

Women in Astronomy: An Introductory Resource Guide

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This guide to non-technical English-language materials is not meant to be a comprehensive or scholarly introduction to the complex topic of the role of women in astronomy. It is simply a resource for educators and students who wish to begin exploring the challenges and triumphs of women of the past and present. It's also an opportunity to get to know the lives and work of some of the key women who have overcome prejudice and exclusion to make significant contributions to our field. We only include a *representative* selection of living women astronomers *about whom non-technical material at the level of beginning astronomy students is easily available*. Lack of inclusion in this introductory list is not meant to suggest any less importance. We also don't include Wikipedia articles, although those are sometimes a good place for students to begin. Suggestions for additional non-technical listings are most welcome.



Vera Rubin Annie Cannon & Henrietta Leavitt Claudia Alexander Cecilia Payne

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Women of the Past Covered in this Guide:

Claudia Alexander
Margaret Burbidge
Annie Cannon
Agnes Clerke

Williamina Fleming
Caroline Herschel
Dorrit Hoffleit
Helen Sawyer Hogg

Margaret Huggins
Henrietta Leavitt
Antonia Maury
Maria Mitchell

Cecilia Payne-Gaposchkin
Dorothea Klumpke Roberts
Nancy Roman

Vera Rubin
Carolyn Shoemaker
Mary Somerville

Beatrice Tinsley

Women of Today Covered in this Guide:

Natalie Batalha
Jocelyn Bell Burnell
Laura Danly
Sandra Faber
Debra Fischer
Wendy Freedman
Margaret Geller

Andrea Ghez
Heidi Hammel
Rosaly Lopes
Jane Luu
Claire Max
Dara Norman
Carolyn Porco

Anneila Sargent
Sara Seager
Aomawa Shields
Ellen Stofan
Jill Tarter
Virginia Trimble
Sidney Wolff

Plus section 5 has material on a number of other women of today.

1. Resources on the History of Women in Astronomy

Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. Covers the lives & careers of 21 women astronomers, past and present; written for teenagers and up.

Bernardi, G. "Who Was the First Professional Woman Astronomer? Christine Kirch" in *Sky & Telescope*, Jan. 2019, p. 68.

Bell Burnell, Jocelyn: "A Celebration of Women in Astronomy" (a talk in 2012 in Edinburgh; we only hear audio, but it's a fascinating public talk with profiles of specific women, including Herschel and Rubin, and trends): <https://www.youtube.com/watch?v=50PyimUE5s>

Bovill, Mia: A 2017 talk on "The Harvard Computers and the Classification of the Stars": <https://www.youtube.com/watch?v=dhF2bOrKWks> (talk starts 16 min 30 sec into the video)

Dvorak, John "The Women Who Created Modern Astronomy" in *Sky & Telescope*, Aug. 2013, p. 28. Focuses on the work of Annie Cannon, Antonia Maury, and Wilhelmina Fleming in classifying and understanding stars.

Freitag, Ruth "Bibliography on Women in Astronomy":

<http://www.loc.gov/rr/scitech/womenastro/womenastro-intro.html> A far more comprehensive and scholarly bibliography, organized by last name, of written articles on women in astronomy. Freitag's work was the early inspiration for the resource guide you are reading.

Ghez, Andrea & Cohen, Judith *You Can Be a Woman Astronomer*. 2006, Cascade Press. A picture book for children from grades 3 - 5.

James, C. "Edward and Mina" in *Astronomy*, July 2002, p. 46. Despite the title, this treats several women who worked at the Harvard Observatory.

Lankford, J. & Slavings, R. "Gender and Science: Women in American Astronomy 1859-1940" in *Physics Today*, Mar. 1990, vol. 43, p. 58.

Mack, P. "Straying from Their Orbits: Women in Astronomy in America" in G. Kass-Simon & P. Farnes, eds. *Women of Science*. 1990, Indiana U. Press.

Rice, Emily: a talk on contributions of women to astronomy (with many historical and contemporary examples and an analysis of modern trends):

<https://www.youtube.com/watch?v=5vMR7su4fi8>

Rubin, Vera "Women's Work: Women in Modern Astronomy" in *Science* 86, Jul/Aug. 1986, p. 58.

Smith, Beverly: A presentation on the history of women in astronomy and current statistics about their participation: <https://www.youtube.com/watch?v=yAa-gCSUwEE>

Sobel, Dava *The Glass Universe*. 2016, Viking. Rich, deeply researched book on the women who worked at Harvard at the start of the 20th century and changed the way we understood the stars.

Spradley, J. "Women and the Stars" in *The Physics Teacher*, Sep. 1990, p. 372.

Warner, Deborah "Women Astronomers" in *Natural History*, May 1979, p. 12.

4000 Years of Women in Science: <http://4kyws.ua.edu/> Maintained by two women astronomers, this site includes brief information on women from many fields of science, not just astronomy. For 20th century women scientists, see: <http://4kyws.ua.edu/20th.century/20th.shtml>

The Woman Astronomer: <http://www.womanastronomer.com/> Debra Davis, a Colorado amateur astronomer, keeps this site and newsletter devoted to both amateurs and professionals.

Women at NASA: <http://women.nasa.gov/> Profiles of women who work for the Space Agency, including astronomers & astrobiologists. The personal statements that can be quite inspiring.

2. Resources on Issues Women Face

Bell Burnell, Jocelyn "So Few Pulsars, So Few Females" in *Science*, 23 April 2004, vol. 304, no. 5670, p. 489.

Bell Burnell, Jocelyn, TED talk on "Reflections on Women in Science: Diversity and Discomfort" (a 15-minute talk with some of her personal history and statistics about women in astronomy): <http://www.youtube.com/watch?v=jp7amRdr30Y>

Bell Burnell, Jocelyn: Oct. 2021 Talk on Women in Astronomy Today (through ESA): https://www.youtube.com/watch?v=KDVVhYtr_dg

Davenport, J., et al. "Studying Gender in [AAS] Conference Talks": <https://arxiv.org/abs/1403.3091>

Finkbeiner, Ann "Good Morning, Gentlemen and Meg: Astronomy, A Woman's Choice" (an article compiling personal history and suggestions from interviews of 15 noted women astronomers): <https://cswa.aas.org/status/2001/JANUARY2001/Finkbeiner.html>

Geller, Margaret "The Black Ribbon" in *Science*, 28 August 1998, vol. 281 no. 5381 p. 1278.
On-line at: <https://science.sciencemag.org/content/281/5381/1278.full>

Kinney, Anne, et al, eds. *Meeting the Challenges of an Increasingly Diverse Workforce: Women in Astronomy and Space Science*. 2009, NASA. The entire book is available free on the web as a PDF file: <https://cswa.aas.org/MEETING/WomeninAstroProceedings.pdf>

Seager, Sara "So Many Exoplanets, So Few Women Scientists," a blog post at: https://www.huffpost.com/entry/women-in-science_b_2471980

Urry, C. Megan, et al, eds. *Women in Astronomy: Proceedings of a 1992 Workshop*. 1993, Space Telescope Science Institute. (On web at: <http://www.stsci.edu/institute/conference/wia/>)

Urry, Meg: colloquium on "Women in Science: Why So Few?" (an hour-long, illustrated talk on statistics and issues, not just about astronomy, but with many eye-opening ideas): <http://vimeo.com/35730552>

American Astronomical Society Committee on the Status of Women: <https://cswa.aas.org/>
A rich site with back issues of the valuable "Status" newsletter, a database of living women astronomers, legal resources, conference proceedings, and discussion of issues related to the role of professional women in the field. For good resources from other fields they recommend, see: <https://cswa.aas.org/resources.html>

STATUS is the magazine of the Committee on the Status of Women of the American Astronomical Society (it is a treasure trove of materials, issues, personal stories):

<https://cswa.aas.org/STATUS.html>

10 Tips for Undergraduate Women Science Students (from Astronomer Sara Seager):

<http://www.usnews.com/education/blogs/professors-guide/2010/08/11/10-tips-for-women-students-in-science-fields>

The Baltimore Charter (spelling out what can be done to help improve the status and working conditions of women in astronomy): <https://cswa.aas.org/bc.html>

Why So Few? Women in Science, Technology, Engineering, and Mathematics (2010 research report from the Assoc. of University Women discusses key research findings on factors that block women's participation and progress in science): <http://www.aauw.org/resource/why-so-few-women-in-science-technology-engineering-and-mathematics/>

Women at Work: A Meeting on the Status of Women in Astronomy:

<http://www.stsci.edu/institute/conference/wia/>

Proceedings of a pioneering 1992 meeting with useful local and national perspectives.

Women in Planetary Science: <http://womeninplanetaryscience.wordpress.com/profiles/> (Profiles of more than 50 women active in studying the solar system, and the issues they face)

Women in Astronomy Blog (from the American Astronomical Society):

<http://womeninastronomy.blogspot.com/>

Women in Astronomy 2009 (a 3-min. video, from the 2009 meeting about women in astronomy.

Concise framing of issues through interviews with leaders such as Vera Rubin, Meg Urry, and Dara Norman): <http://www.youtube.com/watch?v=1QyMB0qagZs>

3. Material on Some Women Astronomers of the Past

Alexander, Claudia (1959 - 2015)

Interview on the Women in Planetary Science web site:

<http://womeninplanetaryscience.wordpress.com/2011/02/03/claudia-alexander-be-prepared-to-be-flexible-in-your-career/>

JPL video where she explains some of her work (3 min):

<https://www.jpl.nasa.gov/video/details.php?id=184>

Memorials and Brief Interview at NASA Solar System Exploration:

<https://solarsystem.nasa.gov/people/1140/claudia-alexander-1959-2015/>

Obituary in the *NY Times*: <https://www.nytimes.com/2015/07/20/us/claudia-alexander-nasa-manager-who-led-jupiter-mission-dies-at-56.html>

Memorial at the American Geophysical Union EOS Site: <https://eos.org/articles/claudia-joan-alexander-1959-2015>

Alexander, Claudia: *Windows to Adventure: Which Mountain is Greatest of All?* (a 2-part children's book series on mountains on Earth and other worlds; 2015, Red Phoenix Books)

Burbidge, Margaret (1919 - 2020)

Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. This book for teens has a chapter on Burbidge.

Bartusiak, Marcia "Margaret Burbidge" in *Smithsonian*, Nov. 2005, p. 34 (brief biography, on the web at: <http://www.marciabartusiak.com/uploads/8/5/8/9/8589314/burbidge.pdf>

Burbidge, Margaret "Watcher of the Skies" (an autobiographical article from *Annual Reviews* 1994; 37-page PDF):
<http://www.annualreviews.org/doi/pdf/10.1146/annurev.aa.32.090194.000245>

Byers, Nina & Williams, Gary, eds. *Out of the Shadows: Contributions of 20th Century Women to Physics*. 2006, Cambridge U. Press. Includes chapter on Burbidge.

Croswell, Ken *The Alchemy of the Heavens: Searching for Meaning in the Milky Way*. 1995, Doubleday. See Chapter 9.

Reed, J. "A Great Woman Astronomer Leaves England Again" in *Smithsonian*, Jan. 1974, p. 34.

Rubin, Vera "Margaret Burbidge: AAAS President-Elect" in *Science*, vol. 211, p. 915 (Feb. 27, 1981). On the web at: <http://science.sciencemag.org/content/211/4485/915> (but you will need privileges from your library to access the piece beyond page 1.)

Skuse, B. "Happy [100th] Birthday, Margaret Burbidge" in *Sky & Telescope*, July 2019, p. 60.

"The Stargazer" in *Time* magazine, Mar. 20, 1972, p. 38.

Bruce Medal Profile: <http://www.phys-astro.sonoma.edu/BruceMedalists/BurbidgeM/>

Interview with David DeVorkin at the Center for the History of Physics from 1978:
<https://www.aip.org/history-programs/niels-bohr-library/oral-histories/25487>

Her 2001 Hitchcock Lecture on "Modern Alchemy: Stars, Chemistry, and Cosmology":
<http://podcast.uctv.tv/vod/23342.mp4>

Happy 100th Birthday Video Card from colleagues at the U. of California, San Diego; reminiscences and the story of her career: <https://www.youtube.com/watch?v=afie3P5hwNg>

Brief Obituary in *Nature* by Virginia Trimble: <https://www.nature.com/articles/d41586-020-01224-9>

Her memorial celebration through the AAS (July 2020) with a 2-hour video remembering her life and work: <https://baas.aas.org/pub/2020i0205/release/1>

Cannon, Annie (1863-1941)

Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. This book for teens has a chapter on Cannon.

Bok, Priscilla "Annie Jump Cannon 1863-1941" in *Publications of the Astronomical Society of the Pacific*, June 1941, vol. 53, p. 168. (Available on the Web at:
<http://adsabs.harvard.edu/abs/1941PASP...53..168B>)

Greenstein, George "The Ladies of Observatory Hill" in *American Scholar*, Feb. 1993, p. 437. (Reprinted in his book *Portraits of Discovery*, 1998, John Wiley.)

Hearnshaw, John *The Analysis of Starlight*. 1986, Cambridge U. Press. See Chapter 5.

Kidwell, P. "Three Women of American Astronomy" in *American Scientist*, May/June 1990, p. 244.

Merrill, P. "Annie Jump Cannon" in *Monthly Notices of the Royal Astronomical Society*, vol. 102, no. 2, p. 74 (1942).

Sobel, Dava *The Glass Universe*. 2016, Viking. Includes a considerable amount of material on Cannon and her mentoring of other women.

Annie Cannon pages at Wellesley College: <http://academics.wellesley.edu/Astronomy/Annie/>
Part of a student project, but with good local historical information.

Article on MacTutor: <http://www-history.mcs.st-andrews.ac.uk/Biographies/Cannon.html>

Aceves, Ana: Annie Jump Cannon, Star Classifier (short post on *Sky & Telescope* website, 2016:
<http://www.skyandtelescope.com/astronomy-resources/annie-jump-cannon-star-classifier/>

Project Continua Page: <http://www.projectcontinua.org/annie-jump-cannon/>

Obituary by H. A. Bruck in *The Observatory*, Vol. 64, p. 113-115 (1941):
<http://adsabs.harvard.edu/abs/1941Obs....64..113B> (click on "full printable article PDF")
Information on video about Cannon's life and work: <http://cfa-www.harvard.edu/~alexg/ajc.html>

Clerke, Agnes (1842-1907)

Bruck, Mary "Agnes Mary Clerke: Chronicler of Astronomy" in *Quarterly Journal of the Royal Astronomical Society*, Mar. 1994, p. 59. Lengthy profile, on the web at:
<http://adsabs.harvard.edu/full/1994QJRAS..35...59B>

Bruck, Mary *Agnes Mary Clerke & the Rise of Astrophysics*. 2002, Cambridge U. Press.

Bruck, Mary "Agnes Mary Clerke: Ever Popular Historian of Astronomy" in *Antiquarian Astronomer*, 2004, iss. #1, p. 3. On the web at: <http://adsabs.harvard.edu/full/2004AntAs...1....3B>

Cliver, Edward "Agnes Mary Clerke: Real Time Historian of Astronomy" in *Astronomy & Geophysics (Royal Astronomical Society)*, June 2007, vol. 48, p. 3.25. (On the web at:
<https://academic.oup.com/astrogeo/article/48/3/3.25/200790/Agnes-Mary-Clerke-Real-time-historian-of-astronomy>)

Debakcsy, Dale: Agnes Mary Clerke: At the Nerve Center of 19th Century Astrophysics" at:
<http://womenshouldknow.net/agnes-mary-clerke-nerve-center-19th-century-astrophysics/>

Russell, Sarah "Agnes Mary Clerke: Stars, Systems, Problems" in *Astronomy & Geophysics*, 1 June 2016, Vol. 57, Issue 3, Pages 3.16ff. On the web at:
<https://academic.oup.com/astrogeo/article/57/3/3.16/1741860>

See, T.J.J. "Some Recollections of Agnes Mary Clerke" in *Popular Astronomy*, 1907, Vol. 15, No. 6, p. 323.

Weitzenhoffer, Kenneth "The Prolific Pen of Agnes Clerke" in *Sky & Telescope*, Sep. 1985, p. 211. Biography at the History of Mathematics website: <http://www-history.mcs.st-andrews.ac.uk/Biographies/Clerke.html>

1907 Obituary from the *Astrophysical Journal* by Margaret Huggins:
<http://adsabs.harvard.edu/abs/1907ApJ....25..226H> (click on full article)

Brief 1907 obituary in the *Times* of London:
http://en.wikisource.org/wiki/The_Times/1907/Obituary/Agnes_Mary_Clerke

Fleming, Williamina (1857-1911)

Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. This book for teens has a chapter on Fleming.

Hirshfeld, Alan "Williamina Fleming: The Brief Life of a Spectrographic Pioneer" in *Harvard Magazine*, Jan/Feb. 2017. At: <https://harvardmagazine.com/2017/01/williamina-fleming>

Nelson, Sue "From Scotch Maid to Innovative Astronomer" in *Astronomy & Geophysics*, 1 June 2016, vol. 57, issue 3, p. 3.12. On-line at:
<https://academic.oup.com/astrogeo/article/57/3/3.12/1741845>

Sobel, Dava *The Glass Universe*. 2016, Viking. Includes a considerable amount of material on Fleming's life and work.

Spradley, J. "The Industrious Mrs. Fleming" in *Astronomy*, July 1990, p. 48.

Spradley, J. "Two Centennials of Star Catalogs Compiled by Women" in *Astronomy Quarterly*, vol. 7, no. 3, p. 177 (1990).

Brief biography at Woman Astronomer site: <http://www.womanastronomer.com/wfleming.htm>

Short article at New England Historical Society:

<http://www.newenglandhistoricalsociety.com/williamina-fleming-boston-maid-discovered-stars/>

Fleming, Wilhelmina: Obituary (1911) by Annie Cannon from *Astrophysical Journal*:

<http://adsabs.harvard.edu/abs/1911ApJ....34..314C> (click PDF box end to see the article)

Her page at Project Continua: <http://www.projectcontinua.org/williamina-paton-fleming/>

Herschel, Caroline (1750-1848)

Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. This book for teens has a chapter on Herschel.

Belkora, Leila *Minding the Heavens: The Story of Our Discovery of the Milky Way*. 2003, IOP Publishing. Chapter 4 is about the Herschels.

Brock, Claire *The Comet Sweeper: Caroline Herschel's Astronomical Ambition*. 2008, Totem Books. A popular-level biography. A radio program interviewing the author can be found at:

http://www.bbc.co.uk/radio4/womanshour/03/2007_11_thu.shtml

Gould, Paula "Two Good Women, or Too Good to Be True?" (2002 essay considering how Caroline Herschel and Mary Somerville are treated by history, in contrast with men of their time): <https://science.sciencemag.org/content/296/5574/1805.full>

Higgins, F. *Sweeper of the Skies: Caroline Herschel*. 1967, Follett. For young people.

Hoskin, Michael "Caroline Herschel's Life of Mortification and Disappointments, in *Journal for the History of Astronomy*, Nov. 2014, Vol. 45, No. 4, p.442-466.

Hoskin, Michael "In Caroline Herschel's Footsteps" in *Sky & Telescope*, Aug. 2007, p. 59.

Hoskin, Michael "Astronomy's Matriarch" in *Sky & Telescope*, May 2005, p. 42-46.

Hoskin, Michael *The Herschel Partnership, as Viewed by Caroline*. 2003, Science History Publications. By a noted historian of astronomy.

Hughes, D. "Caroline Herschel: Comet Huntress" in *Journal of the British Astronomical Association*, Apr. 1999, vol. 109, p. 78. On the web at:

<http://adsabs.harvard.edu/full/1999JBAA..109...78H>

Lemonick, Michael *The Georgian Star: How William and Caroline Herschel Revolutionized Our Understanding of the Cosmos*. 2008, Norton. Popular-level history of their partnership.

Lubbock, C. *The Herschel Chronicle*. 1933, Cambridge U. Press. Family chronicle of William and Caroline, by his grand-daughter: <https://books.google.com/books?id=Hcc5AAAAIAAJ>

McCully, Emily *Caroline's Comet*. 2017, Holiday House. Illustrated children's book.

Ogilvie, Marilyn: *Searching the Stars: The Story of Carolyn Herschel*. 2011, History Press. On the web at: <https://books.google.com/books?id=2LgTDQAAQBAJ>

Winterburn, Emily *The Quiet Revolution of Caroline Herschel: The Lost Heroine in Astronomy*. 2018, History Press.

Biography at MacTutor Site:

http://www-groups.dcs.st-and.ac.uk/~history/Biographies/Herschel_Caroline.html

The full text of the 1879 edition of the *Memoirs and Correspondence of Caroline Herschel* has been digitized; freely from Google Books at: <http://books.google.com/books?id=9kIBAAAAQAAJ>

Nicholas, Siobhán: *Stella* (a play about Caroline Herschel):

<http://www.guardian.co.uk/science/blog/2012/may/14/play-astronomer-caroline-herschel>

Obituary in *Monthly Notices of the RAS*:

<http://adsbit.harvard.edu/full/seri/MNRAS/0008//0000066.000.html>

Huggins, Margaret (1848-1916)

- Becker, Barbara "Dispelling the Myth of the Able Assistant: Margaret and William Huggins at Work in the Tulse Hill Observatory" in Helena Pycior, et al. eds., *Creative Couples in the Sciences*. 1996, Rutgers University Press. (On the web at: <http://faculty.humanities.uci.edu/bjbecker/ExploringtheCosmos/week7b.html>; this is also part of a whole book on the Huggins' at: <http://faculty.humanities.uci.edu/bjbecker/huggins/>)
- Becker, Barbara "Margaret Huggins and Tulse Hill Observatory" in *Astronomy & Geophysics*, Vol. 57, Issue 2, 1 Apr. 2016, p. 2.13. On-line at: <https://academic.oup.com/astrogeo/article/57/2/2.13/2468644>
- Belkora, Leila *Minding the Heavens: The Story of Our Discovery of the Milky Way*. 2003, IOP Publishing. Chapter 6 is about the Hugginses.
- Bruck, Mary *Agnes Mary Clerke & the Rise of Astrophysics*. 2002, Cambridge U. Press. See Chapter 5 and other sections about Margaret Huggins' work and relationship with Clerke.
- Bruck, M. T. "Companions in Astronomy: Margaret Huggins and Agnes Clerke" in *Irish Astronomical Journal*, Sep 1991, vol. 20(2), p. 70. On-line at: <http://cdsads.u-strasbg.fr/pdf/1991IrAJ...20...70B>
- McKenna-Lawlor, Susan *Whatever Shines Should be Observed*. 2003, Springer. The story of five 19th century women who made contributions to astronomy and science, including Huggins. Joe Tenn's article on the Hugginses from the Griffith Observer: <http://www.phys-astro.sonoma.edu/BruceMedalists/Huggins/HugginsesDrapers.pdf>
- Dale Debakcsi's 2018 article "The Secrets Stars Keep: Lady Margaret Huggins Pioneer of Spectral Photography" is at: <https://womenshouldknow.net/margaret-huggins-spectral-photography/>
- Obituary in the Monthly Notices of the Royal Astronomical Society: <http://articles.adsabs.harvard.edu/full/1916MNRAS..76R.278./0000278.000.html>
- Obituary by Sarah Whiting in the *Astrophysical Journal*, 1915: <http://adsabs.harvard.edu/abs/1915ApJ....42....1W>
- Barbara Becker's 2015 public lecture on the history of 19th century spectroscopy has information on M. Huggins' role (about 50 min into the video): <https://www.youtube.com/watch?v=fzw-hRzCfAs>
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Leavitt, Henrietta (1868-1921)

- Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. This book for teens has a chapter on Leavitt.
- Burleigh, Robert *Look Up!: Henrietta Leavitt, Pioneering Woman Astronomer*. 2013, Simon & Schuster. A book for children ages 4 – 8.
- Ferguson, Kitty *Measuring the Universe*. 1999, Walker. Chronicle of how distances were found in the universe, with good discussions of contributions by individual astronomers.
- Johnson, George *Miss Leavitt's Stars: The Untold Story of the Woman Who Discovered How to Measure the Universe*. 2005, Atlas/Norton.
- Margolis, E & Thompson, S. "Remembering Astronomer Henrietta Leavitt" (2021): <https://airandspace.si.edu/stories/editorial/remembering-astronomer-henrietta-swan-leavitt>

Mitchell, H. "Henrietta Leavitt and the Cepheid Variables" in *The Physics Teacher*, Mar. 1976, vol. 14, p. 162.

Moore, Patrick *Astronomers' Stars*. 1987, Norton. Chapter 10 concerns Leavitt's work on Cepheids.

Singh, Simon *Big Bang*. 2004, Harper. Chapter 3 has a nice section on her life and work.

Sobel, Dava Remembering Henrietta Leavitt, *Sky & Telescope*, Dec. 2021, p. 12. On her life and astronomical work.

Sobel, Dava *The Glass Universe*. 2016, Viking. Includes a considerable amount of material on Leavitt's life and work.

Brief Biography at Woman Astronomer Site: <http://www.womanastronomer.com/hleavitt.htm>

Biography on the Famous Scientists Website: <https://www.famousScientists.org/henrietta-swan-leavitt/>

Haynes, Corey "Meet Henrietta Leavitt" post: <http://www.astronomy.com/news/2019/02/meet-henrietta-leavitt-the-woman-who-gave-us-a-universal-ruler>

Gunderson, Lauren: *Silent Sky* (a play about Leavitt):
<https://sites.google.com/site/henriettasrhapsody/> and <http://silentskyplay.tumblr.com/> For more about the dramatist: <http://laurengunderson.com/>

Video of talk by George Johnson on his "Search for Miss Leavitt":
<http://perimeterinstitute.ca/videos/search-miss-leavitt>

Film (17-min) by Pangratios Panacosta on Leavitt:
<https://www.youtube.com/watch?v=70cFwfNW7gQ>

Maury, Antonia (1866-1952)

Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. This book for teens has a chapter on Maury.

Hearnshaw, John *The Analysis of Starlight*. 1986, Cambridge U. Press. See Chapter 5.

Hoffleit, Dorrit "Antonia Maury" in *Sky & Telescope*, Mar. 1952, p. 106.

Sobel, Dava *The Glass Universe*. 2016, Viking. Includes some material on Maury's life and work.

Vassar Encyclopedia Entry: <http://vcencyclopedia.vassar.edu/alumni/antonia-maury.html>

Short biography on the Woman Astronomer site: <http://www.womanastronomer.com/amaury.htm>

Short biography at Project Continua: <http://www.projectcontinua.org/antonia-maury/>

Short biography at Time magazine site: <http://time.com/4262838/antonia-maury-astronomer/>

Mitchell, Maria (1818-1889)

Anderson, Dale *Maria Mitchell: Astronomer*. 2003, Chelsea House. For young adults.

Armstrong, Mabel *Women Astronomers: Reaching for the Stars*. 2008, Stone Pine Press. This book for teens has a chapter on Mitchell.

Belserene, Emelia "Maria Mitchell: 19th Century Astronomer" in *Astronomy Quarterly*, vol. 5, no. 19, p. 133 (1986).

Berglund, Renee *Maria Mitchell and the Sexing of Science*. 2008, Beacon Press. Story of her life and of the importance of her work and fame for women's issues.

Booker, Margaret *Among the Stars: The Life of Maria Mitchell*. 2007, Mill Hill Press. A long biography for adult readers.

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<http://www.noao.edu/outreach/press/pr06/pr0605.html>

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<https://aas.org/archives/BAAS/v32n2/wolff.pdf>

Oral History Interview at the American Institute of Physics: <https://www.aip.org/history-programs/niels-bohr-library/oral-histories/23363-1>

Announcement of a vista point at the Cerro Tololo Interamerican Observatory being named for her: <https://www.noao.edu/news/2010/pr1001.php>

Her 2013 talk at York High School, where she was once a student:
<https://www.youtube.com/watch?v=QftuoG4x4qY>

5. A Sampling of Material about Other Women Astronomers

NOTE: This section is organized by the last name of the astronomers being described, not by author.

A special issue of the magazine *Sky's Up* in Jan. 2018 was devoted to women in astronomy:
<https://view.joomag.com/skys-up-january-february-2018/0999470001513909897>

Bagenal, Fran: Interview: <https://solarsystem.nasa.gov/people/1480/fran-bagenal/> Plus see: Women in Planetary Science: <https://womeninplanetaryscience.wordpress.com/2010/07/16/women-in-planetary-science-meet-fran-bagenal/>

Baliunas, Sallie: see Flamsteed, Sam "Star Spots: The Work of Sallie Baliunas" in *Discover*, Dec. 1991, p. 29.

Brown, Beth: Profile: <https://www.youtube.com/watch?v=KfJMVDjf6dk>

Bunce, Emma: Her page at the U. of Leicester: <https://www2.le.ac.uk/departments/physics/people/emmabunce> (and a BBC Interview: <https://www.bbc.co.uk/sounds/play/m000jvxq>)

Conklin, Nan Dieter: *Two Paths to Heaven's Gate*. 2006, NRAO Archives, 520 Edgemont Rd., Charlottesville, VA 22903. A memoir by a pioneering radio astronomer. See related web pages at: <https://www.nrao.edu/archives/static/Conklin/conklin.shtml> and DeVorkin, David "Interview with Nan Dieter-Conklin" 1977, for the Center for the History of Physics: <http://www.aip.org/history/ohilist/4573.html>

Cordova, France: My Hero Project: (includes biographical information and an interview): http://www.myhero.com/go/hero.asp?hero=dr_france_cordova

Donahue, Megan "Clusters of Galaxies and the Fate of the Universe (or How to be a Cosmologist without Really Trying" in Stern, S. Alan, ed. *Our Universe: The Thrill of Extragalactic Exploration as Told by Leading Experts*. 2001, Cambridge U. Press; pp. 107-126. Combines a discussion of her work and her development as a scientist.

Edwards, Louise: Interview on "Astronomy in Color": <http://astronomyincolor.blogspot.com/2016/04/faculty-highlight-dr-louise-edwards.html> Plus see: "Everybody Has a Story": <https://www.youtube.com/watch?v=CGxRr-lkVis>

Elmegreen, Deborah (interviewed by M. El Yazidi for the IAU Women and Girls in Astronomy Website): <https://www.youtube.com/watch?v=Sdzq5X4jq3M>

Guhathakurta, Madhulika: Her autobiographical page at NASA: <https://women.nasa.gov/madhulika-guhathakurta/> (plus a NASA interview: <https://www.nasa.gov/ames/nisv-podcast-Lika-Guhathakurta>)

Holbrook, Jarita: Sasso, Anne "Jarita Holbrook, Guiding Star" at the *Science* magazine website: <https://www.sciencemag.org/careers/2007/06/jarita-holbrook-guiding-star> +TED talk on cultural astronomy: <https://www.youtube.com/watch?v=tWESrbzV6wI>

Hu, Esther "Looking Back in Time: Searching for the Most Distant Galaxies" in Stern, S. Alan, ed. *Our Universe: The Thrill of Extragalactic Exploration as Told by Leading Experts*. 2001, Cambridge U. Press; pp. 23-36. Discussion of her work and her development as a scientist.

Isler, Jedidah: 2016 Interview: <https://bglh-marketplace.com/2015/09/meet-dr-jedidah-isler-the-first-black-woman-to-graduate-from-yale-with-a-phd-in-astrophysics/> plus TED talk: https://www.ted.com/talks/jedidah_isler_the_untapped_genius_that_could_change_science_for_the_better

Johnson, Kelsey: TED Talk: https://www.ted.com/speakers/kelsey_johnson and "Grounded in the Stars" (an article about her in Virginia magazine): https://uvamagazine.org/articles/grounded_in_the_stars

Kaspi, Victoria: Short profile and interview in the McGill Reporter, 2001: <http://www.mcgill.ca/reporter/33/09/additions/kaspi/> Plus an Article in the Canadian Encyclopedia: <https://www.thecanadianencyclopedia.ca/en/article/victoria-kaspi>

Kinney, Anne: see Schomaker, W. "NASA's Visionary" in *Astronomy*, Jan. 2005, p. 48. Interview and profile.

Levesque, Emily: *The Last Stargazer*. 2020, Sourcebooks. Part autobiography, part a set of stories about the joys and challenges of using telescopes today.

Ma, Chung-Pei: talk on her work on monster black holes in the Silicon Valley Astronomy Lectures: <https://www.youtube.com/watch?v=LN9oYjNKBm8&t=2s> and her *Introductions Necessary* profile: <https://introductionsnecessary.com/2016/08/24/chung-pei-ma/>

Mainzer, Amy: her work with PBS to get young girls into science: <https://www.fastcompany.com/3056446/how-pbs-and-nasas-amy-mainzer-are-getting-more-girls-into-science>

McFadden, Lucy: My Hero Project (short discussion of her work and how she got into astronomy): http://www.myhero.com/go/hero.asp?hero=Lucy_Mcfadden_06

Meadows, Victoria: Wolchover, Natalie "Victoria Meadows' Earthly Vision for Alien Life" in Quanta Magazine: <https://www.quantamagazine.org/victoria-meadows-earthly-visions-of-alien-life-20180605/> and announcement of Drake Award from the SETI Institute: <https://www.geekwire.com/2018/seti-institutes-drake-award-goes-univ-washington-astrobiologist-victoria-meadows/>

Meech, Karen: TED Talk on the interstellar object called Oumuamua: https://www.ted.com/talks/karen_j_meech_the_story_of_oumuamua_the_first_visitor_from_another_star_system

Richards, Mercedes: Eshleman, Adams "Mercedes Richards: Stellar Detective" (Penn State 2009): <http://news.psu.edu/story/141653/2009/08/05/research/stellar-detective-profile-professor-mercedes-richards>

Speck, Angela: "You Can't Take the Sky Away from Me" (profile article): <https://unearthedmag.wordpress.com/2017/05/01/you-cant-take-the-sky-away-from-me-mu-astronomy-professor-angela-speck-says/>

Urry, Meg: Essay at CNN site on her career and how bias holds women back: <https://www.cnn.com/2012/10/01/opinion/urry-women-science/index.html>

Walker, Ashley: Profile and Interview at *Scientific American*: <https://www.scientificamerican.com/article/black-astronomers-highlight-achievements-and-obstacles/> and her project to highlight black astronomers: <http://astronomyincolor.blogspot.com/2019/03/how-ashley-walker-shined-necessary.html>

Weaver, Kimberly: Alumni Spotlight: https://web.archive.org/web/20070430214148/http://alumni.wvu.edu/spotlight/view/kim_weaver/



Debra Fisher



Jocelyn Bell Burnell



Jane Luu



Jill Tarter