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GIS and Data: Making Space @ MIT: Development of the MIT Libraries GIS and Data Lab

Amy Nurnberger
Massachusetts Institute of Technology

Et al.

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GIS and Data: Making Space @ MIT

Development of the MIT Libraries GIS and Data Lab

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Daniel Sheehan,
Program Head, GIS & Statistical Software Services

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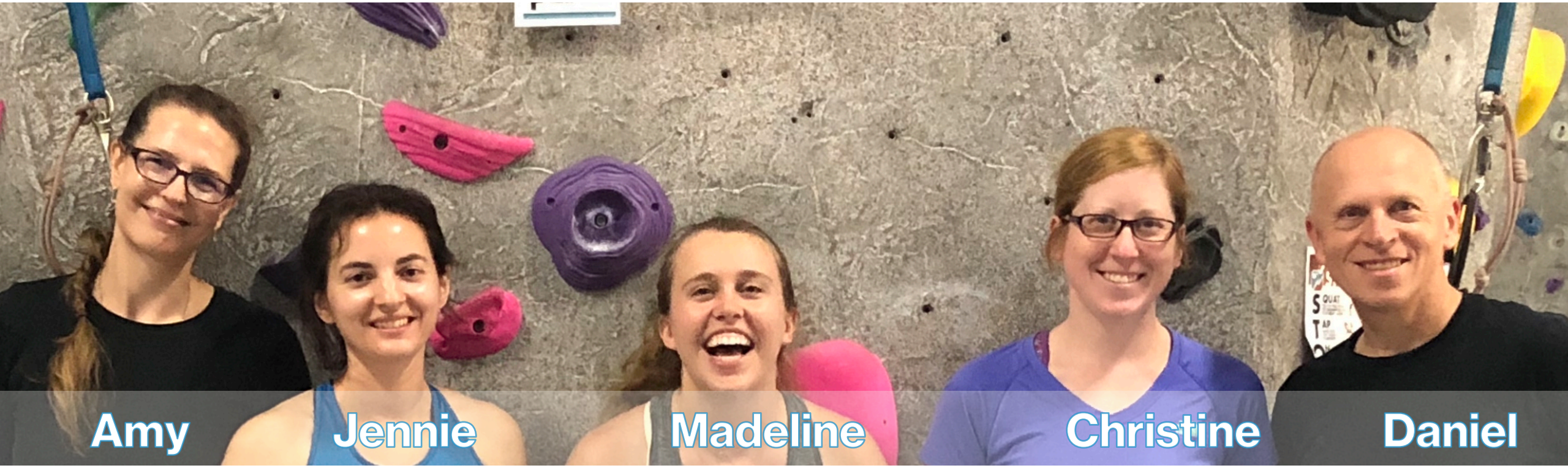
NNLM-NER e-Science Social, 2019-03-29
Northborough, MA

MIT Libraries

Introductions: DSS → GIS & DMS teams



Helen Bailey
DMS & DLS

Phoebe Ayers
DMS & LIRS

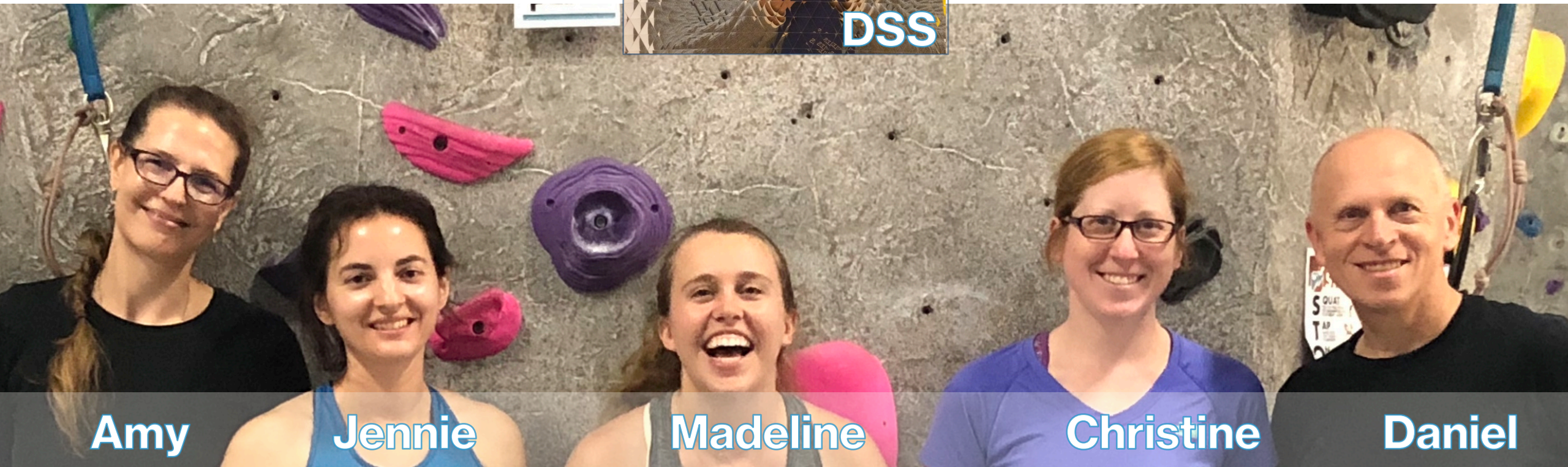
Ece Turnator
DMS & LIRS

Joe Carrano
DMS & IASC

Ye Li
DMS & LIRS

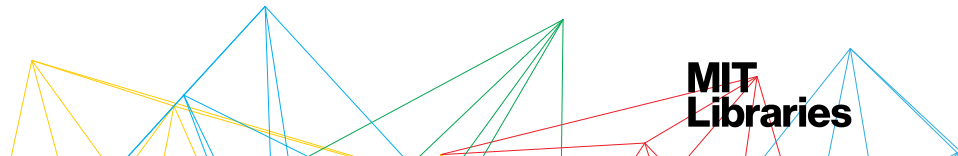
Mikki S. Macdonald
DMS & SCCS

Introductions: Data & Specialized Services



Plan for this session

- Understand the MIT context for GIS and RDM services
- Follow the development of the GIS and Data Lab space
  - Successes
  - Lessons
- Understand the space assessment goals and results
  - Successes
  - Lessons
- Explore future plans



GIS @ MIT Libraries

Data Management Services @ MIT

Census data leads librarians to GIS & spatial data

1990s

MIT Academic Computing hires GIS Specialist; Esri license

1999

GIS workshop given during IAP

2000

MIT Libraries hires GIS Specialist

2001

Access to geospatial data collection through Arcgis

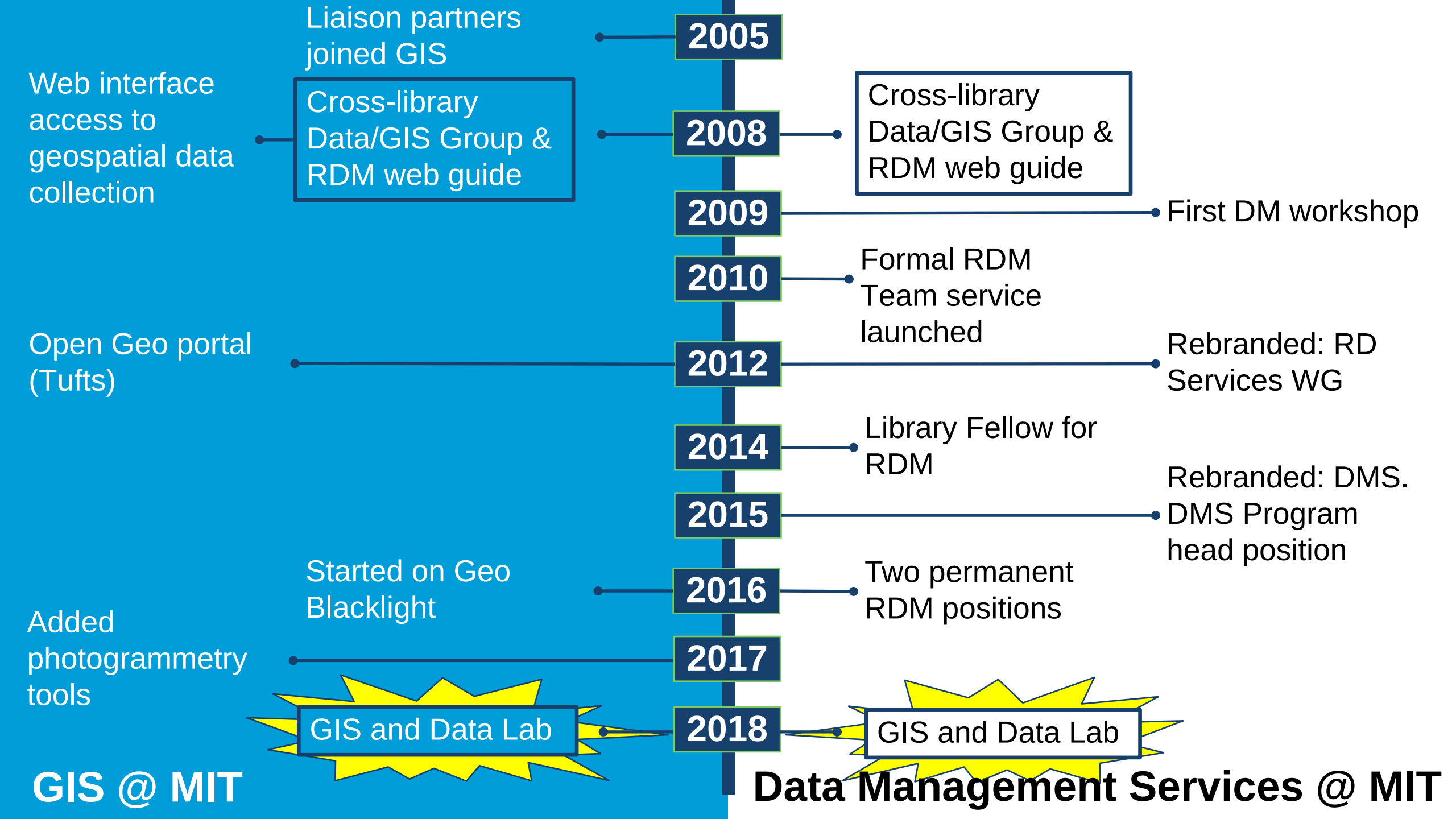
GIS Lab & tech funded by Academic Computing

2002

GIS Lab has six computers

2004

Data Services Reference Librarian began providing informal DM support


Liaison partners joined GIS
2005
Web interface access to geospatial data collection
Cross-library Data/GIS Group & RDM web guide
2008
Cross-library Data/GIS Group & RDM web guide
2009
First DM workshop
2010
Formal RDM Team service launched
Open Geo portal (Tufts)
2012
Rebranded: RD Services WG
2014
Library Fellow for RDM
2015
Rebranded: DMS. DMS Program head position
Started on Geo Blacklight
2016
Two permanent RDM positions
Added photogrammetry tools
2017
GIS and Data Lab
2018
GIS and Data Lab
GIS @ MIT
Data Management Services @ MIT

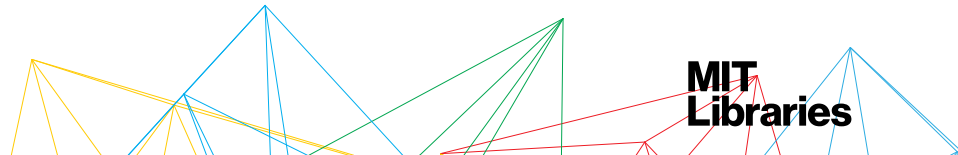
In the beginning,

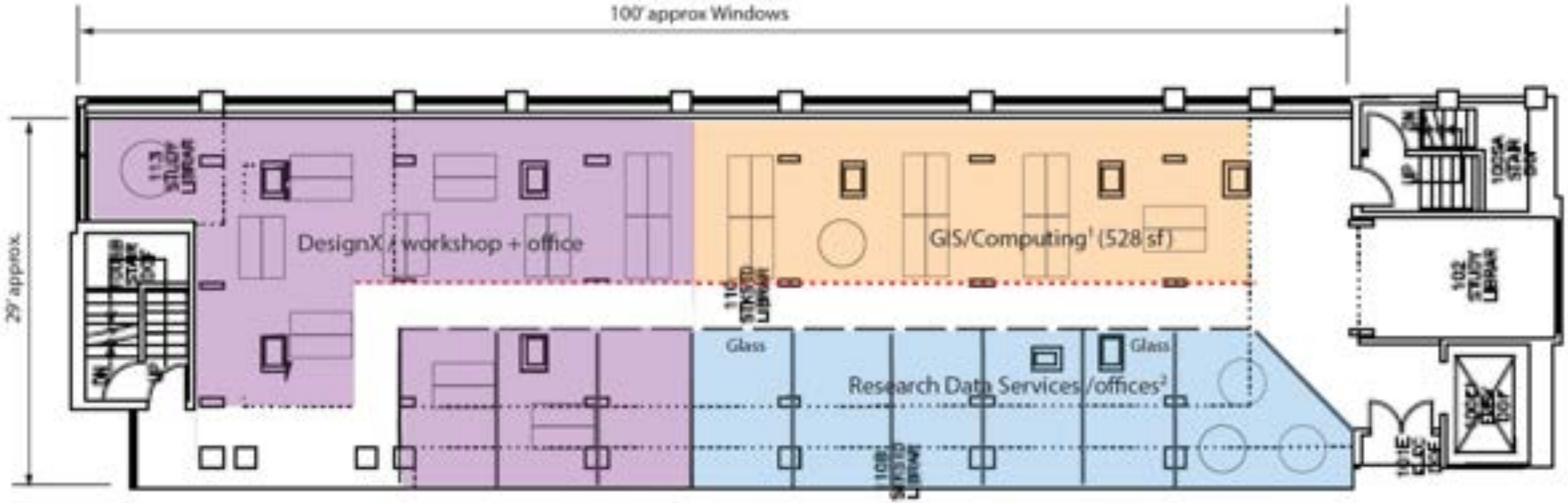
MIT DESIGN X

+

MIT Libraries

MITdesignX is an academic program in the MIT School of Architecture and Planning (SA+P) dedicated to design innovation and entrepreneurship.



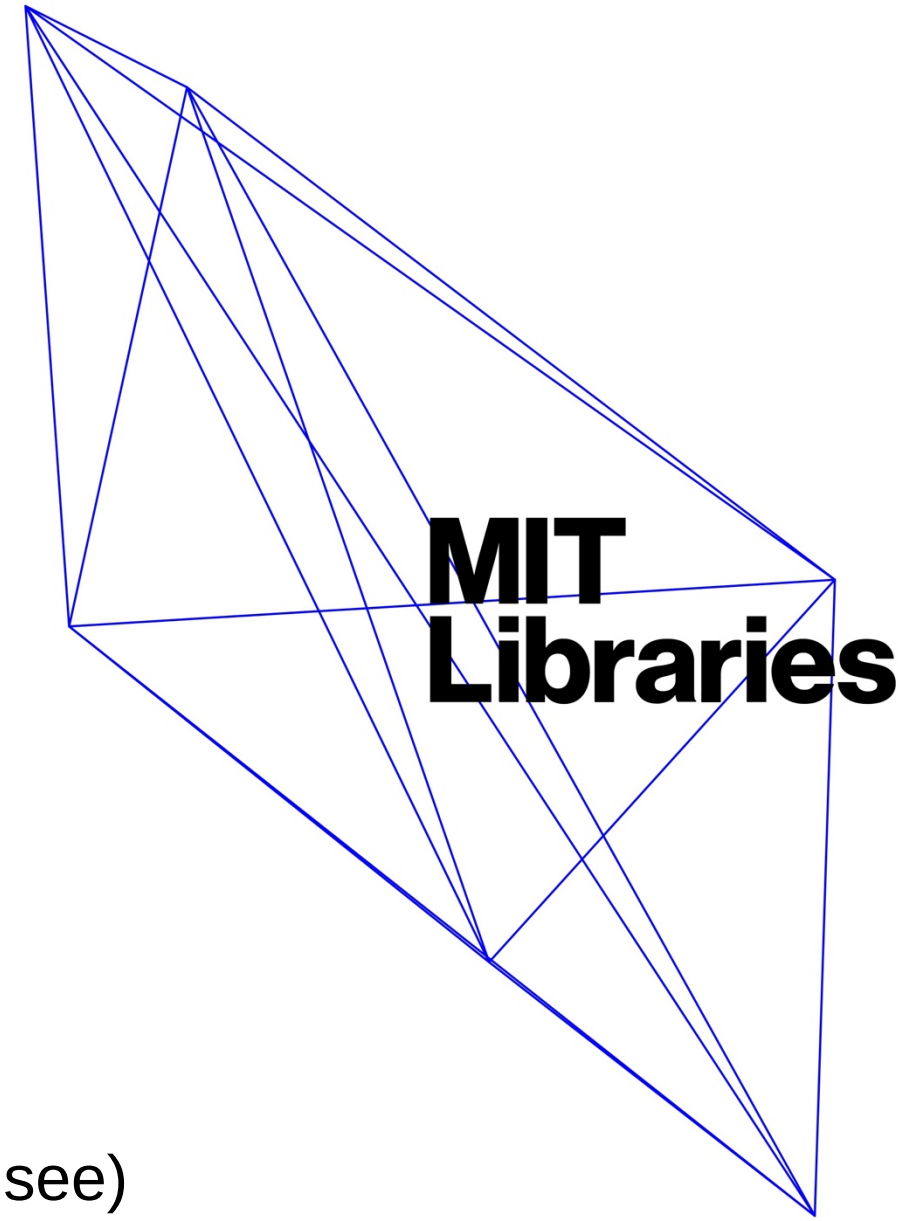


MIT Libraries

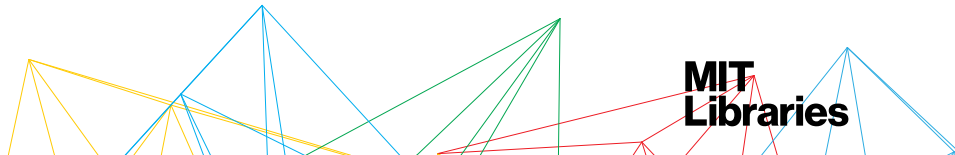
But then, things happened…

Our separate ways by Jukka Zitting https://www.flickr.com/photos/jlz/4138818696 CC By 2.0

and it became



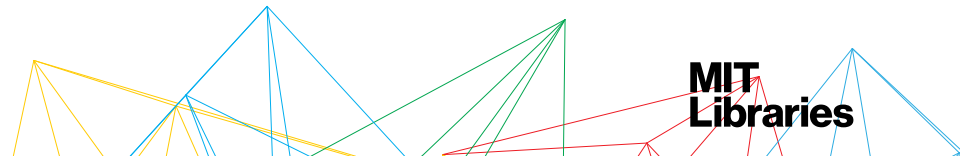
(Good thing, too, once we got into the space – you'll see)



New goals!

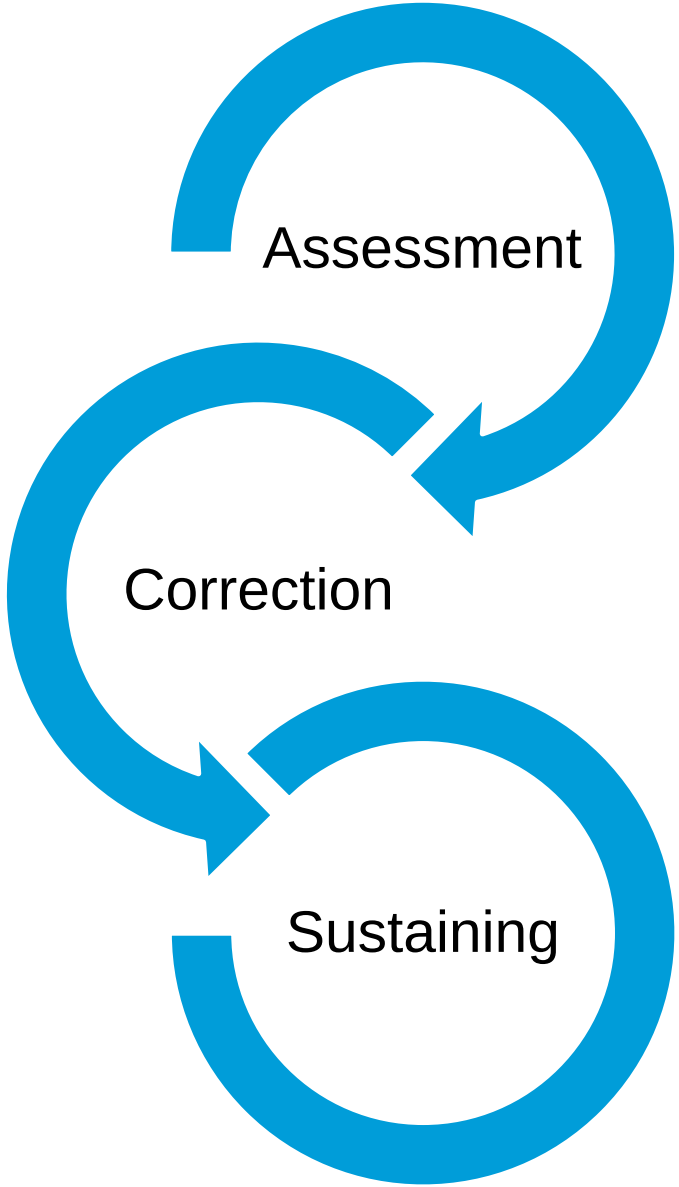
"focused spaces for Learning, Community, and Creating"

- Co-locates DSS staff in GIS and Data Management services;
- Expands the current GIS lab to:
  - Accommodate additional users,
  - Enable experimentation with additional data services on lab computers, and
  - Improve instruction capabilities.
- Creates space for consultation and collaboration;
- Provides space to experiment with visualization and virtual reality technologies.
- Adapts to current and future needs of DSS and the MIT Libraries
- Increases access to expertise



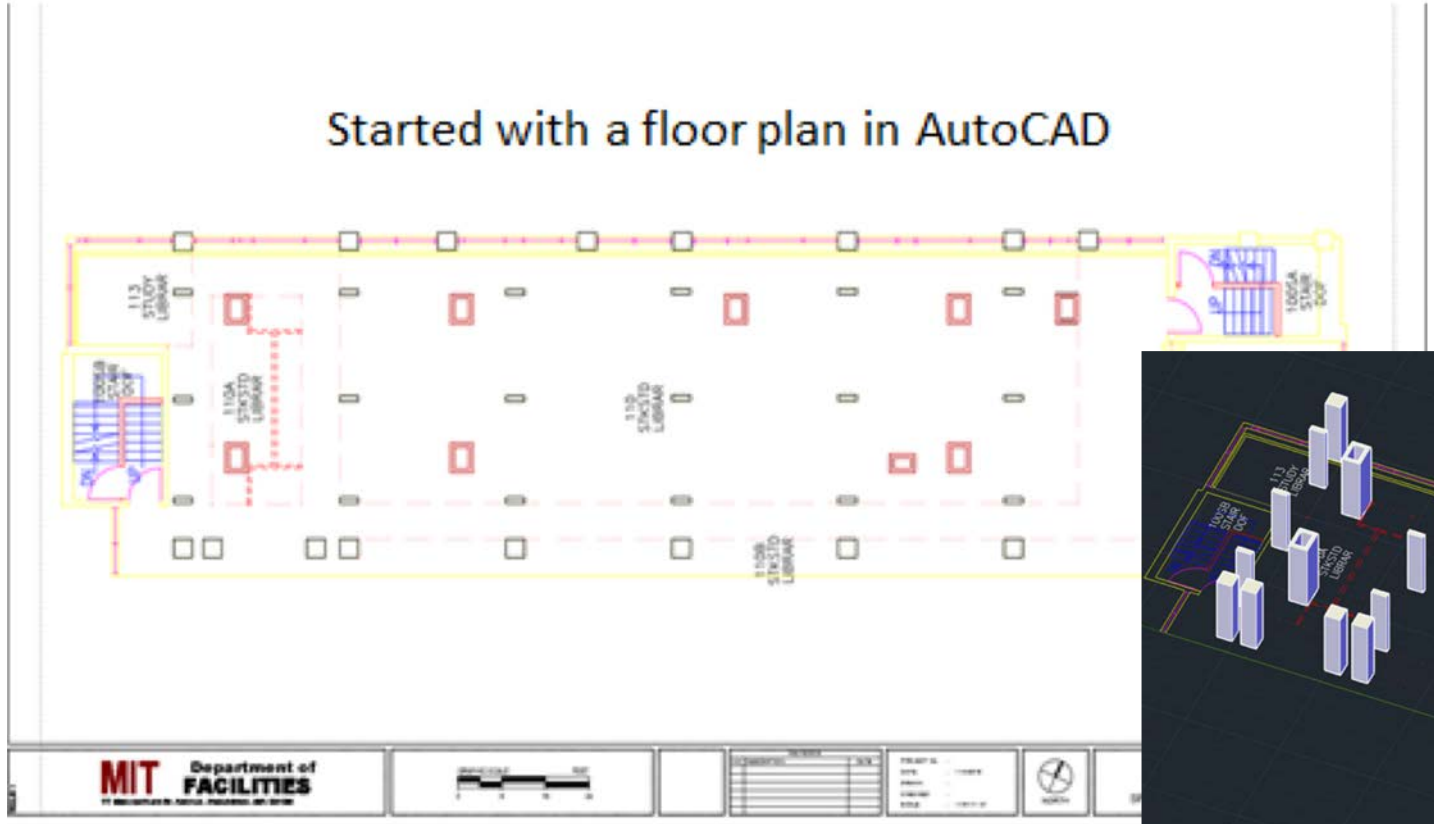
The process

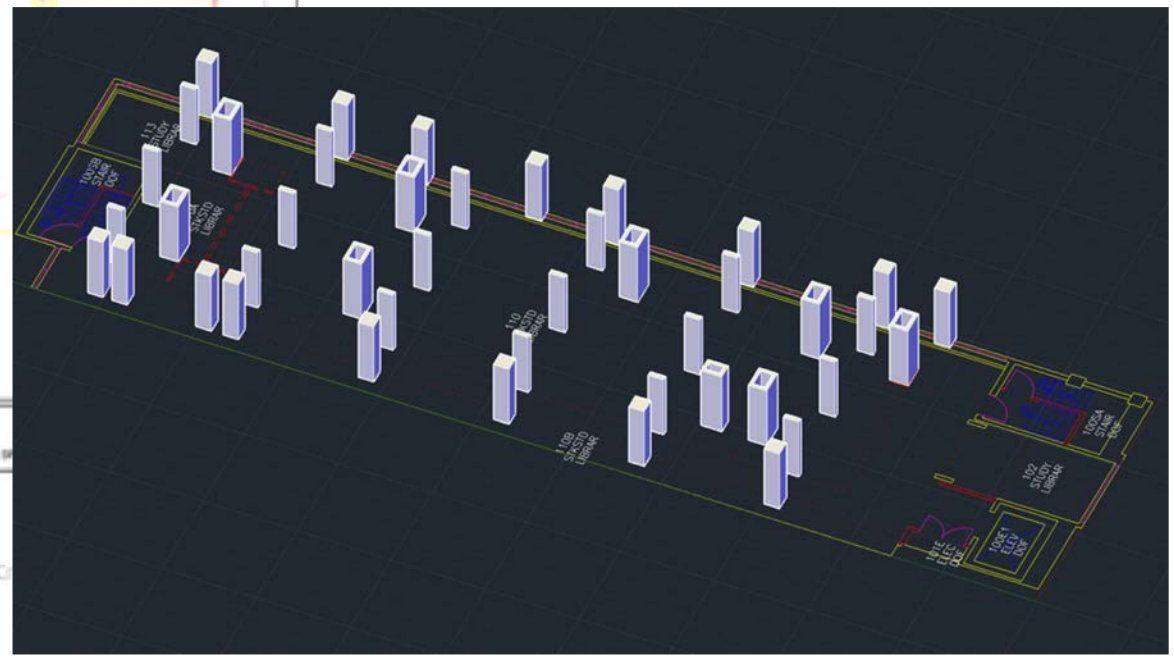
- **Needs**
  - **Services**
  - **Power & data**
  - **Floorplan & furniture**
  - **Offices**
- Solutions
- Refinement
- Implementation



MIT Libraries

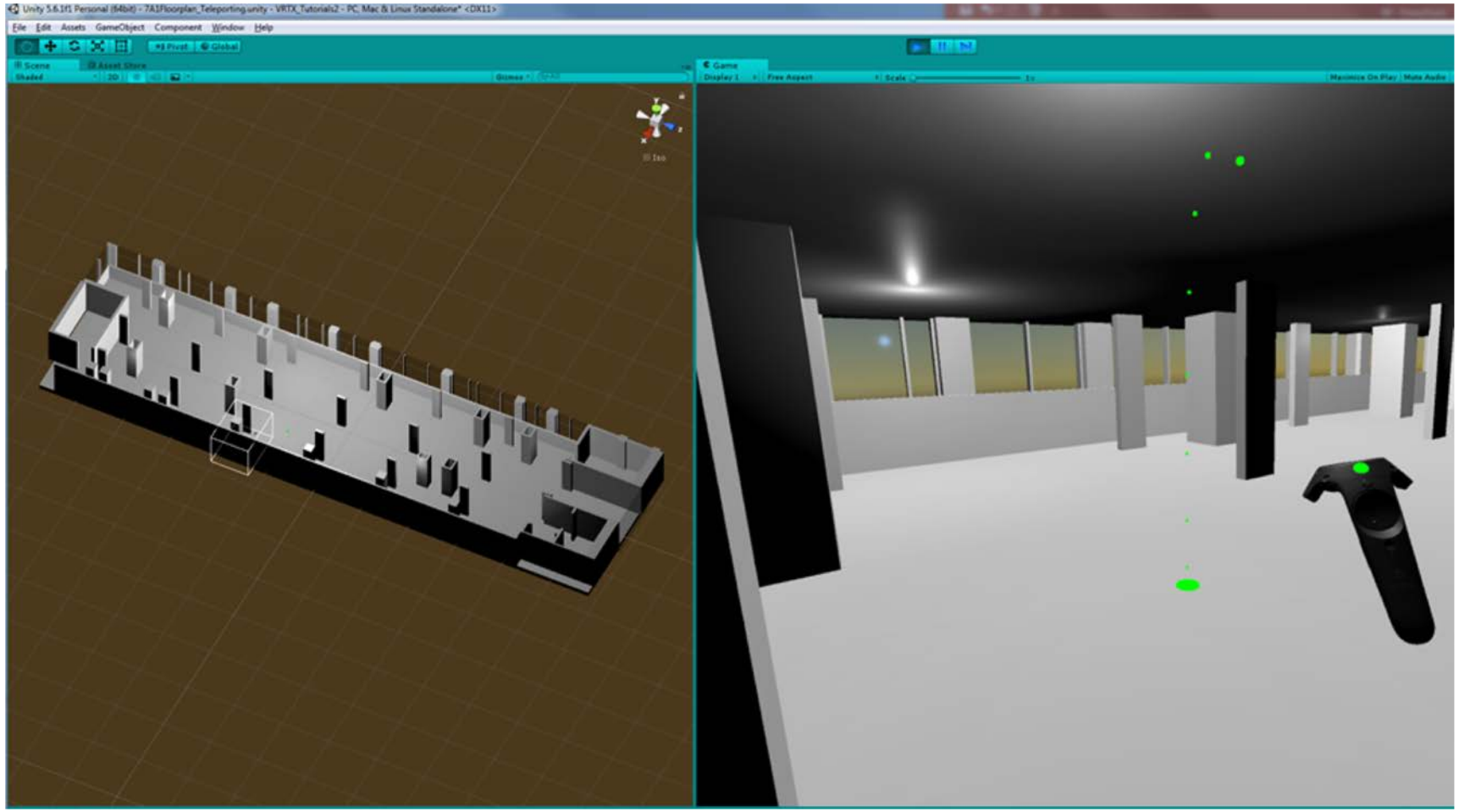
Transition to a new GIS and Data Lab





MIT Libraries

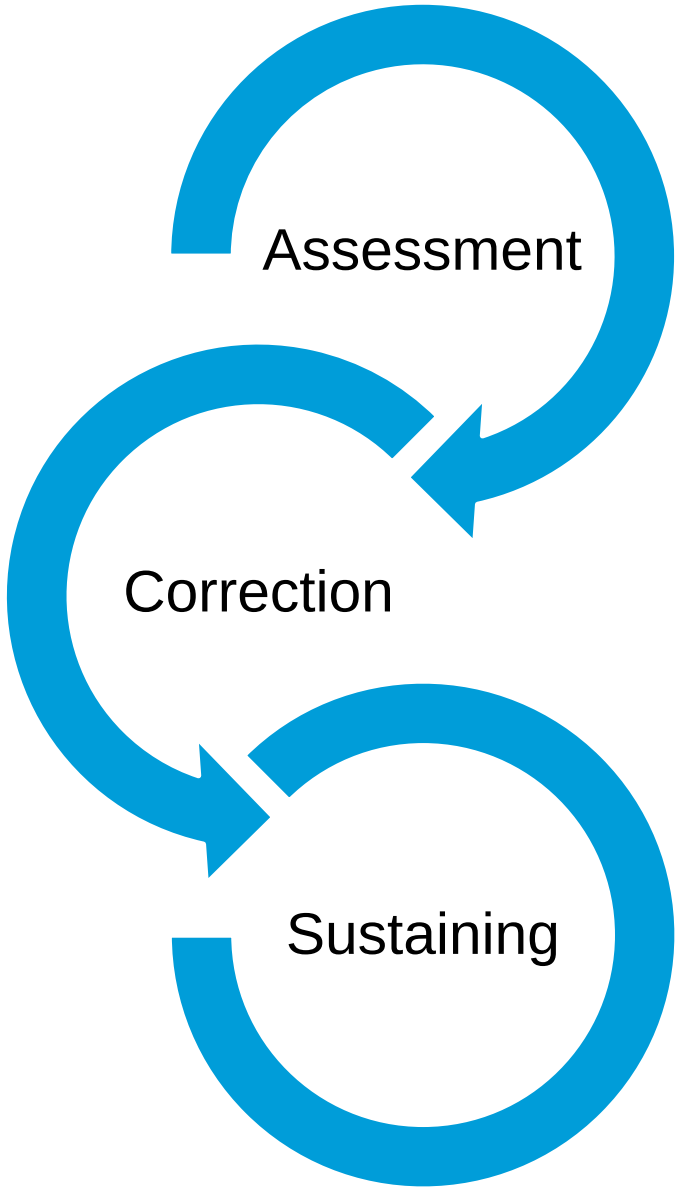
Transition to a new GIS and Data Lab



MIT Libraries

The process

- ⬇Needs
  - Services
  - Power & data
  - Floorplan & furniture
  - Offices
- ⬇Solutions
- ⬇Refinement
- ⬇Implementation



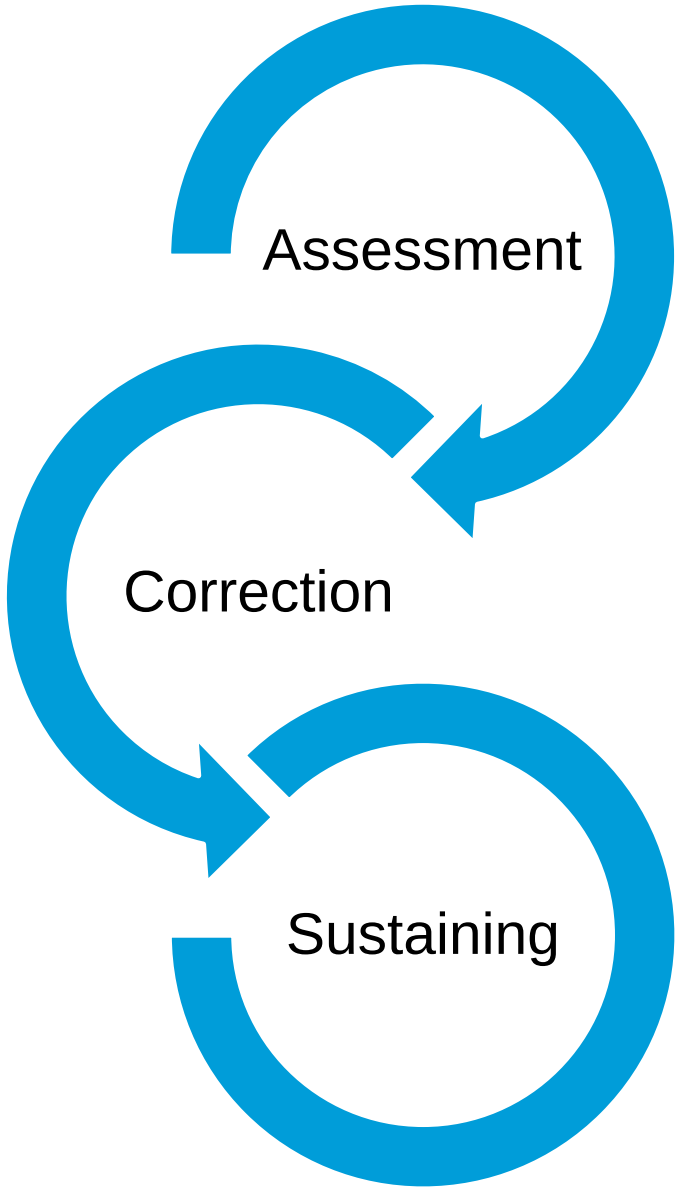
MIT Libraries

Money slide: Space takes money!

- Awesome things we did
  - Good compute power
  - Sustainable funding plan for tech
  - Experimental software
  - Great AV
  - VR equipment and area
- Creativity within restrictions
  - Electricity
    - Outlets
    - Lighting
  - Cubicles
  - Design

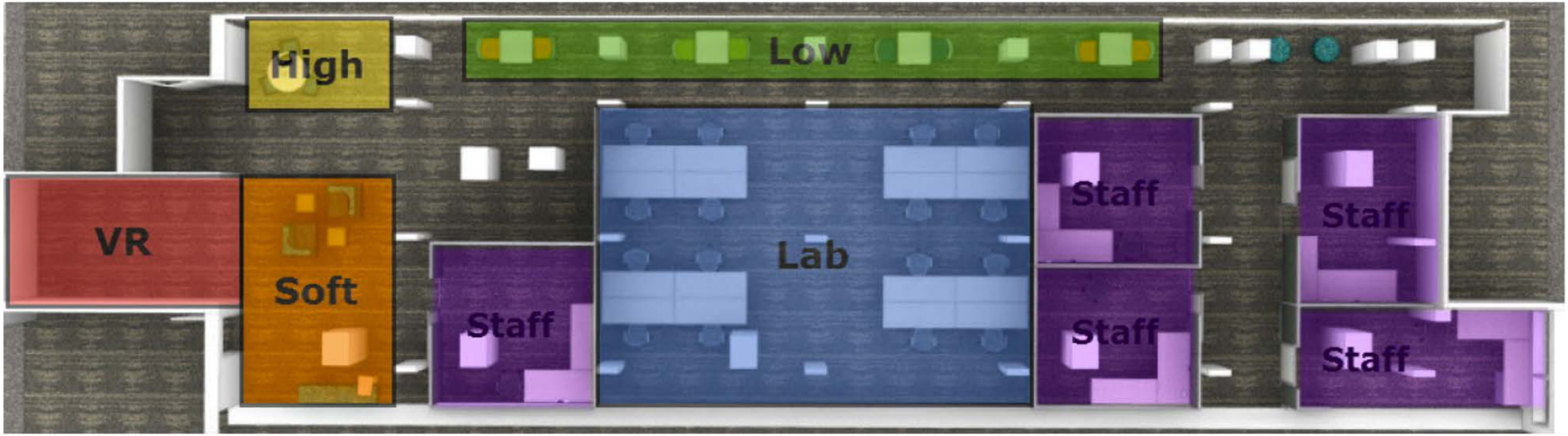
The process

- ⬇Needs
  - Services
  - Power & data
  - Floorplan & furniture
  - Offices
- ⬇Solutions
- ⬇Refinement
- ⬇Implementation



MIT Libraries

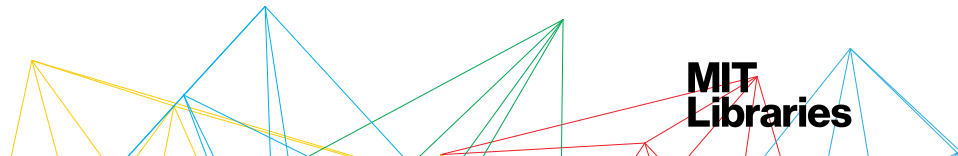
Final lab space configuration



MIT Libraries

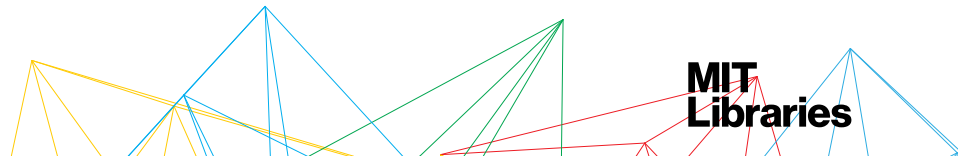
Assessment framework: Goals

- Improve instruction capabilities (Learning)
- Create space for consultation and collaboration (Community)
- Create convenient access to expert help /Increase visibility & accessibility of DSS staff (Community & Learning)
- Improve community access to technologies to enable creation of new work (Creating)



Assessment framework

Goal	Objective	Measure	Tool	Target
1. Improve instruction capabilities (Learning)	a. Increase Community engagement in learning activities at multiple scales, from group-work, to class enrichment, to workshop events	i. Number and type of workshops being taught, by whom, for whom	Instruction log (existing) for library-taught workshops that captures: Workshop title, Workshop schedule, Instructor dept, number of participants, participant dept & MIT status	1/month (average)
		ii. Learner/participant satisfaction	Instruction feedback survey at the end of instruction that captures: Noise level, Room arrangement convenience, Other	60% met expectations or exceeded them

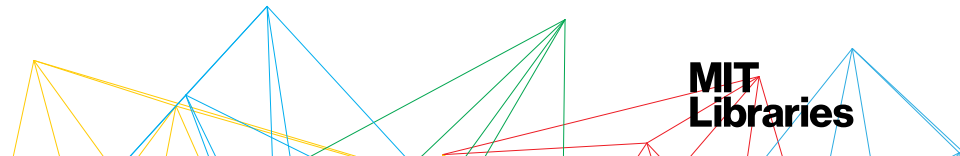


MIT Libraries

10 objectives

16 measures

8 tools



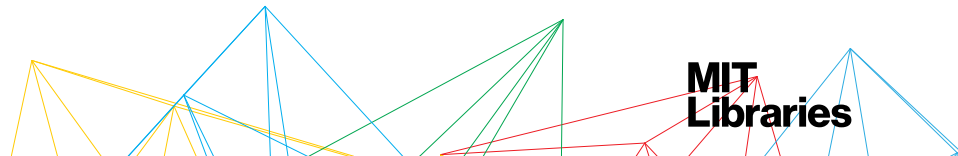
Lessons learned

No plan is perfect

No plan survives confrontation with reality ($$)

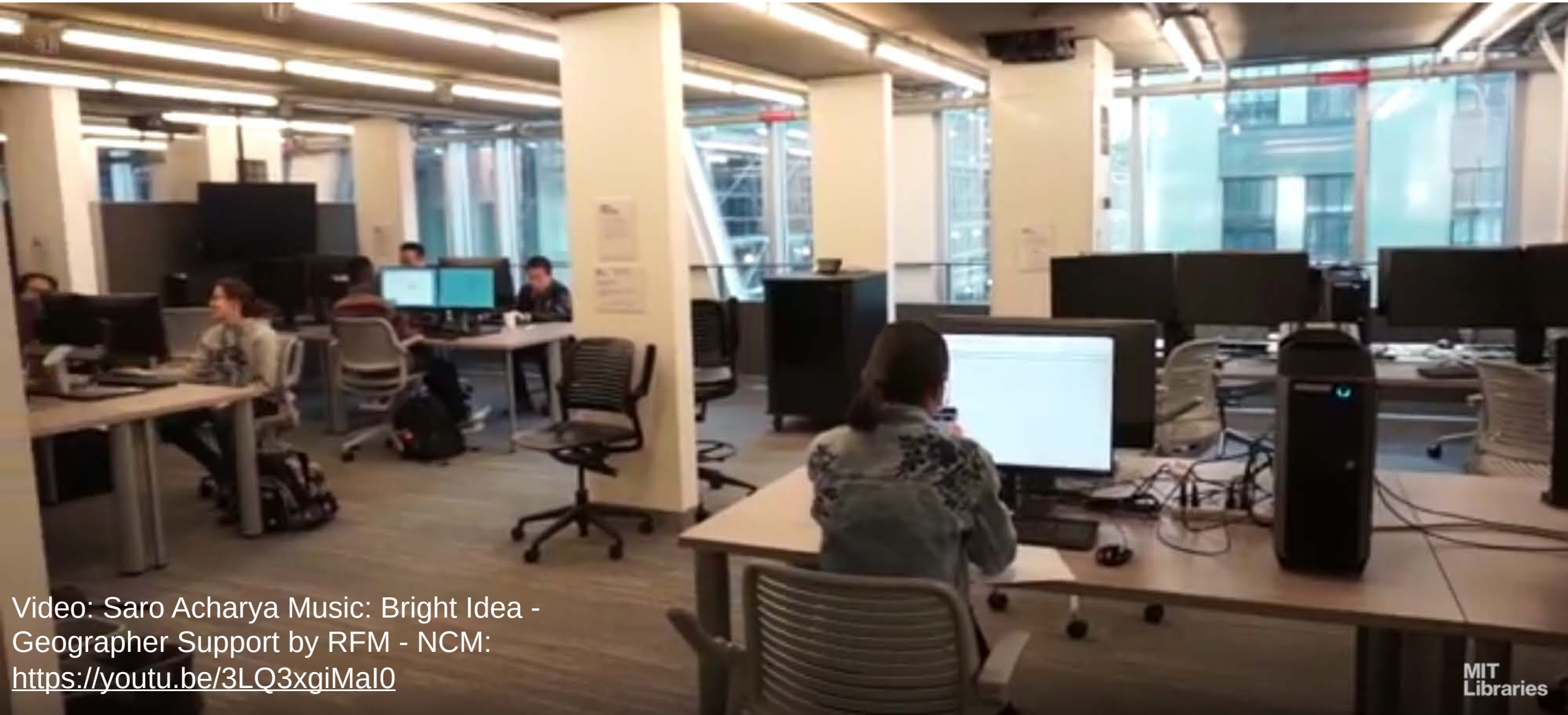
Be specific, assume nothing

Having assessment in mind at the beginning clarifies needs



MIT Libraries

Realizing the Goals



Video: Saro Acharya Music: Bright Idea - Geographer Support by RFM - NCM: https://youtu.be/3LQ3xgiMaI0

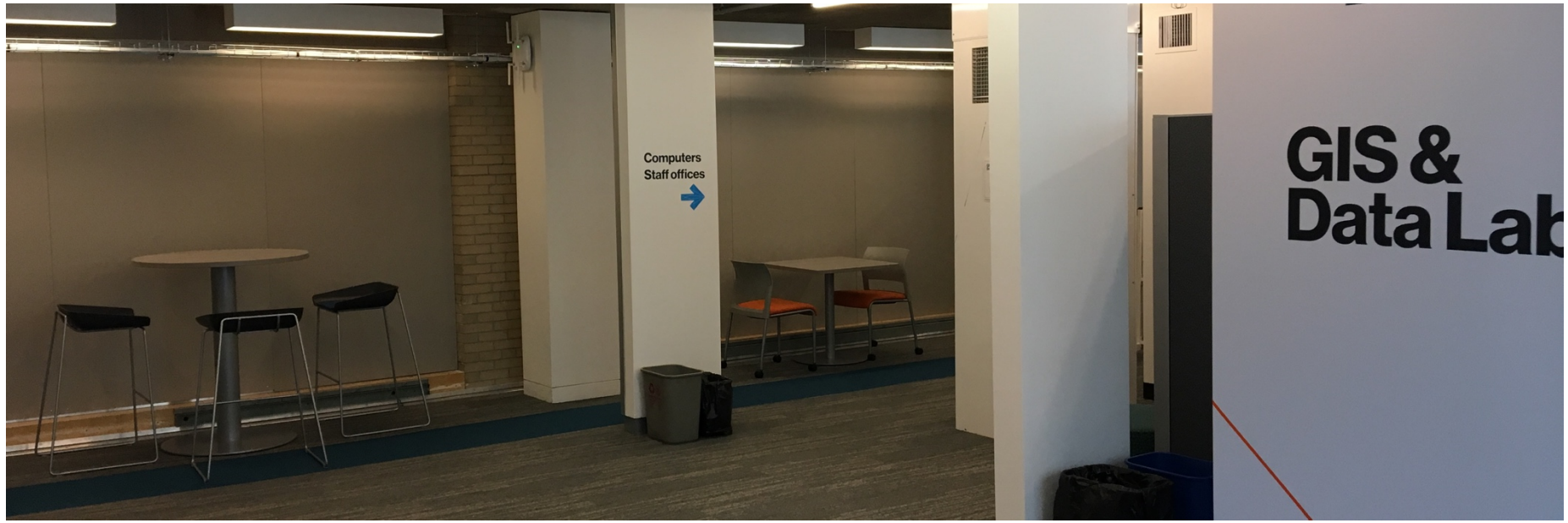
MIT Libraries

The GIS Lab is open to anyone
with an MIT Kerberos account.

Improved instruction capabilities

Instruction at multiple scales

– One on one
– Group work
– Class enrichment
– Workshops and other events

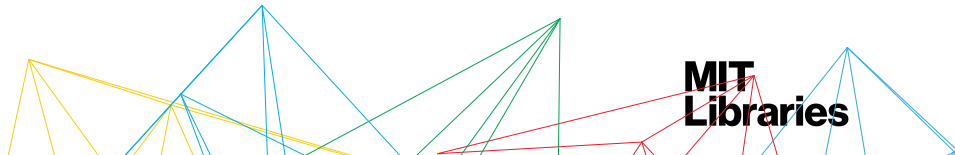


MIT Libraries

Improved instruction capabilities

The workshops!

- Introduction to Gephi for network analysis & visualization
- Introduction to cleaning and prepping data with OpenRefine
- Introduction to using LIDAR data in GIS
- Make a Map in Minutes
- Introduction to GIS
- GIS Level 2
- Introduction to Stata
- Introduction to Python for GIS
- Virtual Reality workshop series
- Introduction to Satellite Remote Sensing
- MINITAB Statistical Software: Experimental Designs and Taguchi Method for Robust Product/ Process Optimization
- Workshops for the following classes or programs:
  - SPURS,
  - Architecture Design Option Studio,
  - HASTS,
  - Terrascope,
  - CMS.633/833,
  - 11.A11,
  - 11.THG
  - Senseable City Lab



MIT Libraries

Consultation & collaboration space

MIT Libraries

Consultation & collaboration space

Access to expertise / Staff visibility

If they see it, they will come!

– Lab visible from main entrance to campus
– Staff easily accessible in lab space
– GIS + DMS office hours

GIS & Data Lab. Photo: Bryce Vickmark

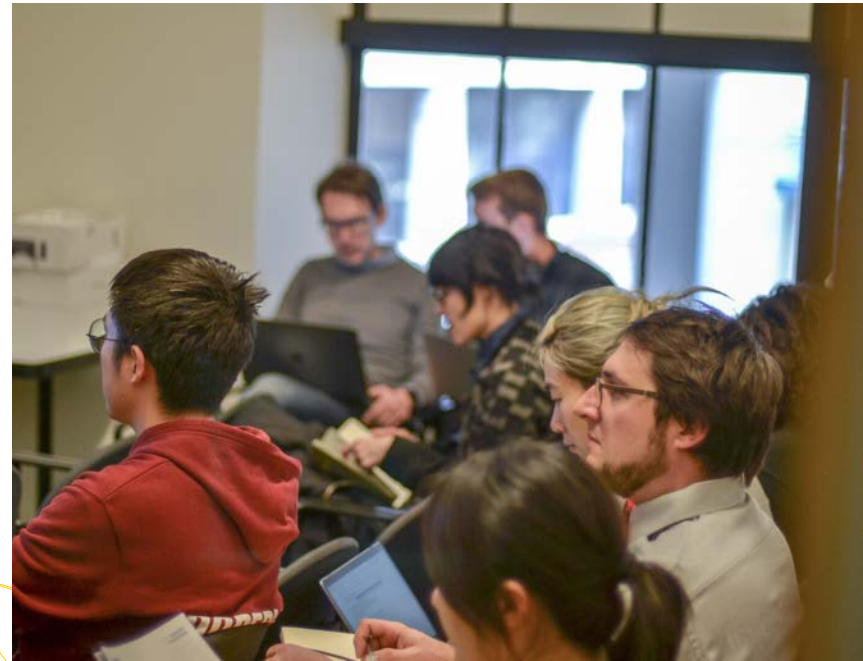
Access to technologies

- Increased number of available computers
- Improved displays
- Better layout and capacity for instruction
- Introduced VR space and equipment

GIS & Data Lab. Photo: Bryce Vickmark

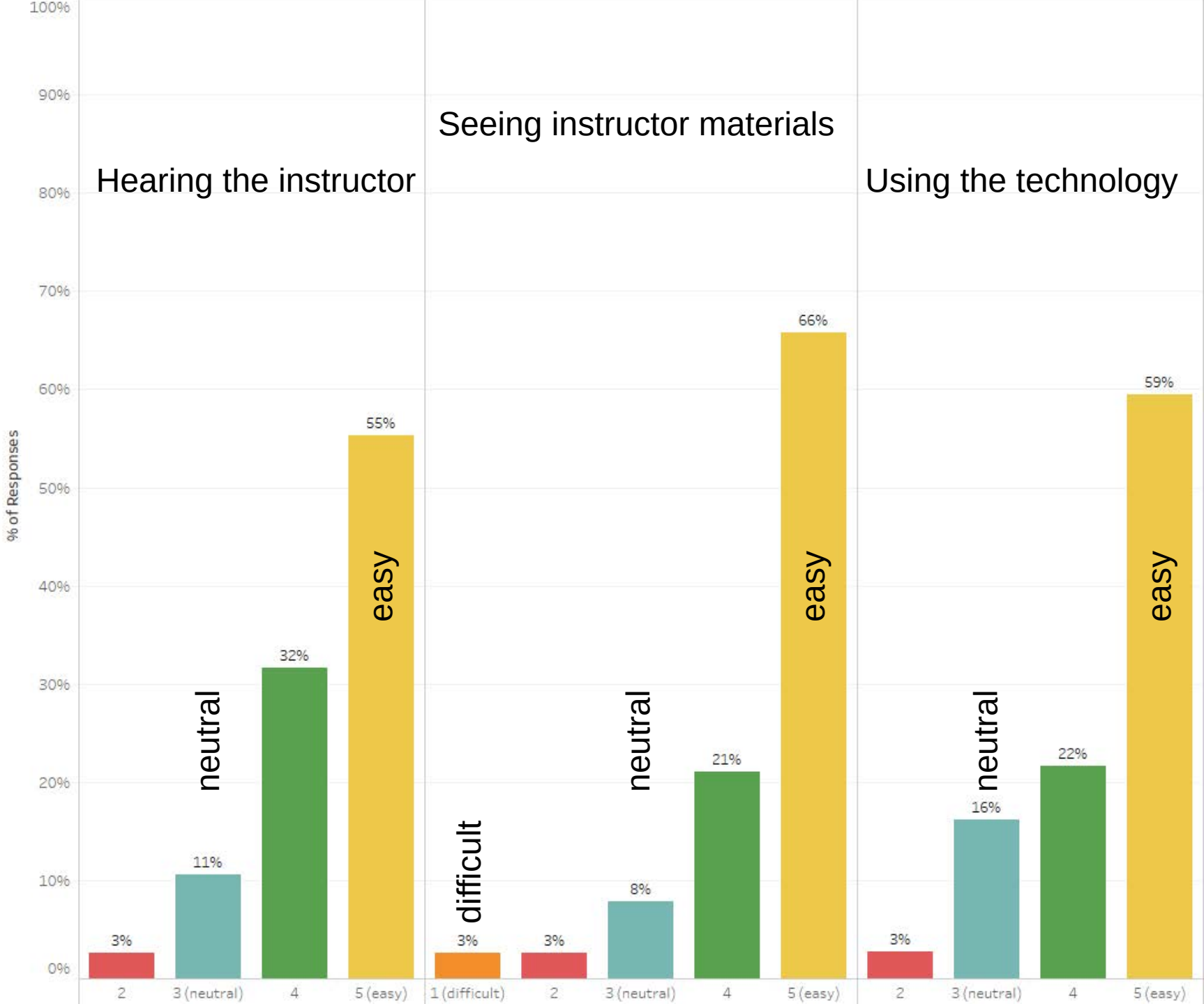
Other experimental aspects realized

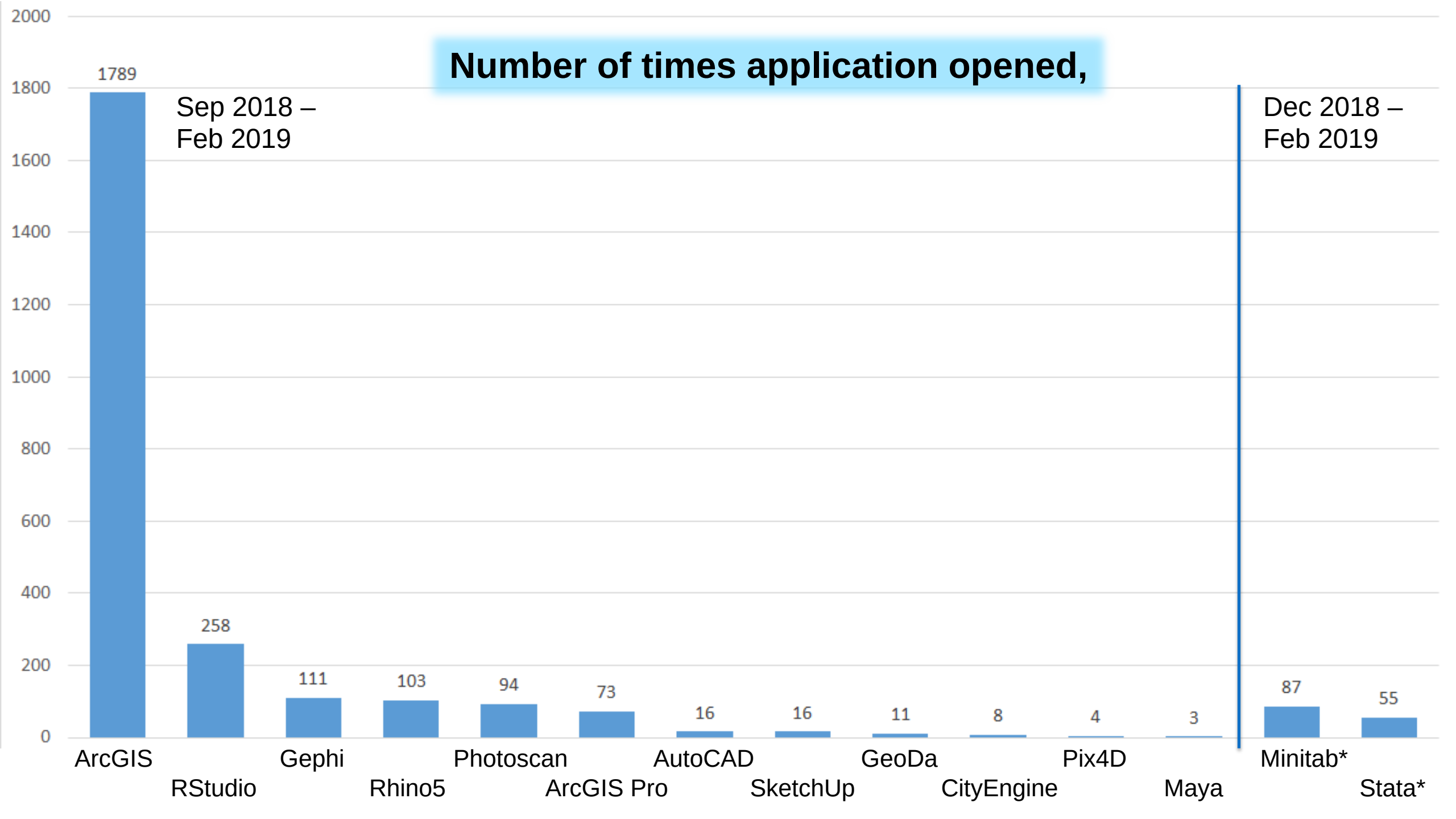
- Evolving internship program supporting equity, diversity, inclusion, and social justice goals
- Development of VR Space
- Data visualization
- Software pilots
- Expanded community use of space



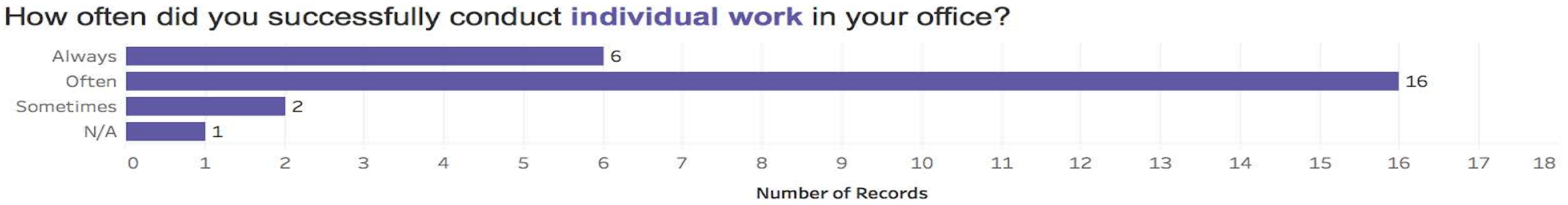
Assessment Results

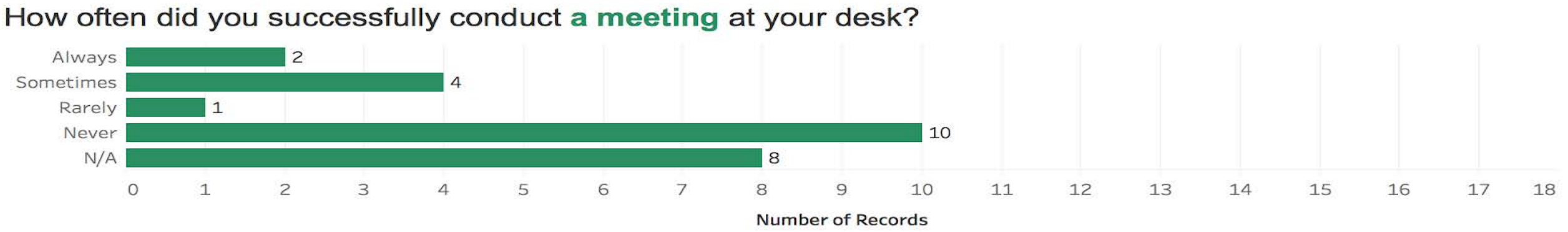
Workshop participant experience

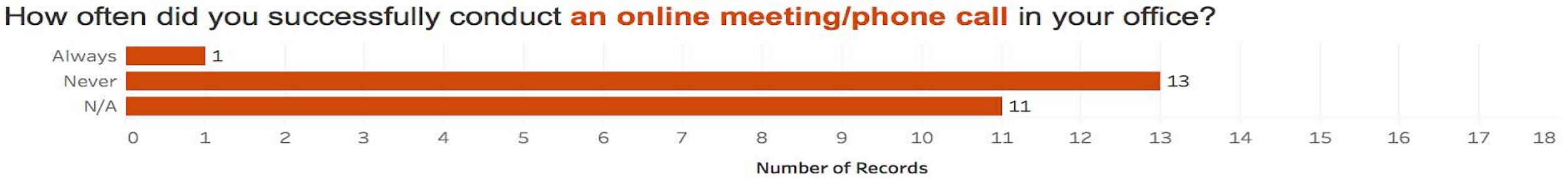


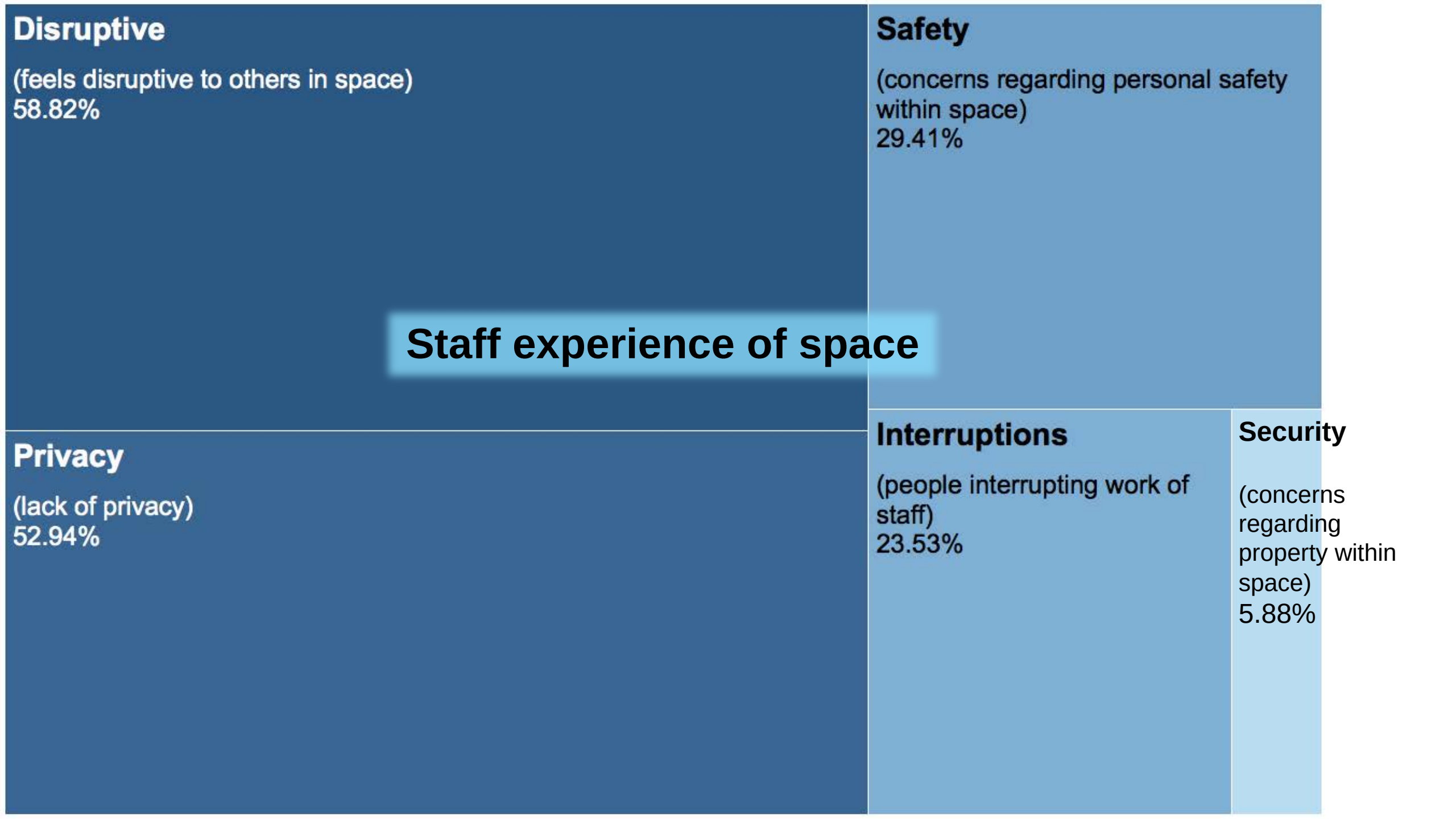

Number of times application opened,
Sep 2018 – Feb 2019
Dec 2018 – Feb 2019
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1789
258
111
103
94
73
16
16
11
8
4
3
87
55
ArcGIS
RStudio
Gephi
Rhino5
Photoscan
ArcGIS Pro
AutoCAD
SketchUp
GeoDa
CityEngine
Pix4D
Maya
Minitab*
Stata*

Staff experience of space



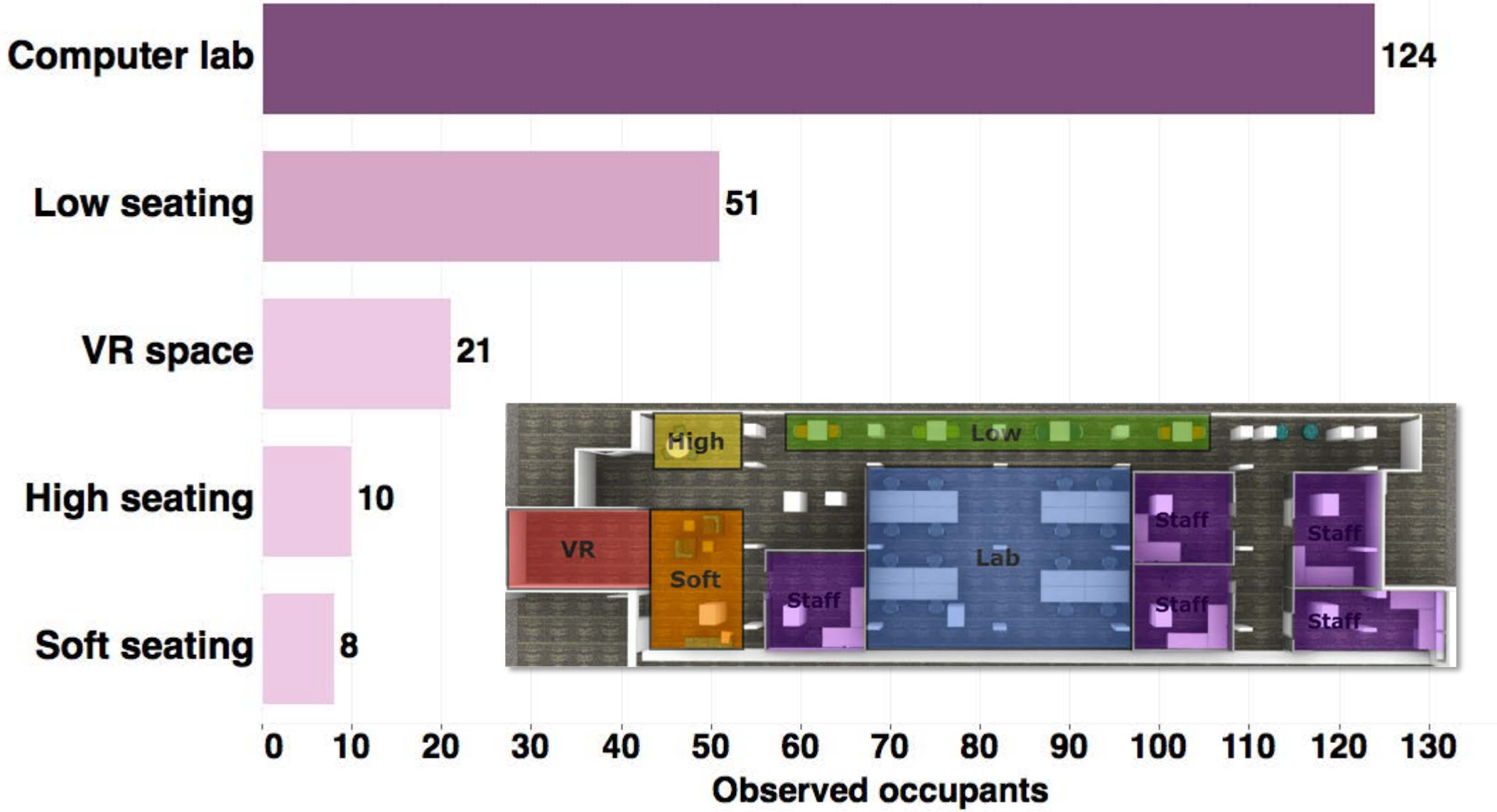





Disruptive
(feels disruptive to others in space)
58.82%
Safety
(concerns regarding personal safety within space)
29.41%
Staff experience of space
Privacy
(lack of privacy)
52.94%
Interruptions
(people interrupting work of staff)
23.53%
Security
(concerns regarding property within space)
5.88%

Space use

Total number of users in each space, as counted over 2 weeks on 73 occasions



Lessons learned

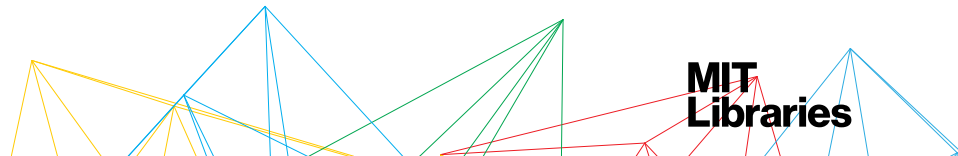
Serendipity works!

Word of mouth works!

Assessment is hard (to get responses)

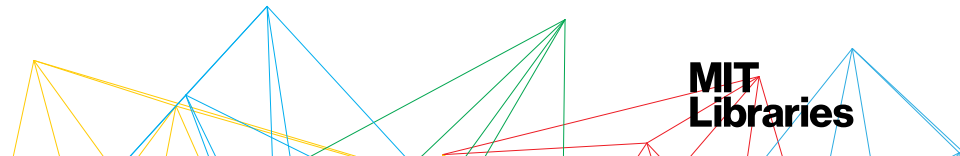
Challenges: Security, Staff privacy, Noise management

Adaptation continues



Where we go from here…Innovation continues

- Experimental Collections Fund
  - Working with faculty to collect, process, and store drone imagery
  - Visualizing parts of the Geospatial Collection in VR
- Building services on GIS and DMS intersections
- Software experiments
- Practical tool use instruction for DMS
- Bringing the Library in to work with data



MIT Libraries

Thank you!

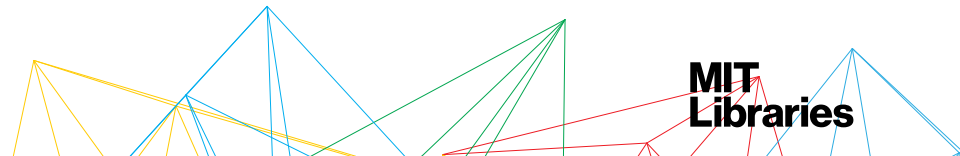
Let’s talk! Questions?

http://libraries.mit.edu/data-management | data-management@mit.edu

nurnberg [at] mit.edu

https://libguides.mit.edu/gis/ | gishelp@mit.edu

dsheehan [at] mit.edu



References not included on slides

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Video: Inside the GIS & Data Lab. Video: Saro Acharya Music: Bright Idea - Geographer Support by RFM - NCM: https://youtu.be/3LQ3xgiMaI0

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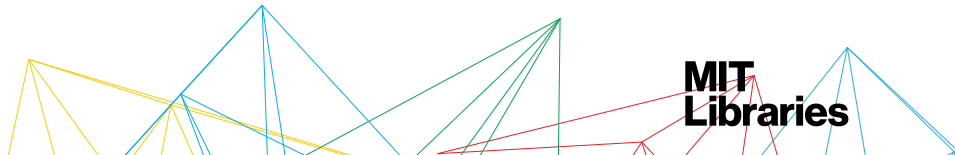

MIT Libraries