





Course-Based Research in Virtual Learning Environments as a new channel to make STEM Education Accessible to All Students

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## Excellence in STEM is still not very inclusive

#### **University DROP OUTS**

- 26% of Black STEM students
- 20% of LatinX STEM students
- 13% white STEM students

and





*increase capacity for inclusion of all students, especially those students who belong to groups underrepresented in science.* 



Transforming the Arts and Sciences curriculum to nurture inclusive excellence in STEM through *coursebased research experiences* (CRE)



No selection no self-selection no extra curricular time Research ownership

# CRE at LTU



Small PUI, 3500 students, 4 colleges, 15 departments, South-East Michigan



About 30 instructors from all disciplines within Art and Sciences

- <u>Scale</u>: more than 40 courses and 30 instructors
- <u>Heterogeneity</u>: CRE involves all the academic fields within Arts & Sciences

#### Logistics of CRE – Time management



#### CRE Virtual Spaces as Inclusive Spaces



# Democratize Neuroscience Education via Open Data and Cloud Technology.

Neuroscience data [in]accessibility

- fMRI data acquisition = between \$300 and \$1,000 an hour
- Data are usually used <u>only once</u>
- Most colleges do not have access to imaging facilities at all
- Data acquisition is limited to faculty and grad students



brainlife.io

Cloud Computing Online repository Big Data analysis Data Mining Co-teaching (even multiinstitutional)

### Integrating CRE and BrainLife.io



Community **Development and Engagement Project** 

- CRE course at LTU
- CRE course at partner MSIs
- Instructor training and outreach
- Collaborative proposal-development activities.





In Brainlife, pipelines allow for applications and processes (rules) to be applied, multiple subjects. The rules of the pipeline can be adjusted to target one subject if there is an error which requires something to be resubmitted. These rules determined by the pipeline will continue to evaluate until they are deschuted. Pipelines enables us to handle large amounts of data and process them without having to do carb input munually. As mentioned if a subject tails re are able to handle that case individually and reprocess the information by adjusting the parameters of the

List of Used Pipelines; Align T1 to ACPC Plane (HCP-based), Generate images of T1, Freesurfer 7.1.1, Generate

Fig.10: Shows the correlation between the simultaneous activation different areas of the brain. Colours represent the strength of correlation

- 1. Schapiro, A.C. and McDevitt, E.A. and Rogers, T.T. and Mednick, S.C. and Norman, K.A. (2020). Human hippocampal replay during rest prioritizes weakly learned information and predicts memory performance. OpenNeuro, [Dataset]
- doi: 10.18112/openneuro.ds001454.v1.3.1
- 2. Brainlife. (n.d.), Retrieved April 08, 2021, from https://brainlife.io/

# Thanks!

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