UNIVERSITY OF TORONTO

Department of Mathematics

August 8, 2001

Dear Connaught Committee,

I am writing to request financial support from the University of Toronto Connaught Fund for a major international conference that will be held in Toronto one week in June 1998. The purpose of this conference, *Formal Power Series and Algebraic Combinatorics/Séries Formelles et Combinatoire Algébrique* (FPSAC/SFCA), is to deepen the relations between combinatorics and other fields of mathematics and sciences, in particular, computer science and geometry. This conference is modeled upon major conferences in algebraic combinatorics which have been held in recent years in Europe and North America, including Montréal in 1992. These symposia have brought many stimulating interchanges and tightened international bonds among the participants. Due to the successes of these previous conferences, the convenience of Toronto for international travelers, and its reputation as a nice place to visit in the summer, we expect to have up to 200 participants at this meeting. This conference in Toronto will be the most significant gathering in 1998 of those who work algebraic combinatorics and related areas and a successful conference will increase the international profile of the University of Toronto.

The conference will likely be held on the University of Toronto campus, with some events at the Fields Institute. In addition to supporting the invited speakers, we hope to encourage the participation of promising junior researchers and graduate students by offering financial support to graduate students and postdocs. There are plans to run a Fields Institute graduate course in algebraic combinatorics in the winter term, and for some expository lectures the week prior to the conference to enable graduate students and non-experts to get more out of the conference.

We are seeking support from several sources including the Fields Institute and the Centre de Recherche Mathématiques (CRM) in Montréal to help fund this international symposium. We request a sum of $ 10,000 from the Connaught fund to help make this a successful conference.

The following three pages contain a more detailed description of the intended scientific program of this conference, a preliminary budget, and a list of other sources of funding we are seeking. I am writing on behalf of the local organizing committee, of which I am a member.

Thank you,

Frank Sottile
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Department of Mathematics

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Formal Power Series and Algebraic Combinatorics 98

Scientific content

The relationship between algebraic and enumerative combinatorics, and computer science is very deep. On one hand, complexity issues in computer science rely on counting techniques and the development of efficient algorithms often depends on the understanding of some combinatorial structures: graphs, posets, matroids, polytopes, etc. On the other hand, combinatorialists use computers for computations and the visualization of objects. This conference will feature both aspects of this relationship. Another major theme is the interaction of algebraic combinatorics with other fields in mathematics. The following connections will be represented in this conference:

- Finite geometry in connection with posets, polytopes, and oriented matroids.
- Algebraic geometry using combinatorial models to describe cohomology of certain varieties or to give computational algorithms.
- Homology via posets (shellable, Cohen-Macaulay, etc.)
- Physics: symmetric polynomials with parameters are eigenvalues of physical model operators.
- Statistical physics via the enumeration of polyominos, stacks of pieces, animals, etc.

Conference program

The official languages of this conference are French and English. This conference will offer five types of scientific sessions:

- eight to ten invited talks
- twenty to thirty contributed 30 minute talks
- one or two sessions of ten posters
- one session devoted to software demonstrations
- one problem session.

The speakers for the conference will be chosen in the following manner. We give a list of potential invited speakers below, and this document concludes with the present composition of the committees involved in its planning. This list of possible invited speakers will be voted on this summer by the executive committee, which consists of senior researchers in this area. At that time, we will begin to invite speakers.

Extended abstracts of potential contributed talks/poster sessions will be accepted in Autumn 1997. Each proposal will be evaluated by two members of the scientific committee or independent referees. Following that, the contributed talks and poster sessions will be decided by a vote of the scientific committee in winter 1998. Those abstracts accepted for submission will be compiled into a bound conference proceedings that will be given to each participant upon their arrival at the conference. After the conference, the authors will have the option to submit a paper to appear in a special issue of *Discrete Mathematics* (refereed).

Possible Invited Speakers: (First choices)

G. Andrews (Penn. State U.,USA) Georgia Benkart (Wisconsin, USA),
Aart Blokhuis (Eindhoven, Netherlands) Peter Cameron (London, England),
Patrick Dehornoy (Caen, France), Persi Diaconis (Harvard, USA),
William Fulton (Chicago, USA), Robert MacPherson (IAS, USA),
Jean Yves Thibon (Paris, France), J. B. Zuber (CENS, France).

Other Possible Invited Speakers:

Christopher Godsil (Waterloo U.), Tom Koornwinder (Amsterdam, Netherlands),
Michael O. Rabin (Harvard, USA), Arun Ram (Princeton, USA),

Arto Salomaa (Turku, Finland), Bernd Sturmfels (Berkeley, USA),

Contribution to Graduate education

Problems in algebraic combinatorics and their solutions are often elementary, hence within the grasp of graduate students. On the other hand, these problems often arise from deep mathematical theory: algebraic geometry, homology, etc. For this reason, a conference like this could be a great motivation for graduate students in mathematics and stimulate their interests in other fields. To take full advantage of this opportunity, we have proposed a graduate course at the Fields Institute for winter 1998 in algebraic combinatorics related to topics of the program. We also propose to have a series of expository lectures in the days preceding the conference to introduce graduate students and non-experts to this field. The speakers (1 or 2) for these expository lectures would also need financial support. As well as helping introduce local students to this field, such a pre conference would help European graduate students get funding from their departments or countries both increasing participation and allowing the support of others' attendance. In winter 1996, a successful such preconference was held in conjunction with a Fields Institute workshop on Geometry and Physics.

Distribution of participants

Toronto is an ideal location for this conference. The access is easy for both Europeans and Americans, as well as Canadian researchers, and Toronto is recognized as a pleasant city to visit in the summer. We will also attract researchers from Japan, China and Australia. We expect to have up to 200 participants at this meeting; Last summer there was a comparable meeting in Minneapolis which drew 127 participants with 42 Graduate students and 11 postdocs requesting partial support. We expect fewer graduate students primarily because there are fewer graduate students in Toronto than in Minneapolis. However, we expect substantially more participants because of Toronto's reputation and the convenience for international travelers. Also, the availability of University residences and inexpensive hotels near the University will lower the cost and hence increase the number of participants.

Due to the expected number of participants, we hope to have the invited and contributed talks in a large lecture hall on the University campus, preferably close to the Fields Institute. We hope to hold the other sessions in the Fields Institute.

Preliminary Budget

We will charge a registration fee of perhaps $150 (half that for graduate students) to cover the costs of providing refreshments, a conference dinner, the bound version of the extended abstracts, and a contribution towards the cost of supporting the invited speakers.

We will also need to provide support for invited speakers and partial support for other speakers, postdocs, and graduate students as follows:

- 10-12 invited speakers (2 for the expository preconference), traveling costs and per diem ($ 2,000 on average): $ 24,000.
- speakers, postdocs and graduate students, contribution to traveling costs and per diem ($ 500 on average, with 40 persons having support): $ 20,000.

The administrative costs including publicity and secretarial support are part of our proposal to the Fields Institute; we also expect that the departments of the local organizers, including the mathematics departments of Waterloo, York, and Toronto, will help with secretarial support.

Requested support from the Connaught fund

We request a sum of \$ 10,000 from the Connaught fund to help make this meeting a success.

Other Sources of support

- We have submitted a proposal to the Fields Institute asking for logistics support, financial support, a reduced teaching load for one semester for one member of the organizing committee, and the Fields graduate course in algebraic combinatorics. The logistics support includes secretarial support, access to computers for participants, and a room for the software demonstration. The financial support we have requested is for \$ 20,000.
- We have submitted a proposal to the *Centre de Recherche Mathématique* (CRM), and we anticipate an amount of \$ 5,000 from them.
- There is a grant application pending for scientific exchanges between York University and Bordeaux (Ontario-Aquitaine Collaboration Program). This would help support participants from France, as well as from Bordeaux, and this proposal looks very promising. We expect to use \$ 5,000 from this grant for FPSAC.
- The registration fees should contribute \$ 2,000 to the support of invited speakers.
- We expect that some support for graduate students may come from individual NSERC research grants of some participants. This amount could be as much as \$ 2,000.
- Since the conference is officially bilingual, we will try to partially support one French invited speaker using the *Fondation Franco-Ontarienne*. This may amount to \$ 1,000.
- We also plan to submit a proposal for support to Waterloo Maple, a software company which makes a very popular mathematical software.

Executive Committee:

P. Leroux, President (LACIM, UQAM),
M. Delest (LaBRI, France), D. Krob (LITP, France),
R. Simion (George Wash. U.), V. Strehl (Erlangen, Germany).

J. Berstel (France), A. Björner (Sweden), R. Cori (France), G. Duchamp (France),
I. Gessel (USA), G. Jacob (France), A. Kerber (Germany), G. C. Rota (USA),
C. Reutenauer (Canada), X. Viennot (France), D. Zeilberger (USA),

Scientific Committee: (Preliminary List).

I. Goulden, Chairman (U. of Waterloo), N. Bergeron (York U.),
C. Reutenauer (UQAM), F. Sottile (U. Toronto), T. Visentin (U. Winnipeg).

S. Billey (USA), F. Brenti (Italy), R. Cori (France), S. Dulucq (France)
K. Eriksson (Sweden), O. Foda (Australia), S. Fomin (USA), I. Gessel (USA),
C. Greene (USA), A. Hamel (England), D. Kim (Korea), C. Krattenthaler (Austria),
D. Krob (France), M. Noy (Spain), V. Reiner (USA), M. Wachs (USA),
H. Yamada (Japan), G. Ziegler (Germany).

Organizing Committee:

N. Bergeron, Chairman (York U.),
M. Delest (U. de Bordeaux), F. Sottile (U. Toronto), W. Whiteley (York U.).