



# Geospatial Software Institute Community Survey Results

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# Dynamic Geospatial Research Environment

- Opportunities and challenges
- How to best support geospatial software users in this environment?



# Geospatial Software Institute (GSI)

- Multi-year NSF planning grant for GSI (OAC-1743184)
- Currently active community institutes:
  - Institute for Research and Innovation in Software for High Energy Physics
  - Science Gateways Community Institute (SGCI)



# GSI Planning Objectives

- Assemble a team of geospatial experts
  - Academia, government, industry
- Develop a strategic plan
  - Vision, direction, purpose, goals



# Steps for Planning GSI

- Series of 3 workshops
- Engagement/outreach opportunities
- Determine community needs and requirements



# How to find out more about the Geospatial Community?

- Survey geospatial software users!
- Survey Team:
  - William Barley, Shaowen Wang, Anand Padmanabhan, Yan Liu, Becky Vandewalle
- Initial survey, follow-up survey



# Survey Design

- What do we want to discover from survey participants?
  - Who are they? Their needs?
- Geospatial software use
- Perceived limitations
- What types of research questions are currently limited by limitations of geospatial software



# Survey Sections

- Introduction
- Geospatial Software Used/Frequency of Use
- What do you use geospatial software for?
- Data/Analysis/Computation
- Software Development
- Access/Sharing/Publishing
- Demographics



# Survey Implementation

- Qualtrics
  - Web-based survey platform
- Voluntary
- IRB





# Finding Participants

- GIS Listservs
  - AAG, AGILE, CRYOLIST, CyberGIS, Geo4all, SIGSPATIAL, SESYNC, UCGIS, XSEDE
- Open invitation at workshops/conference talks



# Analysis Methods

- Descriptive charts/statistics
- Qualitative coding



# Results

- Responses from Jan-Dec 2018
- 526 responses
  - ~446 with usable data
  - 271 completed all questions
- 29% Female, 66% Male
- 62% Academic, 19% Government, 17% Industry/Non-profit

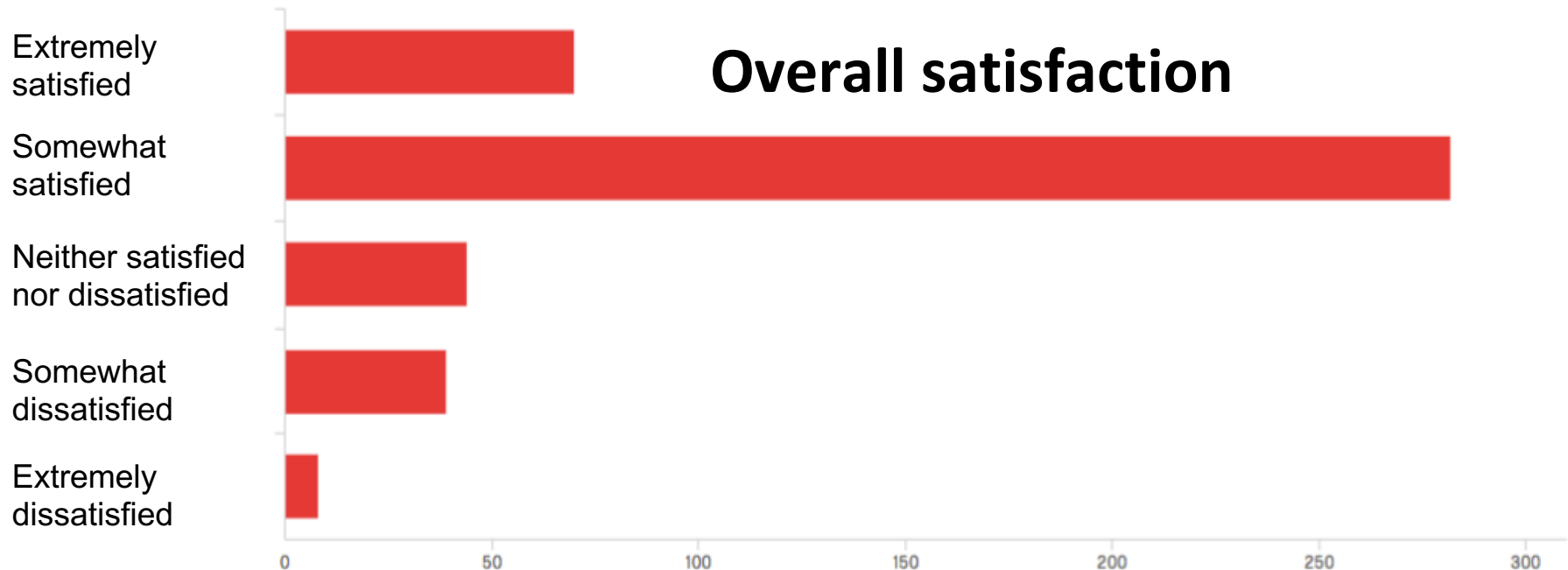
# Tools, Disciplines





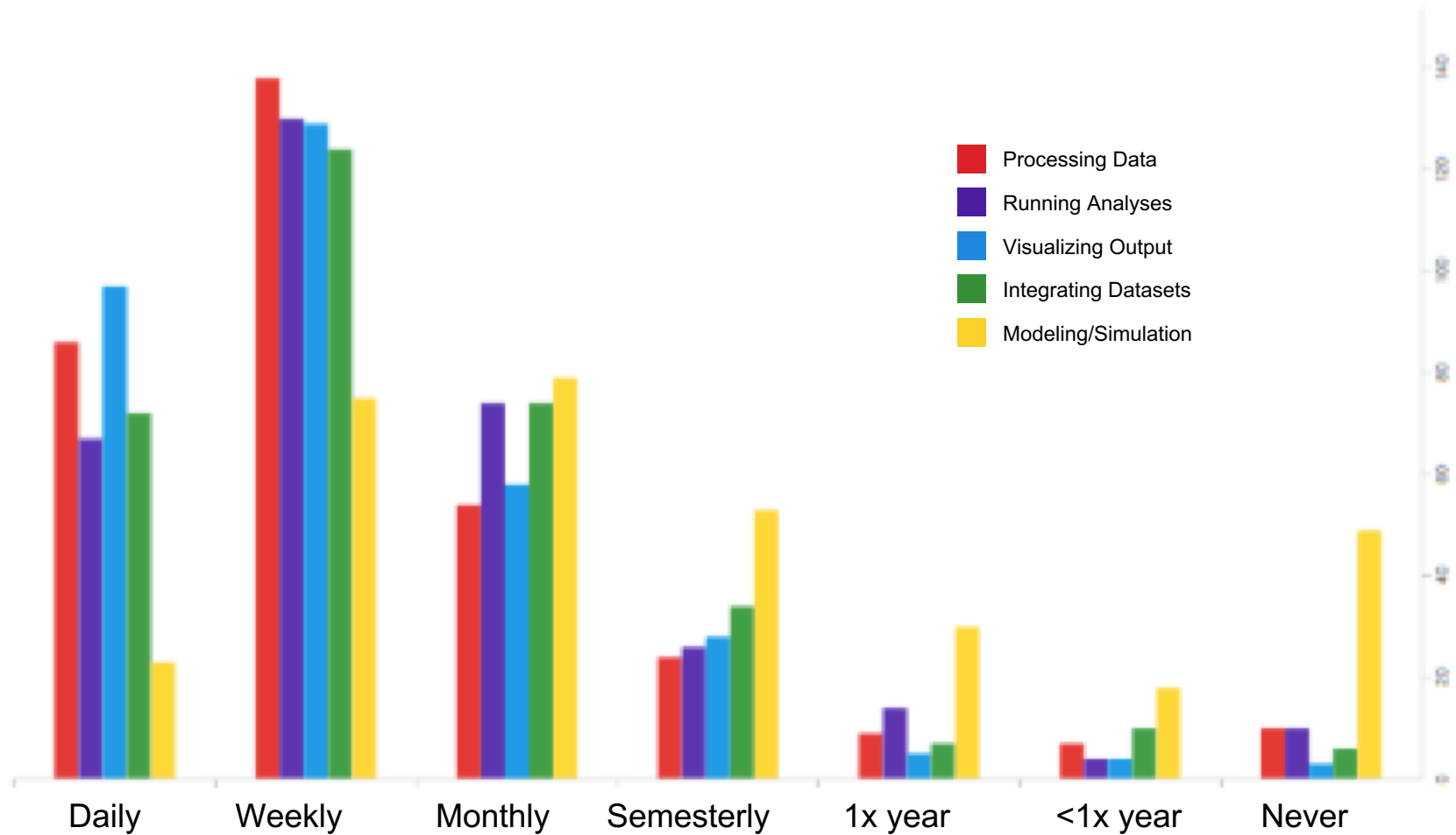
# Overview

- 82% use geospatial software  $\geq 1x$  per week
- 90% see tools as extremely/very important to their work



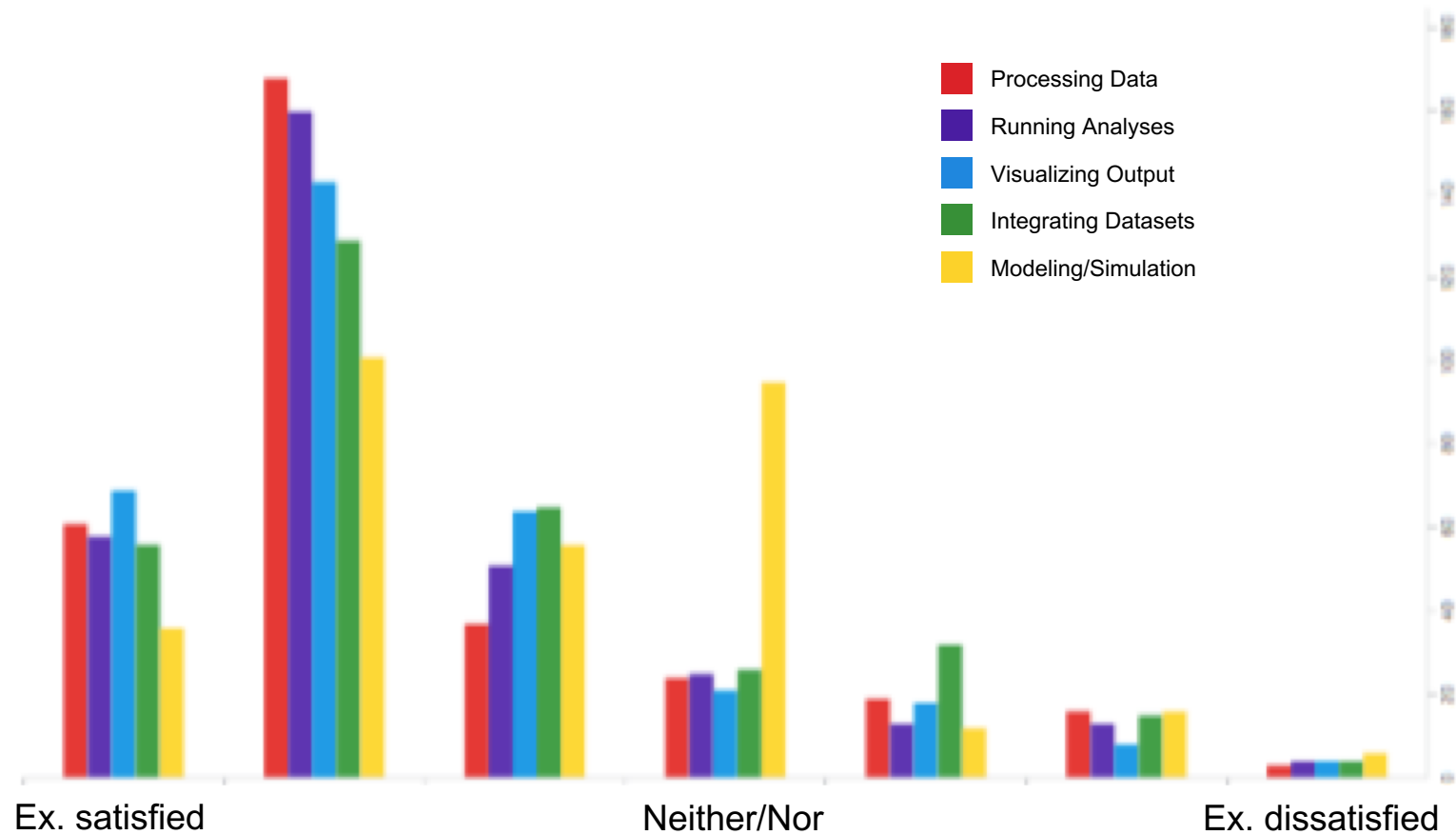


# Geospatial Software Uses





# Satisfaction

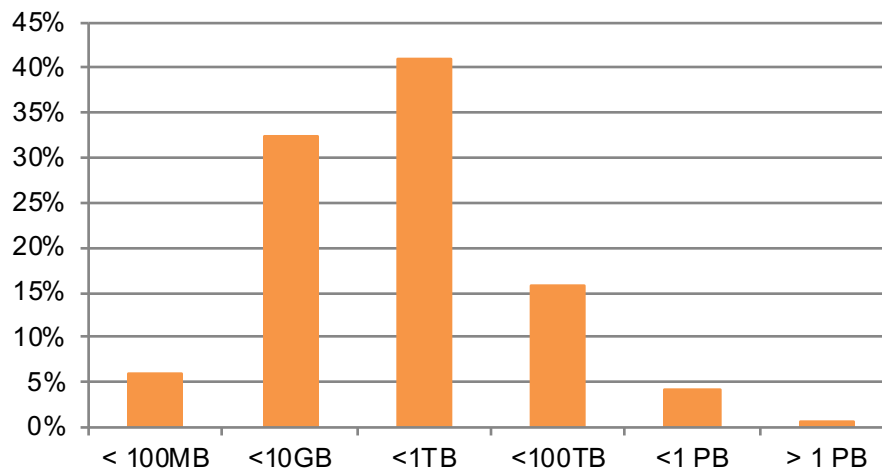




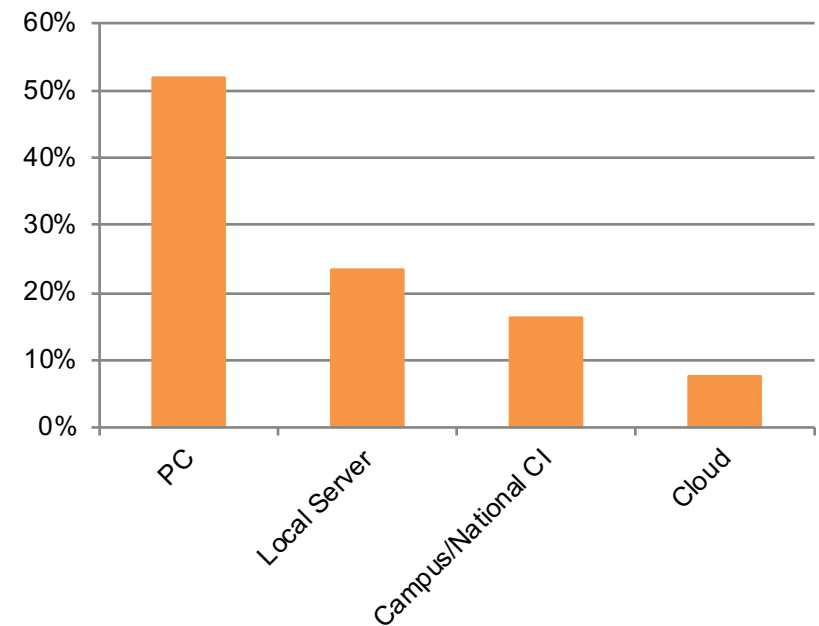


# An Example Analysis

**Data Size**

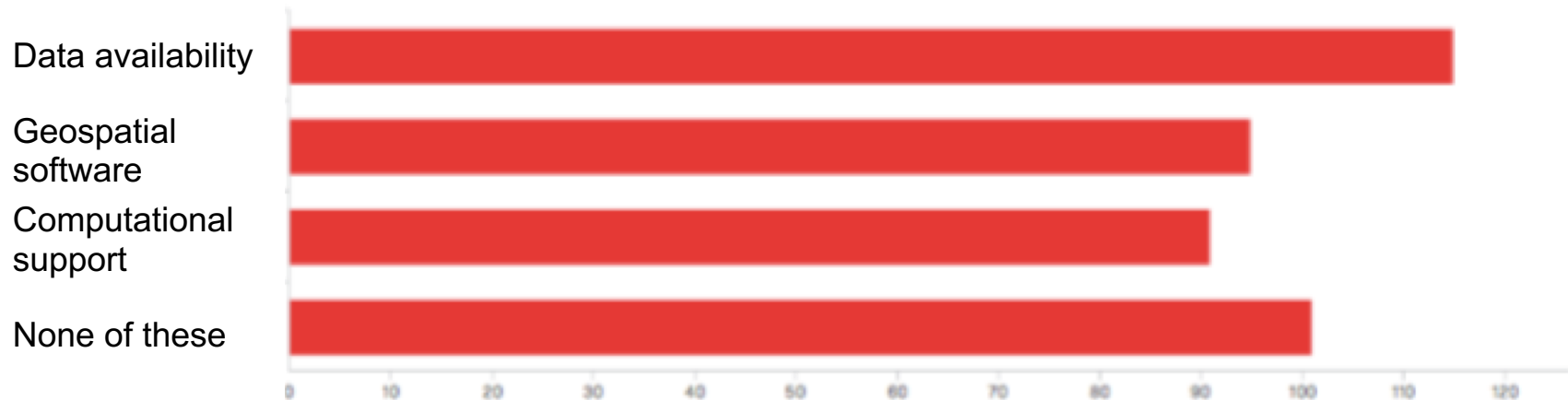


**Computing Platform**





# Limitations



42% of users reported their work was limited by inadequacies in geospatial software (n=329)



# Limitations

- Steep learning curve
- Difficult to find appropriate tools
- Inconsistent data availability and suitability
- Difficulty integrating heterogeneous data
- Too fast or too slow development rate
- Buggy, fragile software ecosystem
- Poor inter-tool compatibility, tool scope
- Costly resource access (for data, computation)
- Computing limitations



# Directions

- Integrating complex heterogeneous data
- Analyzing larger datasets
- Forecasting and modeling
- Scientific exploration



# Thoughts

- “Often, research questions are confronted with having to use a myriad of tools, resulting in a Frankenstein approach to produce a desired outcome”
- “While it is essential to keep innovating software and methods, it happens at a pace that's difficult to keep up with”
- “I don't want to anticipate all the science questions that can be considered if we had access to amazing geospatial software”



# Future Work

- Write up and publish survey results
- Next workshop, final survey



# Thank you!

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Visit the GSI website: <http://gsi.cigi.illinois.edu/>