

# Sex and Science: A Cambridge Perspective

Ania & Madzia Kowalski

Over the last 100 years, female scientists have become an integral part of the vibrant hub of scientific achievement in the University. Here, we celebrate the achievements of several inspirational individuals.

The physicist Hertha Ayrton studied the Mathematics tripos at Girton college, Cambridge. She passed in 1880 [1] but had to pass a further examination a year later for a BSc degree from the University of London [2]. Her work on the electric arc led to improvements in searchlight technology that were used to detect aircraft in both world wars [3]. She was the first woman to present her own work (on the formation of sand ripples on the seashore) to the Royal Society, and the first woman to be nominated a Fellow in 1902, though she was refused Fellowship because she was married [5]. In 1925, two years after her death, the Hertha Ayrton Research Fellowship at Girton College was founded in her honour, ensuring that Ayrton remains a part of Cambridge to this day [4].

Female students such as Ayrton were first admitted to Cambridge in 1870, when they lived in Cambridge homes. They were not equal ‘members of the University’ but from 1881 were permitted to take Tripos examinations and received a certificate if they passed [5]. A quota of 500 ensured that women would not exceed 10% of the male student population. Women were only entitled to the BA Cantab. degree from 1948 [6]. Even women in high positions were not treated in the same manner as men: the mistress of

famous female scientist at Cambridge: Rosalind Franklin. A little-known side to her career is her work on coal, in which she published extensively and was a world authority. Rosalind Franklin began the Natural Sciences tripos at Newnham college, Cambridge in 1938, after coming first in the chemistry entrance exam. She took chemistry,

“ **These successful women flourished in their work at Cambridge despite many hardships** ”

mineralogy, physics and maths and later came top in her physical chemistry examinations in her final year. Franklin, who started her PhD during World War II, examined the thermal expansion of coal and continued this work in Paris. Despite being one of few women in a male-dominated field, she had the confidence to speak forcefully in public about her work—presenting a paper at the Royal Institution aged 26, and at the same meeting confidently pointing out the errors in a male scientist’s work. Franklin became an expert in X-ray diffraction, with which she looked at the structure of charcoal, publishing in *Nature*. When she moved to King’s College, London, she found that women were not allowed in the senior common room; this was commonplace in other universities. Franklin defied the hardships she faced due to her sex and excelled as a woman in science [8].

Currently, 36% of full-time graduates at the schools of physics, biology and technology are female [9]. These women can find inspiration in present-day eminent female scientists. Dame Jocelyn Bell Burnell, President of the Institute of Physics [10], completed her PhD at New Hall, Cambridge. As a postgraduate she constructed a radio telescope to study quasars [3]. In 1967, she noticed a signal which pulsed at regular intervals, leading to the discovery of a rotating neutron star called a pulsar [11]. Controversially, although Bell Burnell’s name was second on the paper that was subsequently published, it was her

supervisor Hewish who received the Nobel Prize [12] (only 3% of Nobel prize winners in science have been female). In her distinguished astrophysics career, Bell Burnell has been a keen promoter of women in science [13].

As biochemistry students will know, Professor Dame Jean Thomas is another highly successful female scientist. She has

Girton College led the way in higher education for women



©Suryani Lukman

Girton and principal of Newnham could not participate in university ceremonies but sat segregated with the wives [7]. Teaching was also a male-dominated affair: it was not until 1939 that the first female professor, the archaeologist Dorothy Garrod, was appointed [8].

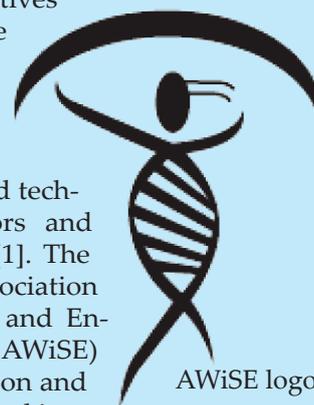
This appointment occurred during the time of another

# Helping Women in Science Today

Ania & Madzia Kowalski

The female scientists of Cambridge's past have achieved great success whilst in the minority.

To ensure this continues into the future, various Cambridge initiatives are working to tackle the attrition of women in academia, from undergraduate onwards; culminating in 11% of science, engineering and technology (SET) professors and readers being women [1]. The local branch of the Association for Women in Science and Engineering (Cambridge AWiSE) offers women information and inspiration, through networking and speaker events [2]. The Cambridge University Initiative for Women in SET (WiSETI) has developed strategies for increasing female representation [3]. The director of WiSETI, Professor Athene Donald from the Department of Physics has received the 2009 L'Oréal UNESCO Women in Science Award. These prestigious awards are the first to internationally celebrate the achievements of female scientists [4]. The result of the efforts of AWiSE and WiSETI led to the Athena SWAN charter awarding the University of Cambridge a Bronze Award in 2006, but the University lags behind others such as York's Chemistry Department which tops the list with Gold [5]. AWiSE and WiSETI are also running events in Cambridge's 800th year to celebrate women's role in science at the University [2]. These initiatives suggest that there is a bright future ahead for women in SET at Cambridge, building on the strong foundations established by women in the past and ensuring that women continue to be an integral part of scientific achievement. ■



©AWiSE

carried out extensive work on chromatin. Professor Thomas is the first female Master of St Catharine's College, as well as being a Fellow of the Royal Society, until recently a Governor of the Wellcome Trust, and a member of the European Molecular Biology Organisation (EMBO) [14].



Courtesy of Professor Dame Jean Thomas

Professor Dame Jean Thomas

These successful women flourished in their work at Cambridge despite many hardships. They have been inspirational and in many cases have actively promoted women's contribution to science. Even in the 19th century, Hertha Ayrton said "Personally I do not agree with sex being

brought into science. The idea of 'women and science' is entirely irrelevant. Either a woman is a good scientist, or she is not; in any case she should be given opportunities, and her work should be studied from the scientific, not the sex, point of view" [15]. In Cambridge's past, women have been given such opportunities. It is up to the female students of today to ensure that this is enhanced in the future.

With thanks to Dr Patricia Fara, lecturer in HPS, for ideas, and to Esther Haines of WiSETI for help with statistics. ■

*Ania Kowalski is a second year studying Biological Natural Sciences at Queens' College. Madzia Kowalski is a second year studying Biological Natural Sciences at Clare College.*

## References:

- [1] Hertha Marks Ayrton, in Contributions of Women to Physics. UCLA [document on the Internet]. Available from: [www.physics.ucla.edu/~cwp/articles/ayrton/ayrtonbio.html](http://www.physics.ucla.edu/~cwp/articles/ayrton/ayrtonbio.html)
- [2] Hertha Marks Ayrton, in Biographies of Women Mathematicians. Agnes Scott College [document on the Internet]. Available from: [www.physics.ucla.edu/~cwp/articles/ayrton/ayrtonbio.html](http://www.physics.ucla.edu/~cwp/articles/ayrton/ayrtonbio.html)
- [3] Professor Jocelyn Bell Burnell FRS. Royal Society [document on the Internet]. Available from: [royalsociety.org/page.asp?tip=1&id=1481](http://royalsociety.org/page.asp?tip=1&id=1481)
- [4] Research Fellows. Girton College, Cambridge [document on the Internet]. Available from: [www.girton.cam.ac.uk/fellows-and-staff/research-fellows/](http://www.girton.cam.ac.uk/fellows-and-staff/research-fellows/)
- [5] Equality & Diversity – The story so far. University of Cambridge Human Resources Division [document on the Internet]. Available from: [www.admin.cam.ac.uk/offices/hr/equality/archive.html](http://www.admin.cam.ac.uk/offices/hr/equality/archive.html)
- [6] Report on the Numbers and Status of Academic Women in the University of Cambridge. Cambridge University Women's Action Group [document on the Internet] 1988 Sep. Available from: [www.admin.cam.ac.uk/offices/hr/equality/fortyyears.pdf](http://www.admin.cam.ac.uk/offices/hr/equality/fortyyears.pdf)
- [7] Maddox B. Rosalind Franklin: The Dark Lady of DNA. HarperCollins; 2003.
- [8] Smith PJ. Dorothy Garrod, first woman Professor at Cambridge. *Antiquity* 2000 Mar; 74(283):131–6.
- [9] Cambridge University Reporter. 2008 Oct 9; Vol 139, Special No 4.
- [10] Queen's Birthday Honours 2007. University of Oxford News [document on the Internet] 2007 Jun 18. Available from: [www.admin.ox.ac.uk/po/news/2006-07/jun/18a.shtml](http://www.admin.ox.ac.uk/po/news/2006-07/jun/18a.shtml)
- [11] Jocelyn Bell Burnell, in Contributions of Women to Physics. UCLA [document on the Internet]. Available from: [cwp.library.ucla.edu/Phase2/Burnell,\\_Jocelyn\\_Bell@841234567.html](http://cwp.library.ucla.edu/Phase2/Burnell,_Jocelyn_Bell@841234567.html)
- [12] Jocelyn Bell Burnell. L'Oréal Women in Science [document on the Internet]. Available from: [www.womeninscience.co.uk/bios.html](http://www.womeninscience.co.uk/bios.html)
- [13] Jocelyn Bell Burnell retires as Dean. University of Bath Public Relations Office [document on the Internet] 2004 Aug. Available from: [www.bath.ac.uk/internal/news/bell\\_burnell.htm](http://www.bath.ac.uk/internal/news/bell_burnell.htm)
- [14] St Catharine's College, Cambridge elects new Master. University of Cambridge News Service [document on the Internet] 2006 Mar 23. Available from: [www.admin.cam.ac.uk/news/press/dpp/2006032301](http://www.admin.cam.ac.uk/news/press/dpp/2006032301)
- [15] Hertha Ayrton, 1854–1923. IEEE [document on the Internet]. Available from: [www.ieee.org/web/aboutus/history\\_center/biography/ayrton.html](http://www.ieee.org/web/aboutus/history_center/biography/ayrton.html)

*Ania Kowalski is a second year studying Biological Natural Sciences at Queens' College. Madzia Kowalski is a second year studying Biological Natural Sciences at Clare College.*

## References:

- [1] Academic Staff Figures 1998–2007. University of Cambridge. Provided via email correspondence with Esther Haines, WiSETI Project Officer.
- [2] Cambridge Association for Women in Science and Engineering [homepage on the Internet] [www.camawise.org.uk/](http://www.camawise.org.uk/)
- [3] Women in Science, Engineering and Technology. University of Cambridge Human Resources Division [document on the Internet]. Available from: [www.admin.cam.ac.uk/offices/hr/equality/wiseti/](http://www.admin.cam.ac.uk/offices/hr/equality/wiseti/)
- [4] Cambridge Physicist wins Top Award. University of Cambridge News Service [document on the Internet] 2008 Nov 17. Available from: [www.admin.cam.ac.uk/news/dp/2008111705](http://www.admin.cam.ac.uk/news/dp/2008111705)
- [5] Current Award Holders. UKRC Athena SWAN charter [document on the Internet]. Available from: [www.athenaswan.org.uk/html/athena-swan/awards/current-award-holders/](http://www.athenaswan.org.uk/html/athena-swan/awards/current-award-holders/)