

Segmentation Using GIMP

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In-Class Activity: Segmentation Using GIMP

Introduction

- We will manually segment an image from the XCT dataset of Al-Zn solidification using GIMP
- In supervised machine learning, image-segmentation pairs are used for training

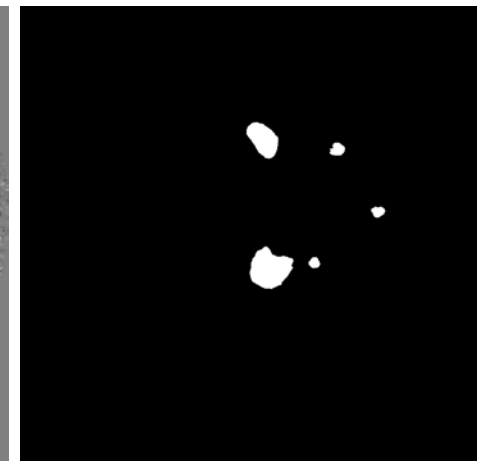
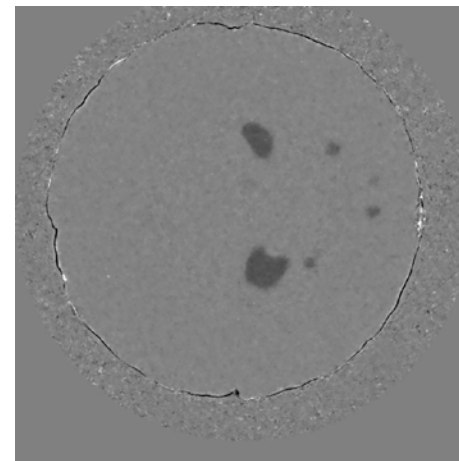
Segmentation steps

- Use the 852x852 pixel XCT image named “c54_ObjT1_z164.png” that is included with this lecture
- Download and install GIMP: www.gimp.org
- Open GIMP



XCT Image

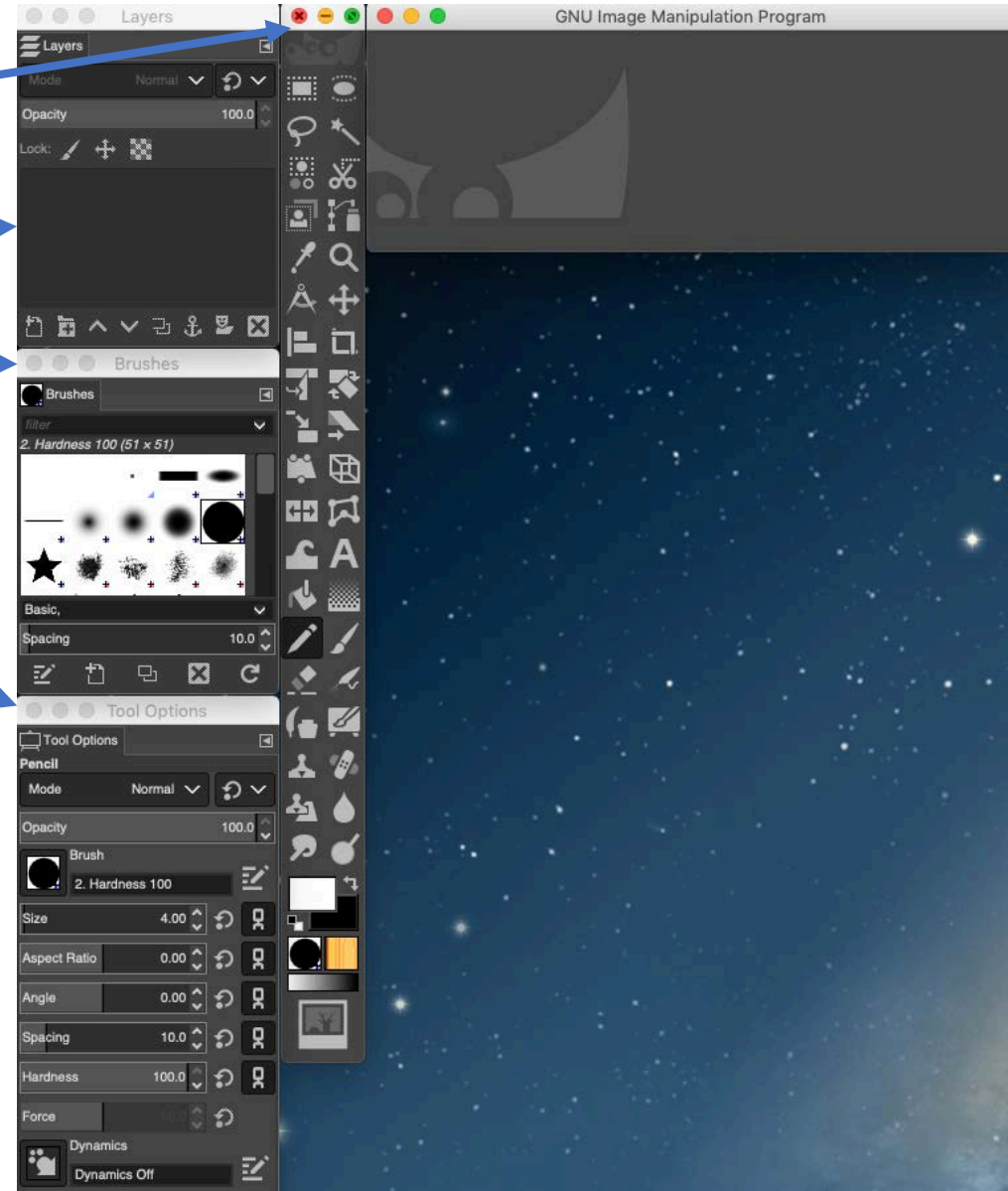
Segmentation



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Open the required toolboxes

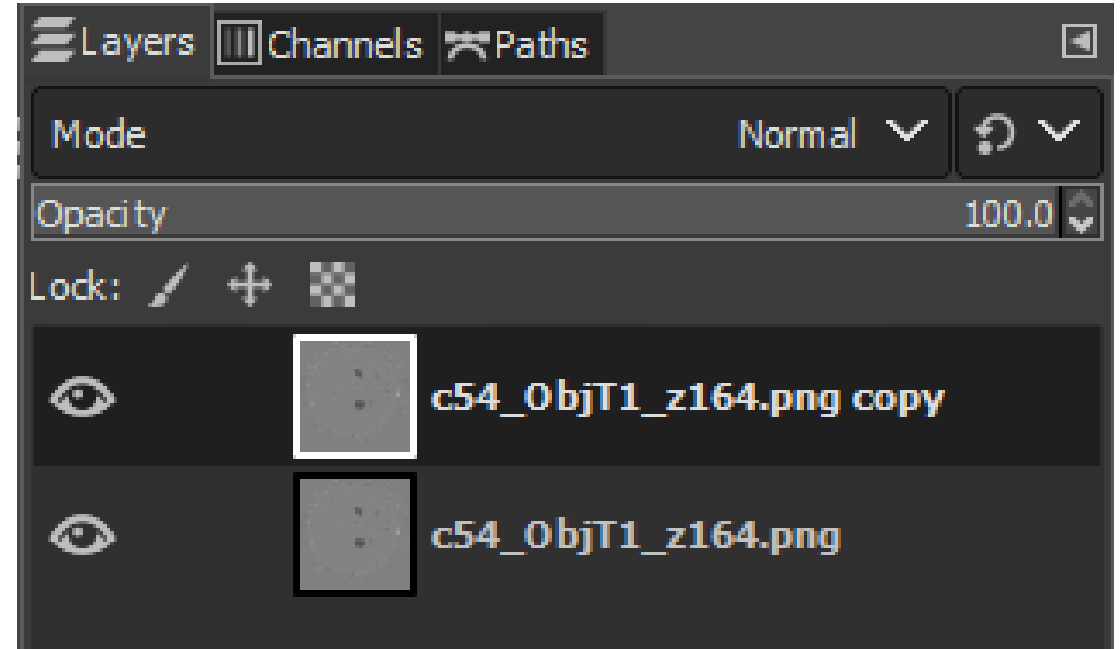
- Windows tab → New Toolboxes
- Windows tab → Dockable Dialogs →
 - Layers
 - Brushes
 - Tool Options



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Load the XCT image

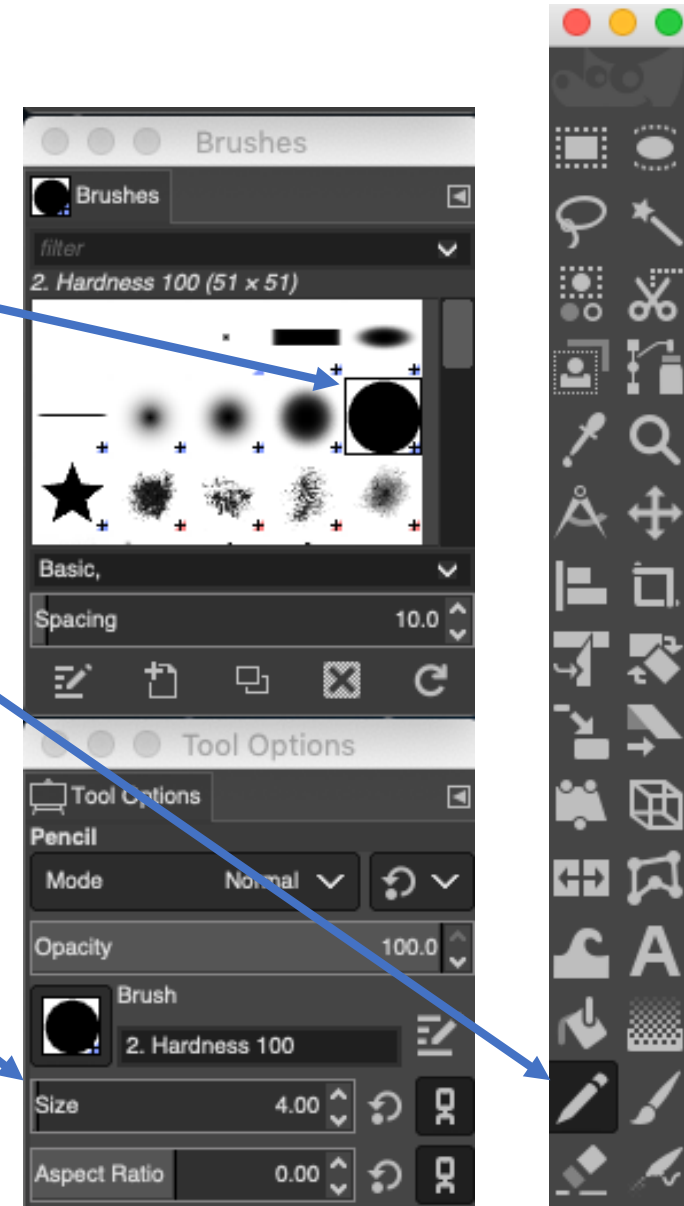
- Drag and drop the XCT image into the main “GNU Image Manipulation Program” window
- In the “Layers” window, right click on the XCT image and select “Duplicate Layer”. You should now have two layers
- Make sure the copy layer is selected



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Making the copy image black

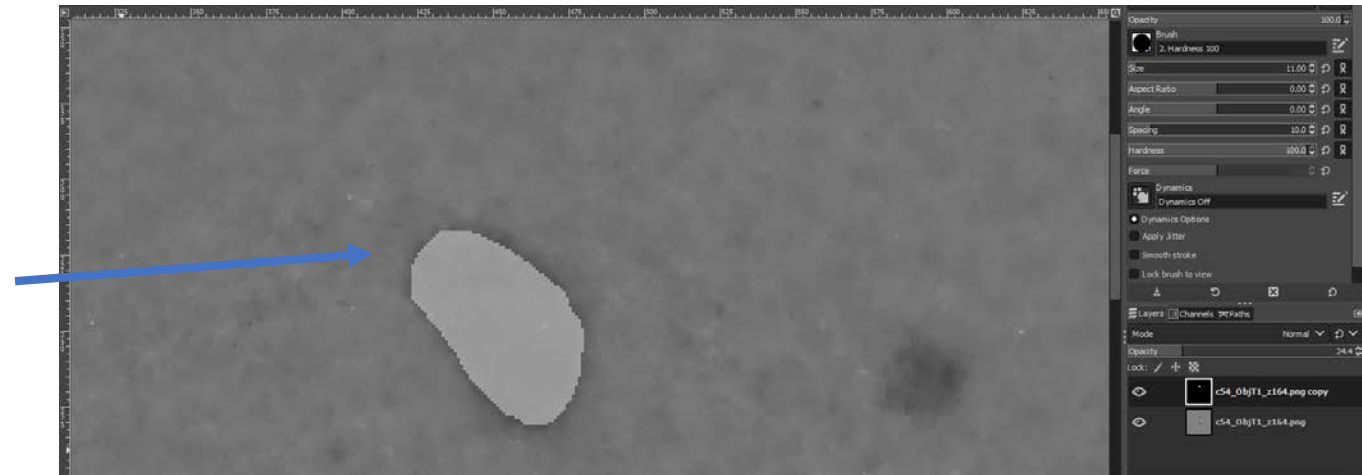
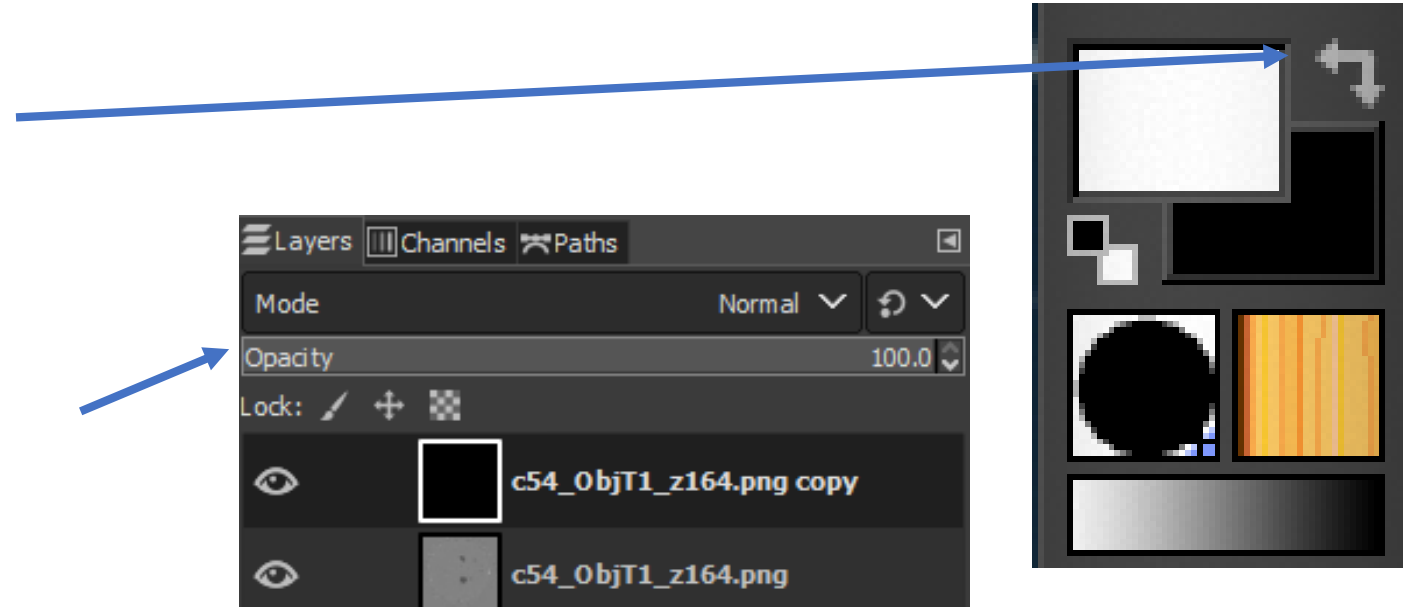
- From “Brushes”, select the circular brush with hardness 100
- From the “Main Toolbox”, click the pencil icon
 - You may have to right-click on “paintbrush” and select “pencil”
- From “Tool Options”, change the size of the brush
 - Change size to a very large number (e.g. 1144.00) to obtain a large circular brush
- Draw over the entire copy image to make it completely black



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Segment the dendrites

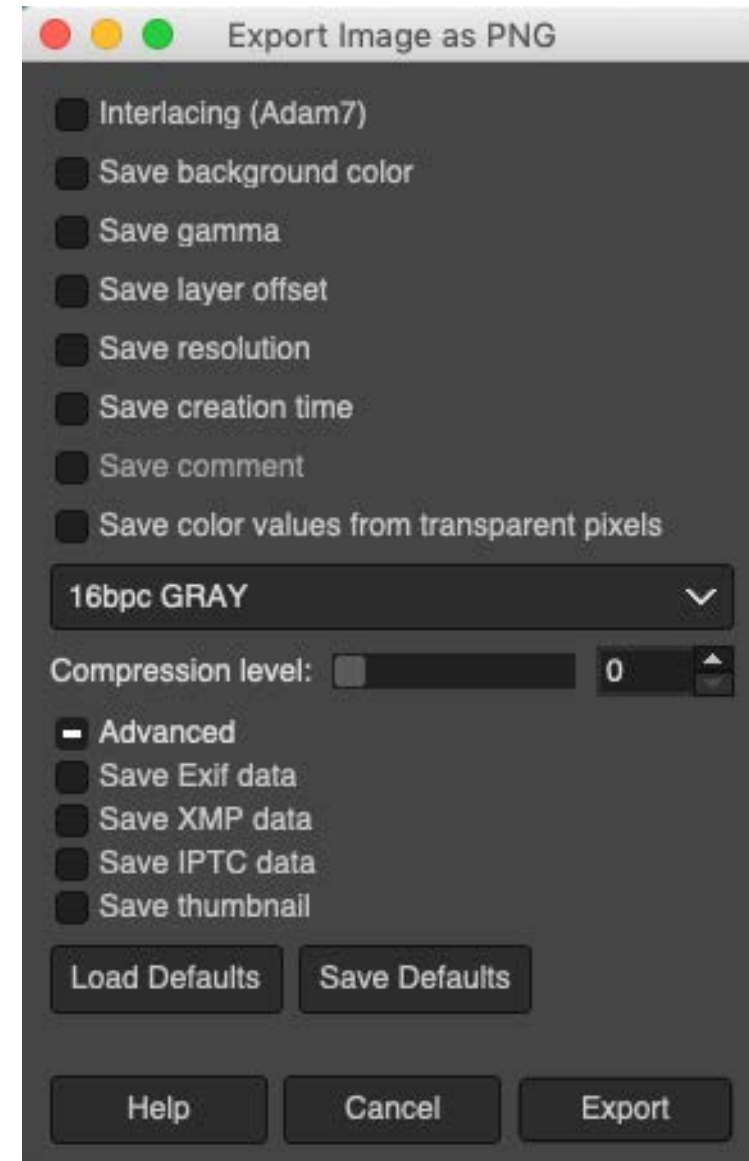
- Change the color to white using the toggle in the “main toolbox”, or by pressing X on your keyboard
- In the “Layers” toolbox, use the Opacity slider to visualize the dendrites
- Zoom in and out by holding the Control key and rotating your mouse wheel
- Color the dendrite pixels **white** using a smaller pencil tool (size ~10). Be as accurate as possible!



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Saving the segmentation

- Set the Opacity to 100
- File → Export As...
- The naming convention in machine learning is to keep the file name and add “_L” to signify that this is a labeled image
 - Name the segmentation
“c54_ObjT1_z164_L.png”
- Click Export
- In the “Export Image as PNG” pop-up, match these settings
- Click Export to save the segmentation



Conclusions

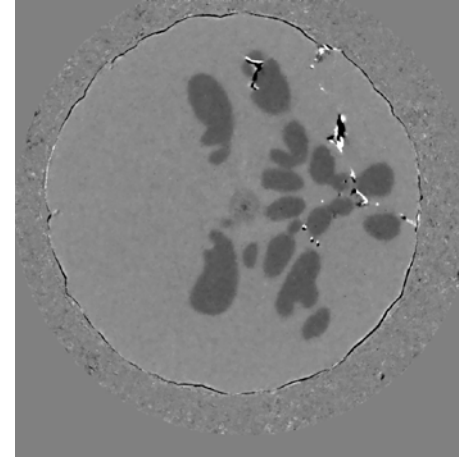
You should now be able to

- Understand the basics of x-ray computed tomography and the Al-Zn solidification dataset
- Describe why accurate segmentations are important in studying phase transformations
- Use the GIMP software to segment images

Next...

- One of the exercises in the laboratory is to manually segment two difficult images
- Next lecture will cover the fundamentals of neural networks

XCT Image



Segmentation

