

REVEALING LIVES: WOMEN IN SCIENCE, 1830-2000
ABSTRACTS

DAY 1: Thursday 22 May 2014

11.15-13.00: Session 1A: Representations of women scientists: KOHN CENTRE

Crystal Clear – Communicating Science and the Work of Women Scientists in the theatre in *Rosalind and Hidden Glory*.

Dr Carina Bartleet, Oxford Brookes University

This paper will explore the representations of women in scientists in two semi-biographical works for the theatre that depict two prominent women crystallographers of the twentieth century, Deborah Gearing's *Rosalind* (Franklin) and Georgina Ferry's *Hidden Glory* (Dorothy Hodgkin). The focus will be to explore how these two pieces for the theatre depict both the lived experience of women scientists and the science itself. It will argue that theatrical representation, which is always a representation, works within existing recuperative motifs (such as Adrienne Rich's 'Re-vision') in order to explore a gendered division of labour that mirrors the female scientist's work with that of the female performer in communicating science through theatre. It will pay attention to aspects of theatrical representation including spectatorship and theatrical conventions in order to explore how each piece stages the story of women in science by placing them at the centre of the theatrical event but as subjects rather than objects of representation. The plots of the plays, and their performance will be read alongside biographical narrative in order to determine whether the plays offer more than mere biographical information and how narrative is pieced together to present a postdramatic and performative presentation of the scientific subject.

Public perception of women scientists

Professor Cynthia Burek, University of Chester and Dr Bettie Higgs, University of Cork

An analysis of over 1000 questionnaires across western Europe but mainly in UK and Ireland, has shown that public recognition of any women scientists, dead or alive, from history or current times, famous or not, is scant. This is independent of age, gender, location and profession/education of the respondents. In order to test the validity of the answers a small-sample questionnaire was also conducted about all scientists. The one exception is recognition of Marie Curie. Her fame is spread across all genders, ages and nationalities. Reasons for this are discussed within the context of the allocated time period.

Further analysis shows that knowledge is dependent on location within Europe, with recall of famous historical women scientists seemingly split between Francophile and broadly Germanic nations. The similarities between these identified women are analysed according to scientific discipline but concentrating on the Earth Sciences. Results show that no one scientific discipline rules with perhaps the Earth Sciences fairing worst of all. We ask "Why is this?"

**'Don't Let History Happen Without You': Hollywood, Ecstasy and the Strange Case of Hedy Lemarr
Dr Esther Sonnet, University of Portsmouth**

This engaging presentation explores the revolutionary work of one of science's most luminary women – actress and film goddess of the 40s and 50s Hedy Lamarr. Using visual illustration and sound recording, the presentation will outline the history of Lamarr's cinematic and personal life within the context of WW2 and her innovative role in the development of US Navy defence technologies. Noting Lamarr's collaboration with avant-garde modernist musician Jean Antheil - famed for his innovative 'mechanical' score for the experimental film Ballet Mecanique (1924) - the paper will argue that Antheil & Lamarr's anti-Nazi patent application in 1941 for 'frequency hopping' is the earliest form of remote control spread-spectrum technology, which provided the foundation for the contemporary technological world – a key component of wireless data systems such as mobile phones and digital communications security. The case of Hedy Lamarr raises key questions about women in science - the limiting force of gender ideologies, the effacement of women from standard histories of science, and the vital role to be played by the chance encounters of arts and science.

11.15-13.00: Session 1B: Women's experiences in science: LIBRARY EVENTS ROOM

Where can we find a good plumber? Half a century of failing to plug the 'leaky pipeline' for women in STEM.

Dr Nina Baker, Women's Engineering Society

It has been understood for decades that, even when the proportion of students of STEM subjects who are women is similar to or higher than that of men, by the time their careers are reaching chartered status or tenured academic posts, the percentage of women has already started to decline and by senior professional stages, women are typically about 15% of the total, at best. Public concerns as to numbers of women in engineering and science goes back to WW1, as seen in historical record of the Women's Engineering Society (WES). WES has been the principal organisation supporting women in STEM for nearly a hundred years. Research into the leaky pipeline for women in engineering, requested by government and commissioned by WES, forms the basis of this paper. It will summarise the almost annual enquiries and governmental 'wake-up calls', followed by short term projects over the past half century. The modest progress and re-invention of wheels will be discussed and the need for actions, rather than enquiries, detailed. Readers should not expect any surprises, as many of the barriers are familiar and many of the solutions obvious. The contribution to the body of knowledge is showing the longevity of the issues.

**Online Gender Equality Community GenPORT
Juliet Webster, Open University of Catalonia**

Resources on gender equality in science offer huge potential for experience sharing and action, but remain dispersed, not always visible, and not always usable. This paper discusses the development of a new online community of practice, entitled 'GenPORT', which aims to overcome these problems.

GenPORT is being designed to offer an internet-based open entry-point to the best research, policy reports and practical resources on gender, science, technology and innovation which already exist, and to new resources as they are generated. It will include histories of women in science, which provide inspiring case studies. The portal, which is currently in development, will be user-driven, interactive and dynamic. Materials will be crowd-sourced, organised thematically, and tagged. Users will be able to create the community they want, adding materials and links to other sites, setting up groups, posting announcements, and so on. In the longer run, the portal will be sustained through their contributions, so that its resources are permanently available to diverse gender and science communities. The portal will cover gender and science issues in the EU, US, Australia, and eventually, worldwide. The project is funded by the EU FP7 Science in Society Programme under the theme 'Creating a transnational community of practitioners (Internet Portal)'.

Reluctant Pioneers: A Case Study of American Women Engineering Graduates from the 1970s
Dr Laura Ettinger, Clarkson University

This paper analyzes the experiences of women engineering graduates from a small technological university in the United States in the 1970s. Oral histories, along with other sources, are used to tease out the experiences of these pioneering engineers as seen from their perspectives. Claiming that “we weren't out burning bras...we just did our thing,” many of these women did not see themselves as pioneers or even as women engineers; instead, they tended to self-identify as gender-less engineers. Although most of these women view their undergraduate years in positive terms and did not believe that their gender had either a positive or a negative influence on their college careers, they became aware of gender discrimination in their professional lives. The experiences, and the proliferation of second-wave feminism in mainstream culture, led these women to notice and discuss gender issues and discrimination and to support other, often younger women facing similar issues. As adults, these women engineering alumnae have complicated identities, sometimes identifying as men, sometimes as women, sometimes as both in the same breath. This paper ends by exploring the potential for using narratives of engineers' lives to help change the gender dynamics of the engineering profession.

Sponsoring women for leadership positions in medicine and science

Dr Elizabeth Travis, University of Texas

Despite a dramatic increase in the numbers of women obtaining medical degrees or PhDs in all fields of science, women remain underrepresented in leadership positions. This is not due to a lack of mentoring, as it is now clear that mentoring, although necessary, is not sufficient to propel women into the leadership ranks. The challenges facing medicine and science in the future require novel approaches and solutions that depend on having a diverse group of leaders, including women. In the business world, companies with more women corporate officers outperform companies with fewer women in senior management. One potential approach is to adapt the success of the corporate world in developing women leaders through sponsorship. In this context, sponsors are highly placed individuals in an organization who have the power and influence to advocate for talent at the leadership table. Although science and medicine differ from the corporate world, the strong sponsorship programs that have advanced women into corporations' upper levels of leadership can serve as models for sponsorship programs to launch new leaders in academic medicine. This talk will discuss what a sponsor and a protégée do, how sponsorship works, finding a sponsor, and the benefits of being a sponsor.

14.00-15.45: Session 2A: Women and Learned Societies: KOHN CENTRE

Margaret Fountaine: a lepidopterist remembered

Sophie Waring, University of Cambridge

Margaret Fountaine (1862-1940) was a lepidopterist and diarist, collecting butterflies across six continents. By examine her interactions with The Linnean Society and the Royal Entomological Society it will be established that gender is only one social factor causing exclusion in this period. The interaction of gender with class, poverty and ethnicity also requires evaluation. The exotic nature of Fountaine's collection lead to her theoretical work becoming highly regard and gave her a space in entomology not often bestowed on her gender. Fountaine's contributions to various entomological journals not only blur contemporary gender roles, but also the boundaries between amateur and professional, and the value of theoretical and specimen contributions to natural history. This paper will also discuss the dangers of celebrating women in science as 'heroines' by examining the more recent biographical work done on her, as well as the limits and motivation for Fountaine's own work and expertise.

Caroline Herschel, agency and self-presentation

Dr Emily Winterburn, University of Leeds

Caroline Herschel is unusual, in the sense that unlike most of her female contemporaries, her contributions to science were recognised in her own time, often in print, by a number of scientific societies. She had papers read on her behalf to the Royal Society, and by the 1830s had awards and (in most cases honorary) membership of several other institutions. In this paper I argue that while her roles within her family's scientific project were often similar to other women, specific aspects of her background and education, made her able to see and make use of social convention to convince a network of male luminaries to promote her name and her contributions to science. As with other papers in this session, this paper looks at the dangers of celebrating women in science as 'heroines' and at the additional roles of class and nationality in complicating issues of access to scientific institutions.

Terra incognita: women in the expedition archives 1913-1970

Sarah Evans, University of the West of England

My PhD research, which is near completion, investigates women's involvement with Royal Geographical Society-supported expeditions between 1913 and 1970, and the relationship between gender, expeditionary space, and geographical knowledge production. Given that women were present on RGS-supported expeditions throughout this period, the paper will seek to use that presence to complicate existing understandings of expeditions as male-dominated spaces and practices. It will explore the relationship between these women and the RGS, arguing that they made use of a number of networks within, around, and beyond the RGS in order to gain support and recognition for their work.

14.00-15.45: Session 2B: Biography: LIBRARY EVENTS ROOM

Digging for a forgotten female archaeologist: The life and works of Ersilia Caetani-Lovatelli, 1840-1925

Floris Meens, Radboud University Nijmegen

In the historiography of archaeology, the contribution of women has been neglected for a long time. Some studies were published from the mid-90s onwards, but still little is known of the pioneering female archaeologists, who were not able to enter universities, but did influence the development of archaeological science and the changing position of women during the Fin de siècle.

Ersilia Caetani-Lovatelli, descendent of a prestigious family and Grand Dame of nineteenth century Italian archaeology, was one of them. She received private education, learning Latin, Greek and Sanskrit. She published many archaeological works and was the first lady to join various learned societies in Italy and abroad. In her salon, the most famous of Rome between 1870-1910, she received the European intellectual elite.

I would like to discuss how Lovatelli's works are related to the transition of archaeology into a modern science and how these can, at the same time, be seen as influenced by, and part of the transition of Italy into a nation state. I finally hope to show the consequences of these two processes for Italian women scientists.

The High Altitude Research of Mabel Purefoy Fitzgerald, 1911-13

Martin Goodman, University of Hull

Mabel Purefoy Fitzgerald (1872-1973) was one of four sisters orphaned to Oxford. She attended physiology lectures but could not graduate, as women were not allowed to enroll at the university, which eventually gave her an honorary Masters when she reached 100. Through work as the assistant in the private laboratory of J.S.Haldane, Fitzgerald achieved such expertise in respiration she co-authored a paper with Haldane in 1905. After touring the Rockies on a Rockefeller grant she was brought into the famous Pikes Peak expedition of 1911. As a woman she could not stay with the

male scientists for their five weeks on a mountain peak, so instead took journeys by rail, mule and on foot to measure respiration in communities settled at altitudes from 5000 to 10,000 feet. She took measurements of breath and haemoglobin from 131 subjects at 12 locations, and of herself at 14 different altitudes. Drawing on her Royal Society papers of 1913 and 1914, and correspondence, I consider her pioneering fieldwork in Colorado, and in the Appalachian Mountains on a return trip of 1913; and see how a woman excluded from a grouping of male scientists achieved work that, as Haldane acknowledged, 'was much more adventurous'.

Chien-Shiung Wu, Courageous Hero of Physics

Maia Weinstock, BrainPOP

This paper looks at the life of Chien-Shiung Wu, a highly accomplished 20th-century Chinese-American physicist, whose experimental work contributed greatly to our understanding of nuclear processes, including beta decay and the conservation of parity. Wu was one of the few women to participate at the highest levels of physics for the U.S. Manhattan Project, which resulted in the construction of the first atomic weapons. She is also noted for having been denied a Nobel Prize for her groundbreaking experiment that overturned a fundamental "law" of nature, while her two male colleagues won for theoretical work on the same problem. Despite Wu's considerable achievements, she is a relative unknown in most parts of the world, including her adopted country, the United States. Research for this paper drew upon previous biographies of Wu's career; a recent celebration of her life in her Chinese hometown; and personal communication with Wu's son, a physicist at the Los Alamos National Laboratory in New Mexico, USA.

Zelia Nuttall: doing archaeology from home and abroad

Carmen (Apen) Ruiz, Universitat Oberta de Catalunya

My presentation explores the work of Zelia Nuttall (1857-1933) a North American archaeologist who worked in Mexico during the early twentieth century. Different to other European and North American pioneer anthropologists who travelled to distant areas to collect artefacts and study ruins, Zelia Nuttall settled and established a home in Mexico, where she lived until her death in 1934. In this sense, she had a clear commitment to be close to the area of her research interest and to establish a dialogue with the national community of scientists in Mexico. My work investigates Nuttall's scientific location as an outsider within the practice of archaeology, a gendered position, I argue, shared by other women scientists at that time. In my work I argue that she was able to maneuver this ambiguous location of "outsider within" by creating a social network of scientific work and patronage with other women scientists. Though Zelia Nuttall research was published in several prominent journals of the discipline and she belonged to major learned societies, Nuttall was always viewed as an amateur, and her voice remains concealed in archaeology's histories.

16.15-17.45: Session 3A: Gendered roles in science: KOHN CENTRE

For the Love of Ada: revealing women's work in computer science

Dr Tilly Blyth, Science Museum

Augustus Ada, Countess of Lovelace, is often heralded as the world's first computer programmer and celebrated annually through Ada Lovelace Day. Working with Charles Babbage, the Victorian mathematician and inventor, she wrote notes to explain his Analytical Engine. These reputedly took Babbage's focus on number and calculation far further than he himself had anticipated, and identified the ability of the machine to extend to symbols and algebra.

Despite the well intentioned claims around Ada Lovelace's importance, many historians have questioned the significance of her contributions (Stein, Collier, Swade). Questions surround the extent to which her 'programs' had already been worked on by Babbage, although they were first published under Lovelace's name.

This paper will draw on the Ada Lovelace's story, alongside other pioneering British women in 1950s computer science (such as Dame Stephanie Shirley who worked with ERNIE, 1956, and Mary Coombes who programmed the LEO, 1951), to examine why women's contributions to computer science have been so hotly celebrated, or in the vast majority of histories, ignored. It will reveal the diverse backgrounds women brought to computing, the focus on 'soft' skills such as programming rather than 'hard' engineering skills, and hierarchical structures that made career progression difficult. It will show how gendered accounts of history have ignored women's contributions to computer science, apart from the 'myth' of Ada Lovelace.

Women vets: doctors or scientists?

Julie Hipperson, King's College, London

Do we really buy into the idea of medicine being the 'applied art' of science? If we do then why, given the concerted effort to get women into 'science', aren't the heavily feminised professions of medicine and veterinary medicine celebrated as a legitimate outlet for scientifically trained women? Using the experience of a number of women who undertook the intensive five year training to become vets in the period 1940-1990, but who ended up in laboratory and research posts, this paper will examine the cultures of the laboratory and of the culture of medicine, and how they were experienced by women who moved between the two. Focusing in on vivisection and animal rights, this paper will ask if women in the laboratory aligned themselves more to the philosophical underpinnings of science or medicine, and how this can help us get a better understanding of whether, historically, these women thought of themselves as scientists.

Women as science authors: Alice Lee and the Philosophical Transactions, 1897–1901

Julie McDougall-Water, University of St Andrews and the Royal Society of London

This paper considers women scientists' experience of publishing in the late nineteenth and early twentieth centuries. To do this I look at the Philosophical Transactions, the organ of the Royal Society, and the attempts of a female scientist to get her work into print. Alice Lee's 1901 contribution to the journal was on 'the Problem of Evolution in Man'. In this, she presented data on her studies of the human skull, taken from her recently completed thesis in craniometry at London University. She was in fact the first female to graduate from this higher institution. This was not an easy achievement. Before passing Lee's thesis, the examiners' accused her of unoriginality, unskilled presentation of results, and taking credit for male colleagues' work. The problem was her argument: that the difference between man and woman was not directly attributable to skull size and shape. Never mind her examiners' anxiety over such a declaration, this challenged the work of pioneer of eugenics, Francis Galton.

As well as overcoming her contemporaries' apprehension, Lee faced the challenge of getting her work into print. In this paper I focus on the ways Lee negotiated the androcentric editorial process of the Royal Society. Lee's paper in the Philosophical Transactions in 1901 was one of several published here in collaboration with her male colleagues. It provides a record of the influence mathematician and eugenicist Karl Pearson had on her work. For example, was it Lee's association with Pearson that meant her referees, George H. Darwin and Alexander Macalister, felt free to report positively on her paper's findings? Rather than interpreting Lee's collaborative experience as inevitable acquiescence to male dominance, in this paper I consider how Lee utilized her male colleague's credibility and prestige to open the way for her own work.

16.15-17.45: Session 3B: Panel: Standing on the Shoulders of Giants: 100 years of women in the Biochemical Society LIBRARY EVENTS ROOM

Benjamin Palmer; Ruth Itzhaki, University of Manchester; Susan Manley, University Hospital, Birmingham; Gillian Murphy, University of Cambridge; Belinda Bullard, University of York and Janet Oliver, University of New Mexico

Women in science are a hot-button topic in current policy work. From government mandates to charities and symposiums; great efforts are being made to improve recruitment and retention of women in scientific research. Sometimes, however, in order to move forward, we need to look back. As part of Celebrating Women in Biochemistry 2013, the Society commissioned research of the lives and experiences of women in biochemistry from 1945-1975. The project has highlighted women who made leaps and bounds in a field where men dominated, their opportunities were limited and sexism was rife.

Trends from this research have identified several common threads amongst the inspiring women who worked in the field during this time. These trends include a strong, informal peer support network, inspiration from an early age and access to educational opportunity. Most of all, they had passion, integrity and perseverance.

In this dynamic panel discussion, several women who were conducting research in biochemistry during this time period come together to discuss their experiences – both triumph and tribulations. We will examine what made biochemistry so appealing to women during this time, what hurdles they faced in their careers and what inspired them to pursue a career in research. Special attention will be paid to how we can learn from their experiences; using history as a magnifying glass to highlight hurdles to equality in the field.

DAY 2: Friday 23 May 2014

09.30-11.00: Session 4A: Women's experiences in science: LIBRARY EVENTS ROOM

White coats and no trousers: Narrating the experiences of women laboratory technicians

Dr Julie Hartley and Professor Tilli Tansey, Queen Mary, University of London

Laboratory technicians are a vital part of any working lab. Not only is their knowledge and expertise important for the success of research, but they carry on the lab's intellectual and social life. Despite the importance of their work, they are rarely acknowledged in publications, and leave only a few traces within the historical record - the voices of women laboratory technicians are even harder to uncover.

This paper will attempt to correct this imbalance by present the narratives of twenty women who worked as laboratory technicians for over forty years at places such as the National Institute for Medical Research (NIMR), the Wellcome Research Laboratories, and established hospital labs in Cambridge, Oxford and London. The data has been collected through narrative interviews and archival sources.

Specifically, the paper will look at the roles of these women within the lab, their experiences of the social and gender dynamics of the lab, and the development of expertise in regard to the work they carried out. Finally, the paper highlights the fact that some of these women were very reticent and reluctant to speak about their experiences and posits some reasons for why this might be.

Women who worked with Marie Curie, 1906-1934

Dr Natalie Pigeard-Micault

In France, few women scientists who lived in early 20th century are known today. Thus the life of Marie Curie appears such as an exception. Marie Curie directed a research laboratory for 28 years. Between 1906 and 1934, 45 women worked under her guidance. Some were and are well-known in their country as first woman full professor such as Ellen Gleditsch or Margaret von Wrangel. But among Marie Curie's 45 female co-workers, nothing was written for 28 of them. These forgotten women were often French. Sometimes their archives do not exist in French institution.

Genealogical researches, and thus new sources, allow us now to highlight the women who spent time at the Curie laboratory. Analyzing the female population, my aim is to show how biographical research on these women can shed light on several questions: where did these women come from, what were their social and geographic origins, and what future did they have after the laboratory? Were they, like their director, able to reconcile research career and family life? Through their lives, we will question the existence, or not, of a one profile of the female researcher in scientific areas in France.

Ingenious Women

Deborah Jaffé, Independent Scholar

In 1637, within eighty years of the granting of the first English patent, Amye Everard Ball became the first woman to apply for one. Since then hundreds of women have applied for and been granted patents for their ingenious ideas and innovations, but few have received recognition and their patents have rarely been cited. This paper will concentrate on these forgotten and overlooked women patent holders. It will look at how women navigated ways, through legislation and social assumption, to ensure their ideas were protected and patents registered as their own. These women, referring to themselves as housewives, widows, inventors, scientists, nurses and engineers, were granted a wide range of patents. Yet, for centuries, the important part women have played in scientific and technological development and innovation, as well as in running companies or fighting in the courts for ownership of their intellectual property, has been overlooked. Inevitably, some of the patents have been surpassed by further improvements and developments, but they still illustrate great ingenuity and thought. This paper takes a number of key characters and their patents, to reveal women's close involvement in and contribution to the fields of science, engineering and technology.

09.30-11.00: Session 4B: Panel: Doing Women's History in a Digital Age: KOHN CENTRE

Doing Women's History in a Digital Age

Convenors: Alexandra Rutherford, Elissa Rodkey and Jacy L. Young, York University, Canada, Victoria Herridge and Brenna Hassett, Natural History Museum, Rebecca Wragg Sykes, Université Bordeaux and Suzanne Pilaar Birch, Brown University

This panel brings together representatives from recent digital initiatives that seek to document, disseminate, and analyze the experiences of women in science. From oral history interviews and the construction of digital archives, to social media outreach and popular writing, these initiatives highlight the historical roots of contemporary issues facing women in science. Using these initiatives as case studies, we will showcase a wide diversity of projects and approaches, and discuss the challenges and opportunities they present for public conversations about, research on, and our understanding of, women and gender in science - both past and present.

Digital resources and their related social media provide historians and scientists with unprecedented opportunities to shape conversations about gender and science, and to bring new perspectives and ideas to the contemporary practice of science. This panel will highlight these opportunities, create engagement with these and other resources, and hopefully inspire others to undertake similar initiatives.

Psychology's Feminist Voices

Elissa N. Rodkey [Panel Chair] and Jacy L. Young, York University, Canada

Psychology's Feminist Voices (<http://www.feministvoices.com/>) is a multimedia digital archive that was launched in 2010. It documents and highlights women in the history of psychology and explores the contemporary relationships between feminism and psychology through oral histories with self-identified feminist psychologists.

TrowelBlazers

Victoria Herridge or Brenna Hassett, Natural History Museum, London

TrowelBlazers (<http://trowelblazers.tumblr.com/>) launched in May 2013 as a grassroots, crowdsourced online initiative which celebrate women's contributions to archaeology, palaeontology, and geology. It is run by four post-doctoral scientists in their 'spare' time, and the majority of blog contributions are also by research scientists.

Oral History of British Science

Sally Horrocks, University of Leicester, Senior Academic Advisor to Oral History of British Science (in partnership with the British Library)

Since 2009 the Oral History of British Science, a National Life Stories project with the British Library, has collected over 100 life story interviews with scientists, both male and female. From the outset it included a commitment to include 'lesser heard' voices from within the scientific community, including women and technicians, as well as leading scientists. Many of the interviews are available in full via the BL Sounds website, <http://sounds.bl.uk/> and curated extracts from interviews are available on the new Voices of Science website, www.bl.uk/voicesof-science.

H-Word blog at The Guardian

Rebekah Higgitt, University of Kent

As well as working on how science has been communicated to the public in the past, Dr Higgitt has focused on communicating the history of science through museum exhibitions, media and public talks. She has been blogging for the Guardian since 2012, and has written about the risk of overplaying the contribution of women in science in popular narratives.

Darwin and Gender

Charissa Varma.

The Darwin and Gender project (<http://www.darwinproject.ac.uk/>) began in 2010, with the aim of exploring what Darwin's letters can tell us about the origins of modern understandings of masculinity and femininity and how they operate in science. As well as blogging and using social media, the project has a dedicated education and outreach programme. Dr. Varma has helped develop teaching resources and is currently transcribing the family letters.

13.30-15.15: Session 5A: Gender identities and science: LIBRARY EVENTS ROOM

Not ordinary but not outstanding: the life stories of female Earth scientists

Dr Paul Merchant, British Library

This paper draws on extended life story interviews recorded recently for the British Library's An Oral History of British Science, to consider forms of self-understanding among women who worked in the Earth sciences in Britain in the second half of the twentieth century. Extracts from interviews are used to explore ways in which female geologists, geophysicists, physicists and oceanographers understood themselves in relation to others, especially other women and other (mostly male) scientists. In particular, the paper argues that these women tend to represent themselves as having been not ordinary, but not outstanding. This particular mix of standing-out and fitting-in cuts across divisions between work and home, life and career, adulthood and childhood, and is therefore captured uniquely by life story oral history.

'Physical Geography': Sources for the Study of Early Science Teaching at The Cheltenham Ladies' College

Rachel Roberts, The Cheltenham Ladies' College

This paper will explore the evidence for early science teaching at The Cheltenham Ladies' College and the efforts of the then Principal, Miss Dorothea Beale, to ensure that it became an established part of the core curriculum in the second half of the nineteenth century. By using illustrations from the College archive, all branches of science teaching at the College will be considered, including the

development of specialist physical provision in terms of laboratory space and a working observatory. As a result, many former pupils became pioneers in their chosen field of scientific research and the strength of the curriculum also ensured that girls were equipped with the necessary analytical skills to pursue a medical career. In addition, through the establishment of an in-house teacher training programme in 1876, this paper will also chart the pivotal role that the College played in championing the expansion of science teaching in girls' schools across the United Kingdom and overseas as graduates of the programme secured posts elsewhere.

Gendered Engineering: Eugenics, Interwar Science and American Women's Education **Simone Diender, Brandeis University**

This paper discusses diverging ideas about American women's roles in 1920s' social science research. Archival research at Smith College, one of the oldest women's colleges in the United States, reveals that conflicting social trends affected the positions of women in scholarly communities; particularly, the trends of the New Woman and feminism on the one hand, and eugenics on the other, pulled young women into different directions.

The doctrine of eugenics, popular among sociologists until well into the 1930s, made a case for improving the quality of the population by encouraging the procreation of the healthy and prohibiting the breeding of "unhealthy" or "unfit" citizens. Professor Frank Hankins, who taught sociology at Smith College from 1922 to 1946, promoted eugenics in his lectures and research projects. However, the doctrine confronted him with a dilemma. On the one hand, his young and highly educated students were excellent field researchers in studies of 'degenerate' rural populations because of their "typically feminine" empathy during door-to-door surveys. On the other hand, Hankins felt it was best for society if women like the Smith alumnae married healthy men and bred a healthier new generation.

The dilemma of progressive eugenicists in the 1920s shows how women could both partake in, and be subject to, projects of social engineering. At times the outcomes of scientific progress, such as eugenics in the early twentieth century, would thus interfere with the progress of women's rights and gender equality.

Disarming Women: At the Interface between Science and Politics **Henrietta Wilson, Independent Scholar**

Women have been iconic in shaping global attitudes to nuclear weapons and disarmament, epitomised by the Greenham Common Women's Peace Camp in the 1980s. At least as important, though far less visible, are women engaged in research-led non-governmental organisations seeking to inform and influence disarmament policies. The UK has a rich tradition of women active in this area.

Their work has involved challenging male-dominated social and political systems, and male-dominated narratives of defence and security. Such women rely on in-depth scientific understanding of the weapons systems they contest and the relevant politics. How have they achieved this? And what impact does gender have within their work?

This paper focusses on the work in the 1980s-90s of two significant women. Patricia Lewis gained a PhD in nuclear physics, and has since held a series of prestigious research-based positions in the UK and abroad including within UNIDIR and Chatham House. Di MacDonald is a prominent activist having contributed to Greenham Common Women's Peace Camp, Cruisewatch and Nukewatch, and she also founded the research-based Nuclear Information Service.

Their experiences suggest that a subtle combination of gender and expertise can serve as a 'Trojan horse', opening up effective dialogue in unexpected and fruitful contexts.

13.30-15.15: Session 5B: Scientific networks: KOHN CENTRE

Women in Physics in the Palestinian Territories

Dr Kate Shaw, The Abdus Salam International Centre for Theoretical Physics (ICTP), Italy and Jack Owen, Documentary Photographer

In recent years female students have come to dominate the physics degree programs in the Palestinian Territories. However, women faculty members are a tiny minority. The demands of societal norms, of gender bias across the international scientific community, in addition to the challenges of pursuing science in the developing world and under occupation, render a career in physics a major challenge for these women. However despite these obstacles social norms are beginning to change and an increasing number of women are embarking on careers in physics.

Through exploring and documenting the lives of the female physicists at Birzeit University and the aspiring Masters students, this analysis will highlight the challenges inherent in the pursuit of scientific research for women in the Palestinian Territories, and discuss the aspirations, both personal and in research, of women in Physics at Birzeit. Using participative social documentary photography and led by Dr Kate Shaw, post-doctoral fellow at ICTP and visiting lecturer at Birzeit University, this mixed media piece will provide critical insight into the complexity of gender, science and development in the Palestinian Territories.

Fraud or science? Women chemists in communist Romania

Dr Luciana-Marioara Jinga, Institute for the Investigation of Communist Crimes and the Memory of Romanian Exile, Bucharest

During my research in the field of Romanian communism in the second half of the XXth century, I've noticed the great deal of interest historians give to the figure of Elena Ceausescu and in the same time the lack of any research on the feminine scientific contribution during the Romanian communist regime, even if the two subjects are closely linked. Despite the fact that she obtained a PhD in chemistry, signed important scientific studies and was awarded several distinctions from prestigious scientific institutions, in Romania, the public opinion always considered her scientific career a total fraud. By extrapolation, all the measures taken by the communist state in order to increase the feminine presence in fields that required strong scientific skills, were considered forced, with no real representation in the economic and academic Romanian reality. This rather superficial treatment made me look forward, in search of reliable about the feminine real presence and activity in male dominated scientific fields and I chose as case study the chemistry.

What I want to show, having as support an extent research in the communist archives, the press and autobiographies, and oral interviews, is the much complex picture of feminine presence in the Romanian scientific production during the communist regime: were scientific contribution and / or women professional abilities less impressive than those of men? What was the real number of women involved in the Romanian science during Nicolae Ceausescu's regime and what was the real impact of this presence.

Many strings to her bow: the career of Elizabeth Lindsay, civil engineer.

Beryl Nicholson, Independent Scholar

The nineteenth century professionalisation of engineering notwithstanding, unlike elsewhere in Europe, in Britain employers remained sceptical of a university education as too theoretical compared with the practical route of apprenticeship. In the first decade of the 20th century still relatively few men with engineering degrees were employed in industry, many went abroad to work. Not until 1916 did the first woman obtain an engineering degree in the British Isles (Iris Cummins at University College Cork), three decades after the first in the US and two after the first in Europe. In making their careers, she and the trickle of women engineering graduates that followed faced not only prejudice against women, but also a lingering anti-intellectualism in engineering itself. This paper explores the career of the first British graduate in civil engineering, Elizabeth Lindsay. After a

two-year contract on a waterworks extension, she worked in Albania as a malaria engineer, first for a private philanthropist, then employed variously by the Albanian authorities and the Rockefeller Foundation. When the Italian invasion of Albania in 1939 ended this work, she returned to Britain, having added Albanian to her existing language competence, and made a second career as a translator in the Air Ministry.

15.45-17.15: Session 6A: Gendered roles in science: LIBRARY EVENTS ROOM

Women Peers in the Scientific Realm: Sarah Bowdich (Lee)'s Expert Collaborations with Cuvier, 1825-1833

Professor Mary Orr, University of Southampton

Because scientific education and exploration were closed to women in the first half of the nineteenth century, historians of science (geography and geology) assert that women can only be translators, illustrators or popularisers of science authored by eminent husbands, brothers or fathers (Abir-Am & Outram, 1989; Pycior, Slack & Abir-Am, 1996, Burek and Higgs, 2007). The counter-example, Sarah Bowdich (Lee) 1791-1856, is the subject of this paper. An important scientific explorer and writer publishing in English and French, she also played key roles as Georges Cuvier's cross-channel scientific collaborator. The first part of this paper outlines her achievements, and how, more importantly, she came (i) to be trained in science, and (ii) apply it expertly. With answers in place, the remainder of the paper can then examine how other women 'exceptions' in science of this period can be uncovered. However I argue not for what is 'remarkable', 'exceptional' or 'singular' about such women, but reveal how their many strategies for doing and writing science were indistinguishable from male experts. Multi-lingual and generic dexterity has a much larger place in science than historians have acknowledged. It is precisely the space in which women in science excelled.

"On the wings of imagination": Agnes Giberne and women as the storytellers of astronomy

Dr Gillian Daw, University of Sussex

This paper examines Agnes Giberne's nineteenth-century astronomy books for children and beginners. During her life-time Giberne penned over 100 books for children and young adults but became most famous for her scientific books on geology, meteorology, oceanography and in particular astronomy. Predominantly a male science, astronomy was nevertheless a popular accomplishment for women in the period and they often acted as "invisible technicians" to male astronomers. However, educational astronomical writing operated as chiefly a male genre. Yet, Giberne carved out a place as one of the most popular writers on astronomy in the late nineteenth century, her works appealing across generational, gender and class lines. Largely overlooked, Giberne's contribution to nineteenth-century scientific education deserves interrogation. This paper reveals Giberne as a "pioneer" of easy to understand astronomy books. It then considers how Giberne's astronomical writing was shaped by contemporary critical responses to women's place in astronomical science and the genres acceptable for female authorship. Giberne, I argue, saw a particular role for the conversational narrative form and the trope of the cosmic journey as acceptable feminine vehicles for transmitting the facts of astronomical science.

Women, science, and the practices of field and museum: the case of Kate Marion Hall and the Whitechapel Museum, 1893-1909

Dr Kate Hill, University of Lincoln

One of the main issues shaping women's involvement in science around the turn of the century was that of science spaces. Sally Gregory Kohlstedt and Leslie Madsen-Brooks suggest that as the most prestigious space of science was increasingly construed as the laboratory, men lost interest in museum science or field science as places to forge careers. This left an opportunity for women to occupy museum roles and orient museums towards particular issues, particularly the popular communication of science. In the USA, as they show, this led to important developments such as the creation of children's museums. This paper will examine the rather different experiences of British

women, using the case study of Kate Marion Hall, who worked as curator of the Whitechapel Museum between 1893 and 1909. She was the first female curator in sole charge of a publicly funded museum in Britain, and her highly innovative practices there were based around museum and field. Moreover she wrote in the *Museums Journal* advocating these practices. However, such innovations were much less influential in Britain than the USA, and there was a clear sense that the different expertise of scientific women and men was differently valued, with women's approach being appropriate only for the working class and for children. The paper will explore the implications of the differing experiences of scientific women in British and American museums.

Creative Forces in Nature: British Women and the Internationalisation of Romantic Science

Dr. Alison E. Martin, MLU Halle-Wittenberg/University of Reading

In 1852, the English translation of the Danish physicist Hans Christian Ørsted's *Soul in Nature* was published in Henry Bohn's 'Scientific Library' in London. A series of papers which included sections on 'The Comprehension of Nature by Thought and Imagination' and 'The Spiritual in the Material', Ørsted's work made a key contribution to Romantic notions of science. The translation itself was the work of the Horner sisters, Leonora and Joanna, who belonged among the most respected female translators of non-fiction working at mid-century. Given their limited knowledge of the original Danish, the Horner sisters drew selectively on the two German translations which had recently appeared in Leipzig and Stuttgart. In this paper I consider the role played by British women translators in the international circulation and transmission of scientific knowledge. I also consider how the Horner sisters used translation as a mode of scientific consumption and production, as much as a creative process, enabling them to contribute productively to the shaping of the scientific imagination in the Victorian period.

15.45-17.15: Session 6B: Networks: KOHN CENTRE

The Coordinamento Nazionale "Donne di Scienza", 1986-1998. An Italian Hi-story about Women, Gender, Feminism and Science

Dr Alessandra Allegrini, Women and Science Association, Italy

This paper aims at presenting some of the main outcomes of a large-scale research project I initiated in the year 2007. The research, promoted by the Women and Science Association, and partially financed by Giacomo Brodolini Foundation, concerns the historical-theoretical reconstruction of the Italian feminist events and elaborations about gender, science and technology from the late 1970s to the early 2000s. Between the 1986 and the 1998 a large part of these elaborations flowed into the Coordinamento Nazionale "Donne di Scienza" (National Coordination of Women of Science) that for almost ten years has been the most influential Italian feminist network of women in science. More than a hundred of women living and working in many different Italian cities participated to this network, both as single activists and as members of local women and science groups, some of which engaged with the Italian feminist movement since the end of the 1970s. The network included practising scientists together with several theoreticians of science: women who were doing and thinking science. Actually, the systematic comparison and debate between scientists – biologists, physicists, engineers, doctors etc. - and philosophers, historians, psychologists of science was among the most distinguishing factors of this network: the political practice it adopted was indeed called "practice of difference" and it was at the base of a plurality of goals concerning women, gender, feminism and science.

L'Association Française des Femmes Médecins. A female association in scientific and social networks. 1924-1940

Dr Carole Carribon, University of Bordeaux

French women were authorized to study medicine from the end of the 1860s onwards; in 1875, Madeleine Brès, the first French woman to graduate and practice as a doctor, opened the way to

following generations, but as a minority during several decades, which place could female doctors find in scientific and social networks?

The AFFM (Association Française des Femmes Médecins/French Women Doctors Association) was founded in 1924. Thanks to its quarterly report and some archives, preserved in the Marguerite Durand's Library, it is possible to study how those women took part in scientific and social networks. Indeed, this association was linked with both national and international societies (Conseil National des Femmes Françaises, Comité d'éducation féminin, Medical Women's International Association, societies connected with the League of Nations...). Its concerns were at the same time scientific (obstretical techniques, infantile diseases), professional (the defense of female doctors) and social (mothers' rights, working women's status, prostitution). The AFFM oscillated between a feminine, sometimes even a feminist point of view, and the perpetuation of gendered roles in medical science and, more widely, in the French society of the interwar period.

Women fellowships of the Caisse nationale des sciences (National Foundation for Sciences) in 1930's France: Towards a new type of scientific worker?

Dr Martine Sonnet, Institut d'Histoire Moderne et Contemporaine, CNRS-Ecole Normale Supérieure

Grants distributed by the Caisse nationale des sciences, since 1930 until the birth of the French National Center for Scientific Research in 1939, produce a new type of scientific worker, relieved of teaching. Among 808 fellowships identified for the exact sciences by analysis of Caisse's archives, 131 are women (16.2%). The beneficiaries are scholars not at all, not yet or not totally integrated in academic careers.

Joining statistical and qualitative informations, I propose a portrait of this generation of women devoting their lives to scientific research in hard material conditions impacting their private lives. This group is too easily hidden by a few great figures as Marie Curie or her daughter Irène.

The collective portrait is based upon all available individual informations: social and geographic origins, academic cursus, working lives, family lives, networks and name recognition. My point of view emphasizes socio-historical and gender historical approaches of scientific work and careers.

The feminization rank of grants is remarkable reported to the small number of women graduated in this period, and because all scientific domains are concerned: mathematical, physical, chemical, biological and natural sciences.

In front of their effective, early and multidisciplinary presence, women have to fight against still well-known traps. They easily receive grants because the fellowship's condition is unwealthy, so not durably coveted by men. Moreover, almost all women remain at the lower echelon of the grants system and can't escape towards academic chairs like men do as soon as possible.