In [3]:

```
import numpy as np
import pandas as pd
import os
import nibabel as nib
import pydicom as dicom
import matplotlib.pyplot as plt
```

Convert nii file to txt file and plot ¶

In [4]:

```
HOME = 'D:\\results0622\\Results\\'
subdirs = ['ROISignals_FunImgWCF']
```

In [5]:

```
for subdir in subdirs:
    home = HOME + subdir
    for fname in os.listdir(home):
        if fname.split('.')[-1] == 'nii':
            fp = home + '\\' + fname
            f = nib.load(fp)
            f_data = f.get_fdata()
            dim_0, dim_1, dim_2 = f.header.get_data_shape()
            N = dim_0 * dim_1 * dim_2
            np.savetxt(home + '\\' + fname.split('.')[0] + '.txt',
                       f_data.reshape(N,))
```

In [16]:

```
# a = np.array([

#               [[0,1,2],
#                [3,4,5]],

#               [[6,7,8],
#                [9,10,11,]],

#               [[12,13,14],
#                [15,16,17]],

#               [[18,19,20],
#                [21,22,23]]

#               ])

# print(a.shape)
# print(a.reshape(24,))
```

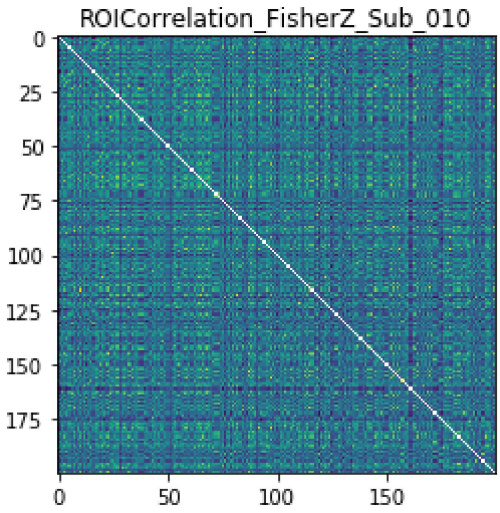
```
(4, 2, 3)
[ 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23]
```

In [16]:

```
subjects = ['Sub_001','Sub_002','Sub_003','Sub_004','Sub_005','Sub_006','Sub_007','Sub_
008','Sub_009','Sub_010',]
p = r'D:\results0622\Results\ROISignals_FunImgWCF'
```

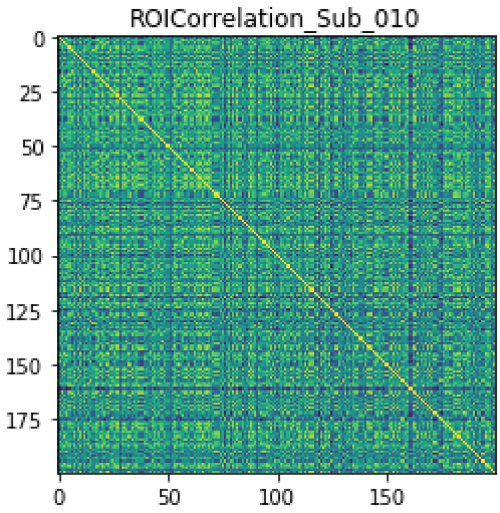
In [17]:

```
for i in subjects:
    matrix = np.loadtxt(p + '\\ROICorrelation_FisherZ_'+ i +'.txt')
    plt.imshow(matrix)
    plt.title('ROICorrelation_FisherZ_' + i)
    plt.savefig(p + '\\ROICorrelation_FisherZ_' + i +'.png')
```



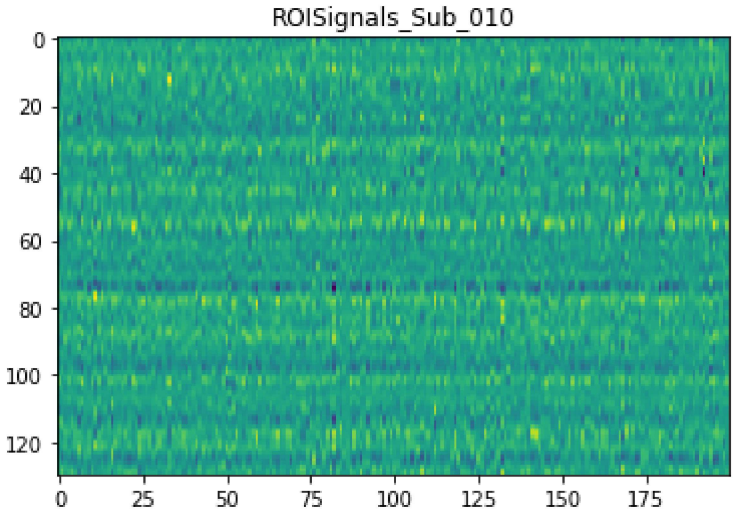
In [18]:

```
for i in subjects:
    matrix = np.loadtxt(p + '\\ROICorrelation_'+ i +'.txt')
    plt.imshow(matrix)
    plt.title('ROICorrelation_' + i)
    plt.savefig(p + '\\ROICorrelation_' + i +'.png')
```



In [19]:

```
for i in subjects:
    matrix = np.loadtxt(p + '\\ROISignals_'+ i +'.txt')
    plt.imshow(matrix)
    plt.title('ROISignals_' + i)
    plt.savefig(p + '\\ROISignals_' + i +'.png')
```



In [89]:

```
for i in subjects:
    p = r'D:\result0620\Results\FunImgARFCB_ROISignals\ROISignals_' + i + '.txt'
    s = np.loadtxt(p)
    print('ROISignals_' + i + ': ', s.shape)
for i in subjects:
    p = r'D:\result0620\Results\FunImgARFCB_ROISignals\ROICorrelation_' + i + '.txt'
    s = np.loadtxt(p)
    print('ROICorrelation_' + i + ': ', s.shape)
for i in subjects:
    p = r'D:\result0620\Results\FunImgARFCB_ROISignals\ROICorrelation_FisherZ_' + i +
'.txt'
    s = np.loadtxt(p)
    print('ROICorrelation_FisherZ_' + i + ': ', s.shape)
```

```
ROISignals_Sub_001:  (83, 116)
ROISignals_Sub_002:  (107, 116)
ROISignals_Sub_003:  (124, 116)
ROISignals_Sub_004:  (121, 116)
ROISignals_Sub_005:  (89, 116)
ROISignals_Sub_006:  (86, 116)
ROISignals_Sub_007:  (130, 116)
ROISignals_Sub_008:  (116, 116)
ROISignals_Sub_009:  (116, 116)
ROISignals_Sub_010:  (91, 116)
ROICorrelation_Sub_001:  (116, 116)
ROICorrelation_Sub_002:  (116, 116)
ROICorrelation_Sub_003:  (116, 116)
ROICorrelation_Sub_004:  (116, 116)
ROICorrelation_Sub_005:  (116, 116)
ROICorrelation_Sub_006:  (116, 116)
ROICorrelation_Sub_007:  (116, 116)
ROICorrelation_Sub_008:  (116, 116)
ROICorrelation_Sub_009:  (116, 116)
ROICorrelation_Sub_010:  (116, 116)
ROICorrelation_FisherZ_Sub_001:  (116, 116)
ROICorrelation_FisherZ_Sub_002:  (116, 116)
ROICorrelation_FisherZ_Sub_003:  (116, 116)
ROICorrelation_FisherZ_Sub_004:  (116, 116)
ROICorrelation_FisherZ_Sub_005:  (116, 116)
ROICorrelation_FisherZ_Sub_006:  (116, 116)
ROICorrelation_FisherZ_Sub_007:  (116, 116)
ROICorrelation_FisherZ_Sub_008:  (116, 116)
ROICorrelation_FisherZ_Sub_009:  (116, 116)
ROICorrelation_FisherZ_Sub_010:  (116, 116)
```

Version check

In [10]:

```
dicom.__version__
```

Out[10]:

```
'2.0.0'
```

In [11]:

```
nib.__version__
```

Out[11]:

```
'3.1.0'
```

NII file

In [20]:

```
path = r'D:\results0622\Results\fALFF_FunImgWC'
img = nib.load(path + '\\zfALFFMap_Sub_001.nii')
img_data = img.get_fdata()
print(img.header.get_data_shape())
img_data[6, 29, 21]
```

```
(61, 73, 61)
```

Out[20]:

```
0.6847445964813232
```

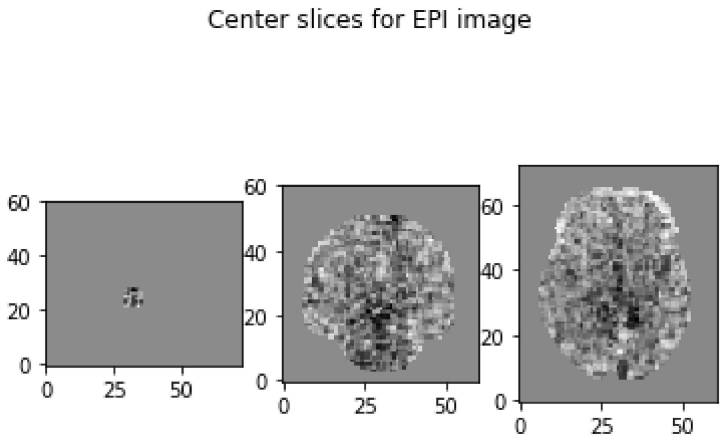
In [22]:

```
def show_slices(slices):
    fig,axes = plt.subplots(1,len(slices))
    for i,slice in enumerate(slices):
        axes[i].imshow(slice.T,cmap="gray",origin="lower")

slice_0 = img_data[6, :, :]
slice_1 = img_data[:, 29, :]
slice_2 = img_data[:, :, 21]
show_slices([slice_0, slice_1, slice_2])
plt.suptitle("Center slices for EPI image")
```

Out[22]:

```
Text(0.5, 0.98, 'Center slices for EPI image')
```



In [ ]:

DCM file

In [13]:

```
img_hcy = dicom.dcmread(path + '\\FunRaw\\Sub_001\\000001.dcm')
print(img_hcy)
```

```
Dataset.file_meta -------------------------------
(0002, 0000) File Meta Information Group Length  UL: 210
(0002, 0001) File Meta Information Version       OB: b'\x00\x01'
(0002, 0002) Media Storage SOP Class UID         UI: MR Image Storage
(0002, 0003) Media Storage SOP Instance UID      UI: 1.3.6.1.4.1.9590.100.
1.2.374667898811965955833216997681997868070
(0002, 0010) Transfer Syntax UID                 UI: Explicit VR Little En
dian
(0002, 0012) Implementation Class UID            UI: 1.3.6.1.4.1.9590.100.
1.3.100.9.4
(0002, 0013) Implementation Version Name         SH: 'MATLAB IPT 9.4'
-------------------------------------------------
(0008, 0005) Specific Character Set              CS: 'ISO_IR 100'
(0008, 0008) Image Type                          CS: ['ORIGINAL', 'PRIMAR
Y', 'M_FFE', 'M', 'FFE']
(0008, 0013) Instance Creation Time              TM: '160318'
(0008, 0014) Instance Creator UID                UI: 2.16.124.113543.6006.
99.3051493601938435224
(0008, 0016) SOP Class UID                       UI: MR Image Storage
(0008, 0018) SOP Instance UID                    UI: 1.3.6.1.4.1.9590.100.
1.2.374667898811965955833216997681997868070
(0008, 0020) Study Date                          DA: '20121114'
(0008, 0021) Series Date                         DA: '20121114'
(0008, 0022) Acquisition Date                    DA: '20121114'
(0008, 0023) Content Date                        DA: '20121114'
(0008, 0030) Study Time                          TM: '151828.000000'
(0008, 0031) Series Time                         TM: '153744.79000'
(0008, 0032) Acquisition Time                    TM: '153744.79'
(0008, 0033) Content Time                        TM: '153744.79'
(0008, 0060) Modality                            CS: 'MR'
(0008, 0070) Manufacturer                        LO: 'Philips Medical Syst
ems'
(0008, 0080) Institution Name                    LO: 'OHSU MRI3'
(0008, 0090) Referring Physician's Name          PN: ''
(0008, 1030) Study Description                   LO: 'MRI BRAIN W/O CONTRA
ST'
(0008, 1032)  Procedure Code Sequence   1 item(s) ----
   (0008, 010b) Context Group Extension Flag        CS: 'N'
   ---------
(0008, 103e) Series Description                  LO: 'Resting State fMRI'
(0008, 1060) Name of Physician(s) Reading Study  PN: ''
(0008, 1070) Operators' Name                     PN: ''
(0008, 1080) Admitting Diagnoses Description     LO: ''
(0008, 1090) Manufacturer's Model Name           LO: 'Intera'
(0008, 1110)  Referenced Study Sequence   1 item(s) ----
   (0008, 1150) Referenced SOP Class UID            UI: 2.16.124.113543.60
06.99.06282883507200984267
   (0008, 1155) Referenced SOP Instance UID         UI: 2.16.124.113543.60
06.99.6893832446125167224
   ---------
(0008, 1111)  Referenced Performed Procedure Step Sequence   1 item(s) ---
-
   (0008, 0013) Instance Creation Time              TM: '160323'
   (0008, 0014) Instance Creator UID                UI: 2.16.124.113543.60
06.99.3051493601938435224
   (0008, 1150) Referenced SOP Class UID            UI: 2.16.124.113543.60
06.99.06279230344779385614
   (0008, 1155) Referenced SOP Instance UID         UI: 2.16.124.113543.60
06.99.03779990973132413033
   (0020, 0013) Instance Number                     IS: "0"
   (2005, 1406) Private tag data                    UN: b'\x00\x00'
```

```
   ---------
(0008, 1120)  Referenced Patient Sequence   1 item(s) ----
   (0008, 1150) Referenced SOP Class UID            UI: 2.16.124.113543.60
06.99.06278070223545294329
   (0008, 1155) Referenced SOP Instance UID         UI: 2.16.124.113543.60
06.99.4513944610792084839
   ---------
(0008, 1140)  Referenced Image Sequence   3 item(s) ----
   (0008, 1150) Referenced SOP Class UID            UI: 2.16.124.113543.60
06.99.4332567756067262732
   (0008, 1155) Referenced SOP Instance UID         UI: 2.16.124.113543.60
06.99.03069736621497723066
   ---------
   (0008, 1150) Referenced SOP Class UID            UI: 2.16.124.113543.60
06.99.4332567756067262732
   (0008, 1155) Referenced SOP Instance UID         UI: 2.16.124.113543.60
06.99.03101131755547137486
   ---------
   (0008, 1150) Referenced SOP Class UID            UI: 2.16.124.113543.60
06.99.4332567756067262732
   (0008, 1155) Referenced SOP Instance UID         UI: 2.16.124.113543.60
06.99.03027800815908766954
   ---------
(0010, 0010) Patient's Name                      PN: '00000001'
(0010, 0020) Patient ID                          LO: '00000001'
(0010, 0030) Patient's Birth Date                DA: ''
(0010, 0040) Patient's Sex                       CS: 'F'
(0010, 1010) Patient's Age                       AS: '075Y'
(0010, 1030) Patient's Weight                    DS: "80.0"
(0010, 21c0) Pregnancy Status                    US: 4
(0018, 0015) Body Part Examined                  CS: 'BRAIN'
(0018, 0020) Scanning Sequence                   CS: 'GR'
(0018, 0021) Sequence Variant                    CS: 'SK'
(0018, 0022) Scan Options                        CS: 'FS'
(0018, 0023) MR Acquisition Type                 CS: '2D'
(0018, 0024) Sequence Name                       SH: ''
(0018, 0050) Slice Thickness                     DS: "3.313"
(0018, 0080) Repetition Time                     DS: "3000.99829101562"
(0018, 0081) Echo Time                           DS: "30.001"
(0018, 0083) Number of Averages                  DS: "1.0"
(0018, 0084) Imaging Frequency                   DS: "127.778973"
(0018, 0085) Imaged Nucleus                      SH: '1H'
(0018, 0086) Echo Number(s)                      IS: "1"
(0018, 0087) Magnetic Field Strength             DS: "3.0"
(0018, 0088) Spacing Between Slices              DS: "3.313"
(0018, 0089) Number of Phase Encoding Steps      IS: "63"
(0018, 0091) Echo Train Length                   IS: "59"
(0018, 0093) Percent Sampling                    DS: "100.0"
(0018, 0094) Percent Phase Field of View         DS: "93.75"
(0018, 0095) Pixel Bandwidth                     DS: "2110.0"
(0018, 1000) Device Serial Number                LO: '4sEr9bzYud6E'
(0018, 1020) Software Versions                   LO: ['3.2.1', '3.2.1.1']
(0018, 1030) Protocol Name                       LO: 'RestingStatefMRI'
(0018, 1060) Trigger Time                        DS: "0.0"
(0018, 1081) Low R-R Value                       IS: "0"
(0018, 1082) High R-R Value                      IS: "0"
(0018, 1083) Intervals Acquired                  IS: "0"
(0018, 1084) Intervals Rejected                  IS: "0"
(0018, 1088) Heart Rate                          IS: "0"
(0018, 1100) Reconstruction Diameter             DS: "212.0"
(0018, 1250) Receive Coil Name                   SH: 'SENSE-Head-8'
```

```
(0018, 1251) Transmit Coil Name                  SH: 'B'
(0018, 1310) Acquisition Matrix                  US: [64, 0, 0, 63]
(0018, 1312) In-plane Phase Encoding Direction   CS: 'COL'
(0018, 1314) Flip Angle                          DS: "80.0"
(0018, 1316) SAR                                 DS: "0.06301491707563"
(0018, 1318) dB/dt                               DS: "45.3371336787068"
(0018, 5100) Patient Position                    CS: 'HFS'
(0018, 9073) Acquisition Duration                FD: 423.1409912109375
(0018, 9087) Diffusion b-value                   FD: 0.0
(0018, 9089) Diffusion Gradient Orientation      FD: [0.0, 0.0, 0.0]
(0020, 000d) Study Instance UID                  UI: 2.16.124.113543.6006.
99.6893832446125167224
(0020, 000e) Series Instance UID                 UI: 2.16.124.113543.6006.
99.03075240958158977453
(0020, 0010) Study ID                            SH: '16904854'
(0020, 0011) Series Number                       IS: "501"
(0020, 0012) Acquisition Number                  IS: "5"
(0020, 0013) Instance Number                     IS: "1"
(0020, 0032) Image Position (Patient)            DS: [-104.74581944942, -1
02.64433813095, -47.136009216308]
(0020, 0037) Image Orientation (Patient)         DS: [1, 0, 0, 0, 1, 0]
(0020, 0052) Frame of Reference UID              UI: 2.16.124.113543.6006.
99.02322024500391392010
(0020, 0100) Temporal Position Identifier        IS: "1"
(0020, 0105) Number of Temporal Positions        IS: "140"
(0020, 1040) Position Reference Indicator        LO: ''
(0020, 1041) Slice Location                      DS: "0.0"
(0028, 0002) Samples per Pixel                   US: 1
(0028, 0004) Photometric Interpretation          CS: 'MONOCHROME2'
(0028, 0010) Rows                                US: 64
(0028, 0011) Columns                             US: 64
(0028, 0030) Pixel Spacing                       DS: [3.3125, 3.3125]
(0028, 0100) Bits Allocated                      US: 16
(0028, 0101) Bits Stored                         US: 16
(0028, 0102) High Bit                            US: 15
(0028, 0103) Pixel Representation                US: 0
(0028, 0106) Smallest Image Pixel Value          US: 0
(0028, 0107) Largest Image Pixel Value           US: 1638
(0028, 1050) Window Center                       DS: "865.25"
(0028, 1051) Window Width                        DS: "1504.09"
(0028, 2110) Lossy Image Compression             CS: '00'
(0032, 000a) Study Status ID                     CS: 'READ'
(0032, 000c) Study Priority ID                   CS: 'LOW'
(0040, 0241) Performed Station AE Title          AE: 'MRI3'
(0040, 0245) Performed Procedure Step Start Time TM: '151828'
(0040, 0251) Performed Procedure Step End Time   TM: '151828'
(0040, 0260)  Performed Protocol Code Sequence   1 item(s) ----
   (0008, 010b) Context Group Extension Flag        CS: 'N'
   ---------
(0040, 0275)  Request Attributes Sequence   1 item(s) ----

   ---------
(0040, 0321)  Film Consumption Sequence   0 item(s) ----
(0040, 9096)  Real World Value Mapping Sequence   1 item(s) ----
   (0040, 9224) Real World Value Intercept          FD: 0.0
   (0040, 9225) Real World Value Slope              FD: 1.2366300366300367
   ---------
(2050, 0020) Presentation LUT Shape              CS: 'IDENTITY'
(7fe0, 0010) Pixel Data                          OW: Array of 8192 element
s
```

In [ ]:

```

```

In [ ]:

```

```

In [ ]:

```

```