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A SCIENTOMETRIC STUDY OF  
IAEA ACTIVATION ANALYSIS CONFERENCES

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Neutron activation analysis (NAA) is an interesting area of science to study: it is relatively homogeneous, yet in application it crosses almost the entire spectrum of science.

Progress in the field of nucleonics (which includes NAA) is reviewed biennially,<sup>1</sup> and the author and others have often noted that NAA is a field wherein much of the communication occurs through conferences. NAA also commands strong international interest and a number of international conferences covering this subject have been held. In 1973 the content of papers at three different NAA international conferences were reviewed<sup>2</sup> and in 1977 the growth and decay of the literature of NAA was explored.<sup>3</sup> But communication is primarily by conference, and perhaps the most prestigious international conferences are those sponsored by the International Atomic Energy Agency (IAEA).

Three IAEA conferences with the title "Nuclear Techniques in the Life Sciences" have been held within the past 11 years.<sup>3</sup> These similar meetings thus offered an excellent opportunity to study conference communication in activation analysis. Since meeting attendance is somewhat of a "plum" and since IAEA meetings are special plums, we thought it instructive to analyze attendance, papers, and chairmanships at three meetings to see what trends, if any, could be observed in the content and participation of these meetings. Session titles might be a clue as to whether contents were stable or rapidly changing; the appearance of the same speakers over and over again might indicate stagnation, lack of new researchers entering the field, or inbreeding. Or perhaps just that the dominant workers of the past continue to be dominant.

But rather than study NAA in vacuo we decided to make comparisons with another IAEA conference series: "Medical Scintigraphy." This in turn led to the thought "are IAEA conferences really different?" So study was made of two other conference series: the U.S. conference series, "Trace Substances in Environmental Health," held at the University of Missouri over a number of years and "AEC Air Cleaning Conferences" sponsored by the U.S. Atomic Energy

Commission and its successor, ERDA, which draws a large attendance from both scientists and engineers.

Total and overlapping attendance and speakers at three different IAEA conferences on Nuclear Activation Techniques in the Life Sciences: Amsterdam (1967); Bled, Yugoslavia (1972); and Vienna (1978) were tabulated and from these the probability of a person giving a paper at meeting  $\alpha$  was calculated:

$$P_{\alpha} = \frac{S_{\alpha}}{N_{\alpha}} \quad (1)$$

where  $S_{\alpha}$  = total number of speakers

$N_{\alpha}$  = total number of attendees.

Likewise, the probability of a speaker giving a paper at two conferences is:

$$P_{\alpha\beta} = \frac{S_{\alpha}}{N_{\alpha}} \cdot \frac{S_{\beta}}{N_{\beta}} = P_{\alpha} \cdot P_{\beta} \quad (2)$$

and at three conferences

$$P_{\alpha\beta\gamma} = \frac{S_{\alpha}}{N_{\alpha}} \cdot \frac{S_{\beta}}{N_{\beta}} \cdot \frac{S_{\gamma}}{N_{\gamma}} = P_{\alpha} \cdot P_{\beta} \cdot P_{\gamma} \quad (3)$$

If one knows the number of multiple attendees at any two meetings,  $N_{\alpha\beta}$ , one can calculate the expected number of multiple speakers

$$S_{\alpha\beta} = P_{\alpha} P_{\beta} \cdot N_{\alpha\beta}. \quad (4)$$

This calculation has been made for the three dual combinations shown in Table 1 as well as for the theoretically expected number giving a paper at all three conferences. From Table 1 one sees that the number of observed multiple speakers is almost twice the expected number for two meetings, and is three times the calculated number for all three. This seems clear evidence that there is an elite within NAA that is statistically over represented on programs. However, when these results are compared with those obtained from the other three meetings (Table 2) it becomes apparent that an elite exists in all the meetings.

Studies of session titles, attendance by country, session chairmen, and conference secretariat of the two IAEA conferences indicate the NAA group to be less "ingrown" than the other. In comparison with all the other conference series

studied NAA appears to be equally innovative and about as open for participation.

#### REFERENCES

1. W. S. Lyon and H. H. Ross, Anal. Chem. 50, No. 5, 80R-86R (1978).
2. W. S. Lyon, Anal. Chem. 45, 383A-386A (1973).
3. W. S. Lyon, T. Braun, and E. Bujdoso, Anal. Chem. 49, 682A-686A (1977).

TABLE 1

Calculated and Observed Multiple Speakers at  
IAEA NAA in Life Sciences  
Total Speakers S = 124

<u>Multiple years</u>	<u>P = probability of giving a paper</u>	<u>N = number of attendees at multiple meetings</u>	<u>Multiple Speakers</u>	
			<u>Theoretical</u>	<u>Observed</u>
67, 72	0.14	39	5	12
72, 78	0.20	44	9	13
67, 78	0.11	34	4	8
67, 72, 78	0.056	12	1	3

TABLE 2

Calculated and Observed Multiple Speakers

A  
IAEA Medical Scintigraphy  
Total Speakers S = 206

<u>Multiple years</u>	<u>Multiple Speakers</u>	
	<u>Theoretical</u>	<u>Observed</u>
64, 68	6	26
68, 73	7	30
64, 73	3	13
64, 68 73	1	6

B  
University of Missouri Trace Substances  
Total Speakers S = 123

<u>Multiple years</u>	<u>Multiple Speakers</u>	
	<u>Theoretical</u>	<u>Observed</u>
69, 71	2	2
71, 76	2	7
69, 76	2	2
69, 71 76	0.3	1

C  
Air Cleaning Conferences  
Total Speakers S = 140

<u>Multiple years</u>	<u>Multiple Speakers</u>	
	<u>Theoretical</u>	<u>Observed</u>
68, 72	1	6
72, 76	3	9
68, 76	1	3
68, 72 76	0.1	3