# **Making predicted lesion masks**

## Before you begin, make sure:

* You are signed into Pikelab on AcademicFS
  + This can be accessed by requesting permission from Andre Robichaud: [andre.robichaud@ucalgary.ca](mailto:andre.robichaud@ucalgary.ca)
  + See lab wiki:
    - https://sites.google.com/site/qmrilab/tutorials/new-lab-members
  + Used to access the needed files. You do not need to copy to directory. The available files are listed further in this document under the Available Files section
    - Refer to available files section to see what files exist and where they are stored
    - Patient zip files
    - Post-Operative to Pre-Operative Transformation matrices
    - Pre-Operative to Intra-Operative Transformation matrices
    - Intra-Operative to Pre-Operagive Transformation matrices
    - Fiesta Images
    - T1 nifti files and
    - T1 lesion masks
* You are using a Mac (tested on OS 10.12.6 and OS 10.13.6)
* You have installed MATLAB (tested on 2018a and 2017b)
* Have xml2struct tool for MATLAB
  + <https://github.com/kndiaye/matlab/blob/master/xml2struct.m>
  + Use to get xml2struct command
* You have FSL installed
  + FSL 5.0.11 or 5.0.10
  + FLIRT v6.0
* Assumes that all scripts/functions are in same folder.

## Functions:

* extractNiftiZipInput2(cmd, zipfile, RigidTransformFile, outFile)
  + MATLAB function
  + Takes zip files and turns binary .raw files into three nifti images
    - Magnitude, Temperature, and Thermal Dose
* Volume3.command(patient 1, patient x)
  + BASH command
  + Processes the output from extractNiftiZipInput2 and produces predicted lesion masks and files for DSC analysis
  + Made to work on single patient or multiple patients
* genReport(patient 1, patient x)
  + BASH command
  + Takes the predicted lesion masks and DSC files and turns into .csv report

## How to process patients, including report generation

1. Open up MATLAB
2. Run extractNiftiZipInput2 for desired patient – See instructions below
3. Open up a terminal
4. Go the directory containing the functions
5. Run predictLesions.command for desired patients – See instructions below
6. Run genReport.command for desired patients – See instructions below

## extractNiftiZipInput2(cmd, zipfile, RigidTransformFile, outFile)

* Purpose
  + Produces the magnitude, temperature, and thermal dose maps for a patient
* Requires
  + Access to Pikelab
  + MATLAB 2018a or 2018b
* To use
  + Open matlab
  + Set working directory to folder with extractNiftiZipInput2.m file
  + Use function extractNiftiZipInput2 <cmd> <filepath> <filepath> <filepath to output directory>, see examples below
* Input – Input is set-up to autocomplete using the included functionSignatures.json file
  + Cmd – Tells MATLAB if you want temperature maps, magnitude maps, or both
  + Use the following keywords to define what nifti files you want output
    - ‘dose’ – Outputs only thermal dose maps
    - ‘temp’ – Outputs only temperature maps
    - ‘mag’ – Outputs only magnitude maps
    - ‘temp&mag’ – Outputs temperature and magnitude maps
    - ‘temp&dose’ – Outputs temperature and thermal dose maps
    - ‘mag&dose’ – Outputs magnitude and thermal dose maps
    - ‘all’ – Outputs temperature maps, magnitude maps, and thermal dose maps
  + **Z**ipfi**l**e – The patient file you want to process
    - Input as a filepath leading to zip file
      * Refer to Available data
  + RigidTransformFile – The matrix that converts files from intra-operative space to pre-operative space
    - Requires Pikelab
    - Generally taken from /Volumes/Pikelab/SPichardo
      * See Available Files section

outfile – The destination file where patient nifti files are to be saved

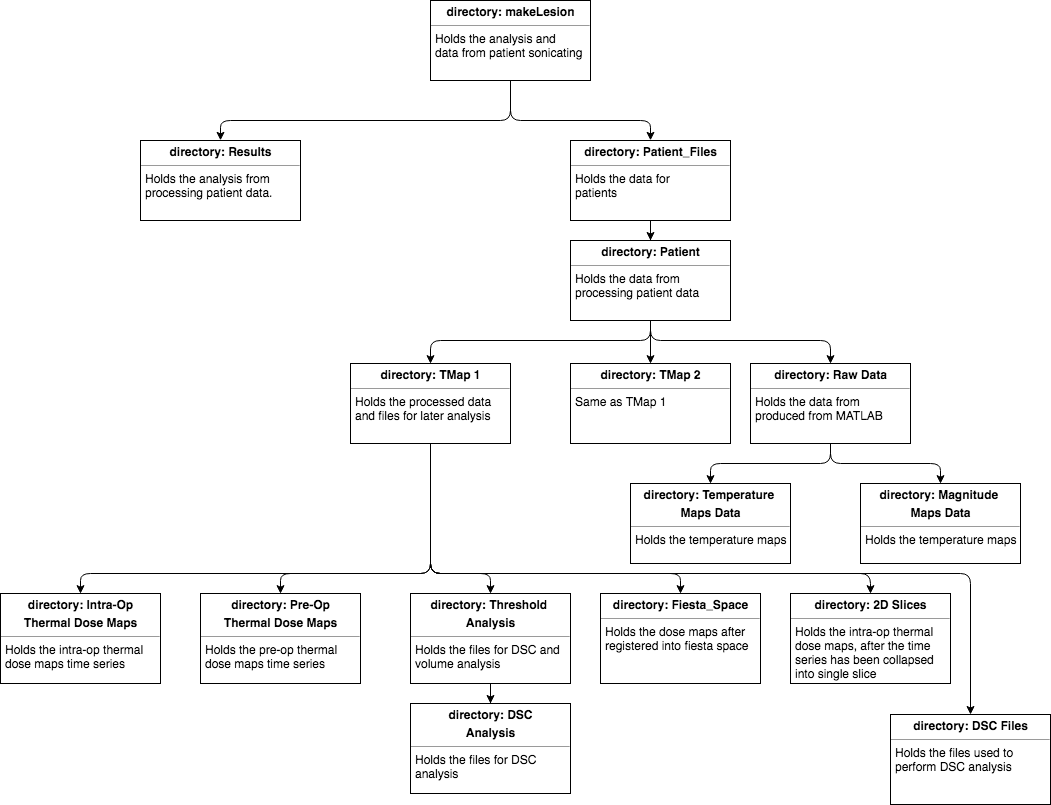
* + - Input as a filepath
    - Optional input, not recommended to use, will make processing and analysis difficult
* Outputs
  + Magnitude Maps – Default Names:
    - IntraOp-Magnitude#-Sonication\_#.nii.gz
    - PreOp-Magnitude#-Sonication\_#.nii.gz
  + Temperature Maps – Default Names:
    - IntraOp-Thermal#-Sonication\_#.nii.gz
    - PreOp-Thermal#-Sonication\_#.nii.gz
  + Thermal Dose Maps – Default Names:
    - IntraOp-CEM240-#-Sonication\_#.nii.gz
    - PreOp-CEM240-#-Sonication\_#.nii.gz
* Examples – Use within MATLAB
  + Extract: temperature maps, magnitude, maps, thermal dose maps. Output to default directory
    - extractNiftiZipInput2(‘all’,’ /Volumes/Pikelab/SPichardo/9002-May19 2017.zip’,’Volumes/Pikelab/SPichardo/9002-Intra-to-Pre.RAS’)
  + Extract temperature maps and thermal dose maps. Output to desktop
    - extractNiftiZipInput2(‘temp&dose’,’ /Volumes/Pikelab/SPichardo/9002-May19 2017.zip’, ’Volumes/Pikelab/SPichardo/9002-Intra-to-Pre.RAS’,’~/Desktop’)
  + Extract temperature maps only. Output to default directory
    - extractNiftiZipInput2(‘temp’,’/Volumes/Pikelab/SPichardo/9002-May19 2017.zip’, ’Volumes/Pikelab/SPichardo/9002-Intra-to-Pre.RAS’)
  + Extract all maps and save to other directory. Output to desktop
    - extractNiftiZipInput2(‘all’,’/Volumes/Pikelab/SPichardo/9002-May19 2017.zip’,’/Volumes/Pikelab/SPicarod/9002-Intra-to-Pre.RAS’,’~/Desktop/9002’)

## predictLesions (patient 1, patient x)

* Purpose:
  + Produced the predicted lesion maps using the thermal dose maps. Operates with two cases.
    - Case 1: Single patient. Input patient number
    - Case 2: Range of patients.
      * Will process patients from lowest number to highest, incrementally
  + Produces the Dice coefficient denominator and numerator niftis for genReport.
* Requires
  + The thermal dose map outputs from MATLAB
  + FSL 5.0.11 or 5.0.10
  + FLIRT v6.0
* To Use:
  + Open up a terminal
  + Change directory to directory with predectLesions.command
  + Type into terminal ./predictLesions.command <patient 1> <patient x>
* Input
  + Patient 1 – Lowest number patient or only patient wanting processing
    - Function will throw an error if not provided
  + Patient x (optional) – Highest number patient
* Outputs
  + Predicted lesion masks
    - Predicted-Lesion-Mask-###.nii.gz
  + DSC numerator and denominator files
    - DSC\_Denom\_###.nii.gz
    - DSC\_Num\_###.nii.gz
  + ### is the thermal dose threshold
* Examples
  + makeLesions user$ ./Volume3.command 9002
    - Will process patient 9002 only
  + makeLesions user$ ./Volume3.command 9004 9006
    - Will process patients 9004, 9005, and 9006
* Possible Thrown Errors:
  + Too many inputs
  + No input
  + The thermal dose maps are not available

## genReport (patient 1, patient x)

* Purpose:
  + Generates a report for volume and dice co-efficients for the patients required works for three cases:
    - Case 1: Generate a report from patients 9002 to 9021. Enter no arguments
    - Case 2: Generate a report for a single patient. Enter single argument
    - Case 3: Generate a report for a specific range of patients. Enter argument 1 then argument 2
* Requires:
  + FSL 5.0.11
  + That the file tree structure is followed
* Directions to use
  + Open up a terminal
  + Change directory to directory with genReport.command
  + Type into terminal ./genReport.command <patient 1> <patient x>
* Input
  + Patient 1 – Optional – First or only patient that is needed
  + Patient x – Optional – Final patient wanted processing
* Output
  + TotalReport.csv in analysis directory
* Examples
  + Case 1
    - makeLesions user$./genReport.command
  + Case 2
    - makeLesions user$ ./genReport.command 9010
  + Case 3
    - makeLesions user$ ./genReport.command 9003 9002
* Possible Thrown Errors
  + Too many inputs



**Available Data:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Patient** | **ZipFile** | **PostOp to PreOp Matrix** | **PreOp to IntraOp Matrix** | **IntraOp to PreOp Matrix** | **Fiesta** | **T1** | **T1 Mask** |
| **9001** | ✓ | ✓ | n/a | n/a | n/a | ✓ | ✓ |
| **9002** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9003** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9004** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9005** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9006** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9007** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9008** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9009** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9010** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9011** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9012** | n/a | n/a | n/a | n/a | n/a | ✓ | ✓ |
| **9013** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9014** | n/a | n/a | n/a | n/a | n/a | ✓ | ✓ |
| **9015** | n/a | n/a | n/a | n/a | n/a | ✓ | ✓ |
| **9016** | ✓ | n/a | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9017** | n/a | n/a | n/a | n/a | n/a | ✓ | ✓ |
| **9018** | n/a | n/a | n/a | n/a | n/a | ✓ | ✓ |
| **9019** | n/a | n/a | n/a | n/a | n/a | ✓ | ✓ |
| **9020** | n/a | n/a | n/a | n/a | ✓ | ✓ | ✓ |
| **9021** | ✓ | n/a | ✓ | ✓ | ✓ | ✓ | ✓ |
| **9022** | n/a | n/a | n/a | n/a | n/a | ✓ | ✓ |

* 9001
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9001 - May 26 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9001-RXYZ-IntraOp-To-PreTreat.RAS
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9001\_SH-11644/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9001\_SH-11644/anat/ T1\_lesion\_mask\_filled.nii.gz
* 9002
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9002 - June 15 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9002-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9002-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9002/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9002 Ra 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9002\_RA-11764/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9002\_RA-11764/anat/ T1\_lesion\_mask\_filled.nii.gz
* 9003
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9003 - July 25 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9003-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9003-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9003T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9003 Rb 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9003\_RB-12013/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9003\_RB-12013/anat/T1\_lesion\_mask\_filled.nii.gz
* 9004
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9004 - Aug 15 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9004-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9004-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9004/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9004 Ep 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9004\_EP-12126/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9004\_EP-12126/anat/T1\_lesion\_mask\_filled.nii.gz
* 9005
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET\_9005 - Jan 16 2018.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9005-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9005-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9005/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9005 Bg 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9005\_BG-13004/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9005\_BG-13004/anat/T1\_lesion\_mask\_filled.nii.gz
* 9006
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9006 - Sep 26 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9006-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9006-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9006/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9006 Eo 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9006\_EO-12389/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9006\_EO-12389/anat/T1\_lesion\_mask\_filled.nii.gz
* 9007
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9007 - Nov 28 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9007-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9007-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9007/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9007 Rb 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9007\_RB-12461/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9007\_RB-12461/anat/T1\_lesion\_mask\_filled.nii.gz
* 9008
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9008 - Oct 24 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9008-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9008-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9008/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9008 Jo 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9008\_JO-12613/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9008\_JO-12613/anat/T1\_lesion\_mask\_filled.nii.gz
* 9009
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9009- Dec 19 2017.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9009-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9009-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9009/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9009 Crb 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9009\_CRB-12609/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9009\_CRB-12609/anat/T1\_lesion\_mask\_filled.nii.gz
* 9010
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET-9010 - March 20 2018.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9010-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9010-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9002/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9010 Rr 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9010\_RR-13130/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9010\_RR-13130/anat/T1\_lesion\_mask\_filled.nii.gz
* 9011
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9011 - June 19 2018.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9011-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9011-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9011/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9011 Bb 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9011\_BB-13042/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9011\_BB-13042/anat/T1\_lesion\_mask\_filled.nii.gz
* 9012
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9012\_AT-13418/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9012\_AT-13418/anat/T1\_lesion\_mask\_filled.nii.gz
* 9013
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9013 - Apr 17 2018.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9013-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9013-PreTreat-To-IntraOp.MAT
  + Post-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9013/T1\_day1\_2\_T2\_pre.mat
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9013 Jd 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9013\_JD-13455/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9013\_JD-13455/anat/T1\_lesion\_mask\_filled.nii.gz
* 9014
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9014\_DM-13068/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9014\_DM-13068/anat/T1\_lesion\_mask\_filled.nii.gz
* 9015
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9015-DW-13582/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9015-DW-13582/anat/T1\_lesion\_mask\_filled.nii.gz
* 9016
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9016 - Aug 2nd 2018.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9016-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9016-PreTreat-To-IntraOp.MAT
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9016 Eb 19000101/study/3D FIESTA.nii.gz
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9016\_EB-13634/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9016\_EB-13634/anat/T1\_lesion\_mask\_filled.nii.gz
* 9017
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9017\_DB-13822/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9017\_DB-13822/anat/T1\_lesion\_mask\_filled.nii.gz
* 9018
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9018\_BK-13858/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9018\_BK-13858/anat/T1\_lesion\_mask\_filled.nii.gz
* 9019
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9019\_TB-14038/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9019\_TB-14038/anat/T1\_lesion\_mask\_filled.nii.gz
* 9020
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9020\_JL-14121/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9020\_JL-14121/anat/T1\_lesion\_mask\_filled.nii.gz
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9020 Jl 19000101/study/3D FIESTA.nii.gz
* 9021
  + Zipfile
    - /Volumes/Pikelab/SPichardo/ET 9021 - Aug 2nd 2018.zip
  + Intra-Operative to Pre-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9021-RXYZ-IntraOp-To-PreTreat.RAS
  + Pre-Operative to Intra-Operative Transformation Matrix
    - /Volumes/Pikelab/SPichardo/9021-PreTreat-To-IntraOp.MAT
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9021\_WM-14127/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9021\_WM-14127/anat/T1\_lesion\_mask\_filled.nii.gz
  + Fiesta
    - /Volumes/Pikelab/SPichardo/input/9021 Wm 19000101/study/3D FIESTA.nii.gz
* 9022
  + T1
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9022\_JG-14290/anat/T1.nii.gz
  + T1 Lesion Mask
    - /Volumes/Pikelab/MRGFUS-shared/analysis\_lesion\_masks/9022\_JG-14290/anat/T1\_lesion\_mask\_filled.nii.gz

## Updates:

* V3
  + Modified extractNiftiZipInput
    - Removed cmd2 input argument.
    - Added keywords for cmd argument.
    - Modified functionSignatures.json to reflect this change.
* V2
  + Modified extractNiftiZipInput
    - Swap position of RigidTransformFile and outFile
    - outFile now has default set to maintain file tree
    - outFile is now optional
    - Removed code line that moved files that didn’t need to exist
  + Modified predictLesions
    - Merged sub functions getSagittal and getFiles into getFiles
      * Now all files are placed into their folders in one function
    - Merged the DSC and Volume subfunctions
      * DSC files are made within the volume function
      * Easier to redefine threshold limits