CNI User Meeting

DECEMBER 7, 2018

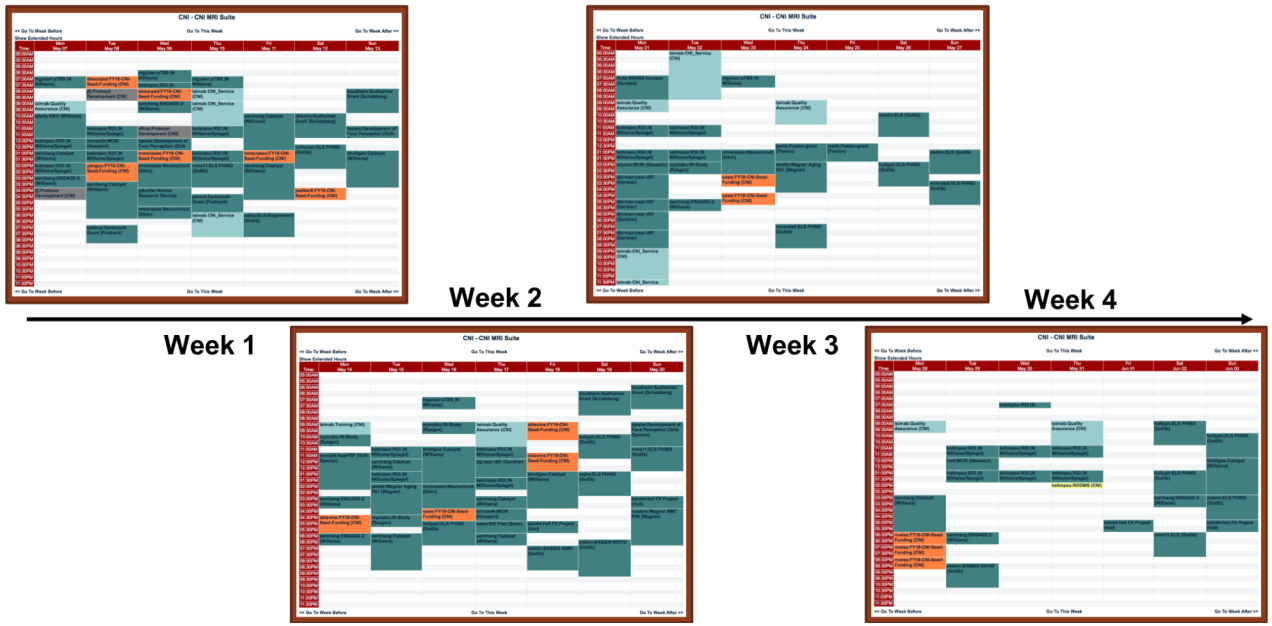
CNI User Meeting Agenda

Dec. 7, 2018

- Scheduling Discussion
- Long-Range Plans
- Flywheel Migration & How-To
- New CNI Features
- Comment / Question Session

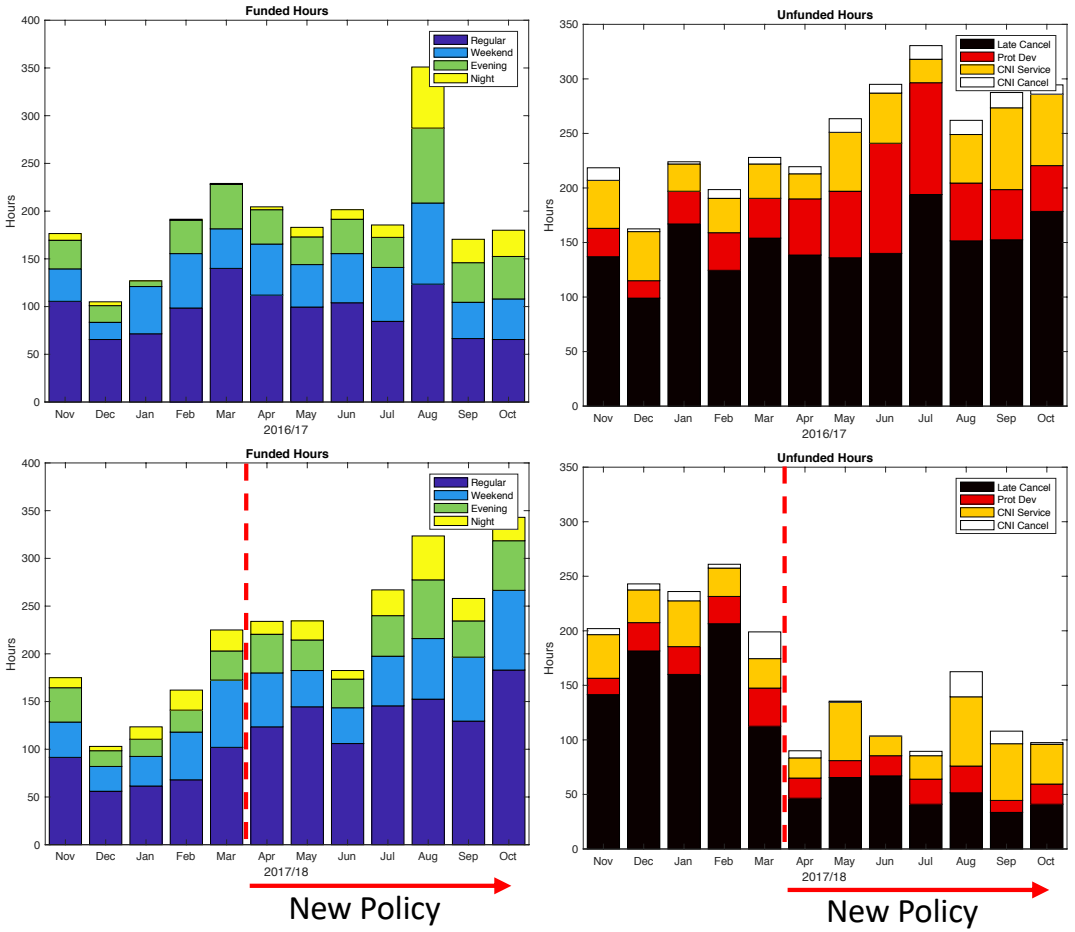
Scheduling Discussion

- Scheduling status mid-2017—3/18:
  - CNI schedule almost fully booked for 6 months in advance
  - Large # cancellations with 1-3 days notice
  - Low effective scanner usage



Scheduling Discussion

- New policy effects
  - Increased daytime usage
  - Fewer cancellations
  - Highest ever usage 10/2018



Scheduling Discussion – Reviews Nov 2018

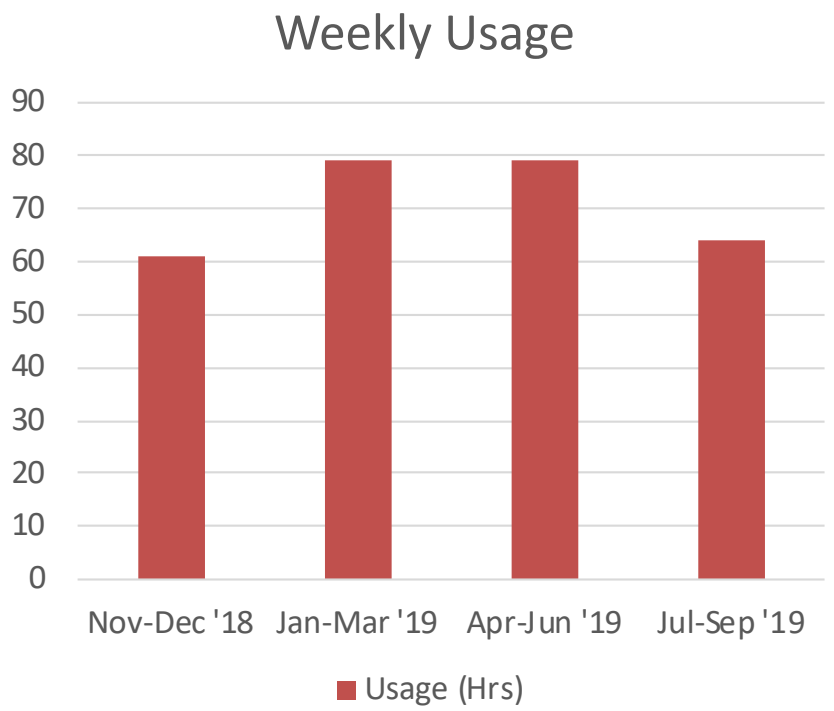
- Comments regarding scheduling difficulties
  - Protocols that have multiple scan dates (baseline/followup or pre/post-treatment) are hard to schedule
  - Protocols that require near-term scanner access are very hard to schedule
  - Extend schedule access beyond 8 weeks; limit schedule access to 4 weeks
  - Implement a quota limit for each lab

Scheduling Discussion – Reviews Nov 2018

- Interest in using other centers?
  - 50% No
  - If scanner demand stays the same: 20% No, 30% Yes
- Can CNI do anything to help migration to other centers?
  - Yes, establish a common MRI scanner schedule; implement a mechanism to keep protocols in sync across multiple scanners
  - No – have dedicated auxiliary equipment at CNI that is not available elsewhere
  - No – convenience of having pre-interview and scan in our building is significant
  - No – ambiance of waiting area, mock scanner, and environment is too much of a win for scanning children to leave
  - No, switching to data from different system in middle of study could create a confound
  - No, too challenging for staff to commute to scan at other centers
  - Prefer scanning at CNI as 1) we have a longitudinal study and 2) it is much more tailored to our needs than other centers

Scheduling Discussion – Reviews Nov 2018

- User poll shows projected usage of 260 – 340 hrs/month
- Less than Oct. 2018 – 440 hrs
- Not all responses received yet



Scheduling Discussion – Lucas Center

- Lucas Center 3T3 has same MR system and software revision as CNI
- Schedule is currently more open
- Equivalent scan rates, though their peak hours are 7am-6pm
- New users should contact Karla Epperson (karlae@stanford.edu)
- Lucas Center will schedule a group tour after Winter Break

Lucas Center: 3T3
Quickview: 3T1 (P021) | 3T2 (P173) | 3T3 (P165) | 7T (PS014) | FUS | MR Simulator
Color code: funded, phantom, restricted, GE Projects, discovery, not available.
Schedule as of Thu Dec 6 15:39:30 2018. This page automatically updates every 60 sec.

« previous — Open through **Sun 24-Feb-2019** — next »

	Go to schedule for this week							Go to schedule for this week						
	Mon Dec 3	Tue Dec 4	Wed Dec 5	TODAY Dec 6	Fri Dec 7	Sat Dec 8	Sun Dec 9	Mon Dec 10	Tue Dec 11	Wed Dec 12	Thu Dec 13	Fri Dec 14	Sat Dec 15	Sun Dec 16
7:00 am														
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8:30 am		rodr1f		etk11f				post7f	etk11f	drag9f		simo1f		
9:00 am		rodr1f		etk11f	cowa1f			post7f	etk11f	drag9f		simo1f		
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11:00 am	rodr1f	rodr1f	rodr1f	drag5f	cowa1f				etk11f	ennd3f	spie6f	post7f		
11:30 am	gre16f	rei18f									spie6f	post7f		
12:00 pm	gre16f	rei18f									spie6f	post7f		
12:30 pm	gary1r	rei18f										post7f		
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1:30 pm	day04f	shas6f	mcla3r	ennd3f	beau1f		carr3r	cowa1f			har17f			
2:00 pm	day04f	shas6f	spl11p	ennd3f	har16f		carr3r	cowa1f	drag5f		har17f			
2:30 pm	day04f	drag5f	spl11p	glo15f	har16f				drag5f		har17f	shas5f		
3:00 pm	day04f	drag5f		glo15f				etk11f	drag5f	etk11f	har17f	shas5f		
3:30 pm	day04f	drag5f		got19f				etk11f		etk11f				
4:00 pm			spie6f	got19f				etk11f		etk11f				
4:30 pm		boho4f	spie6f								sing2f			
5:00 pm		boho4f	spie6f	sing3f							sing2f			
5:30 pm	glo15f	boho4f	spie6f	sing3f						boho5f				
6:00 pm	glo15f		glo15f	etk11f					sing1f	boho5f	elki1p			
6:30 pm		rodr5f	glo15f	etk11f					sing1f	boho5f	elki1p			
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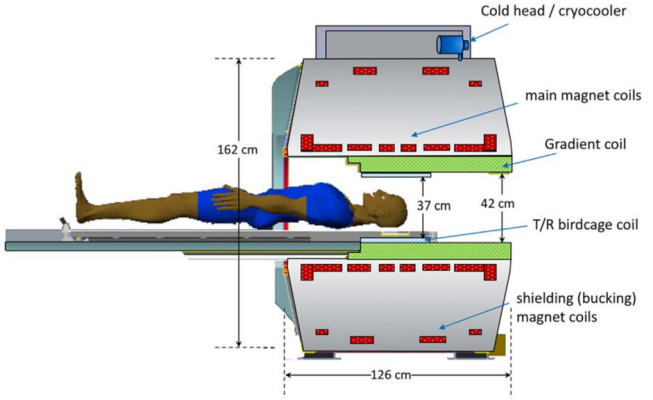
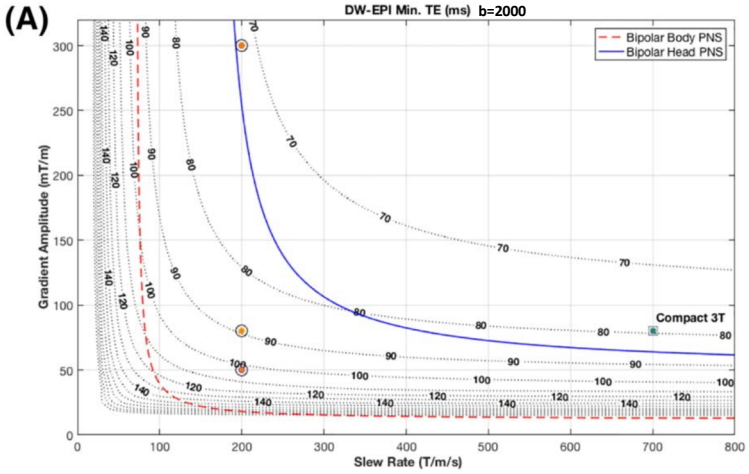
Scheduling Discussion – Round Table Meetings

- Thank you to everyone who participated
- Very useful suggestions / discussion
  - Adding calendar “release request” feature
  - Color coding of subject scheduling difficulty
  - Implementing a lab / grant quota
  - Blocking off time for short-term release
- Scheduling policy changes
  - CNI will book 2-3 blocks of 2-hours each week, releasing them when they are within the 2-week window
  - Will continue to monitor scanner demand

Long-Range Plans

- $3.5M NSF Major Research Instrumentation proposal
  - Psychology (Wandell), Radiology (Glover), Electrical Engineering (Pauly, Kerr)
- GE compact 3T head-only system
  - Low weight, low He volume magnet
  - One system at Mayo Clinic (Bernstein)
  - Very high slew rate (700 mT/m/ms)
  - Improved gradient amplitude (80 mT/m)
- Site location will be basement of Packard EE building (~3,000 sq. ft. identified)
- First 2 years of operation covered by NSF proposal, will translate into a service center





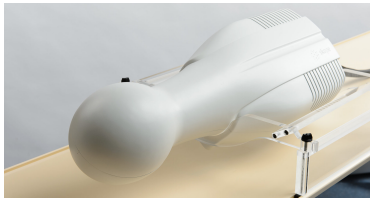
Lightweight, compact, and high-performance 3T MR system for imaging the brain and extremities

Article *in* Magnetic Resonance in Medicine · March 2018

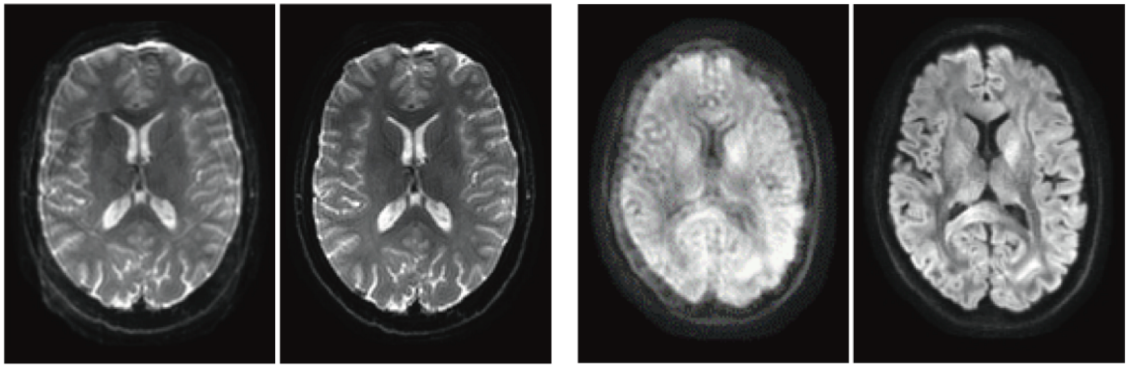
Long-Range Plans

- NSF proposal will also include Skope system
- Measures field dynamics at up to 1Mhz and 3rd order spherical harmonics (an MR oscilloscope)
- Correction of actual encoding reduces artifacts and allows for optimizing sequences for improved SNR
- An enabling technology for non-Cartesian acquisitions that will highly benefit from compact 3T performance

Processing & Acquisition System



Field Camera

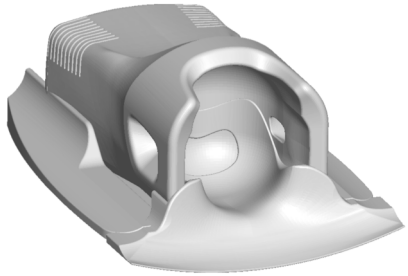


[1] single-shot EPI without correction

single-shot EPI with correction

[2] single-shot spiral without correction

single-shot spiral with correction



Integrated Field Camera & 16-Channel Receive Array

Long-Range Plans

- CNI upgrade to Premier system
  - Wider bore: 70cm vs 60cm
  - Increased receiver channel count (140)
  - Increased peak gradient amplitude (80 mT/m)
  - DTI SNR improved due to shorter TE, but gradient heating limits efficiency gains
  - Large 48-channel head coil (separable)
  - Nova 32-channel coil still compatible
  - 8-channel head array incompatible
- Lucas Premier system availability allows us to conduct thorough evaluation prior to upgrade
- Installation
  - Planned start Dec. 2019
  - Four to six week downtime

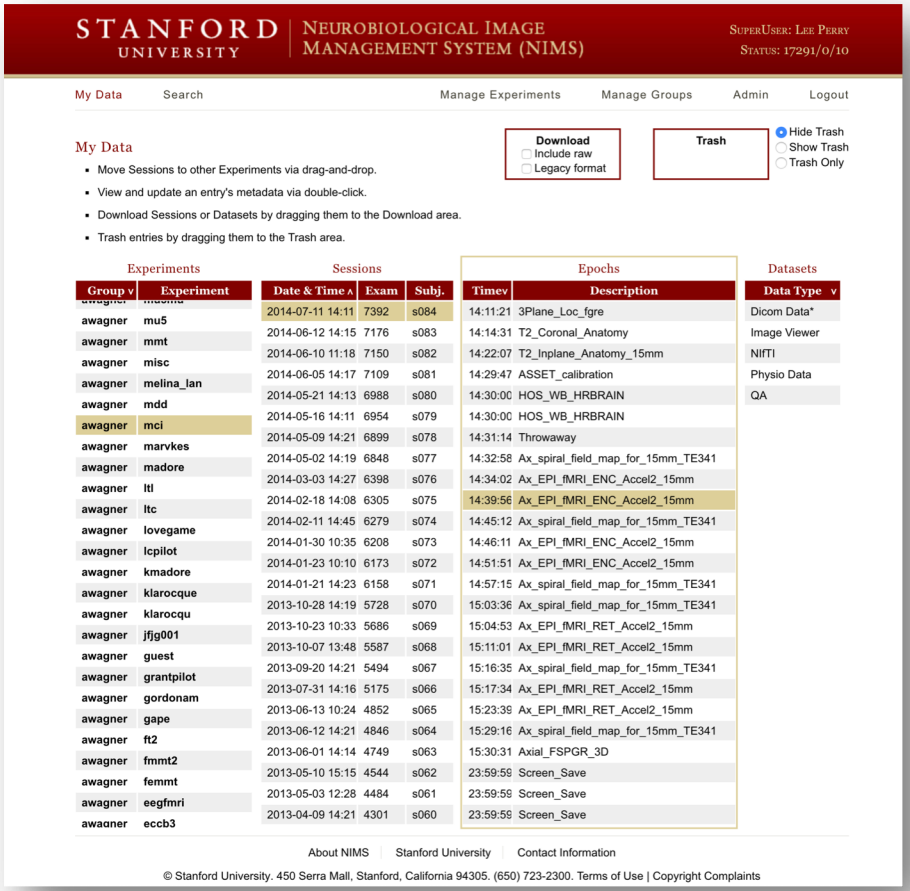
A brief history of NIMS

CNI Data Management – Core mission

- Data Integrity
- Usability
- Future Innovations
- Collaboration

NIMS (2011-2018)

- 6 servers
- 100s of HDDs
- 17281 Sessions
- ~200TB data



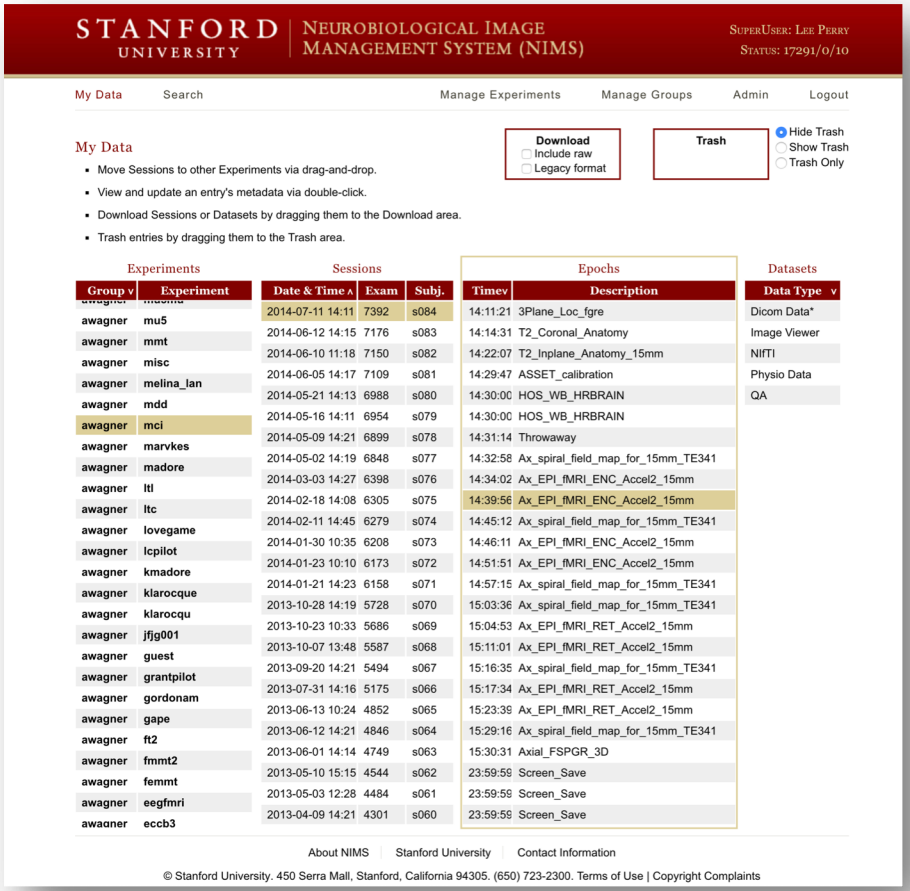
NIMS – Why we moved

Considerations

1. Scalability
2. Technology
3. Features

NIMS

- 6 servers
- 100+HDDs
- 17281 Sessions
- 200TB data



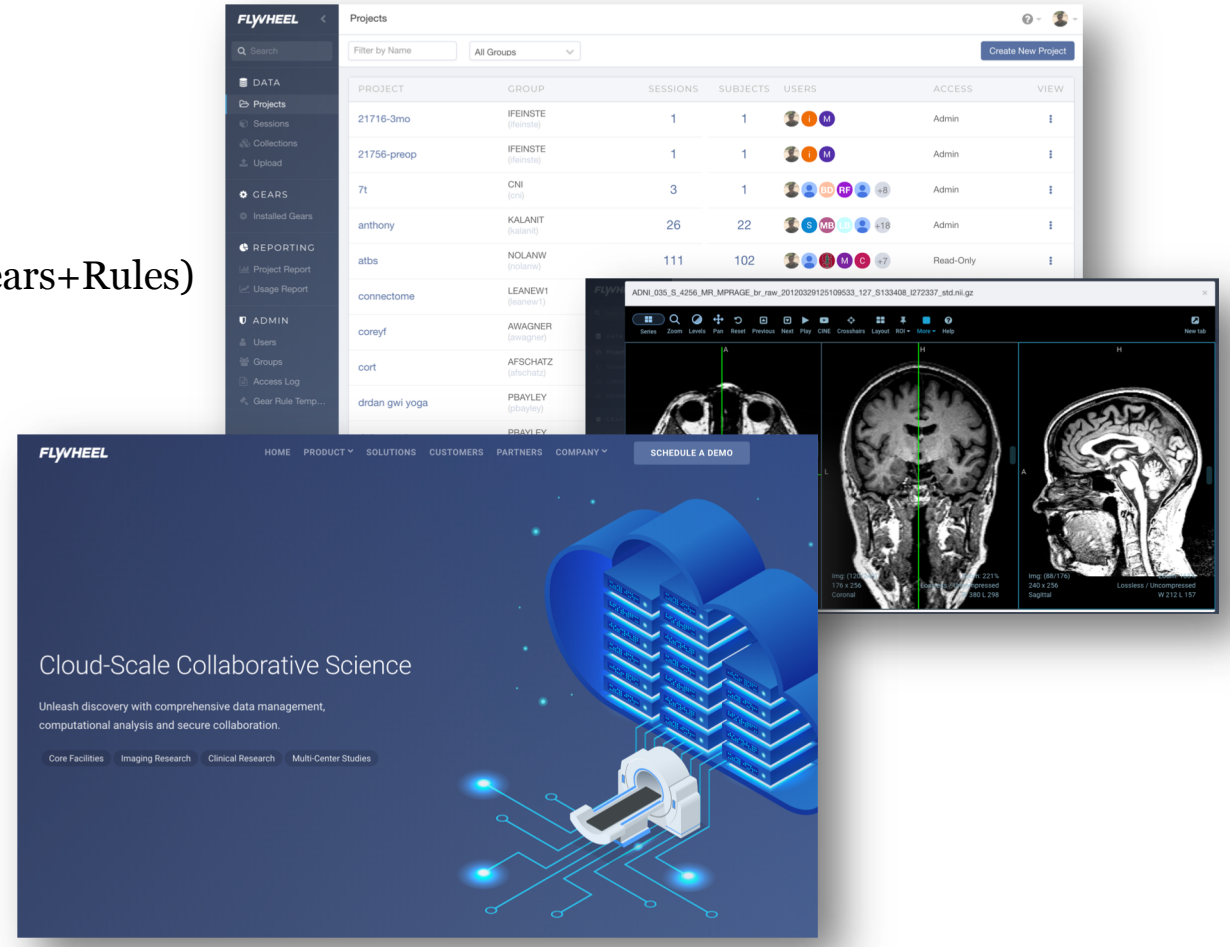
Flywheel

Benefits

- Cloud hosted
- Truly scalable
- Dynamic Data processing (Gears+Rules)
- Project/User Management
- Collections
- Visualization
- CLI
- SDK…

Usage

- ~5000 Sessions
- 100,000+ Gears Run
- ~80TB



NIMS – The Move

October 2017

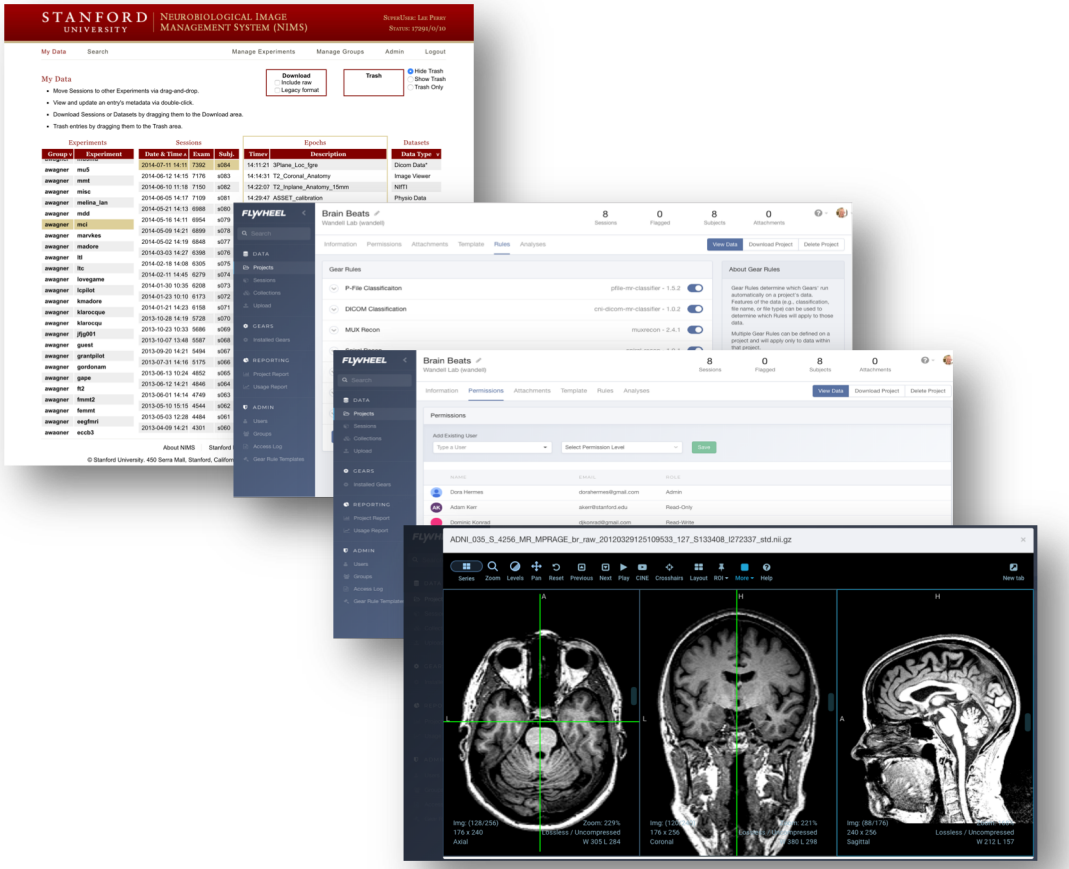
- Flywheel begins shadowing NIMS
- Access provided to all users

September 2018

- Full switch to Flywheel
- NIMS no longer receiving new data

Going forward

- Migration of specific projects
- Migration of all NIMS data



NIMS – The Move

Things to know about the move …

- NIMS Feature Parity +
- Logins and permissions
- Sorting remains the same
  - Patient ID

`<subject_code>@<group>/<project>`

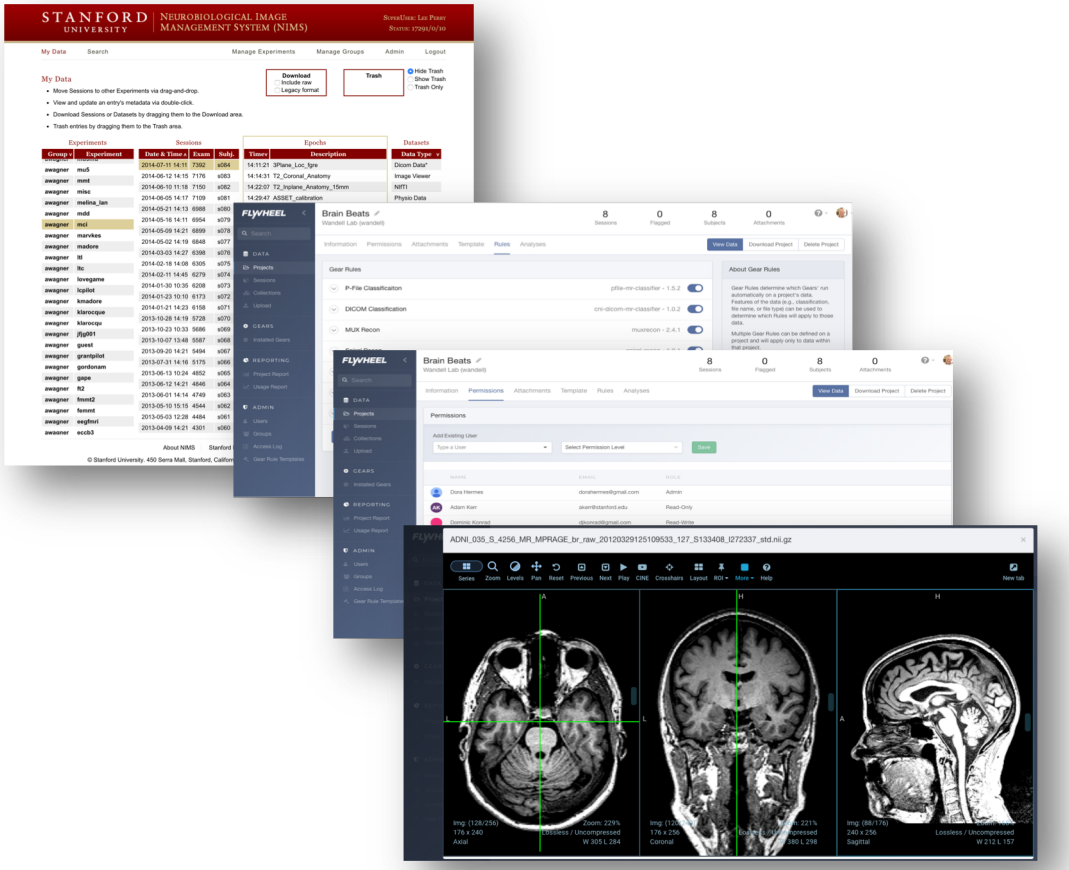
`laima01@cni/gaba`

- Session Labels

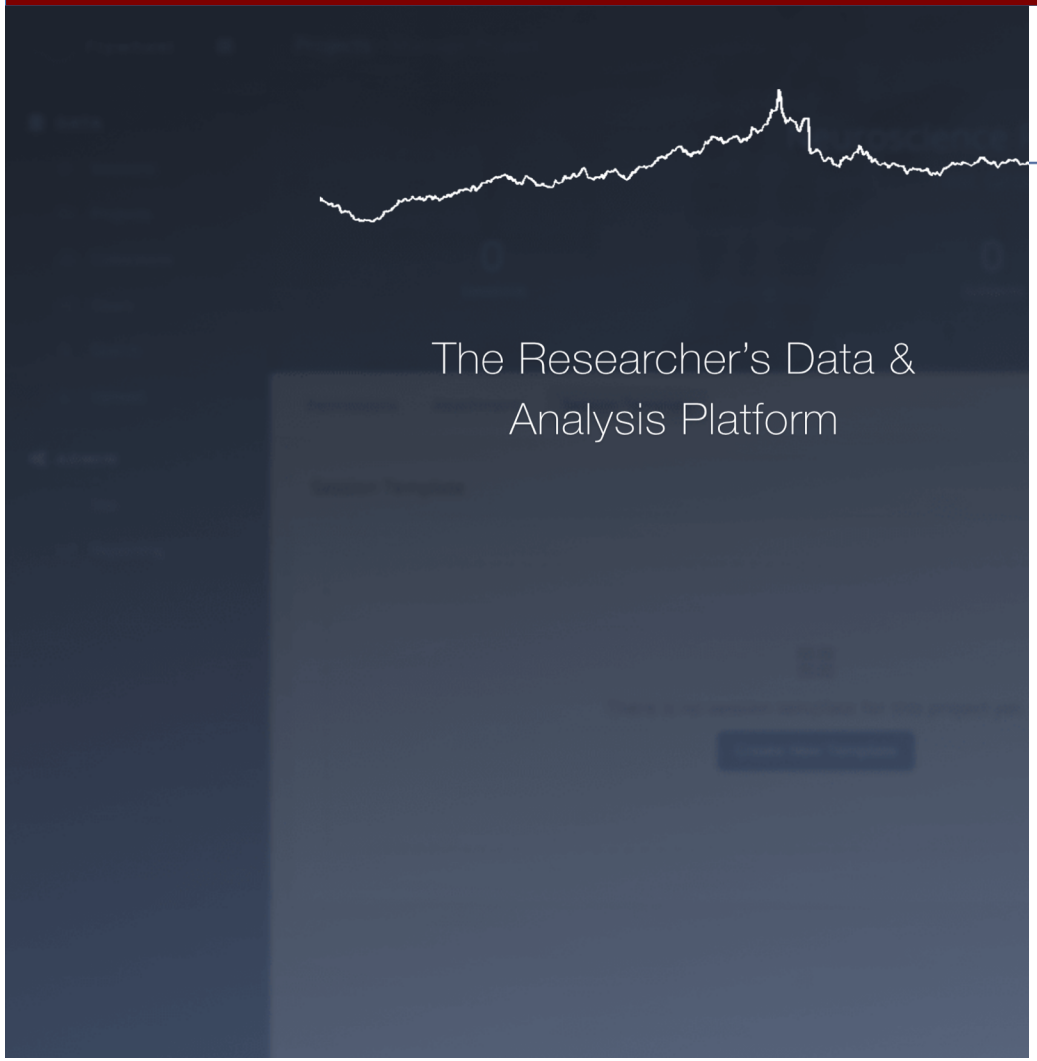
  `label_<label_name>`

- Session Tags

  `tag_<tag_name>`



DEMO



learn more at flywheel.io

FLYWHEEL

Sign in with Google

New CNI Features

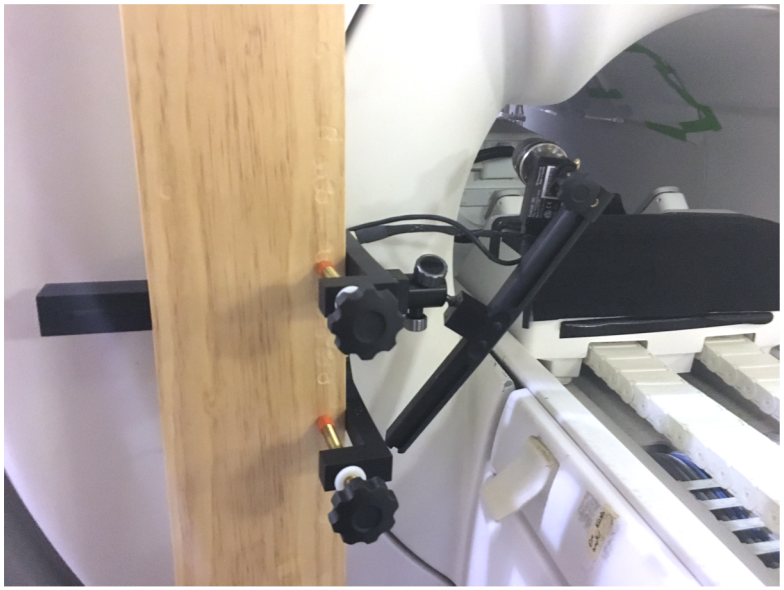
- Advances in in-vivo spectroscopy techniques and analysis
  - Implemented and supporting several spectroscopy sequences both for GABA specific and multi-metabolite data acquisition
  - Automated voxel placement tool
  - Flywheel support for Gannet & LCModel
- Increasing number of exams at CNI incorporate MRS in protocol (~10% for FY18)
- Regular spectroscopy user meeting
- Contact Laima Baltusis for more information

New CNI Features

- The Laima Box
  - Organized input devices and video control into server rack for more robust and easier operation
  - Improved distribution of trigger signals
  - Video projector system interface still needs work
- Biohazard Handling and CLIA Waiver
  - Applied for Clinical Lab status with CADPH and CLIA waiver (allows over-the-counter tests onsite)
  - Carolyn Rodriguez is our Clinical Lab Director (Thanks!)
  - Biohazard waste bins and collection in place

New CNI Features

- Eye tracking support
  - New camera mount and camera head installed
  - Improved sight line to subject eye
  - Can be easily moved out of sight if undesired
  - Use of long-range illuminator is problematic, so near-range illuminator still preferred



New CNI Features

- Actively working towards a migration from CNI SMS (or MUX) sequences to GE Hyperband
  - Advantage to users will be an improved user interface, robustness and near real-time image reconstruction on the scanner host
  - Implementing Split-Slice GRAPPA reconstruction in product pipeline
  - We will conduct thorough comparison of image quality and SNR between sequences with goal of satisfying investigators with any concern about method equivalence

Help Maintain a Productive Environment

- Please stay on time
- Please return all supplies & equipment as necessary so they are ready for the next user
- We all enjoy a nice facility – please keep it looking that way by cleaning up
- Please help us to ensure good data quality
  - Please review your data in a timely fashion
  - Regular QA scans cannot capture all system problems / errors
  - Let us know of any problems as soon as possible

Future CNI User Meetings

- Every 3-6 months
- Inviting “Power Pitch Talks” from user labs for next meeting
  - Brief presentation of research goals & methodology
  - Goal is to foster collaboration and share best practices
- Will host more small meetings to focus on scheduling policy changes if warranted by scanner demand