

## HISTORY OF SCIENCE, TECHNOLOGY AND MEDICINE IN EAST ASIA

**Lecture: 10:30-12:30 Tuesdays @ SPMS-LT4**

**Tutorials: (1) 13:30-14:30, (2) 14:30-15:30, or (3) 16:30-17:30 Tuesdays @ LHS-TR+30**

Instructor: Asst. Prof. Michael Stanley-Baker

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Office: 05-12 SoH, by appointment

[Lectures: 24 hours; Tutorials: 12 hours; Academic Units: 3.0]

**Draft Syllabus – This syllabus will be subject to revision, it is posted for Indicative Purposes. Changes will be indicated on the first day of class, and thereafter through NTU-Learn.**

This course introduces students to major issues and themes in the history of science, technology, environment, and medicine in East Asia. Various ideas about and interactions with the natural world have ancient roots that have undergone myriad changes in the regions that include China, Japan, and Korea today. How did those changes occur within and among different societies? How did transformations of scientific and technological knowledge and practices over the centuries inform everyday life in East Asia? These questions, including those connected to societal and environmental issues on a more global scale, will be examined. In this interdisciplinary course, students will undertake a problem-solving approach to examine how particular histories of science and technology in East Asia societies and cultures contribute to a holistic understanding of highly interconnected issues connected to food and agriculture, health and medicine, architecture, laboratory science, communication, energy, transportation, natural resources, empire, nuclear weapons and power.

### Learning Outcomes and Objectives

- Gain and strengthen understandings of how science, technology, environment, and medicine in East Asian societies formed and changed over time;
- Exercise research skills to investigate a multi-layered, wide-ranging problem at the intersectional histories of science, technology, environment, medicine, and society in East Asia;
- Clearly communicate the processes of researching findings, critical analyses, and exploring interdisciplinary knowledge-based solutions about the significance of different objects and practices connected to science, technology, environment, and medicine in local and global East Asian contexts using both academic and creative forms of communication.

### Emails and Office Hours

If you have a question that cannot be addressed by first reading this syllabus, you may write me an email. I will respond within two working days (M-F). For questions requiring a lengthier reply, don't be surprised if I ask you come speak with me in person.

### Academic Integrity

Any work you submit for this class must be your own work. Collaborative work of the following kinds is authorized in this course: peer review and critique of students' essays by one another, and when pre-approved by the instructor in particular cases, collaborative projects by students. Make yourself familiar with NTU's Academic Integrity Code. Violations will be handled in accordance with the strictest applicable university policies. **In this course for upper level students, the normal penalty for a violation of the code is an 'F' for the term. Sign and turn in last page to begin accumulating class participation points.**

### **Attendance**

There are no make-up activities, tests, quizzes, or points of any kind for no-shows. **Tardiness** or **skipping classes** for reasons other than extraordinary, such as dismemberment, hospitalization, or death of next-of-kin, will result in grade deductions. If you are late for class, you will be marked absent.

### **Technology**

We will use the messaging app "**slack.com**" to communicate and collaborate. Please go to <https://bit.ly/2JEd6hc> and join using your NTU email account.

We will also be using **Turning Point** to take attendance and for in-class quizzes and polls. So make sure you are registered with Turning Point and have it installed on your cell phone or laptop or other device.

<http://www.ntu.edu.sg/cits/lisa/clickers/For-Students/Pages/default.aspx>

### **Assessment**

**20% Participation** – This includes in-class activities such as: class discussions; presentations of the readings; in-class writing; and any fieldtrips. These will evaluate students' steady and consistent application during large class meetings and sectional meetings and engagement with the course materials. This is divided into two major portions:

- 1) Once per semester, a group of students will lead a session during tutorial into a deeper dive in into the reference readings. Each member will present on one of the readings provided in the syllabus, and they will develop a conversation around the readings. The presentations should not exceed 20 minutes. Please choose no more than 2 readings to present, state what they are, and summarise their main arguments. You are also invited to use innovative media or presentation styles.
- 2) During the rest of tutorial time, students will work together during the semester to historicize a science-in-society problem that at first glance may seem ahistorical or contemporary. The general topic will be posed to students, who will use tutorial and class sessions to discuss the problem in more detail, and develop their case for the final project. In these discussions, students will identify different angles and time periods that can be explored in order to deeply analyse the problem and build strategies for delving into those histories.

25% **Quizzes** – To test reading or lecture comprehension, quizzes will be given at random intervals during lecture and/or tutorial.

30% **"I-Search" paper** 3,000 words (*includes footnotes, excludes bibliography*)

This is an exercise designed to encourage individual exploration of how ordinary everyday life has been "scientized" in the history of East Asia. Students will write a reflective paper about the process of investigating one historical facet of a science-and-society problem deliberated throughout the semester. The "I-Search" is a narrative of the student's research process, written from the first-person point of view and should explain and discuss an individual's processes and deep thoughts as he or she undertakes their research of the problem. The resulting work serves to explain and discuss one's challenges and breakthroughs of bibliographic research. It also serves to communicate the depth of the individual's research rigor and their analytical conclusions based on analysis of the materials found.

**Due October 22, 12 noon., Turnitin.com**

**25% Case Study Communication: Making Science and Technology in East Asia Visible** Students will work in groups to mind-map and storyboard an animated series inspired by different historical aspects underlying a science-and-society problem. There should be 1 episode storyboarded per student. Episodes need not be chronological; episodes should depict a unique aspect that serves to deepen an historical understanding of the problem. The group work should be presented in a poster format that may be displayed in the HSS Library. There should be a 100-word summary of the series to go with the mind-map, plus summaries (200 words each) that should explain each storyboarded 'episode' and the illustrative power of the scenario for making history of science and technology visible. The summary text should be footnoted, properly citing reputable sources, and both the text and each storyboard should be accompanied by a fully edited bibliography.

**DUE 13 November 2018, hard copy must be pinned up in display location (TBD) before class begins. Student work will be digitally archived.** All late assignments will be marked with a 10% grade reduction per day late for all group members unless noted otherwise.

All assignments should follow *Chicago Manual of Style*, 16<sup>th</sup> edition. It's advisable to learn a referencing software, such as Endnote or Zotero.

## Course Outline

*Some of the readings below may change at the discretion of the instructor.*

*Any updates will appear on NTU Learn.*

### Outline and Readings

Week 1 Aug 15: Introduction (Aug 14) Changing Approaches to the History of Science, Technology and Medicine in Modern East Asia (STMEA)

None required

Reference

Nathan Sivin (1982). "Why the Scientific Revolution Did Not Take Place in China – Or Didn't It?" in *Chinese Science*, 5, pp.45-66.

Joseph Needham (1969). *The Grand Titration: Science and Society in East and West*. Toronto: University of Toronto Press.

Timothy Brook (1996). "The Sinology of Joseph Needham," *Modern China*, 22, pp.340-348.

Margaret Jacob (1999). "Science Studies after Social Construction: The Turn Toward the Comparative and Global," in Victoria E. Bonnell and Lynn Hunt (eds.) *Beyond the Cultural Turn: New Directions in the Study of Society and Culture*. Berkeley: University of California Press, pp.95-120.

Dieter Kuhn (2006). "Reflections on the Current State and Significance of the History of East Asian Technology," in *East Asian Science, Technology, and Medicine*, 25, pp.9-26.

Morris Low (1998). "Beyond Joseph Needham: Science, Technology, and Medicine in East and Southeast Asia," in Morris Low (ed.) *Beyond Joseph Needham: Science, Technology, and Medicine in East and Southeast Asia*. *Osiris* 13, pp.1-8.

## Lecture 2 Aug 21 The Emergence of STMEA at the Turn of the 20<sup>th</sup> Century

Shen, Grace. 2007. "Murky Waters: Thoughts on Desire, Utility, and the 'Sea of Modern Science.'" *Isis* 98 (3): 584–96. doi:10.1086/524319.

Benjamin Elman (2006). "The Displacement of Traditional Chinese Science and Medicine", in *A Cultural History of Modern Science in China*. Cambridge, MA: Harvard University Press. pp.198-226.

Tessa Morris-Suzuki (1994). "Opening the Doors" and "Technology and the Meiji State, 1868-1912," in *The Technological Transformation of Japan*. Cambridge University Press, pp. 55-104.

Reference

Fu Daiwie (2007). "How Far Can East Asian STS Go? A Position Paper," in *East Asian Science, Technology and Society: An International Journal (EASTS)*, 1, pp.1-14.

Benjamin Elman (2007). "New Directions in the History of Modern Science in China" in *Isis*, 98, pp. 517-523.

Anderson, Warwick. 2012, 'Asia as Method in Science and Technology Studies', *East Asian Science, Technology and Society*, 6.4:445-451.

Fa-ti Fan. 2007, 'Redrawing the Map: Science in Twentieth-Century China', *Isis*, 98.3:524-538. Doi: 10.1086/521156.

James E. McClellan III and Harold Dorn (2006). *Science and Technology in World History: An Introduction*. Second Edition. Baltimore: Johns Hopkins University Press.

Benjamin Elman (2005) *On Their Own Terms: Science in China, 1550-1900*. Cambridge, MA: Harvard University Press.

### Lecture 3 Aug 28: Translation, Transmission, and Circulations of Scientific Knowledge

Pritzker, Sonya E. "Standardization and Its Discontents: Translation, Tension, and the Life of Language in Contemporary Chinese Medicine." *East Asian Science, Technology and Society: An International Journal* 8, no. 1 (2014): 25–42.

Kurtz, J. 2011, *The Discovery of Chinese Logic*, Brill. Introduction

Lydia H. Liu (1995). *Translingual Practice: Literature, National Culture, and Translated Modernity – China, 1900-1937*. Stanford: Stanford University Press. (excerpts)

#### Reference

Michael Lackner, Iwo Amelung and Joachim Kurtz (eds.) (2001). *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China*. Leiden: Brill. (Lippert, Wright)

Kurtz, J. 2011, *The Discovery of Chinese Logic*, Brill. C3.

### Lecture 4 Sept 4: Science, Democracy and the Emergence of Modern Chinese State

Wang Zuoyue (2002). "Saving China through Science: The Science Society of China, Scientific Nationalism, and Civil Society in Republican China," in *Osiris*, 17, pp.291-322.

Fa-ti Fan (2008). "How Did the Chinese Become Native?: Science and the Search for National Origins in the May Fourth Era," in Chow Kai-wing, Tze-ki Hon, Hung-yok Ip and Don C. Price (eds.) *Beyond the May Fourth Paradigm: In Search of Chinese Modernity*. Lanham, MD: Rowman and Littlefield, pp.183-208.

#### Reference

Ellman, Benjamin A. 2014, 'Toward a History of Modern Science in Republican China', in J. Tsu (ed.) *Science and Technology in Modern China, 1880s-1940s*, Leiden: Brill, 15-38.

Wang Hui (2008). "Scientific Worldview, Cultural Debates, and the Reclassification of Knowledge in Twentieth-Century China," in *Boundary 2*, 35, pp.125-155.

Wang Zuoyue (2007). "Science and the State in Modern China," in *Isis*, 98, pp.558-570.

### September 11 No Class: Students' Union Day

### Lecture 5 (Sept 18) : Meiji Science and the Modern Japanese State

Morris-Suzuki, T. 1994, "Systems Building," *The Technological Transformation of Japan: From the Seventeenth to the Twenty-First Century*, Cambridge University Press. 105-42

Hiromi Mizuno (2009). "Toward Technocracy" in *Science for Empire: Scientific Nationalism in Modern Japan*. Stanford University Press, pp. 19-42

#### Reference (Pick 2 to present)

James Bartholomew (1993). "Modern Science in Japan: Comparative Perspectives," *Journal of World History*, 4, pp. 101-116.

Miles Fletcher III . 2005, 'Impact of the Great Depression: The Japan Spinners Association', in M. Low (ed.) *Building a Modern Japan: Science, Technology, and Medicine in the Meiji Era and Beyond*, Palgrave Macmillan, 207-227.

Gregory Clancey . 2005, 'Modernity and Carpenters: Daiku Technique and Meiji Technocracy', in M. Low (ed.) *Building a Modern Japan: Science, Technology, and Medicine in the Meiji Era and Beyond*, Palgrave Macmillan, 207-227.

Chaiklin 2005. "A Miracle of Industry: The struggle to produce sheet glass in modernizing Japan." in M. Low (ed.) *Building a Modern Japan: Science, Technology, and Medicine in the Meiji Era and Beyond*, Palgrave Macmillan, 161-181.

## Lecture 6 Sept 25: Eugenics, Public Health and Biopolitics

Ruth Rogaski (2004). *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China*. Berkeley: University of California Press. See Chapter 8, "Weishang and the Desire for Modernity", pp.225-253.

Perrins, Robert John. 2005, 'Doctors, Disease, and Development: Engineering Colonial Public Health in Southern Manchuria, 1905–1926', in M. Low (ed.) *Building a Modern Japan: Science, Technology, and Medicine in the Meiji Era and Beyond*, Palgrave Macmillan, 103-132.

Frank Dikötter (1991). "The Discourse of Race and the Medicalisation of Public and Private Space in Modern China (1895-1949)," in *History of Science*, 29, pp.411-420.

### Reference

Terazawa, Yuki. 2005, 'Racializing Bodies through Science in Meiji Japan: The Rise of Race-Based Research in Gynecology', in M. Low (ed.) *Building a Modern Japan: Science, Technology, and Medicine in the Meiji Era and Beyond*, Palgrave Macmillan, 83-102.

Ong, A. 2016, *Fungible Life: Experiment in the Asian City of Life*, Duke University Press. Intro, Chapter 1.

## Lecture 7 Oct 9: Science and Technology during the Sino-Japanese War

Morris-Suzuki, T. 1994, "A War of Science and Technology" *The Technological Transformation of Japan: From the Seventeenth to the Twenty-First Century*, Cambridge University Press. 143-57

Laurence Schneider (2005). "War, Revolution, and Science," *Biology and Revolution in Twentieth-Century China*. Lanham, MD: Rowland and Littlefield. 93-108

### Reference

Geoffrey Blowers (2006). "The Origins of Scientific Psychology in China (1899-1949)," in Adrian C. Brock (ed.) *Internationalising the History of Psychology*. New York: NYU Press, pp.94-111.

Hiromi Mizuno (2009). "Technocracy for Scientific Japan", in *Science for Empire: Scientific Nationalism in Modern*

*Japan*. Stanford University Press, pp. 43-70.

## Lecture 8 Oct 16: The “Science” of Population Policy in Asia

Kim, Sonja. 2008. “‘Limiting Birth’: Birth Control in Colonial Korea (1910–1945).” *East Asian Science, Technology and Society* 2 (3): 335–59. doi:10.1215/s12280-008-9064-3.

Susan Greenhalgh (2003). “Science, Modernity, and the Making of China’s One-Child Policy,” in *Population and Development Review*, 29, pp. 163-196.

### Reference (Pick 2 for weekly presentations)

Susan Greenhalgh (2005). “Missile Science, Population Science: The Origins of China’s One-Child Policy,” in *China Quarterly*, 182, pp.253-276.

Susan Greenhalgh (2005). “Globalization and Population Governance in China,” in Aihwa Ong and Stephen J. Collier (eds.) *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*. Oxford: Blackwell, pp. 354-372.

Greenhalgh, Susan. 2008. *Just One Child: Science and Policy in Deng’s China*. University of California Press, Ch. 2.

Frühstück, S. Managing the Truth of Sex in Imperial Japan. *The Journal of Asian Studies*, 59, no. 2 (2000): 332–358.

## I-Search Paper is Due October 22, 12 noon, Turnitin.com

### Lecture 9 Oct 23: The Making of a Technological Superpower: Post-War Japan

Tessa Morris-Suzuki (1994). “Technology and. The Economic Miracle,” in *The Technological Transformation of Japan*. Cambridge University Press, pp. 161-208.

### Reference (pick 2 for presentations)

Nishiyama, Takashi. "War, Peace, and Nonweapons Technology: The Japanese National Railways and Products of Defeat, 1880s-1950s." *Technology and Culture* 48, no. 2 (2007): 286-302.  
<http://www.jstor.org.ezlibproxy1.ntu.edu.sg/stable/40061472>.

Johnson, Chalmers A. 1982. *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975*. Stanford University Press. 1-34.

Tessa Morris-Suzuki (1994). “High-Tech Japan” in *The Technological Transformation of Japan*. Cambridge University Press, pp. 209-44.

## Lecture 10 Nov 6 : The Politics of Science and Science Fiction in China and Japan

Susan J Napier (2007). "When the machines stop" Chapter 6 in Christopher Bolton and Istvan Csicsery-Ronay, Jr eds. *Robot Ghosts and Wired Dreams: Japanese Science Fiction from Origins to Anime*. University of Minnesota Press.

If you have not watched the Neon Genesis Evangelion series, then watch this summary film of the series before class. We'll watch clips from the final two episodes as described in Napier's paper.

<https://watchcartoonsonline.la/neon-genesis-evangelion-death-rebirth-1997/>

Helena Heroldová (2004). "Glass Submarines and Electric Balloons: Creating Scientific and Technical Vocabulary in Chinese Science Fiction," in Michael Lackner and Natascha Vittinghoff (eds.) *Mapping Meanings: The Field of New Learning in Late Qing China*. Leiden: Brill, pp.537-554.

There is some linguistic terminology in Heroldová's paper, but in fact it is very simple. Here are some practical and very short, non-technical definitions which will serve for the purposes of the paper:

Neologism: Newly-created words

Semantic Field: Range of Meaning

lexical system: Vocabulary

morpheme: word (smallest unit of a language)

Semantic morpheme: Meaning unit

Monosyllabic; having single syllable

Bisyllabic: having two syllables

Trisyllabic: having three syllables

### Reference (Pick 2 items)

Any other chapters from *Robot Ghosts*.

Midnight Eye Part 1 & 2: A history of Japanese Science Fiction Cinema

<http://www.midnighteye.com/features/intergalactic-tokusatsu-charting-the-japanese-space-opera-part-1/>

<http://www.midnighteye.com/features/intergalactic-tokusatsu-charting-the-japanese-space-opera-part-2/>

Evan Feigenbaum (2003) *China's Techno-Warriors: National Security and Strategic Competition from the Nuclear to the Information Age*. Stanford: Stanford University Press.

Morris Low (1996). "The Japan that Can say No: The Rise of Techno-nationalism and its Impact on Technological Change," in Robert Fox, ed., *Technological Change: Methods and Themes in the History of Technology*. Amsterdam: Harwood Academic Publishers, pp. 201-14.

Roger Handberg and Zhen Li (2006). *Chinese Space Policy: A Study in Domestic and International Politics*. London: Routledge.

Sigrid Schmalzer (2007) "On the Appropriate Use of Rose-Colored Glasses: Reflections on Science in Socialist China" in *Isis*, 98, pp.571-583.

## Final Lecture no. 11 Nov 13: Projects Storyboard Review

Mandatory peer-review of "Case Study Communication" and wrap-up.



**Declaration on Academic Honesty\***

**Academic year and semester:** AY 16/17 Semester 2

**What is academic dishonesty?**

All members of the NTU community are responsible for upholding the values of academic integrity in all academic undertakings (including, but not limited to, written and oral assignments, presentations, course work, quizzes and exams). Students should not cheat, plagiarise, or attempt to pass off another's work as their own. This includes, but is not limited to, the writing or ideas of another person, without acknowledging or appropriately crediting the source from which the writing or ideas are taken. NTU takes a serious view of any form of academic dishonesty. Plagiarism, cheating, and any other forms of academic dishonesty are considered serious offences for which penalties will be imposed.

**Declaration**

By signing this form, you declare that you have read and understood NTU's Policy on Student Code of Conduct (available here: <http://www.ntu.edu.sg/SAO/Pages/Policies-concerning-students.aspx>) and that all graded and non-graded assignments you have turned in are your/your group's own work and will not involve any plagiarism or collusion. Reliance on other people's work, when allowed, will be appropriately referenced. You are responsible for knowing the appropriate form of referencing used for this course. Quotation marks will be used around materials written verbatim from other sources; citations will clearly indicate paraphrasing of other sources. You will not submit any work for this course that was (in whole or part) graded work for another course, or will be.

**You must print, sign, and return the lower section of this form to the Professor by Week Two. No participation credit will be given until this is returned.** \*Adapted from 'Academic Honesty Declaration' for HS7003.

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**Declaration on Academic Honesty**

**Course code:** HH3002

**Name (as registered):** \_\_\_\_\_

**Matriculation number:** \_\_\_\_\_

**Signature & date** \_\_\_\_\_