Evaluation of the ELSA Workshop on Software Engineering and Numerics, based on participants' responses to the questionnaire

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Date: 2008 Dec 19

1. Background

The *ELSA Workshop on Software Engineering and Numerics* was held on 1–5 September 2008 at the Faculty of Physics of the University of Barcelona (Spain). The aim of the workshop was to give an introduction to several topics in software engineering and numerics of particular relevance for the Gaia mission; these include supercomputing, parallel and distributed processing, numerical and statistical methods, data mining, and the computational challenges of Gaia. The workshop should also present an overview of the research carried out by the ELSA Fellows, provide training on their presentation techniques, improve personal contacts and encourage collaborative projects within the network.

During the first two days (1–2 Sept) the ELSA Fellows presented their work, answered questions and received feedback. A slot of 45 min was devoted to each Fellow (maximum 30 min for the presentation and 15 min for questions and discussion). During these days an external expert on presentation skills, Mr. Guy Thistlethwaite, gave feedback both on a general and individual basis. The subsequent three days (3–5 Sept) consisted mainly of lectures by various experts in the field of software engineering, numerics, and Gaia data processing. The complete programme is listed in **Annex 1**.

The fourth meeting of the ELSA Steering Committee was held on 4 September as part of the programme and was attended by all 13 of the ELSA Fellows appointed at the time (the minutes are available as the document ELSA-SC-004). For most of the Fellows this was their second meeting with the Steering Committee (the first one was in Leiden, Nov 2007).

2. Participants

The workshop was primarily intended for ELSA Fellows but included a small number of participants from outside the network. The total number of participants was 44, viz.:

ELSA Early Stage Researchers	9
ELSA Experienced Researchers	5
external students/junior researchers	2
ELSA Scientists in Charge	11
external experts (lecturers etc)	17

although not all the experts were present during the whole workshop.

3. Questionnaire and replies

After the workshop, the questionnaire in **Annex 2** was sent to all participants of the first three categories above, i.e. in total 16 persons. A total of 14 replies were received, on which the present evaluation is based.

The questionnaire consisted of 22 questions and the participants were asked to give their answers on a numerical scale from 1 to 5. For most of the questions "5" would be the best grade, but for a few of them a grade of "3" was optimal. The summary statistics in **Table 1** is divided accordingly. Most of the questions are identical to the ones used to evaluate the previous workshop (see ELSA-COOR-002-01), in order to facilitate comparison.

Comments received in connection with the questions are listed in **Table 2**.

4. Some conclusions

Clearly one of the most successful elements of the workshop was the feedback provided by the external expert, Mr. Guy Thistlethwaite, during the first two days when the Fellows presented their own work. The two questions on the feedback (21–22) received very high average marks of 4.8–4.9, as did the question (7) whether their presentation skills had been enhanced as a result of the workshop (average mark 4.8).

Also the questions related to the general organization of the workshop and opportunities for interaction (8, 9, 14) received high marks.

Question 6 ("Did you enhance your skills in programming/computing as a result of the workshop?") only received a modest average mark of 3.1. This does not look good considering that software engineering and numerics were main themes of the workshop. It is however a clear improvement from the previous workshop, where this question only got an average of 2.0, in spite of the fact that the fellows then had to do a practical exercise which (usually) included some programming. It is probably true that these skills are rather picked up during the daily work or in specialized workshops (such as the Java workshops regularly organized by CU1, and which many of the fellows have attended). The answers to question 6 also had the largest dispersion, which could indicate that the outcome very much depended on the background and prior skills of each Fellow. Still, the present workshop seems to have given a lot of useful *theoretical* insight into the problems of software project management, parallel computing, and various statistical and numerical applications, as judged from the many positive comments received on several of the lectures (see Table 2).

The overall workload and the length of the workshop, and the balance between presentations, lectures and other activities were perceived to be very appropriate. In contrast to the previous workshop (which lasted 1.5 weeks), nobody thought that this one was far too long, and only one thought it was too long.

The overall marks returned by the participants are high, and generally higher than for the previous workshop (see ELSA-COOR-002-01). This could reflect a general enthusiasm among the Fellows, as their work is now gaining momentum and they find themselves in a better position to enjoy the networking.

Table 1. Summary of questionnaire replies

Question No.	Question	Applicable / not applicable replies	1	2	3	4	5	Mean value	Dispersion
	Questions where "5" is the best grade (1 = no, not at all, 3 = undecided, 5 = yes, very much so)								
1	Were the objectives of the workshop clear?	14 / 0	0	0	1	3	10	4.6	0.61
2	Was the mix of topics discussed right?	14 / 0	0	0	0	7	7	4.5	0.50
3	Did you gain a good understanding of the subjects covered by the workshop?	14 / 0	0	0	4	6	4	4.0	0.76
4	Did the workshop stimulate your interest in the subject areas covered?	14 / 0	0	0	1	4	9	4.6	0.62
5	Did you enhance your skills in the subject area of your work as a result of the workshop?	14 / 0	0	1	3	6	4	3.9	0.88
6	Did you enhance your skills in programming/computing as a result of the workshop?	14 / 0	0	5	3	5	1	3.1	0.99
7	Did you enhance your skills in presenting your work as a result of the workshop?	13 / 1	0	0	0	3	10	4.8	0.42
8	Was there reasonable opportunity for interaction with lecturers and other senior participants during the workshop?	14 / 0	0	0	0	4	10	4.7	0.45
9	Was there reasonable opportunity for interaction with other students during the workshop?	14 / 0	0	0	0	2	12	4.9	0.35
10	Did you receive useful feedback on the scientific content of your project work?	12 / 2	0	1	1	5	5	4.2	0.90
11	Were teaching staff available for consultation?	14 / 0	0	0	1	3	10	4.6	0.61
14	Was the workshop well organized (for example with respect to the order of the various activities, and the time allotted for the activities)?	14 / 0	0	0	0	3	11	4.8	0.41
15	Was there adequate time for social activities and relaxation?	14 / 0	0	0	0	5	9	4.6	0.48
18	Was there adequate student/teacher interaction during the lectures?	14 / 0	0	0	2	6	6	4.3	0.70
21	Feedback on your own presentation skills: Those of you who made presentations were given individual feedback by Guy Thistlethwaite. Did you find this useful?	12 / 0	0	0	0	2	10	4.8	0.37
22	General comments on presentation skills: Thistlethwaite also provided some general views and comments on presentation techniques. Did you find this useful?	14 / 0	0	0	0	2	12	4.9	0.35
	Questions where "3" is the best grade (1 = far too small/short, 3 = appropriate, 5 = far too big/long)								
12	Was the workload during the workshop appropriate?	14 / 0	0	0	13	0	1	3.1	0.52
13	Was the workload for preparations before the workshop appropriate?	11 / 3	0	0	11	0	0	3.0	0.00
16	Was the overall length of the workshop appropriate?	14 / 0	0	0	13	1	0	3.1	0.26
17	Was the length of the lectures appropriate?	14 / 0	0	0	12	2	0	3.1	0.35
19	Length of each student presentation: 30 min (+15 min discussion) were allotted to each presentation. Was this adequate time to present the status or plan of work?	13 / 1	0	0	12	1	0	3.1	0.27
20	Total time devoted to student presentations: Two full days were allotted to these presentations, including discussions and feedback. Was this adequate?	14 / 0	0	0	14	0	0	3.0	0.00

Table 2. Comments received in connection with the questions (sorted by question and slightly paraphrased and/or shortened)

1. -
2. -
3. -
4. -
5. -
6. -
7. - it was a very good idea to invite a professional teacher on presentation techniques, and let him help us concerning our future presentations
8. -
9. -
10. -
11. -
12. -
13. -
14. - excellent!
15. -
16. -
17. - while some of the lectures had the perfect length, others were just too long
18. -
19. - the 15 minutes for discussion were useful, but I believe that people could present their work in less than 30 minutes
20. -
21. -
22. -

Lectures that some participants found particularly useful or good (in parentheses is the number of participants who specifically mentioned these lecturers):

Tarantola (7)
Innocente, Lindegren/Lammers (5)
Thistlethwaite (4)
Badia, Holl, van Leeuwen, Prod'homme, Smith (2)
Cela, Czekaj, Muinonen (1)

Two participants felt that the presentation by Giron and Vicente was too general.

A few general comments:
- I was very glad to know more about the work and the progresses of the other ELSA students
- the workshop was really useful and interesting; this is the first time that all the topics of a single workshop were relevant for my work and I very much appreciated it

Annex 1

Workshop programme

Monday, 1 Sept 2008: Presentations by ELSA Fellows (part 1)

09:00 – 09:45 *Modelling CTI effects for Gaia* (Thibaut Prod'homme)
09:45 – 10:30 *Simulation of CTI effects with GIBIS* (Michael Weiler)
10:30 – 11:00 Coffee break
11:00 – 11:45 *Asteroids' shape modelling applying the triangular mesh generator technique* (Maria Czekaj)
11:45 – 12:30 *Number density of objects in the Magellanic Clouds for Gaia* (Maya Belcheva)

13:00 – 14:00 Lunch

14:30 – 15:15 *AGISLab* (Berry Holl)
15:15 – 16:00 *Gaia Sphere Reconstruction, GSR1* (Ummi Abbas)
16:00 – 16:30 Coffee break
16:30 – 17:15 *Population synthesis for Gaia* (Tenay Saguner)
17:15 – 18:00 *General comments about presentation skills* (Guy Thistlethwaite)

Tuesday, 2 Sept 2008: Presentations by ELSA Fellows (part 2)

09:00 – 09:45 *Study of short period variable detections* (Mihaly Varadi)
09:45 – 10:30 *Astrometry of long-period variables and supergiants* (Ester Pasquato)
10:30 – 11:00 Coffee break
11:00 – 11:45 *Markov-Chain Monte-Carlo methods for asteroid orbit computation* (Dagmara Oszkiewicz)
11:45 – 12:30 *Data reduction algorithms for space astrometry* (Alex Bombrun)

13:00 – 14:00 Lunch

14:30 –15:15 *Classification and astrophysical parameter estimation for Galactic surveys using machine learning algorithms* (Paola Re Fiorentin)
15:15 – 16:00 *Modelling physical effects in Gaia attitude* (Daniel Risquez)
16:00 – 16:30 Coffee break
16:30 – 18:00 *Final comments about presentation skills* (Guy Thistlethwaite)

Wednesday, 3 Sept 2008: Software engineering

09:00 – 10:30 *Management of large scientific software projects* (Vincenzo Innocente)
10:30 – 11:00 Coffee break
11:00 – 12:30 *Supercomputing & high performance computing in science* (Sergi Girona/David Vicente)

13:00 – 14:00 Lunch

14:00 – 15:30 *Parallel and distributed computing in science* (Rosa Badia)
15:30 – 16:00 Coffee break
16:00 – 18:00 Free afternoon

Thursday, 4 Sept 2008: Numerics

09:00 – 10:30 *Statistical Inverse Theory* (Albert Tarantola)
10:30 – 11:00 Coffee break
11:00 – 12:00 *Numerical methods in scientific computing* (J.M. Cela)

13:00 – 14:00 Lunch

14:00 – 15:00 *Markov-Chain Monte-Carlo Methods* (Karri Muinonen)
15:00 – 15:30 Coffee break
15:30 – 17:00 *Data mining concepts & large databases in VO astronomy*
     (Francesc Julbe/Xavier Luri)

17:30 – 19:30 Meeting of the ELSA Steering Committee

Friday 5, Sept 2008: Numerical problems – Gaia as a practical case

09:00 – 09:30 *From raw to intermediate data* (J. Portell)
09:30 – 11:00 *The Astrometric Global Iterative Solution (AGIS)*
     Part I: Problem formulation, solution principle, and numerical methods
     (L. Lindegren)
     Part II: Design, implementation issues and selected results (U. Lammers)
11:00 – 11:30 Coffee break
11:30 – 12:30 *The CTI calibration in Gaia: a computing challenge* (Floor van Leeuwen)

13:00 – 14:00 Lunch

14:00 – 15:00 *Classification algorithms for Gaia* (Kester Smith)
15:00 – 15:30 Coffee break

16:30 – 18:00 Visit to Mare Nostrum

End of workshop

Annex 2

Questionnaire

Please answer the following questions (#1–22) on a scale from 1 to 5, where the meaning of the numbers 1, 3 and 5 is explained after each question. Numbers 2 and 4 should obviously be used for intermediate opinions. "Undecided" means that you do not have a decided opinion either way. If you think a question does not apply to you, please answer with a zero ("0").

1. Were the objectives of the workshop clear?
   (1 = no, not at all, 3 = undecided, 5 = yes, very clear)

2. Was the mix of topics discussed right?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

3. Did you gain a good understanding of the subjects covered by the workshop?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

4. Did the workshop stimulate your interest in the subject areas covered?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

5. Did you enhance your skills in the subject area of your work as a result of the workshop?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

6. Did you enhance your skills in programming/computing as a result of the workshop?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

7. Did you enhance your skills in presenting your work as a result of the workshop?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

8. Was there reasonable opportunity for interaction with lecturers and other senior participants during the workshop?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

9. Was there reasonable opportunity for interaction with other students during the workshop?
   (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

10. Did you receive useful feedback on the scientific content of your project work?
    (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

11. Were teaching staff available for consultation?
    (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

12. Was the workload during the workshop appropriate?
    (1 = far too small, 3 = appropriate, 5 = far too big)

13. Was the workload for preparations before the workshop appropriate?
    (1 = far too small, 3 = appropriate, 5 = far too big)

14. Was the workshop well organized (for example with respect to the order of the various activities, and the time allotted for the activities)?
    (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

15. Was there adequate time for social activities and relaxation?
    (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

16. Was the overall length of the workshop appropriate?
    (1 = far too short, 3 = appropriate, 5 = far too long)

17. Was the length of the lectures appropriate?
    (1 = far too short, 3 = appropriate, 5 = far too long)

18. Was there adequate student/teacher interaction during the lectures?
    (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

19. Length of each student presentation: 30 min (+15 min discussion) were allotted to each presentation. Was this adequate time to present the status or plan of work?
    (1 = far too short, 3 = appropriate, 5 = far too long)

20. Total time devoted to student presentations: Two full days were allotted to these presentations, including discussions and feedback. Was this adequate?
    (1 = far too short, 3 = appropriate, 5 = far too long)

21. Feedback on your own presentation skills: Those of you who made presentations were given individual feedback by Guy Thistlethwaite. Did you find this useful?
    (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

22. General comments on presentation skills: Thistlethwaite also provided some general views and comments on presentation techniques. Did you find this useful?
    (1 = no, not at all, 3 = undecided, 5 = yes, very much so)

Feedback on specific lectures (the lecture programme, including most of the presentations, are available on-line):

- Please mention if you found any of the lectures particularly useful, or good in other ways, and explain why (you may mention any number of lectures here).

- Please mention if you found any of the lectures less useful, or bad in other ways, and explain why (you may mention any number of lectures here).