SIGNAL PROCESSING IN MNE: DAY 3

2 – SPECTRAL CONNECTIVITY

THE MNE-CONNECTIVITY PACKAGE

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CHARITÉ

Forms of connectivity

Structural connectivity

- Physical connections between brain regions, e.g. DWI

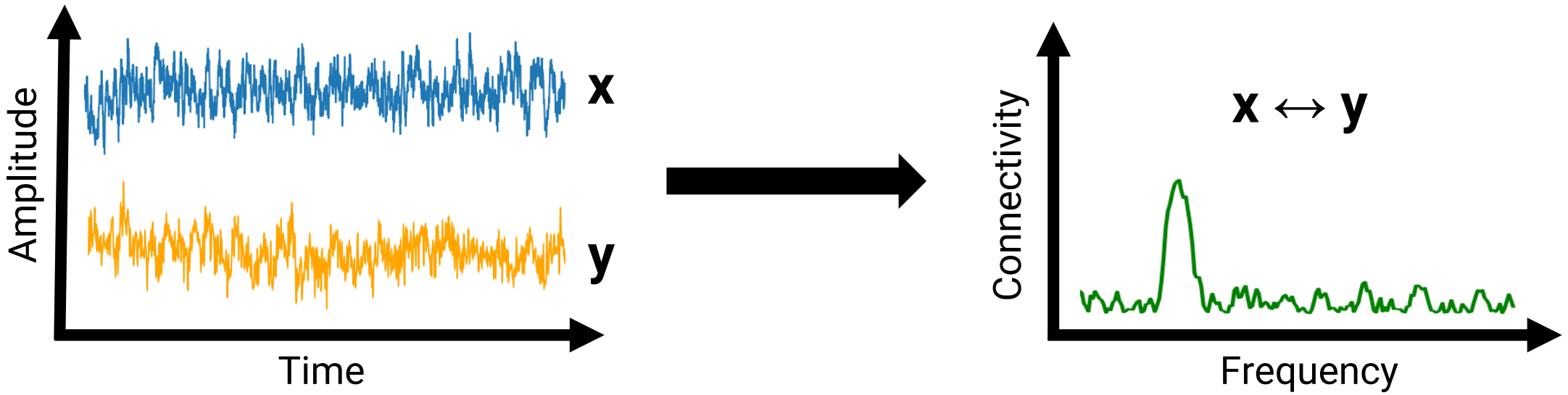
Functional connectivity

- Neuronal activity across brain regions, e.g. fMRI

Spectral (effective) connectivity

- Frequency-resolved relationship between signals
- Undirected vs. directed

Spectral connectivity



E.g. Coherency

- Undirected
- Correlation in the frequency domain

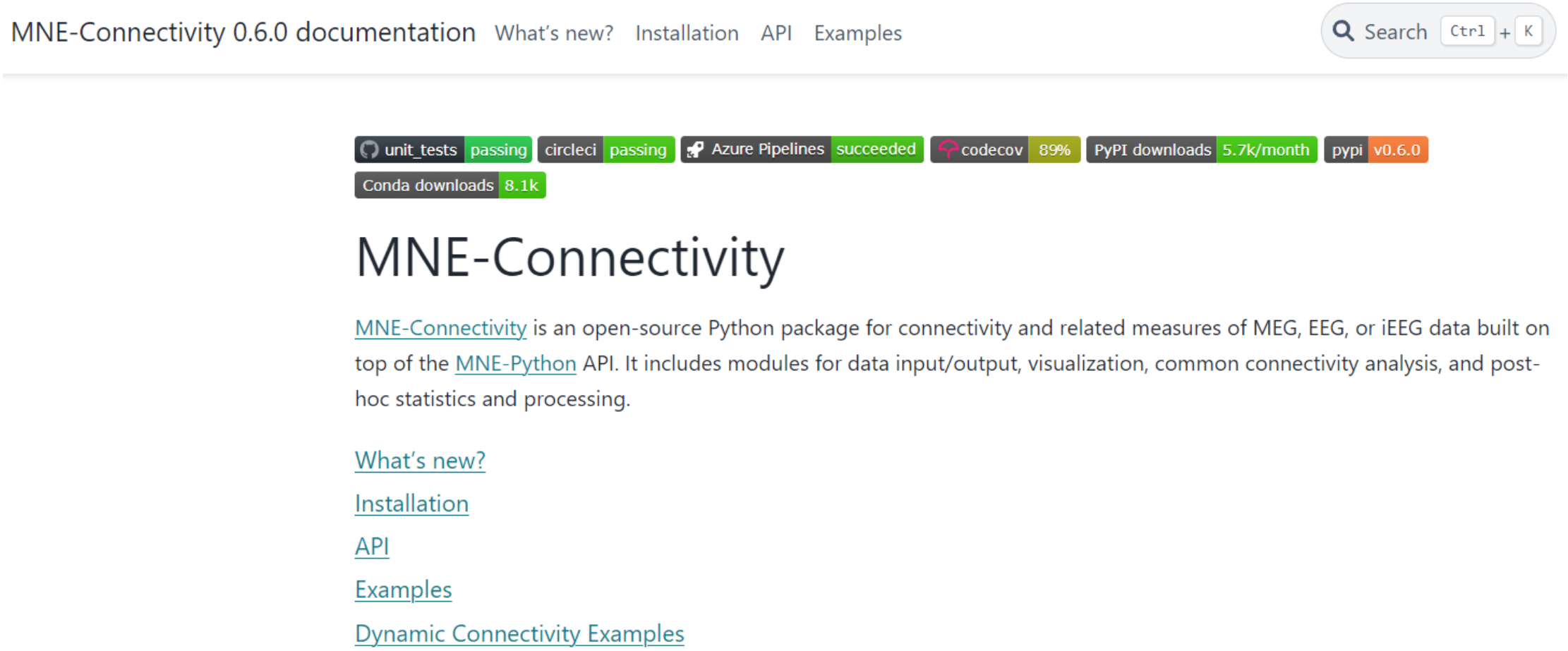
Pearson correlation

$$r = \frac{cov(x, y)}{\sigma_x \sigma_y}$$

Coherency

$$C_{xy}(f) = \frac{S_{xy}(f)}{\sqrt{S_{xx}(f) S_{yy}(f)}}$$

Spectral connectivity



Onto the notebook…

Conclusion

- Tools for computing spectral connectivity in the `mne-connectivity` package
  - `spectral_connectivity_epochs()`
  - `spectral_connectivity_time()`
- Various connectivity methods supported
- Can be computed from `Epochs/EpochsArray` objects and data arrays