



*National Synchrotron Radiation Research Center*

# ***2006 PXIG Meeting & SPXF User Committee Meeting***

## ***Status Report of the Protein Crystallography Stations of NSRRC***

***10-4, 2006***

***NSRRC***



# Current Protein Crystallography Facilities at NSRRC



BioNSRRC Beam Line	<u>BL12B2</u>	<u>BL13B1</u>	<u>BL13C1</u>
Flux @300 mA (p/s)	$6 \times 10^{10}$	$4 \times 10^{11}$	$4 \times 10^{10}$
Beam Size ( $\mu\text{m}$ )	250	200	200
Experiment	MAD	MAD	MONO
Wavelength ( $\text{\AA}$ ) Energy Range (keV)	0.77-0.98 7-23.0	1.9-0.65 6.5-19	0.975, 0.915 12.7, 13.6
Energy Resolution	$1.7 \times 10^{-4}$	$2.2 \times 10^{-4}$	$8 \times 10^{-4}$
Detector	Q4R	Q315	Q210
Detector Size (mm <sup>2</sup> )	188x188	315x315	210x210
Xtal-Detector (mm)	70-350	130-800	100-810
Throughput (images/minute)	4	12	12

# I. Beamtime Delivered and Outcomes

# MAD Beamtime Delivered & Number of User Group

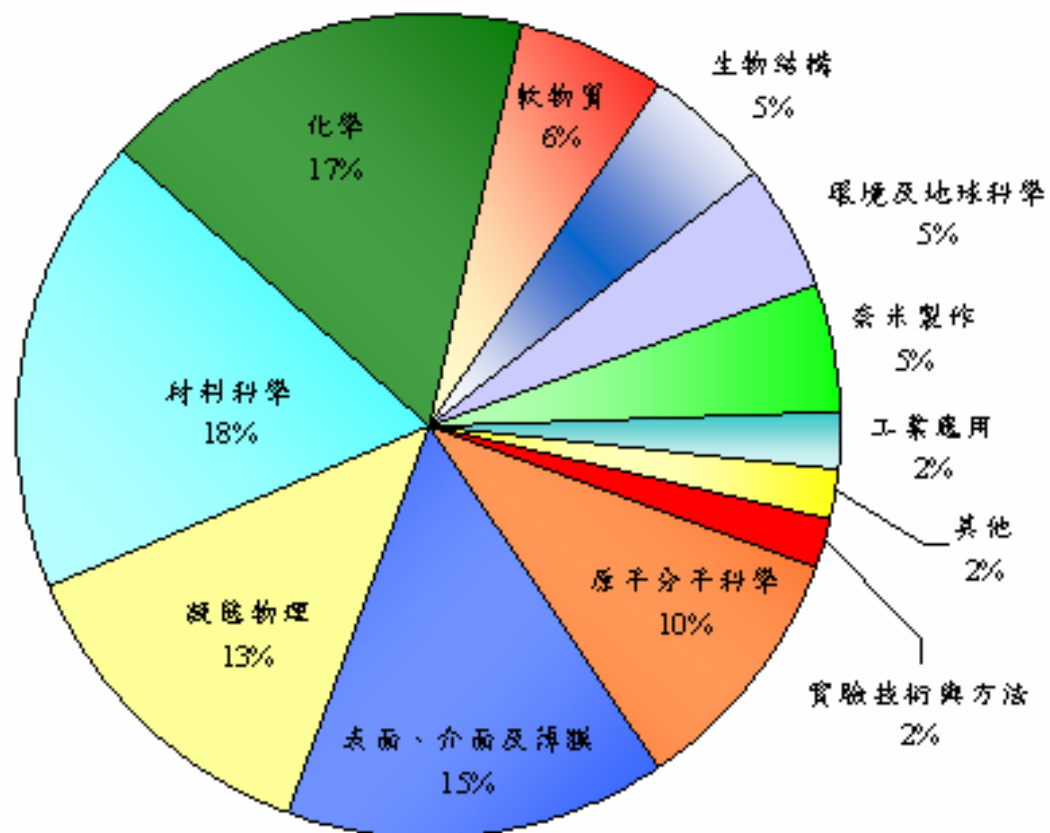
<b>Year</b>	<b># of 8-hrs Shifts</b>	<b># of User Groups</b>	<b>Average Beamtime per User</b>
<b>2001</b>	<b>54</b>	<b>5</b>	<b>10.8</b>
<b>2002</b>	<b>237</b>	<b>9</b>	<b>26.3</b>
<b>2003</b>	<b>299</b>	<b>10</b>	<b>29.9</b>
<b>2004</b>	<b>399</b>	<b>11</b>	<b>36.3</b>
<b>2005</b>	<b>335</b>	<b>11</b>	<b>30.5</b>
<b>2006</b>	<b>684</b>	<b>19</b>	<b>36.0</b>

# Number of PDB Structures and SCI Papers

<b>Depositions Year</b>	<b>BL17B2</b>	<b>BL12B2</b>	<b>BL13B1</b>	<b>BL13C1</b>
2001	1	-	-	-
2002	5	1	-	-
2003	7	7	-	-
2004	9	8	-	-
2005	7	15	0	-
2006	3	10	1	0
<b>Sub Total</b>	<b>32</b>	<b>40</b>	<b>1</b>	<b>0</b>
<b>Total</b>	<b>73</b>			

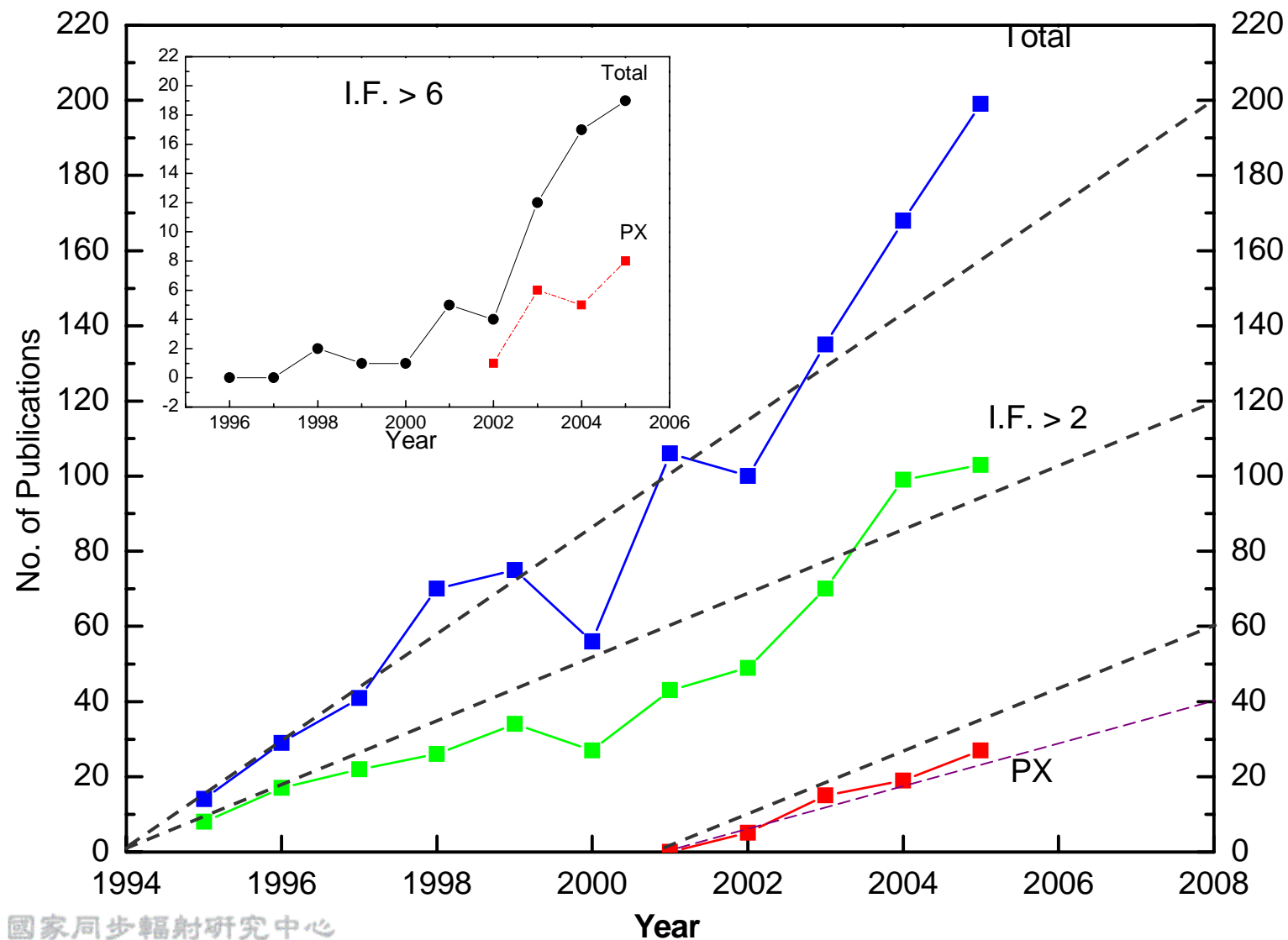
  

<b>Published Year</b>	<b># of SCI Papers</b>	<b># of High Profile (IF &gt; 6)</b>
2001	0	0
2002	5	1
2003	15	6
2004	19	5
2005	30	8
2006	22	4
<b>Total</b>	<b>89</b>	<b>24</b>



	2004			2005		
	# of SCI	IF > 2	IF > 6	# of SCI	IF > 2	IF > 6
NSRRC	158	96	17	224	111	20
PXIG	19	14	5	30	19	8
PXIG/NSRRC	12%	15%	29%	13%	17%	40%

# SCI Papers Published by NSRRC Users



## II. Service Satisfactory and Problems





# BL13B1 Service Satisfactory

2005-3	Excellent	Good	Average	Poor
User Support	12	2		
Data Collection Performance	8	4	2	
Data Processing & Backup Performance	3	5	4	2
Working Environment	4	10		

2006-1	Excellent	Good	Average	Poor
User Support	16	1		
Data Collection Performance	4	10	3	
Data Processing & Backup Performance	9	7	1	
Working Environment	5	12		

2006-2	Excellent	Good	Average	Poor
User Support	23	5		
Data Collection Performance	12	11	5	
Data Processing & Backup Performance	13	14	1	
Working Environment	9	18	1	

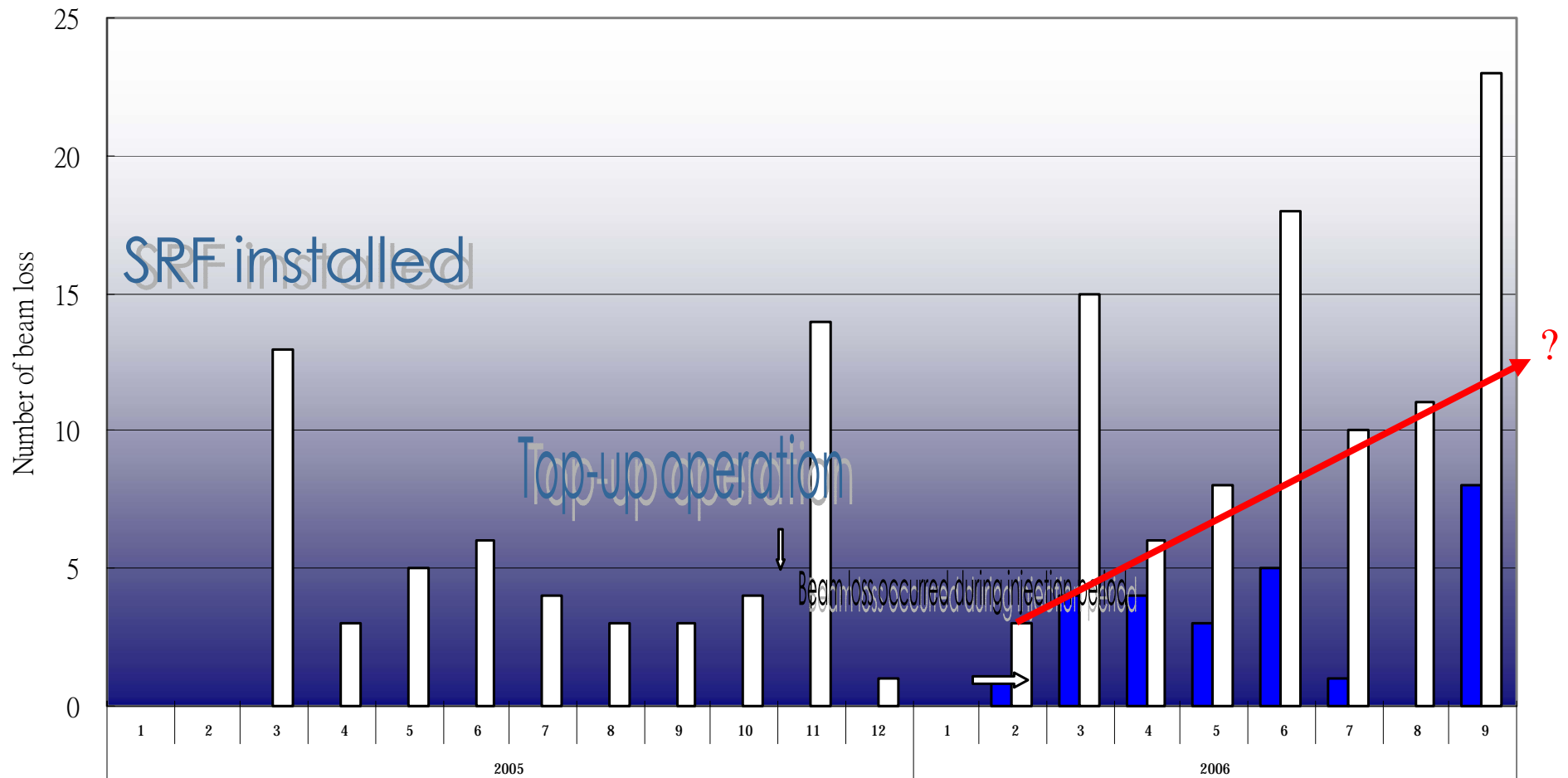
# BL13C1 Service Satisfactory

<b>2006-1</b>	<b>Excellent</b>	<b>Good</b>	<b>Average</b>	<b>Poor</b>
<b>User Support</b>	9	3	1	
<b>Data Collection Performance</b>	1	9	3	
<b>Data Processing &amp; Backup Performance</b>	6	7		
<b>Working Environment</b>	2	11		

<b>2006-2</b>	<b>Excellent</b>	<b>Good</b>	<b>Average</b>	<b>Poor</b>
<b>User Support</b>	16	5		
<b>Data Collection Performance</b>	4	13	4	
<b>Data Processing &amp; Backup Performance</b>	12	8	1	
<b>Working Environment</b>	9	12		

# Statistics of Beam Dump

Beam loss comparison between decay mode and top-up operation.



# III. User Group & New Facility



# Community of Protein Crystallography in Taiwan



## Academia Sinica

**Institute of Chemistry**  
**Institute of Biochemistry**  
**Institute of Molecular Biology**  
**Genomic Research Center**  
**National Yang-Ming University**  
**Institute of Biochemistry**  
**National Taiwan University**  
**National Defense Medical Center**  
**Institute of Biochemistry**

## National Tsing-Hua University

**Institute of Life Sciences**  
**Institute of Bioinformatics and Structural Biology**  
**NSRRC**  
**Life Sciences Group**  
**National Health Research Institute**  
**Division of Biotechnology and Pharmaceutical Research**

## National Chung-Hsing University

**Institute of Biochemistry**

**There are currently 17 domestic users and 7 international users.**

# Community of Protein Crystallography in Taiwan

Name	Position	Affiliation
Chan, Nei-Li 詹迺立	Assistant Professor	Institute of Biochemistry National Chung-Hsing University
Chan, Sunney I. 陳長謙	Distinguished Research Fellow	Institute of Chemistry Academia Sinica
Chen, Chun-Jung 陳俊榮	Associate Scientist	Research Division National Synchrotron Radiation Research Center
Chou, Chia-Cheng 周家承	Assistant Research Specialist	Genomics Research Center Academia Sinica
Chou, Shan-Ho 周三和	Professor	Institute of Biochemistry National Chung-Hsing University
Hsiao, Chwan-Deng 蕭傳鎧	Research Fellow	Institute of Molecular Biology Academia Sinica
Lee, Hwei-Jen 李惠珍	Associate Professor	Institute of Biochemistry National Defense Medical Center
Liaw, Shwu-Huey 廖淑惠	Professor	Institute of Genome Sciences National Yang-Ming University
Liaw, Yen-Chywan 廖彥銓	Associate Research Fellow	Institute of Molecular Biology Academia Sinica

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# Community of Protein Crystallography in Taiwan

Name	Position	Affiliation
Ma, Alex Che 馬徹	Assistant Research Fellow	Genomics Research Center Academia Sinica
Sun, Yuh-Ju 孫玉珠	Associate Professor	Institute of Bioinformatics and Structural Biology National Tsing-Hua University
Wang, Andrew H. 王惠鈞	Distinguished Research Fellow	Institute of Biological Chemistry Academia Sinica
Wang, Wen-Ching 王雯靜	Professor	Institute of Life Science National Tsing-Hua University
Wu, Su-Ying 伍素瑩	Assistant Investigator	Division of Biotechnology and Pharmaceutical Research National Health Research Institutes
Yang, Chii-Shen 楊啟伸	Assistant Professor	Department of Biotechnology National Taiwan University
Yin, Hsien-Sheng 殷獻生	Assistant Professor	Institute of Bioinformatics and Structural Biology National Tsing-Hua University
Yu, Steve Sheng-Fa 俞聖法	Assistant Research Fellow	Institute of Chemistry Academia Sinica
Yuan, Hanna S. 袁小玲	Research Fellow	Institute of Molecular Biology Academia Sinica

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# Community of Protein Crystallography in Taiwan

Name	Position	Affiliation
<b>Singapore</b>		
Robinson, Robert C	Associate Professor	Institute of Molecular and Cell Biology A member of A*STAR's Biomedical Sciences Institutes
Song, Haiwei	Associate Professor	Institute of Molecular and Cell Biology A member of A*STAR's Biomedical Sciences Institutes
Sivaraman, Jayaraman	Assistant Professor	Department of Biological Sciences National University of Singapore
Gruber, Gerhard	Associate Professor	Division of Structural & Computational Biology School of Biological Sciences Nanyang Technological University
<b>Thailand</b>		
Cairns, James R. Ketudat	Associate Professor	Schools of Biochemistry and Chemistry Institute of Science Suranaree University of Technology
Jirundon, Yuvaniyama	Dr.	Department of Chemistry Faculty of Science Mahidol University
Kongsaeree, Palangpon	Associate Professor	Department of Chemistry Faculty of Science Mahidol University National Synchrotron Research Center

**There are currently 17 domestic users and 7 international users.**



# Statistics of Service Demands

BL13B1 光束線	用戶群數	接受訓練 人次	進行實驗 次數	用戶使用時段數 (1時段=8小時)	用戶使用時 段百分比(%)	第一優先用戶 使用時段百分 比(%)	第二優先用戶 使用時段百分 比(%)
2005-3期 (9~12月)	10	102	13	137	69.5	30.4	39.1
2006-1期 (1~4月)	13	133	18	142	76.6	34.5	42.1
2006-2期 (5~8月)	17	231	31	197	86.5	37.6	48.9
2006-3期 (9~12月)	19	-	26	204	78.2	30.5	47.4
2007-1期 (1~4月)	20	-	21	144	91.1	-	-

## New Initiative

項目	設備	業務	小計	總計
BL15 MAD光束線	60,000,000	15,000,000	75,000,000	173,000,000
BL15 MAD實驗站	90,000,000	8,000,000	98,000,000	(FY97/98)

# IV. Facility Dissemination



# 2006 Protein Crystallography Training Course

[http://bionsrrc.nsrrc.org.tw/training\\_open1.php](http://bionsrrc.nsrrc.org.tw/training_open1.php)

Day1, 8/28(一), @Academia Sinica		Day2, 8/29(二), @ Academia Sinica	
08:30~09:00	Opening & Introduction	08:30~12:00	Basic of X-ray Diffraction
09:10~10:10	Theory of Protein Crystallization		Break
10:10~10:30	Break		
10:30~12:00	Crystal Symmetry and Space Group		
12:00~13:30	Lunch	12:00~13:30	Lunch
13:30~17:30	1.Crystallization 2.Demo of Robotic Crystallization 3.Microscope 4.Cryo- Technology 5.Crystal mounting 6.Crystal Quality 7.Data Processing by Crystal Clear	13:30~17:00	1.Principles of Experimental Phasing 2.MAD Data Collection Strategy
		Break	
		Radiation Damage on Protein Crystals	
		17:00~19:00	Dinner, Head to NSRRC
		19:00~21:00	NSRRC Tour & Movie

**BioNSRRC** Biological Crystallography Facility at NSRRC

Home | Beamline | Schedule | Becoming A User | Research | Activities | Staff | More Links | Site Map

Home

- Home
- TLS Status
- SPXF
- NSRRC
- NRPGM
- NSC
- BioSync
- RoboSync
- RCSB PDB
- News

Welcome to the home page of the Biological Crystallography Facility at the [NSRRC](#) (BioNSRRC). Biological Crystallography is a technique that can determine the 3-D molecular structures of biological macromolecules from their single crystals. The goal of BioNSRRC is to provide users with a sophisticated research facility, including a full complement of instrumentation, software, and support for high-throughput data collection and processing. We also provide professional discussions and substantial user support, therefore both experienced and non-experienced users are all welcome to use this facility. Worldwide researchers can access to this facility through the NSRRC [proposal submitting procedure](#).

**BioNSRRC Beamline**

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Xtal-Detector (mm)	70-350	130-800	110-900
Throughput (images/minute)	4	12	12

**Funding Agencies**

**Current News**

- 2006 Protein Crystal...**  
The Protein Crystallography Training Course series provides lecture programs and...
- Crystal Structure of...**  
A Novel Flavinylation of 6-S-CYSTEINYL, 87N1-HISTIDYL FAD
- Premier Gave the Syn...**  
The opening ceremony of Synchrotron-based Protein Crystallography Facility at th...

Since August 1, 2006


**0000567**

Wed, October 04, 2006

The user training and dissemination are also included on this web site

# Structural Biology Synchrotron User Organization




Maintained by:  PROTEIN DATA BANK

**Structural Biology Synchrotron User Organization**

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**International Synchrotrons**

[Add New Beamline](#) Click the link to the left to add a new beamline to this page.

Institution	Beamlines
<a href="#">Australian Synchrotron</a> Melbourne, Australia	Under construction
<a href="#">CLSI</a> Canadian Light Source Inc. (CLSI), University of Saskatchewan	<a href="#">08ID-1</a>
<a href="#">BESSY</a> Berlin, Germany	<a href="#">14.1</a> <a href="#">14.2</a> <a href="#">14.3</a>
<a href="#">BSRF</a> Beijing, China	<a href="#">3W1A</a> <a href="#">4W1C</a>
<a href="#">SLS / PSI</a> Villigen, Switzerland	<a href="#">X06SA</a> <a href="#">X10SA</a>
<a href="#">SOLEIL</a> Saint-Aubin, France	<a href="#">ID-10C</a> <a href="#">ID-10M</a>
<a href="#">Spring-8</a> Super Photon ring 8 GeV, Japan	<a href="#">BL12B2</a> <a href="#">BL24XU</a> <a href="#">BL26B1</a> <a href="#">BL26B2</a> <a href="#">BL32B2</a> <a href="#">BL38B1</a> <a href="#">BL40B2</a> <a href="#">BL41XU</a> <a href="#">BL44B2</a> <a href="#">BL44XU</a> <a href="#">BL45XU</a>
<a href="#">NSRRC</a> National Synchrotron Radiation Research Center, Taiwan	<a href="#">BL13B1</a> <a href="#">BL13C1</a> <a href="#">BL17B2</a>
<a href="#">SRS</a> Synchrotron Radiation Source, Daresbury, UK	<a href="#">PX7.2</a> <a href="#">PX9.5</a> <a href="#">PX9.6</a> <a href="#">PX10.1</a> <a href="#">PX14.1</a> <a href="#">PX14.2</a>

**US Synchrotrons**

**Structural Genomics**

**About BioSync**

**Synchrotron Statistics**

The first international synchrotron registers its beamline information at BioSync

# V. Future Development



# The Challenge

*How to maximize the efficiency of use of the beamline?*

ALS BL\_8.3.1(2003~2004)

- 43% Beamtime:  
Data Collection
- 57% Beamtime:  
Changing Crystal  
Choosing Strategy

Manual Operation  
(~50%)

- Intense SR Source
- Fast & Large Area  
Detector
- Real-time Computing
- Substantial User Support
- Mail-In Data Collection

Automatic Operation  
(~50%)

- Intense SR Source
- Fast & Large Area  
Detector
- Real-time Computing
- Auto-Xtal Mounting
- Auto-Xtal Centering
- Auto-Xtal Screening
- Auto-CHOOCH
- Auto-Data Collection
- Auto-Structure Deter.

# Future Plans

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- **Substantial User Support**
- **Automation**
- **Remote Crystallography**
- **Mail-In Crystallography**