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## An Equal Partnership: Preparing for Faculty-Student Team Teaching of “Cultural History of Chinese Astronomy” through the TLI

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## **AN EQUAL PARTNERSHIP: PREPARING FOR FACULTY-STUDENT TEAM TEACHING OF “CULTURAL HISTORY OF CHINESE ASTRONOMY” THROUGH THE TLI**

*WANG Yi and JIANG Yonglin, Bryn Mawr College*

In keeping with the theme of our essay, we write both as individuals and as a team to capture the spirit and the practice of our work together.

### **I. Introduction: The Project**

Yonglin and Yi: In the Fall Semester 2011, we participated in the TLI “Faculty Pedagogy Seminar on Team Teaching” guided by Alison Cook-Sather. In it, we, as a working pair, prepared our own course, “Cultural History of Chinese Astronomy,” while exploring general issues of team teaching with two other pairs — one team was two faculty members and one was a faculty member and a student. Through our experience, we developed the value and experimented with the practice of “equal partnership” between faculty and undergraduate students in teaching.

Yonglin: I am an associate professor of the Bi-Co East Asian Studies Department at Bryn Mawr and Haverford Colleges. I offer courses on Chinese and East Asian history, and focus on legal culture in imperial China and ethnicity and law in contemporary China as research fields.

Yi: I am a sophomore at Bryn Mawr College, double-majoring in East Asian Studies and International Studies with a concentration in Peace, Justice, and Human Rights. I am one of the paper prize winners at the Seventh Annual Greater Philadelphia Asian Studies Consortium Undergraduate Conference held in April 28, 2012. Before we started the partnership in Fall 2011, I took two courses with Professor Jiang (“Chinese Civilization” and “Legal Culture in Chinese History”) in the fall semester of my freshman year in 2010, and one independent study course (“Cultural History of Chinese Astronomy”) in the spring of 2011. During the fall semester of 2011 when we worked together in the TLI Team Teaching seminar, I was also taking the course “China’s Environment” with Professor Jiang. In the calendar year of 2011, I founded the Taiji Club and taught Taiji classes on Bryn Mawr campus, in which Professor Jiang was a student and teaching assistant. We therefore had worked together on a number of occasions and thus known each other very well prior to and during the preparation of the team-taught course.

Yonglin: I was impressed by Yi’s ability, knowledge, passion, insights, attitude, enthusiasm, dedication, and maturity, all of which played a role in making my choosing her as a working partner. The idea for the course originated in Yi’s hobby, astronomy. As a big fan of star observation, she was looking for possible ways to continue without telescopes on campus. Initially, Yi inquired about doing an independent study course, which I warmly supported as her mentor. Together, we drafted a rough syllabus which covered major parts of our personal interests such as astrology and the astronomical political system. In the private study session in the spring of 2011, we covered the comparison between Western and Eastern Astronomy. In the summer of 2011, when Professor Alison Cook-Sather solicited ideas and potential participants in

the “Faculty Pedagogy Seminar on Team Teaching,” I proposed to team-teach “Cultural History of Chinese Astronomy” with Yi and was strongly supported by Alison.

Yonglin and Yi: In the seminar, we were working with the other two teams to explore and analyze co-teaming concepts, challenges and opportunities. Unlike the other two teams, though, who were already co-teaching courses, we focused on the preparation of the course, while discussing various team-teaching issues such as basic values, key concepts, and pedagogies. At the very beginning of the seminar, we set up three goals for ourselves. The first was to gain general ideas about team-teaching; the second, to study the history of Chinese astronomy; and the third, to write up a course syllabus. Accomplishing these goals could prepare us well to teach the course in the next school year. In the end, we did develop a syllabus for the course and assess its potential effectiveness as a class. The seminar indeed prepared us well in adding a quality course to the curriculum.

## **II. Faculty-Student Equality: The General Principle**

Yonglin and Yi: At the outset of the project, we set the principle of “equality” in our partnership. By “equality,” we mean “equal instructor status” in the classroom, “equal contributions” to the course, and “equal authority” in charge of the course.

Yonglin: To be sure, as a faculty member, I have more teaching experience. But Yi can play an equally important role in the cooperation. A bright student, she has demonstrated that she herself has thought carefully about teaching and often articulates insightful ideas. She also provides a unique student perspective on the teaching philosophy and pedagogy. As mentioned above, she not only proposed the subject of “history of Chinese astronomy” in her independent study course the previous semester, prior to her admission to Bryn Mawr, she extensively studied astronomy and participated in a number of astronomy club activities in China. She thus entered the partnership with rich knowledge, valuable experience, and expert status on the subject matter.

Yi: We planned and practiced the “equal relationship” throughout the preparation of the course. As a student, becoming ‘equal’ to a distinguished professor is sometimes a stressful challenge. However, thanks to Professor Jiang’s open-mindedness and support, it is a valuable opportunity to learn and try new things. We first discussed the basic issues and questions to tackle in the course with ‘equal’ contributions and decision-making power, and set up the strategy to structure the course and divided our work responsibilities. In preparing the syllabus, we started out looking up information in hard-copy materials and on-line sources separately, and then worked out the basic structure together. In looking up course texts, Professor Jiang focused on English literature; and I, the Chinese materials. In creating course requirements, each of us contributed our own input, while collaborating on many others. In designing our roles in teaching the course, Professor Jiang proposed that we emphasize our equal status in classroom, distributing equal preparation and teaching load in classes and providing the same grading responsibility and authority on student coursework. During the whole process, I felt my own opinions were equally valued, and we learnt a lot from each other’s insights and contributions.

Yonglin: Emphasizing “equal partnership,” of course, did not mean I would give up the leading role in the relationship. In fact, due to my professional training, I would have to take more

responsibilities in assisting my student partner to prepare and perform well for the course, including identifying issues, locating and selecting materials, structuring the course, organizing course activities, designing assignments, dealing with social (e.g., gender-ethnicity-class-related) issues among students, assessing students’ coursework, and getting familiar with college academic and social policies. Nevertheless, if selected and assisted properly, a student partner can not only learn those professional “rules” quickly, but also provide insights and help in accomplishing the task rather than only serving a passive role. In our partnership, for example, although only a sophomore, Yi was playing a leading role in identifying the issues of the field and enriching my understanding of astronomy; and, because of her student status and perspective, she could facilitate a smoother working relationship between me and the whole student body in class. She was also more efficient in looking up on-line materials with her superb computer skills. In a word, during our working process, Yi was a true “equal partner” not a “passive assistant.”

Yonglin and Yi: We believe that the “equal partnership” in faculty-(undergraduate) student team teaching is a “revolutionary measure” in (undergraduate) higher education learning. We have known that “equal” or even “independent” status for graduate students in college teaching, but have not heard of the case where an undergraduate student gains the status of instructor in classroom. That a capable undergraduate student teaches classes as an instructor creates a new relationship between student-instructor and faculty, constructs a new teaching-learning angle/perspective between students and the (faculty-student) instructors, builds a new class model, and makes the course more dynamic. It not only helps the student-teacher prepare for her/his liberal arts education and future career, but also establishes a different inspiring role model for the student-teacher’s fellow students.

### **III. How We Worked Together: Specific Tasks**

Yonglin and Yi: During our preparation of the course, we worked at every stage on every matter “together.” We set up a weekly meeting schedule, and worked on specific tasks either together in our meetings, or separately on different components of the tasks and then joining together to discuss.

Yonglin: We started the project by looking up various materials online. Yi and I had a rough division of work: I would focus on the English literature and syllabi; and Yi on Chinese works and multimedia resources. In the end, we both collected a large amount of rich materials. Yi not only prepared a long list of Chinese books, but also downloaded many of them online. She also located quite a lot multimedia sources online, including interactive star maps and star-gazing software. I found several key books and a large number of articles in English literature on the history of Chinese astronomy. Maybe because there are not many such courses offered in colleges, I did not find a specific syllabus on “cultural history of Chinese astronomy” online.

But I found some syllabi on general history of astronomy and special history of Chinese science and technology useful in suggesting themes and texts on Chinese astronomy. The scholarship not only informed us about the state of the field in general, but also provided us with useful information on course themes in particular. The online images and tools not only enriched our understanding of the subject matter, but also stimulated our plan for class activities. To acquire important materials and to prepare the course, Yi and I also personally purchased hard copy

Chinese books while we each traveled to China during vacation/research trips. Meanwhile, we requested and received strong support from BMC Canaday Library: the interlibrary section always provided timely high quality service, and the special collection department purchased key Chinese scholarly books on Chinese astronomy.

Yonglin: From the very beginning of the project, we designed “field trips” as an important component of the course. Student field trips can be both physical and cyber-virtual. For the cyber-virtual component, Yi located some e-tools and software with which students could observe and experience the movement of heavenly bodies. For the physical part, to gain perceptual knowledge of the subject matter and get ourselves more familiar with the prospect facilities/sites, we personally went on some trips. In mid-October, for example, Yi and I went to the Air and Space Museum at the Smithsonian Institution in Washington, DC. We also explored the possible sites of star-gazing, such as the observatories at Haverford College, the University of Pennsylvania, and the Franklin Institute, and the ground site at Valley Forge National Historic Park. In November, while I was visiting Northwestern University, I also took the chance to visit Adler Planetarium at Chicago.

Yonglin and Yi: During the team-teaching seminar, we planned to use fully the resources the seminar provided to make our course ready. One of the strengths of the seminar was the insightful and helpful colleagues/classmates. In addition to Alison, the coordinator, who provided remarkable leadership and insights, there were two pairs of team-teaching practitioners: Professors Kalala Ngalamulume and Tracey Hucks, and Professor Jody Cohen and her student Annie Boggess. Kalala and Tracey had co-taught their course several times already; and Jody and Annie were practicing precisely faculty-student team-teaching. In class, they encouraged us to work with confidence and shared their valuable insights and experience without reservation. Furthermore, they kindly welcomed us to observe their own classes. We visited three of their classes, in which we learned a great deal. We observed how they, as team-teachers in their own classes, started their classes, organized their lectures and discussions, shared their thoughts in turn, made transitions from one teacher to another, and divided their work while cooperating at the same time.

Yonglin and Yi: As a team, we discussed some pedagogical approaches in our course:

1. Lectures: We take turns to deliver lectures on the changes of Chinese astronomy;
2. Critical readings: We locate important reading materials for students to read critically and discuss in class;
3. Hands-on exercises:
  - Locate websites/e-tools for students to explore stars, draw star maps, and make calendars;
  - Use star projectors to observe astronomical phenomena, etc.;
  - Make basic observatory instruments, such as sundial, to imitate how ancients Chinese did their observations;
4. Field trips:

- Take students to Haverford Observatory/astronomy museums to observe/interpret objects and write reports;
  - Observe lunar eclipse/meteor shower to interpret the process and write reports;
5. Group discussions:
- Co-facilitation sessions: Having students take charge of discussion sessions;
  - Teacher-organized discussions;
6. Oral presentations:
- Students deliver oral reports to class about their readings, field trip findings, and hands-on exercises results;
  - Students propose their own projects. We can leave one session to further the discussion or topics they are interested after a pre-class survey;
7. Guest speaker;
8. Role playing: As a way to practice theoretical knowledge, role playing asks students to experience how ancient Chinese observed the sky or conduct any experiments. For instance, “imagine yourself as a superior official in the institute of astronomy in the Song Dynasty, how will you interpret such XXXX (star image).”
9. Informal writing (short paragraphs on readings, reflections, questions, thoughts, associate different readings);
10. Term papers: Students write a term paper examining one aspect of cultural meanings of Chinese astronomy;
11. Student evaluations/inputs: We will pay attention to students’ needs by having a survey of their needs in the beginning of semester, understanding their needs in lunch meetings and on other occasions, and having one mid-term formal evaluation.

In the process of discussion, we readily identified several commonly used pedagogies, such as lecture, discussion, oral presentation, and in/formal writings. Jiang, with his expertise, gave detailed feedback of the academic seriousness of the course quality. Yi, from a student perspective, emphasized the students’ self-proposed projects and role playing, which would certainly promote self-motivated learning among students and enrich the dynamics of the learning process.

Identifying teaching tools/models (star map projector)

Yi: As an astronomy fan, my first thought was how to make astronomy study less mysterious and more welcoming. Since I had done several professional sky observations and know some observation software, I thought it would be helpful if we could provide potential students with experiences of doing more advanced sky observation with such techniques to reproduce the

constellations in class. In order to find the most suitable software, I double checked the ones I've used, did some online research, visited some astronomy forums and also asked my fellow fans. At the same time, Professor Jiang and I were also testing some such as Stellarium and Microsoft WWT. We also prepared to use the star map projector, which can show the constellations in class. Another technique is star map drawing. This project comes from the idea of 'going back and reproducing the original scene,' and asks the students to draw a star map, not only to memorize some important stars, but also to see the star in a way that the ancient people used to see. By comparing star maps of different dynasties, students can track the changes and build up multi-dimensional understanding of Chinese astronomy and culture. I think the overarching principles for identifying teaching tools are associating with one's experiences and reproducing the original scene.

#### **IV. Syllabus: The Product**

Yonglin and Yi: To certain extent, the course syllabus was a summary of part of our achievements in the seminar. To write it up, we drew on what we found in the process and "equally" discussed and contributed to its draft. Actually, we composed the syllabus in several stages. The first was to set up the level of the course: It should be a 200 level course, i.e., critically examining a topic for sophomore and junior as the main audience; it should be cross-listed under East Asian Studies and History, and could also be used to fulfill the distribution requirement of "inquiry into the past" and "cross-cultural analysis." Next we proceeded to figure out the state of the field, look up the literature, and understand the major themes of the subject matter. We then thought over the pedagogical approaches and deliberated on how we could use them at the different components of the course. And finally, we finished it up by putting everything in order: to structure the course with themes, clarify course goals, assign reading materials to each theme, design teaching pedagogies for different activities, and establish assessment mechanisms.

The draft syllabus is as the follows:

### **A CULTURAL HISTORY OF CHINESE ASTRONOMY**

#### ***Instructors***

**WANG Yi, JIANG Yonglin**

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#### ***Course Description***

This course studies Chinese astronomy in its intellectual, social, and cultural context. We will critically assess the "culture" of Chinese astronomy and examines emerging trends in current research.

### ***Goals of the Course***

1. To introduce history as a “way of knowing” the world, and to teach about the methods historians use to understand the past.
2. To understand various values and practices of Chinese people in the study and practice of astronomy.
3. To become familiar with competing historical interpretations of major events and themes in the history of Chinese astronomy.
4. To show how history helps understand the political, social, and cultural issues of the present.
5. To enhance skills in clear writing, analytical thinking, and critical reading; and to relate history to other fields of knowledge or disciplines.

### **Class Activities:**

- 1- To maintain good attendance and actively participate in class activities. Prior to the class, you should read the assigned materials and post at least 2 “good” open-ended questions to class on the Blackboard.
- 2- To participate in a Co-facilitation session to lead discussion
- 3- To participate in one oral presentation
- 4- To write a 2-3 page (double-spaced) critical review of an article/book chapter.
- 5- To take a field trip to Haverford Observatory to observe stars
- 6- To work on software to draw a Chinese star map and interpret its cultural meaning
- 7- To listen to and discuss the lecture by a guest speaker
- 8- To design astronomical project from the Chinese perspective (or, to draw your own zodiac constellation and to interpret its (Chinese) cultural meaning and its difference compared to the Western zodiac)
- 9- To participate in a role play project: The class will be divided into three groups; each group will collectively act as emperor, astronomical official, and foreigner, respectively. They will debate on the meaning of a celestial phenomenon and relevant policies/responses. Write a report on the event after performance.
- 10- To write a 15-page (double-spaced) research paper (see instructions attached to the syllabus).
- 11- Extra Credit: If you would like to do a mini-research on the cultural meaning of Chinese astronomy , and make a 10 minute powerpoint presentation in class, you may receive extra credit (up to 5 points based on your preparation and presentation).

### ***Class Schedule***

#### **Date Topics & Readings**

##### **WEEK ONE**

1-23 Course Introduction

##### **WEEK TWO Perspectives**

1-28

1-30



*What is astronomy?*

*How were science and astronomy perceived and approached in China and the West?*

*How did imperial China evolve?*

Robert Finlay, "China, the West, and World History in Joseph Needham's "Science and Civilisation in China," *Journal of World History*, Vol. 11, No. 2 (Fall, 2000), pp. 265-303.

Ben Elman, "New Directions in the History of Modern Science in China," *Isis*, Vol. 98, No. 3 (September 2007), pp. 517-523.

David S. Landes, "Why Europe and the West? Why Not China," *The Journal of Economic Perspectives*, Vol. 20, No. 2 (Spring, 2006), pp. 3-22.

Justin Yifu Lin, "The Needham Puzzle: Why the Industrial Revolution Did Not Originate in China," *Economic Development and Cultural Change*, Vol. 43, No. 2 (Jan., 1995), pp. 269-292.

### **WEEK THREE Early Development and Value System**

2-4

2-6

*How did Chinese astronomy start?*

*How did Chinese view time and space?*

Nathan Sivin, "Cosmos and Computation in Early Chinese Mathematical Astronomy," *T'oung Pao*, Second Series, Vol. 55, Livr. 1/3 (1969), pp. 1-73.

Junping Liu, and Deyuan Huang, "The Evolution of Tianxia Cosmology and Its Philosophical Implications," *Frontiers of Philosophy in China*, Vol. 1, No. 4 (Dec., 2006), pp. 517-538.

Joseph Needham, "Astronomy in Ancient and Medieval China." *Philosophical Transactions of the Royal Society of London. Series A, Mathematical and Physical Sciences*, Vol. 276, No. 1257, The Place of Astronomy in the Ancient World (May 2, 1974), pp. 67-82.

Nathan Sivin, "Comparing Greek and Chinese Philosophy and Science," reprinted in Sivin, *Medicine, Philosophy and Religion in Ancient China: Researches and Reflections*, Variorum Collected Studies Series (Brookfield, Vt.: Ashgate Publishing Company, 1995).

### **WEEK FOUR Institutions and Instruments**

2-11

2-13

*What institutions did the Chinese establish to observe and study astronomy?*

*What were their political and cultural significance?*

*What instruments did Chinese invent and use to observe and study astronomy?*

Willy Hartner, “The Astronomical Instruments of Cha-ma-lu-ting, Their Identification, and Their Relations to the Instruments of the Observatory of Marāgha,” *Isis*, Vol. 41, No. 2 (Jul., 1950), pp. 184-194.

Thatcher E. Deane, “Instruments and Observation at the Imperial Astronomical Bureau during the Ming Dynasty,” *Osiris*, 2nd Series, Vol. 9, Instruments (1994), pp. 126-140.

Mark Elvin, “Who Was Responsible for the Weather? Moral Meteorology in Late Imperial China,” *Osiris*, 2nd Series, Vol. 13, Beyond Joseph Needham: Science, Technology, and Medicine in East and Southeast Asia (1998), pp. 213-237.

### **WEEK FIVE Calendar**

2-18

2-20

*How was calendar originated?*

*What were its political, economic, social, and cultural meanings?*

Herbert Chatley, “The Date of the Hsia Calendar “Hsia Hsiao Chêng,” *The Journal of the Royal Asiatic Society of Great Britain and Ireland*, No. 4 (Oct., 1938), pp. 523-533.

W. Allyn Rickett, “An Early Chinese Calendar Chart.” *T’oung Pao*, Second Series, Vol. 48, Livr. 1/3 (1960), pp. 195-251

David W. Pankenier, “Reflections of the Lunar Aspect on Western Chou Chronology,” *T’oung Pao*, Second Series, Vol. 78, Livr. 1/3 (1992), pp. 33-76.

Chu Ping-yi, “Scientific Dispute in the Imperial Court: The 1664 Calendar Case,” *Chinese Science* 14 (1997): 7-34.

### **WEEK SIX Astrology (I)**

2-25

2-27

*How was astrology originated?*

*How did Chinese view stars and draw star maps?*

*What cultural values did the star maps demonstrate?*

Shigeru Nakayama, “Characteristics of Chinese Astrology,” *Isis*, Vol. 57, No. 4 (Winter, 1966), pp. 442-454.

David W. Pankenier, “Applied Field-Allocation Astrology in Zhou China: Duke Wen of Jin and the Battle of Chengpu (632 B. C.),” *Journal of the American Oriental Society*, Vol. 119, No. 2 (Apr. – Jun., 1999), pp. 261-279.

Edward H. Schafer, *Pacing the Void: T'ang Approaches to the Stars*. Floating World Editions, Limited. 2008.

Huang, Y.-L., 1990, "A Study on Five Planet Conjunctions in Chinese History," translated in English by Edward L. Shaughnessy, *Early China* (U. S. A.), 15, pp. 97-112

**[Field Trip: Observatory at Haverford or Franklin or Penn]**

**WEEK SEVEN Astrology (II)**

3-4

3-6 [Self-designed Project]

*What impact did astrology have on Chinese society?*

**WEEK EIGHT 3/8—3/17 [Spring Vacation]**

**WEEK NINE Astronomy and Politics**

3-18

3-20

*How did astronomy and politics interact with each other?*

Wolfram Eberhard, "The Political Function of Astronomy and Astronomers in Han China." In John K. Fairbank (ed.), *Chinese Thought and Institutions*, pp. 33-70.

D. Howard Smith, "Divine Kingship in Ancient China," *Numen*, Vol. 4, Fasc. 3 (Sep., 1957), pp. 171-203. *Early Chinese astronomy and cosmology: the "mandate of heaven" as epiphany*.

Michael Loewe, "The Cosmological Context of Sovereignty in Han Times," *Bulletin of the School of Oriental and African Studies*, University of London, Vol. 65, No. 2 (2002), pp. 342-349.

**WEEK TEN Astronomy and Religion**

3-25

3-27

*How did astronomy and religion interact with each other?*

Florian C. Reiter, "'The Discourse on the Thunders' 雷說, by the Taoist Wang Wen-ch'ing 王文卿 (1093-1153)," *Journal of the Royal Asiatic Society*, Third Series, Vol. 14, No. 3 (Nov., 2004), pp. 207-229.

Michael Loewe, "The Oracles of the Clouds and the Winds," *Bulletin of the School of Oriental and African Studies*, University of London, Vol. 51, No. 3 (1988), pp. 500-520.

Tansen Sen, "Astronomical Tomb Paintings from Xuanhua: Maṇḍalas?" *Ars Orientalis*, Vol. 29, (1999), pp. 29-54.

**WEEK ELEVEN Astronomy and War**

4-1

*How did astronomy affect military actions?*

4-3 [Flexible Topic]

**WEEK TWELVE Astronomy, Social Life and Economy**

4-8

4-10

*How did astronomy affect people’s daily life?*

Huang, Y.-L., 2012, “The Impact of Astronomy on Chinese Society in the Days before Telescopes,” in *The Astronomy Revolution: 400 Years of Exploring the Cosmos* (Boca Raton, Florida, USA: CRC Press), eds. Donald G. York, etc., pp. 257-270.

**WEEK THIRTEEN Astronomy and Marriage/Family**

4-15

*How did astronomy affect marriage?*

4-17 [Flexible Topic]

**WEEK FOURTEEN Contemporary Changes**

4-22 China and the West

How did Chinese interact with Western astronomy?

Did the “modern” astronomy begin in China?

Minghui Hu, “Provenance in Contest: Searching for the Origins of Jesuit Astronomy in Early Qing China,” *The International History Review*, Vol. 24, No. 1 (Mar., 2002), pp. 1-36.

John Henderson, “Ch’ing Scholars’ Views of Western Astronomy,” *Harvard Journal of Asiatic Studies*, Vol. 46, No. 1 (Jun., 1986), pp. 121-148.

Luke S. K. Kwong, “The Rise of the Linear Perspective on History and Time in Late Qing China c. 1860-1911,” *Present*, No. 173 (Nov., 2001), pp. 157-190.

George H. C. Wong, “China’s Opposition to Western Science during Late Ming and Early Ch’ing,” *Isis*, Vol. 54, No. 1 (Mar., 1963), pp. 29-49.

N. Sivin, “On “China’s Opposition to Western Science during Late Ming and Early Ch’ing,” *Isis*, Vol. 56, No. 2 (Summer, 1965), pp. 201-205.

4-24 Astronomy and Ethnicities

How did non-Han ethnic groups invent and use astronomy?

**WEEK FIFTEEN**

4-29 [Role Play]

5-1 Conclusion

**Research Paper Due:**

**FINAL EXAMINATION:**

Books and Articles for Further Readings:

Bodde, Derk. *Chinese Thought, Society, and Science: The Intellectual and Social Background of Science and Technology in Pre-Modern China*. Honolulu: University of Hawaii Press, 1991.-  
English Glossary of Astro-Science Terms. Kensington, Md.: Dunwoody Press, 1986.

Chiu, Hong-ye, ed. *Chinese-English, English-Chinese astronomical dictionary*. New York: Consultants Bureau, 1966.

Cullen, Christopher. *Astronomy and Mathematics in Ancient China: The Zhou bi suan jing*. New York: Cambridge University Press, 1996.

Elman, Benjamin A.. *On Their Own Terms: Science in China, 1550-1900*.

Fraser, J. T., N. Lawrence, and F. C. Haber. *Time, Science and Society in China and the West. Modern Scholarship on the History of Chinese Astronomy*. Canberra: Faculty of Asian Studies, Australian National University, 1977.

Huff, Toby E.. *The Rise of Early Modern Science: Islam, China, and the West*.

Lloyd, Geoffrey. *Adversaries and Authorities: Investigations into Ancient Greek and Chinese Science*. Cambridge: Cambridge University Press, 1996.

Lloyd, Geoffrey, and Nathan Sivin. *The Way and the Word: Science and Medicine in Early China and Greece*.

Major, John S.. *Heaven and Earth in Early Han Thought: Chapters Three, Four, and Five of the Huainanzi*.

Nakayama, Shigeru. *A History of Japanese Astronomy: Chinese Background and Western Impact*. Cambridge: Harvard University Press, 1969.

Needham, Joseph. *Chinese astronomy and the Jesuit mission: an encounter of cultures*. London: China Society, 1958.

Needham, Joseph. *The Grand Titration: Science and Society in East and West*. Boston: G. Allen & Unwin, 1979.

Needham, Joseph, and Wang Ling. *Science and Civilisation in China. Volume 3. Mathematics and the Sciences of the Heavens and the Earth*.

Needham, Joseph, Lu Gwei-Djen, John H. Combridge, and John S. Major. *The Hall of Heavenly Records: Korean Astronomical Instruments and Clocks, 1380-1780*.

Pankenier, David. *Early Chinese astronomy and cosmology: the “mandate of heaven” as epiphany*. 1983.

Pankenier, David, Zhentao Xu, and Yaotiao Jiang. *Archaeoastronomy in East Asia*. Cambria Press, 2008.

Rowbotham, Arnold H.. *Missionary and Mandarin: The Jesuits at the Court of China*.

Schafer, Edward H. *Pacing the Void: T'ang Approaches to the Stars*. Floating World Editions, 2008.

Sivin, Nathan. *Medicine, Philosophy and Religion in Ancient China: Researches and Reflections*. Brookfield, Vt.: Ashgate Publishing Company, 1995.

Sivin, Nathan. *Science in Ancient China: Researches and Reflections*. Brookfield, Vt.: Ashgate Publishing Company, 1995.

Sivin, Nathan. *Granting the Seasons: The Chinese Astronomical Reform of 1280, With a Study of Its Many Dimensions and a Translation of its Records*. NY: Springer-Verlag, LLC, 2008.

Sun, Xiaochun, and J. Kistemaker. *The Chinese Sky during the Han: Constellating Stars and Society*. Brill Academic Publishers, Inc., 1997.

Wang P'ing. *The Introduction of Western Astronomical and Mathematical Sciences into China*.

## **V. Conclusion**

Yonglin and Yi: By the end of the seminar, we achieved the three goals we set for ourselves.

That is, to gain general ideas about team-teaching, to study the history of Chinese astronomy, and to write up a course syllabus with innovative pedagogies. The TLI Team-Teaching seminar did prepare us well to teach the course in the next school year.

We accomplished our goals by valuing and experiencing the “equal partnership” principle.

Despite our faculty-student status, we respected each other as equal teaching partners and equally contributed to the preparation for the course. More importantly, we envisioned ourselves as equal teachers in classroom, using our expertise and working with students with the same authority. This arrangement was “revolutionary” in that, by recognizing the student-instructor’s teacher status, it reforms undergraduate teaching value and structure, acknowledges the ability and potentiality of undergraduate students, and inspires them to take initiative and thus promotes self-motivated learning.

The TLI Team-Teaching Seminar provided us with a valuable platform to learn and prepare our course. The leadership and facilitation offered by Alison and the insights and experience

articulated by Annie, Jody, Kalala, and Tracey were truly precious. Thanks to their support, we gained confidence, acquired better understanding of the nature and operation of team-teaching, and constantly examined and revised our teaching ideas and plans. The value and usefulness of the seminar could not be overstated. We hope that when we co-teach the course next school year, we can have another chance to join the seminar and thus share our experience with classmates and improve our course. Both we and our students will benefit greatly from it.

Though we haven't taught the course yet, we believe it would be an interesting course from which students can gain new experiences of both learning and contributing. It is because of this belief that we decided to adopt the following methodologies, like role playing, star may projectors, and observatory field trips. All these teaching techniques were selected not only because they fit the course, but also because they follow our equal partnership principles, that is, creating a context for students and professor to explore new things together, in partnership. The effect of these pedagogies is still waiting to be evaluated. We hope with these pedagogies, we can recreate a place of ancient Chinese astronomical practices for American students to experience across culture and time.