

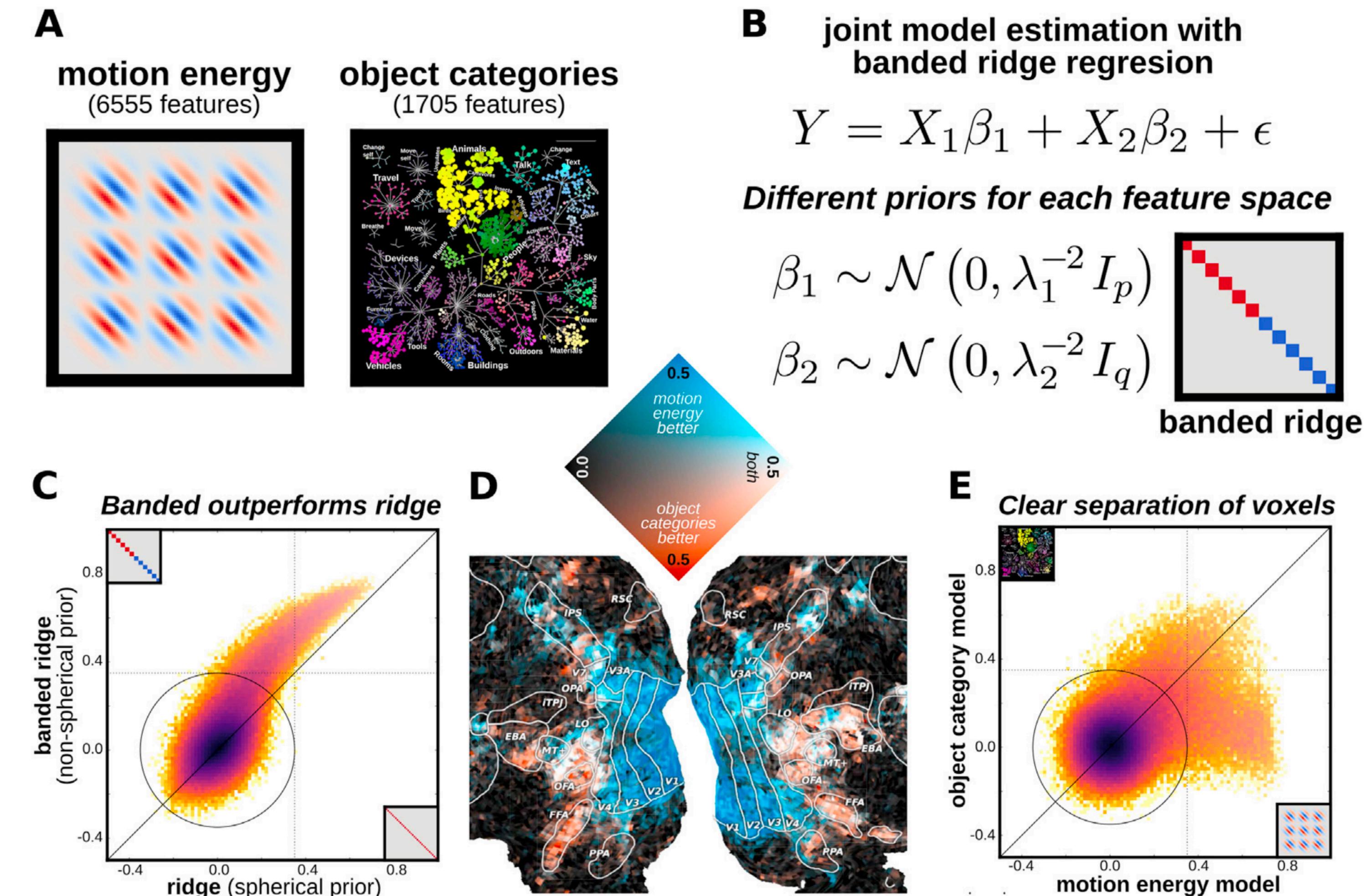
# **Banded ridge in mTRF toolbox**

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# Non-spherical multivariate normal prior for ridge

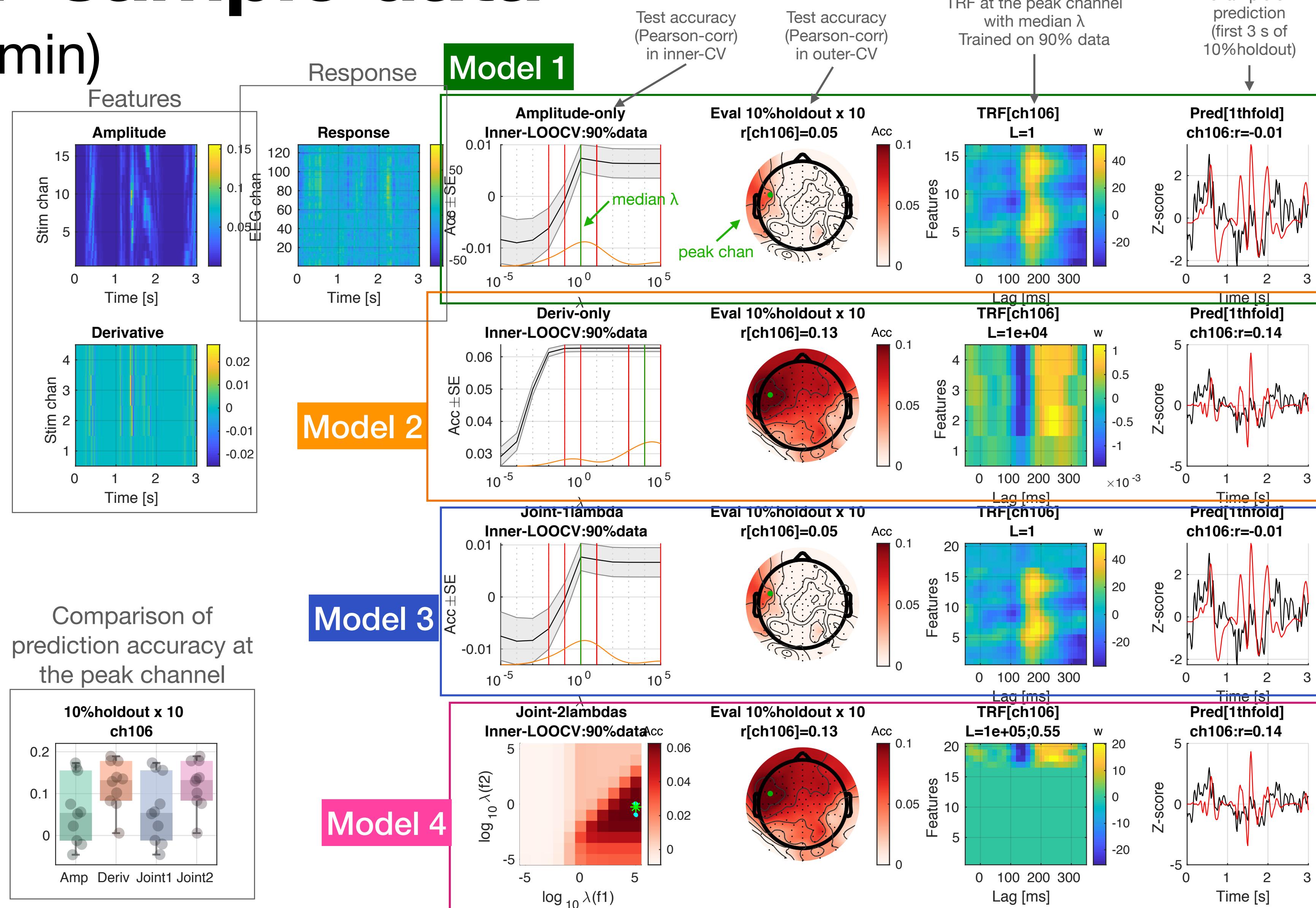
Nunez-Elizalde, Huth, Gallant. 2019. NeuroImage.

- Using N lambdas for N feature sets for set-specific optimization
  - Higher prediction accuracy
  - Fair comparison between features in joint models
- Could this be also beneficial for M/EEG?



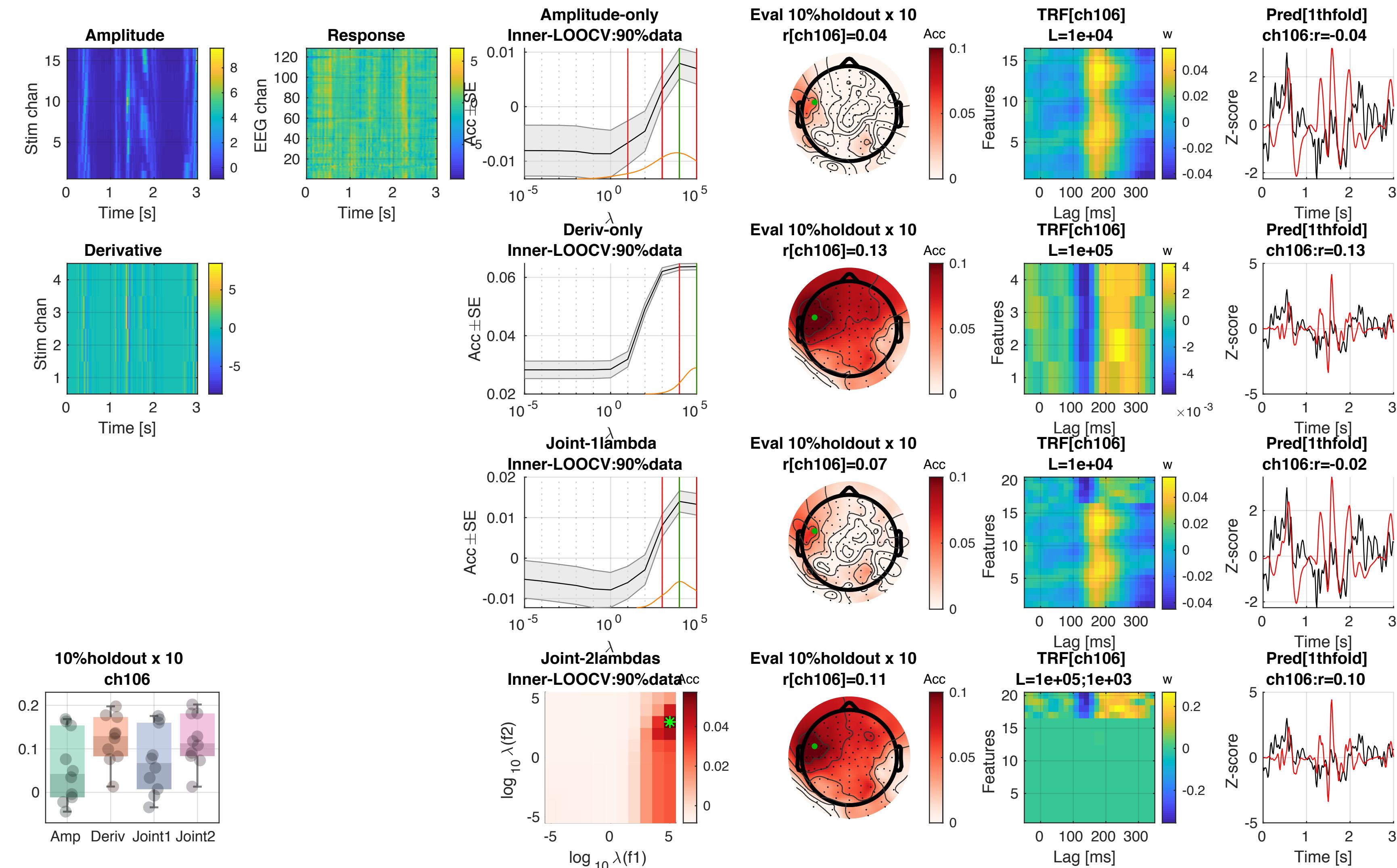
# Test on mTRF sample data

- **Scenario:** you have two sets of features and want to test which feature predicts better.
  - Features: 16-ch spectrogram and 4-ch derivatives (for demo)
  - Outer-CV loop (x10):
    - 90% data: optimization via LOOCV (inner-CV)  
 $\lambda^* = \text{argmax}_{\{\lambda\}}(r)$
    - 10% data: evaluation with  $\lambda^*$
  - Model1: only amplitudes
  - Model2: only derivatives
  - Model3: joint but a single  $\lambda$
  - Model4: joint with two  $\lambda$ s
  - **mTRF Toolbox was modified to handle set-specific lambdas**



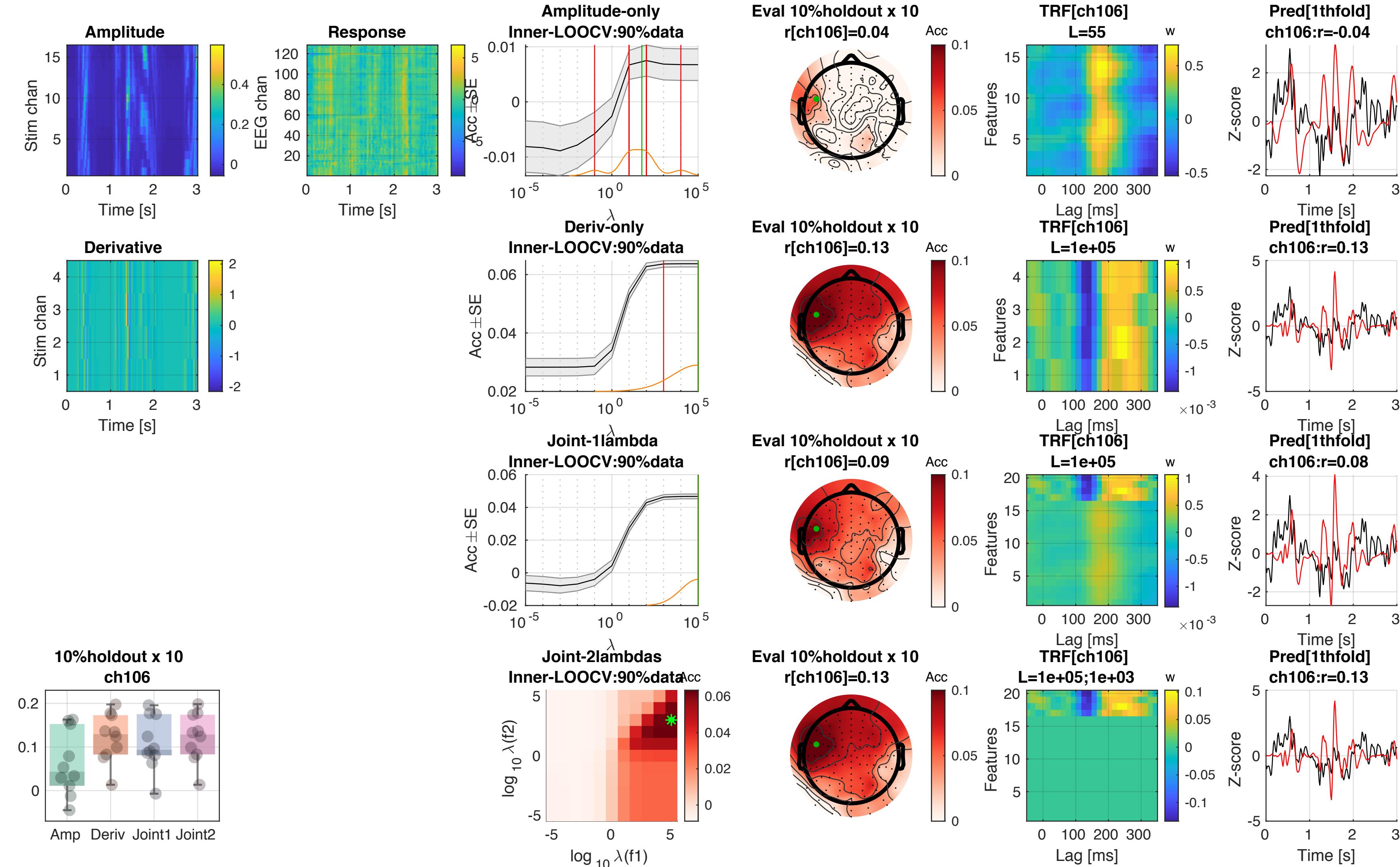
# Test on mTRF sample data

speech\_data.mat (2 min), Z-scored STIM and RESP



# Test on mTRF sample data

speech\_data.mat (2 min), Z-scored STIM and RESP and  $\sum \sigma^2 = 1$  per set



# Conclusion

- Without normalization, joint2 predicted better than joint1 (median r:  $0.13 > 0.05$ )
- Even with set-wise variance normalization, joint2 performed better than joint1 (median r:  $0.13 > 0.09$ )
- Systematic evaluation with a large dataset seems to be beneficial.
- Inclusion in the future version of mTRF after further testing?

