**COMPRES Beamline Scientist Annual Report 2015 to 2016**

**Haiyan Chen**

**APS 6BM-B Large Volume Press Beamline**

**Geoscience Department, Stony Brook University**

I am a Beamline Scientist fully supported by COMPRES. I have been working at X17B2 (NSLS) and then 6BM-B (APS) Beamline run by Stony Brook University for 5 years. From October 2015 to September 2016, as the solo onsite staff for 6BM-B, my focuses are to operate the beamline safely and efficiently, serve users timely and satisfactorily, and bring the user laboratory from initial operation to full function. During this time period, even though 6BM-B had to be uninstalled to give access to the ring for APS superconductor undulator upgrade and then reinstalled at the beginning of 2016-2 cycle, resulting in18 shifts loss of beamtime, 6BM-B still delivered ~83% of beamtime to users. We also commissioned a new ADC slit, an ultrasonic measurement system, and full boron epoxy cubic cell fabrication capabilities. In the following sections, my activities are listed and the way I divide my time is indicated.

**User service (50%)**

Administered safety related APS required Sector Orientation to every user

Helped users with proposals and ESAFs in APS system

Worked with APS user management to get T4-Foreign Visitor approval for a post-doc from Iran

Shipped and received materials, cell parts, tools from APS to and from users

Handled all the paper work, coordination, and execution of Yale RDA (Rotational Drickamer Apparatus) equipment installation and shipment from APS to Yale University

Taught / assisted users with boron epoxy cell fabrication, cell assembly, press operation, alignment, calibration, data collection and analysis

Troubleshot hardware and software problems

Tended to users’ various needs onsite and communicated users’ opinion of beamline to Stony Brook group

**Beamline management and operation (25%)**

Maintain press, tooling, optical system, slit, and detectors at optimum conditions

Restore systems after a blow-out, or Yale’s RDA experiment

Order supplies, such as cell parts, anvils, tools, and chemicals

Fulfill APS safety requirement of the laboratory and beamline

Review user proposals

Work with APS and Stony Brook group on beamtime allocation

Work with 6BM-A Station and users for beamtime scheduling

**Instrument development (25%)**

Designed, machined, installed, tested, and commissioned a new ADC slits

Purchased a Servo Drill Press, designed and machined jigs for making BE cells, fulfilled APS safety requirements, and acquired permission for user operation

Tested different standard D-DIA cell assembly ordered from Arizona State University

Participated in ultrasonic measurement system testing and commissioning

Got quotations and started purchasing process for new camera system

**Improvements made**

New ADC slit shortened the transition time between image mode and diffraction mode

Fully equipped to make BE cells in 6BM-B laboratory

Re-designed, machined, installed a lead shielding system and significantly reduced background for diffraction and radiographic image data

Streamlined the process of switching between D-DIA (differential DIA) operation and RDA (Rotational Drickamer Apparatus) operation; minimized the setup time

**Beamline Proposals to 6BMB**

Effect of water on marco and micro stress in quartz compression: does pre-existing water content in quartz plays important role?

Deformation of 2-layer multiphase system and implications for deep earthquake generation

**Publications**

1. T. Wu, T. A. Tyson, **H. Chen**, P. Gao, T. Yu, Z. Chen, Z. Liu, K. H. Ahn, X. Wang and S.-W. Cheong, “Pressure Dependent Structural Changes and Predicted Electrical Polarization in Perovskite RMnO3”, ***Journal of Physics Condensed Matter***, *28 (****2016****) 056005*
2. Wang, SM; Zang, CP; Wang, YK; Wang, LP; Zhang, JZ; Childs, C; Ge, H; Xu, HW; Chen, HY; He, DW; Zhao, YS; “Revisit of Pressure-Induced Phase Transition in PbSe: Crystal Structure, and Thermoelastic and Electrical Properties” , **Inorganic Chemistry**, 54 (2015) 4981
3. Bai, JM; Hong, J; Chen, HY; Graetz, J; Wang, F; “[Solvothermal Synthesis of LiMn1-xFexPO4 Cathode Materials: A Study of Reaction Mechanisms by Time-Resolved in Situ Synchrotron X-ray Diffraction”,](http://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=12&SID=3DTJKOFKPxlCsRKulEt&page=1&doc=1&cacheurlFromRightClick=no) **Journal of Physical Chemistry C** 119 (2015) 2266
4. Y. Li, YT. Zou, T. Chen, XB. Wang, XT. Qi, **H.** **Chen,** JG. Du, BS. Li, “P-V-T equation of state and high-pressure behavior of CaCO3 aragonite”, ***American Mineralogists***, *100 (****2015****) 2323*

**6BMB Users assisted by PI’s name and institute**

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| **Name** | **Institution** |
|  |  |
| Donald Weidner | Stony Brook University |
| Li Li | Stony Brook University |
| See Nga Cecilia Cheung | University of Wisconsin at Madison |
| Richard Triplett | Stony Brook University |
| Haiyan Chen | Stony Brook University |
| Matthew Whitaker | Stony Brook University |
| Paul Raterron | Brown University |
| Caleb Holyoke | Akron University |
| Leif Tokle | Brown University |
| Pamela Burnley | University of Neveda at Las Vegas |
| Shirin Kaboli | University of Neveda at Las Vegas |
| Richard Roland | University of Neveda at Las Vegas |
| Nolan Regis | University of Neveda at Las Vegas |
| David Kohlstedt | University of Minnesota |
| Alejandra Q. Terminel | University of Minnesota |
| Matej Pec | University of Minnesota |
| Amanda Dillman | University of Minnesota |
| William Durham | Massachusetts Institute of Technology |
| Garret Diedrich | University of Minnesota |
| Shenghua Mei | University of Minnesota |
| Guinan Zhang | University of Minnesota |
| Liping Wang | University of Neveda at Las Vegas |
| Shun-ichiro Karato | Yale University |
| Jennifer Girard | Yale University |
| Peng Sun | Yale University |
| Noriyoshi Tsujino | Yale University |
| Moe Sakurai | Tokyo Institute of Technology |
| Awar Mohiuddin | Yale University |
| Simon Hunt | University College of London |
| Martha Pamato | University College of London |
| Andrew Thomson | University College of London |
| Isra Ezad | University College of London |