Female Semantic Web Researchers:

Does collaboration with male researchers influence their network status?

Tamy Chambers, Staša Milojević, Ying Ding
tischt@indiana.edu, smilojev@indiana.edu, dingying@indiana.edu

Introduction

Gender diversity in computing has been addressed by the highest of organizations though both research and financial support. Examples include, The United States National Science Foundation (NSF)'s more than $130M in ADVANCE grant projects to increase the representation of women in the STEM sciences, the Association of Computing Machinery (ACM)'s, creation of a "Women in Computing" committee (ACM-W) to advocate on behalf of women in all computing fields, and the European Union's initiation of "gender mainstreaming" to increase female participation in all activities relating to science and technology.

This study seeks to further the understanding of female progressions within computer science by focusing on academic faculty in the computer sciences; in particular the collaboration patterns of female researchers within the Semantic Web area. Given that collaboration and co-authorship is very prevalent in this domain, this study seeks to understand how gender impacts collaboration. The study first identifies the most successful and influential female Semantic Web researchers based on the co-authorship network centrality measures (degree, betweeness, and Eigenvector), and second analyzes their collaboration patterns based on gender to see if those who are most influential have more collaborations with men

Previous Work

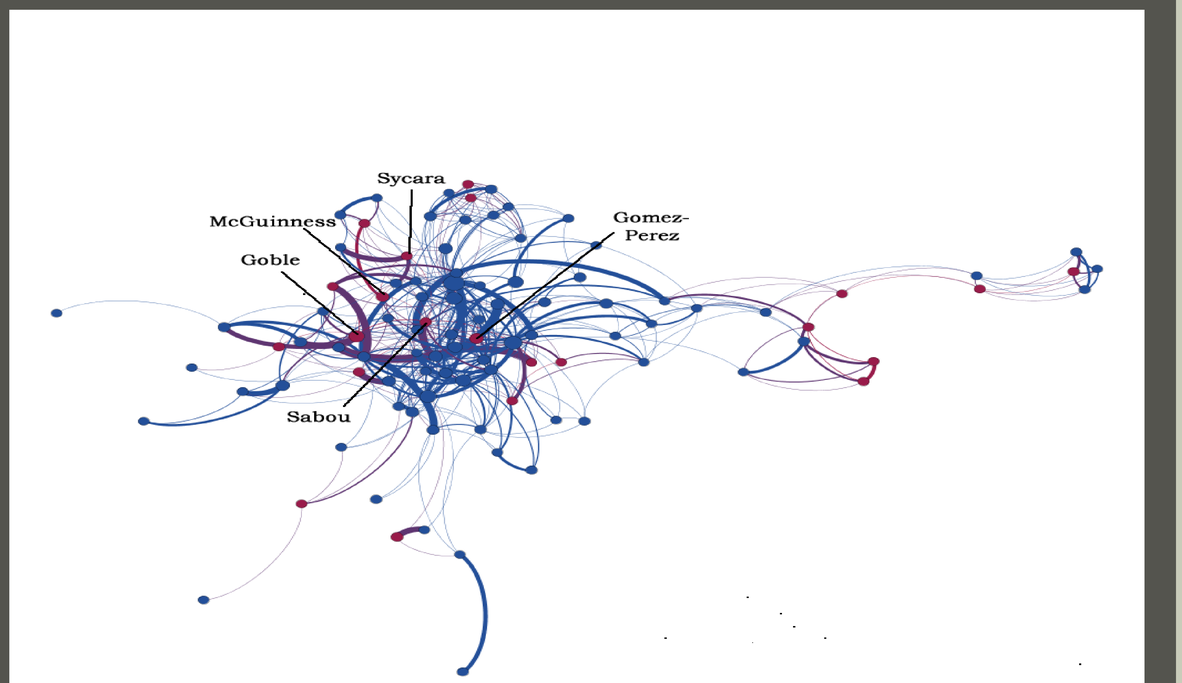
Other studies of gender in academic publishing have included, a survey study in 2002 [1] that concluded "rank, years since PhD, type of university, discipline and department, amount of research time, and marital status are better associated with publication than gender" (p.172), a more recent study in 2013, where researchers assigned h-indices to faculty based on their publication record, noted that "men had significantly higher h-indices than women" [2] (p.215), and a study that analyzed paper counts and citation counts in a far reaching study of all women in science across the world, to conclude that "despite many good intentions and initiatives, gender inequality is still rife in science" [3] (p. 211).

Methdology

Bibliographic data for this study was obtained from Arnetminer (arnetminer.org) and supplemented with data mined to identify gender in the following process. Identification of the gender of each author was based on analysis of their first name. This means of gender identification has been used in other studies including a study commissioned by the European Commission [4] and a more recently a study analyzing gender disparities in scholarly publishing also used a similar gender assignment method from sources such as the US census, WikiName, and Wikipedia [3].

In this study we used the US census list and lists from two international baby name websites (Baby Names Wizard and Babynames World) to obtain gender. The US census list of first names is drawn from the 2010 census and each name is identified with the percentage of its use as either a male or female. This, however, identified only 20% of the names used in our study. Lists of names and gender identification for European, Indian, African, and Asian names were run against the remaining names, after which the gender of less than 30% of the authors remained unknown.

A co-authorship network was created and analyzed based on the following three centrality measures: degree centrality, which identifies those nodes most connected to the community and which are thus the most influential, betweeness centrality which identifies nodes which serve as bridges in the network, and Eigenvector centrality which identifies nodes most connected to influential nodes



Large Component Top 100 Semantic Web Researchers

Centratility measures for the top five female reserachers by measure.

Degree Centrality	Male Coll.
C Goble	.70
A Gomez-Perez	.65
D McGuinness	.64
M Sabou	.59
Y Gil	.56

Betweeness Centrality	Male Coll.
C Goble	.70
K Sycara	.56
A Gomez-Perez	.65
D McGuinness	.64
M Sabou	.59

Eigenvector Centrality	Male Coll.
C Goble	.70
M Sabou	.59
A Gomez-Perez	.65
T Catarci	.68
A Illarramendi	.69

Average male collaboration is .61

Conclusions

The results of the current study, show a small correlation between the network measures of women in the Semantic Web domain and their higher than average collaboration with male researchers. The figure (left) shows that most collaboration is either between men (blue line) or men and women (purple line), but that there is little collaboration between women (red line).

C. Goble ranked first in all three network measures, she also had a higher than average collaboration rate with male researchers and a lower than average collaboration rate with female researchers. A Illarramendi shows a similar collaboration pattern. A. Gomez-Perez, T Catarci, and D.McGuinness have similar higher than average collaboration with men, but all also have a higher than average collaboration with women. The collaboration pattern of M Sabou and Y Gil are complete opposite to both C. Goble and A Illarramendi in that they both have lower than average collaboration with men and higher than average collaboration with women.

Although there was only a small indication of a relationship between female researcher network status and their collaboration with men, there is enough indication to proceed with a larger study over the entire Computer Science domain, which is likely to identify more cohesive patterns.

References

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Direct questions and comments to:
Tamy Chambers
tischt@indiana.edu

Indiana University - Bloomington,
[2]School of Informatics & Computing,
[1]Department of Information & Library Science
1320 E. 10th Street, LI 011,
Bloomington, Indiana 47405-3907

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