The Sinuous Road towards Global Mathematics

Twenty-eight ICMs, two IMUs, and a moving web of international organizations

Norbert Schappacher
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Strasbourg, 27 September 2021

The calendar is like a metronome

Something happened here in Strasbourg 101 years ago.

It calls for being situated in the longer history of international cooperation in mathematics.

Norbert Schappacher

Framing Global Mathematics

The International Mathematical Union between Politics and Theorems

Let us walk through the book

Up to World War I: IAA, *Enzyklopädie*, the first ICMs
A predominantly European Story

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I delegati dell'Associazione Internazionale delle Accademie (adunanze in Roma, 9-15 maggio 1910).

1. Senatore Blaserna – 2. Prof. de Arrillaga – 3. Prof. van de Sande Bakhuyzen – 4. Sir Geikie – 5. Prof. Picard – 6. Prof. von Lang – 7. Prof. Baklund – 8. Prof. Waldeyer – 9. Prof. Schäfer – 10. Prof. Imbart de la Tour – 11 Prof. Sakurai – 12. Prof. Goldziher – 13. Prof. Snouck Hurgronje – 14. Prof. Salemann – 15. Senatore Dalla Vedova – 16. Generale Bassot – 17. Prof. Ehlers. – 18. Prof. Toldt – 19. Prof. Tschernischew – 20. Prof. von Schroeder. – 21. Prof. Retzius – 22. Ing. Mancini – 23. Prof. Leo – 24. Prof. Lindemann – 25. Prof. Heiberg – 26. Sir Larmor – 27. Conte Balzani – 28. Prof. Guidi – 29. Prof. Conklin – 30 Senatore Volterra – 31. Prof. Crusius. – 32. Prof. Lüders – 33. Prof. Diels – 34. Barone de Bildt – 35. Prof. Schuster – 36. Prof. Danilevski – 37. Prof. Turner – 38. Ten. Col. Prain.

Source: Archive Akademie der Wiss. Göttingen

The first ICMs before the Great War have an independent history.

1897 Zürich
1900 Paris
1904 Heidelberg
1908 Rome
1912 Cambridge, UK
~~1916 Stockholm~~

For their first congress the mathematicians were careful to select a host country known for its attention to international causes, the most emblematic example being the International Committee of the Red Cross in Geneva founded in 1863. Hurwitz's welcome speech at the 1897 ICM in Zürich avoided any allusion to national motives, insisting merely on the contrast between lonely work in the study and the exchange with colleagues.[190]

Neither IAA nor another substitute of IMU was involved in organizing these ICMs.
The torch was passed on from one organizing committee to the next.

An ICM was planned by Gösta Mittag-Leffler for Stockholm in 1916.

Two Chapters on upheavals: inside mathematics, and on the battlefields of the Great War

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1918 - 1928. A new structure for *Science International*. The first IMU

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Two of the Big Five — with George Hale, Georges Lecointe, and Arthur Schuster — who created the IRC starting in 1918.

Source: Bibliothèque IRMA Strasbourg

1918 - 1920 The new *International Research Council* IRC

- First inter-Allied meeting in October 1918. Very efficient setup of a new umbrella organization for international scientific unions.

- The approach is top-down: First the IRC; Then the Scientific Unions, with statutes conformal to those of the IRC (July 1919, Brussels).

- Two motivations, represented by the two mathematicians shown:

- 1. taking control by excluding the “central powers”, in particular Germany;

- 2. perpetuating state financed, war related applied research funding into the post-war period: lift “National Research Councils” that had been created for instance in the US and in Italy to the international level.

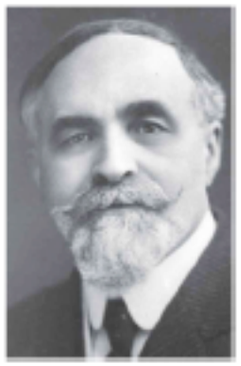
- Neutral states (such as Sweden or The Netherlands) were invited only later.

- Everything was done very quickly, not to lose control of the international scene in times of peace. This may be the reason for the “sunset clause” in the statutes.

A slide from a lecture by **Danielle Fauque** in 2019 (Colloque COFUSI)

Les académiciens français et les Unions

B. Baillaud



Ch.Moureu

G. Ferrié

Ch.Lallemand

Y. Delage

Cinq Unions dont le Bureau est constitué.
Les présidents :

Astronomy — UAI: B. Baillaud (F)
Geology — UGGI: Ch. Lallemand (F)
Chemistry — UICPA: Ch. Moureu (F)
Radio Science — URSI: Général G. Ferrié (F)
Biology — UISB: Y. Delage (F)

Cas de l'UAI

32 commissions, 287 postes
21 français pour 69 postes soit
24% des postes dont
50 postes pour des académiciens (72%)
6 postes de présidence
25 postes pour Deslandres et Bigourdan
Avec Baillaud et Hamy : 54% des postes

The IMU is almost created in 1919

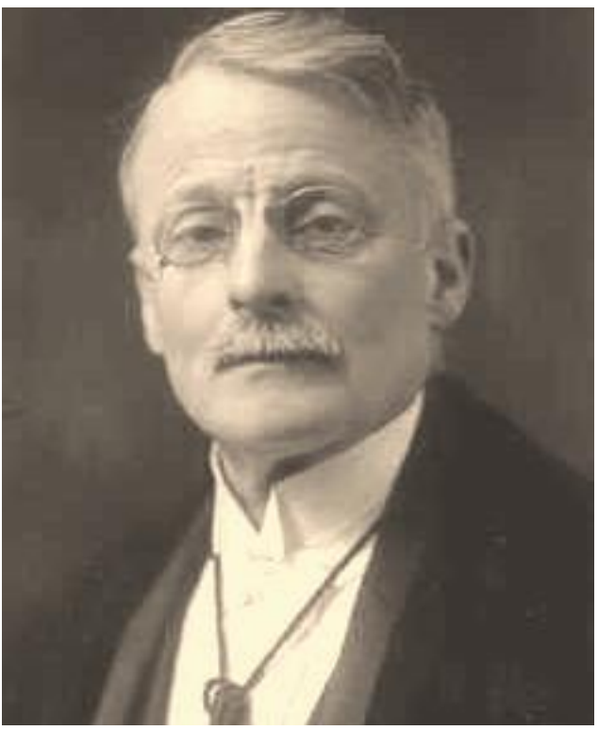
Other union projects were also discussed in Brussels, but could not be finalized in 1919. This was the case in particular for physics—the physicists were not sufficiently advanced in their plans to even propose a provisional executive committee in Brussels—and for mathematics. The following account of the mathematicians' discussion in Brussels can be found in the official report about the Constitutive Assembly of IRC.[23]

D. International Union of Mathematicians.
The sessions are chaired by Mr. de la Vallée Poussin.[24]

Mr. De Donder[25] acts as secretary.

The assembly accepts the proposed statutes unanimously...

The assembly expresses the wish to see an International Congress of Mathematicians organized in September 1920; M. Kœnigs[26] hopes that it will be possible to hold this Congress in Strasbourg. This proposal meets with unanimous consent.



... the assembly expresses the wish that the authors of mathematical papers or treatises send, right after the publication of their works, abstracts of these to an organism whose task it will be to centralize and coordinate all bibliographical abstracts; this organism will be lodged in Paris, or in another scientific centre, and will be linked as far as possible to an existing similar agency.

The delegates present [at the sessions discussing the project of an IMU] form the *Provisional Committee* of the International Union of Mathematicians. Its Executive Committee consists of:

Honorary Presidents: Mr. H. Lamb[27], E. Picard and V. Volterra;

President: Mr. de la Vallée Poussin;

Vice-President: Mr. W.H. Young[28];

Secretaries: Mr. de Donder, Kœnigs, Petrovich[29], and Reina[30].

The remaining delegates in the Provisional Committee are: Mr. Demoulin[31], de Ruyts[32], Glaisher[33], Parenty[34], Stuyvaert[35].

"According to the wish expressed in Brussels [in 1919] by the IMU, the National Committee has actively engaged in organizing the International Congress, which ….
is to open in Strasbourg on 22 September 1920 …"

CONGRÈS INTERNATIONAL

DES MATHÉMATICIENS

Suivant le vœu émis à Bruxelles par l'Union Internationale des Mathématiciens, le *Comité National Français* s'est activement occupé de l'organisation du Congrès international qui, comme vous en a informé une première circulaire, doit s'ouvrir à Strasbourg le 22 septembre 1920. L'accueil fait par nos Collègues à cette entreprise, nous permet de compter dès maintenant sur la présence de nombreux mathématiciens accompagnés de leur famille.

Nous sommes aujourd'hui en mesure de vous donner quelques indications sur le programme du Congrès, ainsi que les conditions matérielles du séjour à Strasbourg.

TRAVAUX SCIENTIFIQUES

Les séances se tiendront dans les salles du Palais de l'Université (place de l'Université).

Dans la première séance plénière, seront précisées la composition et les attributions ces différentes sections Ces dernières se réuniront ensuite pour procéder à l'élection de leur bureau, des secrétaires chargés de recueillir leurs délibérations, et pour fixer le programme de leurs travaux. Les élections, votes et délibérations auront lieu suivant les formes et la procédure habituellement en usage dans les assemblées.

Déjà plusieurs de nos Collègues nous ont fait connaître les sujets des recherches scientifiques dont ils pensent entretenir les congressistes et nous espérons que nombre d'autres annonceront bientôt les communications qu'ils comptent faire au cours des différentes séances.

En outre, nous avons le plaisir de pouvoir annoncer, que plusieurs mathématiciens éminents ont bien voulu accepter de faire des conférences spéciales sur leurs travaux récents.

RÉCEPTIONS OFFICIELLES

La ville de Strasbourg a fait connaître au Comité son intention d'organiser des réceptions officielles en l'honneur des hôtes du Congrès; le programme détaillé qui sera remis à chaque congressiste lors de son arrivée en fera connaître l'heure et le lieu.

EXCURSIONS

Le Comité a cru répondre au désir de ses invités en décidant de les faire profiter de l'occasion qui les attire à Strasbourg, pour visiter la région alsacienne.

A cet effet, il a organisé un certain nombre d'excursions et de promenades dont vous trouverez ci-joint la liste ainsi que le prix.

Elles auront lieu suivant un horaire qui sera établi ultérieurement.

SÉJOUR A STRASBOURG

Un bureau de réception sera ouvert dès le 18 septembre sur la place de la Gare, immédiatement en face de la sortie des voyageurs les congressistes y trouveront leurs cartes, programmes, etc. ainsi que tous les renseignements qui leur seront nécessaires ou agréables.

Le Comité local d'organisation a particulièrement étudié la question du logement. Il compte profiter des ressources fournies par les hôtels, pensions de famille et aussi les particuliers qui voudront bien mettre des appartements à sa disposition. Ceux des congressistes, qui en auront fait la demande en temps utile, trouveront à leur arrivée leur chambre retenue ; les demandes sur ce point seront naturellement satisfaites suivant leur ordre de réception.

Source: BNUS Strasbourg

So the UMI kind of existed already, when it was officially founded on Monday. 20 Sep 1920.

CONGRÈS INTERNATIONAL DES MATHÉMATICIENS

SOUS LE HAUT PATRONAGE

de l'Académie des Sciences
du Ministère de l'Instruction Publique
et du Commissariat Général d'Alsace-Lorraine

Strasbourg, le 1er Juillet 1920.

MONSIEUR,

Le Ministre de l'Instruction Publique et le Comité National Français ont l'honneur de vous inviter à faire partie du Comité d'Organisation du Congrès International des Mathématiciens, qui se tiendra à Strasbourg du 22 au 30 septembre prochain.

Nous vous serions très reconnaissants de bien vouloir assister à la première Séance Plénière du Comité, qui aura lieu au **Palais de l'Université de Strasbourg** (1er étage, Salle A, contigüe à la grande Salle des Fêtes) le **samedi 10 juillet, à 3 h. 1/2 de l'après-midi.**

Monsieur Gabriel Kœnigs, Membre de l'Académie des Sciences, Secrétaire du Comité National Français, présidera cette réunion, où seront constituées les diverses Commissions.

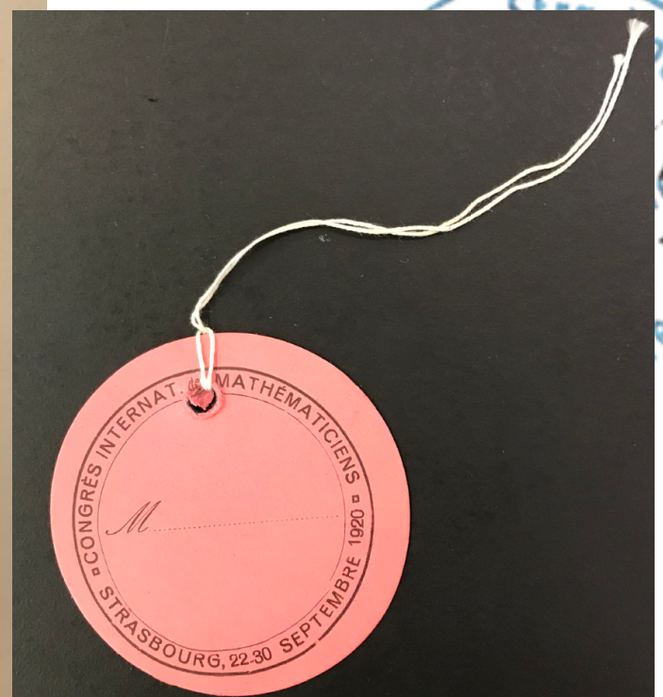
Veuillez agréer, Monsieur, l'expression de nos sentiments les plus distingués.

E. PICARD,
Secrétaire perpétuel de l'Académie des Sciences,
Président du Comité National Français des Mathématiciens.

Pour le Comité du Congrès :

H. VILLAT,
Professeur à la Faculté des Sciences de Strasbourg.
11, rue du Maréchal-Pétain (Strasbourg).

Monsieur Gerock, Bibliothèque de l'Université.



Source: BNUS Strasbourg

Plan of this building distributed to the participants of the 1920 ICM

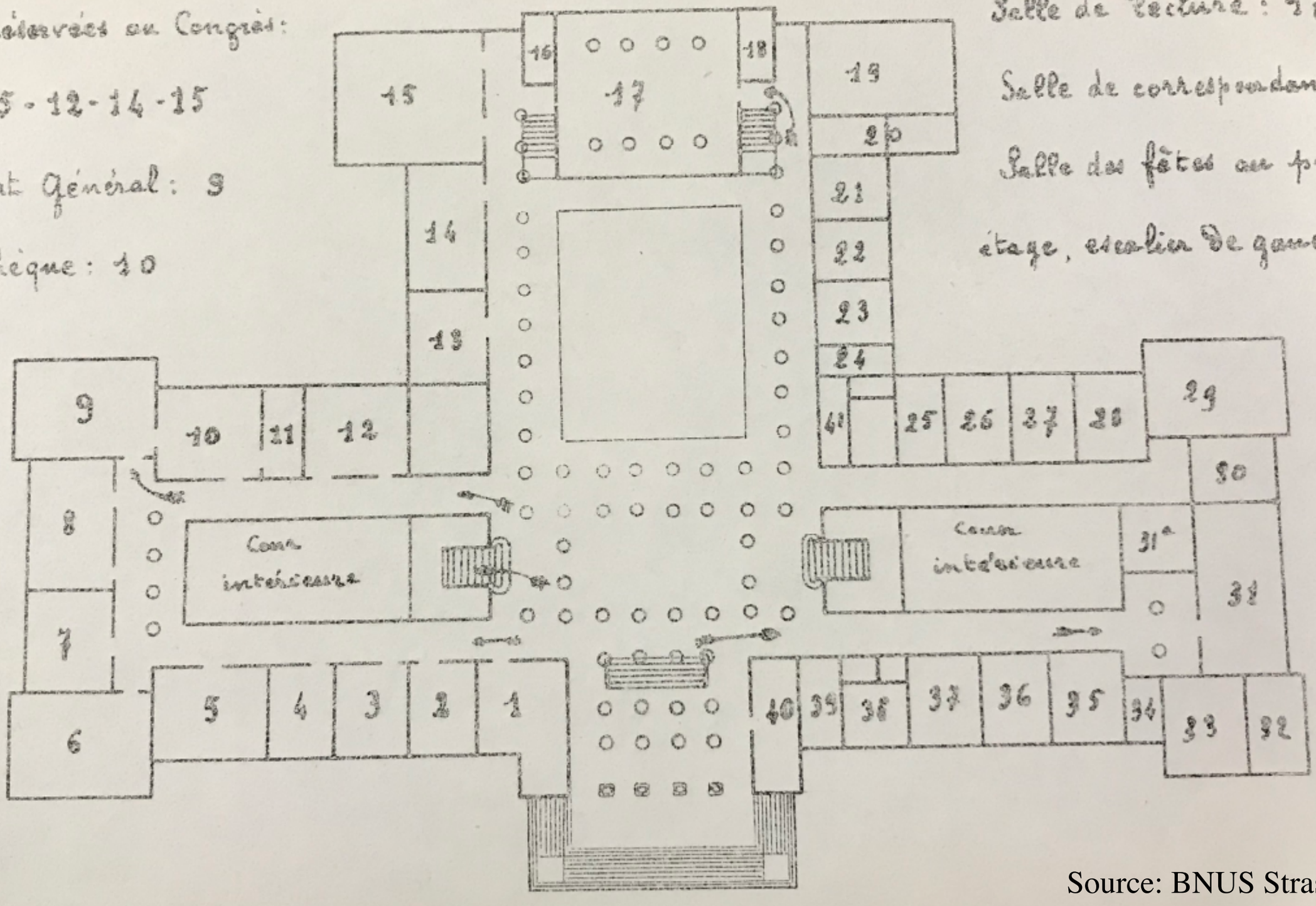
PALAIS DE L'UNIVERSITÉ

Salles réservées au Congrès:

2 - 3 - 4 - 5 - 12 - 14 - 15

Secrétariat Général : 9

Bibliothèque : 10



Salle de lecture : 17

Salle de correspondance : 31

Salle des fêtes au premier étage, escalier de gauche

Source: BNUS Strasbourg

1918 - 1928. A new structure for *Science International*. The first IMU

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A lecture from the Strasbourg ICM which was not reproduced in the Proceedings

> Prof. [Pierre Ernest] Weiss, the director of the Strasbourg Institute of Physics, gave an account of the methods of soundranging in use in the French Army during the war. The method normally employed was the same as that in use in the British Army. A useful alternative was the *méthode à courtes bases*, in which six or more microphones were placed in pairs. The microphones of each pair were about a hundred metres apart, so that the gun locus became a straight line (asymptote), and at once gave the direction of the hostile gun. The installation was very simple, and could be made in an hour, while single sets of observations could be reduced and reported in a minute. This method was used, not for the accurate location of gun emplacements, but for determining quickly which one of the known hostile batteries was in action. Guns were also successfully located by observations of the *onde de choque*. The normals to this wave-surface determine a caustic which is nearly constant in form for high-velocity shells. To locate the gun emplacement, a standard caustic drawn on tracing-paper was fitted by trial to the normals determined by the instruments. This method was used when atmospheric conditions made the spherical wave imperceptible, and, although less accurate, it gave very good results. A case was quoted where 80 per cent. of the hostile emplacements were correctly located solely by *ondes de choque*.[82]

Before the war, Pierre Weiss had established his own institute on magnetic research at the Zürich Polytechnique; he was now about to do the same in Strasbourg.[83] Incidentally, since his days at ENS, Pierre Weiss was a close friend of Élie Cartan who attended the ICM and gave a lecture. Cartan was accompanied by his wife and four children, among them his eldest son Henri Cartan (1904–2008), who would start teaching regularly at Strasbourg University in 1931, and marry Pierre Weiss's daughter Nicole in 1935.

From the list if participants
of the Strasbourg ICM:

CARTAN (E.), professeur à la Sorbonne, 4, avenue de Montespan, Le Chesnaye (Seine-et-Oise).

Mme CARTAN, Mlle CARTAN ;
MM. Jean, Louis, Henri CARTAN.

Henri Cartan

Elie Cartan was a close friend of Pierre Weiss.
His eldest son Henri was born in 1904.

From Norbert Wiener's memoirs

The last International Mathematical Congress before the war had taken place in England in 1912, at Cambridge. The congress which was to have taken place in 1916 was clearly impossible and was allowed to go by the board. The next one, in 1920, did not find any adequate machinery established for its organization. France decided to step into the gap and celebrate an international congress in the newly re-Gallicized city of Strasbourg and at its university, now French. This had become the second university of France and the only provincial university with a great tradition of its own.

In many ways this was an unfortunate decision. It was one which later led me to regret my little share in sanctioning the meeting by my presence. The Germans were excluded as a sort of punitive measure. In my mature, considered opinion, punitive measures are out of place in international scientific relations. Perhaps it would have been impossible to hold a truly international meeting for another couple of years, but this delay would have been preferable to what actually did take place, the nationalization of a truly international institution. All that I can say for myself is that I was young and that I did not feel myself in a position of direct personal responsibility for the course taken by international science.[76]

This a telling example of what the first IMU would represent in hindsight.

1918 - 1928. A new structure for *Science International*. The first IMU

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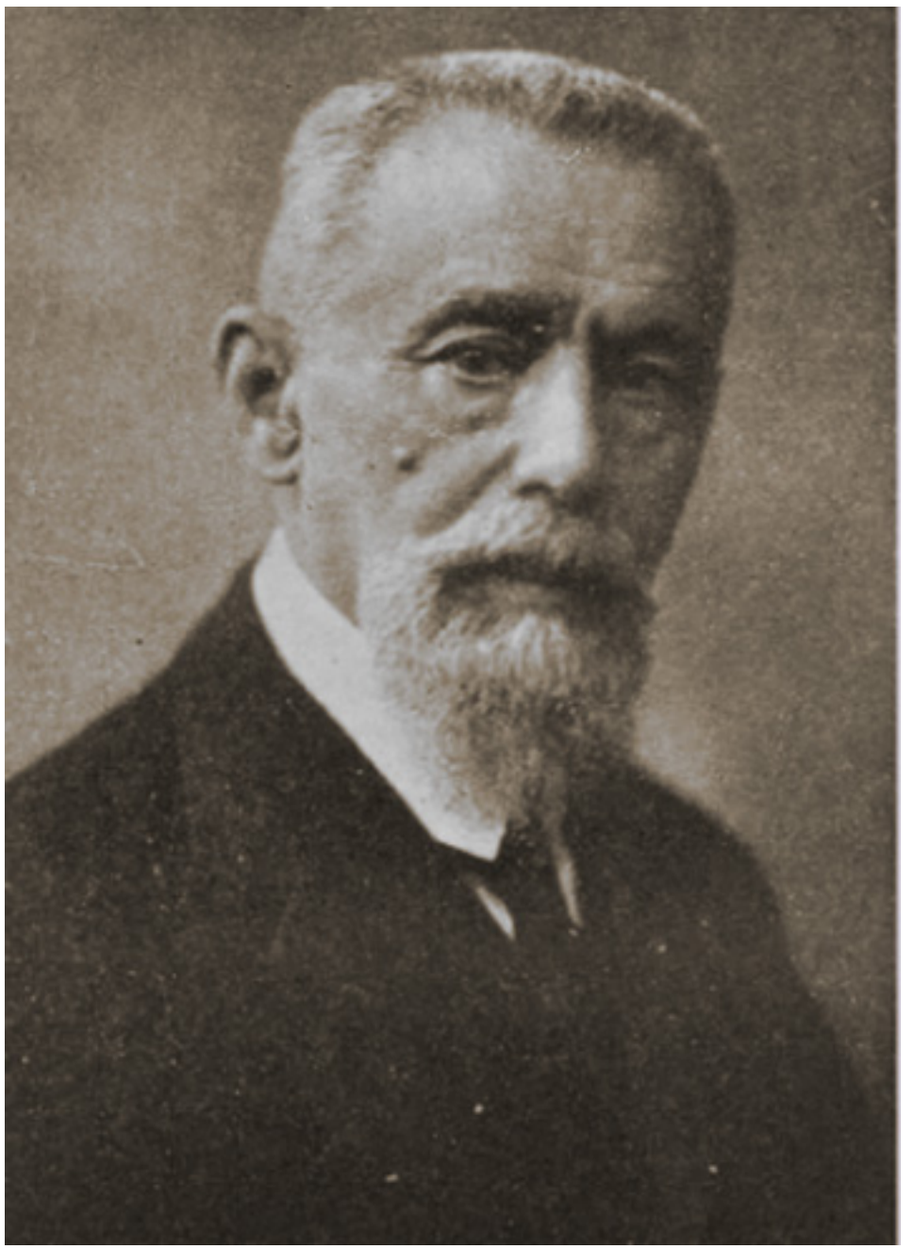
From Edwin B. Wilson's letter to Émile Picard, 19 Dec 1924, summing up his feelings after the Toronto ICM of 1924

Now as I see it the only hope of getting back to reasonably universal and cordial relations among scientific men lies in our exercising a great deal of good taste and charity and keeping out of political entanglements. In a certain sense the International Research Council is political. In this country our state department pays our dues and it would not do so if there were no political aspect to the organization of the International Research Council. I should expect that this political aspect would enable certain persons in power to continue the exclusion of the Germans if they so determined and thereby to delay the resumption first of pleasant scientific cooperation between the various groups of scientists in this country with the French on one hand and the Germans on the other, and further delay the gradual re-establishment of amicable scientific relationship between the French and Germans. I personally regard the organization of the International Research Council as possibly, though not surely, a bad thing for future international cooperation among scientific people. I personally believe that when relations between two parties are strained it is best to have nothing which will add to the group consciousness of either party and to have all arrangements so thoroughly informal and individual that each person of whatever nation comes not as a representative in any way of his nationality but as a scientist with his scientific interests. And I venture to forecast that in those fields such as physics where we have no international organization under the International Research Council we may attain to truly international congresses earlier than in those branches such as mathematics where there is such an organization.

Thanks to R. Siegmund-Schultze for the copy



Salvatore Pincherle
IMU President
&
Organizer of the
1928 ICM in Bologna

The 1928 ICM at Bologna

Pincherle managed to mount the 1928 ICM without the IMU, inviting German mathematicians, because he had the backing of Mussolini.

After the 1928 Congress the IMU was in agony.

The definite “liquidation” followed in 1932.

The IMU was the only International Scientific Union which did not manage to adapt to the historical development of the 1920s, and transform into a Union of ICSU after the 1932 mutation of IRC into ICSU.

There are many more interesting things to relate about
the international development of the mathematical profession
between the two World Wars
than the hapless story of the first IMU.

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1932 Zürich!

After yet another World War …

Marshall Stone

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Twice ~60 years of ICMs

Organized without IMU

1897 Zürich
1900 Paris
1904 Heidelberg
1908 Rome
1912 Cambridge, UK
~~1916 Stockholm~~

First IMU imposes exclusion

1920 Strasbourg
1924 Toronto
1928 Bologna
1932 Zürich
1936 Oslo

Second IMU in creation or existence

1950 Cambridge, Massachusetts
1954 Amsterdam
1958 Edinburgh

The coming together of ICMs and IMU

1962 Stockholm
1966 Moscow
1970 Nice
1974 Vancouver
1978 Helsinki
1982/3 Warsaw
1986 Berkeley
1990 Kyoto
1994 Zürich
1998 Berlin
2002 Beijing
2006 Madrid
2010 Hyderabad
2014 Seoul
2018 Rio de Janeiro

What lessons were there to be learned from the failure of the old IMU?

Olli Lehto

Mathematics Without Borders

A History of the International Mathematical Union

With 55 Illustrations

1998

Looking at Olli Lehto's book (whose title has been chosen as the motto for today's event), many have taken as the basic lesson the principle:

Avoid exclusion on the basis of national origin.

And this line of conduct has been taken to be synonymous to "being apolitical".

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These were of course not the first interferences of politics with the IMU, whose birth was overshadowed by the Cold War.

From a letter of Israel Halperin to Jacques-Louis Lions 7 May 1982

As is well know, the professor of mathematics J.L. Massera has been tortured and then held a prisoner in Uruguay in spite of actions to obtain his freedom by thousands of individual scientists and scientific societies over six years. Some months ago, an international Campaign was started by Profesors Henri Cartan of France and Israel Halperin of Canada to persuade the Government of Uruguay that their image in the world would suffer more damage by continued imprisonment of Prof. Massera than by anything he might say if he were released.

This International Campaign now has the formal support of the Mathematical Societies of Canada, France, Yugoslavia, Italy, Denmark and Czechoslovakia. We anticipate that this list will grow as other Mathematical Societies can arrange to put the question to their memberships.

International Campaign-Massera would like to ask the IMU to take one or more of the following actions:

l. Issue a public statement expressing the wish that Prof. Massera be allowed to go immediately to France or Italy, in both of which countries he has standing invitations.

2. Recommend to adhering National Organizations and National Committees of Mathematics that they in turn take such action as they find appropriate to obtain the release of Professor Massera.

I appreciate that some voices will be raised in opposition to this request on the grounds that the IMU is not authorised to get involved in politics. But it should be clear to all that this is a question of simple humanity and does not involve political attitudes or influence. I imagine that we would all agree that if the IMU had at a certain point in time protested the inhuman treatment of Banach and many other scientists that no one to-day would criticise that action.

The IMU has consistently abstained from throwing its considerable reputation behind such causes or campaigns.

"The E.C. felt that even though as individuals the members are very much concerned with human rights IMU as an organization should refer such matters to ICSU."

Letter Lehto to Rosenzweig, 26 May 1987

Today the reference would be to the ***Committee for Freedom and Responsibility in the Conduct of Science*** (CFRS) of the ISC, which was set up with a new remit in 2005, "which covers not only the special rights of scientists but also the special responsibilities that are concomitant to those rights."

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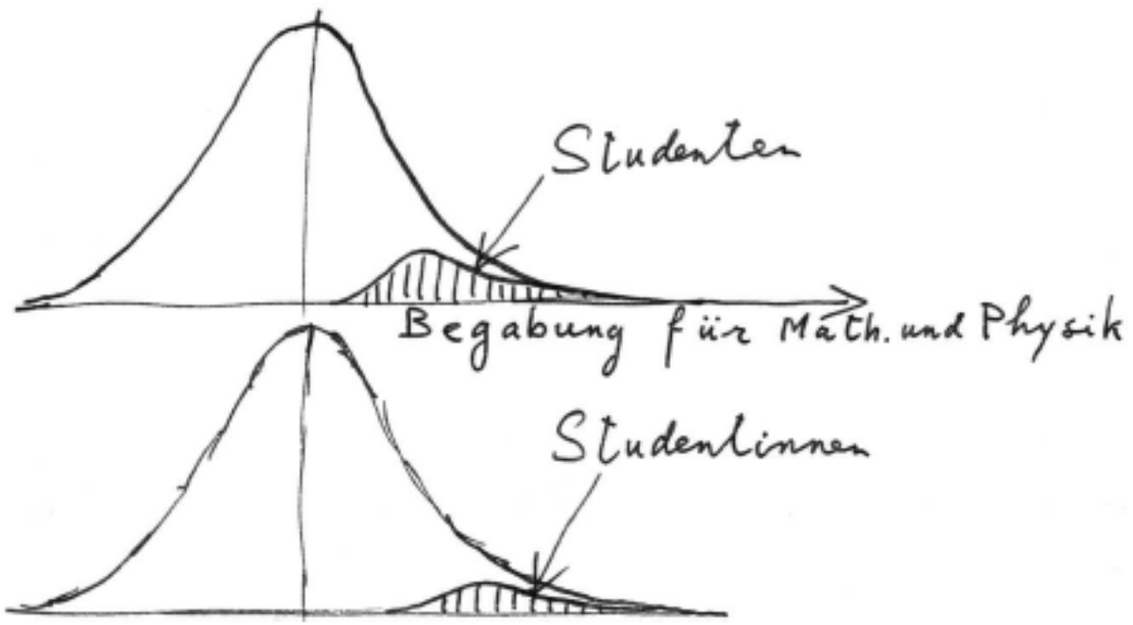
Sehr geehrte Frau Dr. Dick,

Besten Dank für die Zusendung Ihres sehr interessanten Aufsatzes "Die Mathematik und die Mädchen".

Die statistische Untersuchung, von der ich sprach, habe ich inzwischen durchgeführt. Ich habe mich dabei auf theoretische Physiker und Mathematiker beschränkt, die in den Jahren 1900 - 1950 studiert und in den Jahren 1910 - 1960 ihre grössten Leistungen vollbracht haben. Ich schätze, dass in den Jahren 1900 - 1950 mindestens 20 % der Studenten an europäischen und amerikanischen Universitäten Mädchen waren. Die"Nullhypothese", die wir prüfen wollen, ist die Hypothese, dass Knaben und Mädchen von Natur aus gleich begabt sind. Aus zwei genau gleichen Reservoirs von Knaben und Mädchen im Alter von 18 bis 20 Jahren werden also durch einen sozialen Selektionsprozess diejenigen ausgewählt, die nachher an den Universitäten studieren Bei der Selektion spielt die Begabung eine grosse Rolle, aber auch soziale Gesichtspunkte und Vorurteile. Je stärker die Begabung, um so weniger spielen die sozialen Gesichtspunkte eine Rolle. Bei den Mädchen ist die Selektion strenger als bei den Knaben, also ist zu erwarten, dass die schliesslich zum Studium zugelassenen Mädchen im Durchschnitt etwas höher begabt sein werden als die Knaben (s.Figur).



-2

Fig. 10.1 First page of Van der Waerden's letter. Distribution of 'talent for mathematics and physics' among all students, resp. female students.

Source: ETH Archive, Zürich / Auguste Dick Legacy, Vienna;
thanks to R. Siegmund-Schultze for the Vienna copy with drawings.

The Last Chapter

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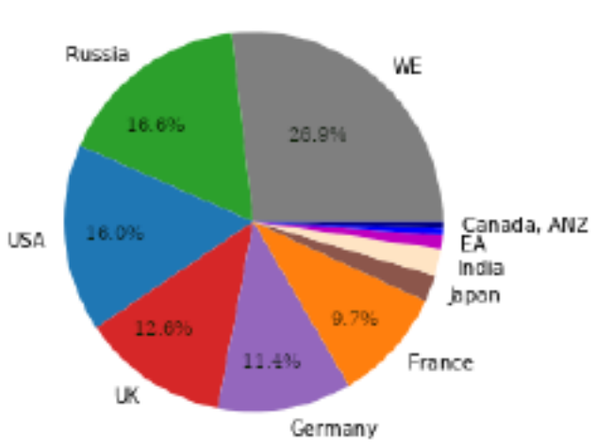
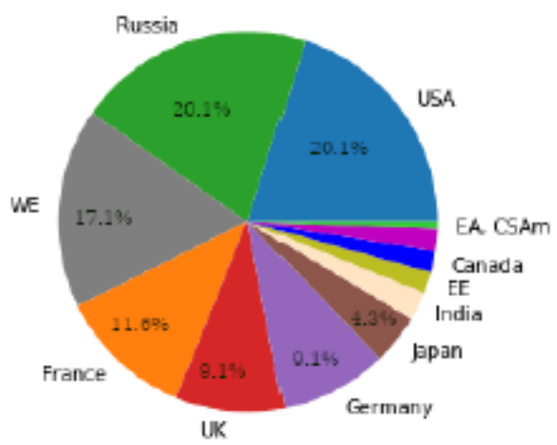
Structure Committee

Sections 10.3 - 10.5 exploit a quantitative analysis of ICM distinctions,
which today have a considerable career impact,
for the period 1950 - 2018,
worked out by **Birgit PETRI,**
and partly based on data graciously provided by ***Zentralblatt.***

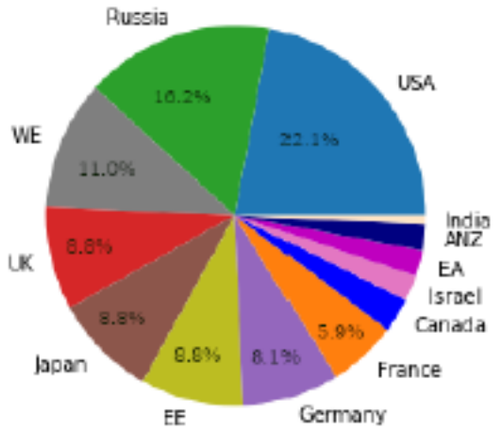
Geographic distribution
of our total population (big charts),
resp. of the subpopulation of
plenary speakers (small charts),
according to countries of origin.



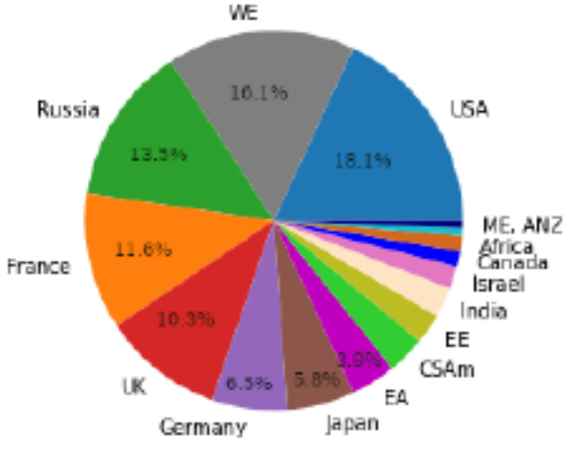
Period 1. 1950-62



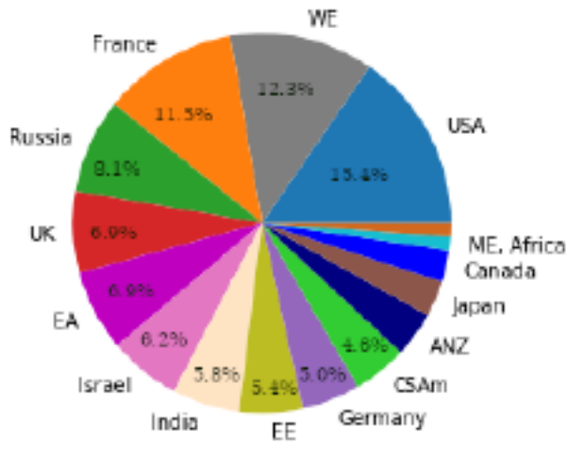
Period 2. 1966-78



Period 3. 1983-90

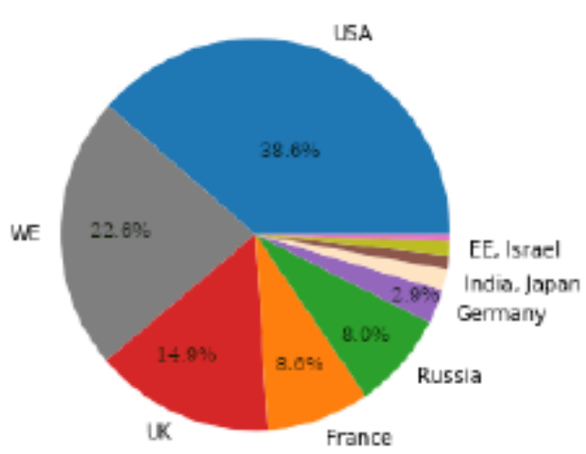


Period 4. 1994-02

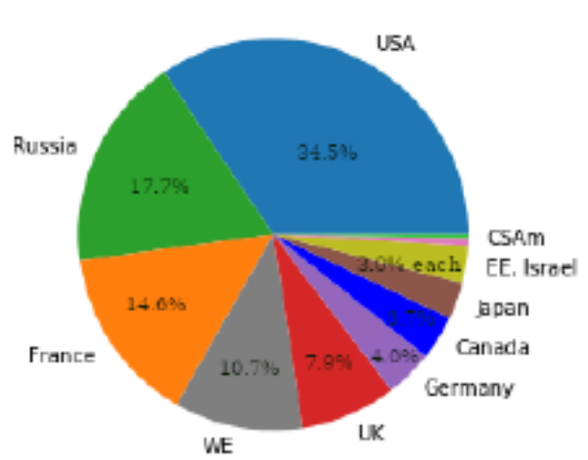


Period 5. 2006-18

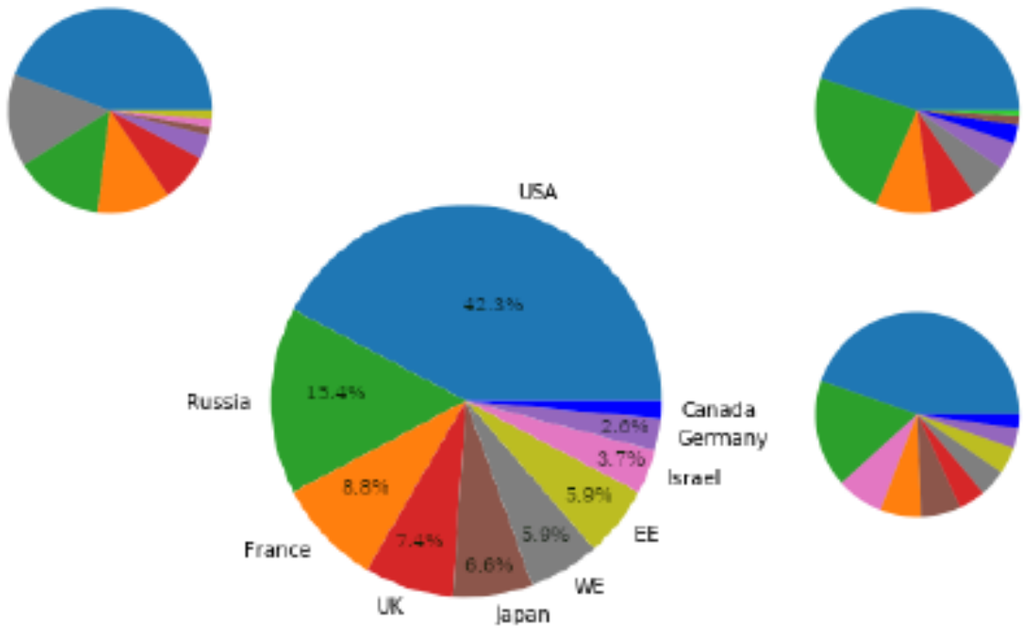
Geographic distribution
of our total population (big charts),
resp. of the subpopulation of
plenary speakers (small charts),
according to professional affiliation.



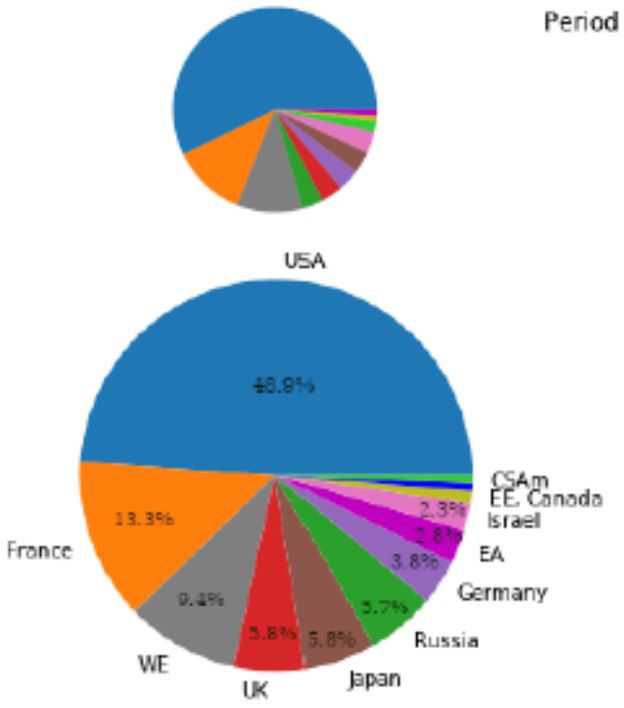
Period 1. 1950-62



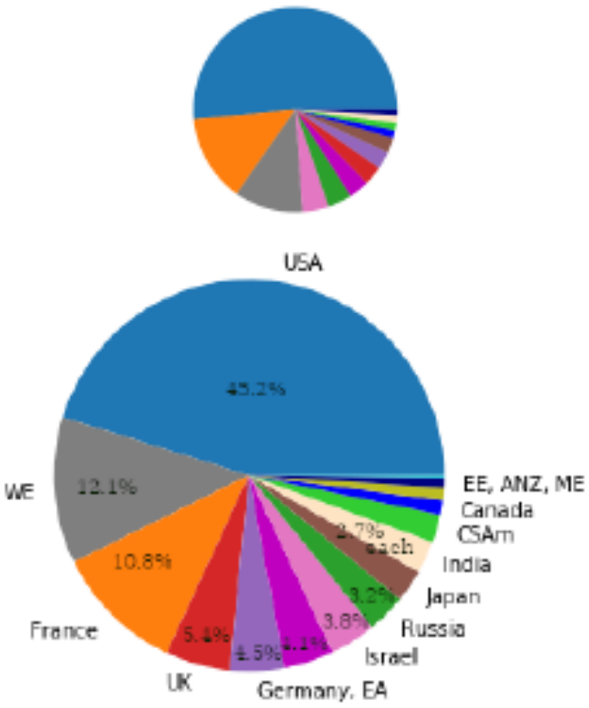
Period 2. 1966-78



Period 3. 1983-90

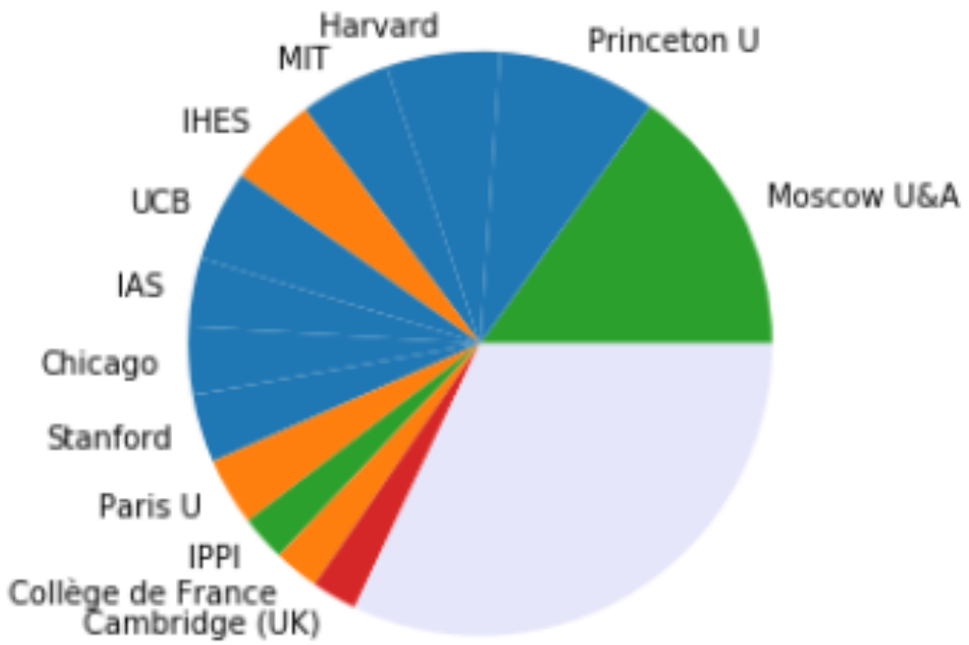


Period 4. 1994-02

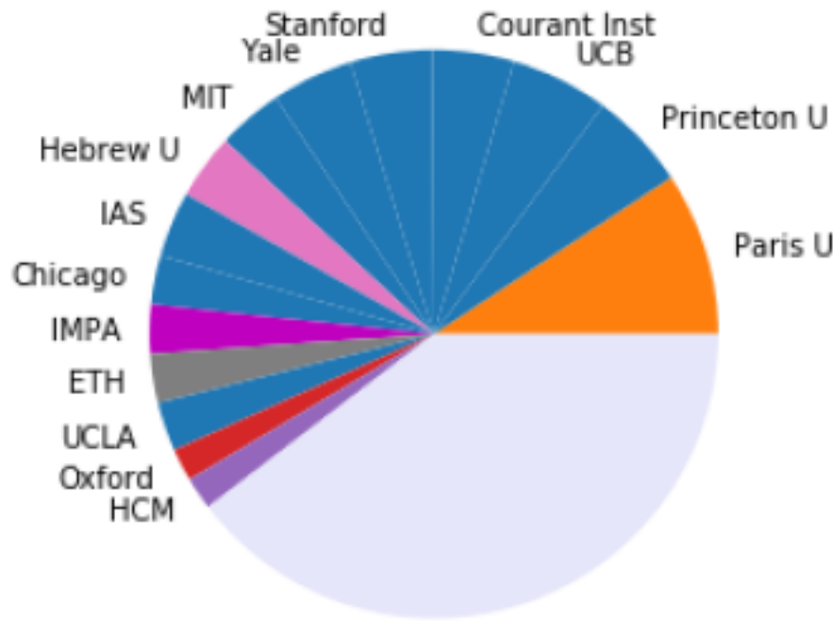


Period 5. 2006-18

Institutions employing exceptionally many mathematicians that play distinguished roles at the ICMs of a given period.



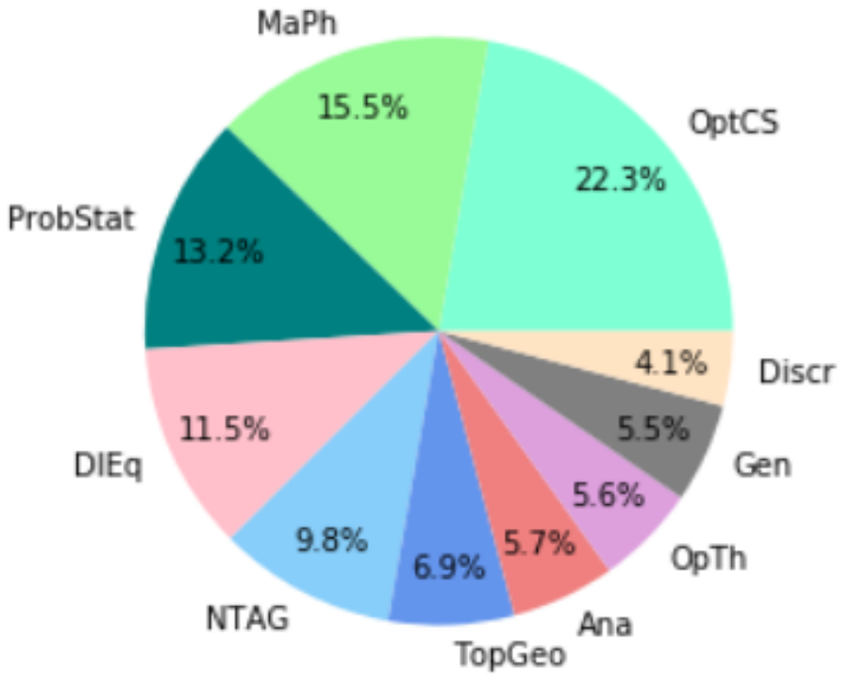
Period 2, 1966-78



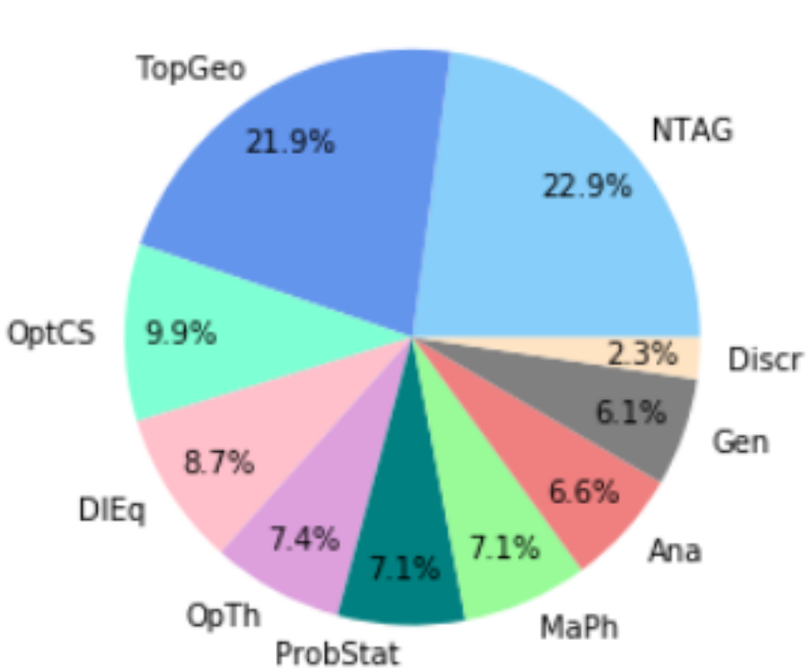
Period 5, 2006-18

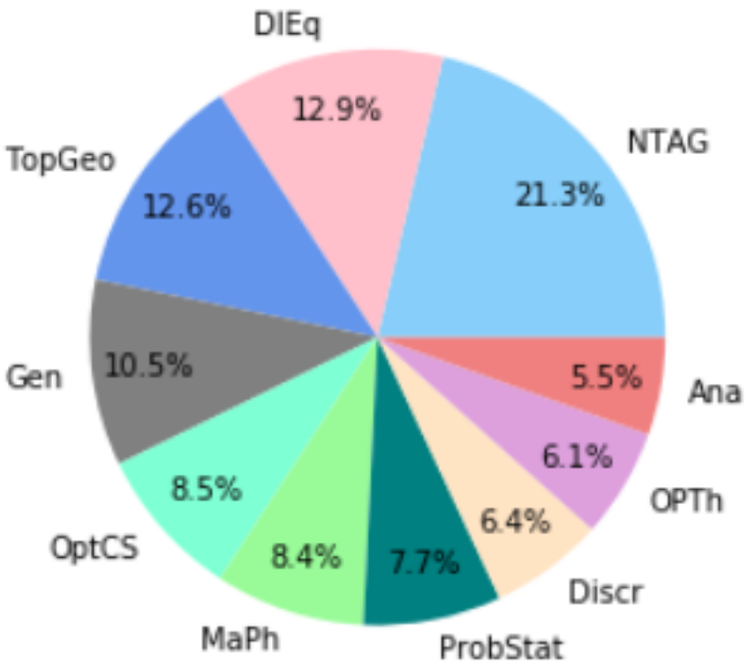
2 example periods

1949 - 2020



What kind of a filter does the selection of plenary speakers amount to in terms of the major domains of mathematics.





Since January 2011, the Secretariat of the International Mathematical Union is permanently based in Berlin, Germany. Under the supervision of the IMU Executive Committee, the Secretariat runs IMU's day-to-day business and provides support for many IMU operations, including administrative assistance for the International Commission on Mathematical Instruction (ICMI) and the Commission for Developing Countries (CDC). The IMU Secretariat also hosts the IMU archive.

Today the IMU counts 87 members

The success of the IMU
is the result of the work
and interaction of
many dedicated
colleagues.