WORLD FEDERATION OF NATIONAL MATHEMATICS COMPETITIONS

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A History of the Federation through My Eyes

by Alexander Soifer, President

Peter O'Halloran receiving his David Hilbert Award from the Chairman of the AMT Board Professor Don Aitkin, at his home on 31 August 1994. Professor Bernard H. Neumann looks on.

Professor Peter O'Halloran of Australia, Executive Director of the Australian Mathematics Trust, envisioned the World Federation of National Mathematics Competitions.

O'Halloran's *singular vision*, energy and will made the Federation possible. It was born in 1984 in Adelaide, Australia, during the 5th International Congress on Mathematical Education, (ICME-5).

O'Halloran's *singular vision* also made the Federation a Theatre of One Actor, King Peter. No dissent was encouraged. For example, in 1994, at the Federation's 2nd Congress in Pravetz, Bulgaria, Peter ordered me to stop the Olympiads Section, organized by Kiril Bankov and I, in the middle. He and I had a brief exchange:

– Shut your section now, I wish to prepare here the General Meeting of the Federation.

– Sorry Peter, I cannot do it. People travelled across the globe to give their talks.

O'Halloran led the Federation for 10 years, almost until his passing in 1994. Academician Blagovest H. Sendov of Bulgaria was handpicked by O'Halloran as his successor, but the successor was not into games of mathematical kind. He aspired to the Presidency of Bulgaria, and in 1995 became the second highest politician of his country, Chairman of Bulgaria's National Assembly. The steering wheel of the Federation stood unattended.

Then there came Ronald G. Dunkley of Canada. In 1996 he was asked to become the President of the Federation. A minute before the General Membership Meeting of the Federation during ICME-8 in Seville, Spain, Ron asked me whether I was willing to help. "Sure," I replied, not knowing what Ron had in mind. At the meeting, Ron commenced a democratisation of the Federation. He nominated 'critical' thinkers to the Executive Committee: Tony Gardiner of Great Britain to Vice-President, and me to Secretary and member of the Program Committee. Ron made the first Constitution of the Federation possible. Six years earlier, in 1990, Ron Dunkley and his Canadian colleagues Ron Scoins, Lloyd Auckland, and others, invented and hosted the unforgettable First Congress of the Federation in their native Waterloo, Canada.

From the left: Dimiter Dimitrov, Kiril Bankov, Alexander Soifer, Ronald Dunkley, Peter Taylor & Konstantin Tsiskartidze, 3rd Congress WFNMC, Zhongshan, China, 1998

In 2000 in Japan, the Federation elected the new President, Peter J. Taylor of Australia. Peter continued the democratisation of the Federation by proposing a Constitutional Amendment limiting President's service to one-term, which first applied to Peter himself. Peter also organized the lovely 4th Federation's Congress in 2002 in Melbourne, Australia.

Three Presidents, One Drink: from the left, Peter Taylor, Alexander Soifer & Petar Kenderov, 4th Congress of WFNMC, Melbourne, 2002

In 2004, Academician Petar S. Kenderov of Bulgaria was elected President. For the first time the Federation earned its history, written by President Kenderov. Earlier, in 1994, Petar spearheaded the 2nd Congress of the Federation in Pravetz, Bulgaria. At about the same time, Bulgaria created the logo for the Federation.

The year 2008 saw the birth of the first Madam President, Maria Falk de Losada of Colombia. A few days earlier, Maria organized, funded, and ran the first Mini-Conference of the Federation a day before ICME-11 in Monterrey, Mexico. The dinner in the Ethnographic Museum, among the masterpieces of Pre-Columbian Art, was unforgettable. Maria continued this most important undertaking by organizing and running the Mini-Conference in 2012, before ICME-12 in Seoul, South Korea. In 2016, she kindly took upon herself the logistics and funding of the Mini-Conference in Hamburg, Germany, right before ICME-13. Maria also organized the Federation's 7th Congress in 2014 in Barranquilla, Colombia.

Madam President Maria Falk de Losada and Senator Ricardo Losada, Canberra, 2000. Photo by A. Soifer

In 2012, at the General Meeting of the Federation in Seoul, during ICME-12, the membership elected me to the Presidency. I Two years earlier, in 2010, I created the International Program of the Federation's 6th Congress in Riga, Latvia, on request of the person, who envisioned that Congress but fell ill, Professor Agnis Andžāns. Ever since my joining the Federation 32 years ago, my main goal has been to bring Mathematical Olympiads closer to research mathematics, to build two-way bridges between the two. After all, according to Professor Boris Delone of Russia, the only difference between an Olympiad problem and a research problem is that the former takes 5 hours while the latter 5,000 hours to solve. I was guided by principles of democracy and inclusiveness, and commitment to high ethics we pursue inside WFNMC and outside. I believe that there is no good Art or good Science, unless we build them on the foundation of high ethical principles.

In 2016, during ICME-13 in Hamburg, our Executive Committee discussed what to do – if anything – about the highest authority of our profession, International Mathematics Union (IMU), ever since 1981 giving to best theoretical computer scientists *The Rolf Nevanlinna Prize*. In my historical research, I discovered that Nevanlinna, while a good mathematician, praised Hitler as liberator of Europe, and recruited *SS* troops in his Finland. I intended to write a letter to IMU urging the name change of the prize but felt it could have stronger effect if it came from our Executive. The proposal to send a letter went to a vote. One member voted against believing – as do so many other mathematicians – that as a math organization, we should stick to math and not meddle in issues of morality and politics. The great majority of the Executive voted to send a letter from our Executive to the Executive Committee (EC) of IMU, which established the prize.

During April 1–2, 2017, EC of IMU discussed our request to change the name of the prize and profile etched on their Gold Medal, and "made a decision." IMU President Shigefumi Mori wrote to me about it, and added that before they make their decision public, they wanted to discuss it with "affiliated organizations." To eliminate an easy excuse – $15000, paid with the prize by Finland – I offered President Mori to personally pay $15000 every four years.

Now, 16 months later, IMU is still discussing, still keeping the decision a secret. *Those, who established the prize in 1981, likely did not know about the past of Rolf Nevanlinna. Today's IMU knows, and without changing the name, converts an unintentional ignorance into an intentional stain on our profession.*

In 2018, during the 8th Congress of the Federation in Semriach, Austria, the membership elected Kiril Bankov of Bulgaria to serve as the next President. Robert Geretschläger became Senior Vice-President. Sergey Dorichenko of Russia and Krzysztof Ciesielski, of Poland became Vice Presidents. David Crawford of the United Kingdom was elected Secretary. Peter Taylor will continue as Treasurer (and our Web Master). I will occupy two seats on the Executive, Immediate Past President and Publications Officer, but of course will have just one vote :). We elected fine members for our Standing Committees: Awards, Program, and Regional Representatives. You can find the Committees membership on our web site: http://www.wfnmc.org/about.html.

Publications of the Federation

The founding visionary, Peter O'Halloran, realized the importance of publications, and already in 1985 commenced the publication of the *Newsletter of WFNMC*. In 1988 the newsletter was upgraded to a biannual journal *Mathematics Competitions*. For many years, until his retirement, Warren Atkins of Australia was the Editor of *Mathematics Competitions*. Starting in 2004, the Editor of *Mathematics Competitions* has been Jaroslav Svrček of Czech Republic. As an editor and publisher of a journal myself, I can appreciate a great job Warren and Jaroslav have done.

In 2018, during the 8th Congress of the Federation in Semriach, Austria, the membership elected me to become the next Editor of *Mathematics Competitions* with Sergey Dorichenko serving as the Assistant Editor, responsible for having accepted by me articles typeset by the Moscow Center for Continuing Mathematics Education (MCCME).

Awards of the Federation

In 1991, Peter O'Halloran introduced two international awards of the Federation: The David Hilbert Award and The Paul Erdős Award, for mathematicians prominent on an international or national scale in mathematical enrichment activities. Both Hilbert and Erdős were mathematicians of genius, but I feared that having two awards would inspire an unintended interpretation of one award being higher than another. When in 1998 I expressed this concern, it did not create support of my fellow Executives. However, a few years later, the Executive reached a consensus on keeping just one award. We chose Paul Erdős, as the person of our time, whom some of us knew well personally. The Federation now presents up to four Paul Erdős awards at Congresses of the Federation and at ICME's.

The great Paul Erdős attended the 2nd Congress of the Federation in 2004 in Pravetz, Bulgaria. The organizer Petar Kenderov asked me to invite Paul, which is what I did.

Doing Math on Excursion: Jaroslav Svrček (left), Paul Erdős, and Josef Molnar,
2nd WFNMC Congress, Pravetz, Bulgaria, 1994

Even dinner cannot stop our doing Math: Paul Erdős, Alexander Soifer, and Kiril Bankov, 2nd WFNMC Congress, Pravetz, Bulgaria, 1994

The 1994 winners of the Paul Erdős Award had a distinct honor of receiving it from Paul Erdős. They included Qiu Zonghu, China: Urgengtserengiin Sanjmyatav, Mongolia: Jordan Tabov, Bulgaria: and Peter Taylor, Australia.

Congresses of the Federation

Starting in 1990, the Federation has been holding its International Congresses every four years. I have already mentioned several of them above. Let me list all of them here, so that you can see their amazing geography:

- WFNMC-1: Waterloo, Canada (1990)
- WFNMC-2: Pravets, Bulgaria (1994)
- WFNMC-3: Zhongshan, China (1998)
- WFNMC-4: Melbourne, Australia (2002)
- WFNMC-5: Cambridge, United Kingdom (2006)
- WFNMC-6: Riga, Latvia (2010)
- WFNMC-7: Barranquilla, Colombia (2014)
- WFNMC-8: Semriach, Austria (2018)
- WFNMC-9: to be held in Sofia, Bulgaria (2022)

Permit me to add some information about the last three Congresses of the Federation.

6th WFNMC Congress, Riga, Latvia, 2010

6th Congress of the Federation took place in the historic Riga, Latvia. Local Organizing Committee was headed by Dr. Dace Bonka and included Dr. Liiga Ramaana and other dedicated Latvian Ladies-Mathematicians. I created an elaborate program that included talks, workshops, problem hour, etc. We were treated to fine concerts of classical and Latvian folk music, some performed by professional musicians and others by students majoring in mathematics. Bach and Vivaldi performed on Europe's largest organ in the Riga Dom were unforgettable. The following plenary talks had been presented:

- *Some Olympiad Problems in Combinatorics and their Generalizations*, by Andris Ambainis (Latvia)
- *New Bridges between Research and Olympiad* Problems, by Alexander Soifer (USA)
- *Eyewitnessing the IMO - Decades of Stability and* Change, by Matti Lehtinen (Finland)
- *The Application of Mathematics as the Source of New* Ideas, by Andris Buiķis (Latvia)

Delegates of the 6th Congress of the Federatrion, July-2010, Riga, Latvia

7th WFNMC Congress, Barranquilla, Colombia, 2014

7th Congress of the Federation was magnificently organized by Maria Falk de Losada in Barranquilla, Colombia, in July-2014. All delegates lived together in a resort-hotel that allowed for much of interaction. The Congress featured the Opening Keynote Address "*Computers and Mathematics: Problems and Prospects*" by the world-renown mathematician and inspiring speaker Ronald L. Graham. The following Plenary Talks were given:

- "*The organization of the International Mathematical Olympiad - IMO with particular emphasis on IMO 2013*" by Maria Falk de Losada (Colombia);
- "*A Few Thoughts on the Putnam*" by Mark Krusemeyer USA);
- "*Math Olympiads for the Public Schools in Brazil II*" by Michel Spira (Brazil);
- "*Is there an impact of mathematical competitions on the development of mathematical research? The Romanian experience*" by Radu Gologan (Romania);
- "*A Paper about Pentagon Problems*" by Robert Geretschläger (Austria).

The Closing Address "*Predicting the Future: Four Classic Conjectures of Mathematics*" was presented by Alexander Soifer. The Congress included many other talks, workshops, and exhibits. A tour of colorful Cartagena served as an icing on this delicious Congress. The following few photos may enliven your perception of the event.

The Russians are coming: Sergei Dorichenko (left) and Nikolai Konstantinov, Barranquilla, 2014

Colorful Cartagena welcomes you!

Opening and Closing Speakers: Ronald L. Graham (right) & Alexander Soifer, Barranquilla, 2014

At the General Meeting, the delegates decided to hold Federation's election during our own Congresses, which have been much better attended than our meetings during massive ICME Congresses. For that purpose, terms of the Federation officers have been extended by two years.

8th Congress, Semriach (Graz), July-2018

Robert and Zita Geretschläger in Riga, 2010

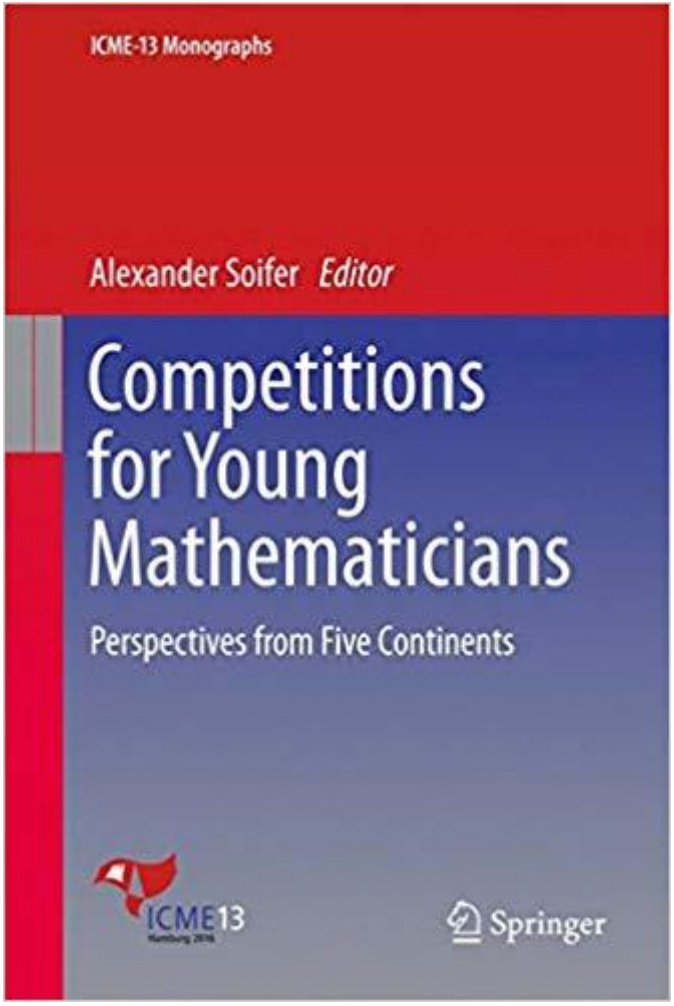
All local arrangements, registration, lodging, meals, excursions, etc. were beautifully organized by our Vice-President Robert Geretschläger. Zita Hauptmann Geretschläger created a lovely ambiance at the Congress. The Program was created by Senior Vice-President and Chair of the

Program Committee Kiril Bankov and me. There will be a book assembling the talks and the workshop of the Congress, edited by Robert Geretschläger, and published by World Scientific. It will also include a chapter on competition problems proposed by the participants of the Congress.

During the Congress three Constitutional Amendments have been approved, limiting service on Standing Committees and most members of the Executive to two consecutive 4-year terms, and allowing past presidents to remain active voting members of the Executive. The following plenary talks have been presented:

- *From the Lifting-the-Exponent-Lemma to Elliptic curves with isomorphic groups of points – how Olympiad Mathematics influences Mathematical Research,* by Clemens Heuberger (Austria).
- *Beyond the Rainbow – Thoughts on the Potential of Mathematics Competition Problems in the Classroom,* Opening the section "Work with Students and Teachers", by Robert Geretschlaeger, (Austria).
- *The Impact of Mathematical Olympiads on the Mathematics Community of Colombia,* Opening the section "Competitions around the World", by Maria Falk de Losada (Colombia)
- *Building Bridges Between Olympiads & Mathematics: Three Long-Distance Trains of Thought,* Opening the section "Building Bridges between Problems of Mathematical Research and Competitions", by Alexander Soifer (USA)
- *Problems: The Treasure of The Mathematics Competitions,* Opening the section "Creating Problems and Problem Solving", by Kiril Bankov (Bulgaria)

Our book "Competitions for Young Mathematicians: Perspectives from Five Continents, Springer International Publishing, 2017, was "*dedicated to all those people around the world, who are passing baton to next generations of mathematicians."* Permit me to list its contents:



The Convenor and Chair of International Program Committee of ICME-13, wrote a most complimentary foreword for our book. Here is a quotation from her text:

> Mathematical competitions are a chance for mathematically talented young scholars to experience mathematics as a research-oriented discipline. These competitions offer the chance to get insight into the beauty of mathematical structures at a high level, which many of these young mathematicians usually will not experience at home. Furthermore, these competitions allow to meet other talented young mathematicians, exchange their ideas with them and experience that they are not singular and isolated youngsters, but part of an important community.
>
> Despite this high importance of mathematical competitions, either as mathematical Olympiad or as mathematical tournament of towns or other kinds of mathematical competitions, there exists hardly any scientific research about mathematical competitions. This is surprising, because these mathematical competitions have a long tradition and a high influence on the promotion of young talented mathematicians.
>
> At the occasion of the 13th International Congress on Mathematical Education (ICME-13) a Topic Study Group on Mathematics Competitions took place, at which famous researchers working in this field met and exchanged about the state-of-the-art in this field. This intensive work together with papers from related groups forms the basis of this book. The book provides an excellent overview about the current discussion, topical themes and experiences with mathematical competitions. It starts with reflections on goals of mathematics education, problems coming from geometry or combinatorics being used in mathematical competitions. The next parts reflect on the role of competitions in the classroom, this theme is hardly researched so far. Then two examples of mathematical competitions are analyzed. The last two parts focus on the present state of mathematical competitions and its future and a bridge between competitions and 'real' mathematics.
>
> To summarize, this book is more than overdue and reflects from an academic perspective on the potential of mathematical competitions for mathematics education in general.
>
> I wish to congratulate the editor—Alexander Soifer—and the contributors to this timely and excellent book."

Hamburg, Germany
Gabriele Kaiser
Convenor of the 13th International Congress
on Mathematical Education, University of Hamburg

The State of the Federation: Summing-Up

In this historical essay, I listed many talks to show what we do. In essence, we are what we do!

Through the 34 years, the Federation has expanded its interests, publications, and activities. It was the 4th organization to become an Affiliate of the International Commission of Mathematical Instruction (ICMI) of the International Mathematics Union (IMU). Our members Peter Taylor and Ed Barbeau led the way in an ICMI Study, resulting in a book. Our Riga-2010 Congress produced 2 books. The Springer "Perspective from Five Continents" book was primarily authored by our members. Robert Geretschläger is assembling a book of Graz-2018 Congress.

However, compared to the earlier years, the number of national IMO leaders, participating in the Federation activities, seems to have declined. I hope their number will grow, and in part for that we are scheduling our 9th Congress of the Federation in 2022 in Europe to immediately follow the International Mathematical Olympiad (IMO) that will be held in Norway.

The so-called "Giftedness" Group, attracted away some of our regular participants, such as our long term member Emilia Velikova and local organizers of our Riga-2010 Congress. It is not surprising considering that their circle of interests is broader than ours.

I encourage all my colleagues to become more active in our Congresses, our topic study groups at ICME Congresses, and in writing for our journal *Mathematics Competitions* (send your submissions to the Editor, i.e., to me at asoifer@uccs.edu). We define ourselves: we are what we do.

Leaving the office, I am compelled to address one issue that became most important to me during my 20 years of work on "The Scholar and the State," my 2015 book in Birkhäuser-Springer. Is there anything more important to me than Mathematics? Yes, there is, and I urge you to listen to the three great minds I am quoting for you.

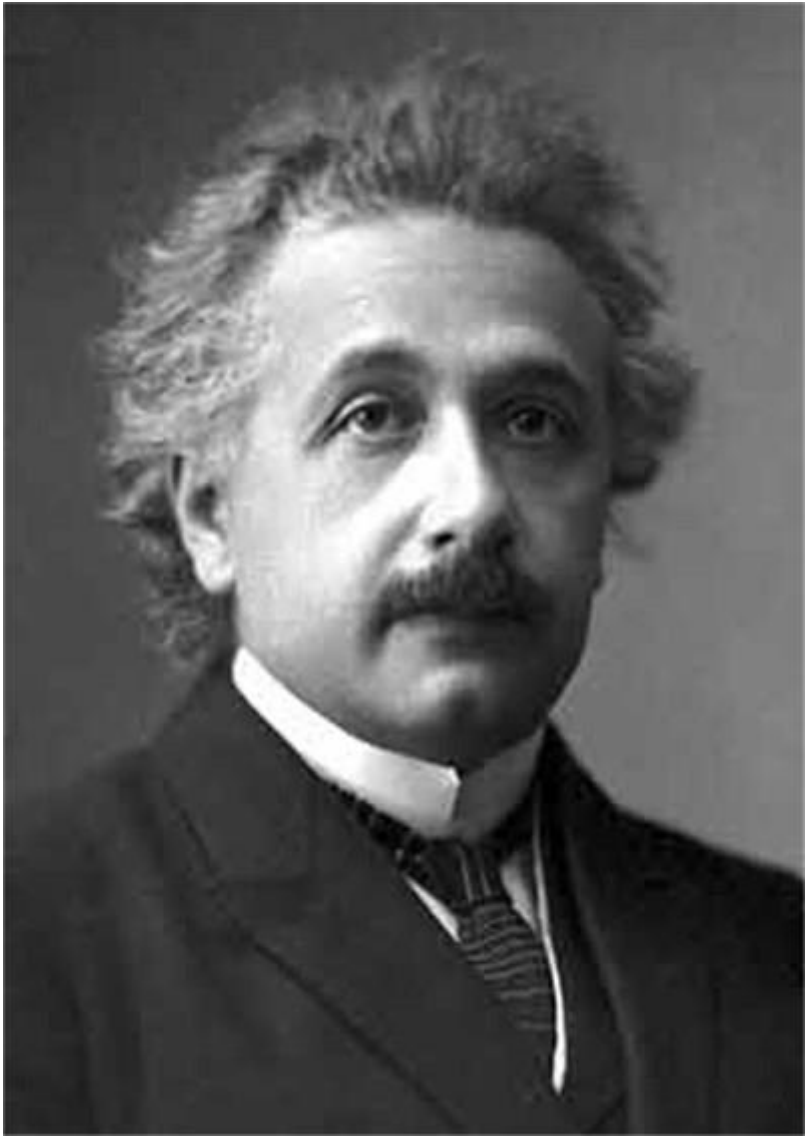
For those who believes that Mathematicians are entitled to live in Ivory Tower and not contribute to ethical and political discourse of the world, let me share words of the greatest Dutch Mathematician of all time, Luitzen Egbertus Jan Brouwer:

> It is my opinion that the tiniest moral matter is more important than all of science, and that one can only maintain the moral quality of the world by standing up to any immoral project.

Luitzen Egbertus Jan Brouwer

Millions of people prefer not to create waves and hide behind a banal excuse “What can I do alone”? For the silent majority, I quote the genius, Albert Einstein:

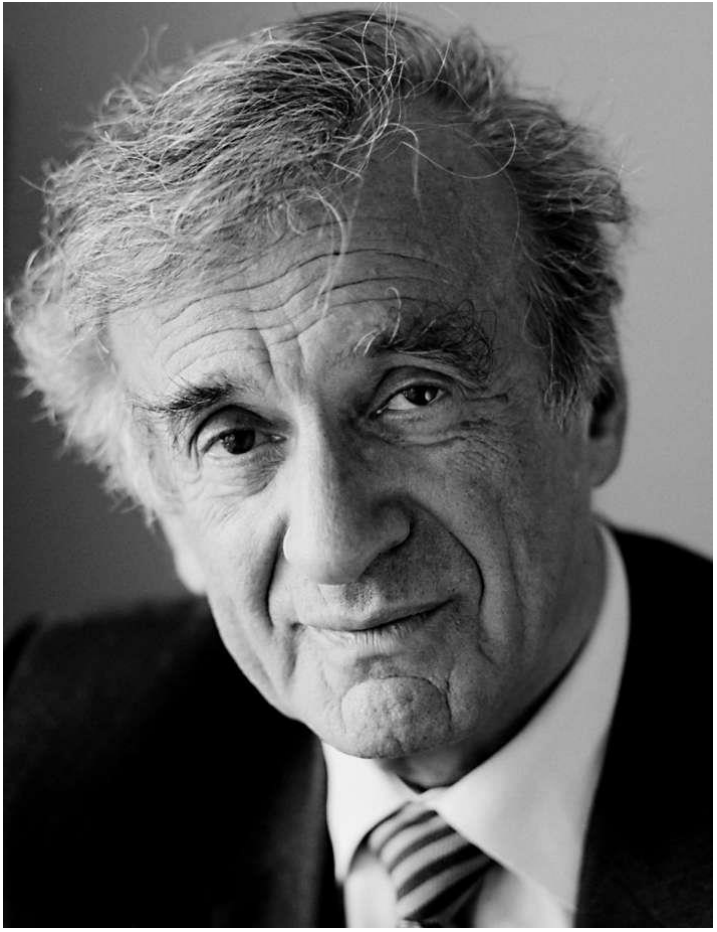
> *The world is a dangerous place to live; not because of the people who are evil, but because of the people who don't do anything about it.*



Albert Einstein

This is precisely why Grisha Perelman left Mathematics. And I quote the 1986 Nobel Peace Prize Laureate and the Holocaust Survivor Elie Wiesel:

> *There may be times when we are powerless to prevent injustice, but there must never be a time when we fail to protest.*



Elie Wiesel

The Federation is 34 years old. I hope it will reach the Golden Anniversary in 2084 and continue beyond! I am grateful for the trust and support of the membership and the opportunity to be your President from 2012 through 2018.