

# A LASER Focus on Understanding and Improving STEM EDUCATION



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**#AERALASER**

# Meet the LASER Team



# Workshop Agenda

**1:00-1:30.** Introduction to the Learning Analytics in STEM Ed Research (LASER)

**1:30-1:40.** RStudio Cloud Setup/Break

**1:40-2:20.** Intro to Text Mining (TM) in STEM

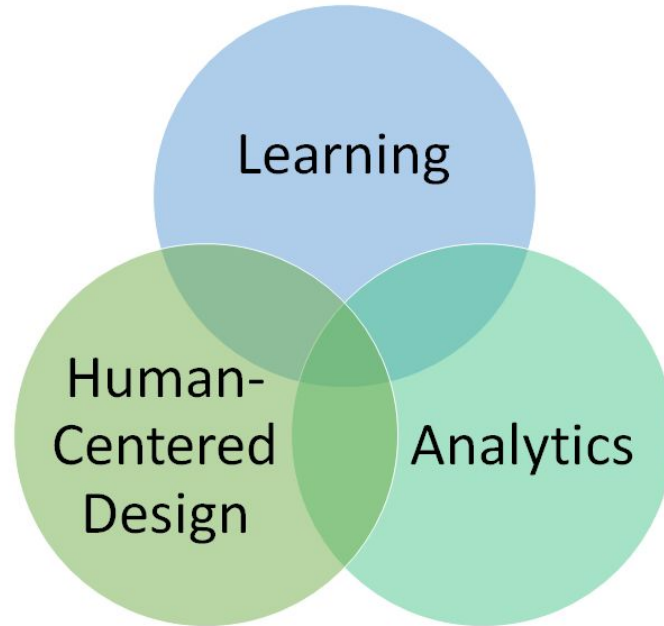
**2:20-2:30.** Q&A/Break

**2:30-3:10.** Intro to Machine Learning (ML) in STEM

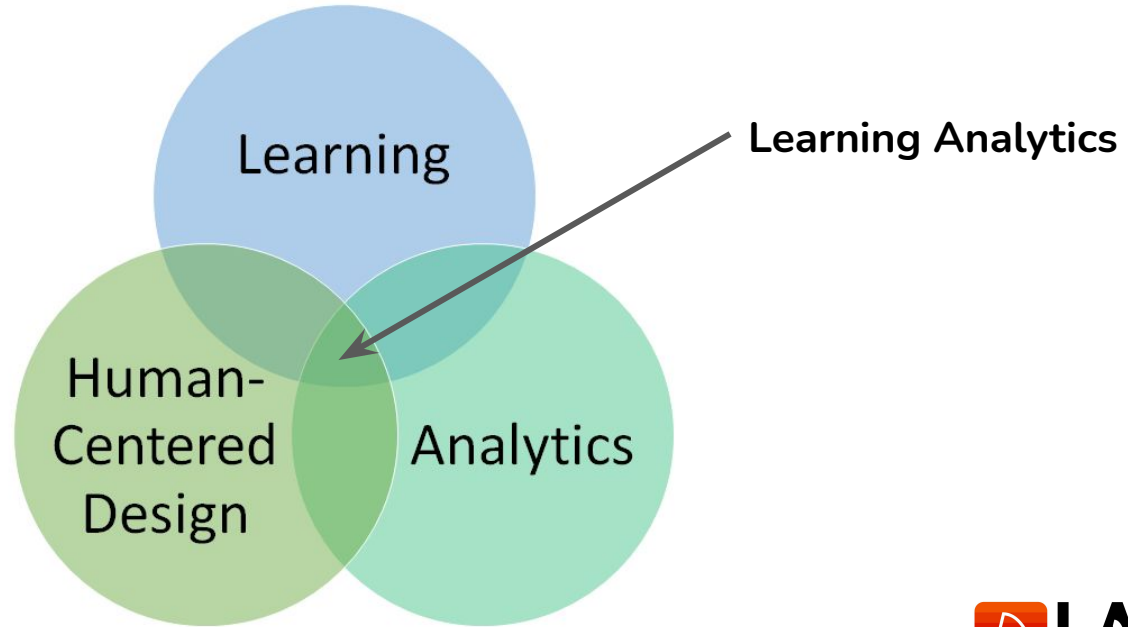
**3:10-3:20.** Q&A/Break

**3:20-4:00.** Intro to Social Network Analysis (SNA) in STEM

# What is Learning Analytics



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Learning analytics is the collection and analysis of data traces ***related to learning*** in order to inform and improve process and/or its outcomes (Siemens et al, 2011)

## Key Questions - 5 Ps (Wise, 2021)

1. What is the **point**?
2. What is the **process**?
3. What is the **proxy**?
4. What is the **plan**?
5. What is the **payoff**?

# What is Learning Analytics

*SOLAR (2021) defines “learning analytics as the measurement, collection, analysis and reporting of data about **learners and their contexts**”*



# Key Uses and Methodologies

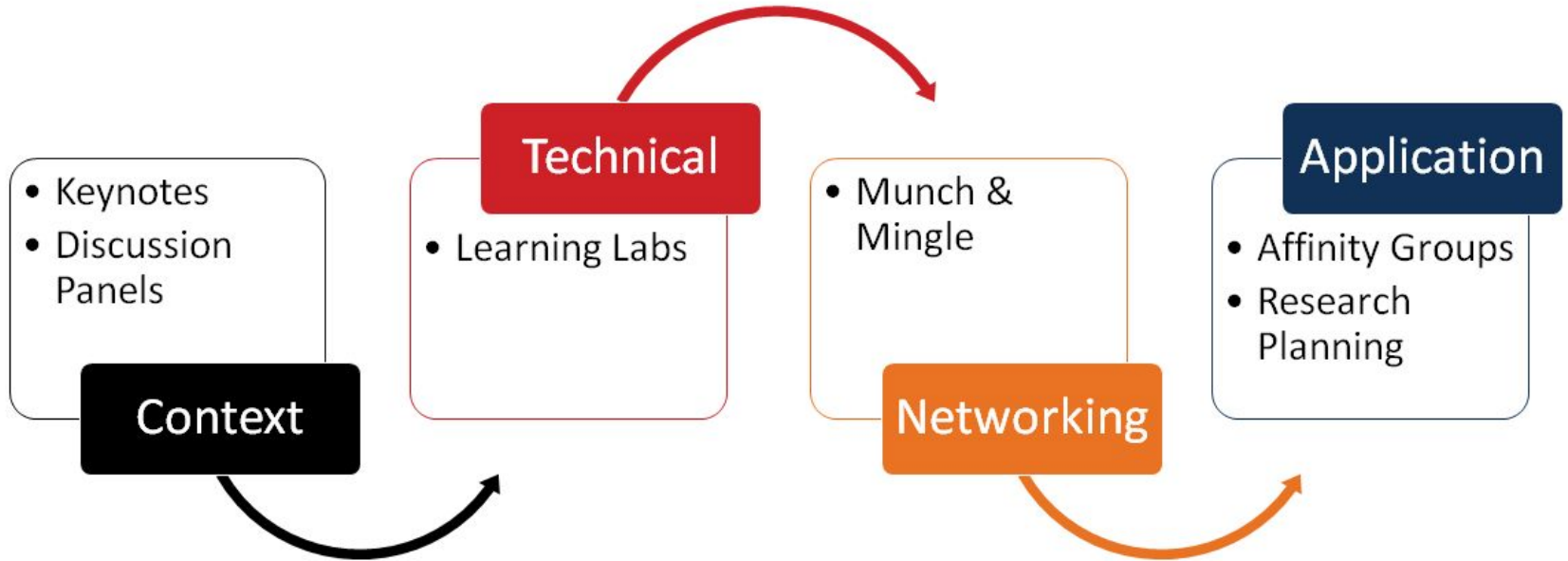
## Uses:

- Prediction models for student success
- Supporting lifelong learning
- Empirical support for pedagogical innovations

## Methodologies:

- Descriptive analytics - What happened in the past?
- Diagnostic Analytics - Why did it happen?
- Prescriptive Analytics - What can happen in the future?

# Summer Workshop Overview



# Research-Practice Partnerships

Research Practice Partnerships (RPP) are ***collaborative*** relationships linking practitioners and researchers in ways that promote and improve education

# RPP Discussion Panel

## Key Points:

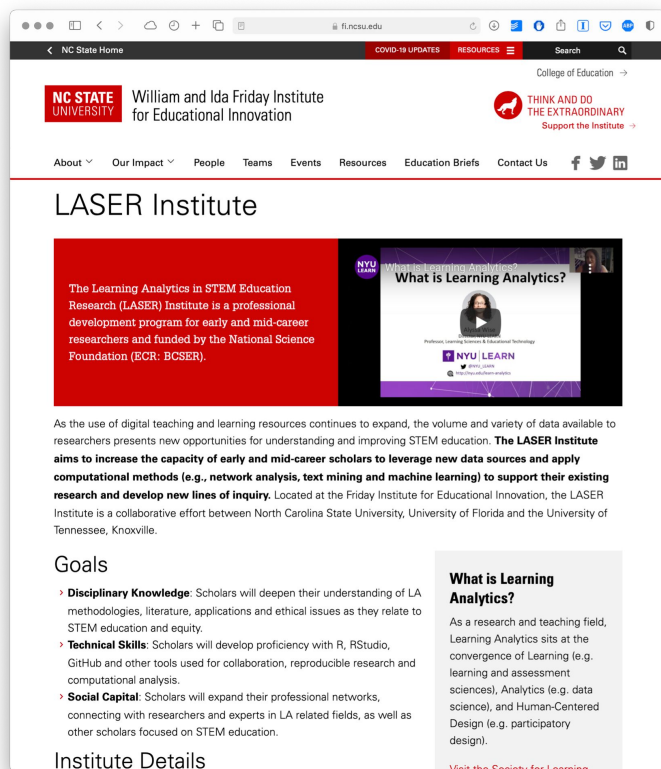
- Relationship building is critical
- Create opportunities for sharing/learning about contexts
- Create shared mission and vision to reach goals

# Legal and Ethical Considerations

## Key Points:

- Role of bias
- Just because we 'can', does that mean we should?
- Consider the purpose of the use of the data

# LASER Institute Website



<http://go.ncsu.edu/laser-institute>

# Context

## **Keynotes:**

- What is Learning Analytics (Dr. Alyssa Wise)
- Machine Learning and STEM Education (Dr. Shiyan Jiang)
- Text Mining and Education (Dr. Carolyn Rose)
- Social Network Analysis and Education (Dr. Sasha Poquet)

# Context

## **Panels:**

- Ethics and Legal Considerations
- Research-Practice Partnerships
- Workflows and Digital Data



# Technical

## **Learning Labs:**

- Foundations of Learning Analytics
- Machine Learning
- Text Mining
- Network Analysis

# Networking

## **Munch & Mingle:**

- Virtual 'Bar' Trivia using PollEverywhere
- Grand Prize Provided by SnagIt

# Application

## **Affinity Groups and Research Planning:**

- Affinity Groups based on application materials
- Research Action Plans