

Hands-On Workshop on Image Processing of Electron Crystallography Data with 2dx

Description	This workshop will discuss the method of membrane protein structure determination by cryo-electron microscopy (cryo-EM). Membrane protein crystallization, sample preparation, and cryo-EM data collection will be introduced. The workshop will then exhaustively lecture the various image processing methods leading to a high-resolution 3D structure of the samples. Accompanying practicals will use the software 2dx for the exercises.
Eligibility	Participants must have a Master degree in math, computer sciences, biology, chemistry, or physics, with an interest in membrane protein structure determination.
Course Structure	Lectures, hands-on experiments, scientific talks.
Assessment	Participation to all activities and a quiz test at the end of the course.
Dates	August 19, 2012 – August 25, 2012
Credits	1.5 ECTS
Facilitators	Prof. Henning Stahlberg, C-CINA, University of Basel Marcel Arheit, C-CINA, University of Basel Anchi Cheng, Scripps, San Diego, CA, USA Hans Hebert, Karolinska Institute, Stockholm, Sweden Cristina Paulino, MPI for Biophysics, Frankfurt, Germany Xiangyan Zeng, FVSU, GA, USA
Location	University of Basel, (details to follow)
Registration	send an Email to Carsten.KniggeSalis@ibmm.unibe.ch , and register also on: http://www.2dx.unibas.ch/workshop/2012
No. of spots	Maximum # of accepted students: 9 for practical part, lectures are public. Priority will be given to researchers (PhD students and post-docs) from NCCR TransCure.

		Aug. 19, 2012	Aug. 20, 2012	Aug. 21, 2012	Aug. 22, 2012	Aug. 23, 2012	Aug. 24, 2012	Aug. 25, 2012	
		Sunday	Mon	Tue	Weds	Thurs	Fri	Saturday	
		<i>Arrival</i>	<i>Introduction</i>	<i>2D non-tilted</i>	<i>2D tilted</i>	<i>3D merge</i>	<i>Evaluation</i>	<i>Departure</i>	
Lectures	9:00		2D crystallization	CTF	2D Merging	3D Merging	Beam Tilt Refinement		
	9:45		Coffee Break						
	10:15		Cryo-EM	Unbending	2D Max. Likelihood S.P.	Lattice Lines	Quality Evaluation: Phase Residuals, FOM, Resolution Circle Plot		
	11:00		Fourier	Symmetry	Tilt Geometry	3D Max. Likelihood S.P.	EMDB Conventions for Data Submission		
	12:00		Lunch (ZLF)						
	13:30		Software Installation	Get and Refine Spotlist	Get Defocus & Tilt	Lattice Line fitting			
	14:30		File Formats / Conversion	Get Defocus	Get Lattice & Tilt	3D Merging			
	15:30		Coffee Break						
	Tutorials	16:00		Project Initialization	Get Lattice	Lattice Analysis (Symmetry, Tilt Geometry)	3D point spread function	Guided Tour to C-CINA, or continuation of practicals, or Departure	
				Introduction to CCP4 / Spider	Unbending I, II	CTF vs. TTF	Synthetic Reference Unbending		
			Reception in Pharmazentrum, Gallery	FFT, Periodogram, Thon Rings	CTF correction	Phase Origins	3D Max. Likelihood		
	19:00		Dinner (Sandwiches)						
Evening Lectures	20:00	Welcome Dinner	Scientific Lecture	Scientific Lecture	Scientific Lecture	Banquet			
	Posters		Posters						

Orange = Lecture / Blue = Practical Part