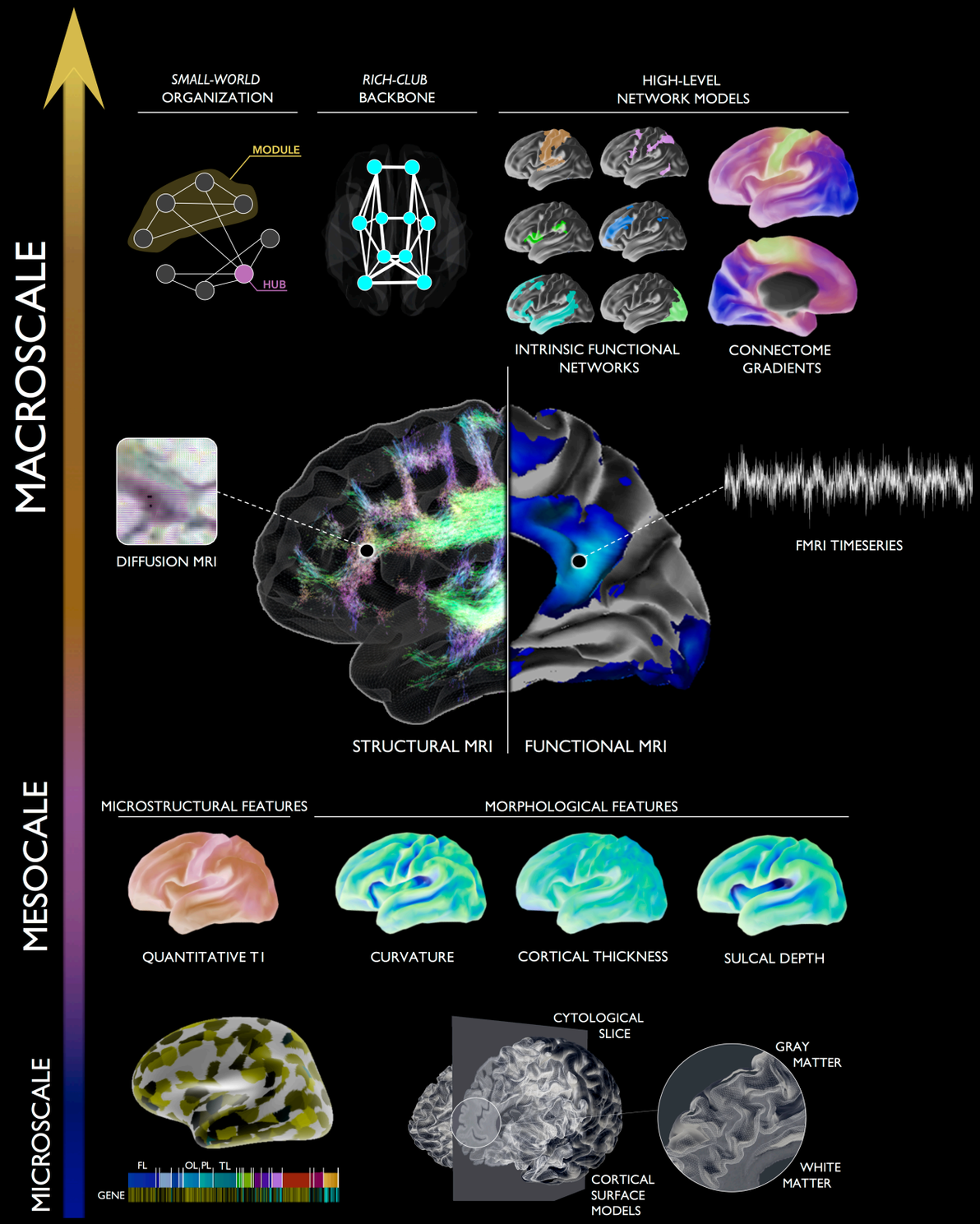
NEUR608 OVERVIEW

BRATISLAV MISIC &

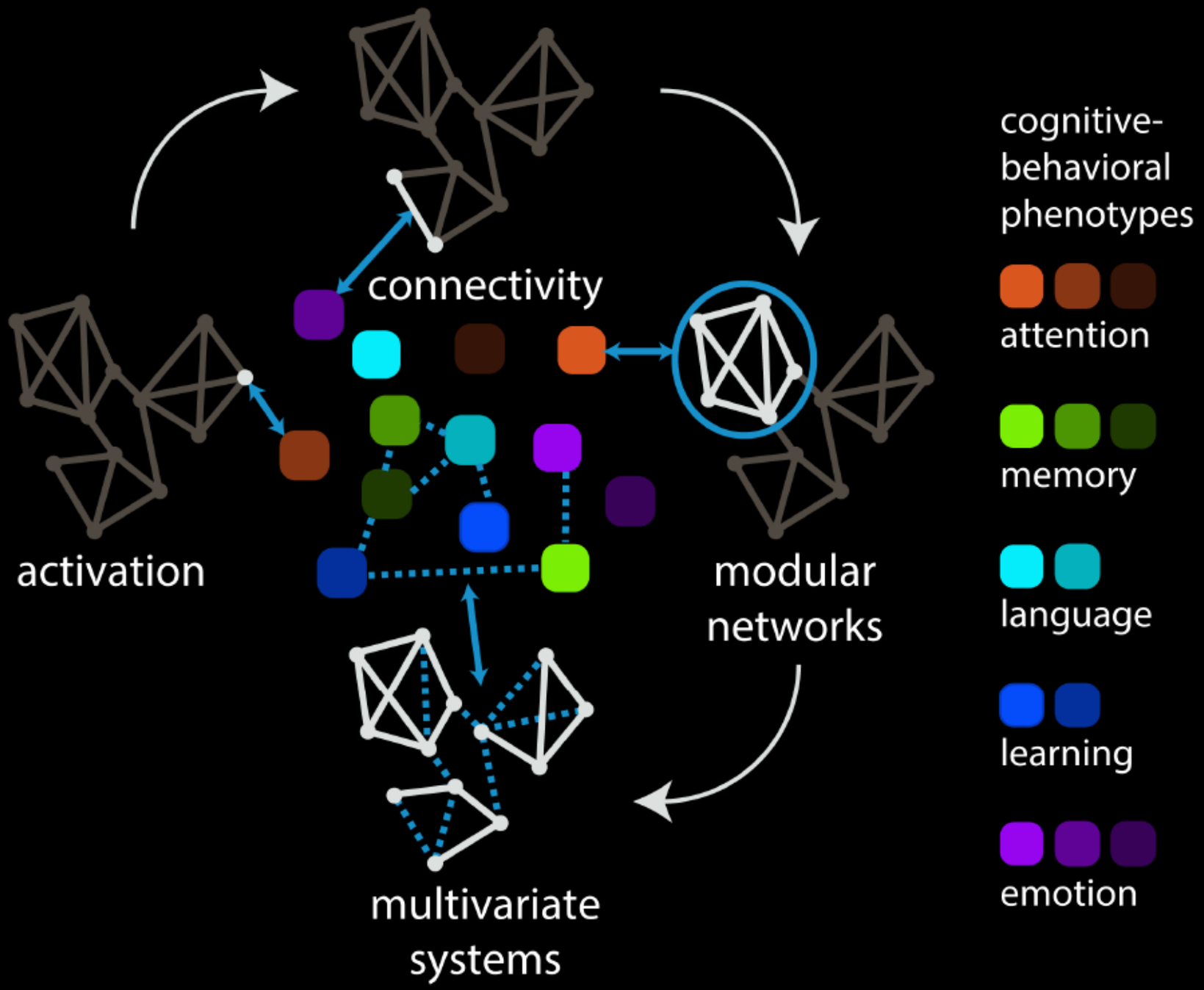
BORIS BERNHARDT

TOWARDS MULTISCALE NEUROSCIENCE



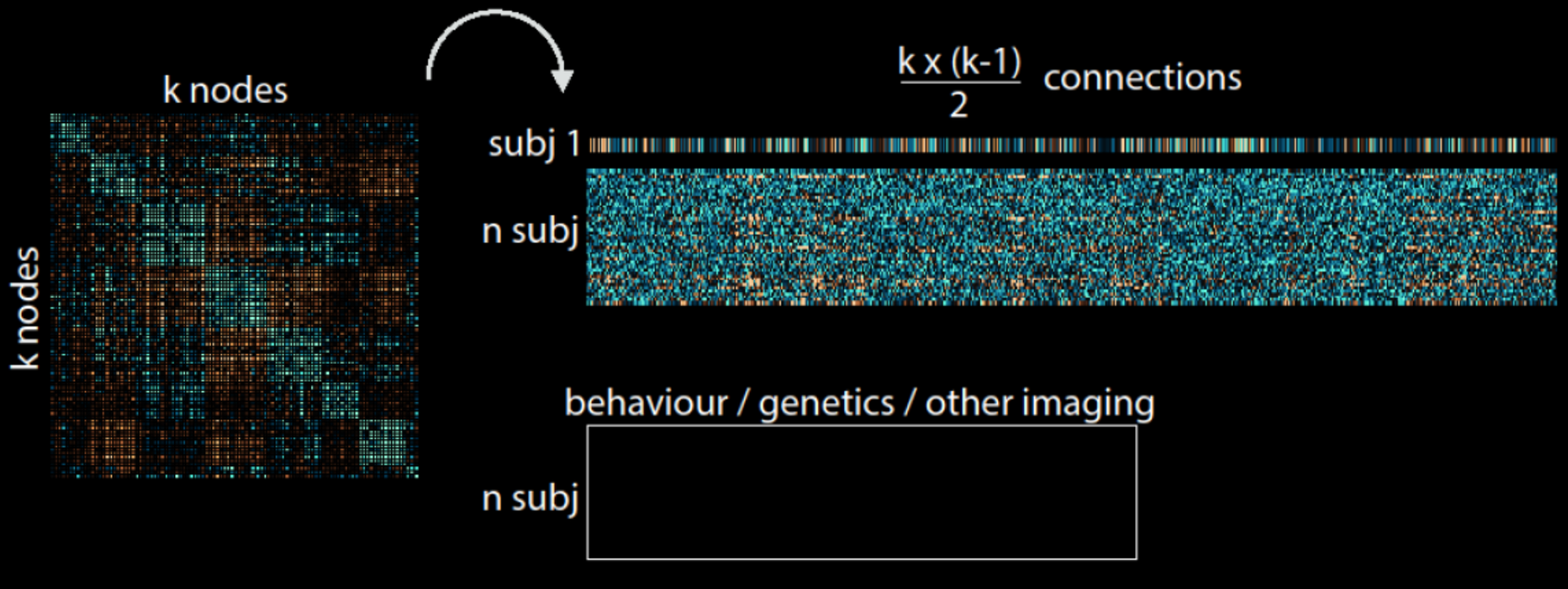
Lariviere et al (2019), Betzel & Basset (2017), Van den Heuvel & Yeo (2015) Neuron

TOWARDS MULTIVARIATE ANALYSES



Misic & Sporns (2016) Curr Opin Neurobiol

TOWARDS MULTIVARIATE ANALYSES



HOW TO DEAL WITH MORE VARIABLES THAN OBSERVATIONS?

HOW TO RELATE MULTIPLE DATA SETS / MODALITIES WITH ONE ANOTHER?

HOW TO OPERATIONALIZE THE NETWORK PROPERTY?

HOW TO INFER LARGE-SCALE MECHANISMS?

TOPICS

WEEK 2: BRIEF INTRO TO MULTIMODAL & MULTISCALE IMAGING

WEEK 3: DATA COMPRESSION AND DIMENSIONALITY REDUCTION

WEEK 4: GLMS AND LMM

WEEK 5: ASSOCIATIVE TECHNIQUES (CCAS, PLS)

WEEK 6: CLUSTERING TECHNIQUES

WEEK 7: CONFIRMATORY TECHNIQUES AND CAUSAL MODELS (SEM, DCM)

WEEKS 8-9: GRAPH THEORY 1-2

WEEK 10: SUPERVISED LEARNING

WEEK 11: META ANALYSIS

WEEK 12: REPRODUCIBILITY

WEEK 13: STUDENT PRESENTATIONS

ORGA

FRIDAY 12-3 PM, BELL ROOM

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A TYPICAL CLASS

1 H LECTURE

1.5 H JOURNAL CLUB

30 MIN LIVE DEMO

REQUIREMENTS

WRITE ½ PAGE CRITIQUE (POSITIVE OR NEGATIVE) AND SUGGESTIONS FOR FUTURE WORK ON EACH PAPER

EMAIL THIS PAGE TO US BEFORE THE CLASS

ATTEND CLASS

BE ABLE TO VERBALLY SUMMARIZE PAPER, UNDERSTAND THE IMAGING METHODOLOGY AND THE ANALYSES USED

DISCUSS THE PAPER WITH YOUR PEERS

END OF CLASS: WRITE A MOCK PAPER USING YOUR OWN DATA

REQUIREMENTS

START THINKING ABOUT IT NOW

DISCUSS YOUR IDEAS WITH YOUR COLLEAGUES AND WITH US

PREPARE YOUR PAPER DRAFT (~10 PAGES)

SUBMIT THE FULL VERSION BY MONDAY OCTOBER 28TH

WE GIVE FEEDBACK BY FRIDAY NOVEMBER 4TH

SUBMIT THE FINAL VERSION MONDAY NOVEMBER 18TH

PRESENTATION AND DISCUSSION OF THE WORK ON LAST DAY OF CLASS
(NOV. 29TH: 8 MINS TALK + 4 MINS QUESTIONS)

GRADING

CLASS ATTENDANCE (EMAIL US IF YOU CANNOT MAKE IT)

SUMMARY ASSIGNMENTS

PARTICIPATION

RESEARCH PAPER

PRESENTATION

MATERIALS

WE WILL EMAIL AROUND CHANGES AT LEAST ONE WEEK
AHEAD OF THE NEXT CLASS

PAPERS + SLIDES WILL BE ON GITHUB
http://github.com/MICA-MNI/micaopen/NEUR608-2019/

OPTIONAL REVIEWS
COMPLEMENT THE RESEARCH ARTICLES

NEXT WEEK

BRAIN CONNECTIVITY:

DIFFUSION MRI, RS-FMRI, MYELIN MEASURES