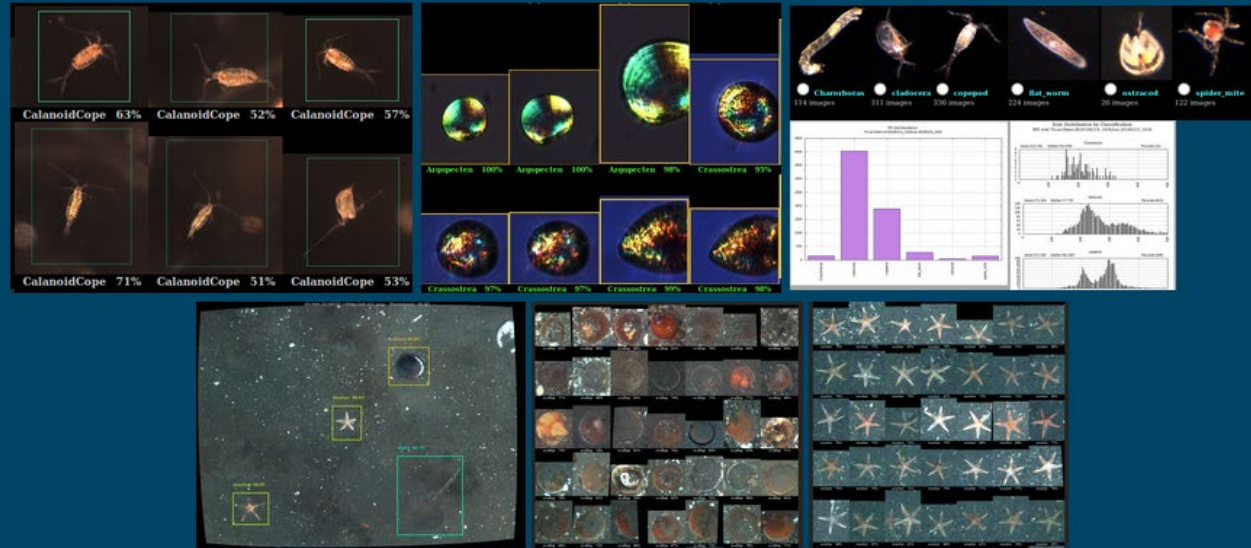


1. Overview
2. CPICS Sync Manager - Import CPICS Data
3. Dataset Manager - Manage DICE Datasets
4. Data Import Manager
5. DICE Admin
6. CPICS Viewer
7. Classify Manager Manual...

DICE - Deep Learning Image Classification Environment Classification of CPICS and Other Underwater Imagery using Deep Learning

Image classification using Deep Learning is applied to underwater imagery ranging in size from microscopic single target images (eg; CPICS) to full-scene imagery containing multiple targets (eg; Habcam). The CPICS instrument is designed for in situ aquatic microscopy of seawater, freshwater and laboratory samples. Using darkfield illumination, the CPICS captures high-resolution color images showing features as small as 1µm. Research has shown that color information is key to high-accuracy classification and because of its open-flow approach to water sampling, the delicate structures of plankton and particles remain completely intact. Click [here](#) for more information on CPICS.



Top-row: CPICS Plankton Classification from Ocean Cube at Bocas del Toro; Bivalve Larvae Identification System using polarized light.
Lake George CPICS fresh water training set with abundance and size distribution plots

Bottom-row: Underwater Imagery from Habcam Habitat Mapping Vehicle with multiple targets identified. Cropped images of identified scallops and seastars

Administrative Utilities: [Sync Manager](#) [Dataset Manager](#) [Dice Admin](#) [Dice Manual](#)

Overview

The Deep Learning Image Classification Environment (DICE) provides users the ability to import plankton images from CPICS instruments, view ROIs (region of interests) by time and events, setup classification labels and manage image datasets, and provides tools for building, training, and validating deep learning models used for automatic image classification.

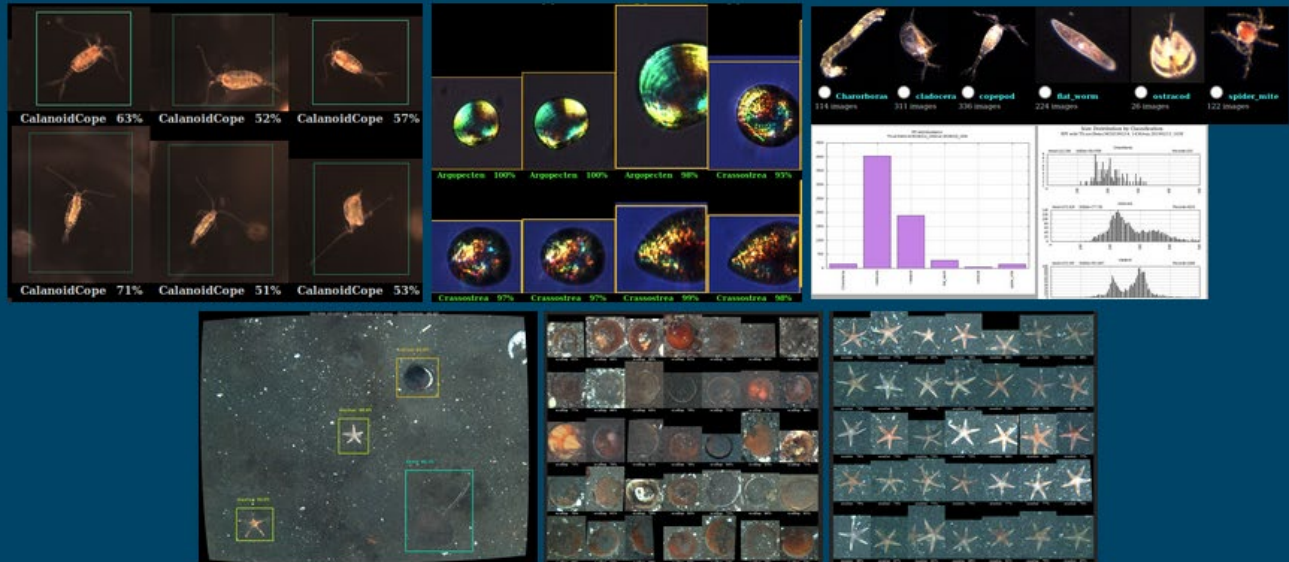
To start DICE

1. Connect a monitor to the HDMI port
2. Connect a USB mouse and keyboard to the USB2 ports on the other side of the unit.
3. Confirm that the external harddrive is connected to the USB3 port (blue).
4. Power-on the DICE unit with the power button on the front-panel. The system will boot-up and automatically login as user dice.
5. Double-click on the Firefox web-browser icon from the left-panel, and the DICE main home page will appear (see below). If the main page does not appear in the browser, either click on the home icon or go to following url: 127.0.0.1/cpics-bin/viewer.pl

Note: If accessing DICE remotely over a LAN, either GbE1 or GbE2 port may be used with ip address of 192.168.0.101 or 192.168.0.102 respectively.

DICE - Deep Learning Image Classification Environment Classification of CPICS and Other Underwater Imagery using Deep Learning

Image classification using Deep Learning is applied to underwater imagery ranging in size from microscopic single target images (eg; CPICS) to full-scene imagery containing multiple targets (eg; Habcam). The CPICS instrument is designed for in situ aquatic microscopy of seawater, freshwater and laboratory samples. Using darkfield illumination, the CPICS captures high-resolution color images showing features as small as 1µm. Research has shown that color information is key to high-accuracy classification and because of its open-flow approach to water sampling, the delicate structures of plankton and particles remain completely intact. Click [here](#) for more information on CPICS.



Top-row: CPICS Plankton Classification from Ocean Cube at Bocas del Toro; Bivalve Larvae Identification System using polarized light. Lake George CPICS fresh water training set with abundance and size distribution plots

Bottom-row: Underwater Imagery from Habcam Habitat Mapping Vehicle with multiple targets identified. Cropped images of identified scallops and seastars

Administrative Utilities: [Sync Manager](#) [Dataset Manager](#) [Dice Admin](#) [Dice Manual](#)

View Available DataSets

Tropical Marine Example

Panama Ocean Cube CPICS

Temperate Fresh Water Example

NY Lake CPICS

Example DICE Main Page

The DICE main home page provides a short description of DICE, some example images, and towards the bottom of the display are links to the administrative utilities for importing data from CPICS, Managing Dice datasets, Admin tools, and a link to the Dice Manual. The Sync Manager is used to import data from a CPICS instrument into a dataset on DICE, the DataSet Manager is used to manage datasets (create, edit, delete), the Admin page provides a few tools to monitor system usage, set time and reboot or power-off DICE. At the bottom of the DICE main home page is a list of available datasets. Click on a dataset link to view and classify images within the Deep Learning Image Classification Environment.

To shutdown DICE

1. If running from the console, close all windows including Firefox. Click on the Ubuntu control-panel icon on the top-right of the desktop and select 'ShutDown'. Then click on 'ShutDown' to confirm.
2. If running remotely from another computer, go to the Dice Admin utility and click on the PowerOff Dice button.

CPICS Sync Manager

The CPICS Sync Manager is used to import data from a CPICS instrument into a dataset on DICE. The Sync Manager application can be started from either the main DICE page (under the Administrative Utilities) or from the CPICS viewer under Related Links. Below is a snapshot of the Sync Manager interface.

CPICS Sync Manager - v1.1-20191229

[Home](#)
[CPICS Viewer](#)

The CPICS Sync Manager is used to copy data from a CPICS instrument into a dataset on DICE.

1. Connect a CPICS instrument into the GbE1 port on DICE
2. Verify the CPICS IP Address, Username, and Password below and then press the 'Test Communication' button to confirm that communications to the CPICS instrument is OK.
3. Select a Dataset from the pull-down list or create a new one with the [Dataset Manager](#).
4. Once the Dataset is selected, click on the 'Copy CPICS Data' button to start the process.
Be patient - it can take a long time to copy, especially if there is a large amount of data on CPICS. Note this will only copy files from CPICS to the DICE Dataset that have not already been copied.

Sync CPICS Instrument Data	
CPICS IP Address: <input type="text" value="192.168.0.50"/>	Copy to Dataset: <input style="border: none; background-color: #f0f0f0; padding: 2px;" type="text" value="TestDataSet"/> ▼
CPICS Username: <input type="text" value="cpics"/>	Title: CPICS on CTD OOI/LTER 2018
CPICS Password: <input type="password" value="*****"/>	
<input type="button" value="Test Communication"/> <input type="button" value="Copy CPICS Data"/>	

5. After CPICS Data has been copied and if there was an auxiliary CTD attached to CPICS, manually merge the CTD Data to be able to view Environmental Data Plots. **Be patient - it can take a long time to merge CTD data. Note: CPICS does not need to be connected**

<input type="button" value="Merge All CTD Data"/>	or	<input type="button" value="Merge CTD by Date"/>
CTD Start Date: <input type="text"/> [yyyymmdd]		
End Date: <input type="text"/> [yyyymmdd]		

2020/02/25 14:14:05 **Network Communications with CPICS Instrument OK**

2020/02/25 14:14:05 Test - will copy CPICS Data to Dataset: **TestDataSet**

When the **Sync Manager** first starts, it displays a user interface form and itemizes the steps necessary to import data from CPICS into a DICE dataset. It will also try to verify communications to the CPICS unit automatically. To copy data from the CPICS instruments, the complete steps are as follows:

1. Connect a CPICS instrument into the GbE1 port on DICE. Lights on the Ethernet port should light up.
2. Verify the CPICS IP Address, Username, and Password on the form. The standard CPICS IP address is set by default, but this can be changed in case you have another CPICS unit with a different IP address. Press the **Test Communication** button to confirm that communications to the CPICS instrument is OK. If a green 'Network Communications with CPICS Instrument OK' is shown and there are no other errors, continue with step 3.

Network Communication Status	Action
Network Communications with CPICS Instrument OK	No action required. If no other errors, proceed to setp 3.
No Network Communications with CPICS Instrument	Check Ethernet port, network cable, power to cpics, or CPICS/DICE IP address
CPICS username and password must be specified	Specify username and password

3. Select a Dataset from the **Copy to Dataset** pull-down list or create a new one with the Dataset Manager. The Dataset Manager can be launched either from the DICE main page (under the Administrative Utilities) or from the CPICS viewer under Related Links. Refer to the [Dataset Manager](#) documentation on how to create a new dataset.
4. Once the Dataset is selected, click on the 'Copy CPICS Data' button to start the copy process. **Be patient - this can take a long time to copy, especially if there is a large amount of data on CPICS.** Note: this will only copy files from CPICS to the DICE Dataset that have not already been copied, so subsequent copies may be considerably faster.

When done, a complete status list of files copied will be shown (see below). Click on 'CPICS Viewer' to view the imported data or proceed with the Classify Manager under Related Links.

The CPICS Sync Manager is used to copy data from a CPICS instrument into a dataset on DICE.

1. Connect a CPICS instrument into the GbE1 port on DICE
2. Verify the CPICS IP Address below and press the 'Test Communication' button to confirm that communications to the CPICS instrument is OK.
3. Select a Dataset from the pull-down list or create a new one with the Dataset Manager.
4. Once the Dataset is selected, click on the 'Copy CPICS Data' button to start the process.
Note this will only copy files from CPICS to the DICE Dataset that have not already been copied.

Sync CPICS Instrument Data	
CPICS IP Address 192.168.0.50	Copy to Dataset testDataset2 ▾ Title: Test Dataset 6000
<input type="button" value="Test Communication"/>	<input type="button" value="Copy CPICS Data"/>

2019/05/10 15:49:16 Network Communications with CPICS Instrument OK

```
2019/05/10 15:49:16 Copying CPICS Data to testDataset2
2019/05/10 15:49:16 Creating /webdata/Data/CPICS/testDataset2/rois
2019/05/10 15:49:16 rsync -avh ubuntu@192.168.0.50:/webdata/cpics/* /webdata/Data/CPICS/testDataset2/rois/..
2019/05/10 15:49:17 receiving incremental file list
2019/05/10 15:49:17 aux/
2019/05/10 15:49:17 aux/20180204.aux.dat
2019/05/10 15:49:17 aux/20180814.aux.dat
2019/05/10 15:49:17 aux/20180815.aux.dat
2019/05/10 15:49:17 aux/20180816.aux.dat
2019/05/10 15:49:17 aux/20180817.aux.dat
2019/05/10 15:49:17 aux/20180821.aux.dat
2019/05/10 15:49:17 aux/20180824.aux.dat
2019/05/10 15:49:17 aux/20180827.aux.dat
2019/05/10 15:49:17 aux/20180830.aux.dat
2019/05/10 15:49:17 aux/20180904.aux.dat
2019/05/10 15:49:17 aux/20180905.aux.dat
2019/05/10 15:49:17 aux/20180907.aux.dat
2019/05/10 15:49:17 aux/20180908.aux.dat
2019/05/10 15:49:17 aux/20180909.aux.dat
2019/05/10 15:49:17 aux/20180910.aux.dat
```

5. After CPICS Data has been copied and if there was an auxiliary CTD attached to CPICS, manually merge the CTD Data to be able to view Environmental Data Plots. Select the Aux Inst Type. Then Verify the Dataset selected, and use the 'Copy to Dataset' from the menu above to select a different Dataset. Merge all the CTD data by pressing the 'Merge All CTD Data' or fill in the CTD start/end dates with yyyyymmdd and press 'Merge CTD by Date'. **Note, be patient as it can take a long time to merge CTD data.** Also note that the **CPICS instrument does not need to be connected**, and merging the CTD Data can be done anytime.

The CPICS Sync Manager is used to copy data from a CPICS instrument into a dataset on DICE.

1. Connect a CPICS instrument into either GbE1 or GbE2 port on the DICE unit.
2. Verify the CPICS IP Address, Username, and Password below and then Select a Dataset from the pull-down list or create a new one with the [Dataset Manager](#).
3. Press the 'Test Communication' button to confirm that communications to the CPICS instrument is OK and the proper Dataset is selected.
4. Click on the 'Copy CPICS Data' button to start the process. **Be patient - it can take a long time to copy**, especially if there is a large amount of data on CPICS. The files copied will be listed when done. Note this will only copy files from CPICS to the DICE Dataset that have not already been copied.

Sync CPICS Instrument Data	
CPICS IP Address: <input type="text" value="192.168.0.50"/>	Copy to Dataset <input type="text" value="DemoUnit6000"/> ▾
CPICS Username: <input type="text" value="cpics"/>	Title: CPICS 6000m
CPICS Password: <input type="password" value="*****"/>	
<input type="button" value="Test Communication"/>	<input type="button" value="Copy CPICS Data"/>

5. After CPICS Data has been copied and if there was an auxiliary CTD attached to CPICS, manually merge the CTD Data to be able to view Environmental Data Plots. **Be patient - it can take a long time to merge CTD data. Note: CPICS does not need to be connected.** To select a different Dataset, use the 'Copy to Dataset' menu above.

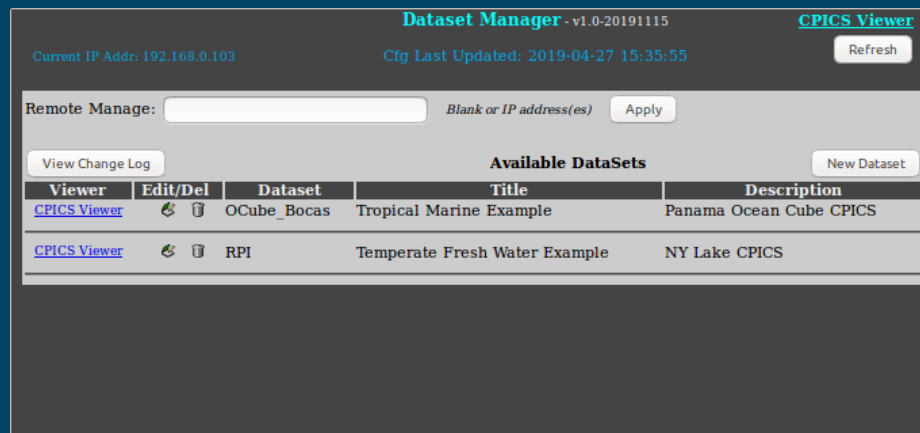
Aux Inst Type <input type="text" value="SBE37"/> ▾	Merge with Dataset: DemoUnit6000
	<input type="button" value="Merge All CTD Data"/> or <input type="button" value="Merge CTD by Date"/>
	CTD Start Date: <input type="text" value="20190726"/> [yyyymmdd]
	End Date: <input type="text" value="20200609"/> [yyyymmdd]

2020/07/03 06:14:59 **Network Communications with CPICS Instrument OK**

2020/07/03 06:14:59 Test - will copy CPICS Data to Dataset: **DemoUnit6000**

Dataset Manager

The DICE Dataset Manager is used to manage datasets (create, delete, and edit dataset configurations) that reside on DICE. The Dataset Manager application can be started from either the main DICE page (under the Administrative Utilities) or from the CPICS viewer under Related Links. Below is a snapshot of the Dataset Manager interface.



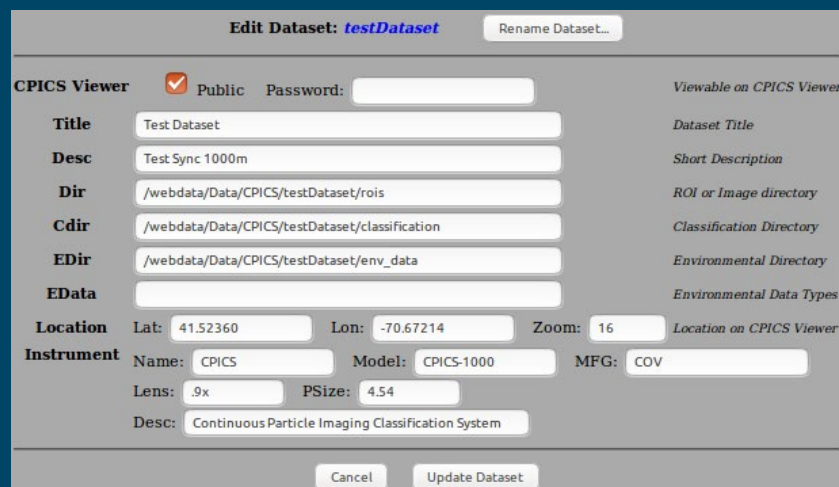
The screenshot shows the Dataset Manager interface with the following elements:

- Header: Dataset Manager - v1.0-20191115, CPICS Viewer, Current IP Addr: 192.168.0.103, Cfg Last Updated: 2019-04-27 15:35:55, Refresh button.
- Form: Remote Manage: [input field] Blank or IP address(es) Apply button.
- Buttons: View Change Log, New Dataset.
- Table: Available DataSets

Viewer	Edit/Del	Dataset	Title	Description
CPICS Viewer		OCube_Bocas	Tropical Marine Example	Panama Ocean Cube CPICS
CPICS Viewer		RPI	Temperate Fresh Water Example	NY Lake CPICS

When the **Dataset Manager** first starts, it displays a user interface form and lists all of the available datasets defined in the DICE configuration file. If the CPICS Viewer link is clickable for a particular dataset, then the data is available on-line for that dataset. You can manually edit a dataset configuration, delete it, or create a new dataset configuration (note that you need to use the Sync Manager to actually import the data). Each of these activities are described in more detail below.

1. CPICS Viewer - click on this link to view a particular dataset with the CPICS viewer. If the link is gray and not clickable, it indicates that there is no data on DICE for that dataset.
2. To EDIT a dataset configuration, click on the 'Edit' icon. A form showing the configuration items will be shown. As an example, the 'Edit' icon for the testDataset is selected (see below). Title, Description, Location, and instrument information can be easily changed. It is **not recommended to manually change any paths**. Note checking the CPICS Viewer Public allows the dataset to be shown on the main DICE page and is recommended for easy access to that dataset.



The screenshot shows the Edit Dataset form for testDataset with the following fields:

- CPICS Viewer: Public Password: [input field] Viewable on CPICS Viewer
- Title: Test Dataset Dataset Title
- Desc: Test Sync 1000m Short Description
- Dir: /webdata/Data/CPICS/testDataset/rois ROI or Image directory
- Cdir: /webdata/Data/CPICS/testDataset/classification Classification Directory
- EDir: /webdata/Data/CPICS/testDataset/env_data Environmental Directory
- EData: [input field] Environmental Data Types
- Location: Lat: 41.52360 Lon: -70.67214 Zoom: 16 Location on CPICS Viewer
- Instrument: Name: CPICS Model: CPICS-1000 MFG: COV
- Lens: .9x PSize: 4.54
- Desc: Continuous Particle Imaging Classification System

Buttons: Cancel, Update Dataset

3. To DELETE a dataset configuration and associated datafiles, click on the 'Trash' icon. A delete form will be displayed and requires confirmation before anything is deleted. As an example, the 'Trash' icon for the testDataset is selected (see below). This will **permanently delete all dataset files**, press the 'Confirm Delete' button to continue. If the Delete Dataset is pressed, the dataset configuration and its files will be deleted. To Cancel the Delete operation, press the 'Cancel' button.

Dataset Manager - v1.0-20191115 [CPICS Viewer](#)

Current IP Addr: 127.0.0.1 Cfg Last Updated: 2019-04-27 15:35:55

Delete Dataset: *testDataset*

Dataset	Title	Description
<i>testDataset</i>	Test Dataset	Test Sync 1000m

This will permanently delete all dataset files, press the 'Confirm Delete' button to continue

Confirm Delete:

4. To CREATE a new dataset configuration entry, click on the 'New Dataset' button in the Dataset Manager. A new dataset form will be displayed, but there are only a few fields that need to be entered or updated as indicated with a blue asteriks. The form on the left is the initial New Dataset form that is displayed, and the form on the right is one where the fields have been filled-out (Dataset, Title, and Desc). Note that the Dataset name is used as a filename path to store the dataset data so it should be concise and **not include any spaces or special characters** such as punctuation.

Dataset Manager - v1.0-20191115 [CPICS Viewer](#)

Current IP Addr: 127.0.0.1 Cfg Last Updated: 2019-04-27 15:35:55

Create New Dataset

*** Dataset** CPICS Viewer: Public Password

*** Title** Dataset Title

*** Desc** Short Description

Base BaseDir

Dir ROIs or Image Dir relative to BaseDir/Dataset

CDir Classification Dir relative to BaseDir/Dataset

EDir Enviromental Dir relative to BaseDir/Dataset

EData Blank or supported types, eg; CTD,CondTemp,ChlorTurbid,DO,PAR

*** Location** Lat: Lon: Zoom:

Instrument Name: Model: Mfg:

Lens: PSize:

Desc:

Fields with * need to be filled-in or updated

Sample Initial New Dataset Form

Dataset Manager - v1.0-20191115 [CPICS Viewer](#)

Current IP Addr: 127.0.0.1 Cfg Last Updated: 2019-04-27 15:35:55

Create New Dataset

*** Dataset** CPICS Viewer: Public Password

*** Title** Dataset Title

*** Desc** Short Description

Base BaseDir

Dir ROIs or Image Dir relative to BaseDir/Dataset

CDir Classification Dir relative to BaseDir/Dataset

EDir Enviromental Dir relative to BaseDir/Dataset

EData Blank or supported types, eg; CTD,CondTemp,ChlorTurbid,DO,PAR

*** Location** Lat: Lon: Zoom:

Instrument Name: Model: Mfg:

Lens: PSize:

Desc:

Fields with * need to be filled-in or updated

Sample Filled-out Form

When done entering the information, click on the 'Add New Dataset' button to add the new dataset, or press the 'Cancel' button to cancel the process.

To go back to the CPICS viewer, click on the 'CPICS Viewer' link in the upper right of the Dataset Manager.

Data Import Manager

The Data Import Manager is used to import data from instruments (other than CPICS) into a dataset on DICE. Select a supported instrument and follow the instrument-specific directions. The Data Import Manager application can be started from the main DICE page (under the Administrative Utilities). Below is a snapshot of the Data Import Manager interface with the VPR instrument and import VPR Data from Disk selected.

Data Import Manager - v1.0-20190908

[Home](#)
[CPICS Viewer](#)

The Data Import Manager is used to copy data from instruments (other than CPICS) into a dataset on DICE. Select a supported instrument and follow the instrument-specific directions.

VPR - Video Plankton Recorder

1. Import VPR Data from Disk Network
2. Enter the VPR Data Path. Press 'Test Data Path' to verify VPR Daily directories to import.
3. Select a Dataset from the pull-down list or create a new one with the [Dataset Manager](#).
4. Once the Dataset is selected, *verify settings by pressing* the 'Test Data Path' button and then click on the 'Import VPR Data' button to start the process.

Be patient - it can take a long time to copy and convert the image data, especially if there is a large amount of VPR data.

Import VPR Data from Disk	
VPR Data Path: <input type="text" value="/media/dice/VPR"/>	Copy to Dataset: <input type="text" value="testVPR"/> ▼
Year of Data: <input type="text" value="2019"/>	Title: test vpr
<input type="button" value="Test Data Path"/>	<input type="button" value="Import VPR Data"/>

When the **Data Import Manager** first starts, it displays a user interface form with a list of supported instruments and a list of itemized instrument-specific instructions. For the VPR - Video Plankton Recorder, select either to import VPR Data from Disk or Network.

• [Import VPR Data from Disk](#)

Enter the VPR Data Path, update the Year of Data (if necessary), select the Dice Dataset to import into, and then press the 'Test Data Path' button to verify the settings.

Test VPR Path Status	Action
Test Path OK, will import daily directories: d287 to Dataset: testVPR using Year: 2019	Verify all the information is correct including daily directories to import, Dice Dataset to copy to, and Year of the Data. Correct any form items if necessary and click on the 'Import VPR Data' button to start the process
VPR Path must be specified	Specify a full VPR path name on the form
VPR Path does not exist	Check the VPR path name and be sure to use a full path name
VPR Path has *NO* daily directories	Check the VPR path and permissions, and make sure the daily VPR dNNN sub-directories exist
Year of Data must be specified and of the form YYYY	Specify the Year of Data (YYYY) on the form

If the Test VPR Path is OK along with the import daily directories, Dataset, and Year, click on the 'Import VPR Data' button to start the process.

Data Import Manager - v1.0-20190908[Home](#)
[CPICS Viewer](#)

The Data Import Manager is used to copy data from instruments (other than CPICS) into a dataset on DICE. Select a supported instrument and follow the instrument-specific directions.

VPR - Video Plankton Recorder

1. Import VPR Data from Disk Network
2. Enter the VPR Data Path. Press 'Test Data Path' to verify VPR Daily directories to import.
3. Select a Dataset from the pull-down list or create a new one with the [Dataset Manager](#).
4. Once the Dataset is selected, *verify settings by pressing* the 'Test Data Path' button and then click on the 'Import VPR Data' button to start the process.

Be patient - it can take a long time to copy and convert the image data, especially if there is a large amount of VPR data.

Import VPR Data from Disk

VPR Data Path: <input type="text" value="/media/dice/VPR"/>	Copy to Dataset: <input type="text" value="testVPR"/> <input type="button" value="v"/>
Year of Data: <input type="text" value="2019"/>	Title: test vpr
<input type="button" value="Test Data Path"/> <input type="button" value="Import VPR Data"/>	

2020/01/02 14:43:43 **Test: VPR Path OK, will import daily directories: d287 to Dataset: testVPR using Year: 2019**

2020/01/02 14:43:43 Copying Daily Directory: d287 to Dataset: testVPR

```
2020/01/02 14:43:43 sending incremental file list
2020/01/02 14:43:43 created directory /webdata/Data/CPICS/testVPR/rois/d287
2020/01/02 14:43:43 ./
2020/01/02 14:43:43 h17ctd.dat
2020/01/02 14:43:43 h17/
2020/01/02 14:43:43 h17/Thumbs.db
2020/01/02 14:43:43 h17/roi.6348612700.tif
2020/01/02 14:43:43 h17/roi.6348612701.tif
2020/01/02 14:43:43 h17/roi.6348634100.tif
2020/01/02 14:43:43 h17/roi.6348634101.tif
2020/01/02 14:43:43 h17/roi.6348634102.tif
2020/01/02 14:43:43 h17/roi.6348641300.tif
2020/01/02 14:43:43 h17/roi.6348641301.tif
2020/01/02 14:43:43 h17/roi.6348648500.tif
2020/01/02 14:43:43 h17/roi.6348705300.tif
2020/01/02 14:43:43 h17/roi.6348726600.tif
2020/01/02 14:43:43 h17/roi.6348768800.tif
2020/01/02 14:43:43 h17/roi.6348775800.tif
2020/01/02 14:43:43 h17/roi.6348775801.tif
```

- Import VPR Data from Network

The user interface form to import the VPR Data from the Network is shown below. Enter the VPR IP Address, Username, Password, VPR Data Path, update the Year of Data (if necessary), select the Dice Dataset to import into, and then press the 'Test Communication' button to verify the settings.

The Data Import Manager is used to copy data from instruments (other than CPICS) into a dataset on DICE. Select a supported instrument and follow the instrument-specific directions.

VPR - Video Plankton Recorder

1. Import VPR Data from Disk Network
2. Verify the VPR IP Address below and press the 'Test Communication' button to confirm that communications to the VPR instrument is OK.
3. Select a Dataset from the pull-down list or create a new one with the [Dataset Manager](#).
4. Once the Dataset is selected, *verify settings by pressing* the 'Test Communications' button and then click on the 'Import VPR Data' button to start the process.
Be patient - it can take a long time to copy and convert the image data, especially if there is a large amount of VPR data.

Import VPR Data from Network	
VPR IP Addr: <input type="text" value="192.168.0.99"/>	Copy to Dataset <input type="text" value="testVPR"/> <input type="button" value="v"/> Title: test vpr
Username: <input type="text" value="vprUser"/>	
Password: <input type="text" value="....."/>	
Path: <input type="text" value="/data/VPR"/>	
Year of Data: <input type="text" value="2019"/>	
<input type="button" value="Test Communication"/> <input type="button" value="Import VPR Data"/>	

Test Communication Status	Action
Network Communications/Ping with VPR Instrument OK	No action required
Test: VPR connection OK, will import daily directories: /data/VPR/d287 /data/VPR/d288 to Dataset: testVPR using Year: 2019	Verify all the information is correct including daily directories to import, Dice Dataset to copy to, and Year of the Data. Correct any form items if necessary and click on the 'Import VPR Data' button to start the process
VPR IP address must be specified	Specify VPR IP address
VPR username and password must be specified	Specify username and password
***No VPR daily dirs, check username, password, and path	Verify that the username, password, and path are correct. Double-check that VPR daily dNNN directories exist.
No Network Communications with VPR Data IP	Verify Ethernet port and network cable. Check that VPR IP Address is setup correctly and accessible from Dice.

If the Test Communication results are OK, click on the 'Import VPR Data' button to start the process.

Test Communication

Import VPR Data

2020/01/02 15:35:56 **Test: VPR connection OK, will import daily directories: /tmp/SampleVPR/d287
/tmp/SampleVPR/d288 to Dataset: testVPR using Year: 2019**

2020/01/02 15:35:56 Copying Daily Directory: /tmp/SampleVPR/d287 to Dataset: testVPR

```
2020/01/02 15:35:56 receiving incremental file list
2020/01/02 15:35:56 d287/
2020/01/02 15:35:56 d287/h17ctd.dat
2020/01/02 15:35:56 d287/h17/
2020/01/02 15:35:56 d287/h17/Thumbs.db
2020/01/02 15:35:56 d287/h17/roi.6348612700.tif
2020/01/02 15:35:56 d287/h17/roi.6348612701.tif
2020/01/02 15:35:56 d287/h17/roi.6348634100.tif
2020/01/02 15:35:56 d287/h17/roi.6348634101.tif
2020/01/02 15:35:56 d287/h17/roi.6348634102.tif
2020/01/02 15:35:56 d287/h17/roi.6348641300.tif
2020/01/02 15:35:56 d287/h17/roi.6348641301.tif
2020/01/02 15:35:56 d287/h17/roi.6348648500.tif
2020/01/02 15:35:56 d287/h17/roi.6348705300.tif
2020/01/02 15:35:56 d287/h17/roi.6348726600.tif
2020/01/02 15:35:56 d287/h17/roi.6348768800.tif
2020/01/02 15:35:56 d287/h17/roi.6348775800.tif
2020/01/02 15:35:56 d287/h17/roi.6348775801.tif
2020/01/02 15:35:56 d287/h17/roi.6348782900.tif
2020/01/02 15:35:56 d287/h17/roi.6348804500.tif
2020/01/02 15:35:56 d287/h17/roi.6348804501.tif
2020/01/02 15:35:56 d287/h17/roi.6348804502.tif
2020/01/02 15:35:56 d287/h17/roi.6348811700.tif
```

The DICE Admin page provides a few tools to monitor the system usage, set time, and either reboot or power-off the system. On the left-hand is the list of available system-level commands. The status of the selected command is shown on the right. Note Admin page automatically displays the system information when first started.

System Info

DICE Admin Panel - v1.0-20190420
[CPICS Viewer](#)

System Info Display system info

Data Usage Display Usage for DataSet: **testDataset2**

Set Time Set DICE system clock

Reboot DICE Reboots DICE processor

PowerOff DICE Requires power-cycle to turn DICE back on

Current Time: 2019/05/10 15:51:36 UTC
15:51:36 up 5 days, 19:26, 2 users, load average: 2.57, 2.36, 2.04

System Info

```
Linux dice 4.4.38-tegra #1 SMP PREEMPT Fri Jun 1 10:56:25 CDT 2018 aarch64 aarch64 aarch64 GNU/Linux
# R28 (release), REVISION: 2.0, GCID: 10567845, BOARD: t186ref, EABI: aarch64, DATE: Fri Mar 2 04:57:01 UTC 2018
NAME="Ubuntu"
VERSION="16.04 LTS (Xenial Xerus)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 16.04 LTS"
VERSION_ID="16.04"
HOME_URL="http://www.ubuntu.com/"
SUPPORT_URL="http://help.ubuntu.com/"
BUG_REPORT_URL="http://bugs.launchpad.net/ubuntu/"
UBUNTU_CODENAME=xenial
```

CPU Info

```
Architecture:      aarch64
Byte Order:        Little Endian
CPU(s):            6
On-line CPU(s) list: 0,3-5
Off-line CPU(s) list: 1,2
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s):         1
Model name:        ARMv8 Processor rev 3 (v8l)
CPU max MHz:       2035.2000
CPU min MHz:       345.6000
L1d cache:         32K
L1i cache:         48K
L2 cache:          2048K
Voltage: 12.184 12.184 4.776  Temperature: 36 36 33.5 36 32 31.5 100 35.2
```

USB Info

```
Bus 002 Device 003: ID 0bc2:ab24 Seagate R55 LLC
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 007: ID 413c:3012 Dell Computer Corp. Optical Wheel Mouse
Bus 001 Device 003: ID 413c:2003 Dell Computer Corp. Keyboard
Bus 001 Device 002: ID 0424:2514 Standard Microsystems Corp. USB 2.0 Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

Disk Info

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/root	28G	19G	7.2G	73%	/
devtmpfs	7.7G	0	7.7G	0%	/dev
tmpfs	7.7G	51M	7.7G	1%	/dev/shm
tmpfs	7.7G	9.5M	7.7G	1%	/run
tmpfs	5.0M	4.0K	5.0M	1%	/run/lock
tmpfs	7.7G	0	7.7G	0%	/sys/fs/cgroup
tmpfs	786M	76K	786M	1%	/run/user/1002

- [System Info](#) Display system info
- [Data Usage](#) Display Usage for DataSet: **testDataset2**

- [Set Time](#) Set DICE system clock
- [Reboot DICE](#) Reboots DICE processor
- [PowerOff DICE](#) Requires power-cycle to turn DICE back on

Current Time: 2019/05/10 15:52:38 UTC

Data Usage for DataSet: testDataset2

Data Type	Usage	Location
ROI Images	157M	/webdata/Data/CPICS/testDataset2/rois
FullFrame Images	107M	/webdata/Data/CPICS/testDataset2/fullframe
Logs	1020K	/webdata/Data/CPICS/testDataset2/logs
Aux Inst Data	236K	/webdata/Data/CPICS/testDataset2/aux
Classification Data		
Environmental Data		

Disk	Used	Available	Location
System	19G 73%	7.2G	/
Data	182G 11%	1.6T	

Data Usage

- [System Info](#) Display system info
- [Data Usage](#) Display Usage for DataSet: **testDataset2**

- [Set Time](#) Set DICE system clock
- [Reboot DICE](#) Reboots DICE processor
- [PowerOff DICE](#) Requires power-cycle to turn DICE back on

Current Time: 2019/05/10 15:53:12 UTC

Enter Time:

Set Time

Reboot DICE Reboots the DICE computer

PowerOff DICE Powers-off the DICE computer. Note requires power-cycle to turn the DICE computer back on.

To go back to the CPICS viewer, click on the 'CPICS Viewer' link in the upper right of the DICE Admin page.

CPICS Viewer

The CPICS Viewer is used to view images from CPICS instruments that have imported to DICE. CPICS ROIs (regions of interest) can be viewed By Day, By Events, By Time, and By Size. Special images can be saved to highlights and reviewed. Below is a screen snapshot of the CPICS Viewer.


The screenshot shows the CPICS Viewer interface. At the top left is the 'Coastal Ocean Vision' logo. The main header displays 'Current Time: 2019/05/16 18:46:29 UTC' and 'CPICS Viewer v1.0DICE-20190512'. To the right, the 'DataSet: Tropical Marine Example' is shown with instrument details: 'Instrument: CPICS', 'Manufacturer: COV', 'Model: CPICS', and 'Description: Continuous Plankton Imaging Classification System'. A 'Related Links' menu includes Home, Event Manager, Classify Manager, Sync Manager, Dataset Manager, and Dice Admin. Below the header, there are options to 'Show: ROIs by Day', 'ROIs by Event', 'Live ROIs', 'Highlights', and 'FullFrame'. The 'Last Image Updated: 239 21:28:23' and 'Last ROI Updated: 683 17:48:09' are displayed. A 'View ROI:' section has radio buttons for 'By Time' and 'By Size'. A calendar search tool shows 'Year: 2017' and 'Month: 07', with a grid of days from 01 to 31. Below the calendar, a table shows 'ROIs for 20170701:' with columns for each hour from 0000 to 2200, a 'Total' of 1095, and a link for 'Plat 26170701 Environmental Data'. The main area contains a grid of plankton images, including radiolaria and other organisms.

ROIs by Day - When the CPICS Viewer first starts, it displays the ROIs by Day and a calendar search will be available (refer to image above). Select to view the ROIs By Time or By Size, then click on a particular date from the calendar search toolbar. The ROIs for that date will be displayed along with hourly links that the user can click to view those images. Below each link is a count of the number of ROIs available for that hour. Clicking on a particular ROI will bring-up an image view of that ROI with its associated meta data.

This block shows a detailed view of a single ROI. On the left is a small image of a radiolarian with a 1mm scale bar. To the right, the following metadata is displayed: 'Time Stamp: 2017/07/01 09:28:17.125', 'Image File: 20170701_092817.125.0.png', 'Image Width: 260 pixels', 'Image Height: 160 pixels', 'Camera Lens: .9x', 'Pixel Size: 4.54 uM', and 'ROI Size: 1.1804 mm x 0.7264 mm'. A 'Go Back' button is visible at the bottom right of the metadata area.

There's also an option to add the ROI to the Highlights. To go back to view more ROIs, simply click on the 'Go Back' button.

ROIs by Event - This allows you to view ROIs that have been labelled for particular time periods using the Event Manager. Instead of a calendar search being displayed, a list of available events will be displayed. Simply click on an event number and the ROIs for that event time period will be displayed. Note that viewing the ROIs by Time or by Size works the same as with ROIs by Day.



Current Time: 2019/05/16 18:57:29 UTC

Refresh Refresh

CPICS Viewer
v1.0DICE-20190512

DataSet: Tropical Marine Example
Instrument: CPICS Manu: COV Model: CPICS
Description: Continuous Plankton Imaging Classification System

Related Links


[Home](#)
[Event Manager](#)
[Classify Manager](#)
[Sync Manager](#)
[Dataset Manager](#)
[Dice Admin](#)

Show: [ROIs by Day](#) [ROIs by Event](#) [Live ROIs](#) [Highlights](#) [FullFrame](#)

Last Image Updated: 2:39 21:39:23
Last ROI Updated: 6:37 05:24:44

View ROI: By Time By Size

ROIs by eventID **1** Description: **SampleEvent1** StartTime: **2017/07/01 09:00:00** EndTime: **2017/07/01 09:59:59** Total ROIs: **32**



To create, edit, or delete events for this dataset, click on the Event Manager link which will bring up the Event Manager window. To Add a new event, simply click on the 'New Event' button and fill-out the form at the bottom of the page and press 'Add Event'. To edit a particular event, click on the edit icon. To delete a particular event, click on the delete icon. Below are two screen snapshots of the Event Manager with some sample events. The first shows sample events for time-series datasets, the seconds shows sample events for CTD casts. To go back to the CPICS Viewer, click on the 'CPICS Viewer' link.

Event Manager -v1.0-20190116
Current Time: 2019/05/16 18:58:00

Events for DataSet: OCube_Bocas

Edit/Del	ID	Start Time	End Time	Description
	1	2017/07/01 09:00:00	2017/07/01 09:59:59	SampleEvent1
	2	2017/07/01 20:00:00	2017/07/01 20:59:59	SampleEvent2
	3	2017/07/01 21:00:00	2017/07/01 21:59:59	SampleEvent3

[CPICS Viewer](#)

Event Manager -v1.0-20200130
Current Time: 2020/03/10 15:39:47

Events for DataSet: DemoUnit6000

Edit/Del	ID	Start Time	End Time	Description
	1	2019/10/22 06:43:00	2019/10/22 06:52:00	ctd-cast1
	2	2019/10/22 06:52:00	2019/10/22 07:01:00	ctd-cast2
	3	2019/10/22 07:03:00	2019/10/22 07:10:00	ctd-cast3
	4	2019/10/22 07:11:00	2019/10/22 07:20:00	ctd-cast4
	5	2019/10/22 07:21:00	2019/10/22 07:31:00	ctd-cast5

[CPICS Viewer](#)
[Manually Edit](#)

Note the Event Manager has been updated to allow users to manually edit the events file by clicking on the "Manually Edit" link just below the CPICS Viewer link. This is useful for rapidly creating, copying, and editing multiple events. Simply edit the events and press 'Update'. To go back to the Event Manager, click on the 'Event Manager' link in the upper-right corner.

Edit Events for DataSet: DemoUnit6000 [Event Manager](#)

```

1,2019/10/22 06:43:00,2019/10/22 06:52:00,ctd-cast1
2,2019/10/22 06:52:00,2019/10/22 07:01:00,ctd-cast2
3,2019/10/22 07:03:00,2019/10/22 07:10:00,ctd-cast3
4,2019/10/22 07:11:00,2019/10/22 07:20:00,ctd-cast4
5,2019/10/22 07:21:00,2019/10/22 07:31:00,ctd-cast5

```

Edit Events and Press Update

View ROIs ByTime, BySize, ByEnv - ROIs shown by ROIs by Day or ROIs by Event can be ordered and displayed by Time, by Size, and by Environmental data (if environmental data is available). When displaying ByEnv, select the environmental variable of interest (eg; Depth, Temperature, Salinity) and specify the min/max values as appropriate. Note if a min or max value is not specified, then the ROIs will be shown for the full range. If you mouse over a ROI that is displayed ByEnv, it will show the value of the environmental variable, Depth=10.235.

Show: [ROIs by Day](#) [ROIs by Event](#) [Live ROIs](#) [Highlights](#) [FullFrame](#) [EnvData](#)

Last Image Updated: **18322 07:27:22**
Last ROI Updated: **130 23:50:56**

View ROI: By Time By Size By Env Depth Min: Max:

Highlights - This allows you to view ROIs that have been highlighted. ROI highlights can be added via ROIs by Day or ROIs by Event. Example ROI highlights are shown below.

Show: ROIs by Day ROIs by Event Live ROIs Highlights FullFrame EnvData

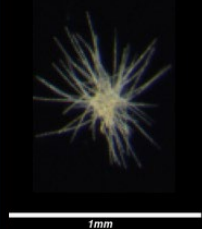
Last Image Updated: 18322 07:38:33

Last ROI Updated: 131 00:02:07

View ROI: By Time By Size



Clicking on a highlight image will display the image, meta data, and any associated environmental data.



Time Stamp: 2019/10/15 02:45:18.592

Image File: 20191015_024518.592.0.png

Image Width: 164 pixels

Image Height: 224 pixels


Camera Lens: .9x

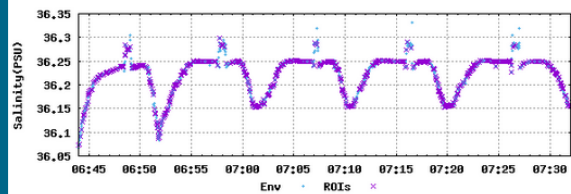
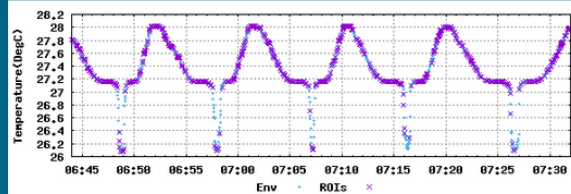
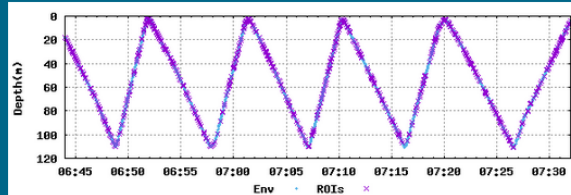
Pixel Size: 4.54 uM

ROI Size: 0.7446 mm x 1.0170 mm

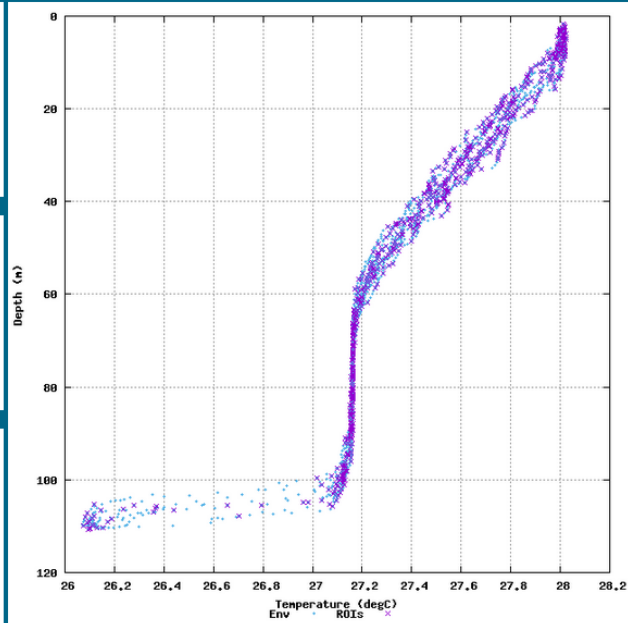
Environmental Data		
Temperature	27.7711	DegC
Conductivity	5.72326	S/m
Salinity	35.8729	PSU
Depth	23.615	m
PAR	N/A	umol/sec/m^2
Chlorophyll	N/A	ug/l
Turbidity	N/A	ftu
DO	N/A	%

EnvData - This allows you to view Environmental time-series plots. Locations of ROIs are superimposed on the plots and are identified by the key at the bottom of each plot. Daily plots can be selected from the calendar search on the right. Environmental plots can be displayed for ROIs by Day and ROIs by Event. Note that the start/end times of the time-series plots can be manually specified along with x/y min:max ranges for both the Depth vs Temperature and Temperature vs Salinity plots. To view a particular time range, both the Start Time and End Time need to be specified. For the Depth/Temp and Temp/Salinity plots, the ranges must specify both min:max values. Note the asterix '*' can be used to auto-scale a range value. For example, to specify the Salinity range starting at 36 PSU and going to the full range, enter 36:* for the SRRange and press enter. Previously entered form values may be selected by using the up and down arrows with the cursor in any of the start/end time fields or min:max range fields.

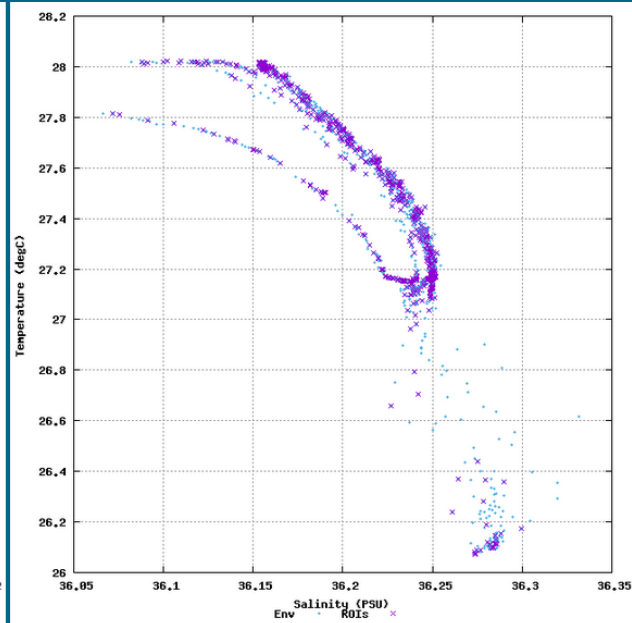
 <p>Current Time: 2020/02/26 05:24:34 UTC</p> <p>Refresh <input type="button" value="600"/> <input type="button" value="Refresh"/></p>	<p>CPICS Viewer v1.2DICE-20200201</p>	<p>DataSet: CPICS 6000m</p> <p>Instrument: CPICS Manuf: COV Model: CPICS-6000</p> <p>Description: Continuous Plankton Imaging Classification System</p>	<p>Related Links</p> <p>Home</p> <p>Event Manager</p> <p>Classify Manager</p> <p>Sync Manager</p> <p>Dataset Manager</p> <p>Dice Admin</p>						
<p>Show: ROIs by Day ROIs by Event Live ROIs Highlights FullFrame EnvData</p> <p>Last Image Updated: 18318 05:24:34</p> <p>Last ROI Updated: 126 21:48:08</p> <p>View ROI: <input type="radio"/> By Time <input checked="" type="radio"/> By Size</p>		<p>Calendar Search</p> <table style="border-collapse: collapse;"> <tr> <td style="text-align: center;">Year</td> <td style="text-align: center;">Month</td> <td style="text-align: center;">Day</td> </tr> <tr> <td style="text-align: center;">2019</td> <td style="text-align: center;">10</td> <td style="text-align: center;"> 04 05 06 07 09 11 12 13 14 15 17 18 19 20 21 22 </td> </tr> </table>		Year	Month	Day	2019	10	04 05 06 07 09 11 12 13 14 15 17 18 19 20 21 22
Year	Month	Day							
2019	10	04 05 06 07 09 11 12 13 14 15 17 18 19 20 21 22							



Start Time: 06:44 End Time: 07:32



DRange: min:max TRange: min:max



TRange: min:max SRange: min:max

Related Links - Related links provide easy access to other utilities within DICE. These include links to the main DICE home page, Event Manager, Classify Manager, Sync Manager, Dataset Manager, and Dice Admin.

- 1. [Overview](#)
- 2. [Manage Sets](#)
- 3. [Manually Classify](#)
- 4. [Build/Train Model](#)
- 5. [Auto Classify](#)
- 6. [Classification Results](#)
- 7. [View Products](#)
- 8. [Single Image Viewer](#)
- 9. [Export Classifier Results](#)
- 10. [Admin Options](#)
 - 1. [Set Reference Image](#)
 - 2. [Auto Load Images](#)
 - 3. [Clone TS Master](#)
 - 4. [Create TS User](#)
 - 5. [Remove TS User](#)
 - 6. [Create New Class](#)
 - 7. [Rename Class](#)
 - 8. [Delete Class](#)
- 11. [DICE Manual](#)

Displaying 363 Validation Images (341 detections with thresh >= .5) from 25 Classes:
Acantheria, Astronella, CalanoidCope, Chaetagnath, Dinoflagellate, FaecalPellet, Fiber, FuzzyStick, Jellie, JellyBell, Larvacea, LarvaceanInHouse, LarvalFish, MarineSnow, MysidsAndThings, nauplii, PleutiusLarva, Pseudosolenia, RoundDiatom, SausageDiatom, Spiral, Syllid, SyllidWithEggs, TwitchyStick

Class	Confidence (%)
Acantheria	79%
Acantheria	95%
Acantheria	63%
Acantheria	89%
Acantheria	91%
Acantheria	91%
Acantheria	84%
Acantheria	94%
Acantheria	85%
Acantheria	88%
Astronella	92%
Astronella	70%
Astronella	53%
Astronella	71%
Zizyag	62%
CalanoidCope	74%
CalanoidCope	78%
CalanoidCope	93%
CalanoidCope	76%
CalanoidCope	83%
CalanoidCope	92%

Overview

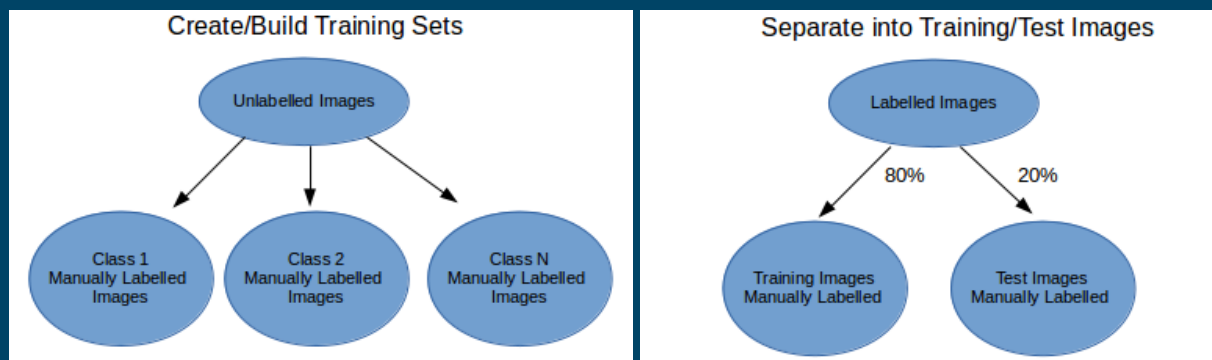
The Classify Manager provides several capabilities for managing sets of images/ROIs (region of interests), manually classifying them, and provides tools for building, training, and validating deep learning models used for automatic image classification. This overview is divided into two sections: The Process of Image Classification and the ClassifyManage Panel Layout. The rest of the manual goes into detail for each of the control-panel options and provides some examples.

The Process of Image Classification

The process of image classification using Deep Learning can be broken down into the following components: Creating/Building Training Sets of manually labelled images; Separating those images into Training Images for training the model and Test Images for validating the model; Building and Training a Deep Learning Classification Model using the Training Images; Validating the Classification Model using the Validation Images; and finally, running that model over a variety of wild images (non-labelled images that have not been used for either training nor validation). The table below provides definitions for Training Images, Test Images, Validation Images, and Wild Images all of which are used in the process of build, training, validating, and running the image classification system.

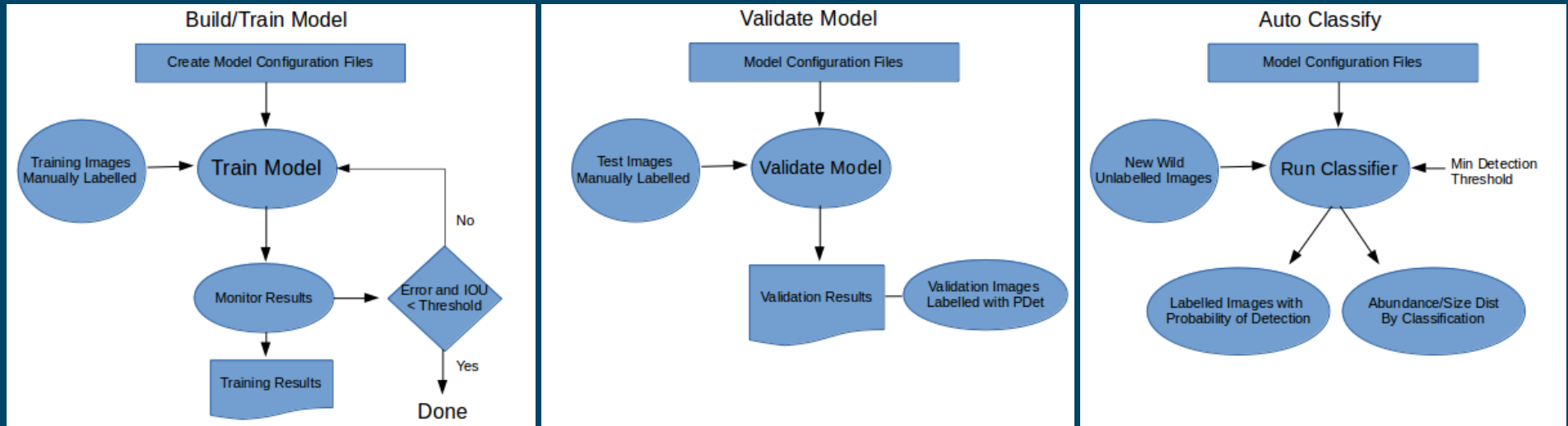
Image Definitions	
Training Images	These are images that have been manually labelled and are used to train the classifier. The images may contain one or more objects. Training images will be displayed with the objects highlighted and labelled with the classification name. The number of training and test images are determined by the validation test percentage which is defined when the configuration files are built. Typically 80% of images are set aside for training and 20% for validation although these percentages can change depending how many images per classification are available.
Test Images	These are images that have been manually labelled and are used to validate the classifier. The images may contain one or more objects. Test images are used for validation and will be displayed with the objects highlighted and labelled with the classification name.
Validation Images	These are test images that have been validated by the classifier. These will be displayed with the detected objects highlighted and labelled with the classification name and probability of detection.
Wild Images	These are new images that were not used in training or validating the model. These images are run with the classification model to detect objects. Wild images will be displayed with the detected objects highlighted and labelled with the classification name and probability of detection.

The first step is to create/build training sets which the user takes unlabelled images and manually labels/classify these images into groups. For images that have been pre-labelled by external applications, these can be automatically imported by the ClassifyManager. The labelled images are then automatically separated into two groups called Training Images and Test Images when the model configuration files are built. See figures below.



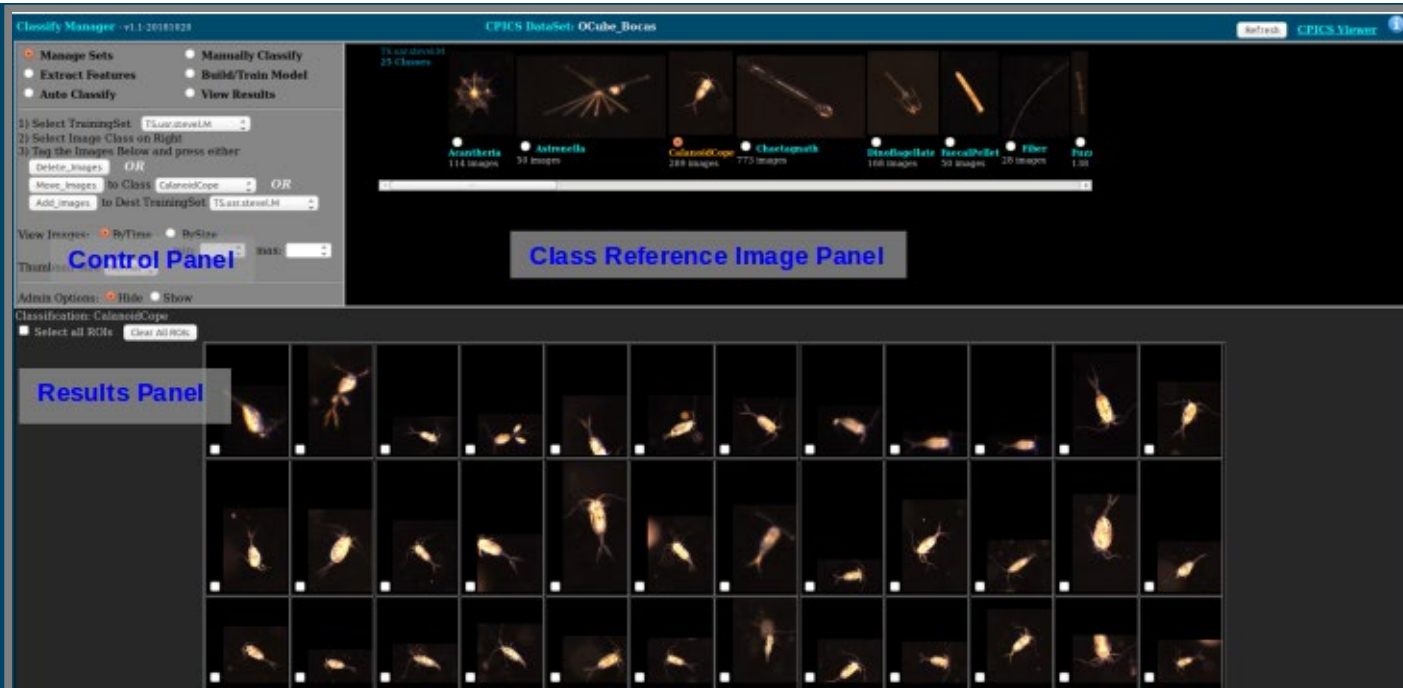
The next step is to build/train the model. Building the model copies the images and labels into a local repository and creates the necessary configurations files. Training the model is an interactive process and the results are monitored in real-time via the ClassifyManager. Training can take a long time to achieve good results where the training error and IOU are near or below the recommended thresholds. The training error and IOU plots are displayed in the ClassifyManager. Note that training can take several days depending on the size of the trainingset, how fast the system converges, and the resources available. After the model is trained, the model should be validated. Validation only takes a few minutes to run depending on the amount of the test

images in the training set. Validation results are displayed in the ClassifyManager and the validation images can be viewed for quality assurance. Note that displays of the validation results and images are directly influenced by the validation threshold. Once the model has been built and validated, new images can be run through the Auto Classify process using the model that was built. The process flow diagrams for training and validating the model along with the Auto Classify is shown in the figures below.



The Auto Classify generates images with objects that are labelled with their classification and probability of detection. In addition, it can also display the abundance and size distribution by classification. Finally, wild images can be viewed in the ClassifyManager. There are several viewing options including viewing just the cropped detection, with a specified probability of detection threshold, by individual classification, or with the Single Image Viewer which is particularly useful for images that have multiple objects.

ClassifyManager Panel Layout



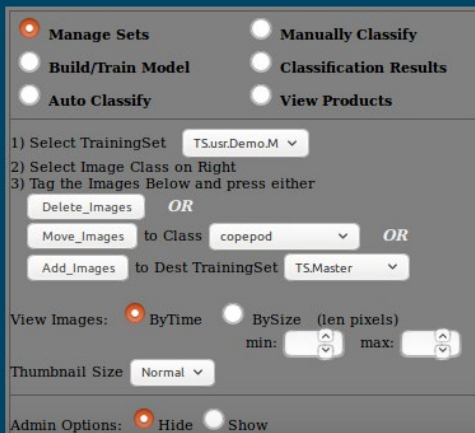
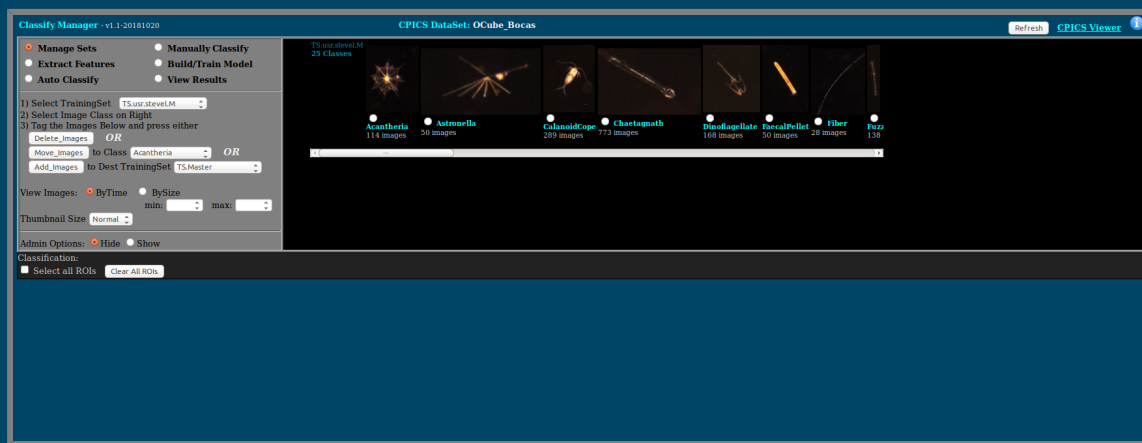
The **Control-Panel** is in the upper-left, and the menu options vary depending on which choice is selected. All of the menu options will list the order of operations that should be followed and are labelled numerically. General viewing options are below those, followed by Administrative options. The Administrative options are hidden by default as care should be used when applying these options. Note that both the menu and administration options will vary depending on which menu options and classes are selected.

The **Class Reference Image Panel** is to the right of the control-panel. This panel is only active for 'Manage Sets' and 'Manually Classify' choices, and just provides a visual reference to classes for the other selected choices in the control-panel. When in 'Manage Sets', selecting an image from the Class Reference Image Panel will display the corresponding images such that ROIs may be tagged and moved between or deleted from different classes. When in 'Manually Classify', selecting an image from the Class Reference Image Panel will display the corresponding images such that ROIs may be tagged and manually classified. If a reference image icon is unavailable, then a new one can be created from either 'Manage Sets' or 'Manually Classify' under the Admin options.

The **Results Panel** is the large main panel below the Control-Panel and Class Reference Image Panel and displays the results from the main options selected in the Control-Panel or Class Reference Image Panel.

Manage Sets

The **Manage Sets** option within the Control-Panel, allows users to view, select, move, copy, and delete ROIs within a selected TrainingSet. It also allows users to add images to other TrainingSets. The Administrative options allow users to clone TrainingSets, create TrainingSet Users, create/rename/delete Classes, set Reference Images, and Auto Load Images from a new dataset.

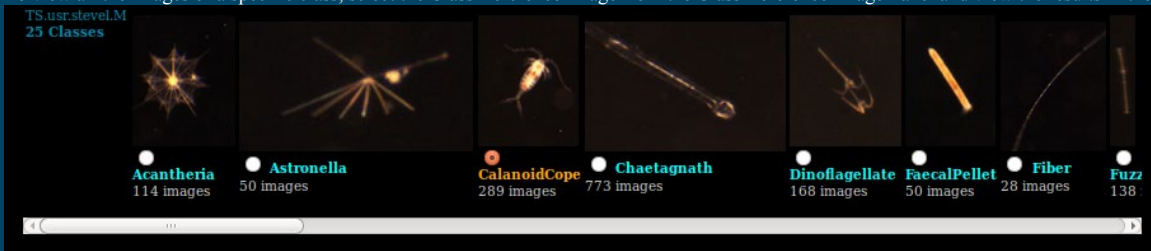


When **Manage Sets** is selected, the options in the Control-Panel will change to the options available for Manage Sets, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. The control-panel shows the sequence that should be followed. So for Manage Sets, the steps are as follows:

1. Select the Training Set from the pull-down menu and the Class Reference Image Panel will be updated
2. Select an Image Class from the panel on the right (note how the Class name changes in the Control-Panel and that all the images are displayed in the Results Panel). Clicking on an image in the Results Panel will bring-up the full resolution image. Note that each image has a selection checkbox to tag it.
3. Tag the Image(s) in the Results Panel and typically either delete the image(s) or move them to another class (note if a specific Class does not exist, one can be created via the Admin Options)

After images are either deleted or moved from a class, the resulting image count should be reflected in the Class Reference Image Panel.

To view all the images of a specific class, select the Class Reference Image from the Class Reference Image Panel and view the results in the Results Panel. For example, to view all images from the CalanoidCope Class:



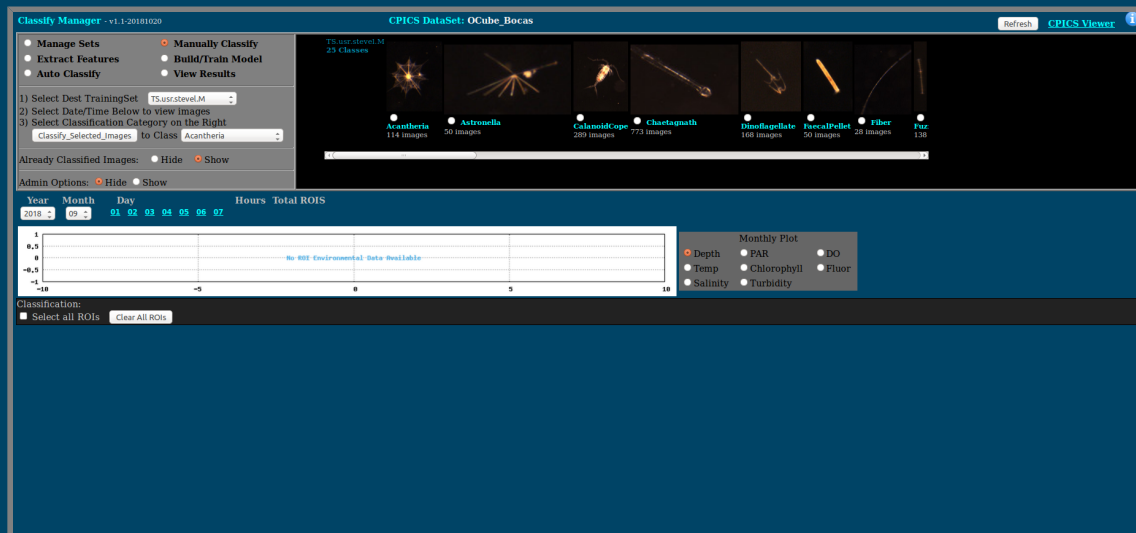
Classification: CalanoidCope

Select all ROIs

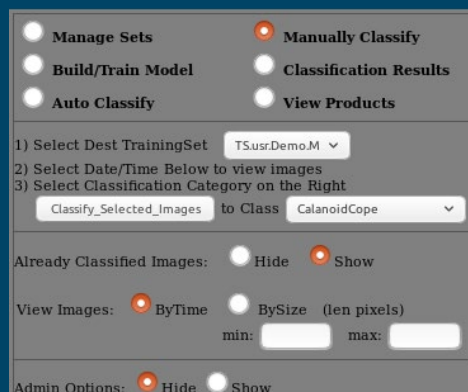


Manually Classify

The **Manually Classify** option within the Control-Panel, allows users to view ROIs by time and classify selected images to a particular class. There's an option to hide already classified images. The Administrative options allow users to Create New Classes and Set a Reference Image.



The screenshot shows the 'Classify Manager' interface for the 'CPICS DataSet: OCube_Bocas'. The left sidebar contains a 'Manually Classify' section with instructions: 1) Select Dest TrainingSet (TS.usr.stevel.M), 2) Select Date/Time Below to view images, and 3) Select Classification Category on the Right (Classify_Selected_Images to Class: Acantheria). The main panel shows a sequence of images for classification, with a 'Classify_Selected_Images' button. Below the images is a calendar and a monthly plot of environmental data.



The close-up shows the 'Manually Classify' control panel. The 'Manually Classify' radio button is selected. The 'Classify_Selected_Images' button is visible. The 'Class' dropdown menu is set to 'CalanoidCope'. The 'Already Classified Images' section has 'Show' selected. The 'View Images' section has 'ByTime' selected. The 'Admin Options' section has 'Hide' selected.

When **Manually Classify** is selected, the options in the Control-Panel will change to the options available for Manually Classify, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. The Results Panel will also be updated to show a calendar and available environment plots. The control-panel shows the sequence that should be followed. So for Manually Classify, the steps are as follows:

1. Select the Destination Training Set from the pull-down menu and both the Class Reference Image Panel and the Results Panel will be updated
2. Select a Date/Time from the Results panel to view images. Start by the Year and Month, and then select a specific day. The hours and image counts for that day will be displayed to the right. Click on a particular hour to view those images. If the Hide Already Classified Images option is selected, images that have already been classified will not be displayed. Images can be displayed either ByTime or BySize (Note BySize can take longer to display). The min/max size limits are used when displaying BySize and will only display images within those ranges. This can be useful to limit the search and reduce the time it takes to display, but is not required.
3. Select a Classification Category on the Right (note how the control-panel now shows the class). Alternatively, the Class menu can be set at anytime before the 'Classify_Selected_Images' button is pressed.
4. Tag the Image(s) in the Results Panel and press the 'Classify_Selected_Images' button which classifies those images to the Class that is listed in the control-panel. If the images belong in another class, select the correct class from the pull-down menu and then press the 'Classify_Selected_Images' button. (Note if the Hide Already Classified Images option is selected, those images will no longer be displayed in the results panel)

After the images are Classified, the resulting image count should be reflected in the Class Reference Image Panel.

Here's an example using the Oshima dataset. **Manually Classify** has been selected and then November 1, 2015 at 12:00 was chosen from the calendar. For the 1200 hour, 1117 ROIs were recorded and are displayed in the Results Panel. In this case, there is environmental data available which shows a monthly plot of depth (and other variables such as temperature or PAR could be plotted). Although hard to see in this image, there is a yellow line overlaid on the plot indicating where the data is being displayed from. Clicking on different dates or hours from the calendar navigates through the data. Note that each image has an associated checkbox for tagging the image or images to be classified. In this example, the copepod Class has been selected and shows-up in the Class menu on the Control-Panel. Then, two copepod images were selected and the 'Classify_Selected_Images' button from the Control Panel is ready to be pressed to classify those images as copepods.

- Manage Sets
- Extract Features
- Auto Classify
- Manually Classify
- Build/Train Model
- View Results

1) Select Dest TrainingSet: TS.usr.tohoku.M
 2) Select Date/Time Below to view images
 3) Select Classification Category on the Right

Classify_Selected_Images to Class: copepod

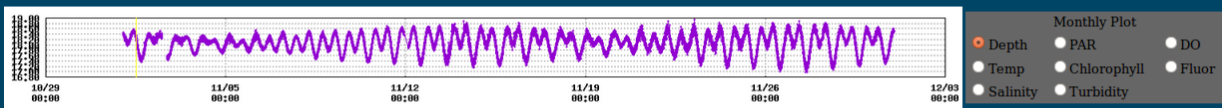
Already Classified Images: Hide Show

Admin Options: Hide Show

TS.usr.tohoku.M
44 Classes

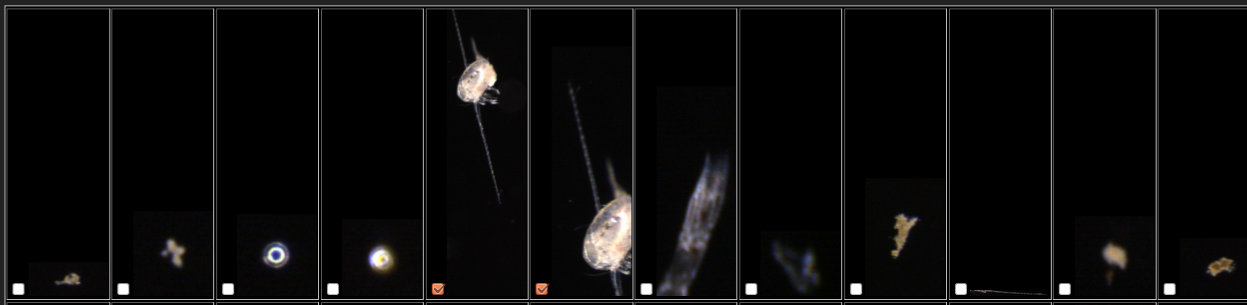
- amphipod (650 images)
- Autosphaera (182 images)
- benthic algae (221 images)
- bubble (306 images)
- ceratium (124 images)
- Chaetoceros (485 images)
- chaetognath (243 images)
- copepod (920 images)

Year	Month	Day	Hours	Total ROIs
2015	11	01	0000	16981
		02	0100	
		03	0200	
		04	0300	
		05	0400	
		06	0500	
		07	0600	
		08	0700	
		09	0800	
		10	0900	
		11	1000	
		12	1100	
		21	1200	
		22	0000	
		23	0100	
		24	0200	
		25	0300	
		26	0400	
		27	0500	
		28	0600	
		29	0700	
		30	0800	



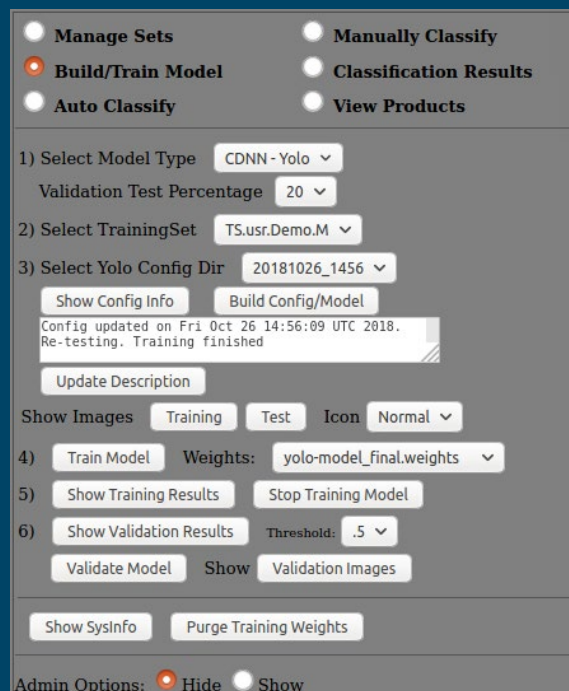
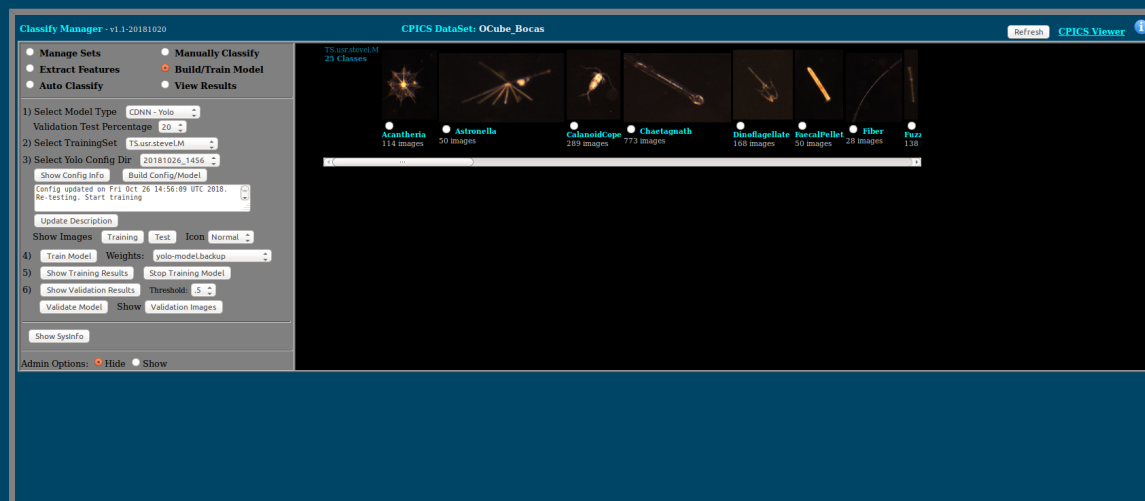
Classification: copepod

Select all ROIs



Build/Train Model

The **Build/Train Model** option within the Control-Panel, allows users to setup and build Random Forest and CDNN-Yolo models. The examples and descriptions here will be for Yolo models only. This option allows the user to build/show a configuration/model, train the model, validate the model, and then show the initial training/test images, training results, and validation results. Note that training a model can take a long time (several days depending on the resources available).



When **Build/Train Model** is selected, the options in the Control-Panel will change to the options available for Build/Train Model, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. The control-panel shows the sequence that should be followed. So for Build/Train Model, the steps are as follows:

1. Select the Model Type - this should be set to CDNN-Yolo
Select the validation test percentage - if set to 20%, this means that 80% of the images will be used for training and 20% for validation.
2. Select the Training Set from the pull-down menu and note that the Class Reference Image Panel will be updated
3. Select the Yolo Config Dir and the description for that configuration will be displayed as well. Note to update the description, simply update the text and then press the **'Update Description'** button.

To view a configuration that has been built, click on the **'Show Config Info'** button - [this can take up to a minute to display](#)

Note, if there are no Yolo Config Dir choices available, click on the **'Build Config/Model'** which will bring-up choices to either re-build or build a new

Build Config/Model: **Re-Build 20180302_1619** or **Build New Config/Model**

[Note: building configuration files can take several minutes](#)

configuration. For example:

click on the **'Build New Config/Model'** button to build a new configuration. After a new configuration has been updated or re-built, be sure to update the description panel and press **'Update Description'**.

Once the build model configuration is complete, you can view the training and test images by clicking on the Show Images **'Training'** and **'Test'** buttons. The results are shown in the Results Panel. In some instances such as full-frame images you may want to select the Large icon option. If you click on the image (or open the image in a new window), you will see the image overlaid with the manually classified target(s). For ROIs such as CPICS plankton images, this will just highlight the full image and display the associated class label.

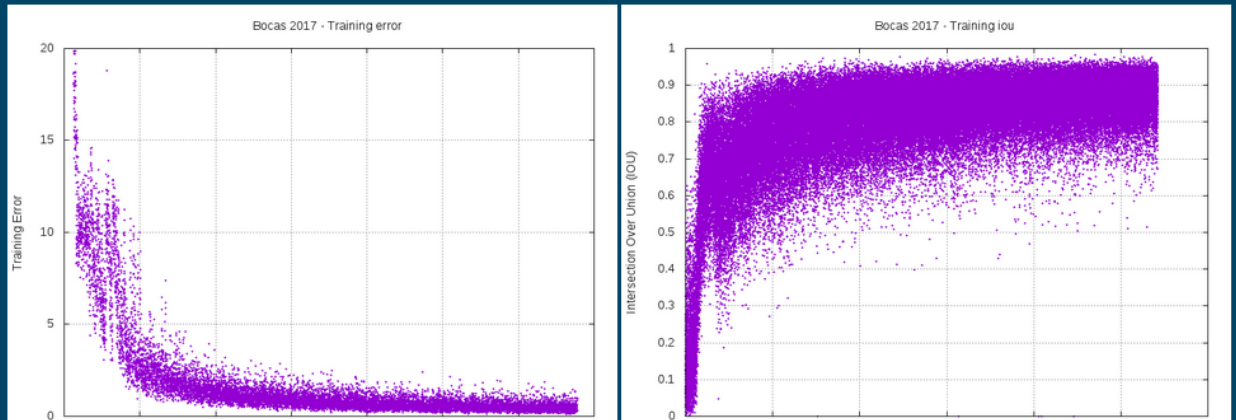
4. To Train the Model, first select the latest weight-file or the backup file for continuing training. Then press the **'Train Model'** button to start training. [Note that training can take up to several days.](#)
5. To monitor the training results, press the **'Show Training Results'** button.

Note: For good training results, Training Error should approach .06 and Training IOU near 1

```

Region Avg IOU: 0.949167, Class: 0.999677, Obj: 0.881164, No Obj: 0.006898, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.850639, Class: 0.850443, Obj: 0.859450, No Obj: 0.007592, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.941732, Class: 0.997434, Obj: 0.999814, No Obj: 0.006844, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.828739, Class: 0.998462, Obj: 0.864989, No Obj: 0.007636, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.748271, Class: 0.989438, Obj: 0.957791, No Obj: 0.007463, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.912702, Class: 0.190000, Obj: 0.940198, No Obj: 0.006727, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.673070, Class: 0.859314, Obj: 0.912963, No Obj: 0.004905, Avg Recall: 0.500000, count: 2
13515: 0.975609, 0.561038 avg, 0.001000 rate, 6.633855 seconds, 216240 images
Loaded: 0.000125 seconds
Region Avg IOU: 0.888460, Class: 0.999721, Obj: 0.931272, No Obj: 0.006395, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.808006, Class: 0.919540, Obj: 0.871300, No Obj: 0.006229, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.895702, Class: 0.924913, Obj: 0.852599, No Obj: 0.006008, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.895691, Class: 0.499944, Obj: 0.869910, No Obj: 0.006352, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.893084, Class: 0.993387, Obj: 0.918452, No Obj: 0.007123, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.916933, Class: 0.990428, Obj: 0.919646, No Obj: 0.007578, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.885097, Class: 0.949433, Obj: 0.881807, No Obj: 0.006823, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.783025, Class: 0.959522, Obj: 0.754915, No Obj: 0.004869, Avg Recall: 1.000000, count: 2
13516: 0.284091, 0.533343 avg, 0.001000 rate, 6.621439 seconds, 216256 images
Loaded: 0.000125 seconds
Region Avg IOU: 0.91824

```



To stop the training at anytime, click on **'Stop Training Model'** and then press the confirmation button in the Results Panel.

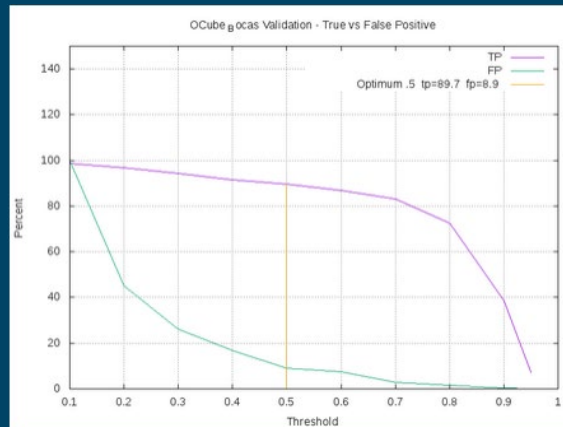
Stop Training Model

Confirmation Required:

- To validate the model, click on the **'Validate Model'** button. Validation takes approximately 1-2 minutes. When done, select a validation Threshold and click on the **'Show Validation Results'** button.

DS: OCube_Bocas ClassName	True Pos	Correct thresh=.5	Incorrect thresh=.5	Incorrectly Classified
Acantheria	90%	10/11		
Astronella	80%	4/5	13	Zigzag(13)
CalanoidCope	100%	29/29		
Chaetagnath	100%	78/78		
Dinoflagellate	82%	14/17	25	Pseudosolenia(25)
FaecalPellet	100%	5/5		
Fiber	100%	2/2		
FuzzyStick	35%	5/14		
Jellie	60%	3/5		
JellyBell	100%	6/6		
Larvacea	100%	2/2		
LarvaceanInHouse	66%	2/3	6	FuzzyStick(6)
LarvalFish	82%	14/17		
MarineSnow	82%	42/51	51	Astronella(16) Spiral(9) Zigzag(26)
MysidsAndThings	100%	11/11		
PleutiusLarva	83%	5/6		
Pseudosolenia	92%	24/26	23	Dinoflagellate(15) SausageDiatom(8)
RoundDiatom	100%	6/6		
SausageDiatom	100%	7/7		
Spiral	88%	8/9		
Syllid	71%	5/7	13	SyllidWithEggs(13)
SyllidWithEggs	100%	12/12		
TwitchyStick	100%	4/4		
Zigzag	90%	10/11		
nauplii	93%	14/15	13	Zigzag(13)
Totals: 25 classes	89.7%	322/359	144 (8.9%)	

Summary: 3189 Training Images, 354 Validation Images, 359 objects, Cfg: TS.usr.stevel.M/20180302_1619



To view the validation images, click on the Show 'Validation Images' button

Displaying 363 Validation Images (341 detections with thresh >= .5) from 25 Classes:

Acantheria, Astronella, CalanoidCope, Chaetagnath, Dinoflagellate, FaecalPellet, Fiber, FuzzyStick, Jellie, JellyBell, Larvacea, LarvaceanInHouse, LarvalFish, MarineSnow, MysidsAndThings, nauplii, PleutiusLarva, Pseudosolenia, RoundDiatom, SausageDiatom, Spiral, Syllid, SyllidWithEggs, TwitchyStick



At the bottom of the Build/Train Model control panel are 'Show SysInfo', 'Purge Training Weights', and Admin Options. The 'Show SysInfo' button dynamically displays the system performance (see below) and the 'Purge Training Weights' button deletes intermediate and usually unnecessary model weight files. This can save a significant amount of disk space. To purge the Training Weights press the 'Purge Training Weights' button and then press the 'Confirm Purge' button.

System Status Top **HTop**

```

1 [          ] 0.0% Tasks: 130, 552 thr; 1 running
2 [|||||||] 100.0% Load average: 1.27 1.39 1.42
3 [          ] 0.0% Uptime: 6 days, 20:08:14
4 [          ] 0.0%
Mem [|||||||] 1.80G/7.67G
Swp [          ] 0K/0K

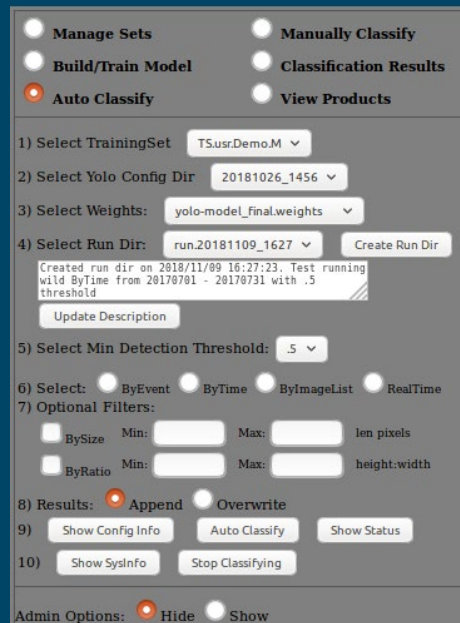
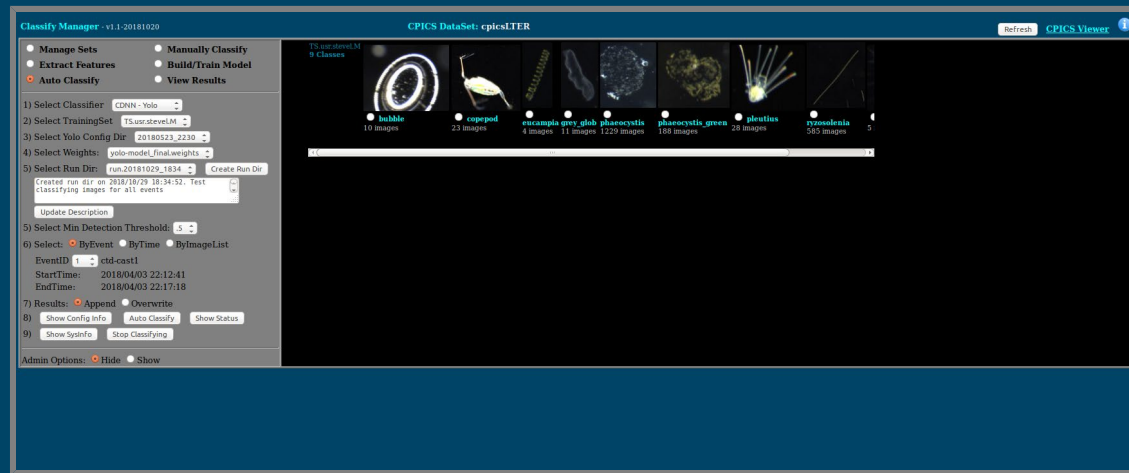
```

pid	ppid	uid	gid	stg	cpu%	mem%	time	command	
15300	www-data	20	0	4328	3000	2044	R 36.4	0.0	0:00.11 /usr/bin/htop
1	root	20	0	151M	5576	3480	S 0.0	0.1	0:10.02 /sbin/init tegra
289	root	20	0	37292	21448	18900	S 0.0	0.3	0:20.46 /lib/systemd/syst
311	root	20	0	12316	3680	2364	S 0.0	0.0	0:01.69 /lib/systemd/syst
485	systemd-t	20	0	77308	1916	1712	S 0.0	0.0	0:00.28 /lib/systemd/syst
441	systemd-t	20	0	77308	1916	1712	S 0.0	0.0	0:01.88 /lib/systemd/syst
749	root	20	0	230M	7968	6440	S 0.0	0.1	0:00.00 /usr/sbin/ModemMa
753	root	20	0	230M	7968	6440	S 0.0	0.1	0:00.00 /usr/sbin/ModemMa
735	root	20	0	230M	7968	6440	S 0.0	0.1	0:00.05 /usr/sbin/ModemMa
738	root	20	0	6408	2540	2272	S 0.0	0.0	0:02.16 /usr/sbin/cron -f
745	messagebu	20	0	7408	4696	2928	S 0.0	0.1	3:07.45 /usr/bin/dbus-dae
855	root	20	0	350M	16500	13068	S 0.0	0.2	0:00.00 /usr/sbin/Network
862	root	20	0	350M	16500	13068	S 0.0	0.2	1:16.32 /usr/sbin/Network
754	root	20	0	350M	16500	13068	S 0.0	0.2	3:13.45 /usr/sbin/Network

F1 Help F2 Stop F3 Search F4 Filter F5 Refresh F6 Sort By F7 Hide F8 Hide F9 All F10 Exit

Auto Classify

The **Auto Classify** option within the Control-Panel, allows users to select a model that has been built, configured, trained, and validated. A run directory is then created and images are selected either ByEvent, ByTime, or ByImageList. The auto classification process can then be started and monitored in real-time.



When **Auto Classify** is selected, the options in the Control-Panel will change to the options available for Auto Classify, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. The control-panel shows the sequence that should be followed. So for Auto Classify, the steps are as follows:

1. Select the Training Set from the pull-down menu and the Class Reference Image Panel will be updated.
2. Select the Yolo Config Dir from the pull-down menu.
3. Select the Yolo weights file to use. Typically the latest one is the best to use.
4. Select the Run Directory from the pull-down menu. Note the corresponding description for that run will be displayed. To update the description, simply update the text and press the '**Update Description**' button. To create a new run directory, press the '**Create RunDir**' button
5. Select the minimum detection threshold. Recommend looking at the validation results for the initial value to use. The lower the number, more positive detections will be detected along with a higher number of false detections as well. Note that a lower number gives some flexibility when displaying the detected results as the detection threshold on the display can be tuned like a focus knob.
6. Select the input choice for images to auto classify. Depending on the selection, more choices will appear. ByEvent will list available event IDs (as setup from the Event Manager), ByTime will allow you to specify start and end times, ByImageList will provide a menu popup list of available imageList files, and RealTime is only available on a CPICS instrument.
7. Optional filters can be pre-applied to the input images to only classify images that match the selected filter criteria.
8. The results can either be Appended or Overwritten. By default, Appended is selected and is recommended to use as new wild images become available.
9. The select configuration files can be displayed (can take up to 1-minute to display them) by pressing the '**Show Config Info**' button. To start the Automatic Classifier, press the '**Auto Classify**' button. To monitor the results in real-time, press the '**Show Status**' button.
10. The Auto Classifier can be stopped anytime by pressing the '**Stop Classifying**' button. Be sure to press the confirm button to stop classifying.

To monitor progress during Auto Classification, click on the '**Show Status**' button. In the results panel you will see a table of classification names and detections (refer to the table on the right). The top-line will show if the classify detector is running. Note that it may take up to a minute for the system to start detecting objects. At the bottom of the table you will see an Class called no_matches. These are where there were no detections with the specified threshold for those images. To view the image results of the auto classifier, select '**View Results**' and click on 'Show Images Wild'. Below is an example of some auto classified images of copepods.



Classification	Detected
Acantheria	18
Astronella	348
CalanoidCope	90
Chaetagnath	51
Dinoflagellate	25
FaecalPellet	23
FuzzyStick	5417
Jellie	3
JellyBell	650
LarvaceanInHouse	1
LarvalFish	14
MarineSnow	6
MysidsAndThings	13
PleutiusLarva	1
Pseudosolenia	20
RoundDiatom	3
SausageDiatom	31
Spiral	1
Syllid	14
SyllidWithEggs	36
TwitchyStick	7
Zigzag	3
nauplii	26
no_matches	1379
Totals:	24 Classes 8180 Detections

Classification Results

The **Classification Results** option within the Control-Panel, allows users to select specific runs from training set configurations and show the Training Results, Validation Results, Wild Results along with the ability to display the Training, Test, Validation, and Wild images. There's also a Single Image Viewer for interactively displaying the images. Users can export the classification results to a CSV file that can be imported into a spreadsheet.

The screenshot shows a control panel with the following sections:

- Navigation:** Manage Sets, Manually Classify, Build/Train Model, Classification Results (selected), Auto Classify, View Products.
- 1) Select TrainingSet:** TS.usr.Demo.M (25 Classes)
- 2) Select Cfg Dir:** 20181026_1456. Description: Config updated on Fri Oct 26 14:56:09 UTC 2018. Re-testing. Training finished.
- Select Run Dir:** run.20181109_1627. Description: Created run dir on 2018/11/09 16:27:23. Test running wild Byline from 20170701 - 20170731 with .5 threshold.
- 3) Show:** Config Info, Training Results (selected)
- 4) Show:** Validation Results, Threshold: .5
- 5) Show:** Wild Results
- 6) Show Images:** Training, Test, Validation, Wild. Wild Options: Limit 100 per Class, Crop, Thresh. Show Class: All Classes. Thumbnail Size: Normal. [Single Image Viewer...](#)
- 7) Show Abundance/Size Dist:** Validation, Wild. Auto Scale, xmin 0, xmax 2000.
- 8) Export CSV Results:** Validation, Wild.
- Admin Options:** Hide (selected), Show

The right side of the interface displays a grid of reference images for the selected training set:

- Acantheria:** 114 images
- Astronella:** 50 images
- CalanoidCope:** 289 images
- Chaetagnath:** 773 images
- Dinoflagellate:** 168 images
- FaecalPellet:** 50 images
- Fiber:** 20 images
- Fu:** 131 images

When **Classification Results** is selected, the options in the Control-Panel will change to the options available for Classification Results, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. The control-panel shows the sequence that should be followed. So for Classification Results, the steps are as follows:

1. Select the Training Set from the pull-down menu and the Class Reference Image Panel will be updated
2. Select the Config Dir from the pull-down menu. Note the corresponding description for that configuration will be displayed.

Select the Run Directory from the pull-down menu. Note the corresponding description for that run will be displayed.

3. To show the selected configuration, press the '**Config Info**' button (note that this can take up to 1-minute to display). To view the training results, press the '**Training Results**' button. The training results will display the last few lines of the run logfile and plots of the Training Error and IOU. A sample training results output is shown below
4. To show the validation results, select a validation Threshold and click on the '**Show Validation Results**' button.

Manage Sets Manually Classify
 Build/Train Model Classification Results
 Auto Classify View Products

1) Select TrainingSet

2) Select Cfg Dir
 Config updated on Fri Oct 26 14:56:09 UTC 2018. Re-testing. Training finished

Select Run Dir
 Created run dir on 2018/11/09 16:27:23. Test running wild ByTime from 20170701 - 20170731 with .5 threshold

3) Show

4) Show Threshold:

5) Show

6) Show Images

Wild Options
 Limit per Class Crop Thresh
 Show Class

Thumbnail Size [Single Image Viewer...](#)

7) Show Abundance/Size Dist
 Auto Scale xmin xmax

8) Export CSV Results

Admin Options: Hide Show

- To show the wild results, click on the '**Show Wild Results**' button
- To show the Training, Test, Validation, and Wild images, click on their respective buttons. Validation results will display the target(s) with their labels and prediction probability.

When displaying Wild images, there are several options available including to Limit the number of images displayed per class, only display the cropped target(s), use the validation threshold, and show either all the detected classes or a specific one from the pull-down menu. Finally, the size of thumbnail display can be selected.

The '**Single Image Viewer**' link will open-up a browser based view to scroll through training, test, validation, and wild images. This is especially useful for datasets that have images containing multiple targets.

- To show the abundance and size distribution, click on either the **Validation** or **Wild** button. Note that the Validation Threshold is used for Validation abundance/size distribution and for Wild if the **Thresh** option is selected in the Wild Options. Note that the abundance plots can either be auto-scaled or the xmin and xmax range can be set.
- To export the CSV results from the image classifier, click on either the **Validation** or **Wild** button. Note that the Validation Threshold is used when exporting Validation results and for Wild if the **Thresh** option is selected in the Wild Options.

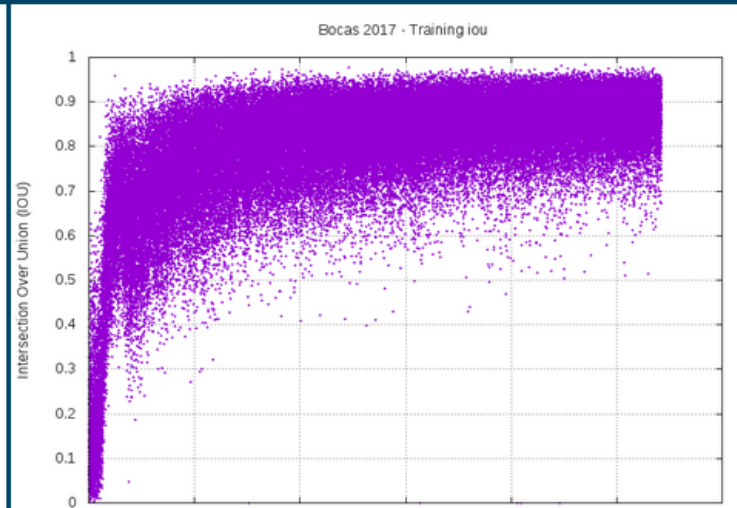
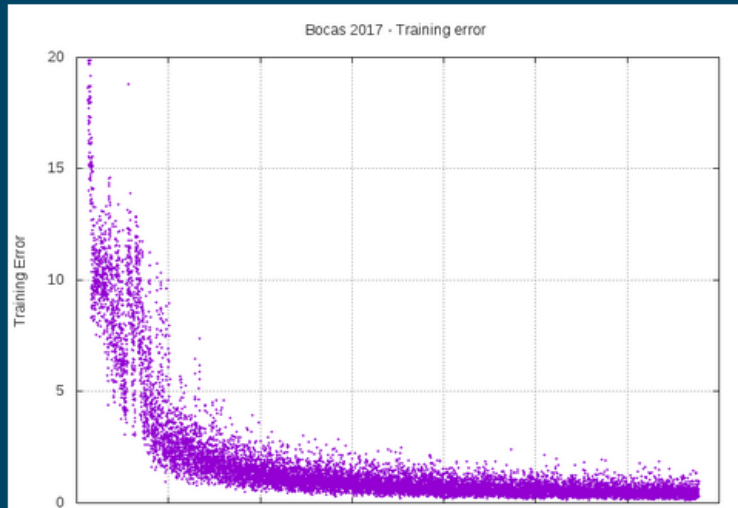
Examples

Training Results

Note: For good training results, Training Error should approach .06 and Training IOU near 1

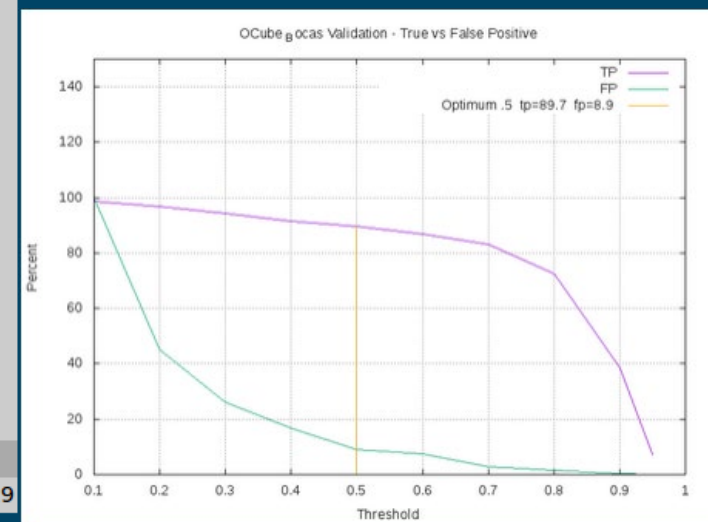
```

Region Avg IOU: 0.949167, Class: 0.999677, Obj: 0.881164, No Obj: 0.006898, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.850639, Class: 0.850443, Obj: 0.859450, No Obj: 0.007592, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.941732, Class: 0.997434, Obj: 0.909814, No Obj: 0.006844, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.828739, Class: 0.998462, Obj: 0.864989, No Obj: 0.007636, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.748271, Class: 0.989438, Obj: 0.957791, No Obj: 0.007463, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.912702, Class: 0.190000, Obj: 0.940198, No Obj: 0.006727, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.673070, Class: 0.859314, Obj: 0.912963, No Obj: 0.004905, Avg Recall: 0.500000, count: 2
13515: 0.975609, 0.561038 avg, 0.001000 rate, 6.633855 seconds, 216240 images
Loaded: 0.000125 seconds
Region Avg IOU: 0.888460, Class: 0.999721, Obj: 0.931272, No Obj: 0.006395, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.808006, Class: 0.919540, Obj: 0.871300, No Obj: 0.006229, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.895702, Class: 0.924913, Obj: 0.852599, No Obj: 0.006008, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.895691, Class: 0.499944, Obj: 0.869910, No Obj: 0.006352, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.893084, Class: 0.993387, Obj: 0.918452, No Obj: 0.007123, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.916933, Class: 0.990428, Obj: 0.919646, No Obj: 0.007578, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.885097, Class: 0.949433, Obj: 0.881007, No Obj: 0.006823, Avg Recall: 1.000000, count: 2
Region Avg IOU: 0.783825, Class: 0.959522, Obj: 0.754915, No Obj: 0.004869, Avg Recall: 1.000000, count: 2
13516: 0.284091, 0.533343 avg, 0.001000 rate, 6.621439 seconds, 216256 images
Loaded: 0.000125 seconds
Region Avg IOU: 0.91824
    
```



Validation Results

DS: OCube_Bocas ClassName	True Pos	Correct thresh=.5	Incorrect thresh=.5	Incorrectly Classified
Acantheria	90%	10/11		
Astronella	80%	4/5	13	Zigzag(13)
CalanoidCope	100%	29/29		
Chaetagnath	100%	78/78		
Dinoflagellate	82%	14/17	25	Pseudosolenia(25)
FaecalPellet	100%	5/5		
Fiber	100%	2/2		
FuzzyStick	35%	5/14		
Jellie	60%	3/5		
JellyBell	100%	6/6		
Larvacea	100%	2/2		
LarvaceanInHouse	66%	2/3	6	FuzzyStick(6)
LarvalFish	82%	14/17		
MarineSnow	82%	42/51	51	Astronella(16) Spiral(9) Zigzag(26)
MysidsAndThings	100%	11/11		
PleutiusLarva	83%	5/6		
Pseudosolenia	92%	24/26	23	Dinoflagellate(15) SausageDiatom(8)
RoundDiatom	100%	6/6		
SausageDiatom	100%	7/7		
Spiral	88%	8/9		
Syllid	71%	5/7	13	SyllidWithEggs(13)
SyllidWithEggs	100%	12/12		
TwitchyStick	100%	4/4		
Zigzag	90%	10/11		
nauplii	93%	14/15	13	Zigzag(13)
Totals: 25 classes	89.7%	322/359	144 (8.9%)	
Summary: 3189 Training Images, 354 Validation Images, 359 objects, Cfg: TS.usr.stevel.M/20180302_1619				

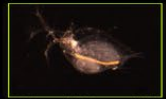


Wild Results

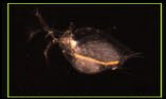
Classification	Detected
Acantheria	18
Astronella	348
CalanoidCope	90
Chaetagnath	51
Dinoflagellate	25
FaecalPellet	23
FuzzyStick	5417
Jellie	3
JellyBell	650
LarvaceanInHouse	1
LarvalFish	14
MarineSnow	6
MysidsAndThings	13
PleutiusLarva	1
Pseudosolenia	20
RoundDiatom	3
SausageDiatom	31
Spiral	1
Syllid	14
SyllidWithEggs	36
TwitchyStick	7
Zigzag	3
nauplii	26
no_matches	1379
Totals: 24 Classes 8180 Detections	



CalanoidCope 91%



CalanoidCope 82%



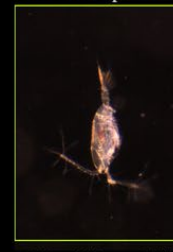
CalanoidCope 82%



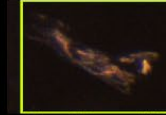
CalanoidCope 76%



CalanoidCope 96%



CalanoidCope 92%



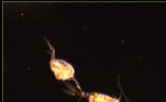
CalanoidCope 71%



CalanoidCope 68%



CalanoidCope 88%



CalanoidCope 87%



CalanoidCope 80%



CalanoidCope 91%



CalanoidCope 91%



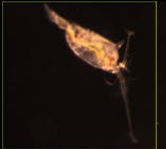
CalanoidCope 61%



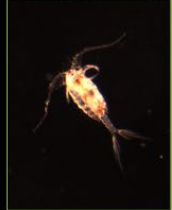
CalanoidCope 89%



CalanoidCope 89%



CalanoidCope 87%



CalanoidCope 93%



CalanoidCope 90%



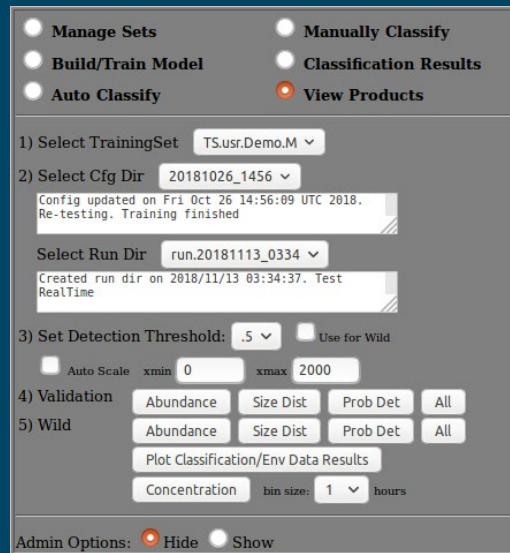
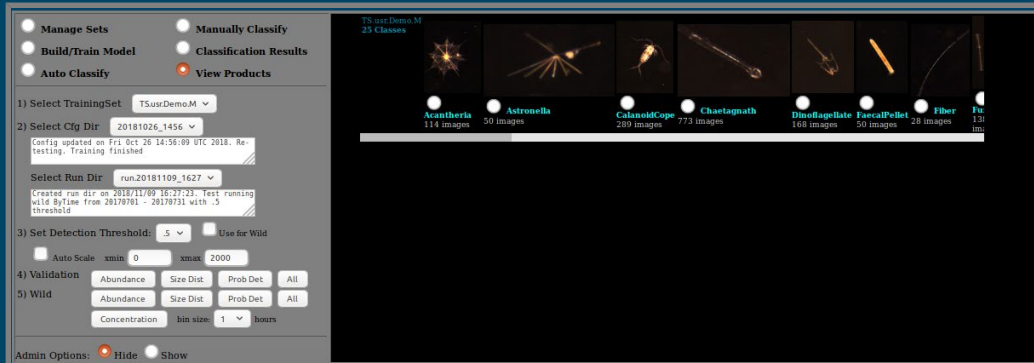
CalanoidCope 90%



CalanoidCope 91%

View Products

The **View Products** option within the Control-Panel, allows users to select specific runs from training set configurations and show the Training Results, Validation Results, Wild Results along with the ability to display the Training, Test, Validation, and Wild images. There's also a Single Image Viewer for interactively displaying the images.



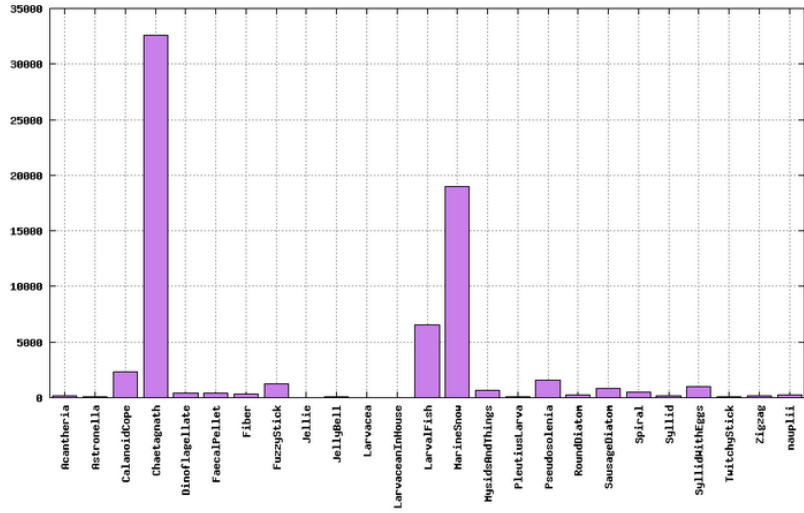
When **View Products** is selected, the options in the Control-Panel will change to the options available for View Products, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. The control-panel shows the sequence that should be followed. So for View Products, the steps are as follows:

1. Select the Training Set from the pull-down menu and the Class Reference Image Panel will be updated
2. Select the Config Dir from the pull-down menu. Note the corresponding description for that configuration will be displayed.
Select the Run Directory from the pull-down menu. Note the corresponding description for that run will be displayed.
3. Set the detection threshold from the pull-down menu, and optional use this for wild results. Note the validation and wild plots can either be auto-scaled or the xmin and xmax ranges can be set.
4. To show the validation products/plots, click on Abundance, Size Dist, ProbDet, or All
5. To show the wild products/plots, click on Abundance, Size Dist, ProbDet, or All

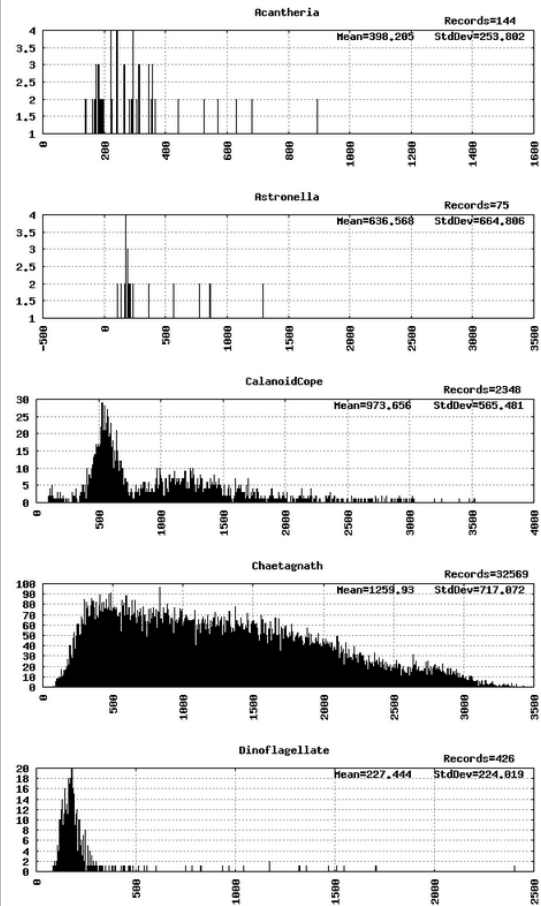
Examples

Wild Results - Abundance & Size Distribution

OCube_Bocas wild Abundance
TS_usr.stevel.H/20181026_1456/run.20181109_1627

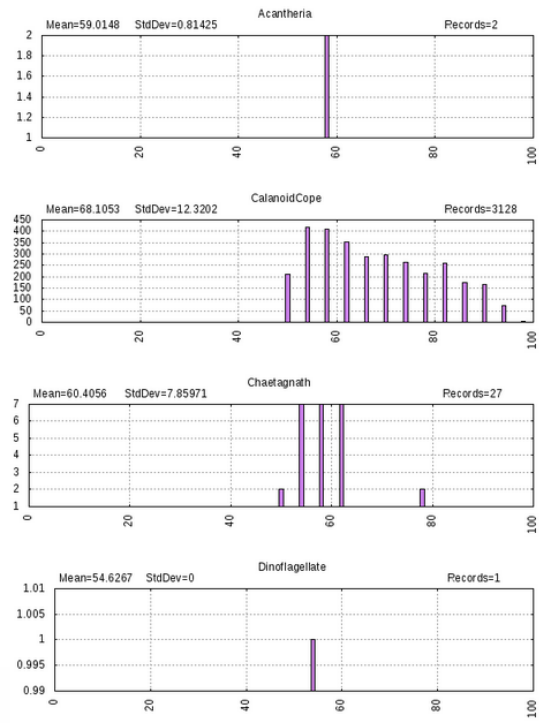


Size Distribution by Classification



Probability of Distribution by Classification

Probability of Detection by Classification - thresh .5
 OCube_Bocas wild TS.usr.Demo.M/20181026_1456/run.20181113_0334



Classification/Environmental Data Plots

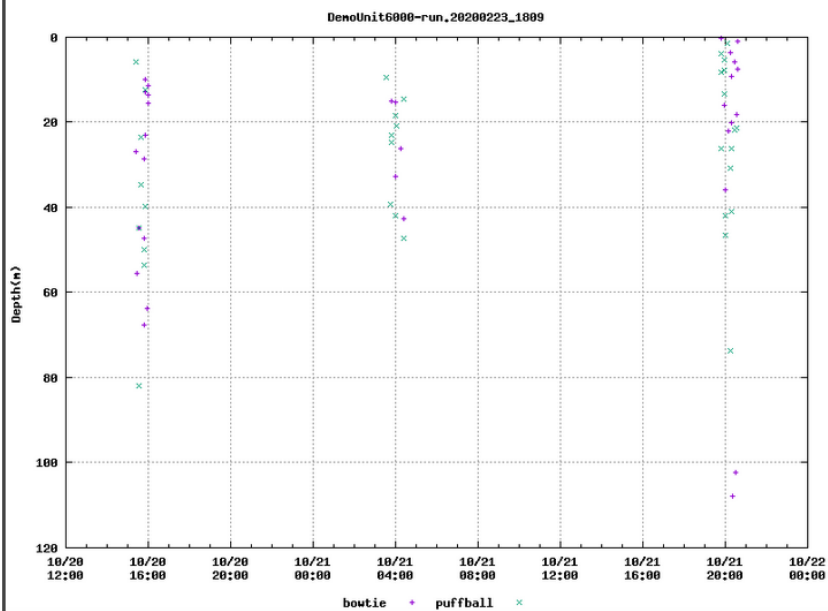
Select Classification(s)

- bowtie
- puffball
- no_matches

Clear Select All

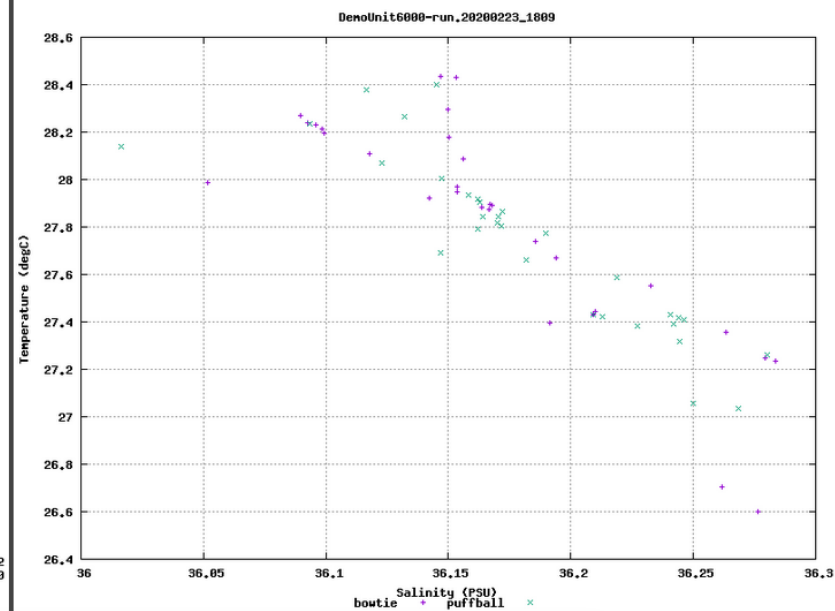
Min Detection Threshold: .5

Time-Series for each ROI Classification Depth Temp Salinity



Start Time: yyyy/mm/dd hh:mm End Time: yyyy/mm/dd hh:mm

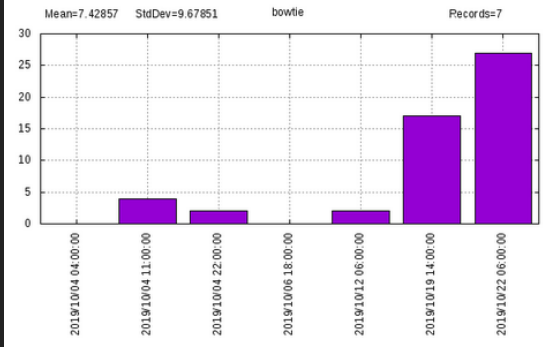
Temperature vs Sallinity for each ROI Classification



TRange: min:max SRRange: 36*

Concentration by Classification Plots

Concentration by Classification bin size 1
DemoUnit6000 wild TS.usr.Demo.M/20200223_1415/run.20200227_2348



Single Image Viewer

The **Single Image Viewer** is an interactive web-browser interface to view Training, Test, Validation, and Wild Images from a specified TrainingSet. The viewer is launched from the 'View Results' option within the Control-Panel. Simply select the TrainingSet and configuration/run directory and click on the '**Single image Viewer**' link. A new tab with the viewer will open. If no images are displayed, double-check that the correct TrainingSet and Configurations were selected. Note the viewer is most-useful for datasets that have multiple targets within an image.

At the top of the viewer, the DataSet, TrainingSet, and CfgDir will be displayed. There is also a pull-down menu for the type of images to display. These currently include Training Images, Test Images, Validation Images, and Wild Images. Note that the pull-down type will also list which image you are viewing along with the total number of images in that category (eg; Training Images [1/1389]).

Image Definitions

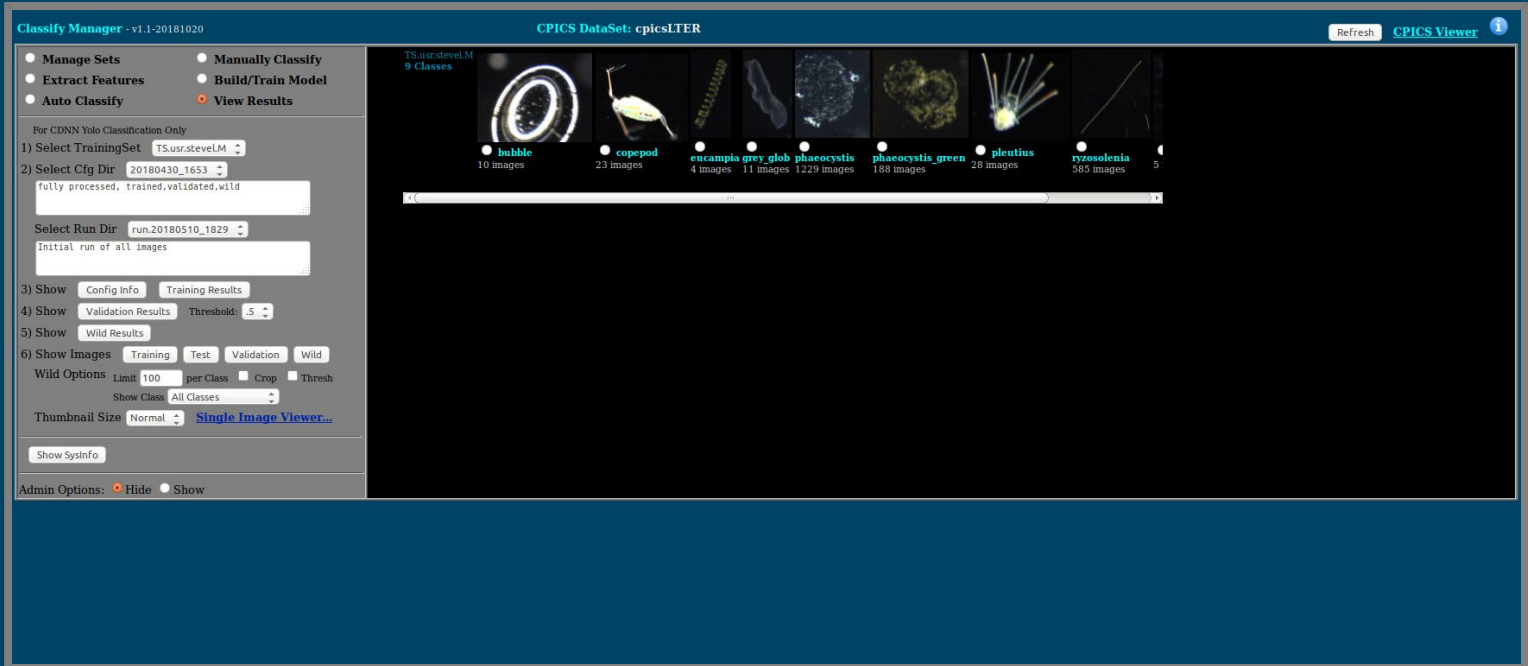
Training Images	These are images that have been hand-labelled and used to train the classifier. These will be displayed with the objects highlighted and labelled. The number of training and test images are determined by the validation test percentage which is defined when the configuration files are built
Test Images	These are images that have been hand-labelled and used to validate the classifier. These will be displayed with the objects highlighted and labelled.
Validation Images	These are test images that have been validated by the classifier. These will be displayed with the detected objects highlighted and labelled with the classification name and probability of detection.
Wild Images	These are new images that were not used in training the model, but use the model to detect objects. These will be displayed with the detected objects highlighted and labelled with the classification name and probability of detection.

Single Viewer Examples

□

Export Classifier Results

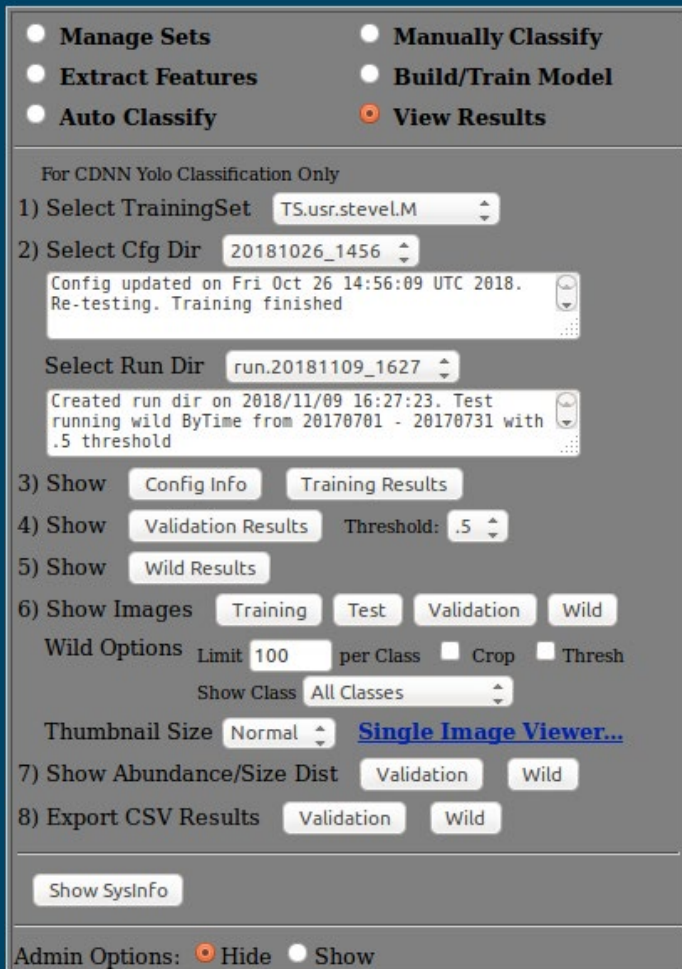
The validation and wild results from the image Classifier can be saved as CSV files by using the **Export CSV Results** option from the **Classification Results** Control-Panel. To download the results, click on either the **Validation** or **Wild** button and a download dialog box will appear. Either save the results or open it with an application such as a spreadsheet program.



The screenshot shows the 'Classify Manager' interface for the 'CPICS DataSet: cpicsLTER'. The left sidebar contains a control panel with the following sections:

- Management:** Manage Sets, Extract Features, Auto Classify, Manually Classify, Build/Train Model, View Results.
- Configuration:** Select TrainingSet (TS.usr.stevel.M), Select Cfg Dir (20180430_1653), Select Run Dir (run.20180510_1829).
- Display Options:** Show Config Info, Training Results, Validation Results (Threshold: .5), Wild Results, Show Images (Training, Test, Validation, Wild), Wild Options (Limit: 100, per Class, Crop, Thresh, Show Class: All Classes), Thumbnail Size (Normal), Single Image Viewer...
- Admin Options:** Hide (selected), Show.

The main area displays a gallery of 9 classes of images: bubble (10 images), copepod (23 images), eucampia_grov_glob (4 images), phaeocystis (11 images), phaeocystis_green (1229 images), pleutius (28 images), and ryzosolenia (585 images).



This detailed view of the control panel shows the following settings:

- Management:** Manually Classify, Build/Train Model, View Results (selected).
- Configuration:** 1) Select TrainingSet: TS.usr.stevel.M; 2) Select Cfg Dir: 20181026_1456. Log: Config updated on Fri Oct 26 14:56:09 UTC 2018. Re-testing. Training finished; Select Run Dir: run.20181109_1627. Log: Created run dir on 2018/11/09 16:27:23. Test running wild ByTime from 20170701 - 20170731 with .5 threshold.
- Display Options:** 3) Show: Config Info, Training Results; 4) Show: Validation Results, Threshold: .5; 5) Show: Wild Results; 6) Show Images: Training, Test, Validation, Wild; Wild Options: Limit 100, per Class, Crop, Thresh, Show Class: All Classes; Thumbnail Size: Normal, Single Image Viewer...; 7) Show Abundance/Size Dist: Validation, Wild; 8) Export CSV Results: Validation, Wild.
- Admin Options:** Hide (selected), Show.

When **Classification Results** is selected, the options in the Control-Panel will change to the options available for Classification Results, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. The control-panel shows the sequence that should be followed. So to export the classifier results from the Classification Results control-panel, select the TrainingSet, Configuration Directory, and the Run Directory using the steps below. Additionally, items such as configuration information, training/validation results, and training/test/validation/wild images can be verified before exporting the CSV results. Step 8 actually exports the data.

1. Select the Training Set from the pull-down menu and the Class Reference Image Panel will be updated
2. Select the Yolo Config Dir from the pull-down menu. Note the corresponding description for that configuration will be displayed.

Select the Run Directory from the pull-down menu. Note the corresponding description for that run will be displayed.

3. To show the selected configuration, press the '**Config Info**' button (note that this can take up to 1-minute to display). To view the training results, press the '**Training Results**' button. The training results will display the last few lines of the run logfile and plots of the Training Error and IOU. A sample training results output is shown below
4. To show the validation results, select a validation Threshold and click on the '**Show Validation Results**' button.
5. To show the wild results, click on the '**Show Wild Results**' button
6. To show the Training, Test, Validation, and Wild images, click on

their respective buttons. Validation results will display the target(s) with their labels and prediction probability.

When displaying Wild images, there are several options available including to Limit the number of images displayed per class, only display the cropped target(s), use the validation threshold, and show either all the detected classes or a specific one from the pull-down menu. Finally, the size of thumbnail display can be selected.

The '**Single Image Viewer**' link will open-up a browser based view to scroll through training, test, validation, and wild images. This is especially useful for datasets that have images containing multiple targets.

7. To show the abundance and size distribution, click on either the **Validation** or **Wild** button. Note that the Validation Threshold is used for Validation abundance/size distribution and for Wild if the **Thresh** option is selected in the Wild Options.
8. To export the CSV results from the image classifier, click on either the **Validation** or **Wild** button. Note that the Validation Threshold is used when exporting Validation results and for Wild if the **Thresh** option is selected in the Wild Options.

Exported Data Format

The first row is a comment-line beginning with a '#' and lists the export type (valid|wild), along with the dataset, trainingset, and threshold information.

The second row contains the field name columns: imagename, probability of detection, bounding box xmin, ymin, xmax, ymax, classID, and className.

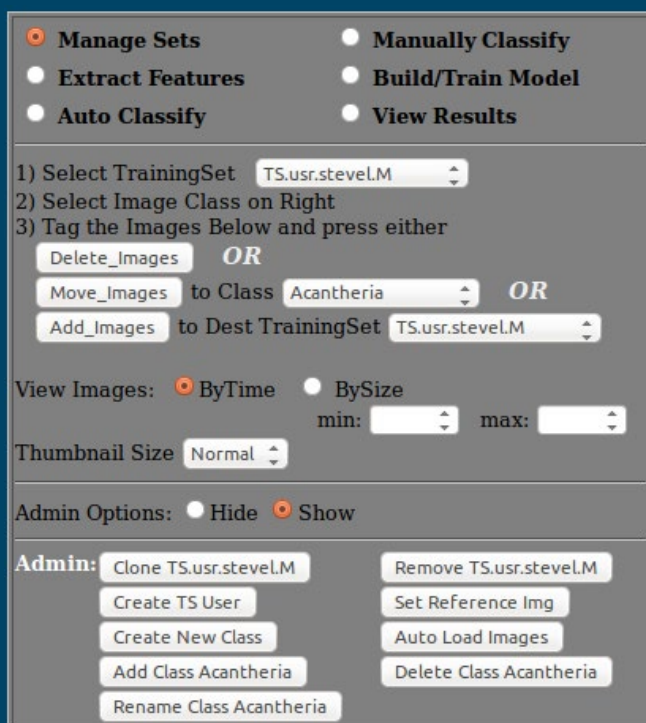
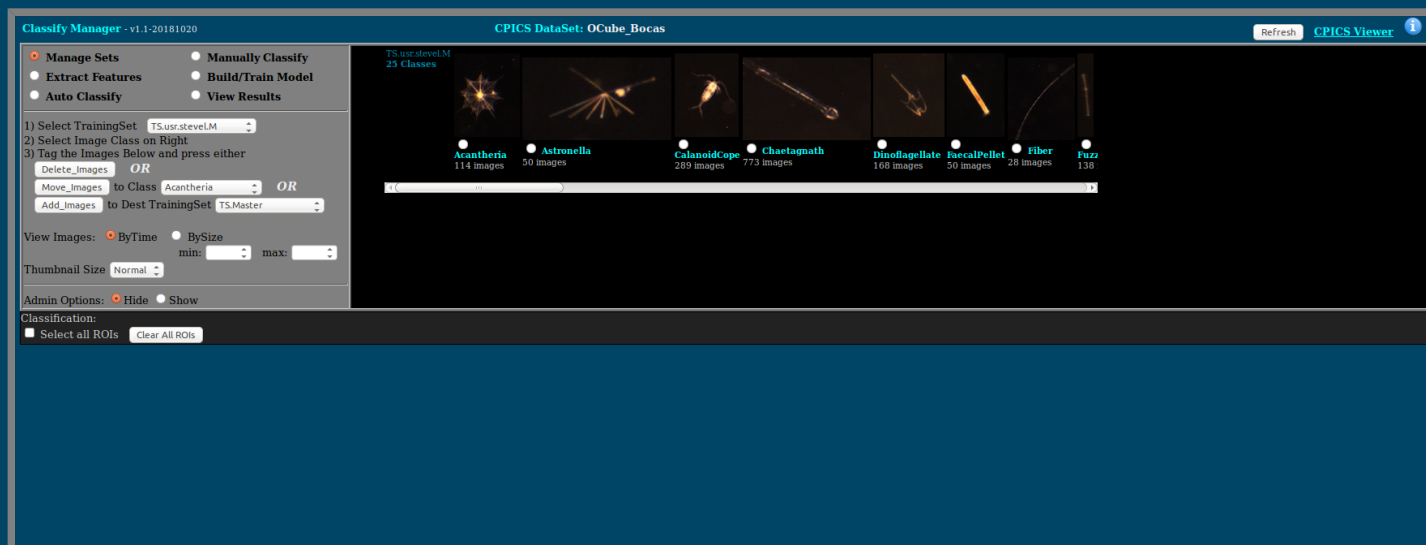
The rest of the rows are comma-separated data.

```
#ClassifyManager Export: type=valid ds=BLIS2018 ts=TS.Subset.1/20181114_2005 thresh=.5
```

imagename	pdet	xmin	ymin	xmax	ymax	classID	className
20181113_170202.817.6.png	0.983866	1	1	432	560	0	Argopecten
20181113_170302.484.5.png	0.986727	1	1	448	388	0	Argopecten
20181113_170322.650.1.png	0.990915	1	1	496	452	0	Argopecten
20181113_170327.317.11.png	0.993291	1	1	256	267.27	0	Argopecten
20181113_170430.486.1.png	0.994066	1	1	368	377.02	0	Argopecten
20181113_170517.653.0.png	0.995297	1	1	416	446.42	0	Argopecten
20181113_171838.985.0.png	0.869236	1	1	365.20	447.24	1	Crassostrea
20181113_133819.668.2.png	0.951045	1	19.82	288	356	1	Crassostrea
20181113_133819.982.0.png	0.972109	1	1	206.46	336	1	Crassostrea
20181113_133820.647.0.png	0.9722	12.83	1	272	248	1	Crassostrea
20181113_133820.813.2.png	0.970605	1	1	242.88	192	1	Crassostrea
20181113_133820.985.4.png	0.973271	1	1	244	196	1	Crassostrea
20181113_170202.817.6.png	0.542922	55.29	1	432	548.41	2	Mercenaria
20181113_170327.317.11.png	0.501871	1	1	211.17	272	2	Mercenaria
20181113_171838.985.0.png	0.523945	1	1	388	379.31	2	Mercenaria
20181113_171921.485.0.png	0.642014	79.15	1	576	512	2	Mercenaria
20181113_164002.650.1.png	0.927549	7.77	1	292	397.66	2	Mercenaria

Admin - Set Reference Image

The Admin **Set Reference Image** option is available with the the **Manage Sets** and the **Manually Classify** options of the Control-Panel. This feature is used to either initially set a reference image or to change a reference image that is displayed in the Class Reference Image Panel.



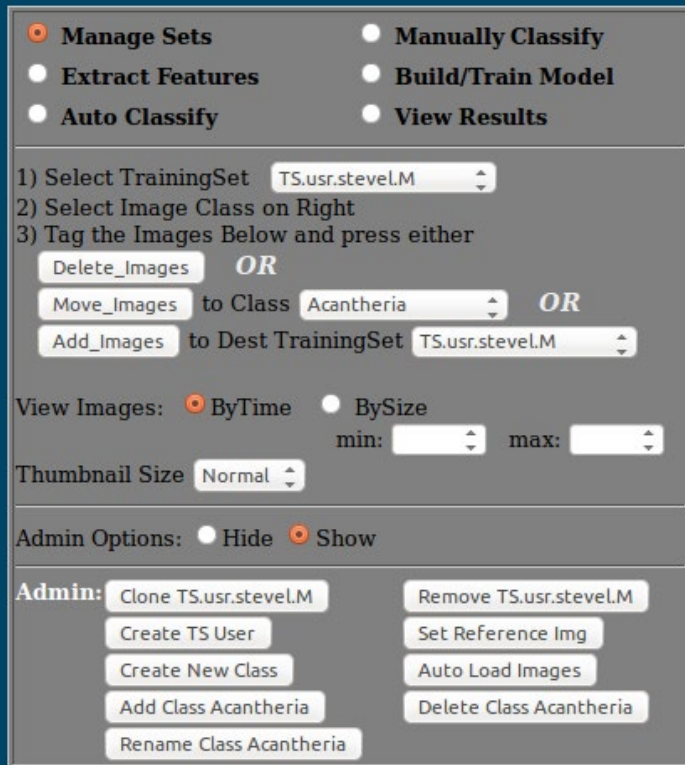
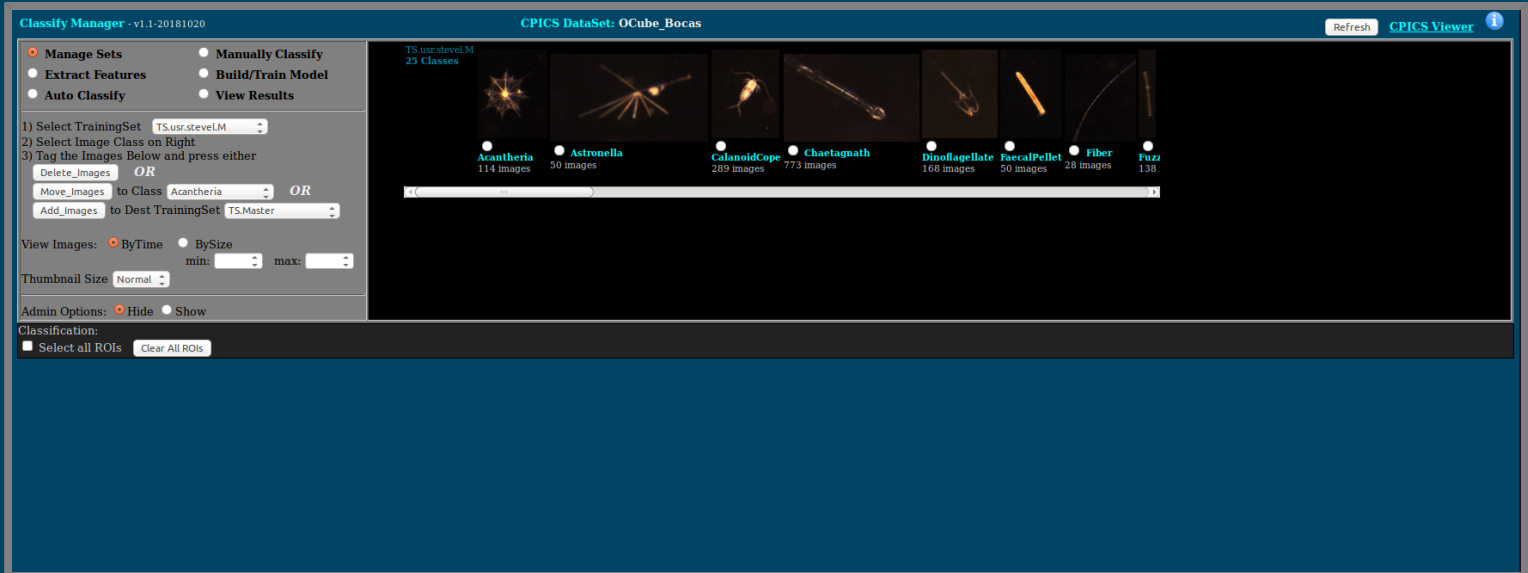
When **Manage Sets** is selected, the options in the Control-Panel will change to the options available for Manage Sets, and the Class Reference Image Panel will be updated to show the Reference Images for the Selected TrainingSet. To access the set reference image option from within the control-panel, you need to select the **Show** option from the Admin Options: **Hide** / **Show** choices. Then follow the control-panel sequences below.

1. Select the TrainingSet and #2 to Select an Image Class from the Class Reference Image Panel.
2. Once the class is selected, the images for that class are displayed in the Results panel (see image below).
3. Select the representative image to use as a reference image and then click the **Set Reference Img** button from the Admin options. The reference image in the Class reference Image Panel should now be updated.

Note you can also set the reference image similarly via from the **Manually Classify** option in the control-panel.

Admin - Auto Load Images

The Admin **Auto Load Images** option is available with the the **Manage Sets** options of the Control-Panel. This feature is used to automatically load already pre-classified images that reside in subdirectories (classnames) under the image directory. Note that these images are previous manually labelled by external software.



When **Manage Sets** is selected, the options in the Control-Panel will change to the options available for Manage Sets. Click on the **Show** option from the Admin Options to display the 'Auto Load Images' option. Then follow the control-panel sequences below.

1. Select the TrainingSet and #2 to Select an Image Class from the Class Reference Image Panel.
2. 'Auto Load Images'. The images will be copied over and the classnames will be available from manage sets. Press the 'Refresh' in the upper-right of the CPICS Viewer to reload the reference image window. Note that reference images will need to be set for each class unless those class references have already been set.

Admin - Clone Master

The Admin **Clone Master** option is available with the the **Manage Sets** options of the Control-Panel. This feature is used to clone a Master Training Set and creates a sequential numbered Subset Training Set. The Subset Training Set can then be managed independently of the Master Training Set. Note the Master Training Set can be cloned multiple times, and a new sequential numbered Subset will be created.

Manage Sets **Manually Classify**
 Build/Train Model **Classification Results**
 Auto Classify **View Products**

1) Select TrainingSet
2) Select Image Class on Right
3) Tag the Images Below and press either
 OR
 to Class *OR*
 to Dest TrainingSet

View Images: ByTime BySize (len pixels)
min: max:

Thumbnail Size

Admin Options: Hide Show

Admin:

When **Manage Sets** is selected, the options in the Control-Panel will change to the options available for Manage Sets. Click on the **Show** option from the Admin Options to display the 'Clone Master' option. Then follow the control-panel sequences below.

1. Select the Master TrainingSet
2. Press the 'Clone TS.Master'. The TS.Subset.1 training set should now be available in the Select TrainingSet list.

Admin - Create TS User

The Admin **Create TS User** option is available with the the **Manage Sets** options of the Control-Panel. This feature is used to create individual user training sets. User training sets have both a Master and sequential numbered Subset Training Sets. Note the User Master Training Set can be cloned multiple times, and a new sequential numbered User Subset will be created.

The screenshot shows the 'Manage Sets' section of the Admin Control Panel. It features several radio buttons for navigation: 'Manage Sets' (selected), 'Manually Classify', 'Build/Train Model', 'Classification Results', 'Auto Classify', and 'View Products'. Below these are instructions: '1) Select TrainingSet' (with a dropdown menu showing 'TS.Master'), '2) Select Image Class on Right', and '3) Tag the Images Below and press either'. There are three main actions: 'Delete_Images', 'Move_Images to Class' (with a dropdown menu showing 'argopecten'), and 'Add_Images to Dest TrainingSet' (with a dropdown menu showing 'TS.Master'). There are also 'View Images' options: 'ByTime' (selected) and 'BySize (len pixels)' with 'min' and 'max' sliders. A 'Thumbnail Size' dropdown is set to 'Normal'. At the bottom, 'Admin Options' are 'Hide' and 'Show' (selected). An 'Admin:' section contains buttons for 'Clone TS.Master', 'Remove TS.Master', 'Create TS User', 'Set Reference Img', 'Create New Class', and 'Auto Load Images'.

When **Manage Sets** is selected, the options in the Control-Panel will change to the options available for Manage Sets. Click on the **Show** option from the Admin Options to display the 'Create TS User' option. Press the 'Create TS User' option and a pop-up menu will appear for a username. Enter the user name (no spaces, only underscores allowed).

The TS.username.Master training set should now be available in the Select TrainingSet list.

Admin - Remove TS User

The Admin **Remove TS User** option is available with the the **Manage Sets** options of the Control-Panel. This feature is used to delete a TS User account.

The screenshot displays the Admin Control Panel interface. At the top, there are six radio button options: **Manage Sets** (selected), **Build/Train Model**, **Auto Classify**, **Manually Classify**, **Classification Results**, and **View Products**. Below these are three numbered instructions: 1) Select TrainingSet (with a dropdown menu showing 'TS.Master'), 2) Select Image Class on Right, and 3) Tag the Images Below and press either. There are three buttons: 'Delete_Images', 'Move_Images', and 'Add_Images'. The 'Move_Images' button is followed by 'to Class' and a dropdown menu showing 'argopecten'. The 'Add_Images' button is followed by 'to Dest TrainingSet' and a dropdown menu showing 'TS.Master'. Below these are 'View Images:' options: 'ByTime' (selected) and 'BySize (len pixels)'. The 'BySize' option has 'min:' and 'max:' labels with up/down arrow buttons. Below that is 'Thumbnail Size' with a dropdown menu showing 'Normal'. At the bottom, there are 'Admin Options:' with 'Hide' and 'Show' radio buttons. Finally, there is an 'Admin:' section with two columns of buttons: 'Clone TS.Master', 'Create TS User', 'Create New Class' on the left, and 'Remove TS.Master', 'Set Reference Img', 'Auto Load Images' on the right.

When **Manage Sets** is selected, the options in the Control-Panel will change to the options available for Manage Sets. Click on the **Show** option from the Admin Options to display the 'Remove TS User' option. Press the 'Remove TS User' option and a status message will appear on the bottom for confirmation.

The selected TS.username training set should now be removed and no longer available in the Select TrainingSet list.

Admin - Create Class

The Admin **Create Class** option is available with the the **Manage Sets** and **Manually Classify** options of the Control-Panel. This feature is used to create class names. Naming conventions should be consistent (such as capitalization) and not include any special characters.

The screenshot shows the Admin Control Panel for 'Create Class'. It features a top section with radio buttons for 'Manage Sets' (selected), 'Manually Classify', 'Build/Train Model', 'Classification Results', 'Auto Classify', and 'View Products'. Below this, there are three numbered instructions: 1) Select TrainingSet (TS.Master), 2) Select Image Class on Right, and 3) Tag the Images Below and press either. There are three buttons: 'Delete_Images', 'Move_Images', and 'Add_Images'. The 'Move_Images' button is selected, and it is followed by 'to Class' and a dropdown menu showing 'argopecten'. There is also an 'OR' button and another 'OR' button. The 'Add_Images' button is followed by 'to Dest TrainingSet' and a dropdown menu showing 'TS.Master'. Below this, there are two radio buttons for 'View Images': 'ByTime' (selected) and 'BySize (len pixels)'. There are also two spinners for 'min:' and 'max:'. Below this, there is a 'Thumbnail Size' dropdown menu showing 'Normal'. At the bottom, there are two radio buttons for 'Admin Options': 'Hide' and 'Show' (selected). Below this, there is an 'Admin:' section with six buttons: 'Clone TS.Master', 'Remove TS.Master', 'Create TS User', 'Set Reference Img', 'Create New Class', and 'Auto Load Images'.

When **Manage Sets** is selected, the options in the Control-Panel will change to the options available for Manage Sets. Click on the **Show** option from the Admin Options to display the 'Create Class' option. Press the 'Create Class' option and a pop-up menu will appear for a classname. Enter the classname (no spaces, only underscores allowed).

The classname should now be available in the reference image window. Refer to set reference image to set the reference image.

Admin - Rename Class

The Admin **Rename Class** option is available with the the **Manage Sets** and **Manually Classify** options of the Control-Panel. This feature is used to rename a class name. Warning, if a class needs to be renamed it should be done immediately after it has been created to avoid mismatch of names once models and results have been processed. Naming conventions should be consistent (such as capitalization) and not include any special characters.

The screenshot shows the Admin Control Panel interface. At the top, there are six radio button options: **Manage Sets** (selected), **Build/Train Model**, **Auto Classify**, **Manually Classify**, **Classification Results**, and **View Products**. Below these are three numbered instructions: 1) Select TrainingSet (dropdown: TS.Master), 2) Select Image Class on Right, and 3) Tag the Images Below and press either. There are three main action buttons: **Delete_Images**, **Move_Images** (with a dropdown for 'argopecten'), and **Add_Images** (with a dropdown for 'TS.Master'). Below these are 'View Images' options: **ByTime** (selected) and **BySize** (with 'len pixels' and 'min:'/'max:' sliders). There is a 'Thumbnail Size' dropdown set to 'Normal'. At the bottom, 'Admin Options' are set to 'Show'. The 'Admin:' section contains six buttons: **Clone TS.Master**, **Create TS User**, **Create New Class**, **Remove TS.Master**, **Set Reference Img**, and **Auto Load Images**.

When **Manage Sets** or **Manually Classify** is selected, the options in the Control-Panel will change to the options available. Click on the **Show** option from the Admin Options to display the available Admin options. Select a TrainingSet and then click on a ClassName from the Reference Image panel. The options will change in the Admin options to include the Rename Classname. Press the 'Rename Class' option and a pop-up menu will appear for a classname. Enter the classname (no spaces, only underscores allowed).

The classname should now be available in the reference image window. Refer to set reference image to set the reference image.

Admin - Delete Class

The Admin **Delete Class** option is available with the the **Manage Sets** and **Manually Classify** options of the Control-Panel. This feature is used to delete a class name.

The screenshot displays the Admin Control Panel interface. At the top, there are two columns of radio buttons. The first column has **Manage Sets** (selected), **Build/Train Model**, and **Auto Classify**. The second column has **Manually Classify**, **Classification Results**, and **View Products**. Below this, there are three numbered instructions: 1) Select TrainingSet (with a dropdown menu showing 'TS.Master'), 2) Select Image Class on Right, and 3) Tag the Images Below and press either. There are three buttons: 'Delete_Images', 'Move_Images to Class' (with a dropdown menu showing 'argopecten'), and 'Add_Images to Dest TrainingSet' (with a dropdown menu showing 'TS.Master'). Below these are 'View Images' options: 'ByTime' (selected) and 'BySize (len pixels)' (with 'min' and 'max' sliders). There is also a 'Thumbnail Size' dropdown menu set to 'Normal'. At the bottom, there are 'Admin Options' with 'Hide' and 'Show' (selected) radio buttons. Finally, there is an 'Admin:' section with six buttons: 'Clone TS.Master', 'Remove TS.Master', 'Create TS User', 'Set Reference Img', 'Create New Class', and 'Auto Load Images'.

When **Manage Sets** or **Manually Classify** is selected, the options in the Control-Panel will change to the options available. Click on the **Show** option from the Admin Options to display the available Admin options. Select a TrainingSet and then click on a ClassName from the Reference Image panel. The options will change in the Admin options to include the Delete Classname. Press the 'Delete Class' option and a pop-up menu will appear for a classname. Enter the classname (no spaces, only underscores allowed).

The classname should now be deleted and no longer available in the reference image window.