

TRAINING

Workshop on Management of Large CryoEM Facilities



SIMONS ELECTRON
MICROSCOPY CENTER

New York Structural
Biology Center



Edward T Eng
February 7, 2017



"This is where you'll be working. Don't worry if it's a little confusing at first. We'll have a few training sessions."

THE SCOPE OF TRAINING



Facility



SOPs



safety



responsibilities



review



User



knowledge



instrumentation



computation



ID / access



testing

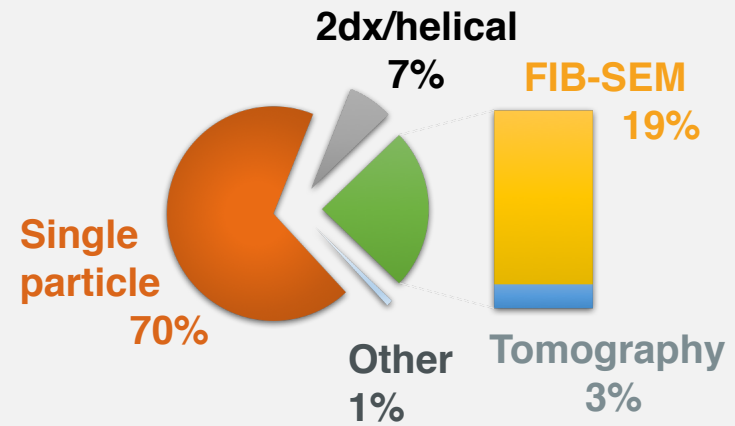


communication

NEED FOR TRAINING AT SEMC



Breakdown of projects

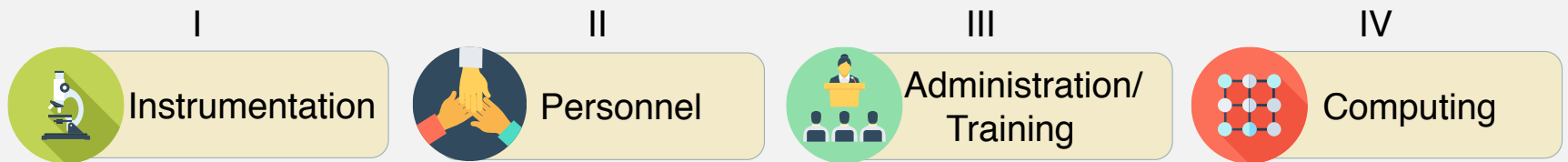


Experience

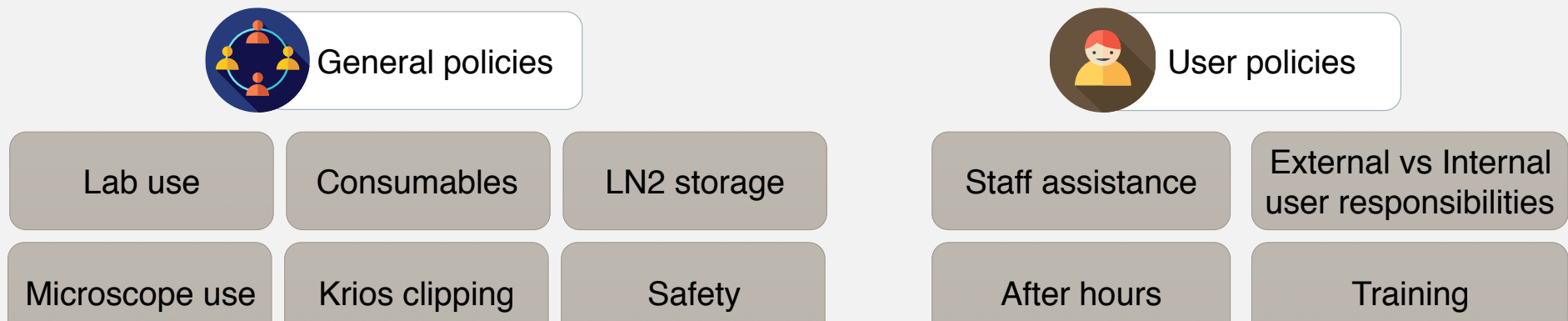


SEMC USERS HAVE ACCESS TO

...these available resources



...given they follow these policies:



TRAINING RESOURCES:

SEMC personnel



Anchi Cheng
Res. Staff Scientist



Sargis Dallakyan
Res. Programmer



Zhening Zhang
Res. Scientist



Carl Negro
Res. Programmer



Alex Wei
Technician



Phil Baldwin
Staff Scientist



Clint Potter
Director



Bridget Carragher
Director



Yong Zi Tan
Grad. Student



Venkat Dandey
Post Doc.



Alex Noble
Post Doc.



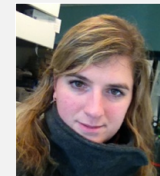
Micah Rapp
Grad Student



Priyamvada Acharya
Embedded Post Doc.



Giovanna Scapin
Embedded Scientist



Julia Brasch
Embedded Post Doc.



Bill Rice
EM Manager



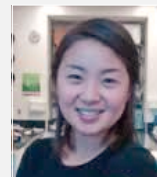
Ed Eng
Staff Scientist



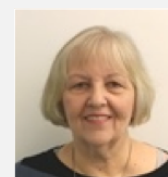
Ashleigh Raczkowski
Senior Technician



Kelsey Jordan
Technician

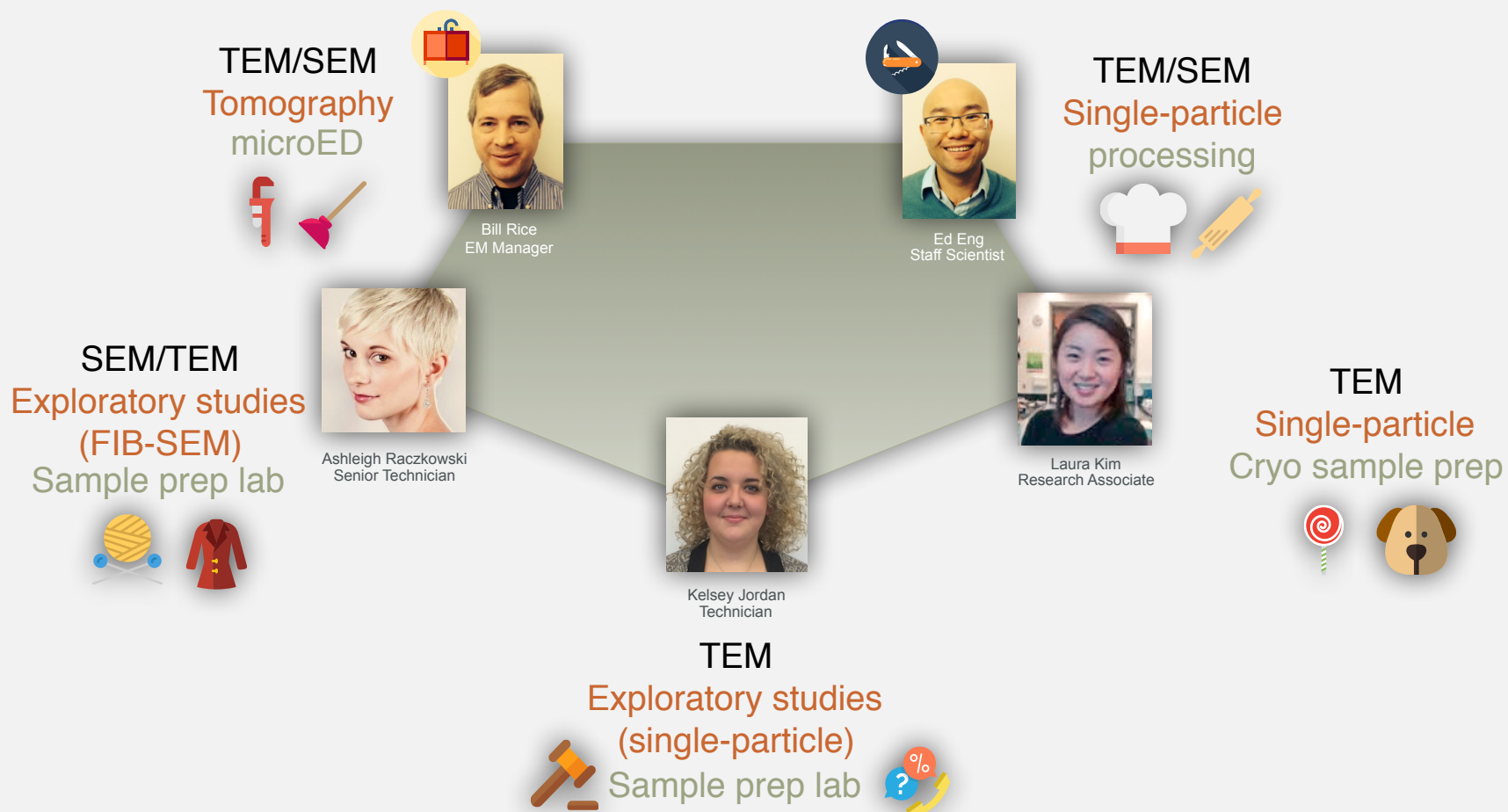


Laura Kim
Research Associate



Crystal Premo
Adminisrator

EXPERTISE AND REDUNDANCY



LEVERAGING RESOURCES:

5 people

SEMC
operations
team



Bill Rice
EM Manager



Ashleigh Raczkowski
Senior Technician



Ed Eng
Staff Scientist



Kelsey Jordan
Technician



Laura Kim
Research Associate

7 EMs, sample prep lab, auxiliary
instrumentation & administration

FEI Titan Krios#1 / #2 / #3



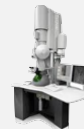
FEI Tecnai Biotwin



FEI Helios 650



FEI Tecnai F20



JEOL 1230



Hundreds of users



Department of
Health



TRAINING SCHEDULE AT SEMC

Type	Frequency	Title	Description
 feedback	yearly	General user meeting	State of the center
 knowledge	yearly	SEMC EM Course	Theory behind EM <i>Graduate level course</i>
 computation	quarterly	SEMC Appion workshop	Data processing workshops
 access	monthly	SEMC New User Orientation	Facility use and Safety Training Sample preparation [neg-stain & cryo] <i>Leginon intro/use of screening microscopes</i>
 troubleshooting	weekly	User Project Discussion Meetings	<i>Appointments: Mon @ 11am, Thurs @3pm & @4pm</i>
 instrumentation	daily	Advanced Leginon use / 1-1 training appointments	Training for independent use of the microscopes and other SEMC resources

TRAINING SCHEDULE AT SEMC

Type	Frequency	Title	Description
 access	monthly	SEMC New User Orientation	Facility use and Safety Training Sample preparation [neg-stain & cryo] <i>Leginon intro/use of screening microscopes</i>

Offered once a month

SEM/TEM users	 	• 9:30 am • 10:30 am • 10:50 am • 11:30 am	New user orientation (SEMC conf room) [Ed] Photo & Tour [Ed] Safety (SEMC conf room) [Bill] Lab overview & ID badge creation • Sample prep overview (Lab) [Ashleigh/Kelsey] • ID badge creation [Bill]
	 		
TEM users		• 12:00 pm • 1:00 pm • 1:30 pm • 3:45 pm	Lunch (on your own) Leginon overview (SEMC conf room) [Ed] Microscope practical (T12 or F20 room) [Laura] Wrap up and brief project meetings [SEMC staff]
			

TRAINING SCHEDULE AT SEMC

Type	Frequency	Title	Description
 computation	quarterly	SEMC Appion workshop	Data processing workshops

Cycle offered once a quarter

Month 1

Month 2

Month 3

Single particle analysis (2 parts)

Tomography (1 part)

Part I

Part II

Part III

Appion basics.

3D reconstruction,
refinement and
validation.

Tomography tools.

Tools to generate a
particle stack and an
initial model from
micrographs.

TRAINING SCHEDULE AT SEMC

Type	Frequency	Title	Description
 troubleshooting	weekly	User Project Discussion Meetings	<i>Appointments: Mon @ 11am, Thurs @3pm & @4pm</i>

Directors



Clint Potter
Director



Bridget Carragher
Director

 @ nysbc.org

Staff



Bill Rice
EM Manager



Ed Eng
Staff Scientist



Ashleigh Raczowski
Senior Technician



Kelsey Jordan
Technician



Laura Kim
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TRAINING SCHEDULE AT SEMC

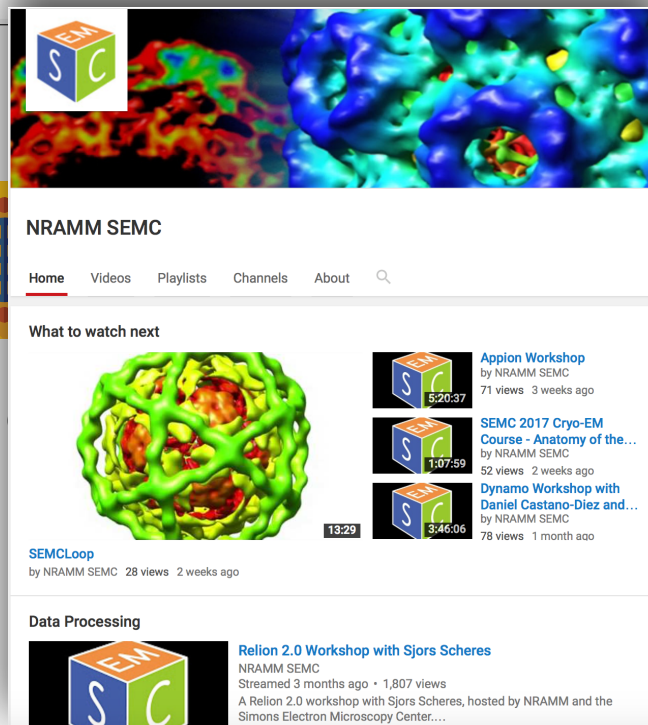
Type	Frequency	Title	Description
 Website & email	online	SOPs, policies and guidelines	<i>Up to date policies and information</i>



documentation



new &



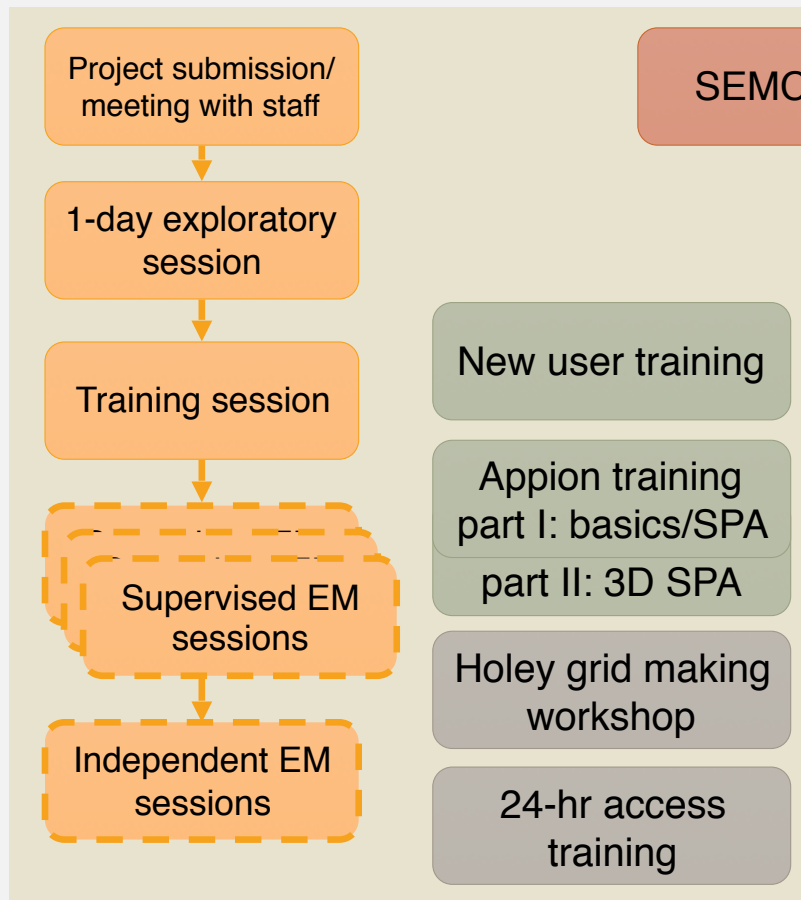

resources
M facilities



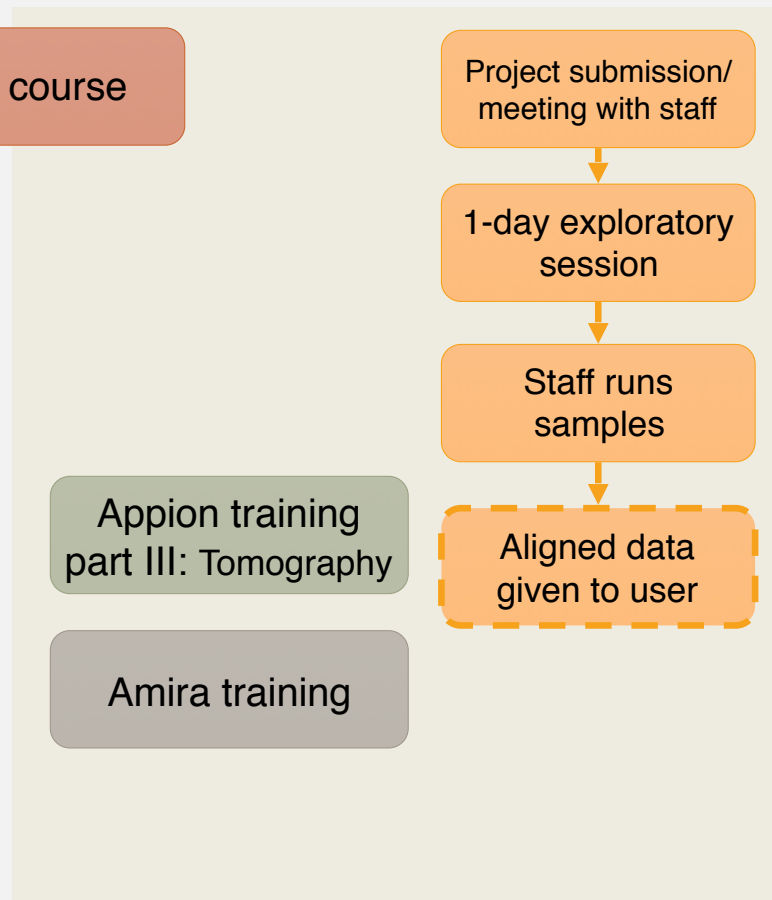
EM supplies

PROJECT WORKFLOW: GENERAL USE

TEM



SEM



TEM COMPETENCY

Open signup EMs



JEOL 1230

+

Gatan US4000
4K CCD



FEI Tecnai 12

+

TVIPS F416
4K CMOS

Pre-allocated EMs



FEI Tecnai F20

+

TVIPS F416
4K CMOS
Direct Electron
DE-20
Direct Detector



Users will be first trained on the J1230 and T12:

- Required to take New User training session
- Required to purchase or assemble their own user tool kit.
- Initial sessions require supervision.



To become independent on the EM the user must demonstrate:

- Able to collect images manually or through Leginon.
- On 2 separate occasions in front of 2 different staff members demonstrate holder care, sample insertion and sample retraction.
- Knows start up and end-of-day shutdown procedures



Moving to the F20:

- User working with a staff member & instrument not being used.
- User screened cryo-grids on the T12.
- Staff comfortable with leaving the user unattended.
- Required to take DE-20 training.



24-hour access:

- Must obtain a C-14 from the FDNY for 24-hour access.
- Must qualify for each instrument.

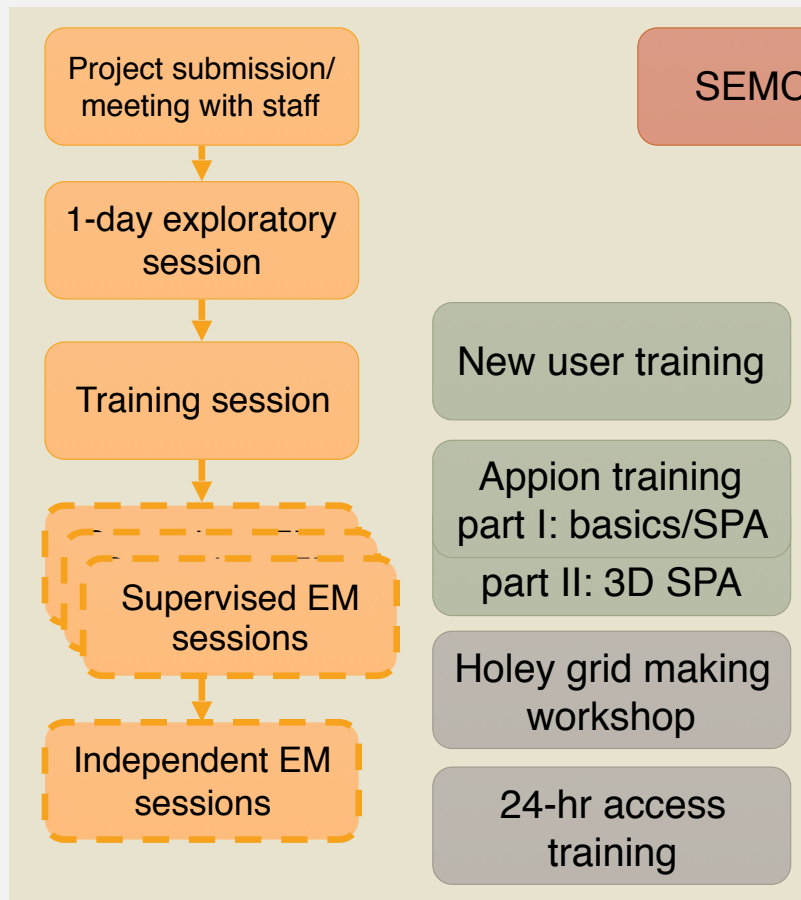


USER TOOLKITS

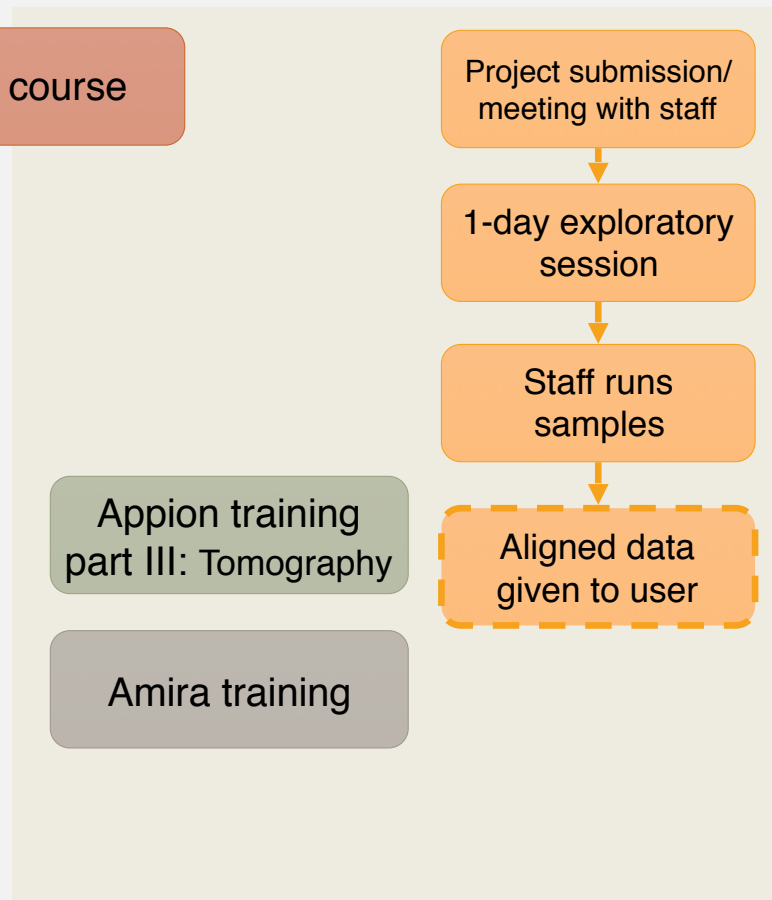


PROJECT WORKFLOW: GENERAL USE

TEM



SEM



EM COMPETENCY

Open signup EMs



JEOL 1230
+
Gatan US4000
4K CCD



FEI Tecnai 12
+
TVIPS F416
4K CMOS



Minimal staff assistance



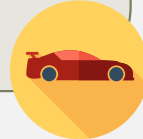
Pre-allocated EMs



FEI Tecnai F20
+
TVIPS F416
4K CMOS
Direct Electron
DE-20
Direct Detector



FEI Helios 650
+
4K ETD, TLD, ICE



Application required to use



FEI Titan
Krios1
+
FEI
Falcon 3
Direct Detector

Gatan
K2 Summit
Direct Detector



FEI Titan
Krios2
+
FEI
Falcon 3
Direct Detector

Gatan
K2 Summit
Direct Detector



FEI Titan
Krios3
+
FEI
Falcon 3
Direct Detector

Gatan
K2 Summit
Direct Detector



Full staff assistance

STAFF ASSISTED USE ONLY



FEI Helios 650
+
4K ETD, TLD, ICE



FEI Titan
Krios1
+
FEI
Falcon 3
Direct Detector

Gatan
K2 Summit
Direct Detector



FEI Titan
Krios2
+
FEI
Falcon 3
Direct Detector

Gatan
K2 Summit
Direct Detector



FEI Titan
Krios3
+
FEI
Falcon 3
Direct Detector

Gatan
K2 Summit
Direct Detector



Minimize downtime
Maximize efficiency



Staff aligns instrument &
loads samples



User selects ROIs.

TRAINING AT SEMC



knowledge



capability



capacity



productivity



performance



Training is teaching, or developing in oneself or others, any skills and knowledge that relate to specific useful competencies. **Training** has specific goals of improving one's capability, capacity, productivity and performance.

<https://en.wikipedia.org/wiki/Training>



Simons Electron Microscopy Center

NEW YORK STRUCTURAL BIOLOGY CENTER
Simons Electron Microscopy Center



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Sargis Dallakyan
Res. Programmer



Zhening Zhang
Res. Scientist



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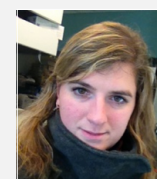
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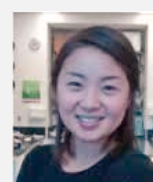
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Staff Scientist



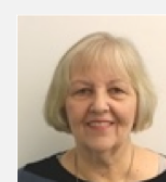
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Research Associate



Crystal Premo
Administrator



National Resource for Automated Molecular Microscopy
<http://nramm.nysbc.org>

Questions?