

# fMRI Image Acquisition and Analyses Course with SPM and ICA

---

## September 9-11, 2026

---

Course Faculty:

**Vince D. Calhoun, Ph.D.**

TReNDS Center  
Georgia State/Georgia Tech/Emory

**Kent A. Kiehl, Ph.D.**

The Mind Research Network (MRN) &  
The University of New Mexico  
&

**Tor Wager, Ph.D.**

Dartmouth College

---

**Location:** Virtual (Eastern Time Zone; NYC)

---

Course website:

<https://sites.google.com/dartmouth.edu/mind-fmri-course/home>

[fMRI Course shared Dropbox folder](#) (restricted)

---

**Day 1: Wednesday, September 9th**

---

| Lecture | Start    | Duration | Description                                                                                    | Instructor(s)         |
|---------|----------|----------|------------------------------------------------------------------------------------------------|-----------------------|
|         | 8:00 am  | 0:30     | Course Introduction                                                                            | Kiehl, Calhoun, Wager |
| 1.1     | 8:30 am  | 1:00     | Virtual tours of MRI and acquisition of data, stimulus presentation, behavioral monitoring     | Kiehl                 |
|         | 9:30 am  | 0:15     | Break                                                                                          |                       |
|         | 9:45 am  | 0:15     | Check download and tools install:                                                              |                       |
| 1.2     | 10:00 am | 1:00     | Dropbox folder with data<br>fMRI Physics, Pulse Sequences, and Reconstruction                  | Calhoun               |
|         | 11:00 am | 0:20     | Install: SPM, Toolboxes                                                                        | Wager                 |
| 1.3     | 11:20 am | 0:10     | Matlab basics and orientation                                                                  |                       |
| 1.4     | 11:30 am | 0:30     | Reproducible analysis: Coding and data management practices<br>CANLab tools install check      | Wager                 |
|         | 12:00 pm | 0:30     | Lunch Break                                                                                    |                       |
| 1.5     | 12:30 pm | 1:00     | Intro to SPM:                                                                                  | Kiehl                 |
| 1.6     | 1:30 pm  | 1:00     | Data Checking, Reorienting Data<br>Spatial Preprocessing:<br>Realignment, Slice Timing, Unwarp | Kiehl                 |
|         | 2:30 pm  | 0:30     | Break                                                                                          |                       |
| 1.7     | 3:00 pm  | 1:00     | Preprocessing: Coregistration, Normalization, Smoothing                                        | Kiehl                 |
| 1.8     | 4:00 pm  | 1:00     | General Linear Model I:<br>Principles and fMRI                                                 | Wager                 |
|         | 5:00 pm  | 0:30     | <a href="#">CANlab interactive tools: Basic analysis and visualization</a>                     | Wager                 |
|         | 5:30 pm  | 0:30     | Question & Answer Session                                                                      | Kiehl, Wager, Calhoun |
|         | 6:00 pm  |          | Adjourn                                                                                        |                       |

---

---

## Day 2: Thursday, September 10th

---

| Lecture | Start    | Duration | Description                                                                       | Instructor(s)         |
|---------|----------|----------|-----------------------------------------------------------------------------------|-----------------------|
|         | 8:00 am  | 0:30     | Review from Day 1:<br>Question and Answer                                         | Kiehl, Calhoun, Wager |
| 2.1     | 8:30 am  | 0:30     | GLM model building: predictors and contrasts                                      | Wager                 |
| 2.2     | 9:00 am  | 0:30     | GLM filtering and nuisance regressors                                             | Wager                 |
| 2.3     | 9:30 am  | 0:45     | GLM multicollinearity and diagnostics                                             | Wager                 |
|         | 10:15 am | 0:15     | Break                                                                             |                       |
| 2.4     | 10:30 am | 1:30     | SPM GUI for Single Subjects: Explore Design, Scaling, Results                     | Kiehl                 |
|         | 12:00 pm | 0:30     | Lunch Break                                                                       |                       |
| 2.5     | 12:30 pm | 0:45     | Basis Sets: Flexible Hemodynamic Modeling                                         | Wager                 |
| 2.6     | 1:15 pm  | 0:15     | Derivative Boost                                                                  | Calhoun               |
| 2.7     | 1:30 pm  | 0:15     | Parametric modulators                                                             | Wager                 |
| 2.8     | 1:45 pm  | 1:00     | Autocorrelation and generalized linear models                                     | Wager                 |
|         | 2:30 pm  | 0:30     | Break                                                                             |                       |
| 2.9     | 3:00 pm  | 1:00     | Intro to Connectivity and Mediation<br><a href="#">Mediation demo/walkthrough</a> | Wager                 |
| 2.10    | 4:00 pm  | 1:30     | Introduction to ICA:<br>Independent Component Analysis                            | Calhoun               |
|         | 5:30 pm  | 0:30     | Question & Answer Session                                                         | Kiehl, Calhoun, Wager |
|         | 6:00 pm  |          | Adjourn                                                                           |                       |

---

---

### Day 3: Friday, September 11th

---

| Lecture | Start    | Duration | Description                                                                   | Instructor(s)         |
|---------|----------|----------|-------------------------------------------------------------------------------|-----------------------|
|         | 8:00 am  | 0:15     | Review of Days 1-2                                                            | Kiehl, Calhoun, Wager |
| 3.1     | 8:15 am  | 1:30     | Experimental Design:<br>Psychological and statistical principles              | Wager                 |
|         | 9:45 am  | 0:15     | Coffee Break                                                                  |                       |
| 3.2     | 10:00 am | 0:45     | Group Analysis:<br>Fixed, Random, and Mixed Effects                           | Wager                 |
| 3.3     | 10:45 am | 0:45     | Group Analysis:<br>Thresholding and Inference                                 | Wager                 |
| 3.4     | 11:30 pm | 1:00     | SPM Results:<br>Group Subjects, Plotting, Display,<br>Small Volume Correction | Kiehl                 |
|         | 12:30 pm | 0:30     | Lunch                                                                         |                       |
| 3.5     | 1:00 pm  | 1:00     | ICA II: fMRI                                                                  | Calhoun               |
|         | 2:00 pm  | 0:15     | Break                                                                         |                       |
| 3.6     | 2:15 pm  | 1:30     | ICA of fMRI:<br>Implementation                                                | Calhoun, Kiehl        |
|         | 3:45 pm  | 0:15     | Final Q & A and Farewell                                                      | Kiehl, Calhoun, Wager |
|         | 4:00 pm  |          | Adjourn                                                                       |                       |

---