

**EMBO-Practical Course**  
**Structural characterization of macromolecular complexes**  
**2-7 June, Grenoble**

**Programme at a Glance**

	Mon Jun 2	Tues Jun 3	Wed Jun 4	Thur Jun 5	Fri Jun 6	Sat Jun 7
<b>Chair:</b>	<b>D. Hart</b>	<b>E. Gordon</b>	<b>W. Weissenhorn</b>	<b>G. Schoehn</b>	<b>S. Cusack</b>	<b>C. Petosa</b>
<b>9:00–9:45</b>	<i>Bacterial expression</i>  <b>Barbara Morris</b>	<i>Co-expression in E.coli</i>  <b>Christophe Romier</b>	<i>SAXS &amp; SANS</i>  <b>Dmitri Svergun</b>	<i>Imaging by EM</i>  <b>Patrick Schultz</b>	<i>Crystallization strategies</i>  <b>Song Tan</b>	<i>Synchrotrons, Beamlines</i>  <b>Martin Walsh</b>
<b>9:45–10:30</b>	<i>Baculovirus expression</i>  <b>Imre Berger</b>	<i>Strategies re: complexes</i>  <b>Bertrand Séraphin</b>	<i>AUC &amp; ITC</i>  <b>Vladimir Rybin</b>	<i>single particle cryo-EM</i>  <b>Holger Stark</b>	<i>Molecular Imaging</i>  <b>Jan Ellenberg</b>	<i>Mass spec of assemblies</i>  <b>Frank Sobott</b>
<b>Coffee</b>						
<b>11:00–11:45</b>	<i>Mammalian cell expression</i>  <b>Radu Aricescu</b>	<i>Producing Complexes</i>  <b>Song Tan</b>	<i>TAP analysis of complexes</i>  <b>Anne-Claude Gavin</b>	<i>EM Docking</i>  <b>Willy Wriggers</b>	<i>cryo-EM of SRP/ribosome</i>  <b>Christiane Schaffitzel</b>	<i>enhanceosome</i>  <b>Daniel Panne</b>
<b>11:45–12:30</b>	<i>HTP methods</i>  <b>Christian Kambach</b>	<i>Preparing multi-subunit complexes</i>  <b>Chris Oubridge</b>	<i>MALS</i> <b>Marc Jamin</b> ----- <i>H/D-MS</i> <b>Ricardo Pires</b>	<i>NMR of complexes</i>  <b>Michael Sattler</b>	<i>yeast transcription system III</i> <b>Carlos F.-Tornero</b>	<i>Final remarks</i>  <b>Carlo Petosa</b>
<b>Lunch</b>						
<b>14:00–18:00</b>	Practicals	Practicals	Practicals	Practicals	Practicals	
<b>18:00–19:00</b>	Poster clip presentations	Poster Session 1	<b>Guest lecture: Titia Sixma</b>	Poster Session 2	Feedback Session	
<b>Dinner</b>			<b>Novagen Buffet</b>		<b>Banquet at Le Sappey</b>	

**Afternoon Practicals:**

1. Crystallization, crystallography, beamlines
2. Protein-Nucleic Acid interactions
3. Electron microscopy, analysis and fitting
4. Biophysical & Biochemical Characterization
5. Thermofluor stability assay & ITC

# Detailed Programme

## Monday 2 June

<b>Expression Strategies</b>		
<b>Chair: Darren Hart Chadwick Amphitheatre</b>		
<b>9:00 - 9.10</b>	Welcome	<b>Carlo Petosa</b>
<b>9:10 - 9.55</b>	Expression strategies using bacterial systems	<b>Barbara Morris</b> Novagen / EMD Chemicals Madison WI, USA
<b>9:55 - 10.40</b>	Baculovirus expression strategies for multiprotein complexes	<b>Imre Berger</b> EMBL Grenoble
	<b>Coffee</b>	
<b>11:00 - 11.45</b>	Large-scale expression of proteins (and complexes) in mammalian cells	<b>Radu Aricescu</b> University of Oxford, UK
<b>11:45 - 12.30</b>	HTP Methods Great and Small : high throughput at the brownie scale and beyond	<b>Christian Kambach</b> Paul Scherrer Institute Villigen, Switzerland
	<b>Lunch</b>	
<b>14:00 - 18:00</b>	Practicals (Meet in ILL 19/20 hall)	
<b>18:00 - 19:00</b>	Poster clip presentations (EMBL Seminar Room)	
<b>19:00 - 20:00</b>	<b>Dinner (canteen)</b>	

## Tuesday 3 June

<b>Isolation of Functional Complexes</b>		
<b>Chair: Elspeth Gordon Chadwick Amphitheatre</b>		
<b>9:00 - 9:45</b>	Strategies for the co-expression of protein complexes in Escherichia coli	<b>Christophe Romier</b> IGBMC Illkirch, France
<b>9:45 - 10:30</b>	Strategies for identifying, overproducing and characterizing protein complexes	<b>Bertrand Séraphin</b> CGM-CNRS Gif-sur-Yvette, France
	<b>Coffee</b>	
<b>11:00 - 11:45</b>	Production of protein complexes	<b>Song Tan</b> Penn State University, University Park, PA, USA
<b>11:45 - 12:30</b>	Preparation of recombinant multi-subunit complexes for crystallization	<b>Chris Oubridge</b> MRC-LMB Cambridge, UK
	<b>Lunch</b>	
<b>14:00 - 18:00</b>	Practicals	
<b>18:00 - 19:00</b>	Poster Session 1	
<b>19:00 - 20:00</b>	<b>Dinner (canteen)</b>	

## Wednesday 4 June

<b>Characterization of macromolecular complexes</b>		
<b>Chair: Winfried Weissenhorn Chadwick Amphitheatre</b>		
<b>9:00 - 9:45</b>	Structure analysis of biomacromolecular solutions by small-angle X-ray and neutron scattering	<b>Dmitri Svergun</b> EMBL Hamburg, Germany
<b>9:45 - 10:30</b>	Analytical ultracentrifugation and isothermal calorimetry in the study of protein complexes	<b>Vladimir Rybin</b> EMBL Heidelberg, Germany
	<b>Coffee</b>	
<b>11:00 - 11:45</b>	Tandem Affinity Purification of protein complexes: lessons from a genome-wide screen	<b>Anne-Claude Gavin</b> EMBL Heidelberg, Germany
<b>11:45 - 12:10</b>	The use of size exclusion chromatography and multi-angle laser light scattering (MALS) to characterize macromolecular complexes	<b>Marc Jamin</b> UVHCI Grenoble
<b>12:10 - 12:35</b>	Analysis of the conformational dynamics of a protein involved in retroviral budding using hydrogen/deuterium exchange and mass spectrometry	<b>Ricardo Pires</b> EMBL Grenoble
	<b>Lunch</b>	
<b>14:00 - 18:00</b>	Practicals	
<b>18:00 - 19:00</b>	<b>Guest Lecture (Chadwick Amphitheatre):</b> Protein-protein interaction modulating ubiquitin and SUMO conjugation	<b>Titia Sixma</b> NKI Amsterdam, The Netherlands
<b>19:00 - 20:00</b>	<b>Novagen Dinner (ILL Hall 19/20)</b>	

## Thursday 5 June

<b>Electron microscopy &amp; NMR</b>		
<b>Chair: Guy Schoehn, Chadwick Amphitheatre</b>		
<b>9:00 - 9:45</b>	Imaging biological macromolecules with electron microscopes	<b>Patrick Schultz</b> IGBMC Illkirch, France
<b>9:45 - 10:30</b>	Structure determination of dynamic macromolecular complexes by single particle cryo-EM	<b>Holger Stark</b> MPI Göttingen, Germany
	<b>Coffee</b>	
<b>11:00 - 11:45</b>	EM interpretation with Situs and Sculptor	<b>Willy Wriggers,</b> D.E. Shaw Research, New York, USA
<b>11:45 - 12:30</b>	Studying macromolecular complexes by NMR	<b>Michael Sattler</b> Technische Universität München, Germany
	<b>Lunch</b>	
<b>14:00 - 18:00</b>	<b>Practicals</b>	
<b>18:00 - 19:00</b>	Poster Session II	
<b>19:00 - 20:00</b>	<b>Dinner (canteen)</b>	

## Friday 6 June

<b>Strategies in structural and functional analysis</b>		
<b>Chair: Stephen Cusack, Chadwick Amphitheatre</b>		
<b>9:00 - 9:45</b>	Crystallization strategies	<b>Song Tan</b> Penn State University, University Park, PA, USA
<b>9:45 - 10:30</b>	Fluorescence microscopy-based methods to study macromolecular complexes in live cells	<b>Jan Ellenberg</b> EMBL Heidelberg
	<b>Coffee</b>	
<b>11:00 - 11:45</b>	Cryo-EM studies of co-translational targeting and translocation	<b>Christiane Schaffitzel</b> EMBL Grenoble
<b>11:45 - 12:30</b>	Structural studies on yeast transcription system III	<b>Carlos Fernández-Tornero</b> EMBL Heidelberg
	<b>Lunch</b>	
<b>14:00 - 18:00</b>	Practicals	
<b>18:00 - 18:20</b>	Feedback session / EMBO Questionnaire	
<b>approx. 18:30</b>	<b>Bus to LeSappey &amp; Banquet</b>	

## Saturday 7 June

<b>More tips/techniques</b>		
<b>Chair: Carlo Petosa, EMBL Seminar Room</b>		
<b>9:00 - 9:45</b>	Synchrotrons, beamlines, and all that jazz	<b>Martin Walsh</b> MRC France, BM-14
<b>9:45 - 10:30</b>	Mass spectrometry of noncovalent assemblies	<b>Frank Sobott</b> University of Oxford, UK
<b>10:30 - 11:15</b>	Crystallizing the enhanceosome	<b>Daniel Panne</b> EMBL Grenoble
<b>11:15 - 11:25</b>	Final remarks	<b>Carlo Petosa</b> EMBL Grenoble