

# ESF RESEARCH CONFERENCES

## Rapporteur Report

Partnership:	ESF-FWF in partnership with LFUI
Conference Title:	New Challenges in Earthquake Dynamics
Dates:	18-23 October, 2008
Chair:	David Marsan
Rapporteur:	Alan G. Jones (LESC)

### General Comments

Any general comments you might have concerning the conference, your role, the scientific area covered by this conference, etc.

#### The conference:

This conference brought together a wide spectrum of senior and establishing scientists and graduate students who study earthquake dynamics, from observation and statistics to modelling and inversion to laboratory studies of both synthetic and real (rocks) materials.

#### My role:

I saw my role at this conference as two-fold. First was to inform all delegates of the opportunities available through ESF instruments, and the second to be the rapporteur for ESF.

For the first, I gave an overview of ESF as part of the Opening Address, and had a number of discussions with scientists, from Europe and from outside Europe, throughout the conference.

For the second, I attended 25 of the 31 talks and the Tuesday evening discussion about a "Forward Look" (not used in the ESF sense), but due to a commitment in Dublin on the Thursday morning I had to leave the conference on Wednesday lunchtime so missed the last 6 talks. I talked with many of the delegates during the meals and breaks and in the evenings and at the posters, and also during the free afternoon when most went for a walk in small groups.

#### Scientific area covered:

Earthquake dynamics is a very broad field within which various subgroups often work with little interaction between each other. Major questions addressed were:

- How does an earthquake nucleate?
- How does an earthquake rupture propagate?
- How does stress release at the earthquake epicentre result in propagating stress into other regions?
- The nature of the stress, whether simply static stress (a virtually instantaneous step-like increase in stress) or dynamic stress (a time-dependent propagating stress front)?
- Whether later earthquakes on the same fault or a nearby fault are a direct consequence, and hence an daughter aftershock, to the parent main shock or not?
- How would a rupture be observed on the surface – modelling the forward problem?
- How can surface observations be inverted for rupture models – undertaking the inverse problem?

This is a very societally-relevant scientific quest – if we better understand earthquake dynamics we have a greater chance of being predictive about where damaging earthquakes might occur, and more difficultly, when.

### Quality of Scientific Programme, Presentations and Discussion

Comments on the balance and scope of the scientific programme, the scientific quality of the presentations and discussions.

#### Balance & Scope of scientific programme

##### Balance:

I thought the organizers had a good balance between the various broad aspects related to the topic of the Conference. There was a weight towards statistical treatment of earthquake data in the oral and poster presentations, but that reflects the numbers of scientists and students working on that topic.

Scope:

The scope of the workshop was very broad, and brought together a wide range of disciplines.

Scientific quality of presentations

All very high to excellent. Many were of a contentious nature, but this is hardly surprising given that the field is highly complex and relatively immature.

Scientific quality of discussions

This really was, from my perspective, at a very high level. I particularly enjoyed interruptions from the audience during the oral presentations for reasons of clarity or to project an alternative viewpoint. After many of the talks there was intensive debate, and in some cases it was a pity that the debate was curtailed. That there was such vigorous debate shows the contentious nature of some of the views expressed.

**Informal Networking and Exchange; Atmosphere**

Was the schedule and the atmosphere conducive to an easy exchange of information? Was there time and space for an informal discussion? Were younger researchers integrated?

Was the schedule and the atmosphere conducive to an easy exchange of information?

Yes, very much so. There were interruptions of speakers for point clarifications and extensive discussions after almost all of the presentations. These discussions were often of contentious points, yet I did not feel any unpleasantness developing – the arguments were kept at a highly objective level.

Was there time and space for an informal discussion?

There were a lot of one-on-one and small group informal discussions around the posters, especially on Monday evening which was dedicated to poster viewing. In addition, the bar area was full every evening and the small groups of delegates, which comprised the spectrum from senior to establishing scientists to graduate students, were intensively discussing various aspects of the science, new research directions, and also potential future collaborations.

Were younger researchers integrated?

There were few presentations by younger researchers, but this is not surprising as this conference is at the cutting-edge of many of the subfields discussed. Some younger researchers asked questions during discussions of the oral presentations, but no student did (that I remember). The 47 posters on display gave younger researchers and students an opportunity to show their work, and the poster viewing time, and free time spent in small group discussions, allowed younger researchers to be integrated. Certainly being in the same accommodation as the senior scientists is a pre-requisite for this trans-generational interaction to occur.

**Balance of Participants**

Was there an appropriate balance between young and senior participants? Was a balance of national groups and researchers from different (sub)fields achieved?

Was there an appropriate balance between young and senior participants?

I have no idea what ESF regards as “an appropriate balance”, so have a problem answering this question, but in my view there was an appropriate balance.

There were a total of 79 delegates, broken down into the following age and gender categories.

	<40	>40	Totals
<b>Male</b>	28	17	55
<b>Female</b>	17	7	24
<b>Totals</b>	45	34	79

The conference had a very refreshing majority number (57%) of scientists and students under 40 years old. I would say that this is appropriate, although I might have naturally expected more senior scientists.

The breakdown I had did not list student delegates. There were 17 (22%) delegates under 30, of which likely a large number were PhD students. This shows a commendable attempt to open the conference to students and newly-minted PhDs.

Was a balance of national groups and researchers from different (sub)fields achieved?

Balance of nationalities

Below is the breakdown by nationality.

Country	Number	Country	Number
US	16	CH	3
IT	12	GR	3
FR	11	IL	3
UK	7	JP	3
DE	6	IN	2
IE	5	CZ, DZ, ES, PL, RO, RU, UA	1

The high attendance from U.S.A. and Italy is expected, but I would have expected a greater attendance from other European countries with significant earthquake risk, such as Greece, Spain, Turkey, Iceland, Former Yugoslavian States and Hungary, as well as a far higher attendance by Japanese scientists.

Balance of presentations

Below are two tables that show the region and gender breakdown of the 31 oral presentations.

REGION	European	U.S.	Other	Totals
Invited	12	9	2	23
Selected	5	3	0	8
Totals	17	12	2	31

Given the scope of the workshop, and that the U.S. and Japan have very extensive earthquake datasets and many scientists working on this problem, the region breakdown, with 45% of presentations being given by non-Europeans, is not surprising and not a cause for concern. Actually, as I said above I would have expected greater Japanese involvement in the conference.

GENDER	Male	Female	Totals
Invited	19	4	23
Selected	5	3	8
Totals	24	7	31

The gender breakdown, with less than one quarter of the presentations being given by female scientists, reflects the male dominance of the senior scientists in the field, and indeed the balance of the selected presentations (37.5% female), primarily given by junior scientists, shows the trend towards greater participation by females in this field, as is true of all of the geosciences.

## Outlook and Future Developments

Will new collaborations emerge from this conference? (How) could the conference outcomes be utilized further? Are there suitable (ESF) programmes or instruments to further the work of the conference?

Will new collaborations emerge from this conference?

Certainly new collaborations will emerge and existing collaborations will be significantly strengthened. Some of these new collaborations will be intra-Europe, but perhaps more importantly given this topic, some of them will be between Europeans and U.S. scientists and between Europeans and Japanese scientists.

(How) could the conference outcomes be utilized further?

Informal discussions were held about a follow-up conference or conferences with a significant overlap of the participants.

Are there suitable (ESF) programmes or instruments to further the work of the conference?

I believe that a significant fraction of the attendees could work towards a very effective Research Network Programme. I discussed it with the Chair and Co-Chairs, and there was a very positive response. Unfortunately, the deadline of 23<sup>rd</sup> October 2008 was too close for this year, but they will think about putting in a proposal in next year's

competition. Also, for some of the more leading-edge aspects perhaps Exploratory Workshops could be held with the top 25-30 individuals on one or more themes.

## Organisation and Infrastructure

Were venue, catering and accommodation appropriate for this conference? Were participants satisfied with the on-site administration and support?

Were venue, catering and accommodation appropriate for this conference?

The venue was very isolated – out-of-season in a ski town. This has the advantages of a “captured” audience, but the disadvantage of no sense of adventure and of trying different social settings each evening. There were no other bars or restaurants to go to.

Were participants satisfied with the on-site administration and support?

I believe generally most delegates were very satisfied with the on-site admin and support. In particular, the quick-thinking decision to react to the power outage of the whole valley scheduled for the Monday afternoon by swapping the free afternoon from Monday to Tuesday was excellent.

## Summary & Overall Assessment

Was the conference successful; were its aims achieved?

Was the conference successful?

I do not know what the ESF criteria are for a successful workshop/conference compared to an unsuccessful one. Certainly the logistics were excellent, the presentations and posters were all very high quality, the interactions were very high, interactions were vigorous, and the delegates appeared to be very satisfied. My own view of a successful workshop/conference is whether I go back home and do something different from what I did before. Judging by what I saw, this is certainly true for a very high percentage of those who attended. Thus, I would say that yes, it was very successful.

Were its aims achieved?

The stated overarching aim of the conference was to “*discuss the recent advances in earthquake physics, in particular relating to earthquake interactions (observations, models)*”. This aim was most certainly met. A subsidiary aim was to “*promote new, exploratory discussions on how to reconcile large scale regional models with small-scale controls on stress and seismicity*”, which was also met.

These aims I view as rather limited, as far more could have been expected, and to my mind far more was achieved. In the words of one of the organizers, the conference:

- Stimulated new ideas
- Modified views of old ideas
- Enabled interaction between senior scientists and early career researchers
- Expanded the knowledge base of many of the participants, particularly, but not limited to, ECRs
- Developed new collaborations or at least provided the first steps to these
- Forced participants at all levels to think about the future of the research area

and I agree with these views.

Overall I did get a strong sense of convergence in the community – it knows where it needs to go and how to get there.