# Week of 10/23 Deliverables

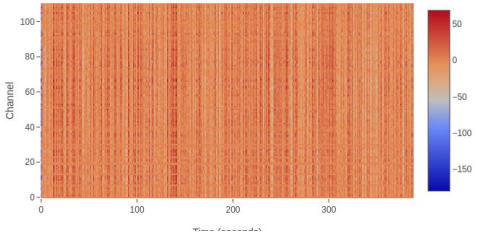
Red Lemurs

# Deliverables

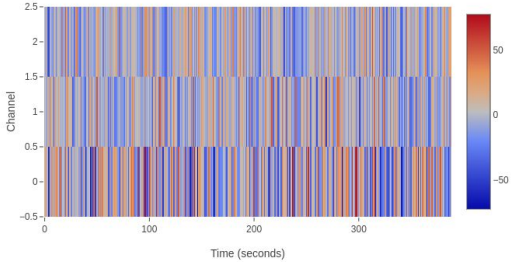
- Lemur library alpha
  - notebook
- C-PAC on fMRI -- issues running C-PAC on HBN data
  - notebook
- Parametric Models for Multivariate Time Series Exploration
  - pdf
- Copula for Intra-Dependence in Time Series
  - notebook

# Lemur Alpha Library notebook

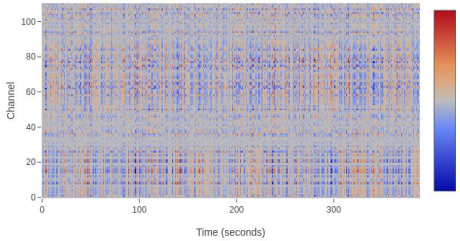
NDARAM277WZT RestingState Heatmap



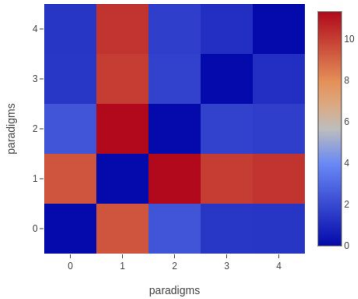

NDARAM277WZT RestingState Heatmap PC-PROJ = (1, 4) COLLAPSED



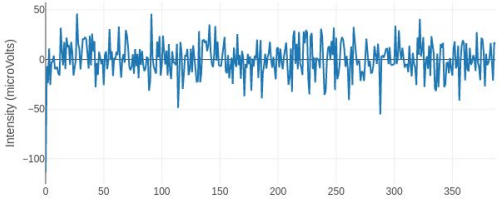

NDARAM277WZT RestingState Heatmap PC-PROJ = (1, 4)




NDARAM277WZT vis_learn FroMetric

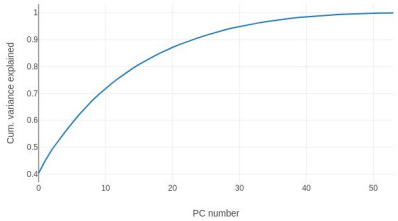



NDARAM277WZT RestingState Raw Sparklines

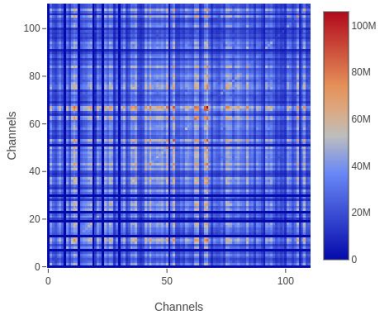



Electrode: 1

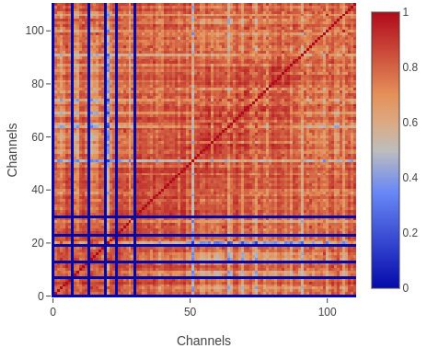
NDARAM277WZT vis_learn Scree Plot



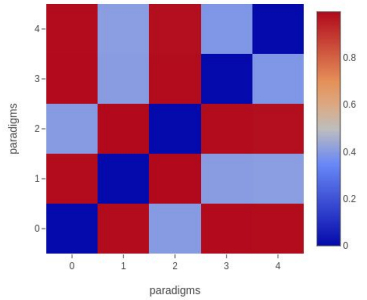

NDARAM277WZT RestingState Covariance Matrix




NDARAM277WZT RestingState Correlation Matrix




NDARAM277WZT vis_learn ErosMean



# Running C-PAC on fMRI

- Tried to install C-PAC locally but failed
- Switched to Docker
- fMRI data in BIDS form (resting state)
- Outputs mainly include preprocessing results
- Several crushes
  - Memory intensive?
  - Missing info (SliceTiming) in data?

# Parametric Models for Multivariate Time Series

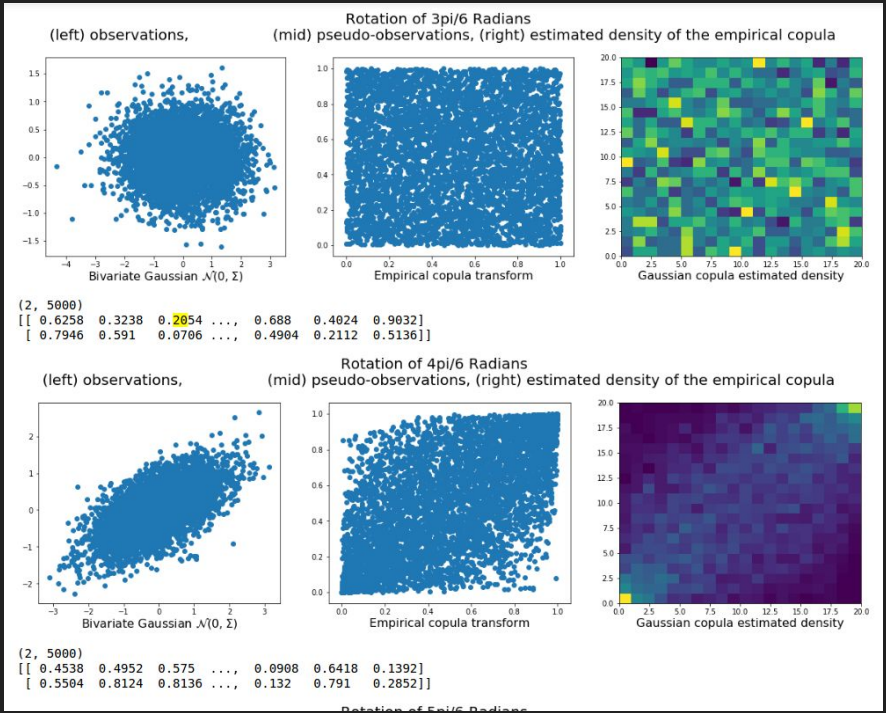
DoD: https://github.com/NeuroDataDesign/lemur-f17s18/blob/master/docs/vidurkailash/NeuroData_Multivariate_Time_Series_Models.pdf

Link to Papers:

file:///Users/vidurkailash/Downloads/Detection-of-Changes-in-Multivariate-Time-Series-With-Application-to-EEG-Data.pdf

https://books.google.com/books?id=joodLUTyIEYC&pg=PA146&lpg=PA146&dq=multivariate+time+series+eeg&source=bl&ots=6wzdKTjXg6&sig=GBOFtnY8IlocQeo8Ni0uFzB5n_U&hl=en&sa=X&ved=0ahUKEwjpxvnw4oXXAhUL5yYKHW-tBTw4ChDoAQgrMAI#v=onepage&q=multivariate%20time%20series%20eeg&f=false

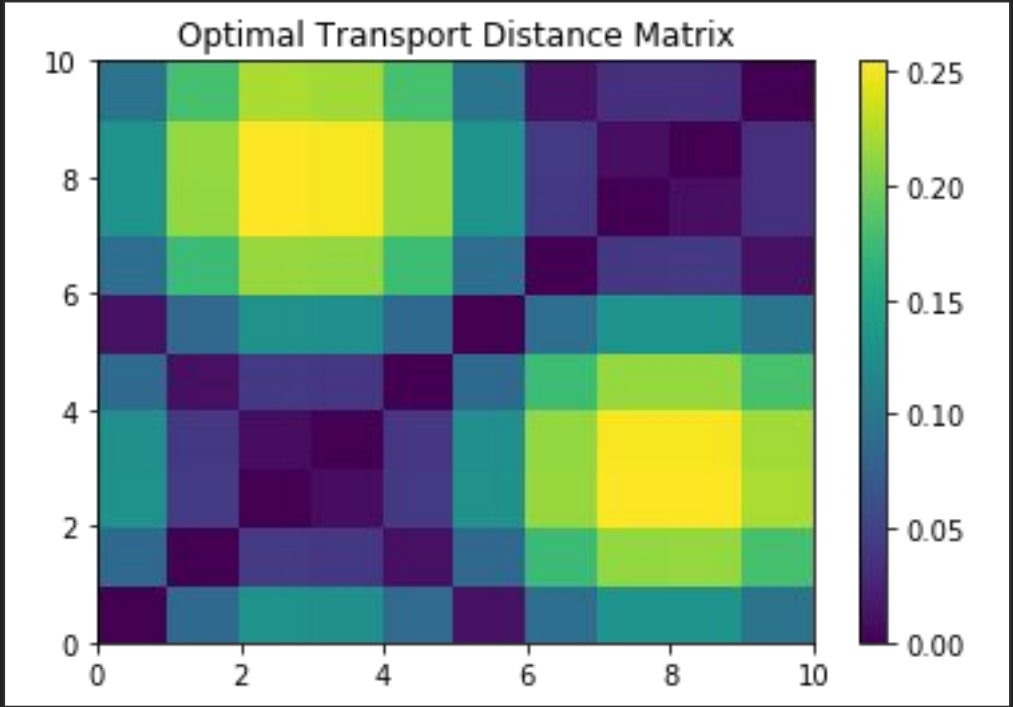
# Copulas




Main Idea:

- We know more about the marginals than joint
- Normalize the marginals
- Analyze the joint relationship more easily

# Copula Distance Matrix



# Next Week

- Create a function to compute a coherence matrix
- Implement and test ARMA models on our data
- Improve data generation functions, create a battery of tests for an arbitrary distance metric (rotation invariant, scale invariant, translation invariant, etc.)
- Figure out whether C-PAC issue is on our end, if not find a different way to get connectivity information