

Insights into Computer Science Academic Careers

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Abstract: Career quantification in academia is necessary to give promotions, raises and grants to professors at universities. In this paper, we report analysis of professors at various universities, through their three academic career stages: pre-tenure, post-tenure (associate professor years), and once they reach full professor. Our work will put to test the status quo that a professors' quality and quantity of work improves as s/he advances through her/his academic career.

Method: We targeted 80 professors who had a Google Scholar profile from the top 90 Computer Science departments according to the U.S. News Rankings 2014. For each scholar in our dataset, we collected publication and citation information for a total of 15 years. In this period, we had two cornerstones for each scholar. The first cornerstone is when s/he becomes an associate professor and the second one represents the year when s/he becomes a full professor. We categorized universities as top, middle and low based on their rankings. In addition, we divided scholars into top, middle and low categories based on their h-index values.

Results: We ran tests on the publications and citations of each publication in the pre-tenure, post-tenure and post full professor periods.

1. Professors publish more after they get tenure and even more after they become full professors. There is significant difference (ANOVA, $p < 0.05$) in the number of publications for professors without high h-index.
2. Professors with high h-index performed consistently well in terms of quantity of publications in different phases of their career. There was no significant difference (ANOVA, $p > 0.05$) in quantity of publications of top professors in the low university and the high university categories.
3. The quality of publications improves after they become full professors. We used the AUC (area under curve) metric with a second degree polynomial fit to determine the quality of the publications. There is significant difference (ANOVA, $p < 0.05$) in the AUC of publications of the professors for all the three categories after they become a full professor. For top professors in high ranking universities, the quantity of publications does not change but there is a significant difference (ANOVA, $p < 0.05$) in the quality.
4. For investigating the quantification of merit, a linear or parabolic fit was done to the citations of a publication in the span of 10 years. There is a significant difference (MANOVA, $p < 0.05$) in the number of linear, parabolic and other publications based on the university ranking and the h-index of the professor.

Conclusion: The performance of professors is not the same in all the pre-tenure, post-tenure (associate professor years) and full professor periods. Our findings support what we know anecdotally that the quality of publications improves as a professor advances through her/his career. Furthermore, professors with higher h-index and in higher ranked universities have higher number of publications with linear or parabolic fit. Hence they have more impactful publications.