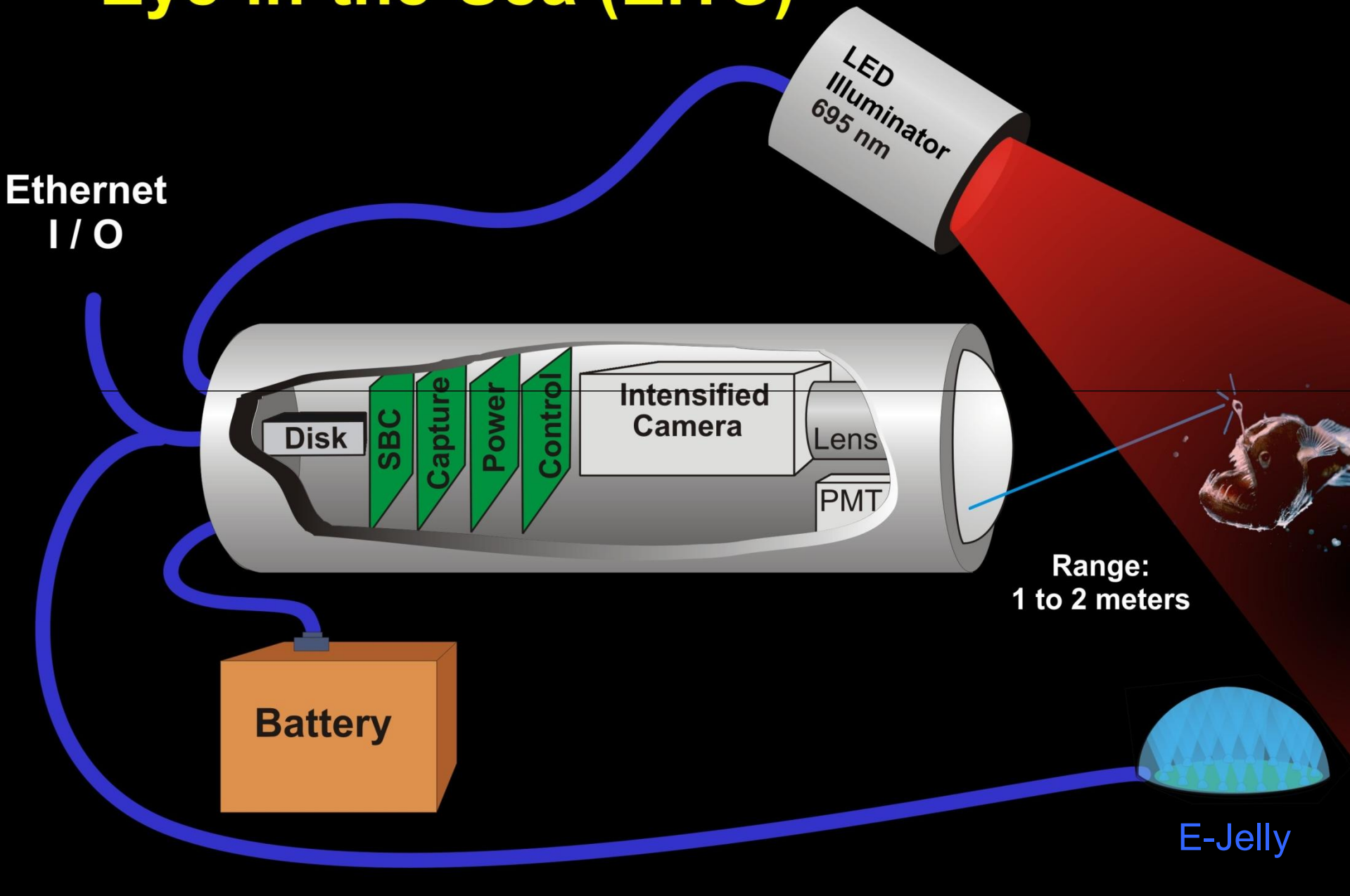
ROV Tiburon – electric
w/ hydraulic capabilities

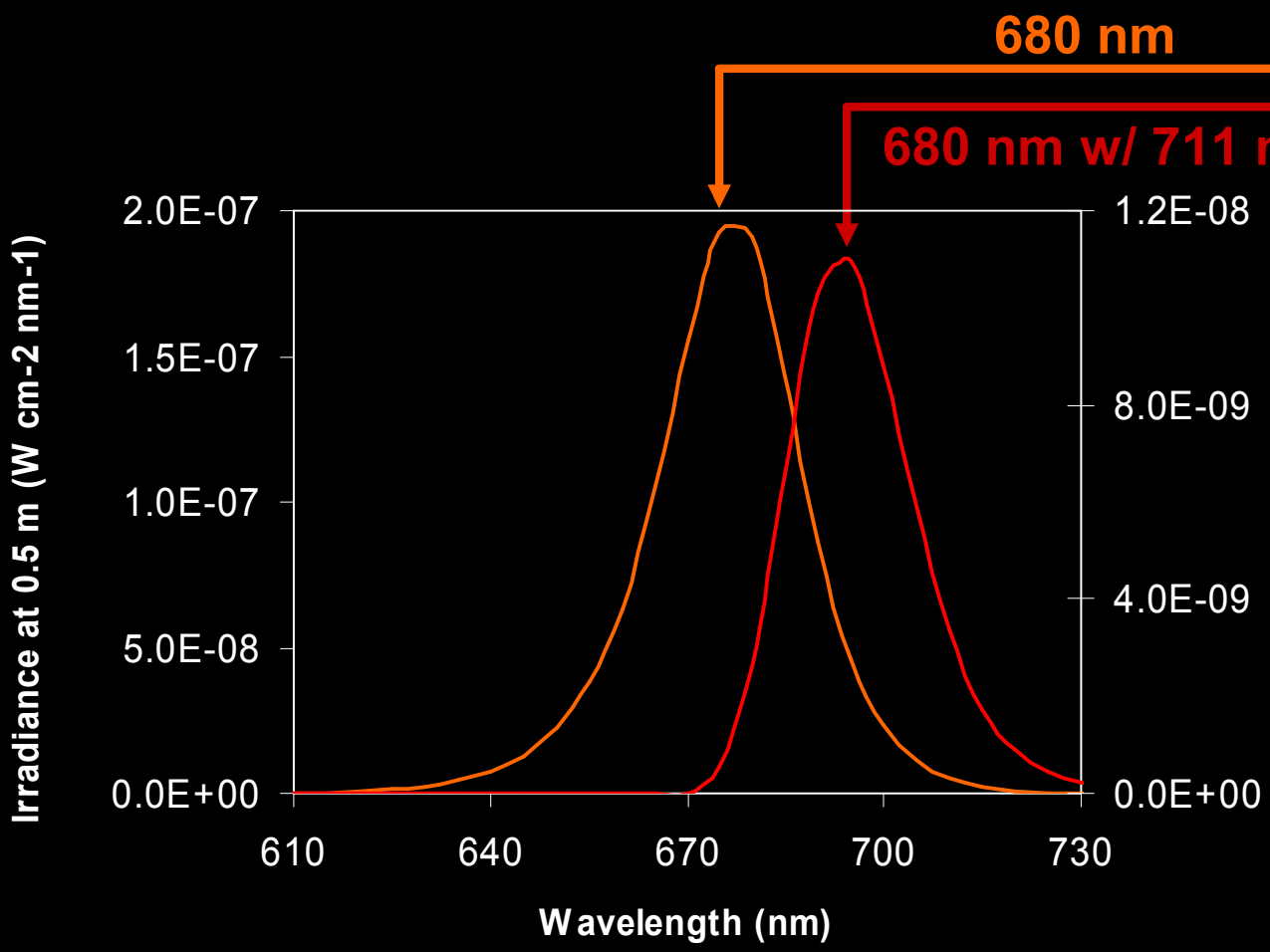
Eye-in-the-Sea

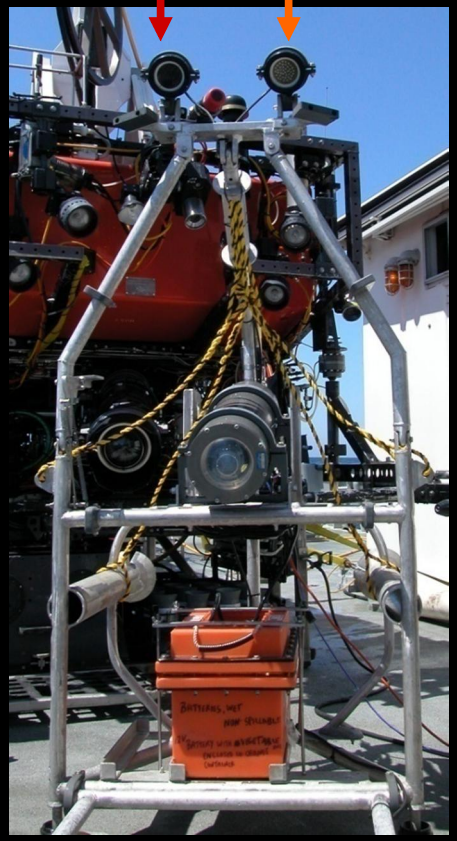




Eye-in-the-Sea (EITS)



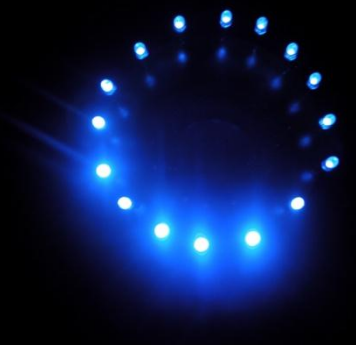

680 nm
680 nm w/ 711 nm filter
Irradiance at 0.5 m (W cm-2 nm-1)
2.0E-07
1.5E-07
1.0E-07
5.0E-08
0.0E+00
1.2E-08
8.0E-09
4.0E-09
0.0E+00
610
640
670
700
730
Wavelength (nm)



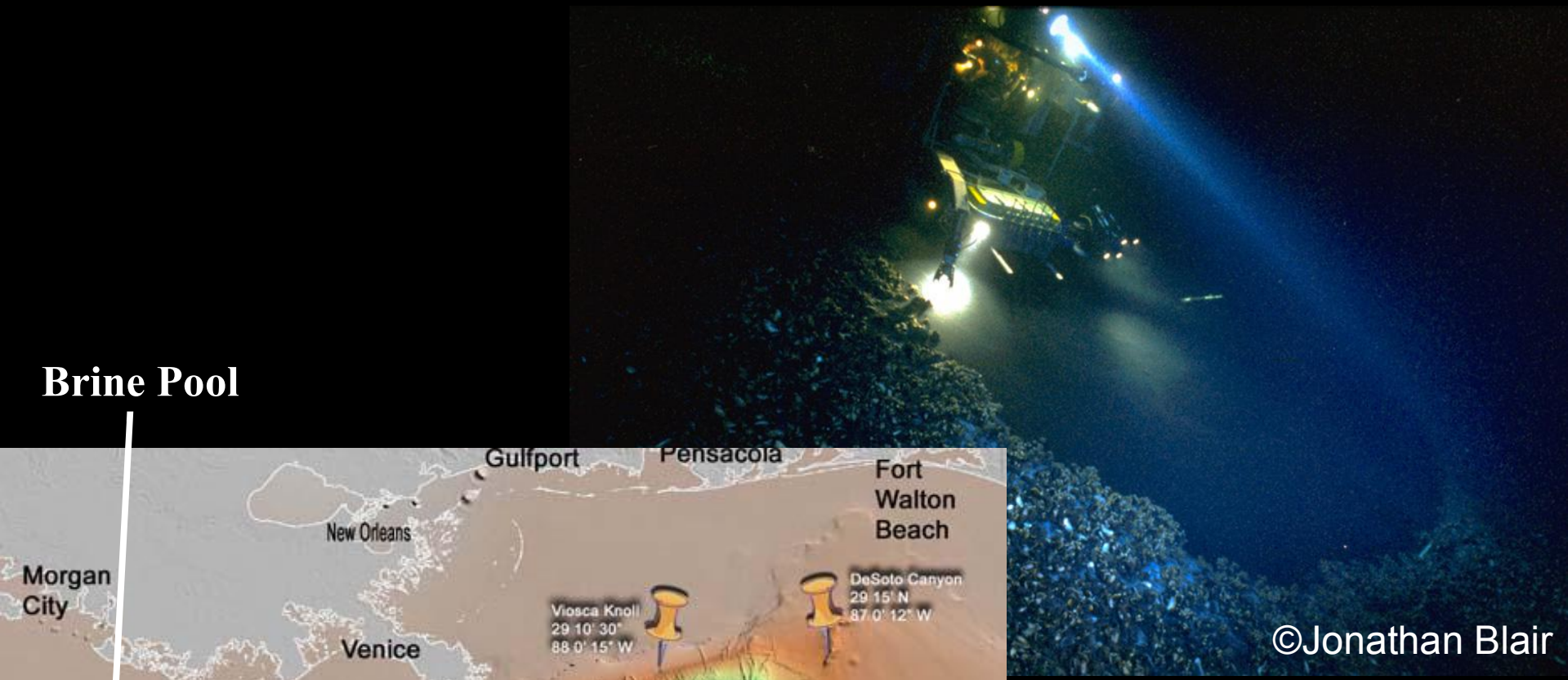
Optical Lure

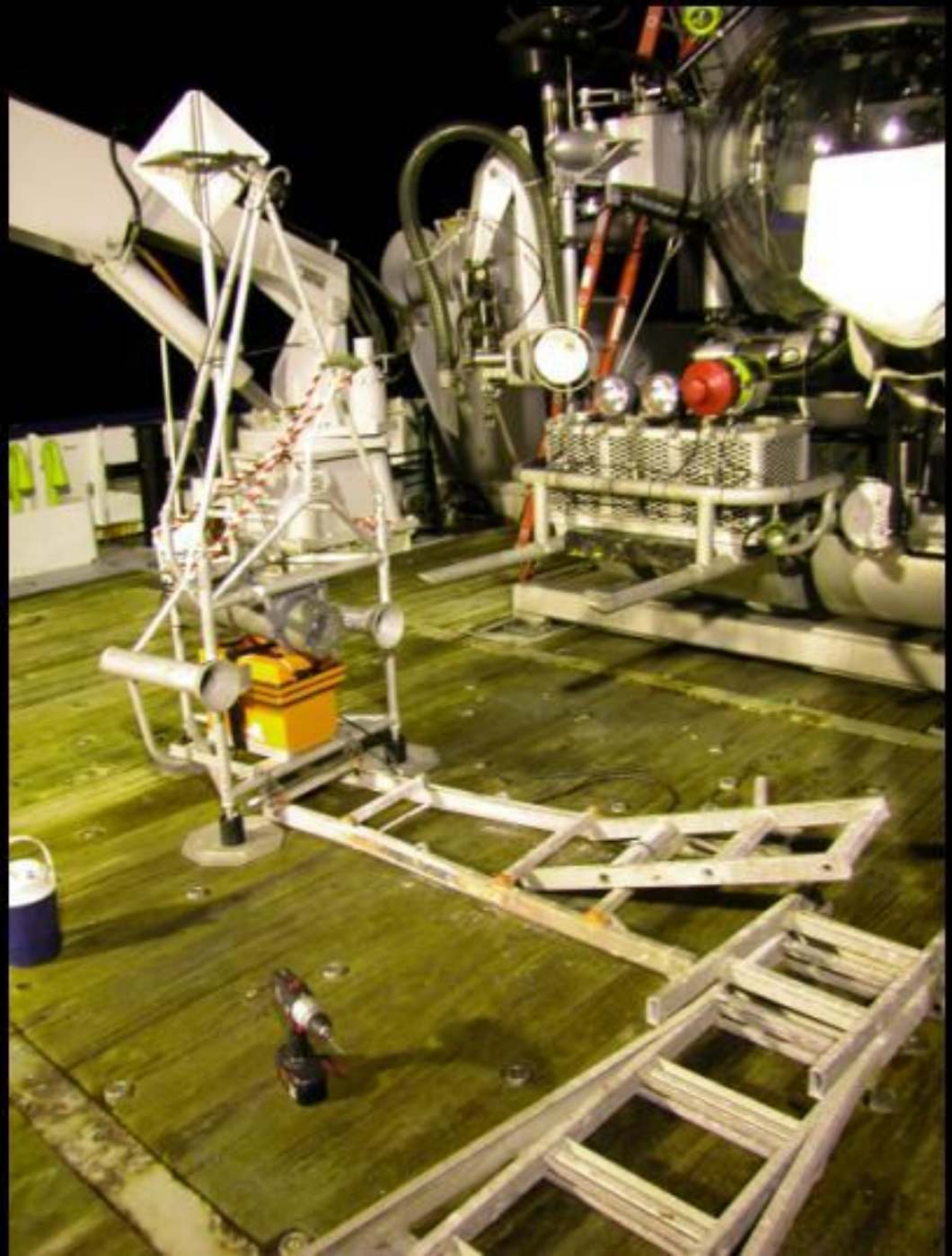
E-Jelly

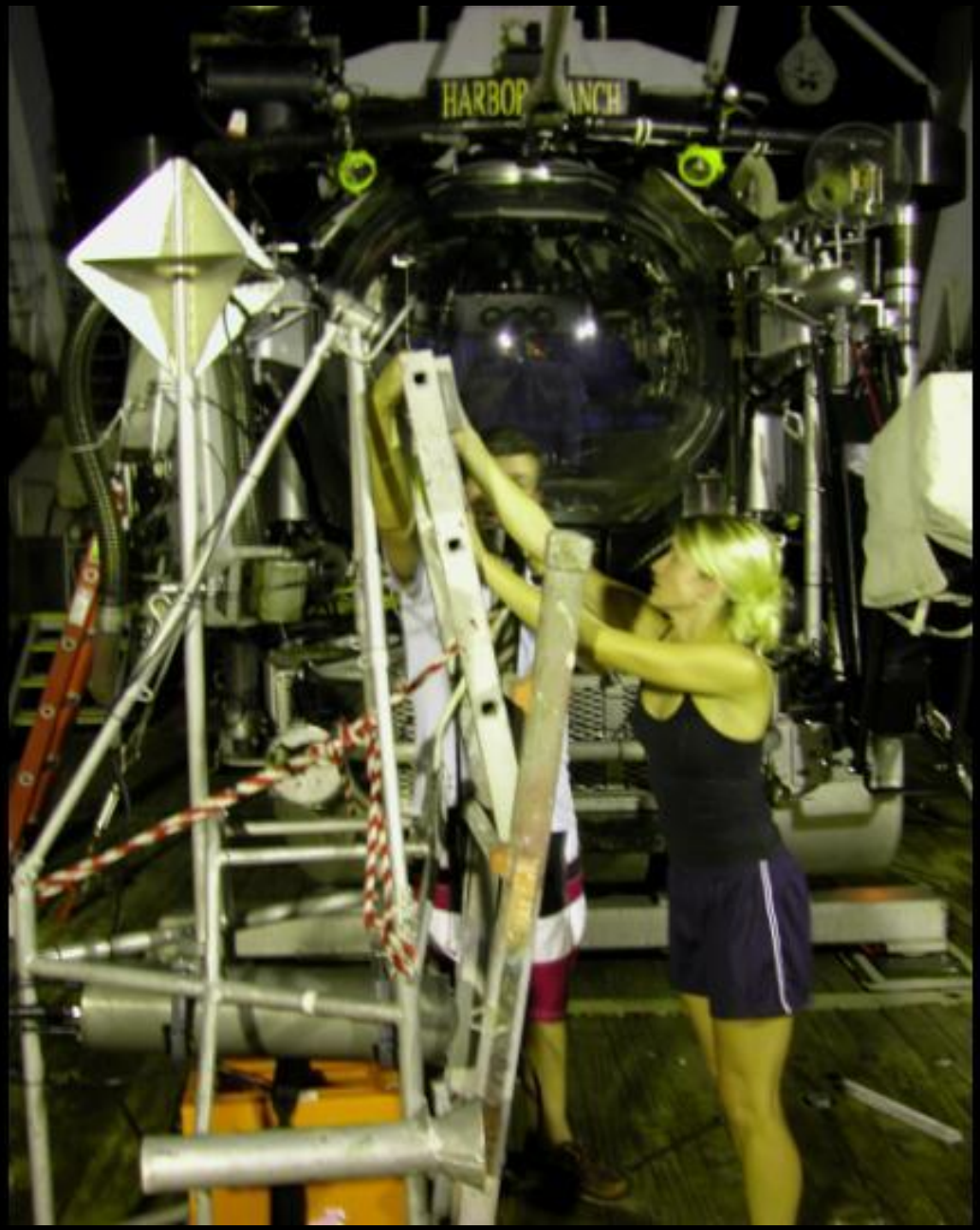
- 5 Display Modes
  - Single Dim LED Glow
  - Single Bright LED GLOW
  - All LEDs Flash
  - All LEDs Pinwheel
  - Programmable Flash



Gulf of Mexico

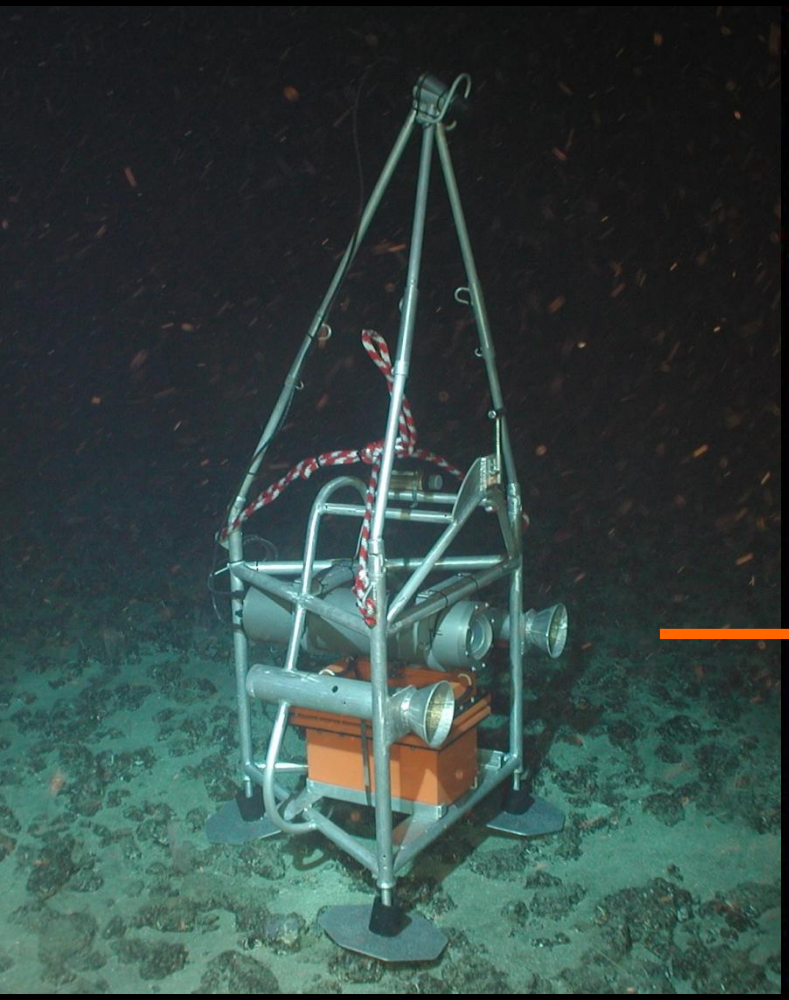


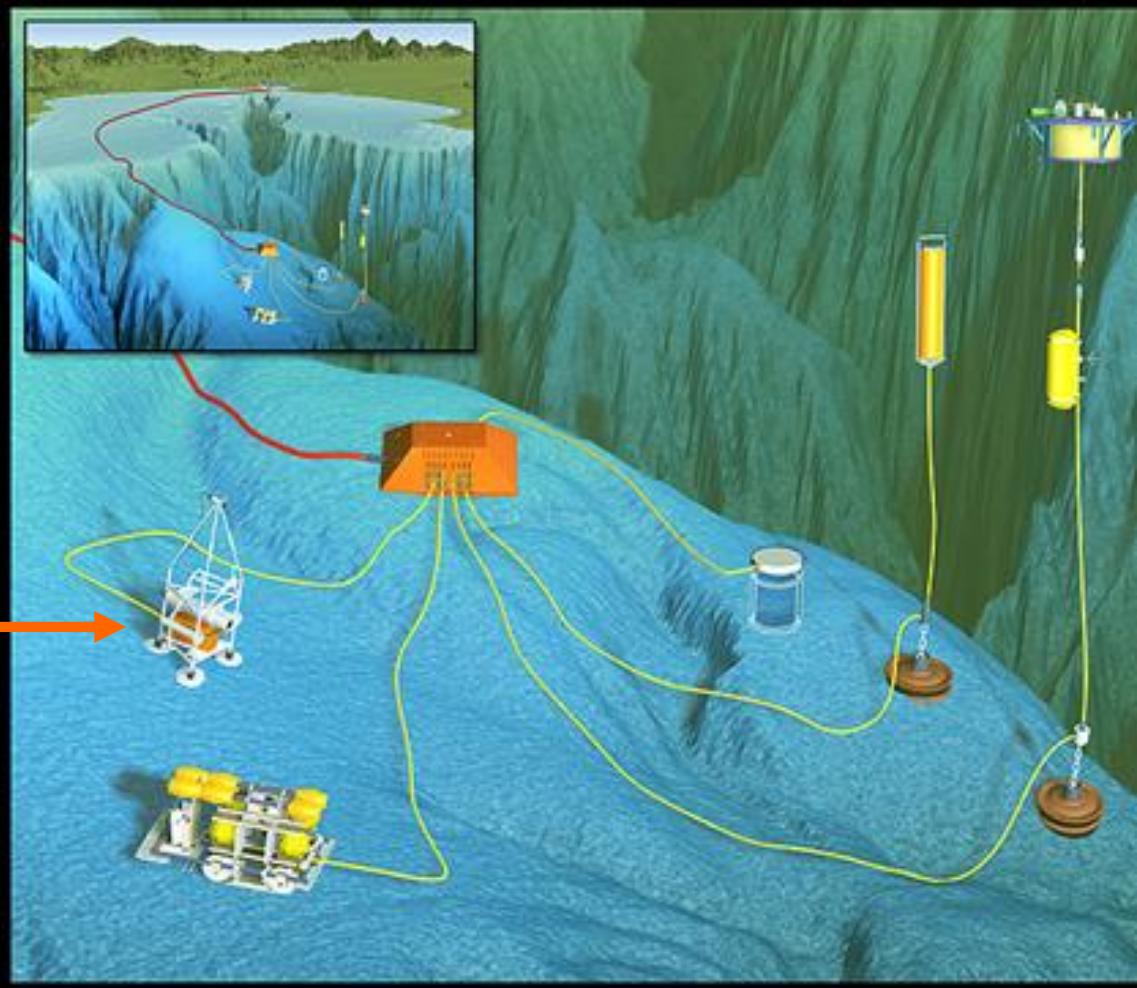




CLAM

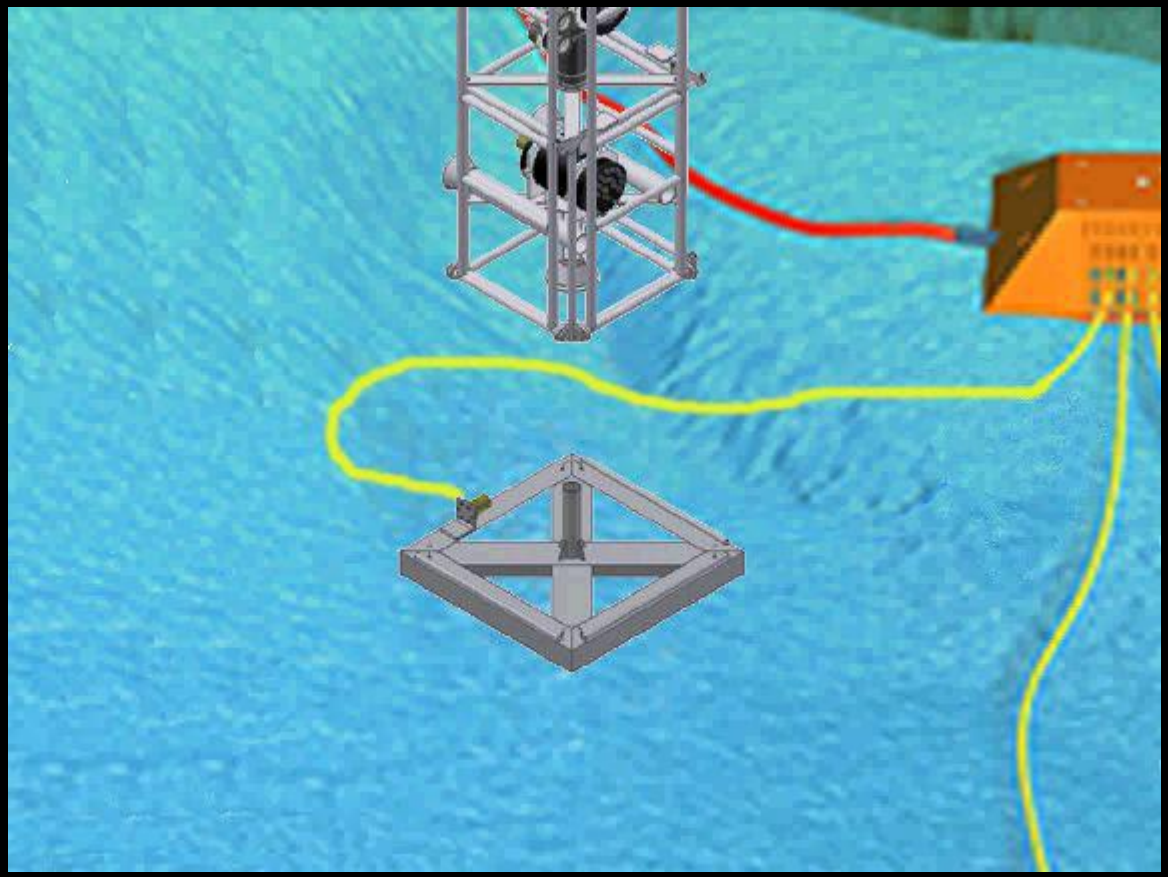
Cannibalized
Ladder
Alignment
Mechanism





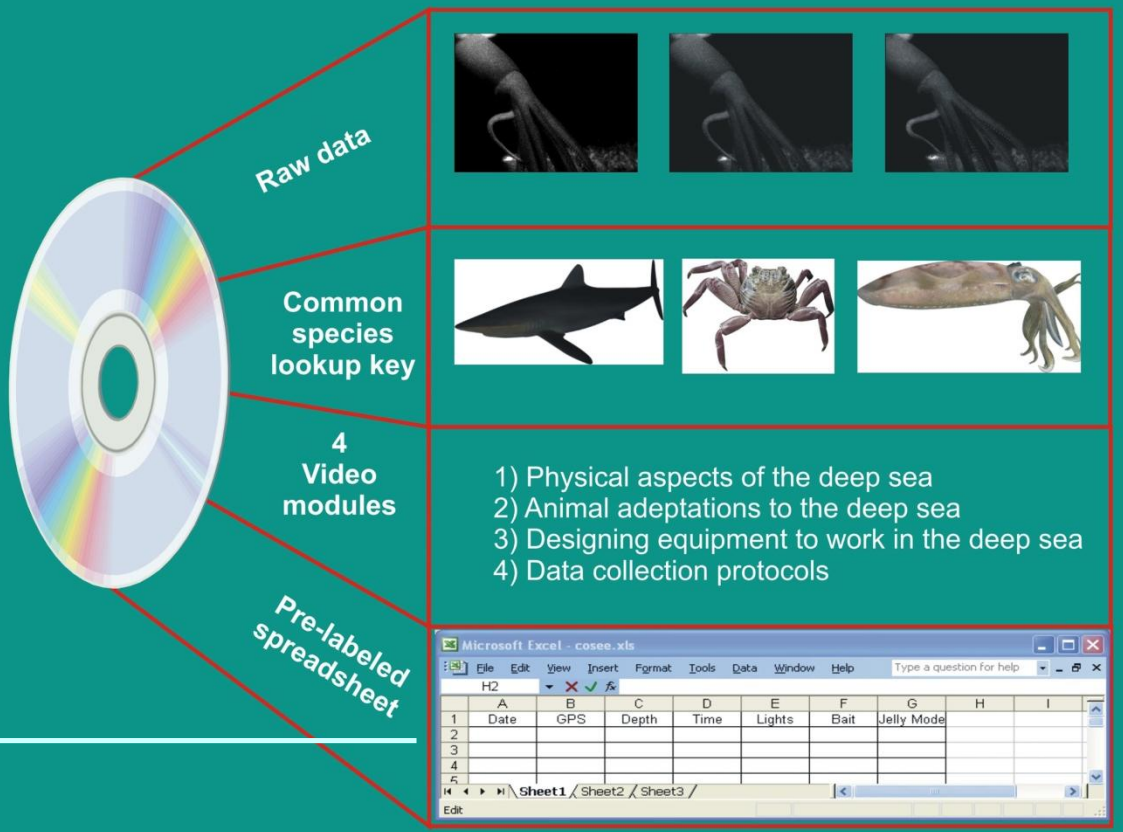
www.mbari.org/mars

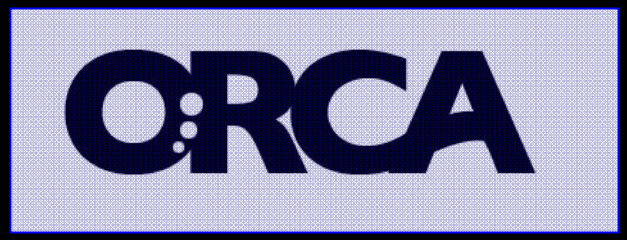
Moored Eye-in-the-Sea



Eye-in-the-Sea

Web-based E-journal, student chat rooms and "ask-a-scientist" bulletin board




ORCA