

Writing Women in Mathematics into Wikipedia

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Abstract

In this article I reflect upon the problems connected with writing women in mathematics into Wikipedia. I discuss some of the current projects and efforts aimed at increasing the visibility of women in mathematics on Wikipedia. I present the rules for creating a biography on Wikipedia and relate my personal experiences in creating such articles. I hope to provide the reader with the background and resources to start editing existing Wikipedia articles and the confidence to create new articles. I would also like to encourage existing editors to look out for and protect new articles about women mathematicians and submit new articles.

1 Introduction

The twin problems of the paucity of women subjects and scarcity of women editors on Wikipedia are well known but no solutions are on the horizon. We can nevertheless take small steps to address these problems. In response to my concerns about these problems and in order to gain first-hand experience, I became a Wikipedia editor in 2013. In this article I will update and expand upon my article *Writing Women in Mathematics into Wikipedia*, which appeared in the May–June 2014 issue of the *Association for Women in Mathematics Newsletter* [8]. Since 2013 some things have improved on Wikipedia and others have remained more or less the same. I will first report on these and then relate some of my personal experiences as a Wikipedia editor. Briefly, this is how this article is organized. In Sect. 2, I discuss gender bias on Wikipedia, the underrepresentation of women on Wikipedia, both as editors and subjects of mathematical biographies, and briefly explain my own interest in this subject. In Sect. 3, I describe the process of creating a biography on Wikipedia and relate my personal experiences of creating pages for prominent women in mathematics on Wikipedia. In Sect. 4, I discuss the Wikipedia Year of Science as well as the related projects *WikiProject Women scientists* and *WikiProject Women in Red* and compare the situation for women in mathematics on Wikipedia in 2014 to the situation in late 2017. I also speak about some of the most recent efforts of the Association for Women in Mathematics (AWM) to increase the visibility of women in mathematics in Wikipedia.

2 Problems for Women on Wikipedia

I have been concerned about the underrepresentation of women in mathematics and the inadequate recognition of outstanding female mathematicians since the late 1970s when I began my long career as a university professor of mathematics. More recently, I have been troubled by the meager representation of women in mathematics as both subjects of Wikipedia pages and as Wikipedia contributors, better known on Wikipedia as editors.

There have been numerous allegations that Wikipedia suffers from systemic gender bias with respect to both editors and content [6] and that the attempts to increase women's participation have failed [2], [7].

See the the Wikipedia page *Gender bias on Wikipedia* for additional references and further discussion of that issue [21].

2.1 The dearth of biographies of women mathematicians on Wikipedia

One disturbing manifestation of the underrepresentation of women in Wikipedia is the dearth of biographies of notable women. According to *WikiProject Women in Red*, which I will discuss in Sect. 4, only 16.36% of the biographies in English Wikipedia were about women as of August 7, 2016. This is up from just over 15% in November 2014. Wikipedia has guidelines on academic notability (also called the professor test) that a subject must meet to merit a Wikipedia page. The first two of the nine criteria of academic notability are: the persons research has made significant impact in their scholarly discipline, broadly construed, as demonstrated by independent reliable sources; and the person has received a highly prestigious academic award or honor at a national or international level. Some of the criteria are subjective in nature and it is not surprising that some of the American mathematicians featured on Wikipedia are more notable than others.

In 2013 the Sociology, Science, Tech & Society Program of the National Science Foundation awarded a grant to Yale University [1] to explore potential gender differences in indicators of academic notability, the existence of networks that help contributors mobilize resources for content creation, gate keeping processes that result in challenges to content associated with women and scholarship, and the unintended consequences of Wikipedias policies themselves.

When I first perused the page for the *Category:Women mathematicians* (formerly called *Category:Female mathematicians*) several years ago I was disheartened to see how many prominent women lacked a Wikipedia page. I downloaded a copy of the category in August of 2015 and again in August of 2016. I was pleased to discover that between 2015 and 2016 there were 73 new biographies of women mathematicians on Wikipedia. I also keep an eye on the women included in the *Category:American mathematicians*. As of August 30, 2016 there were 37 pages (i.e., people) in the *Category:American women mathematicians*. If we assume every woman in the *Category:American women mathematicians* is also in the *Category:American mathematicians* (which is not the case), the percentage of women in the *Category:American mathematicians* was about 17%, at that time. As of October 12, 2017 there were 73 women listed in the *Category:American women mathematicians*; the number of women listed nearly doubled between August 2016 and October 2017, in part, due to the efforts I discuss in Sect. 4. There is also the *Category:Women statisticians*, which contained 82 pages as of October 12, 2017. According to American Mathematical Society (AMS) data from the Annual Survey, we know that 29% of the U.S. citizens to earn PhDs from U.S. mathematics departments between 1991 and 2015 were women. As per the 2015 AMS Annual Survey, about 23% of all doctoral mathematics faculty were women and 19% of the Public or Private Large doctoral mathematics faculty were women.

2.2 Writing Wikipedia pages that will survive

A serious impediment to having more biographies of women in mathematics on Wikipedia is that though anyone can become a Wikipedia editor and post an article, not all of the articles that are created will “survive” on Wikipedia. There are various ways that an article can be deleted. If no opposition to the deletion is expected, any editor can tag the article for *Proposed deletion* (**PROD**), which lists the article in the *Category:Proposed deletion*. Any editor (including the creator of the article) may object to the deletion by simply removing the tag and giving an explanation. My own experience is that the author of an article should be cautious about removing the **PROD** tag without giving a well-reasoned explanation that is backed up by citations. An article marked for proposed deletion is checked by an Administrator, who may remove the **PROD** tag or delete the article. An article may also be nominated for the page *Articles for deletion* (**AfD**), which is where Wikipedians discuss whether or not an article should be deleted.¹ An article listed here is usually discussed for at least seven days, at the end of which the deletion process proceeds on the basis of community consensus. I will discuss my personal experience with the **PROD** tag in Sect. 3.

¹A Wikipedian is a volunteer who writes or edits Wikipedia articles.

Several women who have created biographies of women in mathematics on Wikipedia recommend that the author of a new page have some editors on standby to affirm the article created by making minor edits soon after the article goes live. Edits can be made by less senior editors without logging in to their Wikipedia accounts; only the IP address of the computer they were using will appear on the History page of the article. It is even better if a page creator has an active Administrator looking out for a newly created article.

There is a hierarchy of “functional capacity” among the Wikipedia participants [20]. Wikipedia co-founder Jimmy Wales is the ultimate arbiter on Wikipedia, however, he has usually deferred his authority to the approximately 34 Bureaucrats or *Crats*, the approximately 700 active Administrators or *Admins*, and another group called the Arbitration Committee or *Arbcom*. The membership of the Arbitration Committee changes annually and currently consists of about 14 Wikipedians, all of whom were formerly Administrators. The rights and privileges of the *Crats*, *Admins* and *Arbcom* are described on the Wikipedia pages for these groups [18], [15], [16].

2.3 The scarcity of women editors on Wikipedia

Women are also substantially underrepresented on Wikipedia as editors. A survey [4] conducted by the United Nations University and Maastricht University in collaboration with the Wikimedia Foundation demonstrated that in 2008 only 12.64% of Wikipedia editors worldwide were women. A follow up survey in 2011 showed that things hadn’t improved: 9% of editors worldwide and 15% of those from the US were women.

A few years after the initial study, the Wikimedia Foundation announced the goal of raising the proportion of female editors worldwide to 25% by 2015. In 2014 Wikimedia Foundation founder Jimmy Wales announced that Wikipedia had completely failed to reach this goal [9] despite launching several initiatives. This is particularly disturbing in light of the fact that the percentage of adult Americans who use Wikipedia for information increased from 25% in February 2007 to 42% in May 2010, according to a study conducted by the Pew Research Center [33]. The Pew study also showed that about 50% of the adult female Internet users and 56% of the male adult Internet users look to Wikipedia for information.

In Sect. 4 I will discuss a recent partnership between the AWM and the Wiki Education Foundation to help lessen both the scarcity of women mathematicians as subjects and editors on Wikipedia.

3 Creating a biography on Wikipedia

3.1 The basics: setting up an account, academic notability, and using reliable sources

Every editor is encouraged to sign up for an account on Wikipedia’s home page [14], although this is not mandatory. An editor should care in choosing a username because this name will be displayed on the editor’s User page and on the History page of every article created or edited.² After logging in to a Wikipedia account the User will see a link to her Sandbox at the top of the page. This is where a User can create a draft of an article. If an editor wants to work on two articles at the same time, she can create a second Sandbox by creating a page entitled `User:YourUsername/sandbox2`.³ In this way, an editor can create as many Sandboxes as desired and with whatever names are desired.

A biographer must remain neutral and there can’t be any conflict of interest with the subject. A current Wikimedia administrator recommends that a biographer start her article with one sentence describing what her subject accomplished and another sentence pointing out why her subject and the subject’s work are important. The subject must be notable and every claim made about her must be backed up by a credible citation. Wikipedia has criteria for notability, in general, and for academic notability, in particular. Wikipedia’s guidelines on academic notability (also known as the *professor test*) stipulate that

²My username is Mvitulli.

³For example, if one searches for the page `User:Mvitulli/sandbox2`, a template for creating a Wikipedia page on a woman in mathematics will be found.

a professor is notable provided that she meets at least one of nine criteria listed on the Wiki page for academic notability [26]. Here are the first few criteria from that list.

1. The person's research has made significant impact in their scholarly discipline, broadly construed, as demonstrated by independent reliable sources.
2. The person has received a highly prestigious academic award or honor at a national or international level.
3. The person is or has been an elected member of a highly selective and prestigious scholarly society or association (e.g., a National Academy of Sciences or the Royal Society) or a fellow of a major scholarly society which reserves fellow status as a highly selective honor (e.g., Fellow of the IEEE)

There are additional specific criteria notes on the Wikipedia page on academic notability. A contributor must demonstrate notability using *reliable sources*. In general, reliable sources include mainstream news media and major academic journals, both of which are subject to some sort of editorial control. For Wikipedia purposes, published original research articles are considered primary sources; expository articles or summaries of the current state of affairs in a particular research area are considered to be secondary sources. Unlike the case in academic publishing, Wikipedia administrators frown on the use of too many primary sources, as I found out the hard way. Wikipedia also has a page on Biographies in their Manual of Style and a special page on Biographies of living persons [12], [22].

3.2 Finding women in mathematics on Wikipedia

There are many ways to find lists of women mathematicians on Wikipedia. Wikipedia includes both an article entitled *List of women in mathematics* and lists of women with pages that have been designated as belonging to the *Category:Women mathematicians* or to the *Category:American women mathematicians*. When an editor inserts the tag [[Category:Women mathematicians]] at the end of her article, the name the subject is automatically added to the page for that category. There are many category tags that may be used; look at a few articles to see which may be appropriate.

In the recent past, pages for women elected as Fellows of the American Mathematical Society (AMS) or fellows of other major professional organizations have been routinely created. In checking around, I found that on the Talk page of the *WikiProject:Women scientists*, in the topmost section entitled "Some missing mathematicians", there is a list of women who had been elected Fellows of the AMS but didn't have pages; soon after the list appeared pages were created for most of these women by User:Brirush and User:David Eppstein. After checking this Talk page recently, I discovered that there were five women who were elected Fellows of the AMS in 2017 Class who did not have pages; I listed their names on the Talk page of *WikiProject:Women scientists*, on the home page for *WikiProject Women in Red/Mathematics*, and on the home page for *Wikipedia:Year of Science/Computer science, technology and math*. I am happy to report that as of October 12, 2017 all of these prominent women have Wikipedia pages.

3.3 My experiences writing biographies on Wikipedia

I attended my first edit-a-thon on writing women into Wikipedia at the University of Oregon in March of 2013. This event was part of the Wiki Women's History Month events. The edit-a-thon was led by Sarah Stierch, who was then a program evaluation coordinator for the Wikimedia Foundation and a former Wikipedian in Residence at the Archives of American Art and the Smithsonian Institution Archives.

During the edit-a-thon I decided to write an article about Susan Montgomery. Montgomery was the 2011 AWM Noether Lecturer and in 2012 she was selected as both an American Association for the Advancement of Science (AAAS) Fellow and an AMS Fellow in the inaugural class. I felt she clearly merited a page on Wikipedia. I began working on her page during the edit-a-thon and finished up the article a couple of weeks later. My first experience writing for Wikipedia was extremely frustrating, but in the end I am glad that I undertook this project. I learned that there are many Wikipedia conventions that a contributor must follow. I am still learning about these conventions and the culture of Wikipedia.

The first thing I did during the edit-a-thon was to edit the existing Wikipedia page on the Noether Lecture so that the lecturers for 2011 – 2013, including Montgomery, were listed on that page. I inserted

square brackets around Montgomery's name so she appeared as a red link. A biography has a better chance of surviving on Wikipedia if the subject is already mentioned on an existing Wikipedia page. I followed all the above-mentioned guidelines and asked Stierch to read my article before I published it. In spite of all my precautions my article was proposed for deletion with the **PROD** tag within ten minutes after it went live by a novice editor who made this remark.

It is proposed that this article be deleted because of the following concern: This looks like a case of shameless (self) promotion. Hey, look at me: I teach math and I want my CV on Wikipedia.

Stierch responded to the novice editor by saying the biography was in fact a good faith article by a new editor (not the subject) and removed the **PROD** tag. The article survived only because of Stierch's intervention.⁴

At Montgomery's suggestion I started another Wikipedia biography in May of 2014, this one on Georgia Benkart. Benkart was AWM President during 2009-2011, was elected to the inaugural class of Fellows of the AMS in 2013, was selected to deliver the AWM-AMS Noether Lecture in 2014 and the Emmy Noether Lecture at the International Congress of Mathematicians in Seoul, Korea in 2014. She has published over 100 journal articles and has co-authored three *Memoirs of the American Mathematical Society*. Benkart clearly met the Wikipedia criteria for academic notability. I created the page in my Sandbox and had Stierch both read it and later monitor it when the article was published it on Wikipedia. I also asked Emily Temple-Wood to watch the page and make sure it wasn't deleted.

Soon after the Benkart biography went live, it was tagged for having too many primary sources and not enough secondary sources. Wikipedia recommends that a biography should have at least as many secondary sources in the References section as publications of the subject, which are regarded as primary sources. I addressed that criticism and removed the tag after thanking the editor involved for his comments and explaining that most of the sources were now secondary. The article was then tagged for using *weasel* words: vague phrasing that often accompanies biased or unverifiable information [23]. The Wikipedia administrator asserted the following.

The whole tone of the article is written putting her on a pedestal.

After asking Emily Temple-Wood and Sarah Stierch about weasel words and looking at the Talk page for the article, I found out that the administrator was objecting to my claims that Benkart was a "distinguished" mathematician who is an "international leader" and a "renowned" teacher, and for asserting that one of Benkart's joint papers became "one of the building blocks" of the classification of toroidal rank-one Lie algebras. Since I am not an expert in Benkart's research area (the structure and representation theory of Lie algebras), I asked Montgomery for help. Montgomery enlisted the help of Efim Zelmanov, who wrote up the paragraphs that described the "importance" of Benkart's work (I couldn't help slipping in the weasel word "importance"). In this case an administrator who has virtually no background in mathematics objected to a Fields medalist's description of Benkart's work. As Stierch pointed out to me, this is the reality of the wacky world of Wikipedia. If an editor can't prove her assertion with a reliable secondary source, then any other editor can remove the relevant sentence without question. Stierch removed the uncited weasel words from my article and the tag was eventually removed. As of this writing, the article has survived on Wikipedia.

Other mathematicians have also had a difficult time when writing biographies of women mathematicians. For example, Sormani has created several biographies, originally with the username "Sormani." Beginning around 2007, the articles she wrote were deleted by other editors and *Admins*. She then started writing articles anonymously without logging on to the Wikipedia site and had more success. We do not

⁴Stierch, whose username today is Missvain, is still an active Wikipedia *Admin*. Regrettably, Stierch lost her Wikimedia Foundation job in late 2013 when she was discovered editing for pay [5]. Wikipedia has a conflict of interest policy on paid editing and a page on this policy [13]. In general there is a prohibition on paid editing but it isn't uniformly enforced. There is another page [3] discussing this. I have heard that the Ivy League schools have public relations staff who create pages for distinguished faculty; the staff are supposed to acknowledge their employer in their Talk pages. I came across one such acknowledgment on the User page of Dominic McDevitt-Parks (User:Domnic) who is a paid employee of the US National Archives and Records Administration and edits on Wikipedia for them. I suspect that there are many other paid editors who make no such acknowledgement.

have any data, numerical or anecdotal, on the difficulties editors have in creating or editing pages on male mathematicians.

4 Steps towards a solution

During the past several years there have been a number of successful attempts to increase the visibility of women mathematicians on Wikipedia. In 2007 the Wikipedia page *Noether Lecture* was created by AWM member Christina Sormani. The Noether Lecture is lecture series (and award) that honors women “who have made fundamental and sustained contributions to the mathematical sciences.” The AWM established the lecture in 1980 and in 2013 it was renamed the AWM-AMS Noether Lecture. The Noether lecturers were all listed on the page *Noether Lecture*, some as red links, that is, people (or topics) mentioned on Wikipedia but for whom Wikipedia pages do not exist⁵. I am happy to report that as of today all of the Noether lecturers listed on the page Noether Lecture appear as blue links, that is, people or topics with pages on Wikipedia [25].

4.1 The WikiProjects Women scientists and Women in Red

The *WikiProject Women scientists* [29] began in 2012 and is dedicated to ensuring the quality and quantity of biographies of women in science on Wikipedia. Emily Temple-Wood (who edits on Wikipedia as Keilana) is a co-founder of this project; she started writing Wikipedia pages when she was 12 and continues to write pages and confront gender bias on Wikipedia, although her pace has slowed a bit since she began medical school at Midwestern University in the fall of 2016. Temple-Wood has written over 100 pages on women scientists. She became an *Admin* in 2007 and is currently part of the Arbitration Committee. There is a plethora of information on the project page [29] for *WikiProject Women scientists*, including suggestions of how an editor can help the project. There are links to pages that are helpful to Wikipedia editors and a list of more than 80 members of the project.⁶

The objective of the *WikiProject Women in Red* [27] is to turn red links on Wikipedia (names and topics that appear on Wikipedia but do not have Wikipedia pages) into blue links (names or topics with Wikipedia pages). According to *WikiProject Women in Red*, only 16.36% of the biographies in English Wikipedia were about women as of August 7, 2016. This is up from just over 15% in November 2014. Rosie Stephenson-Goodknight (who edits on Wikipedia as Rosiestep) is a co-founder of this WikiProject. *WikiProject Women in Red* hosts edit-a-thons and socializes their scope and objective via social media. *WikiProject Women in Red* has a page on Mathematics [28] that is organized by country and lists missing articles on women who are (or have been) notable for their contribution to mathematics in academics, business, economics, politics, research, government or the social sector. I made many additions to the list and encourage others to do so as well.

Temple-Wood and Stephenson-Goodknight were named as 2016 co-Wikipedians of the Year by Wikipedia Trustee Jimmy Wales in recognition of their work on harassment on Wikipedia along with their collective efforts to expand coverage of notable women on Wikipedia.

4.2 Other efforts

In the recent past, there have been efforts to create pages for women elected as Fellows of the AMS or fellows of other major professional organizations. Formerly, on the Talk page of the WikiProject:Women scientists, in the topmost section entitled Some missing mathematicians, there was a list of women who had been elected Fellows of the AMS but didnt have pages; soon after the list appeared, pages were created for all of these women, primarily by User:Brirush and User:David Eppstein.

In the summer of 2016 Jami Mathewson of the Wiki Education Foundation created the *Category:Awards and prizes of the Association for Women in Mathematics* [17]. As of October 12, 2017 there were four

⁵A Wikipedia editor can easily create a red link on Wikipedia by surrounding [[name]] or [[topic]] with double square brackets as indicated.

⁶The list of members begins with the usernames of Emily Temple-Wood and Sarah Stierch (Keilana and SarahStierch, respectively); I am member 84 near the bottom of the list.

pages in this category: AWM/MAA Falconer Lecturer, Louise Hay Award, M. Gweneth Humphreys Award, and Noether Lecture. Some of the mathematicians listed on the first three pages appear as red links. The Wikipedia page for the Association for Women in Mathematics lists all past and current AWM presidents. Despite the fact that all AWM presidents have Wikipedia pages, and hence appear as blue links, Mathewson reports that only one page (the page for Ruth Charney) has been rated as “B-class” by the WikiProjects Biography and Women scientists, designating it as one of Wikipedia’s higher-quality articles.⁷ ⁸ Many of the pages for former AWM presidents are *stubs*, that is, pages that exist but need to be expanded to meet Wikipedia standards. To be fair, many of the pages are not rated. My point in mentioning this assessment is that there is still a lot of work to do for fledgling editors who may not yet want to create a page from scratch.

4.3 The year of science

The year 2016 was the Wikipedia Year of Science [31], an unparalleled initiative to improve scientific literacy through Wikipedia. A fundamental part of the Year of Science was the Women in Science initiative, whose stated goal was to create or improve coverage of women scientists on Wikipedia. Three groups, *WikiProject Women scientists* [29], *WikiProject Women in Red* [27] and the Wiki Education Foundation [19], joined forces to run virtual edit-a-thons during the year to create and improve articles about women scientists in diverse fields, emphasizing a different area each month between February and December. Each month had a theme with its own page that was designed to encourage Wikipedians to collaborate, share successes, identify articles that need to be written, find subject-specific sources, or initiate any activity that improves coverage of or celebrates women in science. During the first several months of 2016, the fields of zoology, chemistry, environmental science, psychology, astronomy, plant biology, sociology, and medicine were highlighted, whereas the year ended with the spotlight on linguistics and physics [31]. The month of October highlighted computer science, technology, and mathematics and the corresponding Wikipedia page [32] included a section entitled *Biographies of mathematicians to create or improve*, which I authored. In this section one can find a list of prominent women in mathematics who either don’t have Wikipedia pages or whose pages are stubs. The page also contains a section labeled *Association for Women in Mathematics* that lists AWM awards, prizes, and lectures that either don’t have pages or some of whose recipients don’t have pages. This page is a good starting point for someone who wants to edit or create a page enhancing the visibility of women in mathematics on Wikipedia.

4.4 AWM’s partnership with the Wiki Education Foundation

While writing this article I learned of an unprecedented partnership between the AWM and the Wiki Education Foundation. There is considerable need for such a partnership, particularly since there don’t seem to be many mathematicians involved in the *WikiProject Women scientists* and the *WikiProject Women in Red*. As I said earlier, I added my name as a member of the *WikiProject Women scientists* but I didn’t see any other usernames that I recognized. In the past, I have sought out Stierch and Temple-Wood for advice and for help protecting the pages I wrote. Neither of these allies has much time to devote to Wikipedia today. In response to a query I posted on Temple-Wood’s Talk page, Sarah Barnum, a Public Services Librarian who lives in El Paso, TX and has the username *Megalibrarygirl*, offered help with copyediting and references. It is crucial that we add women editors who can create pages for prominent women in mathematics. But this effort will fail unless there is a network of Wikipedia editors and administrators who watch the pages that we create. Perhaps the partnership can help build such a network.

AWM recently appointed two AWM-Wikipedia Visiting Scholars: Tarini Hardikar, a senior mathematics-chemistry double major at Colby College, and Sara Del Valle, a Ph.D. applied mathematician who is currently a member of the Los Alamos National Laboratory epidemic modeling research team. Hardikar and Del Valle will be working with Ryan McGrady of the Wiki Education Foundation. Visiting Scholars are experienced Wikipedians who are capable of improving the quality of articles to B-class or better.

⁷ To see these ratings, click on the tabs for the Talk pages of the articles.

⁸ We discuss the WikiProject Women scientists[29] in more detail in Sect. 4

Hopefully these two efforts will increase the numbers of women in mathematics who are Wikipedians and increase the quantity and quality of articles on women in mathematics on Wikipedia.

In another unprecedented move, Ursula Whitcher organized a Wikipedia women in mathematics edit-a-thon at the 2017 AWM Research Symposium at University of California, Los Angeles. The edit-a-thon was supported by a grant from the Wiki Education Foundation. Mathewson and I assisted Whitcher during the edit-a-thon. This event and ones like it were a wonderful resource for novice editors. Ten new pages on women mathematicians were created during the edit-a-thon, including a page I created on 2017 AMS Fellow Mei-Chu Chang. Please view and help improve these pages by visiting the Wikipedia page for the edit-a-thon [24].

5 Summary

There are many more Wikipedia articles on women mathematicians today than when I first became a Wikipedia editor in early 2013. However, many of these articles are stubs and not a single women mathematician appears in the 10 articles allotted to mathematicians in *Wikipedia:Vital Articles*. WikiProject Women scientists is attempting to have the page on Emmy Noether included in this prestigious list. Although all of the women who were elected AMS Fellows now have Wikipedia pages, several of the women who were elected SIAM Fellows or who have received awards from national organizations still do not have pages. The percentage of women editors on Wikipedia remains dismally low I have edited many biographies of women mathematicians and will continue to do so.

Even though writing a new biography is at times frustrating and is always time-consuming, I am glad that I created biographies of three prominent women mathematicians and hope to write more. Anyone who wants to become a Wikipedia editor can find a useful list of Wikipedia help pages on the bottom of the Project page for the *WikiProject Women scientists* [29]. Placing {WPWS} at the top of the Talk page of an article will result in the article being automatically added to *Category:WikiProject women scientists* and the other members of the WikiProject will be able to keep an eye on the page. I hope you will decide to take the plunge. The entire community of women in mathematics will be looking forward to reading new articles on notable women in mathematics.

6 Acknowledgements

I would like to acknowledge and applaud the efforts of Emily Temple-Wood and Rosie Stephenson-Goodknight for their work on harassment on Wikipedia along with their collective efforts to expand coverage of notable women on Wikipedia. On behalf of the greater mathematics community I offer them both a great big virtual thank you.

References

- [1] Adams, Julia and Hannah Brückner. 2013. Collaborative Research: Wikipedia and the Democratization of Academic Knowledge. NSF Award 1322934. http://www.nsf.gov/awardsearch/showAward?AWD_ID=1322934. Accessed 15 March, 2017.
- [2] Cohen, Noam. 2011. Define gender gap? Look up Wikipedia's contributor list. *The New York Times* January 30. <http://www.nytimes.com/2011/01/31/business/media/31link.html>. Accessed 13 May, 2017.
- [3] Conservapedia Contributor. Examples of Bias in Wikipedia: on Paid Editing. http://www.conservapedia.com/Examples_of_Bias_in_Wikipedia:_Paid_Editing Accessed 28 June, 2017.

- [4] Glott, Ruediger, Philipp Schmidt, and Rishab Ghosh. 2010. Wikipedia Survey March 2010. <https://web.archive.org/web/20100414165445/http://wikipediasurvey.org/docs/WikipediaSurveyMarch2010.pdf> Accessed 13 May, 2017.
- [5] Mullin, Joe. 2014. Wikimedia Foundation employee ousted over paid editing. *Ars Technica* January 9. <http://arstechnica.com/tech-policy/2014/01/wikimedia-foundation-employee-ousted-over-paid-editing/> Accessed 13 May, 2017.
- [6] Paling, Emma. 2015. Wikipedia's hostility to women. *The Atlantic* October 21. <http://www.theatlantic.com/technology/archive/2015/10/how-wikipedia-is-hostile-to-women/> Accessed 13 May, 2017.
- [7] Torres, Nicole. 2016. Why do so few women edit Wikipedia? *Harvard Business Review* June 2. <https://hbr.org/2016/06/why-do-so-few-women-edit-wikipedia>. Accessed 13 May, 2017.
- [8] Vitulli, Marie A. 2014. Writing women mathematicians into Wikipedia. *AWM Newsletter* 44 no. 3 (May–June): 17–18.
- [9] Wales, Jimmy. 2014. Wikipedia “completely failed” to fix gender imbalance: Interview with Jimmy Wales by Caroline Hepker. *BBC News* August 8. <http://www.bbc.com/news/business-28701772>
- [10] Wikipedia contributors. Category:American mathematicians. https://en.wikipedia.org/wiki/Category:American_mathematicians
- [11] Wikipedia contributors. Category:American women mathematicians. https://en.wikipedia.org/wiki/Category:Women_mathematicians. Accessed 27 June, 2017.
- [12] Wikipedia contributors. Wikipedia: Biographies of living persons. https://en.wikipedia.org/wiki/Wikipedia:Biographies_of_living_persons Accessed 27 June, 2017.
- [13] Wikipedia contributors. Conflict-of-interest editing on Wikipedia. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Conflict-of-interest_editing_on_Wikipedia. Accessed 13 May, 2017.
- [14] Wikipedia contributors. Main page. *Wikipedia, The Free Encyclopedia*. <http://en.wikipedia.org/>. Accessed 13 May, 2017.
- [15] Wikipedia: Administrators <https://en.wikipedia.org/wiki/Wikipedia:Administrators> Accessed 27 June, 2017.
- [16] Wikipedia: Arbitration Committee https://en.wikipedia.org/wiki/Arbitration_Committee Accessed 27 June, 2017.
- [17] Wikipedia contributors. Category:Awards and prizes of the Association for Women in Mathematics. https://en.wikipedia.org/wiki/Category:Awards_and_prizes_of_the_Association_for_Women_in_Mathematics. Accessed 27 June, 2017.
- [18] Wikipedia: Bureaucrats <https://en.wikipedia.org/wiki/Wikipedia:Bureaucrats> Accessed 27 June, 2017.
- [19] Wiki Education Foundation. <https://wikiedu.org> Accessed 27 June, 2017.
- [20] Wikipedia contributors. Wikipedia: Formal organization. *Wikipedia, The Free Encyclopedia*. https://en.m.wikipedia.org/wiki/Wikipedia:Formal_organization. Accessed 13 May, 2017.
- [21] Wikipedia contributors. Gender Bias on Wikipedia https://en.wikipedia.org/wiki/Gender_bias_on_Wikipedia Accessed 27 June, 2017.
- [22] Wikipedia contributors. Wikipedia: Manual of Style. https://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style Accessed 27 June, 2017.

- [23] Wikipedia contributors. Wikipedia: Manual of Style/Words to watch. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style/Words_to_watch#Unsu. Accessed 13 May, 2017.
- [24] Wikipedia contributors. Wikipedia: MeetupAWMAWM Symposium 2017. https://en.wikipedia.org/wiki/Wikipedia:Meetup/AWM/AWM_Symposium_2017#Outcomes. Accessed 27 June, 2017.
- [25] Wikipedia contributors. Wikipedia: Noether Lecture. https://en.wikipedia.org/wiki/Noether_Lecture. Accessed 27 June, 2017.
- [26] Wikipedia contributors. Wikipedia: Notability (academics). *Wikipedia, The Free Encyclopedia*. [https://en.wikipedia.org/wiki/Wikipedia:Notability_\(academics\)](https://en.wikipedia.org/wiki/Wikipedia:Notability_(academics)). Accessed 13 May, 2017.
- [27] Wikipedia contributors. Wikipedia: WikiProject Women in Red. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Women_in_Red. Accessed 27 June, 2017.
- [28] Wikipedia contributors. Wikipedia: WikiProject Women in Red/Mathematics. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Women_in_Red/Mathema. Accessed 13 May, 2017.
- [29] Wikipedia contributors. Wikipedia: WikiProject Women scientists. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Women_scientists. Accessed 13 May, 2017.
- [30] Wikipedia contributors. Wikipedia: WikiProject Women scientists/Worklist. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Women_scientists/Wor.
- [31] Wikipedia contributors. Wikipedia:Year of Science/About. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Wikipedia:Year_of_Science/About. Accessed 13 May, 2017.
- [32] Wikipedia contributors. Wikipedia: Year of Science/Computer science, technology, and math. *Wikipedia, The Free Encyclopedia*. https://en.wikipedia.org/wiki/Wikipedia:Year_of_Science/Computer_science,_technolog. Accessed 13 May, 2017.
- [33] Zickuhr, Kathryn and Lee Rainie, Wikipedia past and present: A snapshot of Wikipedia users. Pew Research Center. January 13, 2011. <http://www.pewinternet.org/2011/01/13/wikipedia-past-and-present/>. Accessed 13 May, 2017.