ON THE EVOLUTION OF ICPhS BETWEEN 1932 AND 2019

Jürgen Trouvain

Language Science and Technology, Saarland University, Saarbrücken (Germany)
trouvain [at] lst.uni-saarland.de

ABSTRACT

A freely accessible online collection to all ICPhS proceedings (1932-2019) is used to study changes over eight decades in the community of phonetic sciences. ICPhS not only evolved from a meeting with 38 contributions to a congress with about 800 papers but also shows a gradual tendency from single to multiple authorship. "International" in its name, ICPhS starts as a European event in the 1930s, complemented by North America in the 1960s, with a constant rise of contributions from Asia in the last 20 years. English became the dominant congress language of writing in the 1970s, other languages used before 1995 were German, French, and occasionally Russian. Whereas female authors represent a minority in the 1930s (10%), the gender balance was reached in the 1990s, in contrast to technology-oriented speech research conferences. These facts are seen as first steps towards a more comprehensive, content-based analysis of the field reflected in these proceedings.

Keywords: history of phonetics, ICPhS, archiving

1. INTRODUCTION

The International Congress of Phonetic Sciences (ICPhS) is probably the most known, the most popular and one of the earliest conferences for all aspects of phonetic research in the world. Proceedings of meetings like ICPhS provide an optimal opportunity to record and learn more about the current topics and research themes at the time. Thus, congress proceedings represent an extremely useful resource to keep track of research development, besides journal publications. In a long-term view, congress proceedings over several decades provide the opportunity to study changes in the scientific field, be it on topics, theories and models, methods, measurement instruments, evaluation of findings, elicitation and assessment of data, but also on metadata such as gender, language, or country of research affiliation.

Since 2007 the proceedings of all ICPhS meetings are published online. To complement such effort, the International Phonetic Association (IPA) also made the proceedings of 2003 and 1999 available on their website. Recently, the Phonetics group at Saarland University has closed the gap between the proceedings which are accessible online (1999-2019) and those which are not online (1932-1995). The latter are now accessible at [1] as searchable pdf documents.

The following list includes all locations and years of past ICPhS meetings. Please note the rather long gap of 23 years between 1938 and 1961. This can be partially explained by the second world war (WWII), as well as other reasons [2]. No printed proceedings from ICPhS 1975 were available.

1. Amsterdam, Netherlands (1932)
2. London, United Kingdom (1935)
3. Ghent, Belgium (1938)
4. Helsinki, Finland (1961)
5. Münster, Western Germany (1964)
6. Prague, Czechoslovakia, now Czechia (1967)
7. Montreal, Canada (1971)
8. Leeds, United Kingdom (1975)
9. Copenhagen, Denmark (1979)
10. Utrecht, Netherlands (1983)
11. Tallinn, Soviet Union, now Estonia (1987)
12. Aix-en-Provence, France (1991)
13. Stockholm, Sweden (1995)
14. San Francisco, USA (1999)
15. Barcelona, Spain (2003)
16. Saarbrücken, Germany (2007)
17. Hong Kong (2011)
18. Glasgow, United Kingdom (2015)
19. Melbourne, Australia (2019)

Using the meta-data over the history of the congress, we concentrated on 1) the size of the meeting in terms of presented papers, 2) the development of multiple authorship, 3) the diversity of languages which the paper was written in, 4) the geographical location of research affiliation, and 5) the gender distribution of researchers. This information allows us to overview some sociological aspects of the research community in phonetic sciences over a period longer than typically inspected. The use of a longer period is important because it can reveal aspects of dominance and blind spots that possibly lead to biases in the research output.

2. NUMBER OF PAPERS

Counting the number of papers seems to be rather trivial. However, it requires a definition of what counts as a paper. In the first three congresses, papers were often transcripts of talks rather than manuscripts or written articles in a standard format [3]. It might also be the case that authors were unable or unwilling to submit their paper, so that it did not appear in the proceedings.

Fig. 1 shows the development of the size of each meeting in terms of number of published papers. We can see a dramatic expansion in 1987. From then onwards all congresses accepted between 500 and 800 papers. The drop in 2007 can be explained by the decision that full papers rather than abstracts had to be submitted and maybe with a more rigid acceptance policy along with a lesser known congress location.
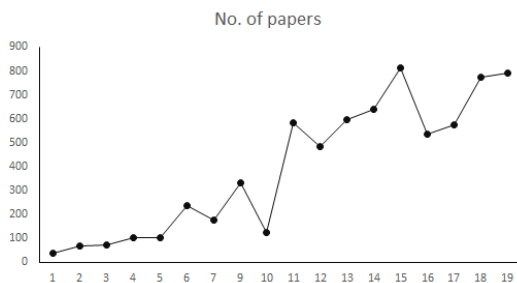

Figure 1: The absolute number of papers in the proceedings per year.

3. LANGUAGES IN PAPERS

Since 1995 English is the only language used in paper submission. Before that time, some degree of language diversity in published papers can be observed, see Fig. 2. Before WWII, German was the dominant language in 1932 and 1938, but not for the congress in 1935 in London. There were still 30% of all papers in German in 1967.

French was considerably used before WWII, but also thereafter, particularly when the congress was hosted in a French-speaking environment as it was the case 1971 in Montreal and 1991 in Aix-en-Provence. 1991 was the last time that papers were written in languages other than English.

Russian was also used at two meetings that were held in the *Eastern Bloc*: in 1967 (Prague, Czecho-slovakia) with 34 papers, and in 1987 (Tallinn, Soviet Union, now Estonia) with 47 papers. It is more a side-remark that only one paper in Russian was given in 1971. The same is valid for Italian in
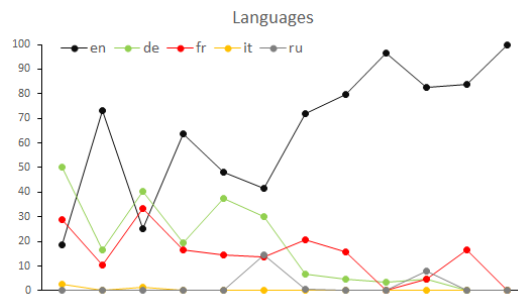

Figure 2: The relative number of papers written in different languages.

1932 and in 1983, respectively.

English has assumed a more dominant role as a language in research communication after WWII. Since 1971 constantly more than half of all papers per congress were written in English (leaving aside the peaks in 1935 in London, and in 1961, after WWII). From today's perspective, although English is the standard publishing language for most global or international conferences and journals, it is yet interesting to see that this dominance was present and established 50 years ago. The advantage of using just one language mastered to a certain degree by all congress delegates guarantees a common and constant means for sharing and exchanging ideas. The unavoidable disadvantage of mono-lingual exchange is the preferential treatment to native speakers of the dominant language being chosen, a group that usually represents a minority at such a conference.

4. NUMBER OF AUTHORS PER PAPER

From today's perspective, it is striking to see that exclusively all papers before WWII were written by only one author. In the beginning, single authorship was the rule, nowadays this is an exception (20%). This evolution is reflected in Fig. 3 where we can see a gradual change after WWII with a decreasing number of single-authored papers and an increasing number of papers with two authors. Papers with three authors increase with a slower pace but outnumber now single-authored papers. In the last congress in 2019, 14% of all contributions were written by four authors, a value reached in 1971 for two-authored papers and in 1983 for three-authored papers. Papers with five and more authors occur as well with the tendency to multiple-authorship, but they seem to be rather constant (below 10%).

The development from purely single to multiple authorship is clearly noticeable. The tendency to multiple authors is probably a consequence of the
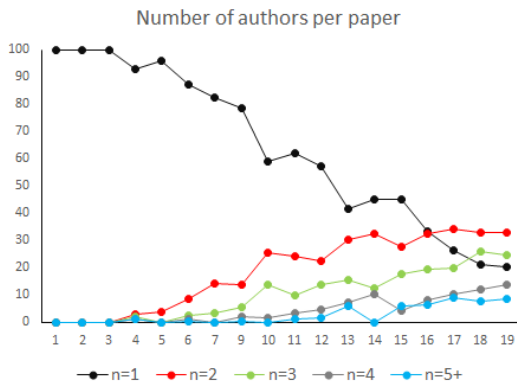
Figure 3: Percentage of papers pooled over the number of authors per paper.

fact that there are more researchers in general, and also more younger colleagues in early phases of their careers, which is likely to be linked to more employment opportunities and more labs.

5. GENDER

In relation to the paper counts reported in the prior sections, a pertinent aspect is to determine the gender of authors. It is not trivial and requires research on how to process or classify names. Typical challenges include that only initials are given, some names like *Kim* can be used for both sexes, and that for some names it was impossible to determine the sex (e.g. for romanized forms of Chinese names). In the end, nearly each congress contained a couple of unclear cases (ignored in this study). The absolute number of unclear cases increases with the number of authors, so the absolute numbers must be considered with some degree of uncertainty. However, the relative numbers do show a clear tendency.

In Fig. 4 we can see the gradual increase of female researchers in the phonetic community. However, this gradual increase does not start from the very beginning. Before WWII there were up to 18%, a value that was not unusual until 1983. Between 1987 and 2003, about a third of all authors were female. A real balance of nearly 50% has been reached in 2007 for the first time and has remained since then.

6. GEOGRAPHICAL AFFILIATION OF AUTHORS

Another important social factor which can be extracted from the metadata is the geographical affiliation of a paper's author/s presented at an international conference. For this parameter the country of the (first) research affiliation of the
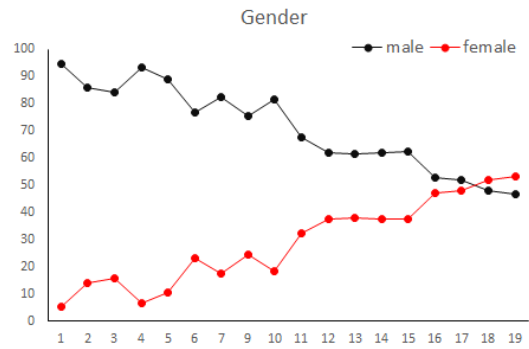

Figure 4: The relative number of authors pooled over gender of authors.

first author was determined. This also includes countries that do not exist nowadays like the Soviet Union, German Democratic Republic (GDR), or Czechoslovakia. In a number of cases, determining the country of affiliation required some further research when the country or the town was not indicated.

A pure list or table of countries would be rather complex. As a first approach we decided to allocate the countries to six continents: Europe (EUR), North America (NAM), Asia, South and Middle America (SAM), Africa (AFR), and Australia/Oceania (OCE). In Fig. 5 we can see the gradual shift from an exclusive European event in the 1930s to a real international conference where the authors with a European affiliation represent about a third in 2019. Contributions from North America started to increase after WWII. Papers from North America and Europe dominated with 90% of contributions. This dominant trend is gradually slowing in the millennium but still is rather strong with about two thirds in 2019. The trend was mostly contributed by authors from Asia.
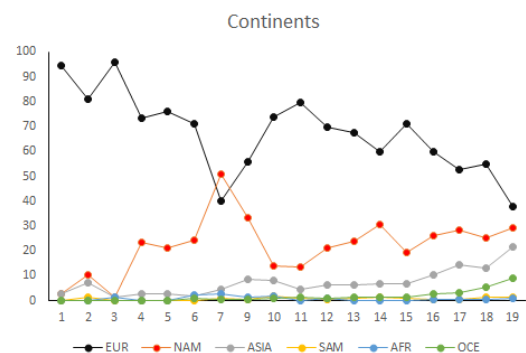

Figure 5: The relative number in % of first authors' first affiliations to countries binned by continents (see text for acronyms).

There is a clear association between congress location and country of delegates' affiliation. This link is also visible from the continent-wide perspective, e.g. the number of authors from North America at ICPhS in Montreal in 1971, or to a smaller extent, the number of authors from Oceania and perhaps also Asia at ICPhS in Melbourne in 2019.

A continent-wide view has its methodological weakness (e.g. both Saudia Arabia and Japan are currently classified under *Asia*, although geographically extremely distant). Nevertheless, it allows us to see the development from an intra-European congress to a conference with European and North American contributions to a meeting of the Northern hemisphere including Asia and Oceania as well. We can also see that South America and Africa are still underrepresented, although both are continents with the highest number of languages. Such imbalance in continental representation can have consequences for languages examined, recorded, taught, including phoneme inventory and supra-segmental characteristics.

7. SUMMARY AND CONCLUSIONS

Regarding the total number of papers ICPhS represents the largest congress in the phonetic sciences with an impressive growth over the years. It is obvious that the number of phonetic labs and also the number of researchers per lab have been growing. This is reflected by the increasing number of authors and the increasing number of countries different authors are affiliated with. Whereas female authors represented a minority in the 1930s (10%), the gender balance was reached in the 1990s. Regarding the number of authors per paper we can see a clear shift from single-authored to multiple- authored papers. Collaborative studies within a lab or between labs, often across countries, are the typical model. However, there seems to be a limit on the number of authors per paper. Regarding the countries of affiliation we can see that ICPhS evolved from a European to a much more international congress, still, with a great gap regarding countries of Africa, and to a lesser degree regarding countries of South America.

The freely available online access to the papers of all ICPhS proceedings allows us to conduct different types of studies with a historical perspective without the effort of procuring the primary literature resources. An example from the recent past is a study on the history of computational modelling and simulations in the phonetic sciences [4]. Other

examples refer to historical views on explicitly this congress and this community as was performed by [5] and [2] on comparisons between two time points, or by [6] on longer periods.

It is also interesting to compare this to historical overviews of other related conference series. In a historical outline of 50 years of the speech research conference of the French-speaking community (JEP) we can see parallels regarding multiple authorship and gender balance [7]. The large-scaled analysis project for different conferences and journals in the field of Natural Language Processing by [8] also includes meetings like *Interspeech*. Here, we can see parallels as well regarding growing number of papers and multiple authorship but also a distinct difference regarding gender. There is also a balance in the number of male and female authorship, however, this convergence is extremely slower than at ICPhS and JEP. In the more technology-oriented conferences female authors represent only about 20% of all authors [8].

Next steps in the historical analysis of the ICPhS Proceedings should focus on topic- or content-specific issues. For instance, this could involve questions such as "When did acoustic measurements become popular?" or "How did *coarticulation* become an established technical term?". Concepts that are taken for granted nowadays such as *coarticulation* and *formant* were infrequently used in the congresses before WWII [3].

Other questions relate to the most-cited references over the years or also which languages were object of studies. Many more inspirations for content-based analysis in the history of a scientific discipline can be found in [8].

8. ACKNOWLEDGEMENTS

9. REFERENCES

[1] "ICPhS proccedings," https://www.coli. uni-saarland.de/groups/BM/phonetics/resources. html#icphs.

[2] J.-F. Bonnot and L.-J. Boë, "So where should the 4th ICPhS take place? And why did it never occur?" in *Proc. 14th ICPhS*, San Francisco, 1999, pp. 1325–1328.

[3] J. Trouvain, "On the early history of ICPhS," in *Proc. Fifth International Workshop on the History of Speech Communication Research (HSCR 2022)*, Porto, 2023.

[4] D. Duran, "On the history of computational modelling and simulations in the phonetic sciences," in *Proc. Second International Workshop on the History of Speech Communication Research (HSCR 2017)*, 2017, pp. 95–98.

[5] P. Šturm, "International phonetic congresses: the shift in research practices and areas of interest over 44 years," in *Proc. 18th ICPhS*, Glasgow, 2015.

[6] K. Kohler, "Two anniversaries: 75 years of international congresses of phonetic sciences and 50 years of Phonetica," *Phonetica*, vol. 64, pp. 73–79, 2007.

[7] V. Delvaux, G. Luxardo, and F. Hirsch, "Une histoire de JEP : 50 and d'études sur la parole," in *Proc. XXXIIe Journées d'Études sur la Parole*, Aix-en-Provence, 2018, pp. 365–373.

[8] J. Mariani, G. Francopoulo, and P. Paroubek, "The NLP4NLP Corpus (i): 50 years of publication, collaboration and citation in speech and language processing," *Frontiers in Research Metrics and Analytics*, vol. 3, 2019. [Online]. Available: https://www.frontiersin.org/articles/10.3389/frma.2018.00036