



Gender, Education and STEM

馬璵

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(please note the underscore between the surname Ma and the given name Li)



Outline

- Situation
- Experiences
- Reflections



Women in STEM fields

- Historically underrepresented
- Reasons for the gender gap
- Strategies for improvement



From Northern Europe

Norway in focus



Gender balance and gender perspectives in research and innovation

Policy for the Research Council of Norway
2013–2017



KIF: Committee for Gender Balance and Diversity in Research

- Launched in 2004 as “Committee for Mainstreaming – Women in Science”
- Completed three terms
- The third committee changed its name
- The fourth 2014-2017



Senter for tverrfaglig kjønnsforskning

- Senter for kvinneforskning (1986-2001)
- Senter for kvinne- og kjønnsforskning (2001-2008)
- Senter for tverrfaglig kjønnsforskning (2008 -)



Gender balance and learning outcomes

Kjønnsbalanse og læringsutbytte



Kvinneuniversitetet i Norden
Nordic Women's University

- Funded by the Norwegian Ministry of Education and the Ministry of Children, Equality and Social Inclusion
- hosted by Nesna University College



Nordic programme on gender in the Nordic research and innovation area

- A newly established programme (2015)
- Co-funded by
 - Research Council of Norway
 - Forte in Sweden
 - Ministry of Education, Science and Culture in Iceland



Swedish Secretariat
for Gender Research



- **Coordinate the Gender in Norway project**



Outline

- How it came about
- Horizon 2020 – an example of good practice
- Norway & Sweden
- North & South
- West & East
- Yin & Yang
- Vertically & horizontally (historically and
- Gendered science & the science of gender



How it came about

- Joan Stm



Thank you!

**ISTITUZIONI
ANALITICHE**

DELLA SOCIETÀ ITALIANA

DI D^{MA} MARIA GAETANA

AOPESI

MILANO

Per l'acquisto dell'Opera si legge

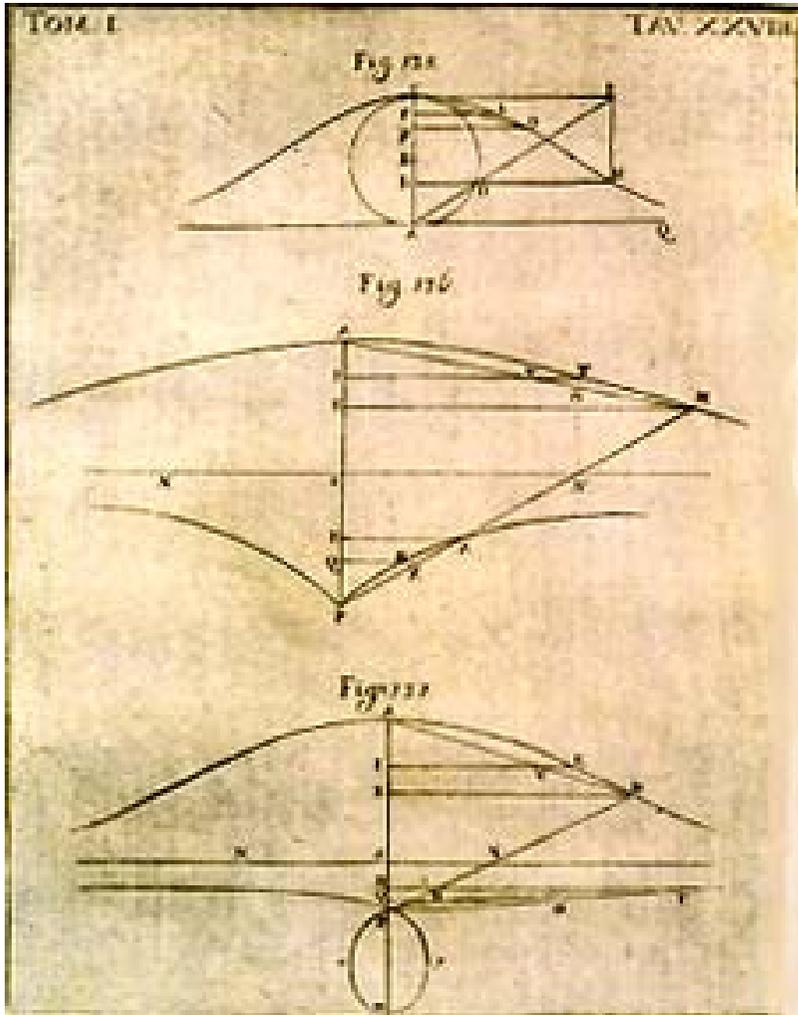
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IN MILANO, MDCCCXXXII.

NELLA BIBLIOTECA DELLA SOCIETÀ
CON SECONDA EDIZIONE







The Witch of Agnesi

is an example for using original sources to integrate history of mathematics in mathematics education. Maria Gaetana Agnesi (1718-1799) was the first woman to publish a mathematical work. Her *Instituzioni Analitiche ad uso della gioventù italiana* supplies one of the first complete accounts of calculus. Her style of presentation is characterized by expositions through examples, the most well-known is the Witch of Agnesi, so named in the English-speaking world due to an error in translation.



Gendering mathematics education

The main duty of a mathematics educator, as well as her fondest privilege, is to explain the humanity of mathematics, to illustrate its greatness, beauty and dignity, and to describe how the incessant efforts and accumulated genius of many generations have built up that magnificent monument, the object of our most legitimate pride as human beings, and of our wonder, humility and thankfulness, as individuals. The study of the history of mathematics will perhaps not necessarily make better mathematicians but gentler ones, it will enrich their minds, mellow their hearts, and bring out their finer qualities.



Studies of Wang Zhenyi

Wang Zhenyi (1768--1797) lived in the Qing Dynasty. Despite her short life she left voluminous works on astronomy, mathematics, literature, history, medicine, geography, etc. This study is based on her *Collection of Defeng Pavilion* and is part of a monograph.



Cuneiform Mathematics

- C. C. Lambert-Kalowski
- E. M. Bruins
- J. Friberg
- J. Needham



Traditional Oriental Mathematics

- pedagogical implications and didactical consequences

- As art
- As science
- As technique

Comparative studies

www2.lse.ac.uk/economicHistory/CCPN/whoisWho/Team/MaLi.aspx

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China in comparative perspective network (CCPN) ▶

Who's who ▶

Team members ▼

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How to contact us

Professor MA Li

Ma Li received a Ph.D. in mathematics from CTH/Gothenburg University in 1994. After post-doctoral research in Kysto, she was appointed a university lecturer/senior lecturer/associate professor and worked in Sweden for a decade before moving on to Norway. She has been teaching mathematics and various related yet "non-standard" courses at the under-graduate as well as Master and Ph.D. levels. Her research interests include mathematics and its history; fuzzy logic; the influence on learning styles of language background, gender perspective and culture; methodological issues in comparative studies; the public understanding of science; and STS (Science, Technology & Society).

As an ECMI stipendiary she studied in Cambridge where she met among others Professor Sir Geoffrey Lloyd, Professor Nathan Sivin, and the late Dr. Joseph Needham and Professor Tom Whiteside, who, along with Professor Jöran Friberg from Gothenburg, encouraged her interest in comparative studies. Subsequently she was awarded Royal Society ESEP Visiting Fellowships three times to conduct comparative studies of mathematical traditions at Cambridge University, Needham Research Institute, and Imperial College London. An important part of the investigation has been focusing on parallels between ancient Chinese and Mesopotamian mathematics.

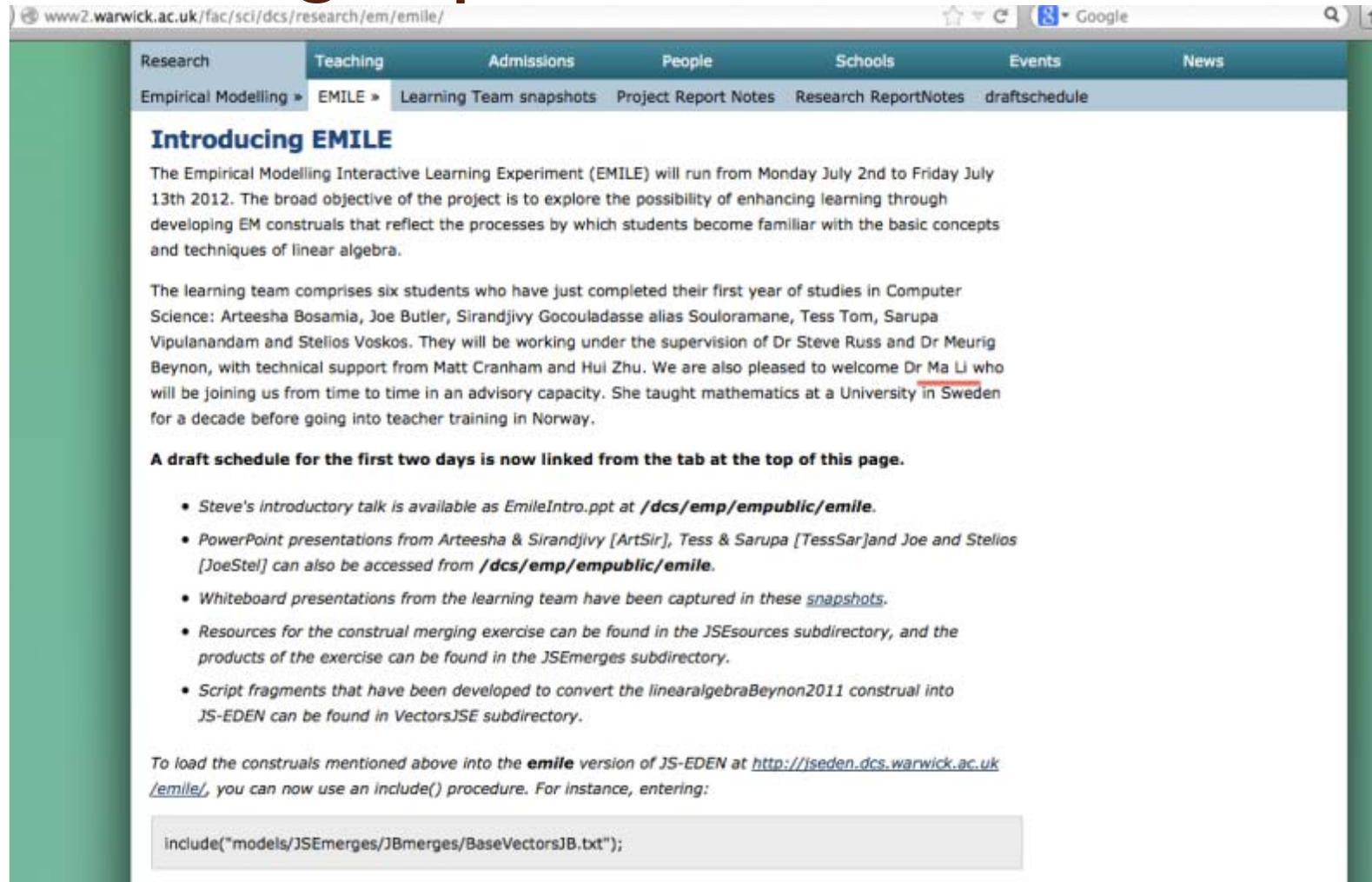
The OECD has been coordinating a worldwide evaluation PISA in its member countries. Much of the methodology follows the example of the Trends in International Mathematics and Science Study. Since China/Shanghai was included in the study as a non-OECD education system in 2009, the top test scores of Shanghai students stun the world. Having been invited to speak on the successes, the significance and to offer explanations, Dr. Ma Li indicates that the results may be more a consequence of cultural factors than pedagogic excellence. Further explorations are under way from a comparative perspective.

Another of Ma Li's current projects is a monograph about a female scholar living in eighteenth century China, and her contribution to the exact sciences. The work is based on original sources, taking the social environment of the time into consideration and referring to an Italian female mathematician of the same period.

Ma Li has learned a dozen languages and is fluent in a handful of them. At Massachusetts Institute of Technology she completed technical translation between Japanese and English in the STS/Japan Program. From 2005 to 2009 she was chair of the Japan Society for the Promotion of Science alumni board and remains a board member.



Empirical Modelling Interactive Learning Experiment

A screenshot of a web browser displaying the EMILE website. The browser's address bar shows the URL 'www2.warwick.ac.uk/fac/sci/dcs/research/em/emile/'. The page has a navigation menu with tabs for 'Research', 'Teaching', 'Admissions', 'People', 'Schools', 'Events', and 'News'. Below the navigation, there are sub-links for 'Empirical Modelling', 'EMILE', 'Learning Team snapshots', 'Project Report Notes', 'Research ReportNotes', and 'draftschedule'. The main content area features a section titled 'Introducing EMILE' with two paragraphs of text, a bolded statement about a draft schedule, a bulleted list of resources, and a paragraph about loading construals into JS-EDEN. A code block at the bottom shows an example of an include() procedure.

www2.warwick.ac.uk/fac/sci/dcs/research/em/emile/

Research Teaching Admissions People Schools Events News

Empirical Modelling » EMILE » Learning Team snapshots Project Report Notes Research ReportNotes draftschedule

Introducing EMILE

The Empirical Modelling Interactive Learning Experiment (EMILE) will run from Monday July 2nd to Friday July 13th 2012. The broad objective of the project is to explore the possibility of enhancing learning through developing EM construals that reflect the processes by which students become familiar with the basic concepts and techniques of linear algebra.

The learning team comprises six students who have just completed their first year of studies in Computer Science: Arteesha Bosamia, Joe Butler, Sirandjivy Gocouladasse alias Souloramane, Tess Tom, Sarupa Vipulanandam and Stelios Voskos. They will be working under the supervision of Dr Steve Russ and Dr Meurig Beynon, with technical support from Matt Cranham and Hui Zhu. We are also pleased to welcome Dr Ma Li who will be joining us from time to time in an advisory capacity. She taught mathematics at a University in Sweden for a decade before going into teacher training in Norway.

A draft schedule for the first two days is now linked from the tab at the top of this page.

- Steve's introductory talk is available as *EmileIntro.ppt* at </dcs/emp/emppublic/emile>.
- PowerPoint presentations from Arteesha & Sirandjivy [ArtSir], Tess & Sarupa [TessSar] and Joe and Stelios [JoeStel] can also be accessed from </dcs/emp/emppublic/emile>.
- Whiteboard presentations from the learning team have been captured in these [snapshots](#).
- Resources for the construal merging exercise can be found in the *JSEsources* subdirectory, and the products of the exercise can be found in the *JSEmerges* subdirectory.
- Script fragments that have been developed to convert the *linearalgebraBeynon2011* construal into JS-EDEN can be found in *VectorsJSE* subdirectory.

To load the construals mentioned above into the **emile** version of JS-EDEN at <http://iseden.dcs.warwick.ac.uk/emile/>, you can now use an `include()` procedure. For instance, entering:

```
include("~/models/JSEmerges/JBmerges/BaseVectorsJB.txt");
```



Learning styles influenced by language background

- Ideogram vs. phonogram
- East vs. West
- Reading vs. spoken focus
- Visual vs. aural communication
- Recording vs debating
- Documentative vs argumentative



Cross-disciplinary perspectives

- Educational
- Historical
- Cultural
- Linguistic
- Gender
- ...