# The Electron Imaging Center for Nanomachines (EICN) at UCLA

Hong Zhou

CNSI (commissioned 2007)



# 3.3Å Structure of a Non-enveloped Virus



#### Zhang et al. Cell (2010)141:472-482

#### Atomic tomogram of gold nanoparticle



MC Scott et al. Nature 483, 444-447 (2012)

### Free (via voucher) access to Krios



# **EM & supporting instruments in EICN**

aging Ce	nter ×				-	-			Concession in the local division of the loca
00	clms.cnsi.ucla.edu/	cnsi/clms/e	equi at-lint?se	arch lab = 67848		77838ccal_view=week			
ported Fr	rom IF Pi x 🖝 B	lookmarks	T Suggested Sites	magneo	Online PL HP	Games Pl Web Slice Gallery			
porteo n		ioonininino	e suggestee me		11.00		Equipmen	t/Service	
January	29, 2017 - February	4, 2017 🛄					Equipinon		
day	Monday	Tuesday	Wednesday	Thursday	Friday				
10.5	30	31	1	2	3	Unavailable	Available	Available	Avai
M (FEI);	Titan S/TEM (FEI),	TF 20 High-	Titan Krios High-	Titan Krios High-	Titan Krios Hig	Titae S/TEM /EEI) Boom B122	Titan Krige High Pas CoupEM	TE20 High Decelution EM	T12 Onick Con
2	Room B122	Resolution	Res CryoEM and	Res CryoEM and	Res CryoEM an	Than arrent (rei), room biez	and CryoET Room B140	CryoEM and CryoET (EEI) Boom	/EEI) Bo
7)94.90pm	101/29/2017)06.00pm	EM, CryoEM	CryoET, Room B14	0CryoET, Room B140	CryoET, Room		and cryster, would brief	B146C	It say, iso
	02:00em.	and CryoET	09;00am-	(02/01/2017)/09.00am	(02/01/2017)09.0	-		arres.	
M (FEI),	TF20 High-	(FEI), Room	09:00am(02/04/2017	)09:00am(02/04/2017)	09.00em(02/04/2				(t)
2 (12:00	Resolution EM,	B146C			National States				1
vm)	CryoEM and CryoET	(10:00 am-	T12 Quick CryoEM	T12 Quick CryoEM	TF20 High-			and the second	6
CryoEM	(FEI), Room B146C	10:00 pm)	and CryoET (FEI),	and CryoET (FEI),	Resolution EM.				
T (FEI),	(10:00 am-10:00 pm)	ZEISS	Room B122 (09:00	Room B122 (09:00	CryoEM and Cr				-
2 (10:00	ZEISS Supra 40VP	Supra 40VP	am-10:30 am) .	am-10:00 am)	(FEI), Room B1			State of the state	4.2
m) .	SEM, Room B146B	SEM, Room	ZEISS Supra 40VP	TF20 High-	(10:00 am-10:00				
CryoEM	(10:00 am-11:00 am)	B146B	SEM, Room B146B	Resolution EM,	ZEISS Supra 40		and the second s		
T (FEI),	JEM1200-EX (JEOL).	(10:00 am-	(09:20 am-09:55 am	CryoEM and CryoEl	SEM, Room B1-				
2 (11:20	Room B146D (10:00	11:30 am) .	Second and the second	(FEI), Room B148C	(11:00 am-01:00	Available	Available	Available	Avai
m).	am-10:30 am) .	T12 Quick	JEM1200-EX	(10:00 am-01:00 pm)	T12 Quick Cryo	Available	Available	Manable	Avai
B	ZEISS Supra 40VP	CryoEM and	(JEOL), Room	ZEISS Supra 40VP	and CryoET (FE	ZEISS Supra 40VP SEM, Room	JEM1200-EX (JEOL), Room	T20 (Corr (FEI) High-Res	UCT Ultrami
n EM,	SEM, Room B146B	CryoET	B146D (10:00 am-	SEM, Room B146B	Room B122 (11	B146B	B146D	CryoEM and CryoET, Correlative	Room
nd CryoE	T (11:10 am-12:10 pm)	(FEI), Room	11:00 am)	(10:00 am-11:00 am)	am-12:00 pm) .			Microscopy, Room B200	
m B146C	ZEISS Supra 40VP	B122 (10:30	ZEISS Supra 40VP	JEM1200-EX (JEOL)	T20 ICorr (FEI)	and the second se	4	6	
10:00 pm	SEM, Room B146B	em-12:00	SEM, Room B146B	Room B146D (10:15	Res CryoEM an		- 39	The second s	1000
ra 40VP	(12:10 pm-01:00 pm)	.pm) .	(10:00 em-11:00 em)	am-10:45 am)	CryoET, Correla	A DESCRIPTION OF	+	. 2.	
m B146B	ZEISS Supra 40VP	ZEISS		ZEISS Supra 40VP	Microscopy, Rc		-0.5	the a	
05:00 pm	SEM, Room B146B	Supra 40VP	JEM1200-EX	SEM, Room B146B	B208 (12:00 pm	and the second			and the second s
M (FEI),	(01:00 pm-04:00 pm)	. SEM, Room	(JEOL), Room	(11:00 am-12:30 pm)	. 06:00 pm)		2.2:		
2 (04:00	T20 iCerr (FEI) High	B146B	B146D (11:00 am-	T20 (Corr (FEI) High	T12 Quick Cryo				
nto).	Res CryoEM and	(11:30 am-	12:30 pm) .	Res CryoEM and	and CryoET (FE		T I I		
ra 40VP	CryoET, Constative	12:25 pm) .	ZEISS Supra 40VP	CryoET, Correlative	Room B122 (01		and the second second		
m B146B	Microscopy, Roam	ZEISS	SEM, Room B146B	Microscopy, Room	pm-02.00 pm)				-
09:30 pm)	B200 (01 15 pm-	Supra 40VP	(11:00 am-01:00 pm)	B200 (11:25 am-	ZEISS Supra 40	Available	Available	Available	Avai
M (FEI),	03:00 pm)	SEM, Room	and the second	os:00 pm)	SEM, Room 81-	UC6 cryo-Ultramicrotome	LKB 7800 KnifeMaker, Room	EM PACT2-RTS High Pressure	EM AFS2 A
2	T12 Quick CryoEM	B146B	TF20 High-	TF20 High-	(03:00 pm-04:00	(Leica), Room B146E	B146E	Freezer (Leica), Room B146E	substitution (Le
	and CryoET (FEI),	(12:30 pm-	Resolution EM,	Resolution EM,	ZEISS Supra 40	0.00020020020020002000024	0.000.000	10023630566325252525630231525	2.53.272522.25262.000.000
11302017	Room B122 (02:00	02:30 pm) .	CrydEM and	CryoEM and CryoEl	SEM, Room B14				
	pm-03:10 pm) :	JEM1200-ED	CryoET (FEI), Roon	n(r El), Room B146C	(04:00 pm-06:00		T-S		-18
	1 20 iCon (FEI) High	(JEOL),	B146C (11:00 am-	(01:00 pm-04:00 pm)	ZEISS Supra 40				C/A
	Res CryoEM and	Room	Uc(UU pm) .	112 Quick CryoEM	SEM, Room B1	A		C. Mary	
	Crypes, Constative	61460	T20 ICON (FEI)	and CryoET (FEI),	(06.40 pm-07:55		Ha		
	Microscopy, Room	101.00 pm-	nigh Res CryoEM	HOOM B122 (01:50	2EISS Supra 40		-		-
	PS00 103 00 bit-	03.00 pm)	and CryoE1,	pm-03(00 pm)	SEM, Room B1-				
	(10,00,000)	112 Quick	Correlative	THAN SITEM (FEI),	108.30 pm-09:20				4

### **Reserving EICN Instruments**



#### Throughput: optimization and measurement



 First-come, first-served policy for low-end T12/T20/TF20
Krios: demonstration of sample integrity (2D classaverages) and multiple views in ice

#### Cost

- Water ring in Fourier spectrum
- 500-1000 movies depending on imaging strategy (super resolution and number of frames/movies)
- 3D structures & publications

# **Consortium/remote users work flow**



FeeEx.

#### Sample dry shipper

100



#### Data disks

### **Remote monitoring through Leginon**



# **Remote/VNC alignment & operation**

	krioslegion 3.eicn.	n.ucla.edu:1 (remote_desktop) - VNC	
le Application	Krios_Server_op - TeamViewer - Free lice Week Week Week Manager Wiek Cana View View Actions - 및 View - ピーCommunicate - [] 当該 コンドキタ IIビビビに合む当日キリー - IIIンナキタメ INO ロームノッロ O NO IO	rense (non-commercial use only)	ت ت به ت NC Viewer
Presets Man Grid Targetin Grid Square Targe Hole Targetin Hole Targetin Hole Targetin Hole Square State Hole Targetin Hole Square State Preview State State Exposure Tal Exposure Tal Exposure Tal Exposure Tal Beam_Tilt State State Drift_Monitor N2_Filling Fix_Beam Correction Target_Adjust Navigation	Image: State Stat	Trans Total System Trans Tr	X: Y:

#### Data collection strategy: 3 servers & bandwidth



#### **Data collection strategy: 3 servers & bandwidth**



# **Acknowledgements**

# **EICN Staff**

<u>Peng Ge (technical director)</u> <u>Ivo Atanasov (operation)</u> <u>Wong H. Hui (IT and accounting)</u> Cristian Giron (user coordinator)

Funding from NIH and NSF NIH (1S10RR23057, 1S100D018111, 1U24GM116792), NSF (DBI-1338135)