# Welcome to RIMORPHIS Workshop II

**May 19, 2022**

## Objectives

- Provide an update on the current development of the RIMORPHIS platform including its functionality and tools
- Seek feedback from the community on the current design of RIMPORPHIS and future plans for science test cases

# Workshop Agenda

- **12:00 - 12:15: Project Introduction (Venkatesh Merwade)**
- 12:15 - 12:35: Overview of RIMORPHIS Platform - Year 2  (Iowa team)
- 12:35 - 12:50: Tools in Development (Purdue team)
- 12:50 - 12:55: Q & A
- 12:55 - 01:00: Break
- 01:00 - 01:55: Online Poll, Break out and Discussion (J. Toby Minear)
- 01:55 - 02:00: Concluding Remarks (Venkatesh Merwade)

**Please type questions/comments in chat box/google doc (link in chat box) anytime. We will try to respond during or after the workshop**

# RIMORPHIS: River Morphology Information System

Venkatesh Merwade[2], Amanda Cox[2], Ibrahim Demir[3], J. Toby Minear[4], Marian Muste[3],

[1] Lyle School of Civil Engineering, Purdue University

[2] Water Institute, Saint Louis University

[3] IIHR – Hydroscience & Engineering, The University of Iowa

[4] Cooperative Institute for Research in Environmental Sciences, University of Colorado

# Problem Statement

- River morphology data are not easily available in public domain – Lack of access
- River morphology data are collected for short reaches – non-availability over large areas
- River Morphology data are not always available in a usable form – lack of pre- and post-processing tools

# Proposed Solution - RIMORPHIS

- User-friendly, scalable, data and information system for river morphology research, equipped with tools for discovery, retrieval, analysis, integration, and knowledge generation.

- Linked to comprehensive river morphology resources aligned with the needs of the river morphology community

- Visualization and collaboration tools that enable transparency and reproducible research outcomes

# NSF Collaborative Research Project

River Morphology Data and Analysis Tools (RiverMorph – now RIMORPHIS):
A Web Platform for Enabling River Morphology Research




Awards: #1948938 - #1948944 - #1948972 - #1948940

(August 2020 – July 2023)

PURDUE UNIVERSITY

THE UNIVERSITY OF IOWA

SAINT LOUIS UNIVERSITY
EST. 1818

University of Colorado Boulder

# NSF Geoinformatics Program

- Catalytic Track ← We have this
  - Pilot geoinformatics development effort (up to 3 years)
- Facility Track
  - Implementation and operation of a CI resource (3-5 years but no more than 10 years)
- Sustainability Track
  - Development and implementation of sustainable funding models (up to 3 years)

# Project Team

Post-docs/Students



Sayan Dey, Purdue U.



Chung-Yuan Liang, Purdue U.



Rensi Pipalia, Purdue U.



Yusuf Sermet, U. of Iowa

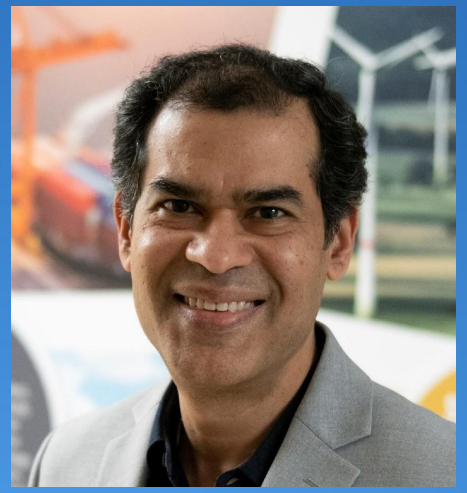
Leadership/CoPI



Amanda Cox, Saint Louis U.



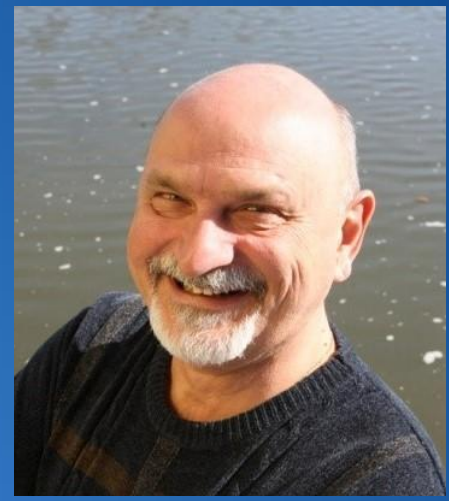
Ibrahim Demir, U. of Iowa.



Venkatesh Merwade, Purdue U.

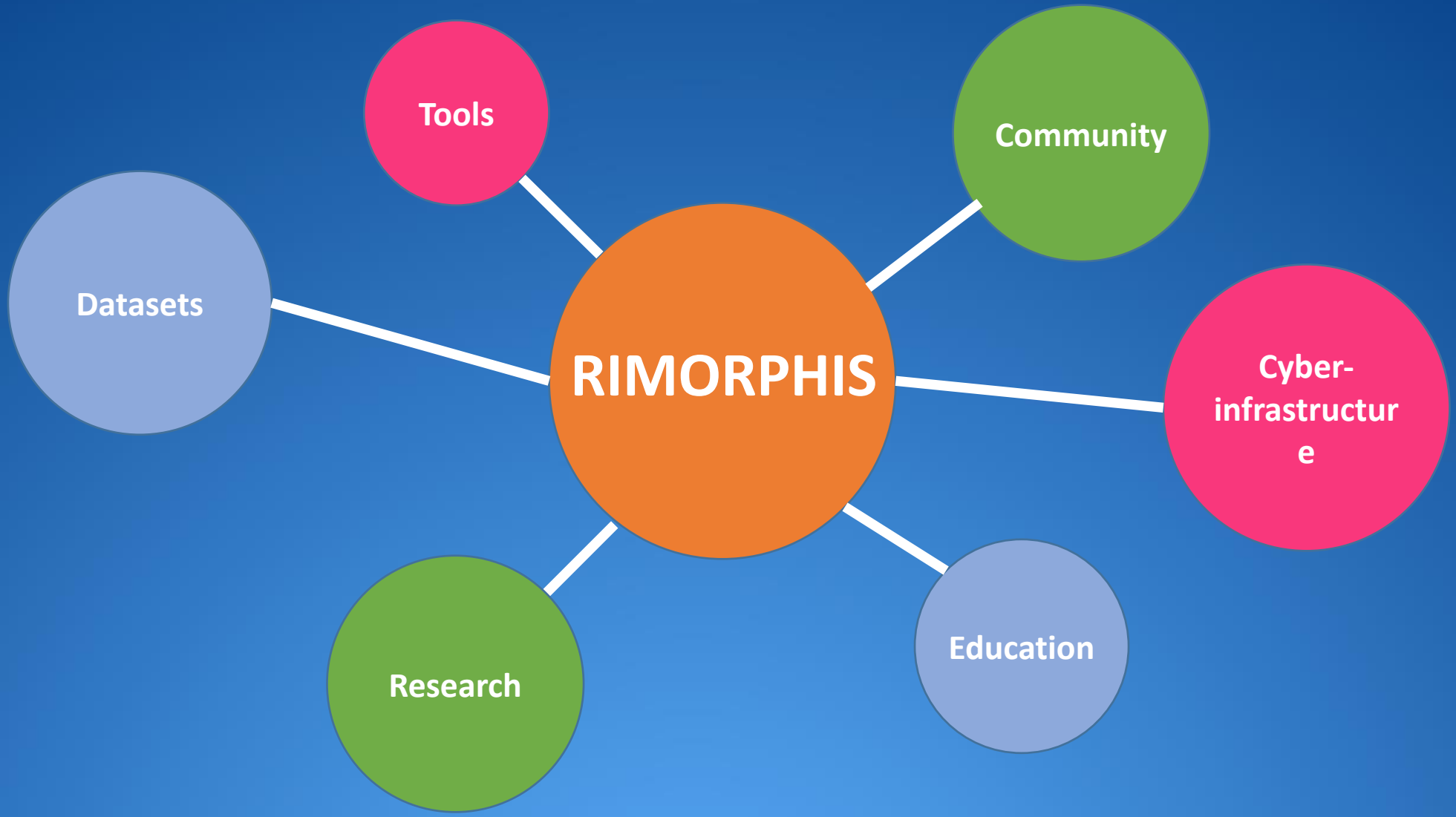


J. Toby Minear, U. of Colorado

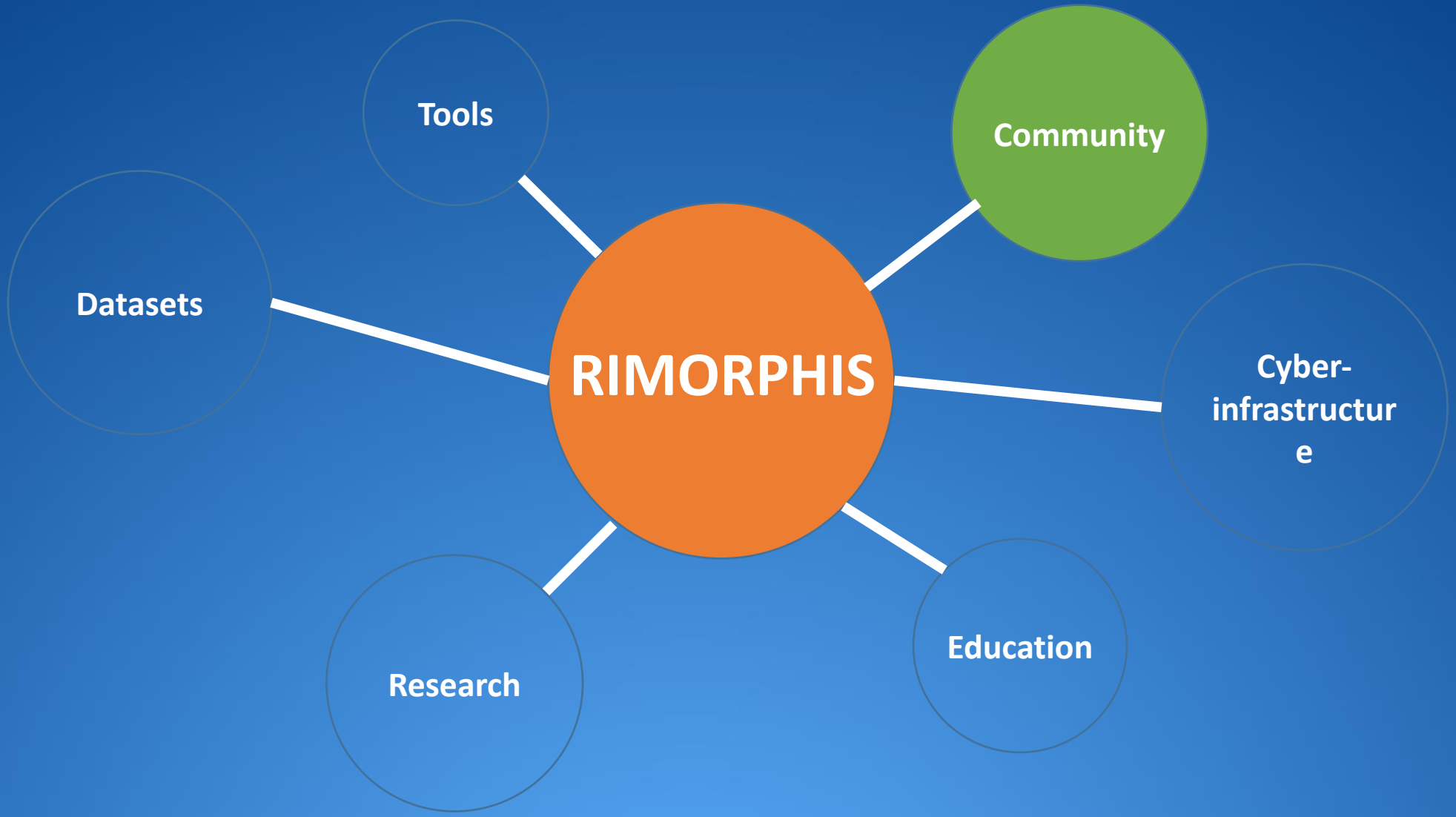


Marian Muste, U. of Iowa

# RIMORPHIS Vision



# RIMORPHIS Vision



# RIMORHIS Workshop 1 – May 2021

- Workshop objectives included seeking partnerships for sharing data resources and get feedback on project activities
- Attended by 49 individuals representing 23 government agencies
- Identified key initial partners for prototype development of data access capabilities and functionalities



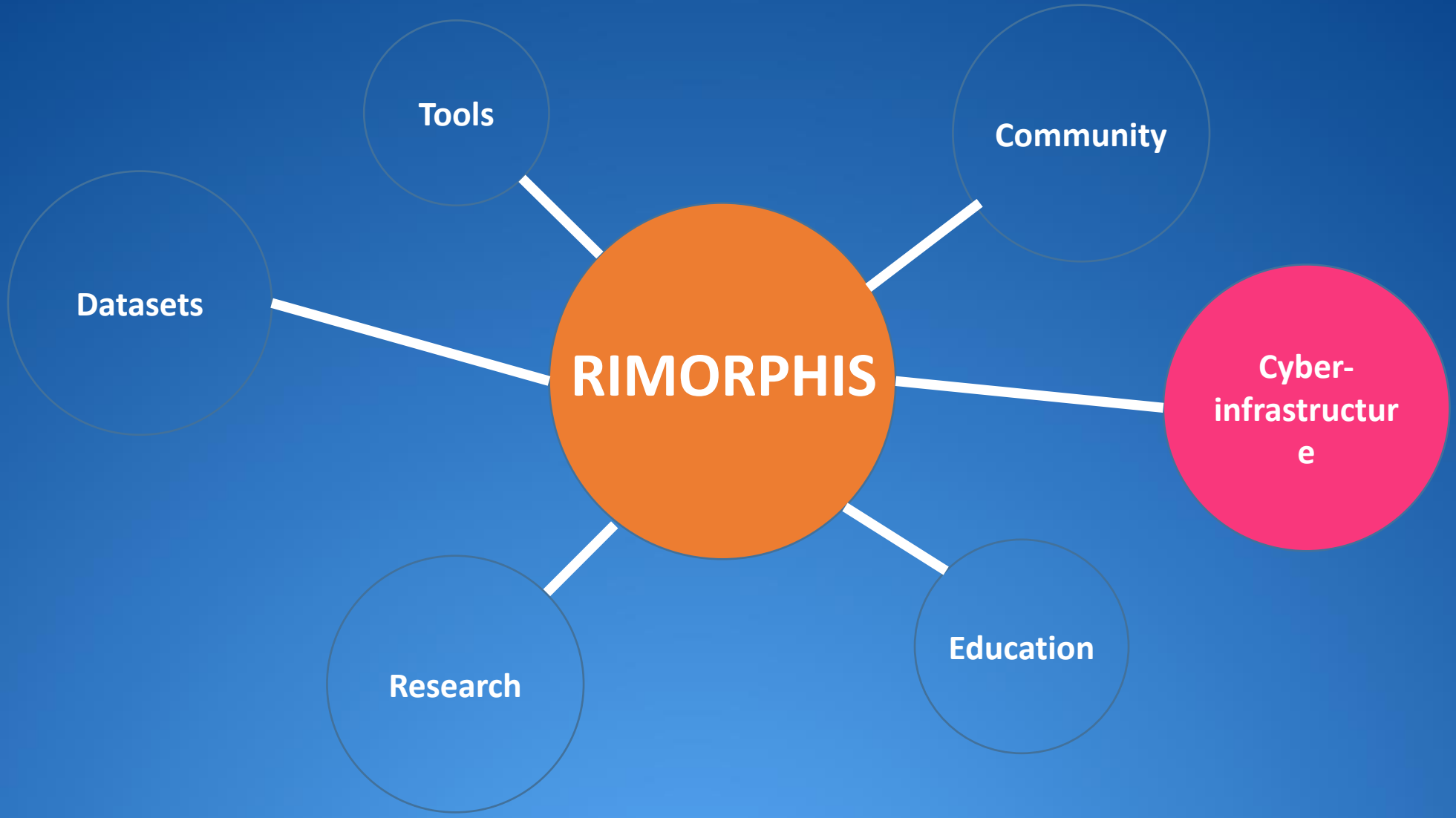

Presentations from the team and participants available on project website at: **rimorphis.org/workshop.html**

**Current partners include 3DEP (USGS), GDEP (USGS/USACE), eHydro (USACE)**

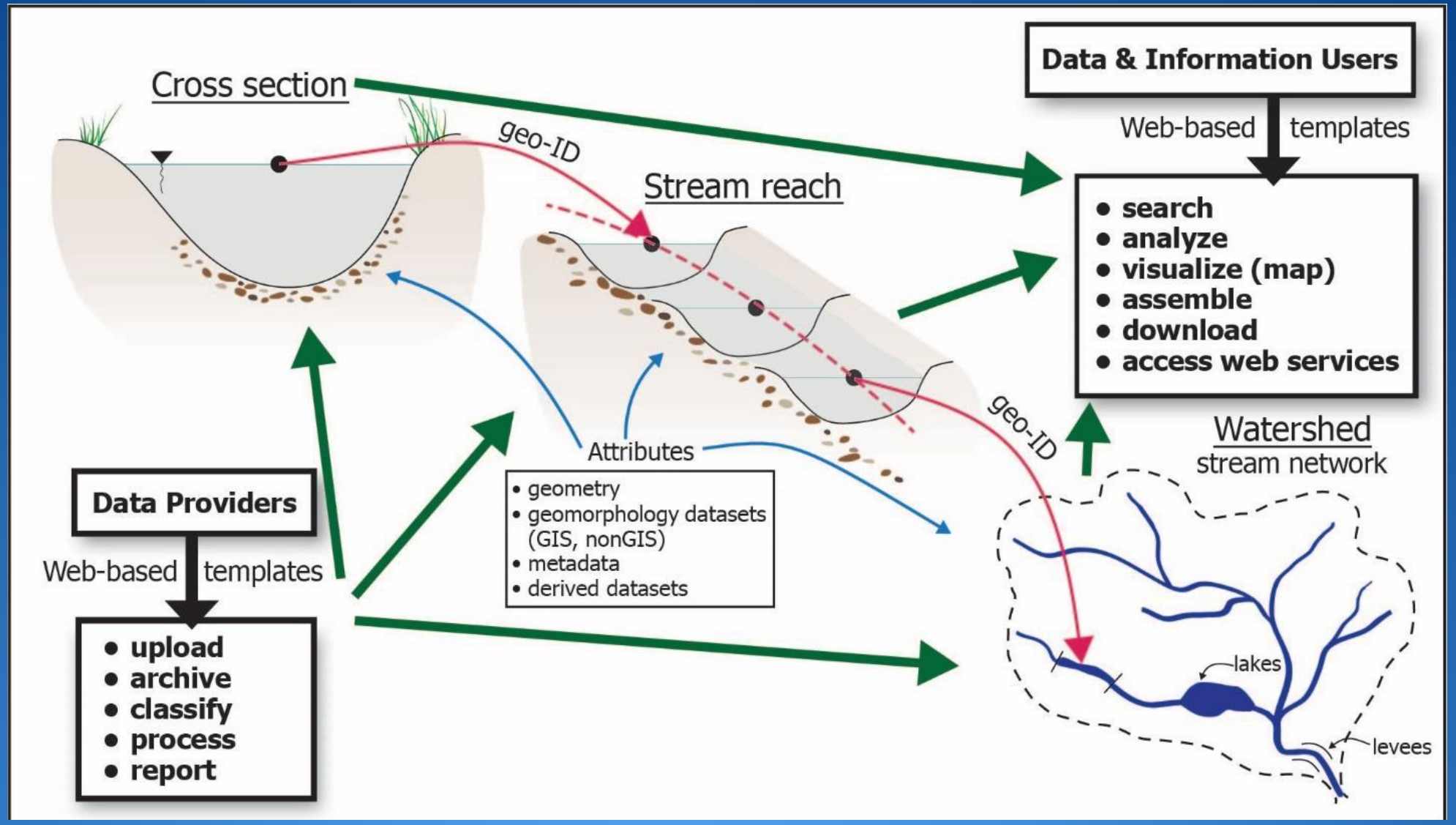
# RIMORHIS Workshop 2 – May 2022

- Total Registrations: 150
- Approximately 50% international
- Several federal agencies represented
  - USGS, NOAA, USDA, USFS, USACE, DOE
- 23 US universities are represented
- NSF, JPL, CUAHSI, industry

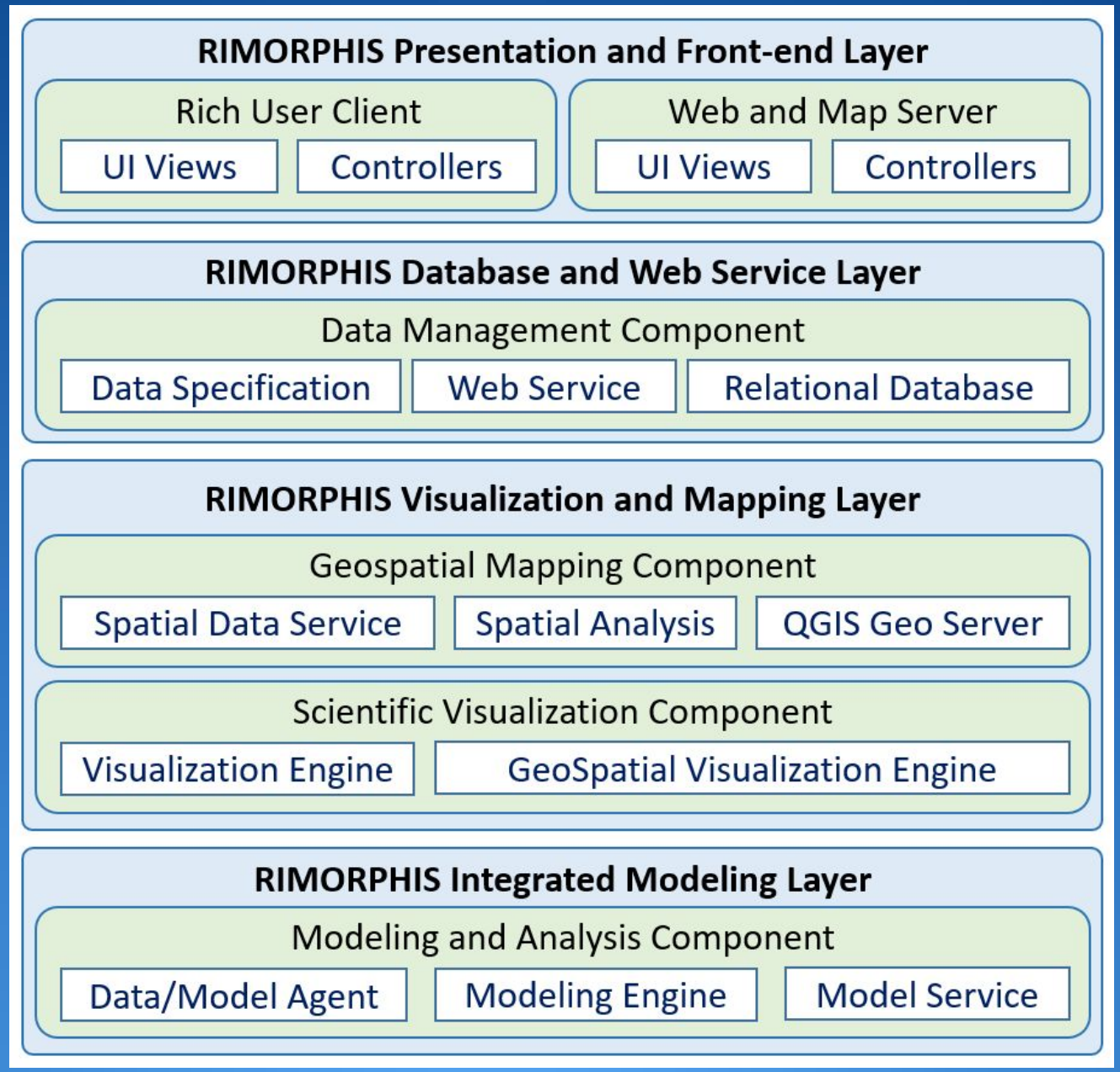
# RIMORPHIS Vision



# RIMORPHIS FRAMEWORK



# RIMORPHIS: Architecture



# Cyberinfrastructure Components

## NHDPlus HR based referencing structure

HUC4 Catchment




| RiverCatchmentNHD |
| --- |
| RiverCatchmentNHDID |
| Area (Km$^2$) |

| RiverFlowline |
| --- |
| RiverFlowlineID |
| ForeignID |
| ForeignReachCode |
| DownFlow |
| FromJunc |
| ToJuncti |
| RiverNa |
| Length |
| Slop |

| RiverJunction |
| --- |
| RiverJunctionID |
| Location (point) |
| ForeignID (nodeid) |

**Relational Data Model**

**RIMORPHIS** 1.0.5

[ Base URL: rimorphis.org/v2 ]
https://rimorphis.org/v2/swagger.json

This is the API for the RIMORPHIS (River Morphology Information System) project. You can use it to filter and retrieve morphological data for the United States.

Terms of service
Contact the developer

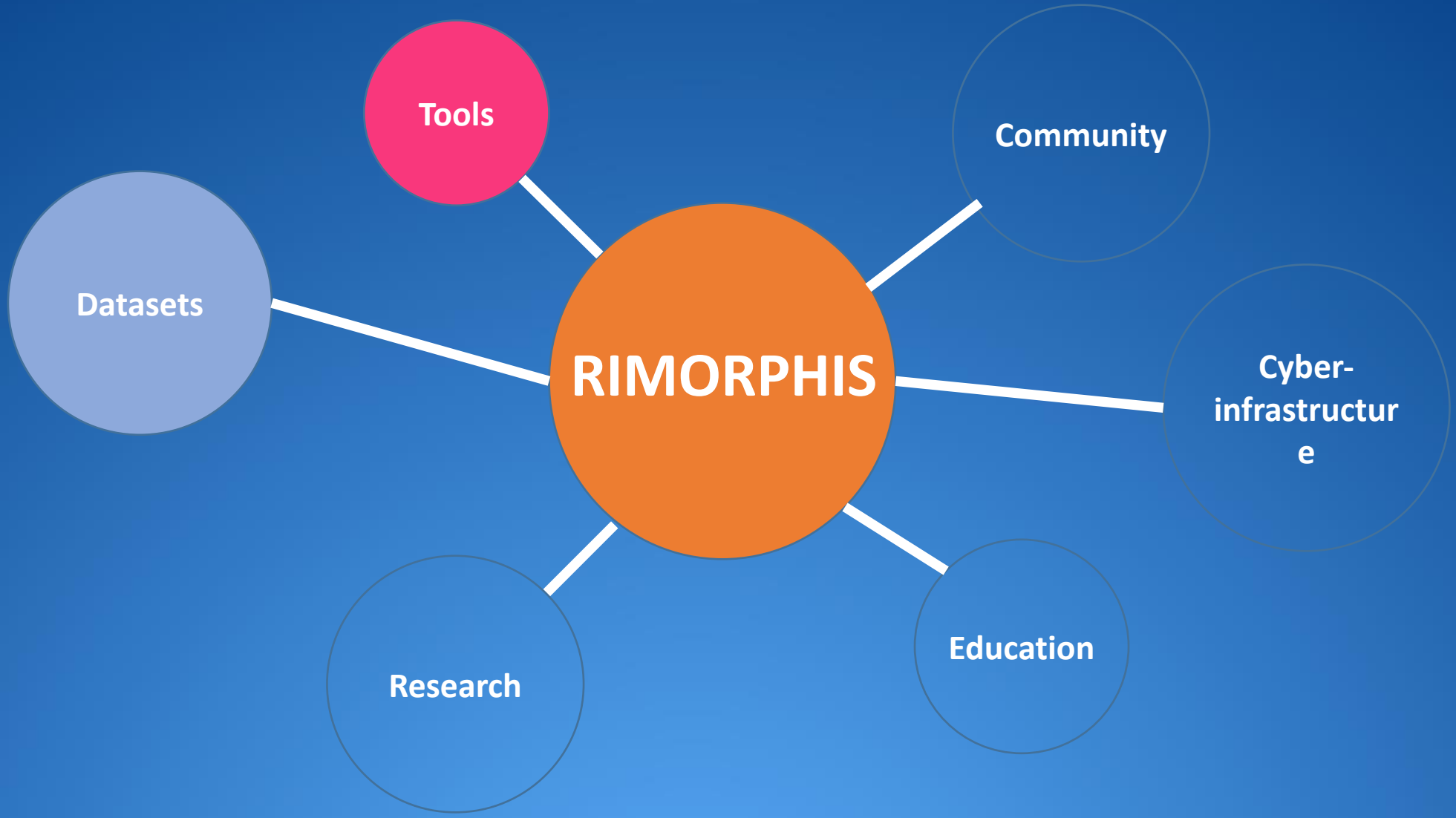
Schemes: HTTPS

Authorize

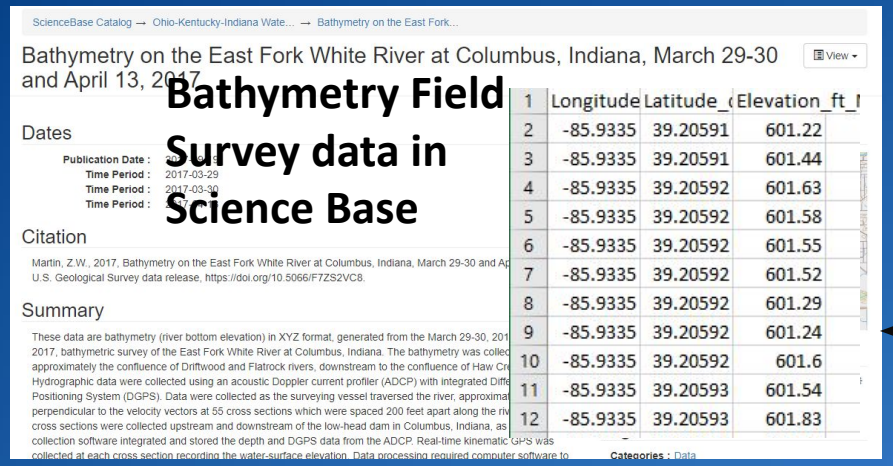
**API Development**

- **riverCatchment** Everything about Catchments — Find out more: http://rimorphis.org
- **riverJunction** Access to river junctions (i.e. nodes)
- **riverFlowline** Operations about flowlines — Find out more about the project: http://rimorphis.org
  - POST `/flowline/getDownstream` Returns the downstream flowline
  - POST `/flowline/calculateNetworkPath` Calculates the network path with given parameters
  - GET `/flowline/{RiverFlowlineID}` Get user by flowline ID
  - PUT `/flowline/{RiverFlowlineID}` Updated flowline

# RIMORPHIS Vision



# Enabling Data Discovery – 3DEP




**Bathymetry Field Survey data in Science Base**




**USGS 3DEP Topobathy Inventory**

**RIMORPHIS**



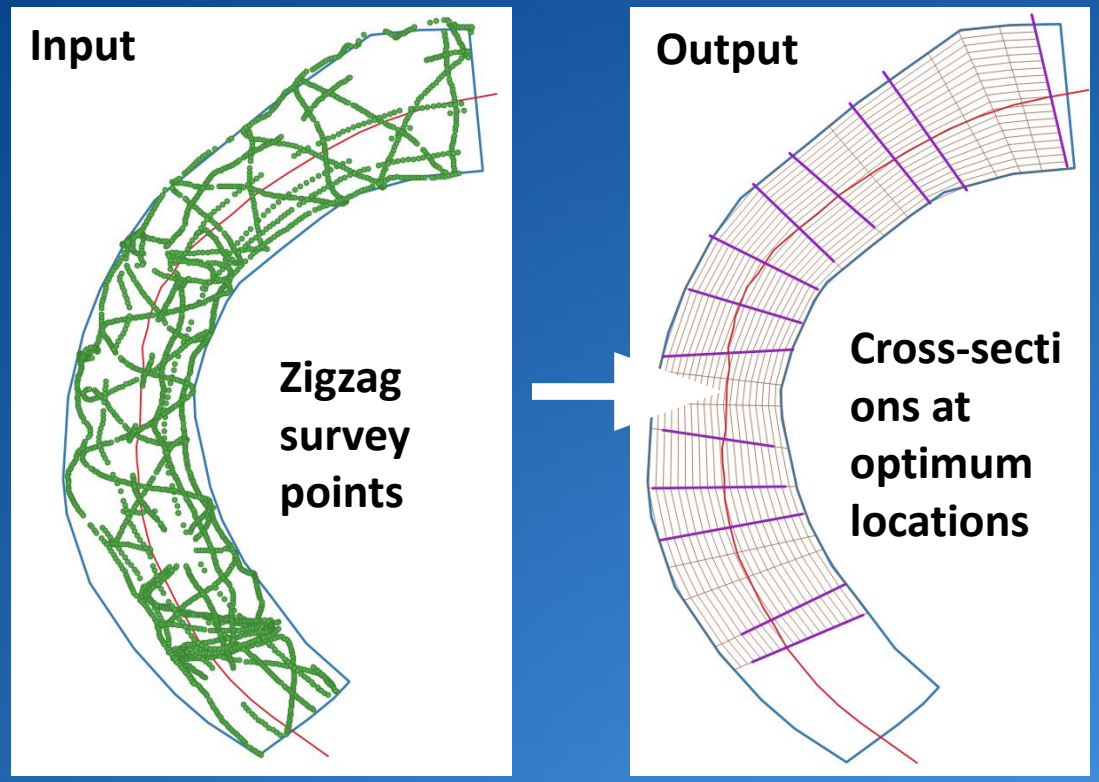

Yes

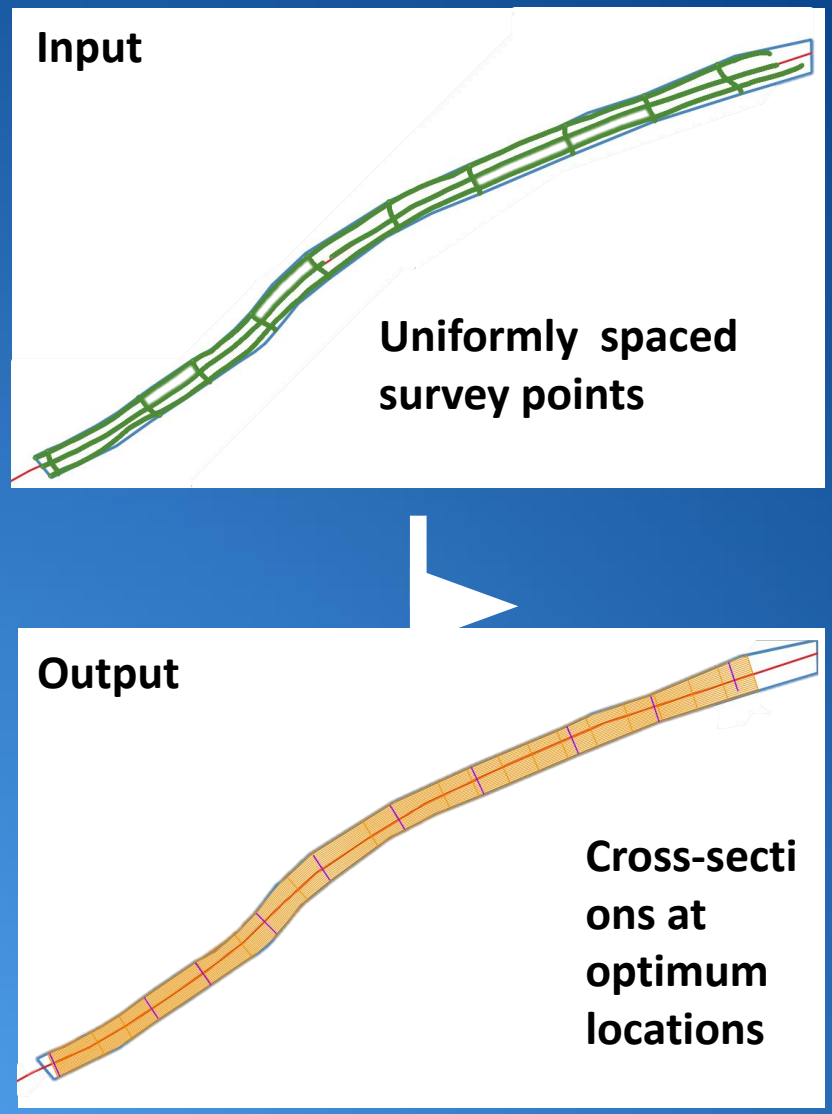


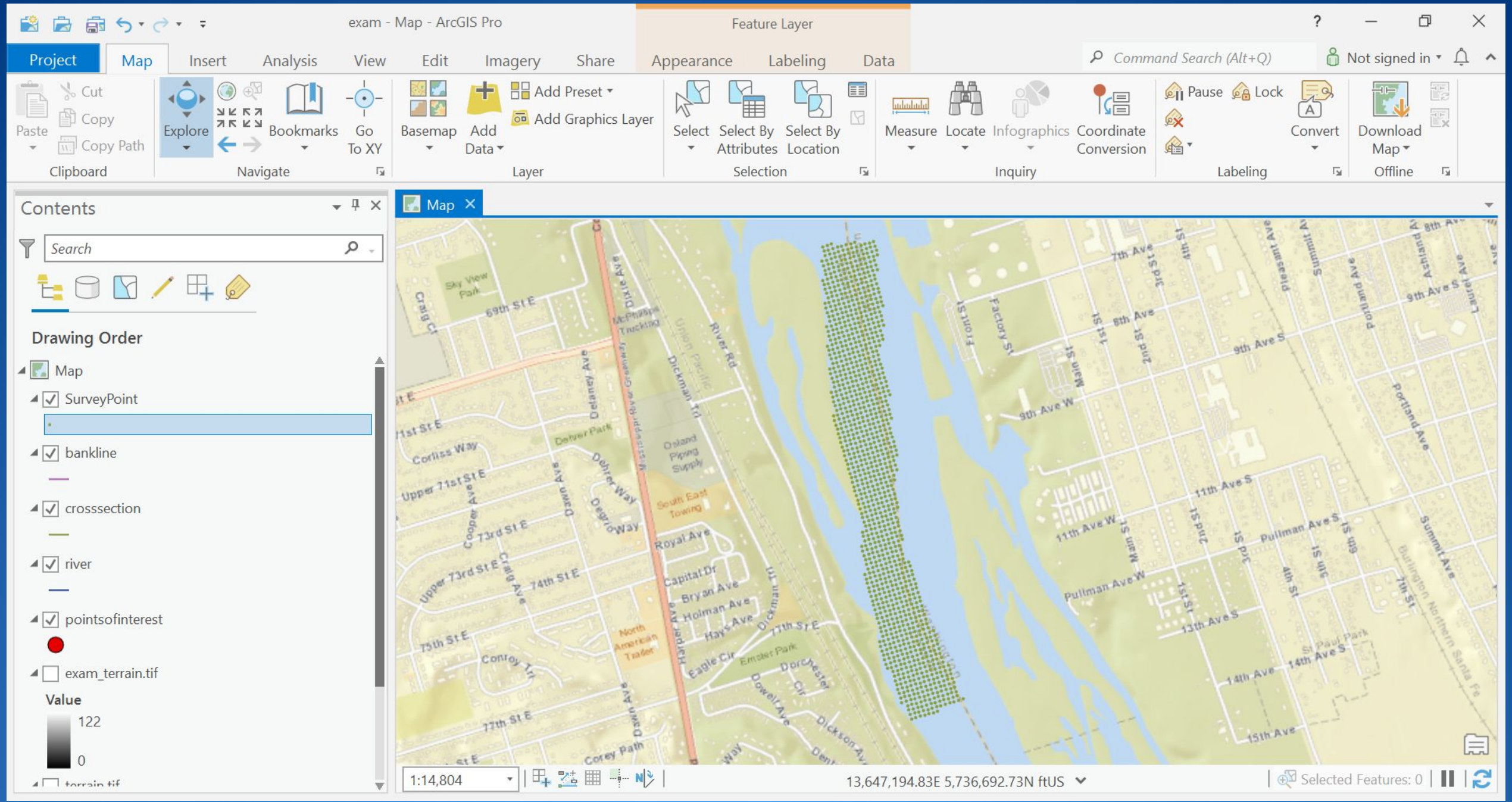
Data available?



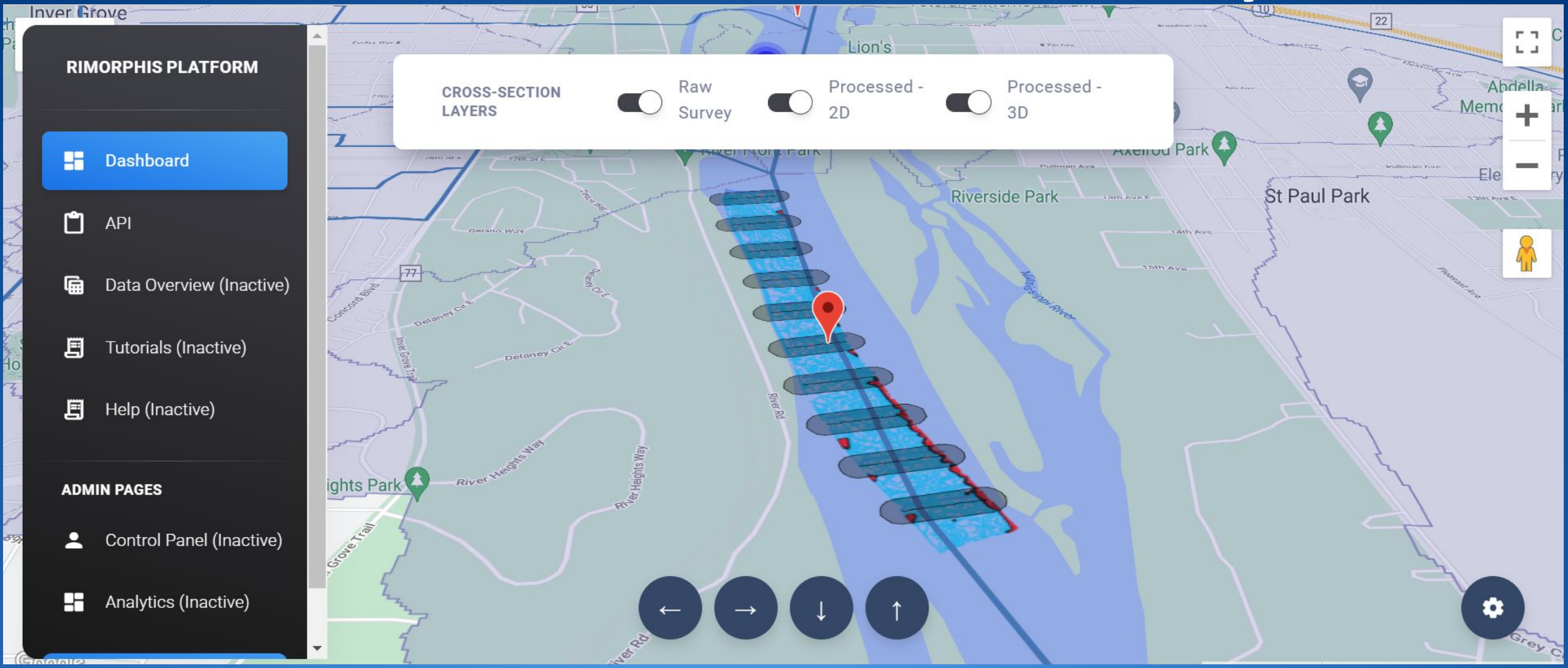
# Data conversion from points to lines




exam - Map - ArcGIS Pro
Feature Layer
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Appearance
Labeling
Data
Command Search (Alt+Q)
Not signed in
Cut
Copy
Copy Path
Paste
Clipboard
Explore
Bookmarks
Go To XY
Navigate
Basemap
Add Data
Add Preset
Add Graphics Layer
Layer
Select
Select By Attributes
Select By Location
Selection
Measure
Locate
Infographics
Coordinate Conversion
Inquiry
Pause
Lock
Convert
Labeling
Download Map
Offline
Contents
Search
Drawing Order
Map
SurveyPoint
bankline
crosssection
river
pointsofinterest
exam_terrain.tif
Value
122
0
Map
1:14,804
13,647,194.83E 5,736,692.73N ftUS
Selected Features: 0

# End Result from RIMORPHIS for eHydro




**Stay tuned to see this in action!**

# Today's Agenda

- 12:00 - 12:15: Project Introduction (Venkatesh Merwade)
- **12:15 - 12:35: Overview of RIMORPHIS Platform - Year 2 (Iowa team)**
- 12:35 - 12:50: Tools in Development (Purdue team)
- 12:50 - 12:55: Q & A
- 12:55 - 01:00: Break
- 01:00 - 01:05: Ground Rules (Toby Minear)
- 01:05 - 01:15: Polling Questions (Toby Minear)
- 01:15 - 01:40: Breakout Groups
- 01:40 - 01:55: Open Forum/Discussion
- 01:55 - 02:00: Concluding Remarks (Venkatesh Merwade)