

Research Computing at UC Merced

OIT Behind the Scenes

Webinar Series



Setting Expectations



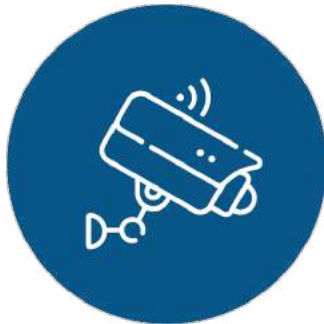
Lights!

- Camera & Audio



Cut!

- Q & A



Camera!

- Recorded Session



Action!

- Feedback requested

TODAY'S AGENDA

- General overview of research computing & why it's critical at UC Merced
- High Performance Computing (HPC) resources on & off campus
- How to get research computing help at any level

What is High Performance Computing (HPC)?



Cyberinfrastructure & Research Technologies

Sarvani Chadalapaka

Director, Cyberinfrastructure &
Research Technologies (CIRT)



Why is HPC
important?

How does CIRT
figure in?



Why is HPC important?

- HPC speeds up academic research.
- Research production is critical to the UC Merced mission & obtaining R1 status.



How does CIRT figure in?

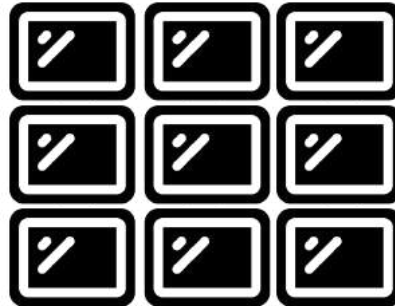
- Build HPC infrastructure
- Maintain environment
- Grow capabilities

CIRT RESOURCES AT UC MERCED

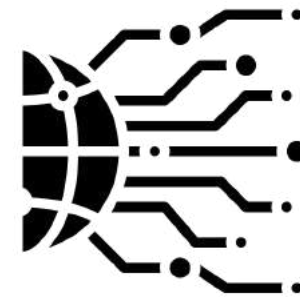


High Performance Computing

- MERCED cluster
- Pinnacles cluster



Wide Area Visualization Environment (WAVE)



High Speed Research Network (ScienceDMZ)

HPC at UC Merced

MERCED cluster

NSF MRI Grant Number: 1429783

NSF Award Amount: \$515,842.00

Pinnacles cluster

NSF MRI Grant Number: 2019144

NSF Award Amount: \$700,000

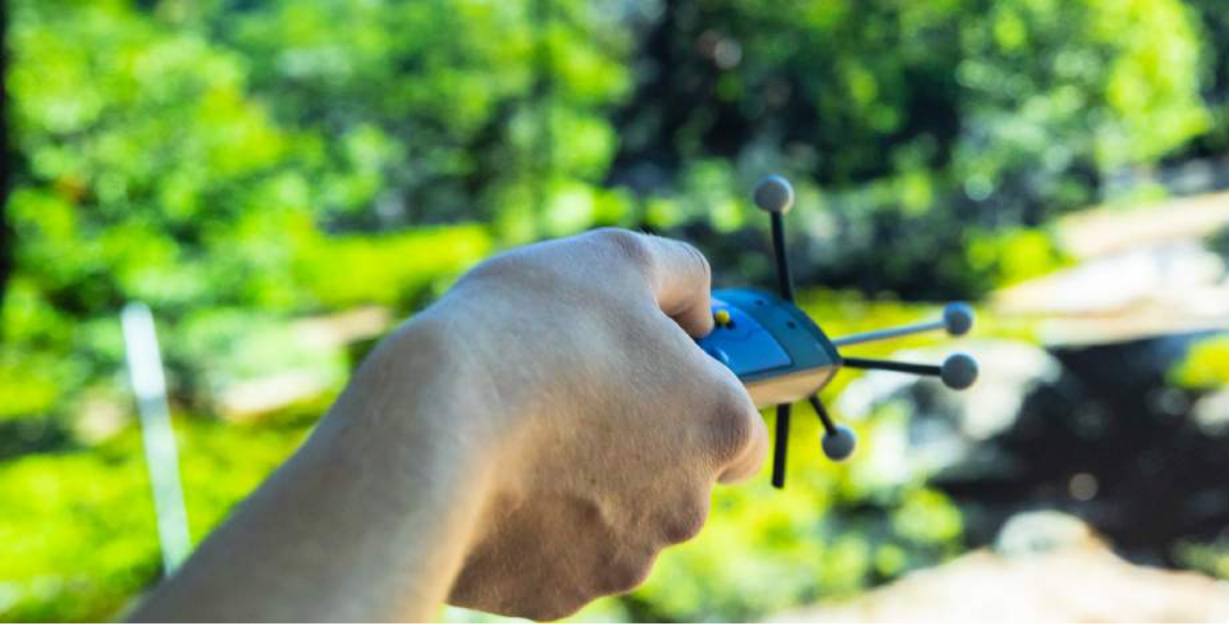
- 3000 cores each
(750 times the power of a typical laptop)
- Infiniband network
- Scheduling software to allocate resources





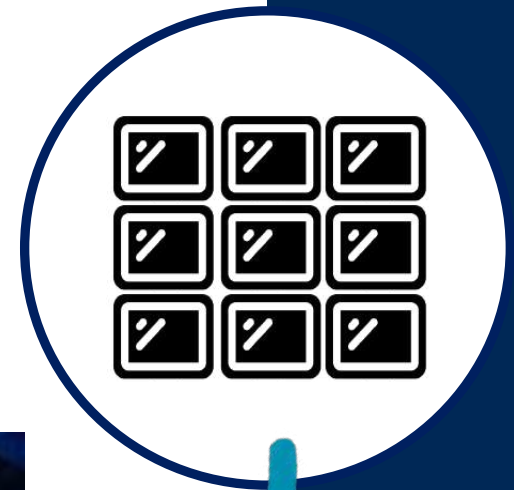


Wide Area Visualization Environment (WAVE)

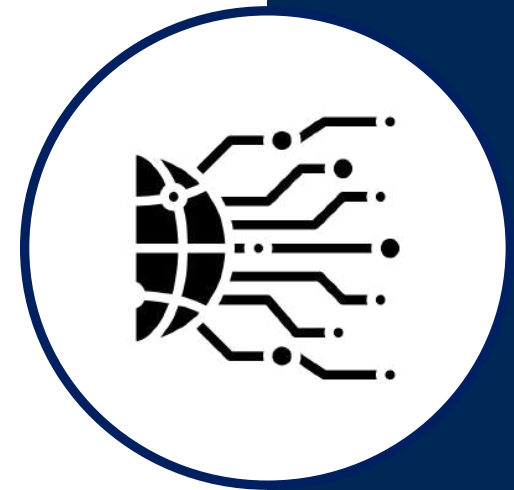
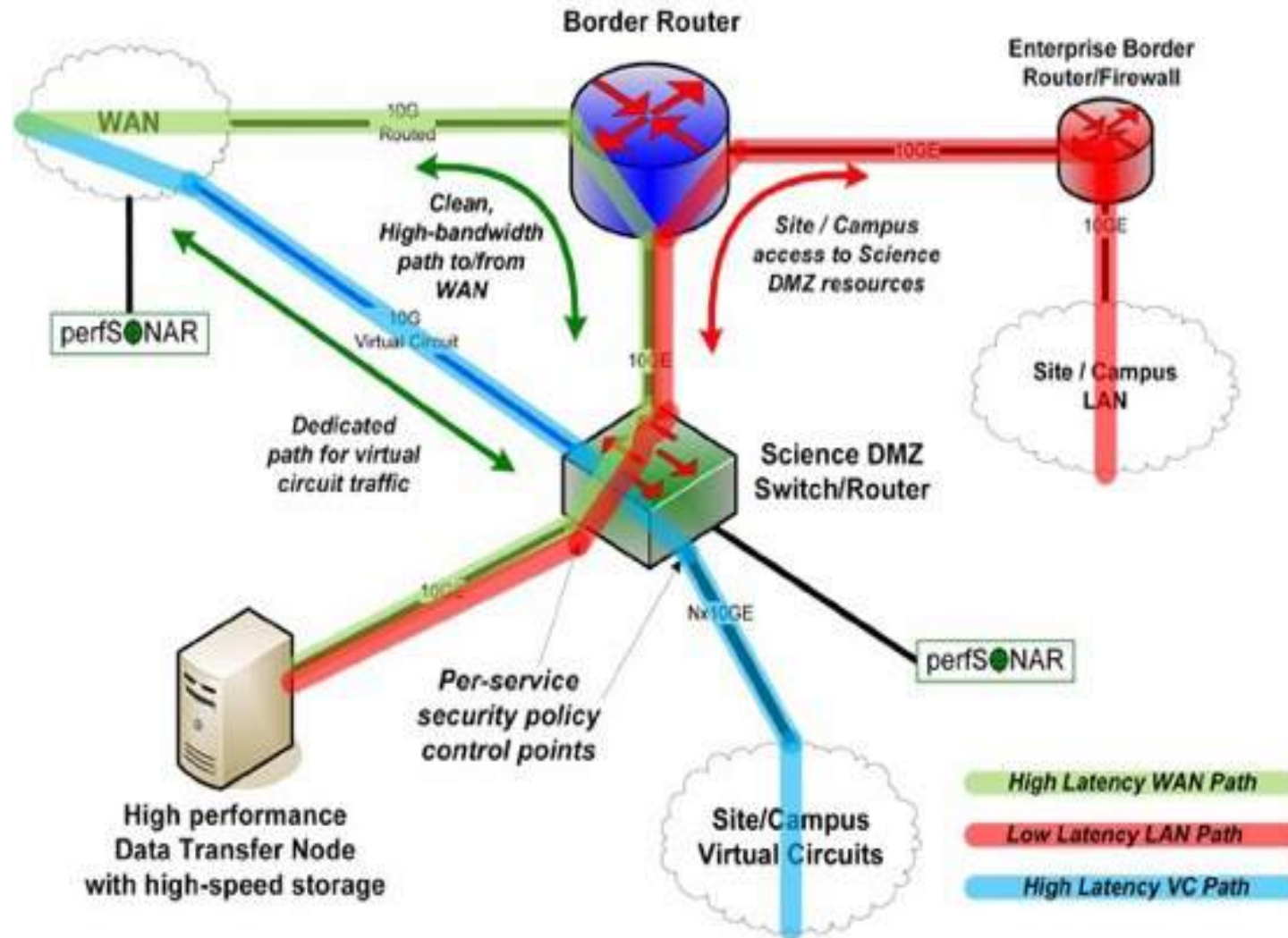


WAVE: Technical Specifications

- 20 OLED UHD 4K TVs
- 32 1080 graphics cards
- High-speed data transfer nodes
 - Connection to California Research and Education Network (CalREN) High Performance Research Network (HPR)



ScienceDMZ





CIRT MISSION

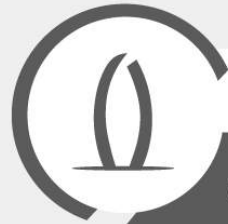
SEAMLESS
TRANSITION
BETWEEN
COMPUTING LEVELS



Local
Desktop
Mobile
Small Clusters

LAB

A white rectangular box with a grey shadow and a slanted top-right corner. On the left side, there is an orange circle containing a white computer monitor icon. Below the icon is an orange rectangular tab with the word 'LAB' in white. To the right of the tab, the word 'Local' is written in bold black font, followed by a list of computing levels: 'Desktop', 'Mobile', and 'Small Clusters'.



UC MERCED

Campus

Pinnacles Cluster
MERCED Cluster
WAVE Lab
Science Demilitarized Zone (**ScienceDMZ**)



CALIFORNIA

Regional

San Diego Supercomputer Center (**SDSC**)
Texas Advanced Computing Center (**TACC**)



GLOBAL

National & International

Lawrence Livermore National Labs (LLNL)
National Center for Supercomputing Applications (NCSA)
National Energy Research Scientific Computing Center (NERSC)
Extreme Science & Engineering Discovery Environment (XSEDE)



LAB

Local

Desktop
Mobile
Small Clusters

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HPC Research Examples

Graham Goodwin

Ali Heydari

UC Merced Graduate Students



HPC Training and Outreach

Yue Yu

Senior Research Computing
Facilitator

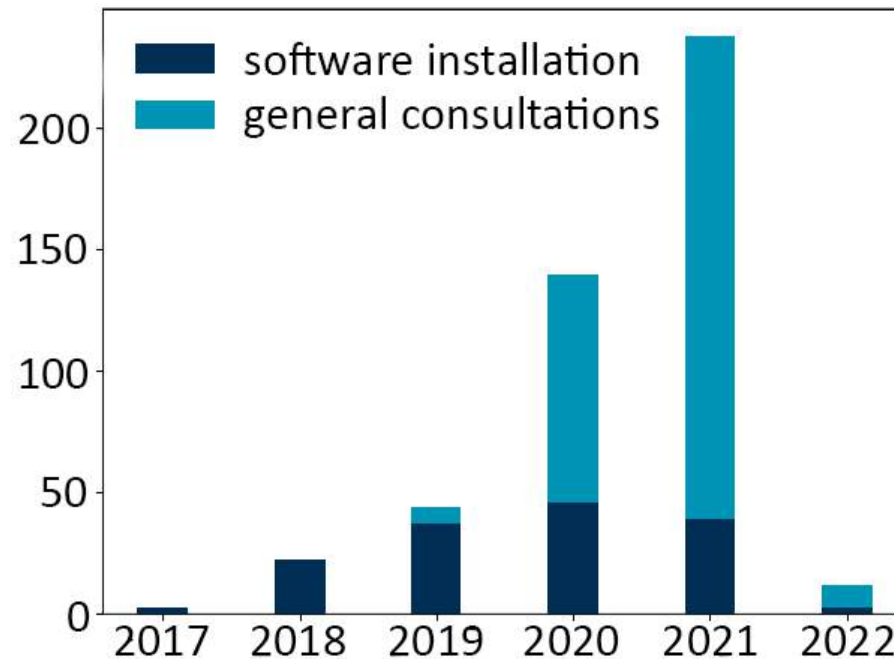
Trending Computing Research

- Artificial intelligence (AI), machine learning, and robotics
- Big data analytics
- Computer-assisted education
- Bioinformatics
- Cyber security



Campus Demand

- Surge in demand in computational research on campus
 - Increasing account request
 - More active consultations





MERCED Cluster

- Head + 1 login node
- 110 CPU compute nodes
- 8GPU nodes
- Cluster storages + 0.5PB Borg storage

Pinnacles Cluster

- Head + 2 login nodes
- 40 CPU compute nodes
- 4 big memory CPU nodes
- 8 GPU nodes



Research Computing

HPC Demo



Support for New Users



Research group consultation



HPC intro class



Workshops



Support for Experienced Users



ServiceHub → open a ticket for technical help



HPC office hours on Zoom
(Fridays 10:30am-12:00pm)



User documentation



Contact Me



Yue Yu
Senior Research
Computing Facilitator



yyu49@ucmerced.edu



<https://ucm.edu/ResearchComputingHelp>

fastest way to get help



Or search **Research Computing** at
<https://servicehub.ucmerced.edu>

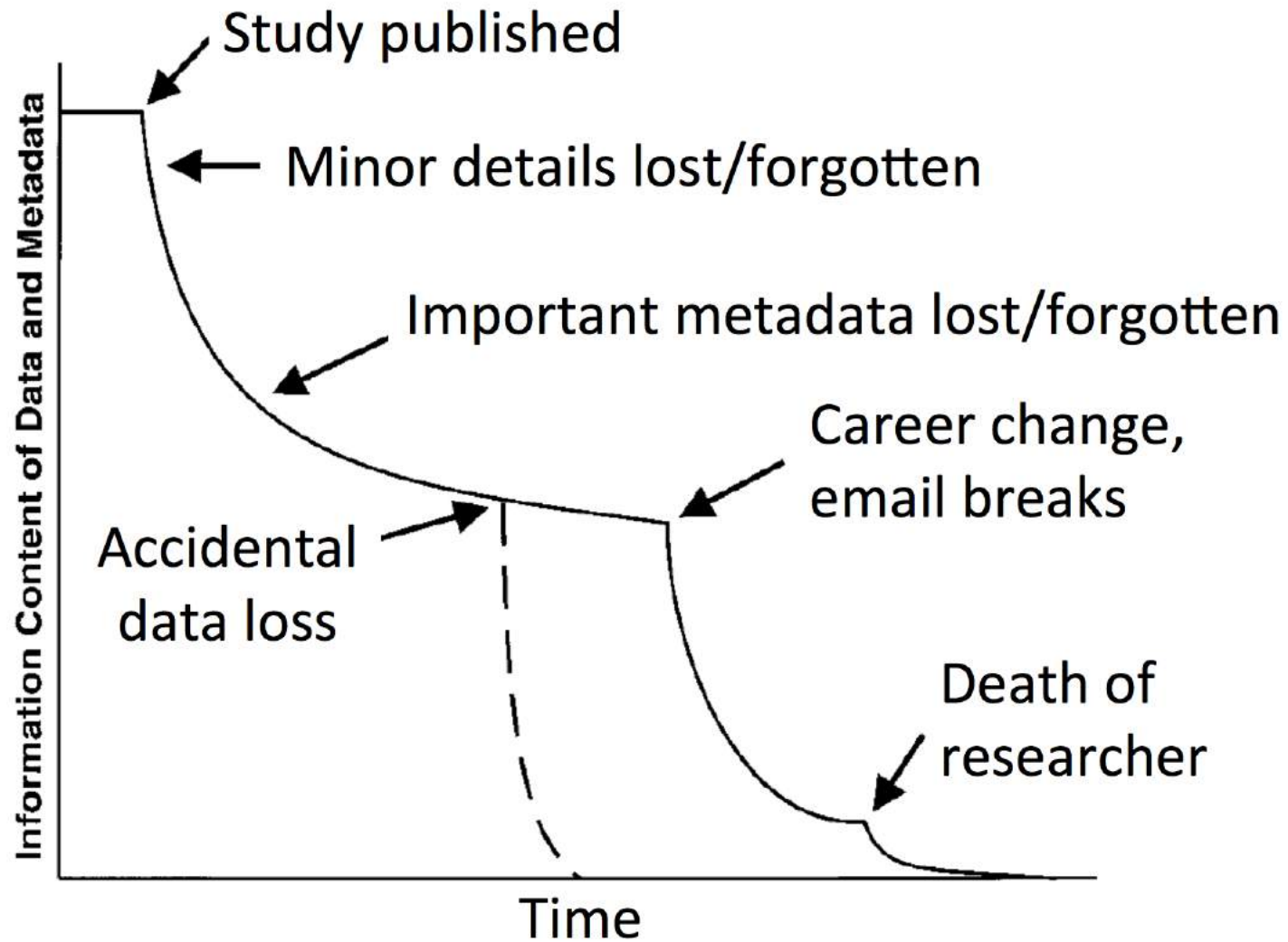


Data Management & Software Carpentry

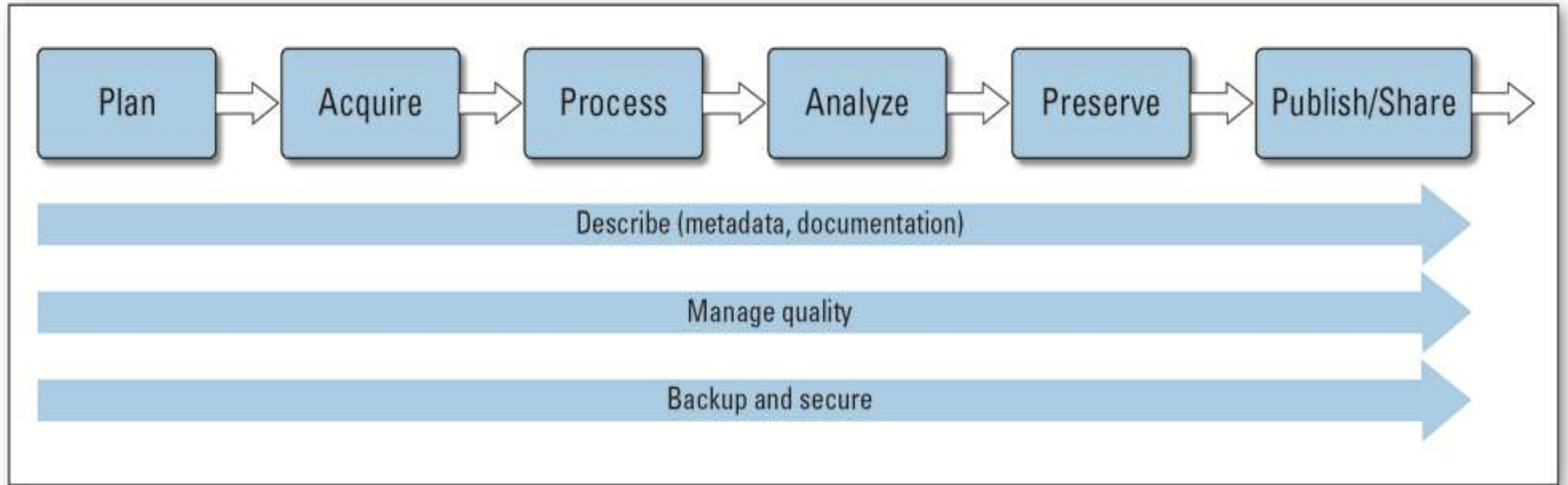
Derek Devnich

Director, UC Merced Center for Data
Services

Data Management



Good Scholarship is Reproducible



Data (and code) sharing is increasingly required by funders

The image shows two overlapping website screenshots. The top screenshot is the National Science Foundation (NSF) website, featuring the NSF logo and the tagline "WHERE DISCOVERIES BEGIN". It includes a search bar and a navigation menu with categories like "Research Areas", "Funding", "Awards", "Document Library", "News", and "About NSF". The bottom screenshot is the NIH Grants & Funding website, titled "NIH GRANTS & FUNDING" and "NIH Central Resource for Grants and Funding Information". It features a search bar and a navigation menu with categories like "HOME", "ABOUT GRANTS", "FUNDING", "POLICY & COMPLIANCE", "NEWS & EVENTS", and "ABOUT OER". The main content area of the NIH website displays the "NIH Data Sharing Policy" page, which includes a news section titled "NEWS: New NIH Policy on Data Management and Sharing" and a paragraph stating that data sharing is essential for expedited translation of research results into knowledge, products and procedures to improve human health.

NSF National Science Foundation
WHERE DISCOVERIES BEGIN

NIH GRANTS & FUNDING
NIH Central Resource for Grants and Funding Information

NSF DATA SHARING POLICY

Investigators are expected to share their research data in a timely and reasonable time, the primary data gathered in the course of work under the award. See [Proposal & Award Policy](#).

NSF DATA MANAGEMENT POLICY

Proposals must include a supplement titled "Data Management Plan". This supplement should describe the policy on the dissemination and sharing of research data and its implementation.

NEWS: New NIH Policy on Data Management and Sharing

On October 29, 2020, NIH issued the [NIH Policy for Data Management and Sharing](#) which will require NIH funded researchers to prospectively submit a plan outlining how scientific data from their research will be managed and shared. This policy will be effective January 25, 2023 and at that time will replace the 2003 NIH Data Sharing Plan. [Learn more about the new policy.](#)

Data sharing is essential for expedited translation of research results into knowledge, products and procedures to improve human health.

The [Final NIH Statement on Sharing Research Data](#) was published in the NIH Guide on February 26, 2003. This is an extension of NIH policy on sharing research resources, and reaffirms NIH support for the concept of data sharing. The new policy becomes effective with the October 1, 2003 receipt date for applications or proposals to NIH.

More about funder requirements: <http://datasharing.sparcopen.org/data>

Workshops

- Data management: From plan to publication
- Creating data management plans with DMPTool
- Data management for social scientists and humanists
- How to choose a license





Come talk to us!

<https://ucm.edu/DataServicesAppt>



Create a data management plan!

<https://dmptool.org>



Come to our workshops!

https://libcal.ucmerced.edu/calendar/data_management



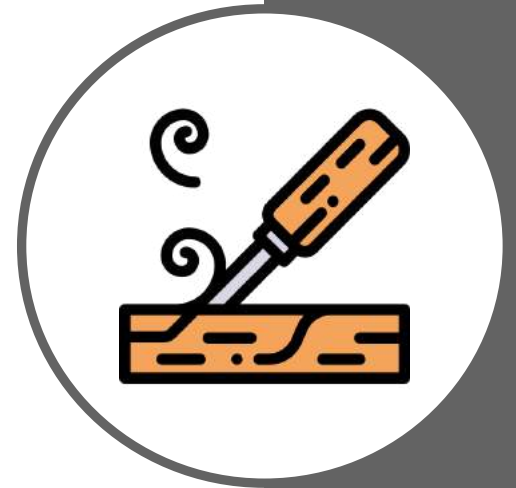
Read our informative documentation!

<https://library.ucmerced.edu/research-data-curation>

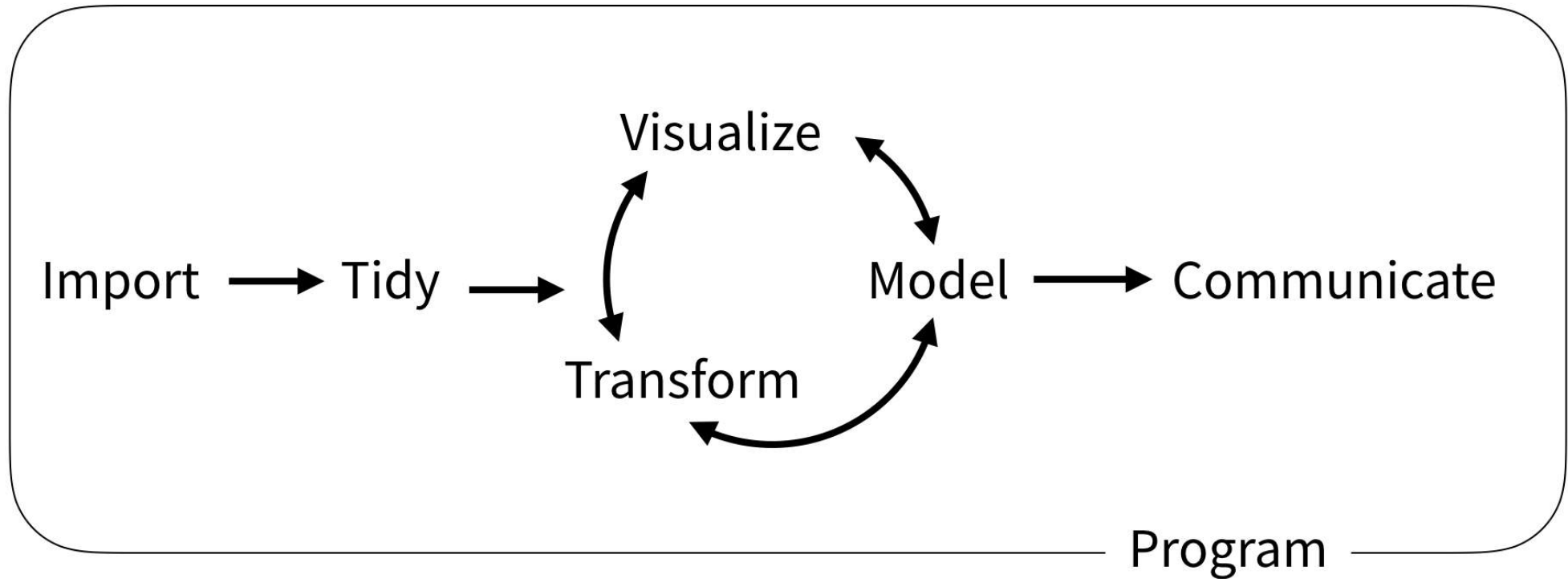
Consultations
& Resources

Software Carpentry

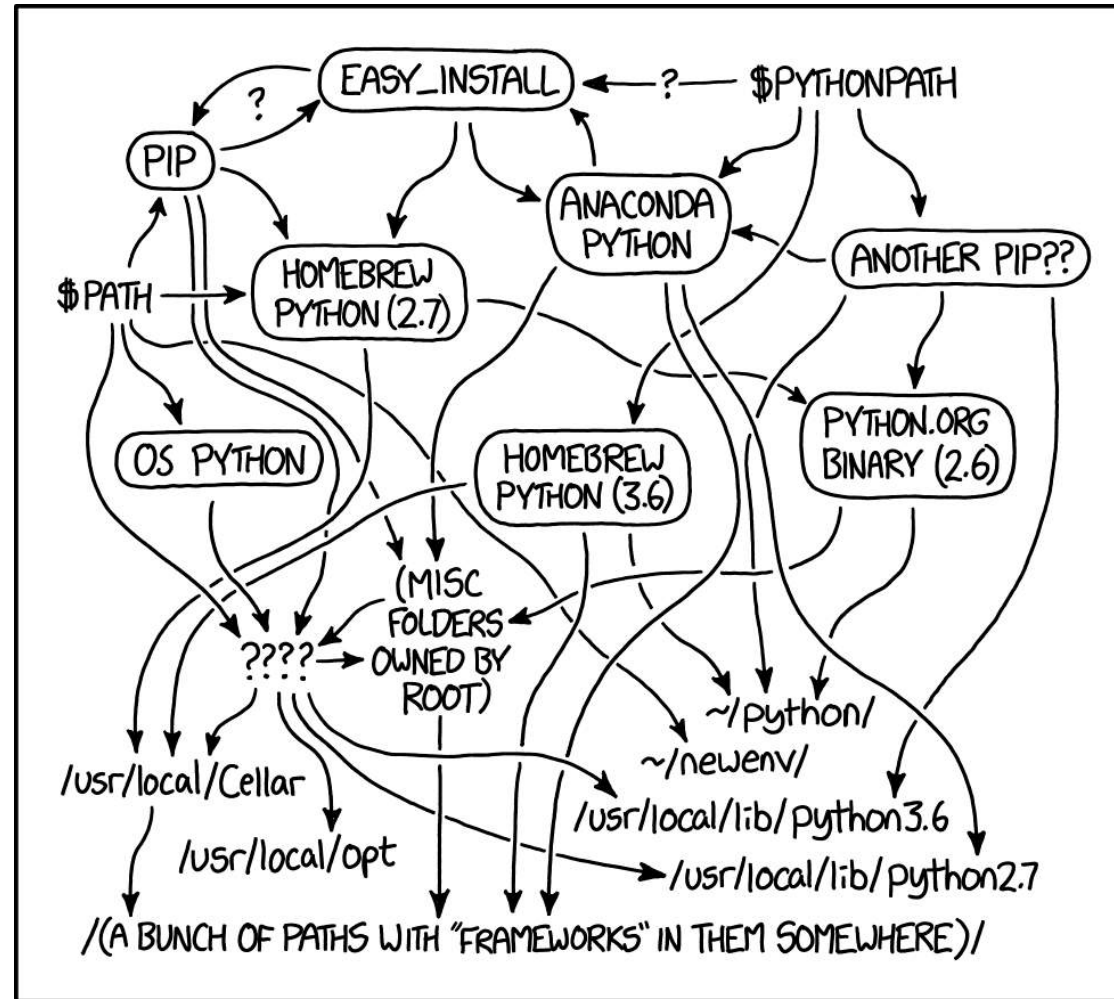
- Making software is a craft
 - You work with your hands
 - You respond to the needs & constraints of the moment
 - You get better with practice



The Ideal of Data Science



The Reality of Data Science



MY PYTHON ENVIRONMENT HAS BECOME SO DEGRADED THAT MY LAPTOP HAS BEEN DECLARED A SUPERFUND SITE.

Regular Workshops

- Introduction to Unix shell
- Version control with Git and Github
- Programming and plotting in Python
- R for reproducible scientific analysis



Occasional Workshops

- Introduction to R for geospatial data
- Databases and SQL
- How to manage software development projects



Custom Workshops

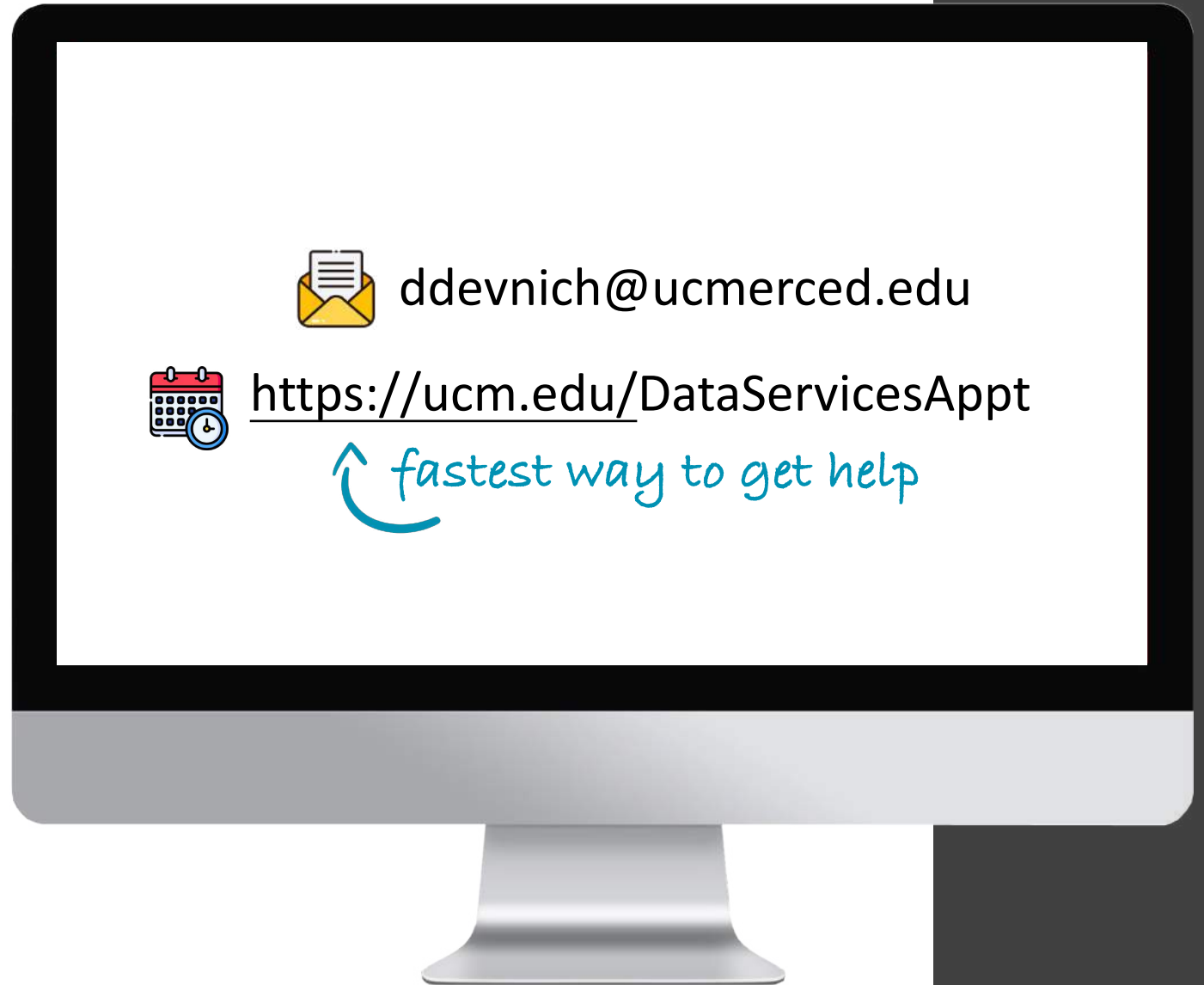
- Custom workshops for research groups and graduate classes
- Instructor consultations
- Instructor training



Contact Me



Derek Devnich
Director, UC Merced
Center for Data Services





CIRT Services

Sarvani Chadalapaka

Director, Cyberinfrastructure &
Research Technologies (CIRT)

CIRT Services

- Colocation services
- On premises storage
- Condo-model compute node purchases for Pinnacles

CIRT Recharge Services (On Hold)

- MERCED cluster core-hour cycles
- Enhanced user support for research computing



Contact Me



Sarvani Chadalapaka
Director,
Cyberinfrastructure &
Research Technologies



We Want Your Feedback!

Feedback Survey for today's webinar:

<https://ucm.edu/ResearchWebinar>

Thanks in advance for helping us improve
our future offerings to campus!





Q&A



COMING SOON: MORE BEHIND THE SCENES!

Apr 14th - Technology Procurement

April 27: IS-3 Ask Me Anything

Summer: Microsoft 365 Tools



<http://ucm.edu/v/oitbehindthescenes>

OIT Behind the Scenes: Research Computing was created on location at the University of California, Merced in Merced, California!

Thanks to all the OIT (and non-OIT) folks who put hard work into this webinar!

Katie Adams Arca, Webinar Coordinator
tries to rein in the madness

Sarvani Chadalapaka, Subject Matter Expert
graciously let us mess with already-good presentation materials

Derek Devnich, Subject Matter Expert
has the best slide illustrations

Edson Gonzales, Webinar Support
had it pretty easy on this one honestly

Preethi Merugumala, Student Technology Consultant
organizes the madness when we let her

Christian Ortiz, Student Technology Consultant
produced that animated explainer in no time at all

Rachel Peters, Webinar Support
know-it-all in charge

Christy Snyder, Communications & Promotional Support
can't stop won't stop messing with the deck

Yue Yu, Subject Matter Expert
makes cluster jobs look easy

*Icons & Images made by the following artists
courtesy of flaticon.com and freepik.com:*

FauzIDEA

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Freepik

Good Ware

Jcomp

juicy_fish

kerismaker

Monkik

Pixel Perfect

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rang

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surang





That's all, folks!