



## Image and video annotation with BIIGLE



Martin Zurowietz



**Biodata Mining Group**  
Bielefeld University

Imaging data is collected in many fields of research.

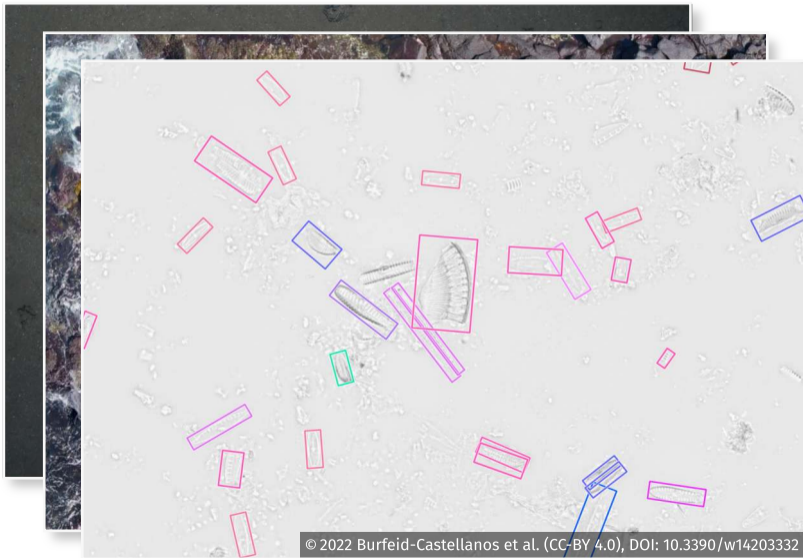


Imaging data is collected in many fields of research.

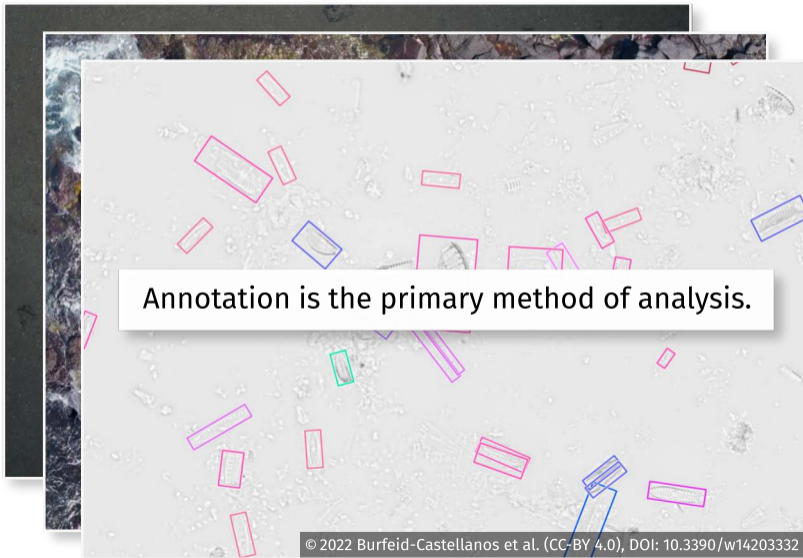


© 2021 Amy McLeod, Iguanas From Above

Imaging data is collected in many fields of research.



Imaging data is collected in many fields of research.



# Marker + Label = Image Annotation

Holothuroidea

*Label*

*Marker*

# Image annotation bottleneck

- An AUV can capture **34,000 images** in 11 hours



# Image annotation bottleneck

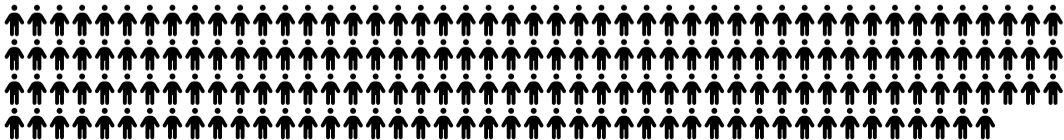
- An AUV can capture **34,000 images** in 11 hours
- An expert biologist can annotate **180 images** in 11 hours





# Image annotation bottleneck

- An AUV can capture **34,000 images** in 11 hours
- An expert biologist can annotate **180 images** in 11 hours



**Computer assistance is needed to keep up with the volumes of data!**

**Computer assistance is needed to keep up with the volumes of data!**



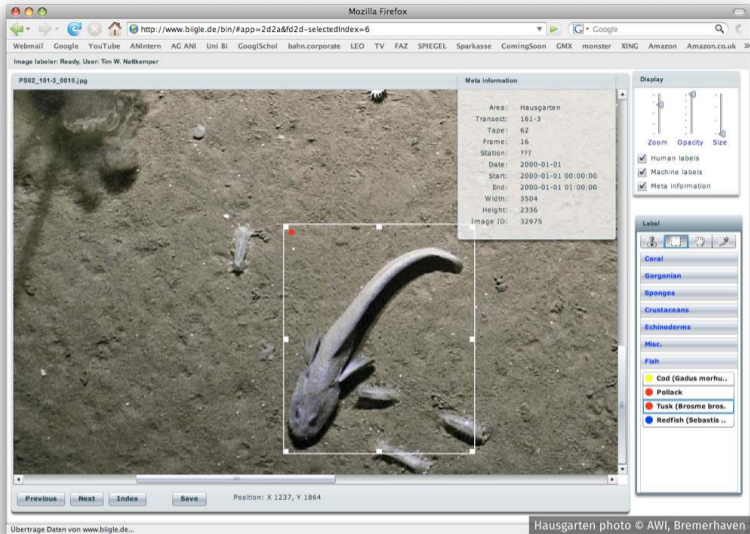
Specialized software  
+  
Automated processing

**Computer assistance is needed to keep up with the volumes of data!**



Specialized software  
+  
Automated processing

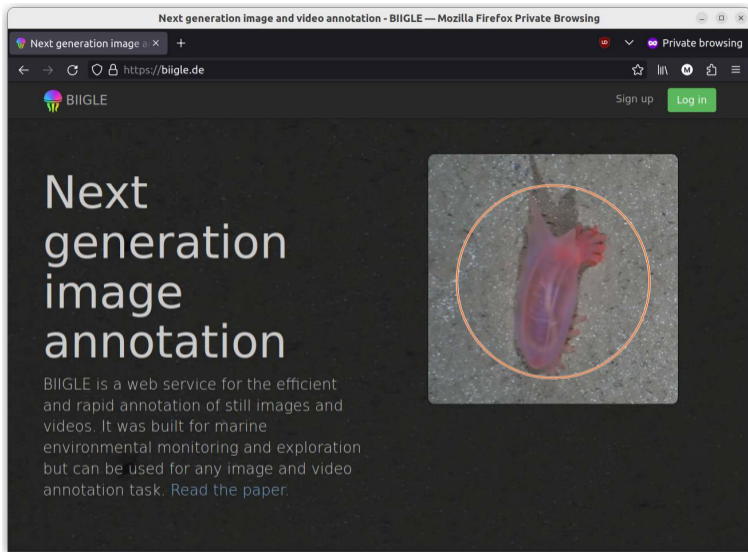




## BIIGLE 1.0 (2009)

Ontrup, J., Ehnert, N., Bergmann, M., & Nattkemper, T. W. (2009, May). BIIGLE-Web 2.0 enabled labelling and exploring of images from the Arctic deep-sea observatory HAUSGARTEN. In OCEANS 2009-EUROPE (pp. 1-7). IEEE.


## BIIGLE 2.0 (2017)





---

Langenkämper, D., Zurowietz, M., Schoening, T., & Nattkemper, T. W. (2017). BIIGLE 2.0-browsing and annotating large marine image collections. *Frontiers in Marine Science*, 4, 83.

## BIIGLE 2.0 (2017)

 3,000

 18,000,000

 3,000,000

Read the paper.' To the right of the text is a square image of a reddish, translucent marine organism (possibly a nudibranch) on a grey surface, with an orange circle drawn around it, indicating an annotation." data-bbox="300 33 919 839"/>


Next generation image and video annotation - BIIGLE — Mozilla Firefox Private Browsing


Next generation image annotation


BIIGLE is a web service for the efficient and rapid annotation of still images and videos. It was built for marine environmental monitoring and exploration but can be used for any image and video annotation task. [Read the paper.](#)

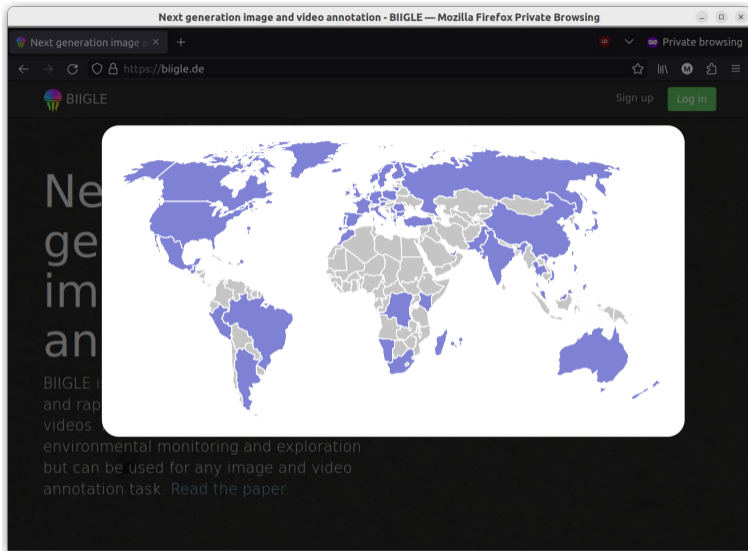
Langenkämper, D., Zurowietz, M., Schoening, T., & Nattkemper, T. W. (2017). BIIGLE 2.0-browsing and annotating large marine image collections. *Frontiers in Marine Science*, 4, 83.

## BIIGLE 2.0 (2017)

 3,000

 18,000,000

 3,000,000

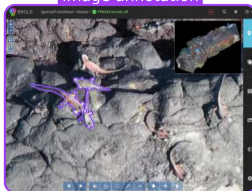


Langenkämper, D., Zurowietz, M., Schoening, T., & Nattkemper, T. W. (2017). BIIGLE 2.0-browsing and annotating large marine image collections. *Frontiers in Marine Science*, 4, 83.



# BIIGLE Features

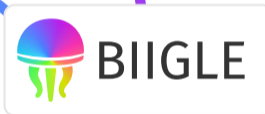
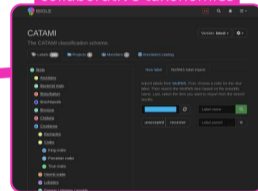
image annotation



video annotation



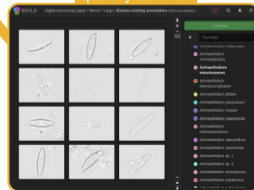
collaborative taxonomies

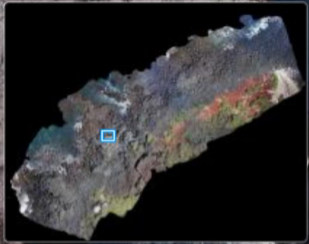


computer-assisted annotation



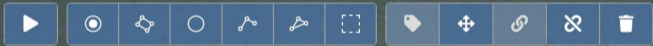
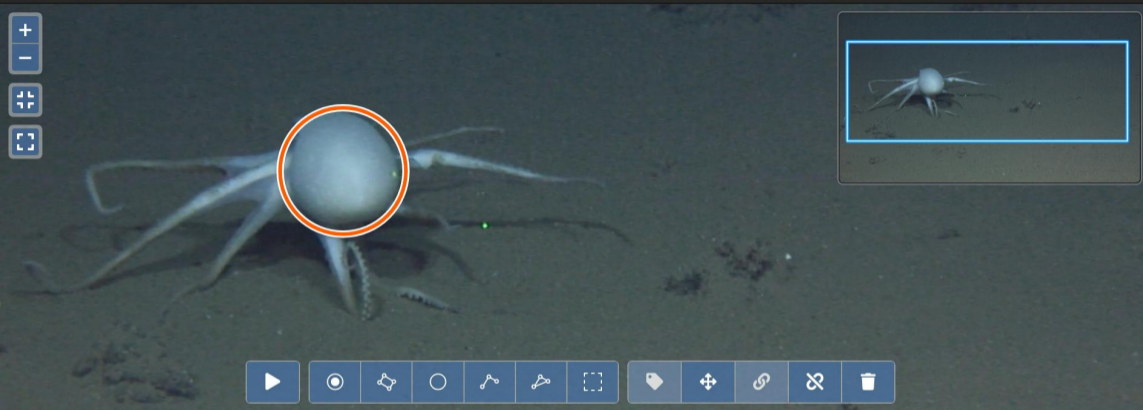
quality control





200 px





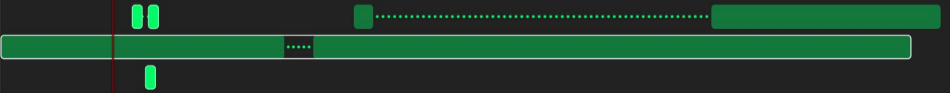
00:00:17.23

00:00:00.00 | 00:00:18.73 | 00:00:37.46 | 00:00:56.19 | 00:01:14.92 | 00:01:33.65 | 00:01:52.38 | 00:02:11.11

Pebble



Animal





Continue






Achnanthydiu minutissimu


- Achnanthydiu linearioides
- Achnanthydiu microcephalum
- Achnanthydiu minutissimu**
- Achnanthydiu neomicrocephalum
- Achnanthydiu pfisteri
- Achnanthydiu pyrenaicum
- Achnanthydiu rivulare
- Achnanthydiu rosenstockii
- Achnanthydiu rostronvrenaicum

# CATAMI

 Version: **latest**


The CATAMI classification scheme.

 Labels **289**
 Projects **9**
 Members **1**
 Annotation catalog

 Biota
 Ascidians
 Bacterial mats
 Bioturbation
 Brachiopods
 Bryozoa
 Cnidaria
 Crustacea
 Echinoderms
 Fishes
 Jellies

New label

WoRMS label import

Import labels from **WoRMS**. First, choose a color for the new label. Then search the WoRMS item based on the scientific name. Last, select the item you want to import from the search results.



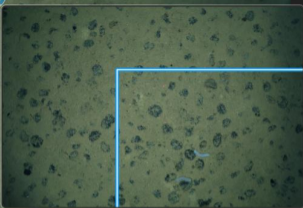
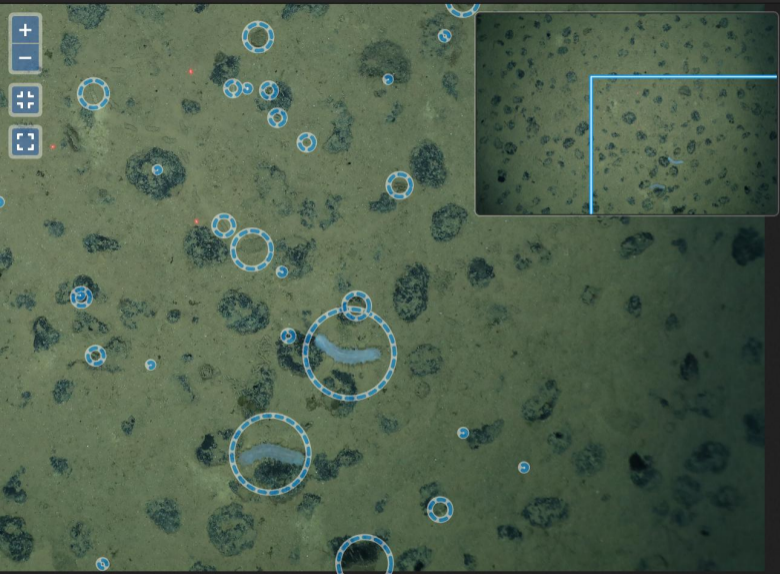
Label name


 unaccepted

 recursive

Label parent





Find label

Favourites

- Actinopterygii
- Brachiopoda

Global

- Laser Point
- lost+found



SO268 OFOS label tree

- Actinopterygii
- Animalia
- Amphibia

Please attach labels  to annotation candidates.

Convert annotation candidates

## More automated assistance

- **Magic SAM**
- Patch sorting
- LabelBOT (*soon*)

## More automated assistance

- **Magic SAM**
- Patch sorting
- LabelBOT (*soon*)





## More automated assistance

- **Magic SAM**
- Patch sorting
- LabelBOT (*soon*)



## More automated assistance

- Magic SAM
- **Patch sorting**
- LabelBOT (*soon*)



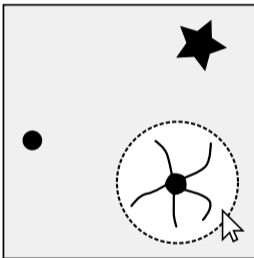
## More automated assistance

- Magic SAM
- **Patch sorting**
- LabelBOT (*soon*)



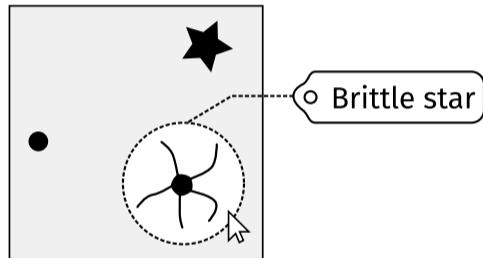
# More automated assistance

- Magic SAM
- Patch sorting
- **LabelBOT** (*soon*)



## More automated assistance

- Magic SAM
- Patch sorting
- **LabelBOT** (*soon*)



# How to get BIIGLE

- Use **biigle.de** (easiest, all features included)

# How to get BIIGLE

- Use **biigle.de** (easiest, all features included)
- Install **on-site** (for larger organizations)

# How to get BIIGLE

- Use **biigle.de** (easiest, all features included)
- Install **on-site** (for larger organizations)
- Install **locally** (for research expeditions)



# How to get BIIGLE

- Use **biigle.de** (easiest, all features included)
- Install **on-site** (for larger organizations)
- Install **locally** (for research expeditions)

`</>` [github.com/biigle](https://github.com/biigle)

**Demo!**

 **biigle.de**

 **info@biigle.de**



Beginner's workshop  
on December 7<sup>th</sup>!