Prosperity Spheres

S. R. Kulkarni

June 6, 2020–June 16, 2020

1 Motivation

Our community relies on a torrent of reviews: review of journal papers, reviews for telescope time, reviews for funding and reviews or assessments for appointments (fellowships, faculty, staff) and promotions. Naturally, a major question is the (im)partiality of the reviewer. NSF, to minimize this issue, excludes those have been co-authors on papers over the previous few years.[1]

I will call the collection of co-authors over either a specified interval (two years) or otherwise as "Co-Author Sphere". Sometime ago, using Unix tools I coded a utility[2] which, given a list of papers by an astronomer produced the list of the author's co-authors. I note that the new ADS has a tool which can do this task.

Recently, my colleague Sterl Phinney approached me and, given my interest in bibliometrics and Unix programming, he posed the following problem: "generate the list of all authors who cite the papers for a given author". I will call this collection as "Prosperity Sphere". I call this as the Prosperity Sphere because the more this sphere is populated the more prosperous is the author.

Symmetrically, in my view, there should be "Co-Prosperity Sphere". This is the collection of authors of all references made by an author. In a simple world this collection is rooted in papers which the author has invoked to support statements being made in the author's papers. However, in a more complex world the co-prosperity sphere provides interesting insights.

---

[1] Of course, a strict application of this rule in this era of mega-team papers such as those from the LIGO-Virgo consortium or the EHT consortium would force NSF to find scientists in areas outside astronomy and physics to provide letters.

[2] `https://www.astro.caltech.edu/~srk/SRKUnix/Examples/AuthorshipHistogram.txt`

Co-Authors	Prosperity Sphere	Co-Prosperity
83 Phinney E S	143 Kulkarni S R	63 Kulkarni S R
12 Kulkarni S R	139 Lyne A G	51 Hut P
9 Blandford R D	138 Camilo F	44 Lyne A G
4 Djorgovski S G	126 Kramer M	44 Taylor J H
4 Hansen B M S	124 Lorimer D R	38 Phinney E S
4 Prince T A	118 Rasio F A	29 Hills J G
3 Evans C R	116 Possenti A	29 Verbunt F
3 Frail D A	110 Manchester R N	29 Wolszczan A
3 Kaplan D L	95 Ransom S M	25 Narayan R
3 Matthews K	90 D'Amico N	24 Manchester R N
3 Meylan G	83 Stairs I H	24 van Paradijs J
3 Piotto G	82 Kalogera V	23 Bailes M
3 Pryor C	81 Ramirez-Ruiz E	22 Goodman J
3 Sigurdsson S	81 Stappers B W	20 Frail D A
3 Soifer B T	79 Sesana A	20 Pryor C
3 Verbunt F	79 Sigurdsson S	20 Rees M J
2 Anderson J	76 Piran T	19 Sigurdsson S
2 Bellm E C	75 Ferraro F R	18 Grindlay J E
2 Bloom J S	75 Freire P C C	17 Goss W M
2 Breton R P	72 Phinney E S	17 Makino J
2 Coughlin M W	71 Cenko S B	17 Webbink R F
2 Dekany R G	71 Narayan R	16 D'Amico N
2 Dorman B	70 Begelman M C	16 Djorgovski S
2 Drake A J	66 Kaspi V M	16 King I R
2 Duev D A	64 Frail D A	16 Neugebauer G

A   Using the programs

Note: Before using these tools be aware that ADS restricts the number of inquiries to 5,000 over a 24-hour period. For this reason, I wrote the programs so that you can execute them piecemeal.

Co-Authors	Prosperity Sphere	Co-Prosperity
30 Ho A Y Q	168 Kulkarni S R	345 Kulkarni S R
19 Kulkarni S R	154 Masci F J	302 Cenko S B
18 Kasliwal M M	152 Kasliwal M M	284 Kasliwal M M
17 De K	137 Graham M J	275 Gal-Yam A
17 Sollerman J	131 Kupfer T	223 Filippenko A V
16 Fremling C	130 Bellm E C	208 Sollerman J
15 Cenko S B	130 Rusholme B	203 Ofek E O
15 Masci F J	128 Sollerman J	175 Nugent P E
14 Laher R R	123 Laher R R	169 Fremling C
13 Bellm E C	122 Cenko S B	162 Howell D A
12 Miller A A	122 De K	148 Sullivan M
12 Perley D A	118 Fremling C	146 Perley D A
12 Rusholme B	115 Shupe D L	140 Arcavi I
11 Blagorodnova N	108 Coughlin M W	131 Blagorodnova N
11 Kupfer T	105 Ho A Y Q	130 Walters R
11 Shupe D L	102 Perley D A	128 Foley R J
10 Graham M J	100 Corsi A	128 Smartt S J
10 Hung T	99 Dekany R	125 Bloom J S
10 Soumagnac M T	96 Golkhou V Z	125 Rest A
10 Yan L	95 Soumagnac M T	122 Berger E
9 Adams S M	89 Rix H	119 Miller A A
9 Gal-Yam A	88 Miller A A	118 Taddia F
9 Goobar A	86 Andreoni I	117 Chornock R
9 Neill J D	86 Ting Y	109 Masci F J
9 Taddia F	83 Yu H	107 Kasen D
9 Walters R	81 Ghosh A	105 Lunnan R
8 Andreoni I	79 Nissanke S	105 Valenti S
8 Dekany R	79 Schulze S	104 Goobar A
8 Frederick S	78 Ness M	103 Gezari S
8 Golkhou V Z	78 Riddle R	103 Quimby R M

```
----------------------------------------------------------------------
co-prosperity spheres
----------------------------------------------------------------------
```

1. Use ADS and make a list of papers.
2. Save the collection as a private library (useful, should you wish
   to redo the exercise)

3. Export the library using "Other Formats" and within that choose "Custom
   Format" and type in "%R, %c" (the quotes are not to be entered)
   in the "Enter Custom Format" box.
4. Save the output as, say, Author.dat
5. Save your ADS Token in file "ADS_Token"

Programs: Gen_ACR, bc2authors, HistogramAuthors

STEP 1: Generate list of bibcodes for refs and cites
```
$ ./Gen_ACR Author.dat
```

```
# output files:
# bc.dat      ... list of bibcodes of author with citations>0
# ref_bc.dat  ... list of bibcodes of papers referred to be the author
# cite_bc.dat ... list of bibcodes of papers citing the author
# CoAuthor.dat .. list of co-authors of the author
```

STEP 2: Obtain a histogram of co-authors
```
$ ./HistogramAuthors CoAuthor.dat > CA_hist.dat
```

STEP 3: Build and histogram list of authors of citations
```
$ ./bc2authors ref_bc.dat       #output: ref_bc_nnn.dat
$ cat ref_bc_*.dat | sed '/^#/d' > a
$ ./HistogramAuthors a > REF_hist.dat
```

STEP 4: Build and histogram list of authors of references
```
$ ./bc2authors cite_bc.dat       #output: cite_bc_nnn.dat
$ cat cite_bc_*.dat | sed '/^#/d' > a
$ ./HistogramAuthors a > CITE_hist.dat
```

STEP 5: Make a LaTeX Table
```
$ paste -d"&" <(head -20 CA_hist.dat) <(head -20 CITE_hist.dat) \
  <(head -20 REF_hist.dat) | sed 's/$/\\\cr/' > Table.tex
```

```
$ cat Table15.tex
\begin{table}[hbtp]
\begin{tabular}{lll}
\hrule\\
Co-Authors & Prosperity & Co-Prosperity \cr
\hrule\\
\input{Table.tex}
\end{tabular}
\end{table}
```

4