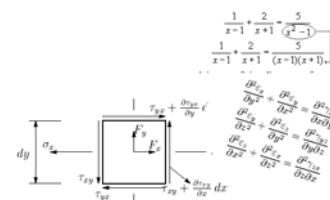




ICM 2006

Daily News



Madrid, August 30th 2006

LENNART CARLESON, 2006 ABEL PRIZE

“It is a delicate balance between giving up and trying very hard, when trying to solve a problem”

Swedish mathematician Lennart Carleson, 78, is the recipient of this year’s Abel Prize. According to the Abel Committee “Carleson is always far ahead of the crowd. He concentrates on only the most difficult and deep problems”. Two young mathematicians interviewed him during the ICM2006.

When you received the Abel prize, did it help you to keep doing mathematics, I mean, did it motivate you?

Well, I’m kind of old, and at the end of my career in mathematics, but in general I think that the main

point of prizes in mathematics is to attract the attention of students to what we are doing, and the attention of the public, which is not very usual at congresses.

Do you think that mathematical prizes are an incentive to mathematical research?

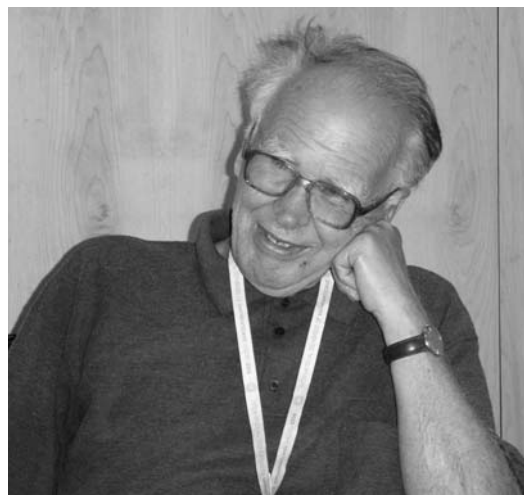
To the extent that it makes people feel that they are doing something which is appreciated. But I mean, if it goes so far that the people are only concerned about the prizes, that is not good, and this is what happens sometimes with prizes. So it is not so obvious what the effect of prizes can be. I always thought, personally, that too much money was not good. You have to have a more profound reason. If you want to be rich, then don’t do mathematics.

Have you ever tried any problem without success?

Oh yes, many times. Most problems I cannot solve. There have been problems that I have devoted many years to and had to give up. It is a delicate balance between giving up and trying very hard. Because if you don’t try very hard you won’t solve anything interesting. On the other hand if you try very hard and have to give up, it doesn’t seem good either.

What do you think of educational programmes to teach mathematics to gifted children?

We have one school in Sweden with a more advanced program, and there are about ten or fifteen students admitted every year. But it is part of general school organization to have special work in mathematics in which all students can participate. But somehow I am against the idea of an elite; when you take people out of the general system and make them something special. When you are young that’s a period when you are supposed to study a lot



of things, get a good education, read the classics, and also have some fun rather than concentrate on one subject. But it is important that the schools provide sufficiently good teachers, so the students can get good advice and so on.

Could you point out problems that affect education in mathematics nowadays?

Basically, I think that the focus on mathematics has disappeared. There are no proofs, no definitions, no specialist teachers... And we underestimate the students. The

problem, I think, is not that they are not capable of learning, but they are not interested.

We are now starting our PhD. Could you give as some advice for the next years?

I think that a general piece of advice is to read a lot of mathematics, but not to try to understand everything. It is better to read many things and then, when you get to a point where you don’t understand, keep on reading, reading around it. If you get your hands on a journal, read not only one particular article. It’s better to get general ideas, to get a feeling. In the end of course you have to go on, but it is much easier if you read like a novel —get the plot, see that it is interesting and that it leads somewhere. And then, in the end, I think, see that you can fill in the detail. And the second piece of advice will be to find a good problem for the PhD thesis. To the professors it is not so easy to choose a good subject. Because you [the advisor] are not supposed to have solved it, but you must be fairly sure that you could solve it. But it must not be too easy. There must be some kind of balance. And my experience is that it takes the professor a lot of thought. So, pick a good advisor.

What is a good problem?

The problem should relate to something larger, it should not be a dead end. You should not go into an area where there are just details left. That wouldn’t be a good idea. The best is to enter an emerging field. But the advisor would have to know what to do with this. This is not easy, life is not easy.

*Álvaro Antón Sancho y Mario García Fdez
Estudiantes predoctorales del CSIC*

FAREWELL TO A CONGRESS WITH INFINITY AT THE DOOR

As the congress reaches its end certain doubts occur to us. Will people leave with a good taste in their mouths? According to an old saying, “Predicting is difficult, especially when it comes to predicting the future”. Well, that’s what has happened to us. It was easy to imagine that the ICM2006 participants would have a positive opinion of the congress, but we could never have imagined that the level of satisfaction could have been so high, at least in the scientific sector, which is the most important. Here the reader might ask: But what if the opinions had been negative – would the “Daily News” have reported it? This is an “undecidable”, and will have to remain in the air. But just to dwell on the doubt a little, here’s an excuse to pass the time.

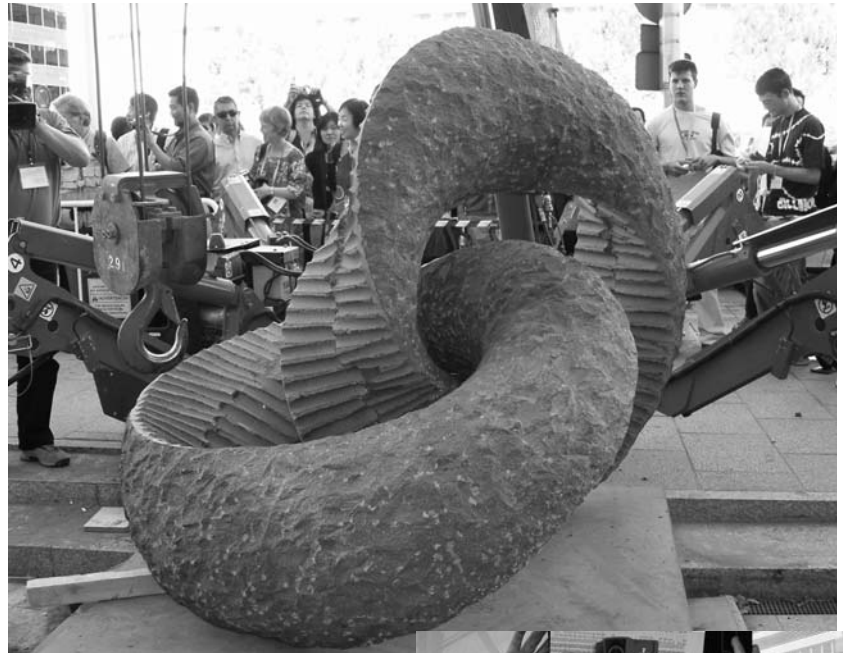
-“Come on! Say something negative!”

-“Well,” the congress participants reply, “nothing perfect exists” and go on to mention “minor” aspects of the Congress. For example – and here we humbly intone a “mea culpa” - the occasional delay in the delivery of the “Daily News”.

Some felt overwhelmed by the hurly-burly of inauguration day, while only a few have complained about the last-minute changes. All things considered, there is almost total agreement about the magnificent organization of the event, and the expression “very professional” has been heard a great deal. “Enormously important for mathematics”, say a group of participants from the Far East. “I couldn’t pick out one particular thing”, says a gentleman from Mauritania, “everything has been splendid from beginning to end”. “Everything to do with the Fields Medals has been very interesting”, say a group of Spanish professors with a broad smile.

The education and training side has been on many people’s lips. A participant from Algeria said that it was “simply incredible to see so many teachers together”, and added that he has learned very much. A British participant said he had thoroughly enjoyed all the interventions and was delighted to have been involved in such a broad collective.

A visitor from China said that this congress is the best he has attended. “Better even than the one in China”, he added, and our pride, of course, expanded toward the infinite. An Indian participant says that as promoters of the next ICM to be held in India in 2010, he and his



colleagues have had a meeting in Spain, where they have learned much about the organization of the Congress.

In the Congress book section we find more positive opinions, with one reservation from a friendly Italian woman behind the Birkhauser counter, who complains about “the lack of sunlight”. She goes on to joke about the cakes on sale there rivalling those in the cafeteria.

We move on to the cafeteria to speak to a waitress: “I belong one hundred percent to letters,” she says. “I don’t understand anything about exponentials or equations”. What becomes more apparent as the ICM2006 draws to a close are faces showing signs of tiredness. Just as Keizo Ushio must be tired – and happy, too, to judge by his expression – after transforming a hard chunk of granite into a solid evocation of the infinite. Maybe it’s just well that the ICM2006 isn’t ... Infinite, we mean.



KEPLER IN THE GROCERY STORE

The North American mathematician Thomas Hales recently demonstrated that there are no more than 5,094 ways of stacking oranges in a grocery store. This is far from being a banal affair, since the proof appeared in *Annals of Mathematics* and the calculations by computer in *Discrete and Computational Geometry*.

The story about how best to stack oranges in grocery stores goes back to the travels of adventurers and marauding pirates in Elizabethan England. During his term in prison, Sir Walter Raleigh, the 16th century English pirate and expeditionary, spent his time creatively by writing and posing mathematical problems. Raleigh wrote to his colleague, mathematician Thomas Harriot, asking him about a simple way of solving one of the problems common to mariners at that time; how many cannon balls could be stacked on the deck to occupy the smallest possible space. In mathematical terms, the question might be phrased thus: What is the optimum (densest) packing for a set of spheres?

Unable to obtain a satisfactory reply, Harriot posed the question to the German astronomer Johannes Kepler, who in 1611 conjectured in perfectly precise but non-mathematical terms that the distribution in question had to be the same that grocers used to stack oranges in the market. More explicitly, it is a question of proving that the greatest packing density is and the optimum pattern is the face-centered cubic packing arrangement.

The solution of the conjecture remained an open problem for the next 450 years. In the 19th century, Gauss proved



that the stacking of oranges is the best among all the regular lattice stacking patterns, but he did not conclude the general problem. In 1953, the Hungarian mathematician Laszlo Toth reduced the problem to the analysis of a finite

quantity of specific cases, a vital step towards tackling the final solution.

In 1998, proceeding from Toth's work, American mathematician Thomas Hales, professor at the University of Pittsburg, managed to describe all the conceivably possible arrangements of spheres, and analyzed the 5,094 positions one by one by means of advanced techniques of linear programming. The best specialists were unable to verify a small part of his work, and had to spend several years of study and refinement until finally, this year, the theoretical proof of the conjecture appeared in *Annals of Mathematics* (2006, v. 162, n. 3, page. 1065-1185), and the part carried out by computer in the specialized journal *Discrete and Computational Geometry* (July, 2006).

Kepler's conjecture is of great contemporary interest, since it is related to problems of storing the greatest quantity of information on CDs and to the compression of information.

Álvaro Antón Sancho, estudiante predoctoral del CSIC

THE SPANISH FACE OF THE CONGRESS: WHO'S WHO on the Executive Committee

Making science better known to the public is a tough job, and to do it well requires passion, something that is certainly not lacking in the projects undertaken by **Raúl Ibáñez** (Vizcaya, 1968). He has conducted research work in differential geometry and worked with mathematicians such as Marisa Fernández, M. De León, J. C. Marrero, A. Tralle and Y. Rudyak. He is at present engaged on making science more accessible at the head of the Spanish Royal Society of Mathematics Comisión de Divulgación ("Divulgamat", among other publications).

According to Ibáñez, the Congress has made him hopeful for the future: "We've seen that it's possible to get mathematics across to society better than we expected, and that shows us that the work we're doing is useful". As far as this work is concerned, he makes particular mention of his excellent relations with the executive committee and especially with Manuel de León, a sentiment echoed reciprocally by his colleagues.



Perseverance and tenacity are the adjectives to describe **Juan Manuel Viaño** (A Coruña, 1955) at work. He was head of the Applied Mathematics Department at the University of Santiago. He has been awarded the prize for the research from the Xunta de Galicia (Autonomous Government of Galicia), the SEMA Prize for education and public outreach of applied mathematics. He chaired the IMU General Assembly and is at present dean of the Faculty of Mathematics at the University of Santiago de Compostela. His main research interest is numerical simulation in solid mechanics and biomechanics. The General Assembly in Santiago (attended by 160 prestigious mathematicians) tested his organizational skills to the full, but the results exceeded all expectations and are reason enough for him to feel proud. In his role as a member of the Programme Committee, he feels very satisfied to see the high attendance at the different sessions. Furthermore, as he himself states, "In this Congress we've broken through the media barrier; we've managed to get across to the public at large".

”I Confess that I Have Helped”

“Without them it would’ve been impossible”; so says Emilio Bujalance, member of the ICM executive committee, about the 360 congress volunteers. It would have been easier and cheaper to have taken them all from Madrid, but the organizers thought it more appropriate to invite them from all over Spain. In the end, 110 volunteers came from the rest of Spain and the others from the Community of Madrid, those from outside the city being supplied with food and accommodation.

Although the congress began on August 22nd, some of the volunteers started working the weekend before, after giving up their free time for tasks such as preparing registration envelopes and getting the congress backpacks ready for 9 o’clock on the morning of August 21st. Those were then able to enjoy the congress without yellow vests. One of them, Alberto Criado, tells us that he remembers how hot it was inside the Palacio de Congresos, since when the volunteers first arrived the air-conditioning was still not working.

The volunteers in Registration were those who had the most work on the first days. Furthermore, they had experiences like seeing a participant lose all the documentation 20 metres away from the stand, and were subjected to challenging questions such as “Don’t you know who I am?” from invited speakers. Borja Alonso, who worked with Raquel Gonzalvo and Abel Molina on the desk, remarks on the “interconnection between the different areas” in the congress.

The information stand was another of the most frequented places on the first day, although on quieter occasions David García, a student at the Complutense University, used the time to study Differential Geometry of Curves and Surfaces, a subject in which he has an exam in September. By chance, we saw him asking his professor, Marco Castrillón, if he could use a calculator. Marco is responsible for the Community of Madrid stand, where he is helped by several volunteers. One of them, Natalia Fernández, tells us that candies are the most popular product she dispenses; she has given out 5 kilos in the space of a week. Moreover, the information stand is the meeting point for all the volunteers working on the fourth floor, so much so that one day Servando Arbolí, another volunteer, was carrying a strategy game called Quoridor that aroused the curiosity of many mathematicians passing by. “We had put up the instructions in English”. Those responsible for registering the volunteers are on the second floor. One of them, Ricardo Martín, told us that he was using a computer when suddenly someone asked him to get up because somebody else needed to use it. It was not until he was on his feet that he realized he had given up his seat to Benoit Mandelbrot.

The cloakroom is another of the busiest places. “They come here to tell us their stories”, say María Allanegui and



Volunteers getting some petrol for Keizo

Adriana Alcalde. One day someone turned up and tried to convince them that since in the school where he was staying there were no coathangers, they were obliged to provide him with some.

Many other volunteers are responsible for seeing that all goes well with the short communications. Carmen María de Paz tells us that she is underemployed, and her job is confined to alerting the technician if there is a

problem. Volunteers like Alberto Navarro have told us that they have had to make up the numbers in hall for a speaker with little pulling power.

There are also volunteers working on the outside of the Congress Palace; those helping in the halls of residence; those working as attendants at the different exhibitions, and some with rather special jobs – those who are at the main entrance with the sculptor Keizo Ushio. Esther Romero, who wears a mask against the dust, tells us that Keizo “is great”. She spends a lot of time with him. If it falls to her to get all the material and equipment out, she has to be there at 8.30am, and if she puts it away she has to stay till 8.00pm. And on Sunday only these volunteers were at work. Nevertheless, as Esther’s colleague Álex Aginagalde points out: “I don’t regret anything. You get to see everybody here”. Some of the jobs these volunteers have been asked to do is buy chains in a shopping centre; sand (which turned out to be plaster) in a store for building materials, and go to a gas-station with a can to get 10 litres of petrol for the Japanese sculptor. They get on so well together that Álex went with Keizo to buy a pair of trainers. “He wanted some like mine,” he said, “but we couldn’t find any”.

Although they are divided into different groups and have different timetables, they all say they feel very close to their work companions. Their yellow vests are a sign of their unity. In fact, on Saturday night, after word had got around on the grapevine, the yellow vests poured into the Dos de Mayo square in Madrid, attracting the attention of many people who, although they had heard about the ICM2006, knew nothing about its more human side: all those volunteers who could put their names to the phrase “I confess that I have helped”.



Interview with John Ball

“IF PERELMAN CHANGES HIS MIND, HIS MEDAL IS WAITING FOR HIM”

What will you remember most about the ICM2006?

I will remember it on the whole as a fine symphony with many beautiful, exciting and memorable moments. But the overture of the Opening Ceremony is, of course, a specially vivid memory. It was marvelous for mathematics that King Juan Carlos opened the Congress, and the fact that he stayed for a long time afterwards and talked to many participants was very pleasing and set the tone for the Congress.

What was the most difficult thing you had to do in preparation for the Congress?

Working out how to handle the unusual set of circumstances surrounding Perelman’s decision not to accept the Fields Medal.

Obviously this was a great news story, but do you think it is sad for mathematics that he did not accept?

Not sad for mathematics; perhaps, though not



Sir John Ball during the opening ceremony

necessarily, sad for him. I hope that he finds a way to continue to do mathematics and feel part of the community.

Do you think he might change his mind in the future?

I don’t know, but if he does his medal is waiting for him.

How do you feel about stepping down as President of IMU.

It has been a great privilege to be IMU President, and I have found the last four years very interesting and rewarding. I am very happy at the election

of Laszlo Lovasz as my successor, and wish him every success for his term of office. I will continue as a member of the Executive Committee for the next four years, so I’ll still be involved with the IMU. But I will have much more time for mathematics, and have both old work to write up and new research projects just starting that I am excited about.

Interview with Manuel de León, president of the Executive Committee

“We could’ve done with more private funding”

Where Manuel de León, president of the ICM2006 Executive Committee is concerned, the expression “tomorrow’s another day” takes on a special sense. August 31st will be the “day after”, the sigh of relief.

What were your initial worries about organizing the ICM2006?

My first worry was about getting funding, of course. And after that the attendance, which in the end has turned out well, although a little less than we expected.

Why hasn’t it been as high as you hoped?

Because of the political situation. Politics always affects the ICMs.

How will you remember this congress?

As the greatest event in my professional life.

In 2000, the IMU Executive Committee encouraged Spain in its candidacy to organize the ICM2006. Did you imagine then that it would require such an effort?

When it was suggested to us we accepted at once, of course. But I couldn’t really imagine what it was going to



The King greets Manuel de León

take. What’s more, I’d never been to an ICM. But now I can tell you that organizing an ICM is the greatest honour.

Is there anything you would’ve like to change?

We could’ve done with more private funding. To a certain extent, the little we’ve had is a result of the few relations between Spanish mathematics and industry. This is starting to change, because one of the achievements of this congress is bringing mathematics a little closer to society.

What about your relation with politicians when organizing the ICM2006?

Fortunately, we’ve had no problems at all with public administration. They’ve treated us very well.

What memories do you think participants will take away from this congress?

People have experienced a “fiesta” of mathematics, with everything that involves. I hope that all those who have attended have witnessed an active and dynamic Spanish mathematical community. And I think we the Spanish have learned the benefits of working together towards a common objective.

PALOMA HERRERO, DIRECTOR OF UNICONGRESS

“I realized that this congress was different from those we usually organize”

El ICM2006 decided to trust Unicongress with the logistic organization of the Congress to make it as enjoyable as possible for all the mathematicians attending. Unicongress is the department of Atlanta Viajes responsible for congresses and conferences.

What’s your work for the Congress been like?

We’ve worked endless hours since we started organizing the congress in 2002, when we went to Beijing with the Organizing Committee. There we drew up a report that was necessary for choosing infrastructures and the venue for the congress. After that, we’ve been holding regular meetings since 2004 with the Committee to make sure everything turned out well.

What about your personal involvement?

My personal involvement has been 100%, because I realized from the start that this congress was going to be different from

those we usually organize. The ICM2006 has brought together people from such different countries that it’s impossible to handle everyone in a general way. 4,000 mathematicians have attended, and many of them require a personalized treatment. It’s a Herculean task, and personalized attention requires constant readjustment in organization management. A congress is just like a puzzle in which all the pieces have to fit. On this occasion, the pieces have kept changing, and if some pieces change, all the others have to be changed as well. This has been one of the biggest problems and has required a greater personal commitment than usual.

Has it been worthwhile?

Yes. The bigger the challenge, the greater the satisfaction if you meet it successfully.

What about the Unicongress teamwork?

It’s not a big team, but we work to maximum effect. I’m proud to have a team like this.



Paloma Herrero (middle, in glasses) with her team

VÍCTOR IRIBERRI HARO. MANAGER OF MADRID ESPACIOS Y CONGRESOS

“We offer the Indian Committee all our support”

Madrid Espacios y Congresos is the municipal company responsible for providing the space and management of infrastructures for the ICM2006. We spoke with the manager of this company about his impressions of the Congress.

How would you assess the celebration of the ICM2006?

We catalogue it as a highly positive event. Our company is 100% public; the only shareholder is Madrid City Hall. That’s why it’s our job to organize events in benefit of Madrid and its citizens. On this occasion the aim has been fulfilled. Thanks to the 3,600 mathematicians from all over the world who have come to the city, Madrid has been projected onto the international stage. Business tourism has increased, when in August it practically ceases to exist, and this is reflected positively in the economy.

What has it taken to set up the Congress?

As a private management company, we want to make a profit, but this Congress has been well backed up by Madrid City Hall. At their request, we have made a

considerable discount, a financial commitment that has found its compensation in the way Madrid has been projected in the foreign media.

As far as our own personal efforts are concerned, everyone from the managing director to the production and communication team and management and maintenance personnel have been well rewarded by the congratulations they have received from the ICM and even from Madrid City Hall and its mayor, Alberto Ruiz Gallardón.

Any advice for the next Organizing Committee in India?

We’ve already told the Organizing Committee of the next ICM that we’re completely at their disposition. We’ll offer them all the help we can, and we’re prepared to go over there ourselves if necessary.



THE ORGANIZING COMMITTEE FOR THE NEXT ICM

“We’d like to know the secrets of the ICM 2006 organization”

Daily News spoke to representatives on the Organizing Committee of the next ICM to be held in the Indian city of Hyderabad in 2010. Professors M. S. Raghunathan and Gadadhar Misna, and Doctor S. D. Paranjape replied to our questions.

What do you think about India organizing the next ICM?

We’re very happy that India has been chosen to host the Congress. Asia isn’t often selected as a host continent; it’s the third time in its history.

Will you ask the Spanish Committee for advice?

Yes, we’d like them to tell us the secrets of how to do it successfully.

What would you change and what would you keep from the present Congress?

It’s too early to say. It’s necessary to take into account that the two countries are very different. We’d like the Spanish organizers to tell us what their main problems have been and explain to us their experience step by step.

What will the differences between the Spanish and Indian organization be?

Many; first, most of our funding, almost 90%, comes from the Government. That’s a big difference; it’s not the same here. Besides, there are many things in our country that are not so developed as in Spain and that will also

make a difference. And lastly, India is much bigger and therefore domestic participation will be much greater.

The organizers of the ICM 2006 have said that the volunteers have been absolutely essential for the Congress. Will you also have a team of volunteers?

Yes, of course. Young Indian mathematicians, like all the mathematical community, are very enthusiastic about holding the Congress in India. The volunteers are the mathematicians of the future and they are happy to be part of the event.

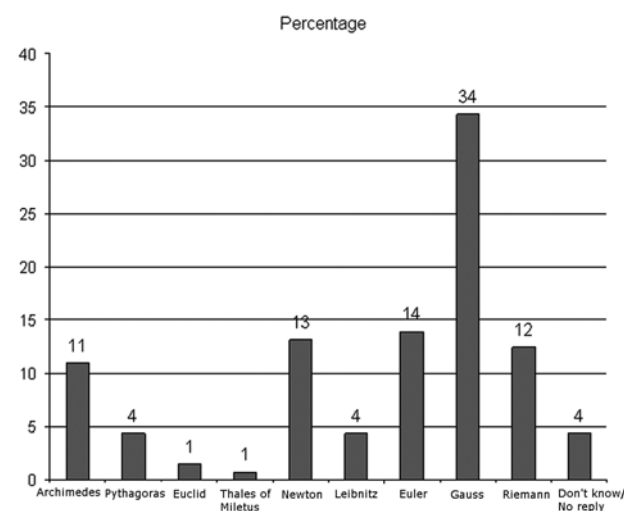


Professor M.S. Raghunathan (center), Gadadhar Misna(left), Doctor S.D. Paranjape(right)

THE BEST MATHEMATICIAN IN HISTORY

Who is the best mathematician in history? What better occasion than the ICM2006 to find out? The scientific value of a survey like this is not very great. In fact, it may have no scientific value at all, but between one session and another we’ve had fun asking some of the Congress participants this question. They looked at us in surprise when we gave them our improvised list of candidates, and not only because there were undoubtedly some important names missing. We asked a broad cross-section of mathematicians from very varied backgrounds, and their reactions were also very varied, although all were unfailingly friendly in their replies. Most of them smiled in amusement. Quite a few hesitated before answering, some for quite a long time, regarding us with knitted brows. If we asked the question to a group of people, they invariably started a discussion about the candidates’ relative merits before answering us. So much so that the question took on a life of its own, and if we hadn’t stepped in to mediate in the debate, the mathematicians would probably have forgotten all about us.

Some of the people we asked approached the question in a reasoned way: “Humm... What does ‘best’ mean exactly?”. Some responded with all the passion of a football fan: “He might not be the best, but he’s my idol!”. Others adopted a more diplomatic approach: “Please! They’re all the best in their own way!”. Some malcontents pointed out that that they preferred figures we’d forgotten to include on the list. The range of



reactions couldn’t have been more varied. Except for Archimedes, figures from the classical era did not come out very well. Neither Euclid, Pythagoras nor Thales of Miletus aroused much support. Travelling closer to the present, the figure of Sir Isaac Newton looms a little larger, and later still Leonhard Euler has quite a few devotees. However, the winner by a long way is Carl Friedrich Gauss. Most of the mathematicians who voted for him did so almost with hesitation. Is he really the best? There’s no shortage of wise heads in mathematics, and the debate is still open.

(Sample:137 mathematicians - 4% of all participants-)

The Human Face of the “Erratum”

Every morning (and sometimes in the afternoon), the ICM2006 press team went tumbling eagerly down the stairs to distribute the fruits of their labours. Long hours of work from sunrise to sunset -and the patience of the printers ‘Elece’- lie behind the “Daily News”, the paper you hold in your hands.

But this daily has a father: the weekly news bulletin InfoICM2006, which appeared regularly on www.icm2006.org (and it’s still there, under “Press Office”). It first saw the light of day 20 weeks before the ICM and helped to warm up the atmosphere for the Congress. The people working on the bulletin were Clemente Álvarez – trying to show the most applied side of mathematics. Pablo Francescutti – announcing the satellite conferences. Laura Sánchez – tracking down speakers and getting them to explain what they were going to talk about. And at the head, Mónica Salomone and Ignacio F. Bayo, all five forming the basis of a project they had to get up and running. .

But the Congress was getting closer, and some of the original team were going away on holiday. Panic stations! The new team, recently arrived, viewed the situation with trepidation. Last minute changes just before D-Day? Would we be able to manage? Would we be capable of producing the 16 pages of the “Daily News” every 24 hours with the accuracy and attention to detail required not just by one mathematician but by 3,500?! However,

we never imagined for a moment that the real threat would come not from the mathematicians but from the avalanche of calls from different media from all over the world – and here’s the real scoop – convinced that mathematics was a newsworthy subject! With so much media attention, who had time to think about the “Daily News”?



Now, on the last day, we can fairly say that we’ve survived, and have decided to introduce ourselves, the other alternative being to slip away anonymously through the side entrance. So, spotlights please! Wearing the number 2, 3 and 5 shirts respectively, Pilar Gil, Lula Gómez and Abelardo Hernández, the editorial staff, also

responsible for co-ordination, attention to media and photos. Wearing numbers 7 and 11, Jeff Palmer and Concha Muro; the former, our translator, impassible while the storm raged around him; the latter, our meticulous editor, both indispensable. Wearing numbers 13 and 17, Laura Sánchez, a mathematician keen to put science across, and Sherezade Álvarez, a journalist new to the abstract world of mathematics, but both of them the source of youth and energy of the team. Last but very far from least, and without whom nothing of the foregoing would have been possible, the volunteers: Mario García, alias “Manifold”; Álvaro Antón, a dashing young gentleman who also understands numbers, and Roberto Rubio, so perfect in everything (as far as we can guess).



(continued from page 12)

17:00 – 17:20 *On the functional-differential equation*
 $f'(x)=4*f(2x)$, Room L205

Tsuyoshi Yoneda, The University of Tokyo,
 bkaoj300@rinku.zaq.ne.jp

SUMMARY: We constructed solutions for the equation
 $f'(x)=4*f(2x)$, $f(0)=0$ explicitly. We can get numerical
 data easily with a computer.

17:30 – 17:50 *A problem with a multiple spectrum*,
 Room L205

Prof. Abubakir Dzhuraev, Osh State University,
 ajrv@ramblev.ru

SUMMARY: The boundary-value problem is put and the
 asymptotical theory of integration of the singular-
 perturbed boundary-value problems with a multiple only
 imaginary spectrum for Jordan matrix is developed in [1].

[1] Dzhuraev A. A problem with a multiple pure
 imaginary spectrum, Ist TWMS-Elazig, 1999, p. 124-127.

15:30 – 15:50 *Infinitesimal bending and visualization*,
 Room L203

Ljubica Velimirovic, Svetozar Ranci, Faculty of
 Science, University of Nis, Serbia, ljubicavelimirovic@
 yahoo.com

SUMMARY: We consider infinitesimal bending of
 surfaces, specially of toroidal surfaces and present
 infinitesimal bending using Surfend programme
 package.

16:00 – 16:20 *Construction, ordering and recognising*
of all knots and links by an unexpected complete and
natural invariant, Room L203

Michel Thomé, SMF and EMS, michelmthome@free.fr

SUMMARY: From the famous lemma of Alexander in
 1923, it is evident that the isotopic classes of closed braids,
 as a universal property of knots and links, make a natural

and complete invariant. By topologisation of these classes
 we show they have each a natural and canonical
 representant. And by a decomposition in four ordered
 variables we construct the table of all candidates to be a
 canonical representant. Finally with a sieve made of all
 values and all combinations of values of all known
 invariants, we, incrinsingly in the table, distinguish quite all
 the canonical representations of all knots and links.

16:30 – 16:50 *On the Young theorem for amalgams and*
besov spaces, Room L203

Yoshihiro Sawano, Tsuyoshi Yoneda, University of
 Tokyo, yoshihiro@ms.u-tokyo.ac.jp, yoneda@ms.u-
 tokyo.ac.jp

SUMMARY: The aim of this seminar is to refine the
 Young theorem which asserts that the Fourier transform F
 sends L^p to L^q . For example we consider the image of L^p
 by F . we will present some generalization of the above
 results.

17:00 -17:20 *Kolmogorov Foundations of*
Mathematics., Room L 203.

Alexander Kuzichev, Moscow State University, Russia,
 askuzichev@rambler.ru.

SUMMARY: according to Kolmogorov's program on
 foundations of mathematics, we propose: 1) realization of
 Kolmogorov's program on foundations of mathematics in
 the form of sequential calculus, that solves the central
 Hilbert program. 2) Proof of consistency of all known
 first-order theories of modern mathematics.

17:30 – 17:50 *Dirichlet type problem for an irregular*
elliptic third order equation, Room L203

Hrachik Hayrapetyan, hhairapet@seua.am

SUMMARY: We study the Dirichlet problem in the
 half-plane in weight spaces for an irregular elliptic third
 order equation, when the weight function has a unique
 singularity at the point at infinity.

More information about the work of Andrei Okounkov

The Chair of the Local Program Committee would like
 to add the following information to the article written by
 Allyn Jackson and published on August 26th:

Baik, Deift and Johansson determined the statistical
 fluctuations of the longest increasing subsequence of a
 random permutation as n goes to infinity. They point to
 the fact that these are the same fluctuations as the
 fluctuations of the longest eigenvalue of a random
 Hermitian matrix (due to Tracy and Widom). Baik et al.
 also gave a greatly extended version of their result in the
 form of a conjecture. It was this conjecture that
 Okounkov proved using a very different and original
 proof by showing that this two fluctuation problems are
 related to a common third one which concerns counting
 random surfaces. This provided a novel direct link
 between random matrix theory and random permutations.

Daily News (versión en español)

KEPLER EN LA FRUTERÍA

Recientemente, el matemático americano Thomas Hales consiguió demostrar que no hay más de 5.094 formas de apilar las naranjas de una frutería. Y la cuestión no es banal, puesto que la prueba acaba de aparecer en las prestigiosas revistas *Annals of Mathematics* y los cálculos hechos a ordenador en *Discrete and Computational Geometry*.

La historia del buen apilamiento de las naranjas en nuestras fruterías se remonta a los viajes de aventureros y saqueos de piratas en la Inglaterra isabelina. Sir Walter Raleigh, expedicionario y pirata inglés del siglo XVI, se dedicó, al verse encarcelado, a la labor creativa, fruto de la cual escribió varias obras de poesía y una Historia del Mundo y planteó algunos problemas matemáticos. Entre ellos, Raleigh se dirigió al matemático y colaborador suyo Thomas Harriot para preguntarle si conocía un método sencillo para resolver un problema típico de los marinos de la época: averiguar cuántas balas de cañón se pueden apilar en cubierta utilizando el menor espacio posible. En terminología matemática, ¿cuál es el empaquetamiento óptimo (más denso) para un conjunto de esferas?

Incapaz de obtener una respuesta satisfactoria, Harriot planteó la cuestión al astrónomo alemán Johannes Kepler, quien, en 1611, conjeturó, en términos no matemáticos pero perfectamente precisos, que la distribución en cuestión debe ser la misma que la que han venido utilizando los frutereros para apilar naranjas en los mercados. Más explícitamente, se trata de probar que la mayor densidad de empaquetamiento es aproximadamente 0,74 y que el agrupamiento óptimo se logra con el empaquetamiento cúbico centrado en las caras.

La resolución de la conjetura ha sido un problema abierto durante los últimos 450 años. En el siglo XIX, Gauss demostró que el empaquetamiento de las naranjas es el más eficaz entre los empaquetamientos reticulares, pero no concluyó el problema general. Más recientemente, en 1953, el matemático húngaro Laszlo Toth redujo el problema al análisis de una cantidad finita de casos específicos, lo que supuso un paso imprescindible para abordar la solución final.

En 1998, el matemático americano y profesor de la Universidad de Pittsburgh Thomas Hales consiguió describir, a partir de los trabajos de Toth, todos los posibles agrupamientos de esferas concebibles y analizó caso por caso las 5.094 posiciones mediante avanzadas técnicas de programación lineal. Los mejores especialistas fueron incapaces de verificar una pequeña parte de su trabajo, así que tuvieron que pasar varios años de estudios y refinamientos hasta que, finalmente, este año se ha publicado la prueba teórica de la conjetura en *Annals of Mathematics* (2006, v. 162, n. 3, pág. 1065-1185) y la parte hecha por ordenador en *Discrete and Computational Geometry* (julio de 2006).

La conjetura de Kepler tiene interés en los tiempos actuales, puesto que se relaciona con los problemas de

guardar la mayor cantidad de información en discos compactos o de compresión de información.

Álvaro Antón Sancho (+1), Estudiante predoctoral del CSIC, Voluntario del ICM

Entrevista: Paloma Herrero, directora Unicongress “NO ES UN CONGRESO COMO LOS QUE SOLEMOS ORGANIZAR”

El ICM2006 decidió confiar en Unicongress para organizar la logística del Congreso y de forma que los matemáticos puedan disfrutarlo plenamente. Unicongress es la División de Congresos de Atlanta Viajes.

¿Cómo ha sido el trabajo en el Congreso?

Hemos trabajado incontables horas desde que se empezó a organizar en el 2002, cuando viajamos a Pekín con el Comité Organizador. Allí, hicimos un informe que era necesario para elegir las infraestructuras y la sede del congreso. Después, desde 2004 se han tenido reuniones constantes con el Comité para que todo salga bien.

¿Cuál ha sido su implicación personal?

Mi implicación ha sido del 100%, porque desde el principio vi que no era un Congreso como los que solemos organizar, este era diferente. ICM2006 reúne gente de países tan diferentes que no se puede hacer una gestión general, sino personalizada, y han venido unas 4.000 personas. Es un trabajo titánico y esta circunstancia de la atención personal conlleva una reorganización constante de la gestión. Un congreso es como un puzzle donde todas las piezas tienen que encajar. Aquí las piezas han ido cambiando y, si una cambia, no encaja y, para volver a tener el puzzle compuesto, hay que cambiar todas las demás. Esto ha sido una de las mayores problemáticas y por lo que he tenido una involucración personal mayor de lo habitual.

Pero, ¿ha merecido la pena?

Sí. Cuanto mayor es el reto, mayor la satisfacción al verlo superado.

¿Cómo ha sido el trabajo del equipo de Unicongress?

El equipo no es numeroso, pero su eficiencia es máxima; estoy orgullosa de contar con un equipo así.

“CONFIESO QUE HE AYUDADO”

“Sin ellos hubiese sido imposible”. Así se refiere Emilio Bujalance, del comité ejecutivo, a la labor de los 360 voluntarios. Lo más sencillo y barato hubiera sido seleccionarlos a todos de Madrid, pero la organización consideró oportuno que viniese gente de toda España. En total, 110 voluntarios (que se suman a los de la Comunidad de Madrid) a los que se les ha proporcionado el alojamiento y la comida.

Aunque el congreso empezó el día 22, el trabajo de los voluntarios comenzó antes. El fin de semana anterior, voluntarios de Madrid habían dejado de lado su

tiempo de ocio para que todos los sobres del registro y las mochilas estuvieran listos el 21 a las 9 de la mañana. Ellos cumplieron con su trabajo durante esos días y han podido disfrutar del congreso sin vestir el peto amarillo. Uno de ellos, Alberto Criado, nos comenta que su recuerdo del Palacio era mucho más caluroso, porque cuando ellos estuvieron no había aire acondicionado.

Los voluntarios del Registro fueron los que más trabajo tuvieron los primeros días. Además, vieron cómo algún asistente perdía toda la documentación a 20 metros del stand, y se sometieron a las desafiantes preguntas “¿Usted no sabe quién soy?” de alguno de los conferenciantes invitados. Borja Alonso, compañero de Raquel Gonzalvo y Abel Molina, en el mostrador, se queda con la “interconexión entre las áreas” que ha visto en el congreso.

El mostrador de información es otro de los que más visitas reciben al día. Ahora bien, en las horas más tranquilas, David García, estudiante de la Complutense, aprovecha para estudiar “Geometría diferencial de curvas y superficies”, asignatura de la que se examina en septiembre. Y casualmente le vimos preguntando a Marco Castrillón, su profesor, si va a poder utilizar calculadora. Marco es responsable del stand de la Comunidad de Madrid y cuenta con varios voluntarios a su disposición. Natalia Fernández, una de ellos, nos comenta que su producto estrella son los caramelos, y nos dan la cifra de cinco kilos en una semana. Además, este stand es el punto de encuentro de todos los voluntarios de esa planta, la -4. Tanto es así, que Servando Arbolí, otro voluntario, llevó un día un juego de estrategia llamado Quoridor, que despertó la curiosidad de los matemáticos que pasaban por allí. “Tuvimos que poner las instrucciones en inglés”.

En la planta -2 están los encargados del registro de los voluntarios. Ricardo Martín, uno de ellos, nos contó que estaba utilizando un ordenador cuando, de repente, le pidieron que se levantara porque tenía que utilizarlo otra persona. Ya de pie se dio cuenta de que había cedido su asiento a Benoit Mandelbrot.

El guardarropa es otro de los lugares más frecuentados. “Vienen a contar sus historias”, nos dicen María Allanegui y Adriana Alcalde. Hasta vino una persona a pedirles que le proporcionaran perchas, porque en el colegio donde se hospedaba no las había.

Muchos otros voluntarios se encuentran velando por el buen funcionamiento de las comunicaciones cortas. Carmen María de Paz nos comenta que podría dar mucho más de sí, pero su labor se reduce a estar allí para avisar al técnico si hay algún problema. Voluntarios como Alberto Navarro nos han comentado que a veces son útiles para llenar la sala cuando el conferenciante no ha tenido mucho poder de convocatoria.

Fuera del palacio nos encontramos también a voluntarios: los que ayudan en colegios mayores, los que vigilan las exposiciones y unos muy especiales: los que están a las puertas del congreso con el escultor Keizo Ushio. Esther Romero, con una mascarilla para protegerse del polvo, nos comenta que K. Ushio “es super majo”. Con él pasa muchas horas al día. Si le toca sacar el material, ha de estar allí a las 8:30, y si le toca recoger, sale de allí a las 20h. Además, el domingo fueron los únicos voluntarios que trabajaron. No obstante, Álex

Aginagalde, compañero de Esther, señala: “Yo no me arrepiento de nada. Ves a todo el mundo”. Entre sus labores han estado la de comprar cadenas en un centro comercial y arena (que resultó ser finalmente yeso) en una tienda de materiales de construcción, e ir a una gasolinera con una garrafa, para llevarle diez litros al escultor japonés. La confianza es tal, que Álex acompañó a Keizo a comprarse unas zapatillas, “quería unas como las mías, pero no las encontramos”.

Aunque están divididos en grupos muy distintos y con horarios diferentes, todos confiesan sentirse unidos a sus compañeros. Parece que el peto amarillo une. Tanto es así que el sábado por la noche, tras una convocatoria que pasó de boca en boca, los petos amarillos inundaron la plaza del Dos de Mayo de Madrid, atrayendo a muchos curiosos que quizá conocían el ICM 2006, pero no su faceta más humana: todos estos voluntarios que podrían firmar la frase “confieso que he ayudado”.

*Roberto Rubio Núñez
Estudiante predoctoral del CSIC
Voluntario ICM2006*

La cara española del congreso

QUIÉN ES QUIÉN EN EL COMITÉ EJECUTIVO ICM 2006

La divulgación de la ciencia es un trabajo arduo y, para llevarla a cabo, hace falta verdadera pasión, algo que **Raúl Ibáñez** (Vizcaya, 1968) demuestra con sus trabajos. Ha sido investigador en el área de geometría diferencial y ha trabajado con matemáticos como Marisa Fernández, M. de León, J. C. Marrero, A. Tralle y Y. Rudyak. Actualmente realiza una labor divulgativa como presidente de la Comisión de Divulgación de la RSME (Divulgamat, entre otras publicaciones).

El Congreso, dice, le ha aportado ilusión para el futuro: “Hemos visto que es posible llegar a la sociedad superando las expectativas y esto nos demuestra que la divulgación que hacemos es útil”. En cuanto a su trabajo, durante estos días señala como especialmente positivo el trato con la gente del equipo y en especial con Manuel de León, sensaciones que son recíprocas con sus compañeros.

Su constancia y tesón en el trabajo definen a **Juan Manuel Viaño** (A Coruña, 1955). Ha sido director del Departamento de Matemática Aplicada de la Universidad de Santiago, Premio de investigación de la Xunta de Galicia, Premio SEMA de divulgación de la matemática aplicada, chairman de la Asamblea General de la IMU y actualmente decano de la Facultad de Matemáticas de la Universidad de Santiago de Compostela. Su interés principal en investigación es la simulación numérica en mecánica de sólidos y biomecánica. La Asamblea General de Santiago (tuvo que recibir a 160 prestigiosos matemáticos para ella) le ha dejado una sensación de orgullo al comprobar su capacidad de organización y al ver superadas todas las expectativas. En el Congreso, como miembro del Comité de Programa, se siente satisfecho de ver la gran participación que hay en las sesiones. Además afirma que “en este Congreso hemos ganado la batalla mediática: hemos conseguido llegar al gran público”.

ICM 2006

Daily News

Madrid, August 30th 2006

LAST MINUTE CHANGES TO THE OFFICIAL PROGRAM FOR TODAY

NOTES OF INTEREST

WED 30, 15:00-15:45 IL A

Lecture by a Fields Medalist

Wendelin Werner, Université Paris-Sud, Orsay, France

Random planar loops and conformal restriction

Chair: Gregory Lawler

INVITED LECTURES

Wed 30, 17:00-17:45 R L101

Gerard Laumon, Université de Paris-Sud, Orsay, France

Geometric aspects of the Langlands-Shelstad

Fundamental Lemma

SHORT COMMUNICATIONS (new)

WED 30, 16:25-16:45 SC 07 L103

Wafaâ Batat, Ecole Normale Supérieure

d'Enseignement Technique d'Oran, Aine el turck, Algeria

Homogeneous Lorentzian structures on the $(2p+1)$ -dimensional Heisenberg group.

Chair: Enrique Macias

WED 30, 16:55-17:15 SC 17 R203

Sanjay Chaudhary, Dr. B. R. Ambedkar University,

Agra, India. *Reliability analysis of three different series system built up of different devices*

WED 30, 17:15-17:35 SC 14 R103

Dara Moazzami, Faculty of Engineering, Department of Engineering Science, University of Tehran, Iran

Measures of Vulnerability - the Tenacity Family

Chair: Francisco Santos

WED 30, 17:15-17:35 SCM 17 R204

Mihai Popescu, Institute of Mathematical Statistics and Applied Mathematics, Bucharest, Romania. *On the*

optimal control of quadratic functionals for affine nilpotent systems

WED 30, 17:15-17:35 SC 19 R402

Mohammadhossein Pourkazemi, Shahid Beheshti

University, Tegrans, Iran. *The best method to teach calculus to the non-mathematical Branches in the university.*

Chair: Maria Gaspar

WED 30, 17:35-17:55 SC 19 R402

Carlos Rondero Guerrero, Autonomous University of

Hidalgo State, Pachuca, Mexico. *Conceptual articulation of calculus: construction of the tangent line without the use of derivative*

Chair: Maria Gaspar

WED 30 17:35-17:55 SC 06 R404

Fariborz Azarpanah, Chamran University, Ahvaz, Iran

The ring $\mathcal{S}C(X)$ modulo its socle and principal ideals

Chair: Carles Broto

WED 30 17:35-17:55 SC 19 R401

Yafen Jin, Academy of Mathematics and Systems Science of Chinese Academy of Sciences, Beijing, China. *Using*

video conference to do mathematical cooperative research

Chair: Marco Castrillón López

SHORT COMMUNICATIONS (cancelled)

WED 30, 16:05-16:25 SC 06 R404 Michael Farber

WED 30, 16:05-16:25 SC 10 L401 Hiroki Sumi

WED 30, 16:55-17:15 SC 16 R102 Alexander

Kurganov

WED 30, 17:35-17:55 SC 17 R204 Giulio Pianigiani

WED 30, 16:05-16:25 SC 18 R101 Dayse Haime

Pastore

SHORT COMMUNICATIONS (changes respect to the printed program)

WED 30 16:05-16:25 SC 02 R201,

Martin Mathie (already done)

WED 30, 16:05-16:25 SC 02 R201

Ignacio Ojeda Martínez de Castilla, Universidad de

Extremadura, Badajoz, Spain. *Algebraic geometry of*

Markov random fields

Chair: Alejandro Melle

WED 30, 17:35-17:55 SC 026 R204

Agostino Prastaro, Università di Roma La Sapienza,

Roma, Italy. *Algebraic topology in constrained*

variational PDE's

INFORMAL SEMINARS 30TH AUGUST

14:35-14:55 *A functional equation derivation of Z for the Ising chain*, Room L205

Ricardo Gracia-Pelayo

SUMMARY: The problem of finding the partition function for the Ising model is turned into a combinatorial model, and a combinatorial function is associated with each Ising crystal. When joining two Ising chains, the difference between the convolution of their combinatorial functions and the actual combinatorial function of the resulting Ising chain is calculated. This allows to write a functional equation for the partition function of the Ising chain which can be solved. Some conclusions are stated.

16:00 – 16:20 *Morrey space for non-doubling measure*, Room L205

Yoshihiro Sawano, Hitoshi Tanaka, University of Tokyo, yosihito@ms.u-tokyo.ac.jp

SUMMARY: The aim of the seminar is to introduce Morrey spaces with underlying measure μ non-doubling. Under some growth condition, we will consider the relation between RBMO introduced by Tolsa.

16:30 – 16:50 *Construction of fixed points of strictly pseudo-contractive mappings in uniformly convex spaces*, Room L205

Amiefiok Udomene, AS-ICTP, Trieste, Italy, audomene@ictp.it

SUMMARY: We discuss new results on the demiclosedness of $I-T$, where I is an identity map and T is a continuous pseudo-contractive map, and the construction of fixed points of strictly pseudo-contractive mappings.

(continued on page 9)