Nuclear Physics Authorship Trends

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Maximum number of authors in NSR was increased from 128 to 256 one year ago.


Is it a whole story???
Nuclear Science References Database

- P.J. Wyatt and others have analyzed small samples.
- NSR DB is a statistically-significant sample:
  - 215,000 articles
  - 92,600 authors
  - Timeline: 1896 to present
- In the early years, these data experience fluctuations due to insufficient number of publications, and become very reliable in the 50ies.
- Initial analysis of NSR Authorship evolution supports findings of P.J. Wyatt.
NSR & EXFOR Authors

- Annual trends of:
  - NSR Authors
  - NSR Experimental papers
  - EXFOR authors
- Increase ~1990
- Possible explanation:
  - The end of the "Cold War"???
  - Information Age Revolution (Internet effect)???
Internet Effect

- Collaborative style of research between different institutions.
- EXFOR database tracks authors’ affiliations.
- Number of affiliations correlates with authors.
- Average number of affiliations is equal to 2 in 1990 and 3 in 2000.
- Internet facilitates information exchange between physicists.
Experimental Nuclear Reaction Papers & Experiments

- Authors/Affiliations are going up while papers are down…
- EXFOR tracks a number of experiments in Area 1 (US & Canada), Area 2 (Europe), Area 3 (Africa, Asia, Latin America), Area 4 (Former USSR & Russian Federation) by grouping all relevant publications into a single entry.
The nature of research has changed in the 90ies due to closures and conversions of a large number of small facilities: Chalk River, Indiana, ORELA,...

- Smaller number of the more advanced facilities produces less papers.
- More sophisticated experiments that often require large teams.
- Relatively constant level of research staff and graduate students over the years.
- More lenient authorship rules, in the past important contributions were often listed in the acknowledgements.
- Information age revolution that made world-wide collaborations possible.
- Finally, authorship increase or “inflation of author list”.

Evolution of Research
Conclusions

- Results of the NSR and EXFOR bibliographical data mining have been presented.
- The data analysis shows a strong correlation between authorship increase of experimental papers and overall reduction of measurements due to closures of many small facilities.
- The increase of the group sizes coincide in time with the development of Web collaboration tools.
- These findings suggest that article authorship is a very complex phenomenon, and presently-observed increase or “inflation” in authorship could be explained by the adaption to the changing research environment, in addition to the evolving authorship rules that progressed over the years from very strict to lenient.
- An additional research is necessary to investigate these new trends in other areas of science.
Other Interesting Trends

- The largest number of articles per single scientist in NSR is 1017, and 100 out of 92600 authors have at least 330 publications.
- Such a large number of publications per single contributor could not be possible previously, when users operated a large number of small facilities.
- The overall number of nuclear reaction experiments in the area 1 is 37.16%, area 2 is 34.79%, area 3 is 13.35% and area 4 is 14.70% of the total.
- Additional funding is necessary to sustain scientific output in Area 1.
- The described above trends reflect a non-uniform distribution of nuclear science activities around the world.
- Data analysis was performed in September of 2014.