Unheard Voices, Part 2: Women in Astronomy

A Resource Guide by Andrew Fraknoi [Aug. 2021]

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There is growing documentation of the challenges women have faced, and are facing, in having an equal role in astronomy. At the same time, women are attaining important positions throughout the astronomical community, including the presidency of the International Astronomical Union and the American Astronomical Society. This means that excellent role models are now available to show girls that they can be an integral part of the human exploration of the universe. Many instructors of astronomy would like to present such role models during their class discussions, but don’t have the material to do so at hand or in their textbooks.

Therefore, the Higher Education Working Group within NASA’s Science Mission Directorate sponsored this guide to English-language materials on women in astronomy. It has now been updated to include more younger women and people of color among the women featured. It is not meant to be a comprehensive introduction to this complex topic, but merely a sampling of useful resource for educators and their students on the history, the biographical information, and the current issues. Suggestions for additional materials that are both accessible to and readable by beginners are most welcome.

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1. Resources on the History of Women in Astronomy


Bell Burnell, Jocelyn: “A Celebration of Women in Astronomy” (a talk in 2012 in Edinburgh; we only hear the audio, there is no video, but it is a fascinating public talk with profiles of specific women, including Caroline Herschel and Vera Rubin, and discussions of trends): [https://www.youtube.com/watch?v=_50PyimUE5s](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](https://www.youtube.com/watch?v=dhF2bOrKWks) (the talk starts at 16 min 30 sec into the video)


Freitag, Ruth “Bibliography on Women in Astronomy”:
[http://www.loc.gov/rr/scitech/womenastro/womenastro-intro.html](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. Ruth Freitag’s work was the early inspiration for the resource guide you are reading.


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


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](https://www.youtube.com/watch?v=5vMR7su4fi8)


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](https://www.youtube.com/watch?v=yAa-gCSUwEE)

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


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](http://www.youtube.com/watch?v=jp7amRdr30Y)


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](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](https://science.sciencemag.org/content/281/5381/1278.full)


Seager, Sara “So Many Exoplanets, So Few Women Scientists,” a blog post at: [https://www.huffpost.com/entry/women-in-science_b_2471980](https://www.huffpost.com/entry/women-in-science_b_2471980)


American Astronomical Society Committee on the Status of Women: [https://cswa.aas.org/](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


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


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

(Profiles of more than 50 women active in studying the solar system, and a discussion of issues they face)


Women in Astronomy 2009 (a 3-minute video, made in conjunction with 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

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3. Material on Some Women Astronomers of the Past

Alexander, Claudia (1959 - 2015)


JPL video where she explains some of her work (3 min): https://www.jpl.nasa.gov/video/details.php?id=184


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)


Bartusiak, Marcia "Margaret Burbidge" in *Smithsonian*, Nov. 2005, p. 34 (brief biography, on the web at:  
Burbidge, Margaret "Watcher of the Skies" (an autobiographical article from *Annual Reviews* 1994; 37-page PDF):  


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.


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  

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Cannon, Annie (1863-1941)


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


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

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Clerke, Agnes (1842-1907)


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

Debakcsy, Dale: Agnes Mary Clerke: At the Nerve Center of 19th Century Astrophysics” at: 
http://womenyousshouldknow.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

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

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Fleming, Williamina (1857-1911)

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. On the web 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:

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


Spradley, J. "Two Centennials of Star Catalogs Compiled by Women" in Astronomy 

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

Short biographical article at the New England Historical Society: 
http://www.newenglandhistoricalsociety.com/williamina-fleming-boston-maid-
discovered-stars/

Fleming, Wilhelmina: Obituary (1911) by Annie Cannon from the Astrophysical Journal: 
http://adsabs.harvard.edu/abs/1911ApJ....34..314C (click on the PDF box at the 
end to see the article itself)

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

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**Herschel, Caroline** (1750-1848)


Gould, Paula “Two Good Women, or Too Good to Be True?” (a 2002 essay from *Science*, 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](https://science.sciencemag.org/content/296/5574/1805.full)


Biography at MacTutor Site: [http://www-groups.dcs.st-and.ac.uk/~history/Biographies/Herschel_Caroline.html](http://www-groups.dcs.st-and.ac.uk/~history/Biographies/Herschel_Caroline.html)

The full text of the 1879 (2nd) edition of the *Memoirs and Correspondence of Caroline Herschel* has been digitized and is freely available from Google Books at: [http://books.google.com/books?id=9kIBAAAQAAJ](http://books.google.com/books?id=9kIBAAAQAAJ)

Nicholas, Siobhán: *Stella* (a play about Caroline Herschel): [http://www.guardian.co.uk/science/blog/2012/may/14/play-astronomer-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//000066.000.html

**Huggins, Margaret** (1848-1916)


Bruck, Mary *Agnes Mary Clerke & the Rise of Astrophysics*. 2002, Cambridge U. Press. See Chapter 5 and several other sections about Margaret Huggins’ work and relationship with Clerke.


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://womenyoushouldknow.net/margaret-huggins-spectral-photography/


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

**Leavitt, Henrietta** (1868-1921)


Ferguson, Kitty  *Measuring the Universe*. 1999, Walker. Chronicle of how distances were found in the universe, with good discussions of contributions by individual astronomers.


Singh, Simon  *Big Bang*. 2004, Harper. Chapter 3 has a nice section on her 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, Korey “Meet Henrietta Leavitt” post:  

Gunderson, Lauren:  *Silent Sky* (a play about Leavitt):  
https://sites.google.com/site/henrietrasrhapsody/ 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=70cFwuNW7qQ

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**Maury, Antonia** (1866-1952)

This book for teens has a chapter on Maury.


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/
Mitchell, Maria (1818-1889)

This book for teens has a chapter on Mitchell.
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.
https://www.nature.com/articles/d41586-018-05458-6
McGraw, E. “When Girls Studied Planets and the Sky Had No Limits” (from Smithsonian):
Maria Mitchell for Students (at the Maria Mitchell Association website; use the menu at left to find all the pages): https://www.mariamitchell.org/research-and-collections/maria-mitchell/for-students (This is part of a rich website with information, images, archival material: https://www.mariamitchell.org/)
Brief biography at the Maria Mitchell House Preservation Web Site:
http://www.nps.gov/history/nr/travel/pwwmh/ma74.htm
Brief Biography at Unitarian/Universalist pages: http://uudb.org/articles/mariamitchell.html
Her Entry in the Vassar Encyclopedia:
http://vcencyclopedia.vassar.edu/index.php/Maria_Mitchell
An 1881 Address by Mitchell about the Collegiate Education of Women:
https://iiif.lib.harvard.edu/manifests/view/drs:2575143$1
Payne-Gaposchkin, Cecilia (1900-1979)

   This book for teens has a chapter on Payne-Gaposchkin.
Brief Obituary from the Quarterly Journal of the RAS by Owen Gingerich: http://adsabs.harvard.edu/abs/1982QJRAS..23..450G
Two excellent articles about her at the Harvard Square Library: http://www.harvardsquarelibrary.org/biographies/cecilia-payne-gaposchkin-3/
1968 Interview by Owen Gingerich at AIP: [https://www.aip.org/history-programs/niels-bohr-library/oral-histories/4620](https://www.aip.org/history-programs/niels-bohr-library/oral-histories/4620)

Hoffleit, Dorrit "Reminiscences of Cecilia Payne-Gaposchkin": [http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?2001stun.conf...87H&amp](http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?2001stun.conf...87H&amp)


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**Roberts, Dorothea Klumpke** (1861-1942)


Sobel, Dava: Brief Biography: [https://www.lindahall.org/dorothea-klumpke-roberts/](https://www.lindahall.org/dorothea-klumpke-roberts/)

About her Pioneering Balloon Flights: [https://leonid.arc.nasa.gov/Klumpke.html](https://leonid.arc.nasa.gov/Klumpke.html) and [http://www.whiteoaks.com/jane/leonidklumpke/dorothea.txt](http://www.whiteoaks.com/jane/leonidklumpke/dorothea.txt)


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**Roman, Nancy (1925 - 2018)**


Silver, Lily "Dr. Nancy G. Roman, the Astronomer’s Astronomer” in *Profiles in Success: 40 Lives of Achievement.* 1965, Fountainhead Publishers.


Autobiographical Article in *Astronomy Beat*: [https://astrosociety.org/file_download:inline/35b2af80-3d63-4222-886d-b65e42689c49](https://astrosociety.org/file_download:inline/35b2af80-3d63-4222-886d-b65e42689c49)

“Mother of the Hubble Space Telescope” – a 10-min 2008 Interview: [https://www.youtube.com/watch?v=b2movHF4NzA](https://www.youtube.com/watch?v=b2movHF4NzA)
Obituary in the *New York Times*, 2018:
Interview with David DeVorkin at the Center for the History of Physics from 1980:
https://www.aip.org/history-programs/niels-bohr-library/oral-histories/4846
Searcy, Maureen “A Wider Scope” from the U. of Chicago:
https://mag.uchicago.edu/science-medicine/wider-scope
Brief Interview at Women at NASA: https://women.nasa.gov/nancy-grace-roman-2/
5-minute video on her role in the history of the Hubble Space Telescope:
https://www.youtube.com/watch?v=8PwJIeiZ_vI
Biographical article by Dale Debakcsy at *Women You Should Know*:
http://womenyoushouldknow.net/nancy-roman-hubble-space-telescope/

**Rubin, Vera** (1928 - 2016)

Rubin, Vera *Bright Galaxies, Dark Matters*. 1997, American Institute of Physics Press. A collection of her articles, including several personal reminiscences.

**Remembering Vera** website at the Carnegie Institution: [https://dtm.carnegiescience.edu/remembering-vera](https://dtm.carnegiescience.edu/remembering-vera)


Joe Tenn’s Bruce Medalist Profile of her: [http://www.phys-astro.sonoma.edu/BruceMedalists/Rubin/index.html](http://www.phys-astro.sonoma.edu/BruceMedalists/Rubin/index.html)


She receives an honorary degree and addresses the graduates of American University in 2011: [https://vimeo.com/23419815](https://vimeo.com/23419815)

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**Somerville, Mary** (1780-1872)


Biography at Mac Tutor: http://www-history.mcs.st-andrews.ac.uk/Biographies/Somerville.html

From Biographies of Women Mathematicians: http://www.agnesscott.edu/riddle/women/somer.htm

Brief Biography at Burntisland Site: http://www.burntisland.net/mabon.htm

Biography on Women In European History site: http://womenineuropeanhistory.org/index.php?title=Mary_Somerville

BBC Radio Program about her, with Allan Chapman (audio): http://www.bbc.co.uk/radio4/science/thematerialworld_20040826.shtml

Interesting essay by Paula Gould from Science, wondering if her life story (and Caroline Herschel’s) has been whitewashed by history: http://www.sciencemag.org/cgi/content/full/sci;296/5574/1805

Kelly, Erin: “Mary Somerville: The Woman for Whom the Word ‘Scientist’ Was Made”: http://all-that-is-interesting.com/mary-somerville


A book of recollections by her daughter, Personal Recollections, from Early Life to Old Age, of Mary Somerville is available online from Project Gutenberg: http://www.gutenberg.org/ebooks/27747

An annotated version of her 1831 book Mechanism of the Heavens is on line at: http://www.malaspina.com/etext/heavens.htm

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Tinsley, Beatrice (1941-1981)


Biography at New Zealand Edge page: http://www.nzedge.com/legends/beatrice-tinsley/
4. Material on Some Living Astronomers who are Women

Batalha, Natalie (1966 –)

Kaufman, Marc “The Very Influential Natalie Batalha“:

Interview with Susan Niebur on the Women in Planetary Science website:
https://womeninplanetaryscience.wordpress.com/2010/07/06/women-exoplanets-meet-natalie%C2%A0batalha/

2013 Interview on the NPR show “On Being”: transcript at:

2017 News Release on Her Being Named one of the 100 Most Influential People in the World: https://news.ucsc.edu/2017/06/batalha-natalie-time-100.html

Interview on Science Friday, on NPR, May 2016 (13 min):

Her 2012 talk in the Silicon Valley Astronomy Lectures:
https://www.youtube.com/watch?v=ZbijER_AALo&t=8s

Her 2017 talk in the Silicon Valley Astronomy Lectures:
https://www.youtube.com/watch?v=e2Q1iBqEkBu&t=2575s

Bell Burnell, Jocelyn (1943 - )

Levin, Janna *Black Hole Blues and Other Songs from Outer Space*. 2016, Knopf. Has a section of her work on pulsars.
Wade, N. "Discovery of Pulsars: A Graduate Student's Story" in *Science*, Aug. 1, 1975, p. 358. On line at: https://science.sciencemag.org/content/189/4200/358.long (but you will need privileges from your library to read the entire piece.)

Interview on BBC with Jim Al-Khalili (30 min): http://www.bbc.co.uk/programmes/b016812j
Interview at the 2015 Edinburgh Science Festival by Andy Cohen: https://www.youtube.com/watch?v=DCPereT6XxU
Her TED talk, “Reflections on Women in Science”: https://www.youtube.com/watch?v=jp7amRdr30Y&t=33s


BBC collection of video clips featuring her: https://www.bbc.co.uk/programmes/b00ry9jq/clips


1977 After-dinner Speech about her Discovery of Pulsars (text): http://www.bigear.org/vol1no1/burnell.htm
Danly, Laura (1958 - )

Interview for Physics Today (2015):
Videos at Roadtrip Nation: http://roadtripnation.com/leader/laura-danly
Q&A 2012 at the L.A. Observed site:
http://www.laobserved.com/archive/2012/04/qa_with_griffith_observat.php
Her public interest video on soil health:
“To Fathom the Frontier”: Post-eclipse talk (2017) from Jackson Hole: Video at:
https://www.youtube.com/watch?v=kDh81Xt1c04
Interview in the Inspirational Women Talk to Teens Series:
https://www.youtube.com/watch?v=DZH9PQVIJso

Faber, Sandra (1944 - )

Dressler, Alan Voyage to the Great Attractor. 1994, Knopf. Story of how we learned to
explore the large-scale structure of the realm of the galaxies, focusing on the
astronomers who call themselves the “Seven Samurai” (of which Faber is one).
See especially Chapter 6.
Lightman, Alan & Brawer, Roberta "Interview with Sandra Faber" in Origins. 1990,
Harvard U. Press.
Her Web Page at Lick Observatory: http://www.ucolick.org/~faber/
Interview with Alan Lightman for the Center for the History of Physics 1988:
https://www.aip.org/history-programs/niels-bohr-library/oral-histories/33932
Her page at the “Bruce Medalists” site: http://www.phys-astro.sonoma.edu/BruceMedalists/Faber/index.html
News Release on her Gruber Cosmology Prize:
https://aas.org/posts/news/2017/05/sandra-faber-receives-500000-gruber-cosmology-prize
Her talk on “How Galaxies Were Cooked from the Primordial Soup” in the Silicon Valley
Astronomy Lectures: https://www.youtube.com/watch?v=wqNNCc7SNyw
2009 Interview at Annual Reviews Audio (transcription):
http://www.annualreviews.org/userimages/ContentEditor/1299600853298/SandraFaberInterviewTranscript.pdf
Interview with Melanie Fine at the Rocket Girls site: http://rocketgirls.com/interview-with-astronomer-sandra-faber/
Short video about her work on the Hubble:
https://www.youtube.com/watch?v=Goe8vRNxiIM
Interview on the Planetary Radio podcast:
https://www.youtube.com/watch?v=4MBsBChHsQY

Fischer, Debra (1953 - )

Debra Fischer’s professional page at Yale:
http://exoplanets.astro.yale.edu/people/dfischer.php
Interview at the Woman Astronomer site (2008):
http://www.womanastronomer.com/dfischer.htm
Her page at the Planetary Society, with link to a radio interview:
2015 Interview with the Editor of Astronomy Magazine:

Freedman, Wendy (1957 - )

Ferguson, Kitty Measuring the Universe. 1999, Walker. Chronicle of how distances were found in the universe, with good discussions of contributions by individual astronomers.
http://articles.adsabs.harvard.edu/full/2004JRASC..98..135M
Sokol, Joshua “A recharged debate over the speed of the expansion of the universe could lead to new physics” on Science magazine’s web pages (Mar. 2017):
Stephens, Sally “Hubble Warrior” in Astronomy, March 2000, p. 52. Profile of her work trying to find the Hubble constant and other cosmological parameters.
Her faculty page at the U. of Chicago: https://astro.uchicago.edu/people/wendy-l-freedman.php#research-person


TED Talks Page: https://www.ted.com/speakers/wendy_freedman

Interview from April 2004, at the National Academy of Sciences (about her life and work): http://www.nasonline.org/news-and-multimedia/podcasts/interviews/wendy-l-freedman.html

Cosmologist Michael Turner interviews her for a TEDX Evening in 2016: https://www.youtube.com/watch?v=LHsL-M6Tz9g

2011 Interview with Michael Shara at the American Museum of Natural History: https://www.youtube.com/watch?v=90IYIU1Stlo

Brief Profile for the 2009 Gruber Prize: http://gruber.yale.edu/cosmology/2009/wendy-l-freedman

Her page and contributions at Huffington Post: https://www.huffpost.com/author/wendy-l-freedman

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Geller, Margaret (1947 - )


Chaikin, Andrew "Surveyor of the Universe” in Air & Space, Aug/Sept. 1991; vol. 6, p. 84.


Geller, Margaret “The Black Ribbon” (essay on science and society) in Science, 28 Aug 1998:


Greenstein, George Portraits of Discovery. 1998, John Wiley. Chapter 8 of this collection of biographical articles is about Margaret Geller and John Huchra.


Her web page at Smithsonian: http://cfa-www.harvard.edu/~mjg/
Her MacArthur Foundation “Genius Award” Page: https://www.macfound.org/fellows/394/
Text of her 1995 Phi Beta Kappa Address at Harvard “Sense of Wonder”: http://gos.sbc.edu/g/geller.html (Listed by NPR as one of the best commencement speeches ever: https://apps.npr.org/commencement/speech/margaret-j-geller-harvard-university-1995/)

Her 2010 Chautauqua Lecture on astronomical photography “Click! The Universe”: https://www.youtube.com/watch?v=kTKGQzWa6yM

2013 interview when she won the APS Lillienfeld Prize (6 min): http://www.youtube.com/watch?v=8c3lM8v68Hw

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Ghez, Andrea (1965 - )


Her web page at UCLA: http://www.astro.ucla.edu/~ghez/
Her Nobel Prize Lecture in 2020: https://www.youtube.com/watch?v=wGw6_CdvGKM

Interview at the U. of Chicago website about her high school days and winning the Nobel Prize: https://news.uchicago.edu/story/astronomer-andrea-ghez-responsibility-comes-nobel-prize

“The Monster Black Hole at the Center of the Milky Way,” her 2017 talk in the Silicon Valley Astronomy Lectures: https://www.youtube.com/watch?v=dv1igzE-aX4&t=359s

2017 UCLA Student Video where she is asked 37 questions in 6 minutes: https://www.youtube.com/watch?v=o-Tnc3CUsEM

Her 2009 Lecture at TED: https://www.youtube.com/watch?v=c8re1U9rCo4 OR http://www.ted.com/talks/andrea_ghez_the_hunt_for_a_supermassive_black_hole.html

Sky & Telescope website pieces about her work: http://www.skyandtelescope.com/astronomy-news/star-zips-around-black-hole/ AND

“Andrea Ghez: Puzzle Solver” at StarDate’s black hole encyclopedia (interview):
http://blackholes.stardate.org/research/ghez-interview.php.html

Her MacArthur Foundation “Genius Prize” page:
https://www.macfound.org/fellows/798/

Interview with her for the PBS TV Show NOVA in 2006:
http://www.pbs.org/wgbh/nova/blackhole/explorer.html

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**Hammel, Heidi** (1960 - )


Brief 2010 interview on the Women in Planetary Science site:


Her Planetary Society page with posts and radio show appearance:
http://www.planetary.org/about/board-of-directors/heidi-hammel.html

Her answers to frequently asked questions at the site for the kids’ book about her:
http://www.fredbortz.com/HammelBio/AstroFAQ.htm

2016 podcast with the editor of *Astronomy* magazine:

An hour interview of Minnesota Public Radio about the successor telescope to the Hubble and her work:
http://minnesota.publicradio.org/display/web/2008/03/05/midmorning2/

Some brief reminiscences by her brother:
http://everything2.com/index.pl?node_id=1373765

Interview in Newsweek, Nov. 26, 2007: http://www.newsweek.com/id/70975

Her page at the James Webb Space Telescope website: https://jwst.nasa.gov/meet-hammel.html

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**Luu, Jane** (1963 - )


Davies, John *Beyond Pluto: Exploring the Outer Limits of the Solar System*. Chapter 4 features Luu’s life and work.

Interview from 2003 (with a lot of biographical information) at Imagiverse Site: http://www.imagiverse.org/interviews/janeluu/jane_luu_21_03_03.htm


Career profile at the Science magazine site: http://www.sciencemag.org/careers/2012/10/no-starry-eyed-astronomer

Transcript of her Kavli Prize talk: http://www.kavliprize.org/sites/default/files/Jane_Luu_manuscript.pdf

Brief 2012 video of her and David Jewitt’s Shaw Prize lecture: https://www.youtube.com/watch?v=ypKWDKWRzyY

2012 Talk to the Rosalind Franklin Society on the Kuiper Belt (with some personal memories): https://www.youtube.com/watch?v=I5pnR002y6k

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Lopes, Rosaly (1957 - )

Her page at JPL Science: https://science.jpl.nasa.gov/people/Lopes/

Biography and interview in Volcano World: http://volcanoworld.wordpress.com/2011/12/19/rosaly-lopes/

Discusses her work on “Through the Eyes of Scientists” (3 min, 2011): http://www.youtube.com/watch?v=ntCPur1SQ4Y

Shalby, Colleen “Rosaly Lopes and the Enigmatic Workings of Volcanoes” at the AAAS website: https://www.aaas.org/rosaly-lopes-and-enigmatic-workings-volcanoes

“To Understand Volcanoes on Other Worlds, Stand on Our Own” in Quanta Magazine: https://www.quantamagazine.org/to-understand-volcanoes-on-other-worlds-stand-on-our-own-20180828/


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Max, Claire (1946 - )

Her page at the University of California Observatories: http://www.ucolick.org/~max/

Article on her receiving the 2004 E.O. Lawrence Award: http://currents.ucsc.edu/04-05/09-27/max_award.asp

3-minute video with Freeman Dyson describing her role in the rise of adaptive optics: https://www.youtube.com/watch?v=4ntfOaqKHFU

2015 News Release on being appointed Director of the U. of California Observatories:
https://news.ucsc.edu/2015/08/uco-director.html

A Basic Tutorial on Adaptive Optics (2012):
https://www.youtube.com/watch?v=4VWFcy6_Ij8

Max, Claire: “A Sharper Image” talk in the Silicon Valley Astronomy Lectures:
https://www.youtube.com/watch?v=stAGLke6XDU&t=84s

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**Norman, Dara** (1970 - )

Her moving talk at the June 2020 American Astronomical Society meeting on “The Inclusion Revolution”: https://www.youtube.com/watch?v=rQDzeDuCLLs

*Mee the Keynote Speaker* feature from Astrobites (related to the above talk):
https://astrobites.org/2020/05/25/meet-the-keynote-speakers-dara-norman/


Norman, Dara “Can Big Data Lead to an Inclusion Revolution” in *Astronomy Beat*, July 2018: https://astrosociety.org/file_download/inline/12faca89-b5f4-4e59-aa62-ce7ad5add47c

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**Porco, Carolyn** (1953 - )

Overbye, Dennis “An Odyssey from the Bronx to Saturn’s Rings” (a Sep. 21, 2009 *New York Times* profile):


Her biography at her website: http://carolynporco.com/about/biography/

Her biography on the *Edge* website: http://www.edge.org/3rd_culture/bios/porco.html

1999 Profile in the *New York Times*:

2005 Profile by Bjorn Carey:

Her talk on Cassini at the Silicon Valley Astronomy Lectures (2015):
https://www.youtube.com/watch?v=Vx135n8VFxY

Her entry at the Encyclopedia of World Biography:
Her talk to the TED Conference (Mar. 2007):  

2014 Appearance on StarTalk with Neil Tyson:  
https://www.startalkradio.net/show/madame-saturn-a-conversation-with-carolyn-porco-part-1/

2017 Article about Her and Space Images at Time.com:  
http://time.com/4894102/voyager-anniversary-photos/

Sargent, Anneila (1942 - )

Gallagher, Paul “Anneila Sargent: The Woman from Fife who Advises the White House” in The Independent, Apr. 13, 2013:  

Goldsmith, Donald The Astronomers. 1991, St. Martin’s Press. See Chapter 12 of this book, which focuses on the work of a few astronomers at the frontiers of science.

Sommerville, Iain “From Burtisland to the Outer Limits: The Journey of Anneila Cassells [Sargent]” (mostly about her early life):  
http://www.burntisland.net/sargent.htm

Her page at Caltech:  
http://www.astro.caltech.edu/people/faculty/Anneila_Sargent.html

Her 2015 talk in Edinburgh on “Make it Happen: Women into Science” (with a bit about her own career):  
https://www.youtube.com/watch?v=TnAL1FVYz8

2017 Profile in the Courier (a UK Newspaper):  

Seager, Sara (1971 - )


Powell, Corey “Sara Seager’s Tenacious Drive to Discover Another Earth” in Smithsonian, May 2014. On the web at:  

Seager, Sara “So Many Exoplanets, So Few Women Astronomers” (an article in the Huffington Post Jan. 2013 about the hardship that constant travel imposes on women scientists with small children):  
http://www.huffingtonpost.com/sara-seager/women-in-science_b_2471980.html

Seager, Sara Is There Life Out There: The Search for Habitable Exoplanets (her 48-page, 2009, self-published popular-level intro, as a free PDF):  

Shoemaker, Carolyn (1929 - )


Biography at USGS Page: https://astrogeology.usgs.gov/people/carolyn-shoemaker

1994 Article from New Scientist, with history and reactions to the discover of Comet Shoemaker-Levy 9: http://www.bibliotecapleyades.net/esp_shoemaker_a.htm

Brief Biography at the Harcourt School Site: http://www.harcourtschool.com/activity/biographies_science/shoemaker/

Her 1998 Essay from Science Magazine on Space Exploration (with some thoughts about her own life and work): http://www.sciencemag.org/cgi/content/full/282/5394/1637

2-min video with advice for young women going into astronomy: https://www.youtube.com/watch?v=_AADENDV2Z8

Page about her and her story about her husband, at Story Corps: https://storycorps.org/stories/carolyn-shoemaker-and-phred-salazar-160708/

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Stofan, Ellen (1961 - )


Her page when she was Chief Scientist at NASA: https://www.nasa.gov/offices/ocs/stofan_bio.html


Her 2013 Interview at SpaceNews: http://spacenews.com/37599profile-ellen-stofan-nasa-chief-scientist/
Her talk on Mars Exploration at the Royal Institution:  
https://www.youtube.com/watch?v=20ufMGrA2e0

Announcement of her becoming Director of the Air and Space Museum, 2018:  

“Lecture on Exploring Titan by Boat” (at the Denver Museum of Natural History 2012, 1 hr, 18 min):  
http://vimeo.com/44046816

JPL Podcast with Slides on YouTube (about lakes on Titan):  
http://www.youtube.com/watch?v=0PP5hSbwHxQ (Transcript at:  

News announcement being named NASA Chief Scientist, July 2013:  
http://www.nasa.gov/press/2013/july/nasa-welcomes-new-chief-scientist/#.UfbSwo3CZ8E

Video where she explains a proposed mission to study the lakes of Titan; a bit technical  
(2011, 9 min):  
http://www.youtube.com/watch?v=xkYIdhvdyWU

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Tarter, Jill (1944 - )

This book for teens has a chapter on Tarter.

Has a number of discussions of Tarter’s life and work, especially in Chapters 7 & 10.


On web at:  

Jackson, Ellen  Looking for Life in the Universe: The Search for Extraterrestrial Intelligence.  

of Tarter and her SETI work.

Scoles, Sarah  Making Contact: Jill Tarter and the Search for Extraterrestrial Intelligence.  

Brief 2004 Profile on CNN Site:  

2017 Interview on the KQED Forum program about her work:  

“Will the 21st Century be the Time we Discover Life Beyond Earth?” Her 2017 talk in the  
Silicon Valley Astronomy Lectures:  
https://www.youtube.com/watch?v=wYcM0BOYHyw
Interview at the U. of Washington in 2015 (37 min):
https://www.washington.edu/alumni/at-length-with-jill-cornell-tarter/
Nov. 2007 Interview for the KQED TV show Quest:
https://www.youtube.com/watch?v=QwEm3WHvNHI
The Search for Cosmic Company (her 2011 TEDX Talk at USC):
https://www.youtube.com/watch?v=6DmpJoEmyZs
2012 Talk on “The World We Dream”:
https://www.youtube.com/watch?v=4EABW8WVT0

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Trimble, Virginia (1943 - )

Feder, Toni “Q&A: Virginia Trimble on Fifty Plus Years in Astronomy” for Physics Today, 2018:
Scoles, Sara “The Woman Who Knows Everything about the Universe” in Wired magazine, 2018:
Trimble, Virginia Visit to a Small Universe. 1992, American Institute of Physics Press. A collection of her articles, including several that bear on her own life and work.
Her page at U. of California, Irvine:
https://www.faculty.uci.edu/profile.cfm?faculty_id=3060
Interview on the “Science and Society” podcast:
http://www.scienceandsociety.net/audio/trimble.mp3
Transcript of a brief interview about telescopes (with a bit about her life) on ABC:
Her “Top 10” lists for the astronomy of the past and future:
http://www.aps.org/publications/apsnews/200010/astronomy.cfm
Honors from the AAS and the IAU: https://aas.org/posts/news/2018/02/virginia-trimble-honored-aas-and-iau

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Wolff, Sidney (1941 - )


Wolff, Sidney, et al. *Astronomy*. 2016, OpenStax. A free open-source introductory astronomy textbook on which she is one of the three lead authors. 
[http://openstax.org/details/astronomy](http://openstax.org/details/astronomy)


Announcement of her AAS Education Prize:  
[http://www.noao.edu/outreach/press/pr06/pr0605.html](http://www.noao.edu/outreach/press/pr06/pr0605.html)

Her speech for the 100th anniversary of the American Astronomical Society (pdf file):  
[https://aas.org/archives/BAAS/v32n2/wolff.pdf](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](https://www.aip.org/history-programs/niels-bohr-library/oral-histories/23363-1)


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

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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 on-line magazine *Sky’s Up* in Jan. 2018 was devoted to women in astronomy: [https://view.joomag.com/skys-up-january-february-2018/0999470001513909897](https://view.joomag.com/skys-up-january-february-2018/0999470001513909897)

Bagenal, Fran: Interview: [https://solarsystem.nasa.gov/people/1480/fran-bagenal/](https://solarsystem.nasa.gov/people/1480/fran-bagenal/)  
Plus see: Women in Planetary Science:  


Brown, Beth: Profile: [https://www.youtube.com/watch?v=KfJMVdjf6dk](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](https://www2.le.ac.uk/departments/physics/people/emmabunce) (and a BBC Interview: [https://www.bbc.co.uk/sounds/play/m000jvxq](https://www.bbc.co.uk/sounds/play/m000jvxq)


Johnson, Kelsey: TED Talk: [https://www.ted.com/speakers/kelsey_johnson](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](https://uvamagazine.org/articles/grounded_in_the_stars)


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](https://www.youtube.com/watch?v=LN9oYjNKBM8&t=2s) and her *Introductions Necessary* profile: [https://introductionsnecessary.com/2016/08/24/chung-pei-ma/](https://introductionsnecessary.com/2016/08/24/chung-pei-ma/)
Mainzer, Amy: her work with PBS to get young girls into science:

McFadden, Lucy: My Hero Project (short discussion of her work and how she got into astronomy):

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:

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

Richards, Mercedes: Eshleman, Adams “Mercedes Richards: Stellar Detective” (Penn State University news story 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://unearthedmaq.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: