SCAT

SCIENTIFIC COMPUTING ADVANCED TRAINING

Second Interim Report – ALFA Project on Scientific Computing Advanced Training

Dr Lorena A Barba

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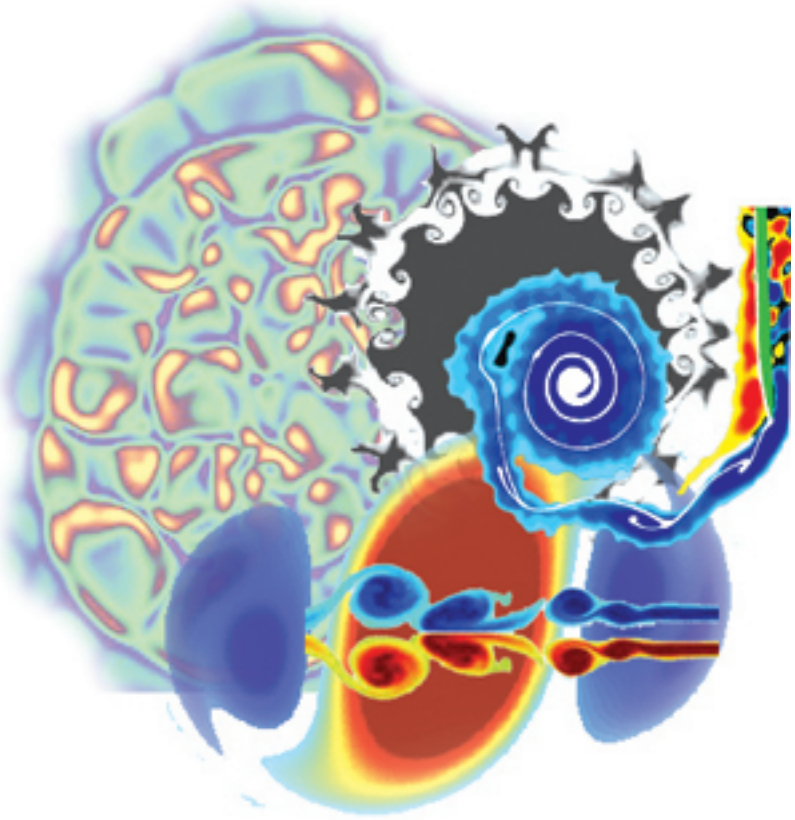
A project co-funded by EuropeAid



Preface

The developed world has been effectively using science and technology to drive economic progress for more than 200 years. But today, about 150 countries, mostly in the Southern Hemisphere, remain at lower levels of economic development and of personal health and wealth of their populations.

It has been recognized that developing countries need to build scientific capacity to use science and technology as an engine of economic development[1]. However, scientists in the developing world face many difficult challenges in education, resources, autonomy, access to equipment and scientific literature, and lack of role models for the young.

The European Union has consistently increased its involvement in support of scientific activity in developing countries. One predominant approach of these programs is the encouragement of international cooperation. Within this framework lies the ALFA Programme[2], for cooperation between higher education institutions in Europe and Latin America.

ALFA — América Latina, Formación Académica — is a programme for the advancement of academic cooperation between the European Union and Latin America.

A project co-funded by EuropeAid

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[1] See, for example, "Building Scientific Capacity", a report of the Third World Academy of Sciences, 2004

[2] http://ec.europa.eu/europeaid/projects/alfa/

Executive Summary

The Scientific Computing Advanced Training (SCAT) project is a collaboration project among ten (10) institutions of higher learning and research, in six (6) countries of Latin America and Europe. The main actions of the project consist of a programme of mobility grants, aimed at post-graduate students or postdoctoral fellows, and a programme of international scientific meetings and courses.

This report covers the second period of under a year —the first report (submitted March 2007) covered 14 months of activities. In the first period, we reported 3 rounds of selection for mobility grants, with 8 grants awarded, and 4 international meetings plus one summer school. In this second period, we can report a steady continuation of our activities. Two more selection rounds have been held for mobility grants, with 7 grants awarded in the first and 4 grants awarded in the second. Hence, SCAT has awarded a total of 19 grants so far —one of these was declined by the grantee, and one is deferred, while 4 are awarded but have not commenced. Two more international meetings have been held in this period, bringing the total to 6 meetings in two years (as scheduled in the proposal stage).

The project continues to offer a professional and informative web site, and we have continued to disseminate our activities to the wider academic communities in the countries of the partners.

We are presenting this technical report within the indicated period of two months after the second year of the project. However, in regards to the expenditures, we have not reached the required threshold for the request of the third payment, and thus the financial report will be submitted in the coming months.

SCAT

Scientific computing Advanced Training

Contents

Section 1

Introduction

The SCAT (Scientific Computing Advanced Training) project is a collaboration project involving 10 institutions in Europe and Latin America, co-financed by the ALFA Programme of EuropeAid.

The overall objectives of the project, as detailed in the project proposal (submitted for the 10th round of ALFA in October 2004), are the following:

- Consolidate a partnership of institutions of higher education and research provoking accelerated knowledge transfer in scientific computing technology and applications in science and engineering.
- Provide hands-on training to advanced students and postdoctoral researchers in the methods and applications of advanced computational research.
- Bring together research groups in the network partners, to develop a synergy and a common vision in the use of scientific computing in balance with analysis and experiments, for the production of high-quality research.
- Trigger initiatives for furthering advanced computational research in Latin American institutions of higher-education, and promote future student exchanges with Europe.

The partners in the SCAT project are the following institutions of higher learning and research:

1. University of Bristol, United Kingdom (coordinating institution) —including members in the Department of Mathematics, the Information Services Department, and the Department of Aerospace Engineering.
2. Computational Engineering Group, Daresbury Laboratory, U.K.
3. Institut de Recherche sur Phénomènes Hors Equilibre, Marseille, France.
4. Laboratoire de Modélisation en Mécanique, Université Pierre et Marie Curie, Paris, France[1]

[1]This institution has changed name now to Institut Jean Le Rond D'Alembert.

5. École Supérieure de Physique et de Chimie Industrielles, Paris, France

6. Universitat Politécnica de Catalunya, Barcelona, Spain —Heat and Mass Transfer Technological Centre.

7. Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil.

8. Universidad Técnica Federico Santa María, Valparaíso, Chile —Department of Mathematics, Department of Computer Science (*Informática*), and Department of Mechanical Engineering.

9. University of Chile, Santiago, Chile —Dept. of Physics.

10. Universidad Nacional Autónoma de México, Mexico City —Instituto de Investigación en Matemáticas Aplicadas y Sistemas, Instituto de Geofísica, and Facultad de Estudios Superiores Cuautitlán.

This Interim Report #2 covers a period of 10 months starting on February 2007, as the previous report covered from the start date of 25 November 2005 until end of January 2007 (14 months). Report #1 was presented in that way because we decided to include two additional months, such that the First Financial Report covered a level of expenditure reaching 70% of the European Commission contribution to the pre-financing. Thus, the first Financial Report was submitted with the Technical Report.

On this opportunity, we are presenting our second Technical Report first, within two months of ending the second year of the project, and will await until the threshold of expenditures for requesting the third payment is reached before submitting the second Financial Report. This has been discussed and agreed with our counterpart project managers in the ALFA office.

The rest of this report is organized as follows. Section §2 details the Grant Holder Mobility programme during this second period of activity. Two rounds of selection have been carried out, and eleven (11) grants have been awarded during this time. We give details of each selection round, and identify the grant holders. Supporting documents for this section, including the minutes of the selection rounds and changes in the procedures of selection introduced, are included in Appendix A.

The next section, §3, details the additional international scientific meetings held in this period. Two meetings have been carried out, completing a programme of six meetings in two years —a considerable success considering the fact that the partners have busy schedules and the pace has been kept up from the beginning of the project. Overall, meetings have been well attended, and very successful, and they have increasingly attracted attention beyond the SCAT network. Documentation pertaining to the meetings, including full programmes for each event, are included in the Appendix.

Section §4 has been titled Dissemination and Impact, and includes a report of the efforts made for wide dissemination of the

project actions, as well as an account of additional (sometimes unexpected) impacts that the project has had.

The final Appendix includes several supporting documents, which are provided in hard copy but not in the electronic version (PDF) of this document. The CVs of grant holders are included here —they are not included in the electronic copy for consideration of the privacy of the grant holders (as the electronic document will be available on the project web site).

Note The links in blue are active links that in the electronic version of the document will attempt a connection to the internet, opening a web page or a draft email. The links in the SCAT purple color are internal links of the document, which in the PDF jump to a section or subsection.

Section 2

Grant Holder Mobility

Summary In the period of this interim Report, two grant holder selection rounds have been carried out, and eleven (11) grantees were selected. This brings the total of grants awarded to 19, of which one was declined and one deferred. Of the total group of grantees from the two years of the project, seven (7) have completed their mobility and submitted their report.

Goals
The project proposal contemplated fifteen (15) mobility grants to be awarded and completed in years 1 and 2.

Success
During years 1 and 2, SCAT has awarded 19 grants: one declined, one is deferred and four have not started —bringing the number of grantees who have commenced their mobility to 13. Of these, 7 have already finished and returned to their home institution.

2.1 Selection Rounds

Three selection rounds were held in the first period, as detailed in Report #1. In this period, two more rounds have been held:

1. Deadline: 15 March 2007 — selection was carried out entirely online, using a virtual environment for secure document sharing and online discussions.

2. Deadline: 15 November 2007 — selection carried out during the SCAT meeting in Mexico (meeting is identified as the Second Latin American Scientific Workshop; see §3).

We have had seven grantees complete their mobilities up to this point:

Helmut Wahanik Finished his mobility to the UK in Feb. 2007[1].

Leonardo Gordillo Finished his mobility to France in Aug. 2007[2].

Dr Thomas Séon Finished his mobility to Chile in Dec. 2007.

Felipe Cruz Finished his mobility to the UK in Dec. 2007.

Guillermo Oyarzún Finished his mobility to Spain in Dec. 2007.

César Gómez Finished his mobility to France in Dec. 2007.

Claudio Torres Finished his mobility to the UK in Jan. 2008.

[1]See the News item, including online access to the mobility report, at http://www.scat-alfa.eu/news/articles_and_archive2/feb07_helmut.html

[2]See the News item, including online access to the mobility report, at http://www.scat-alfa.eu/news/articles_and_archive2/aug07_leonardo.html

Of the seven grantees listed above, all but one were selected in the previous period, and hence the details of their institutions and area of study were given in Report #1. César Gómez commenced his mobility in August 2007 and his grant is described in the present report, below.

2.2 Application Process

The process for the applications of grant holders is described in detail in the document "Guideline for Applicants", attached in Appendix A of Report #1. This document remains up to date, and is available via the project website.

In summary, the application requirements are the following:

1. Grants are intended for graduate students (MSc or PhD) or postdoctoral fellows registered at, affiliated to, or graduated from one of the network partner institutions.

2. Applicants must have at least a Bachelor of Science or equivalent degree, and a strong mathematical background.

3. Applicants must have proven English language skills, for example, by standard tests such as TOEFL, IELTS, or Melab.

4. Computer skills are required, and previous research experience desirable.

All applications are received via an online form, available on the project website. This facilitates the process for the applicant, and in addition leaves a complete electronic record of all applications received.

2.3 Selection of Grant Holders

The selection of grant holders in the three rounds during the first period (Report #1) were held at one of the project's international meetings. In the present period, we have for the first time completed a selection round completely online.

Success
For the first time, a selection process was held entirely online, using distance collaboration technologies.

The online selection round made use of a virtual learning environment, *Blackboard*, which we take advantage of for secure sharing of documents and online discussion fora. The procedure consisted of a **screening** stage, and a **selection** stage. During the screening period, only tutors and supervisors are asked to comment on the applicants and their files. At the selection stage, only members of the Scholarship Team are asked to participate. Details of the online selection round can be found in the Minutes included in Appendix A.

A chairman of the session is selected among the members of the Scholarship Team for each round. The chairmen have been:

1. Online round (15 March 2007) — Dr Lorena Barba

2. Mexico (15 November 2007) — Dr Christophe Josserand

We have included copies of the Minutes produced after each selection process, detailing the proceedings, in Appendix A.

Before a selection session, the coordination office prepares a dossier for each applicant, with all their documents received with the application. Furthermore, we have developed a Check List, which is added to each dossier, pre-screening applications for eligibility, satisfaction of prerequisites, and supporting documents. A sample of the Check List was included in Appendix A of Report #1 and remains current.

2.4 Preparations for Mobility

As described in Report #1, the SCAT coordination office circulates a guidance note for the initiation of the mobility of grant holders, titled "General Recommendations Regarding the Registration of Grant Holders".

Moreover, grantees are asked to read and sign a document entitled "Responsibilities of Grant Holders" before their travel. This document reminds them that they have made a commitment to complete the mobility, that they are responsible for their travel arrangements, insurance and Visa, and that they must acknowledge SCAT in any publications, among other things. A modification was introduced to this document in April 2007, adding a compulsory requirement for writing a final report at the end of the mobility. The full document is included in Appendix A.

2.5 Identification of Grantees

Following, is a roster of all the candidates awarded a mobility grant during the period of this interim Report. The details of their applications, and a report of each selection process, can be found in the Minutes of each selection round included in Appendix A. The CVs of grantees are included in the Additional Documentation included in the CD (Appendix).

Name of the grantee *Víctor Romero*

Institution of origin Departament of Physics, University of Chile, Santiago, Chile.

Host institution École Supérieure de Physique et de Chimie Industrielles, Paris.

Kind of training and duration Advanced Training (AT), 8 months

Beginning of the training period August 2007

Area of study Numerical simulation and experimental study of thin elastic films.

Name of the grantee *Natalia Rodríguez*

Institution of origin Departament of Physics, University of Chile, Santiago, Chile.

Host institution École Supérieure de Physique et de Chimie Industrielles, Paris.

Kind of training and duration AT, 8 months

Beginning of the training period August 2007

Area of study Computational study of the mechanical properties of sound.

Name of the grantee *César Gómez*

Institution of origin Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil.

Host institution Institut Jean Le Rond D'Alembert, Paris, France.

Kind of training and duration AT (postdoctoral), 5 months

Beginning of the training period August 2007

Area of study Computational science; financial models: risk premium for option pricing in a stochastic-volatility environment.

Name of the grantee *Guillermo Ovando*

Institution of origin Universidad Nacional Autónoma de México, Mexico City.

Host institution Computational Engineering Group, Daresbury Laboratory, U.K.

Kind of training and duration AT (postdoctoral), 8 months

Beginning of the training period February 2008

Area of study Computational fluid dynamics and combustion systems.

Name of the grantee *Eduardo Sufán*

Institution of origin Universidad Técnica Federico Santa María, Valparaiso, Chile.

Host institution Universitat Politécnica de Catalunya, Barcelona, Spain

Kind of training and duration AT, 8 months

Beginning of the training period September 2007

Area of study Computational fluid dynamics, convection flows and applications in solar energy and cooling systems.

Name of the grantee *Georgette Pavez*

Institution of origin Universidad Técnica Federico Santa María, Valparaiso, Chile.

Host institutions Institut de Phénomènes Hors Équilibre, IRPHE, Marseille, France.

Kind of training and duration AT, 8 months

Beginning of the training period October 2007

Area of study Computational solid mechanics.

Name of the grantee *Marcelo Abarca*

Institution of origin Universidad Técnica Federico Santa María, Valparaiso, Chile.

Host institution Institut de Phénomènes Hors Équilibre, IRPHE, Marseille, France.

Kind of training and duration AT, 8 months

Beginning of the training period October 2007

Area of study Computational fluid dynamics; motion of thin elastic bodies

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Name of the grantee *Christopher Cooper*

Institution of origin Universidad Técnica Federico Santa María, Valparaiso, Chile.

Host institution University of Bristol, U. K.

Kind of training and duration AT, 8 months

Beginning of the training period February 2008.

Area of study Development of particle methods for the simulation of fluid flow.

Name of the grantee *Gustavo Ramos*

Institution of origin Universidad Nacional Autónoma de México, Mexico City.

Host institution Computational Engineering Group, Daresbury Laboratory, U.K.

Kind of training and duration AT, MSc level, 8 months

Beginning of the training period March 2008

Area of study Computational science; numerical analysis of flow in porous media.

Name of the grantee *Carlos Valdivia*

Institution of origin Universidad Técnica Federico Santa María, Valparaiso, Chile.

Host institution Institut Jean Le Rond DAlembert, Paris, France.

Kind of training and duration AT, MSc level, 8 months

Beginning of the training period March 2008.

Area of study Computational solid mechanics.

Name of the grantee *Fabien Ternat*

Institution of origin Institut de Phénomènes Hors Équilibre, IRPHE, Marseille, France.

Host institution Universidad Técnica Federico Santa María, Valparaiso, Chile.

Kind of training and duration AT (post-doctoral), 8 months

Beginning of the training period March 2008

Area of study Computational fluid dynamics.

2.6 Training Programme & Conditions

2.6.1 Research Training

As the mobility grants of the SCAT project are at the postgraduate level, and meant to provide hands-on research experience in computational science, the training programme consists on personally supervised independent research. The tutors at the host institution collaborate with the SCAT grantee as they would with a PhD student or a regular post-doctoral fellow (depending on the level of the grantee). Each applicant has corresponded with their potential host supervisor and determined a research topic before submitting an application. Once in place for the mobility, the research topic may be adapted to the needs of training of the grantee, at the discretion of the host supervisor.

2.6.2 Language Improvement

Language improvement courses have been offered to all grantees as a possibility. English is the official language of the project, and it is required at the application stage that applicants have a level of proficiency in the English language which is comparable to the usual requirements of postgraduate admissions to universities in English-speaking countries. Nevertheless, in many cases there is still much to be gained from improving the language skills of the grantee.

In general, the support for language improvement has proved to be of much interest to the grant holders. For them, being highly proficient in the English language enhances their career prospects as scientists.

Success
One grantee (Claudio Torres) was allowed to pursue his mobility even though his TOEFL (IBT) score was too low at 43; he was required to take intensive English courses during his mobility as part of this exception. After 7 months of his mobility, his TOEFL had increased dramatically to 83 (IBT), which allowed him to successfully apply for PhD study in the USA.

2.6.3 Grantee Testimonial

We would like to finish this section on Grant Holder Mobility with a Testimonial. Several other testimonials like this one can be found in the Appendix.

> The central objective of my project is to study the macroscopic behaviour of matter out of equilibrium from an experimental, computational and theoretical point of view. The Department of Physics, and more generally the University of Chile, seemed to me as a particularly favourable environment for such research. Without a doubt, this post doctoral year financed by SCAT has allowed me to expand my research experience in the field of Nonlinear Macroscopic Physics. But not only that! This year also allowed me to learn Spanish, to improve my English, and to meet a whole community of excellent researchers with whom, I am sure, I will stay in contact with all my life.
>
> Each point that I have detailed here is very important for me, because I really want to have a career in academic research! And so this year allowed me to build serious experience, essential to join academia. Finally, there are already many collaborations between both French and Chilean researchers in the field of macroscopic physics, and I'm already glad to be able to pursue these very rewarding collaborations.
>
> *Thomas Séon – Santiago, December 2007*

2.7 Successes of Grant Holders

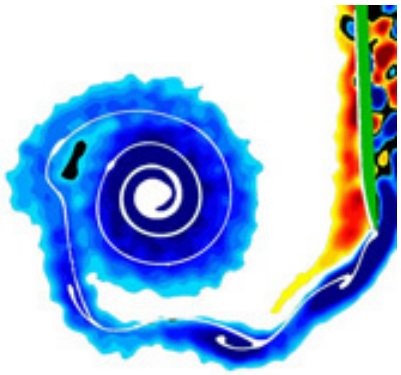
Grant holder Felipe Cruz finished his SCAT scholarship in December 2007, but he continues in Bristol, as he has been accepted for PhD study there. He will be fully funded by a new grant from BAE/Airbus, and this is made possible thanks to the excellent work that he did during his SCAT mobility.

Claudio Torres, who ended his mobility in Bristol in January 2008, has been accepted for PhD study in applied mathematics at the University of Delaware, USA. He has been offered a place by Prof. Louis F. Rossi who is a collaborator of SCAT coordinator, Dr. Lorena Barba.

Victor Romero, from the Department of Physics at University of Chile, traveled to Paris for his SCAT mobility, to work at the École Supérieure de Physique et Chimie Industrielles. Thanks to his excellent work in Paris, he has been offered the opportunity to start a PhD under a *co-tutelle* situation, which means that he will be jointly supervised by ESPCI and University of Chile. Because of this opportunity, he has been able to secure additional funding from CONICYT, Chile, with the program *Colegio Doctoral Franco-Chileno*. Information about this program is found at http://www.conicyt.cl/573/article-7630.html

Section 3

International Meetings and Courses



Vortex sheet image by Prof Alberto Verga, IRPHE.

Summary In this second period, we complete the six meetings that were scheduled for the first two years of the project. The SCAT project meetings now increasingly include the wider participation of scientists beyond the partner institutions.

3.1 Third European SCAT Workshop and Summer School

Goals
The project contemplates three (3) international meetings per project year, which is the maximum according to the ALFA Programme guidelines.

Theme
The focus of this meeting was on the theoretical basis, modelling and computational study of fluid vortices and vortex sheets.

Held in France in June 2007, this event was locally organized by SCAT partners at Institut de Recherche sur les Phénomènes Hors Equilibre, Marseille, and received additional support from CNRS (Centre National de la Recherche Scientifique). The additional support permitted the participation of local students, and the funding of invited speakers from other institutions.

Following is a list of the participants from SCAT partner institutions:

- Dr. Lorena Barba, Department of Mathematics, University of Bristol, United Kingdom
- Mr. Boris Drappier, SCAT Project Manager, University of Bristol, United Kingdom
- Dr. Andrew Sunderland, Computational Science and Engineering Department, Daresbury Laboratory, United Kingdom
- Dr. Agnès Maurel, École Supérieure de Physique et de Chimie Industrielles, Paris, France
- Dr. Sophie Goujon-Durand, École Supérieure de Physique et de Chimie Industrielles, Paris, France
- Dr. Maurice Rossi, Laboratoire de Modélisation en Mécanique, Université Pierre et Marie Curie, Paris, France
- Prof. Oscar Orellana, Department of Mathematics, Universidad Técnica Federico Santa María, Valparaíso, Chile

Meeting participants pose at the conference location in France.

- Prof. Gonzalo Hernández, Department of Informatics, Universidad Técnica Federico Santa María, Valparaíso, Chile
- Dr. Jorge Zubelli, Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, Brazil
- Dr. Sergio Rica, Department of Physics, Universidad de Chile, Santiago, Chile

The local participants from IRPHE were:

- Dr. Stéphane Le Dizès
- Dr. Laurent Duchemin
- Dr. Uwe Ehrenstein
- Dr. Alberto Verga

Courses covered a comprehensive overview of the different physical mechanisms involved in the stability and dynamics of vortices and vortex sheets.

The thematic focus of this workshop was in the theoretical basis, modelling and computational study of fluid vortices and vortex sheets.

Vortices and vortex sheets are fundamental constitutive elements of turbulent flows. They are present on the smallest scales of turbulence as well as on large scale in the form of coherent structures. They have their own dynamics and are extremely receptive to external forcing. They are also subject to complex interactions which may lead to their recombination (vortex merging) or disappearance (vortex breakdown or bursting).

The objective of this summer school was to provide a comprehensive overview of the different physical mechanisms involved in the stability and dynamics of vortices and vortex sheets, to introduce the numerical tools and theoretical methods used to describe their evolution, and to discuss some applications in the aeronautical context.

The **Summer School** aspect of this event consisted of a series of mini-courses, of which a sample is listed below:

Meshless methods and vortex methods By Dr Lorena Barba, University of Bristol. Presenting the origins of vortex methods and its modern formulation; the smooth particle hydrodynamics method and its formulation; the issue of particle field uniformity and spatial adaption and trends for the future.

Transient Growth in Vortices By Dr Pierre Branchet, Université Paul Sabatier, Toulouse.

Airplane Trailing Vortices, Instabilities and Control By Dr Jeffrey Crouch, Boeing Company (Seattle). Discussing vortex systems behind aircraft, vortex-pair instabilities, and active control of vortex breakup.

Global stability analysis and control in non-parallel open flows By Prof Uwe Ehrenstein, Université de Provence. Presenting perturbation analysis using global temporal eigenmodes, and applications in flow control.

Computing Vortex Sheet Motion By Prof Robert Krasny, University of Michigan. Presenting Lagrangian particle methods for computing vortex sheet evolution in 2D and 3D.

Vortex Kelvin Waves, and Elliptic Instability By Dr Stéphane Le Dizès. A presentation of the fundamental problem of vortex waves on a uniform vortex, the case of non-uniform vortices, shear instability, centrifugal instability and elliptic instability.

Introduction to Vortex Dynamics by Dr Thomas Leweke, IRPHE. Discussing the dynamics of vortex filaments and the local induction approximation, Crow instability and other fundamental material.

Vortex Instability By Dr Maurice Rossi, Université de Paris VI. Discussing basic concepts of vortex stability, shear instability, centrifugal instability and swirling jets.

General concepts in stability theory By Prof Peter Schmid, École Polytechnique. An introduction to general concepts for stability analysis of shear flows.

Theory of vortex sheets By Prof Alberto Verga, IRPHE. Presenting the foundations of vortex sheets, including Birkhoff-Rott equation and Kelvin-Helmholtz instability.

Vortex Particle and Vortex-in-cell Methods By Prof Gregoire Winckelmans. Presenting both the theoretical and practical aspects of simulating unsteady 3D incompressible vortical flows using the vortex particle and VIC methods.

The one-page course descriptions for the series of courses listed above are included in the Appendix.

The additional financial support by CNRS allowed the participation of several students from the local French partner institutions. This, added to the external invited lecturers and the SCAT partners, meant that the total number of participants to this event reached close to 50.

We acknowledge additional funding by CNRS for the local participants and invited speakers.

3.2 Second Latin American SCAT Workshop

Held in Mexico, November 2007, this event received additional funding from CONACyT, which allowed the participation of two-dozen local Mexican students and academic faculty. This meeting was a huge success in terms of participation, as well as dissemination of the SCAT project actions.

Following is a list of the participants from SCAT partner institutions:

- Dr. Lorena Barba, Department of Mathematics, University of Bristol, United Kingdom
- Mr. Boris Drappier, SCAT Project Manager, University of Bristol, United Kingdom

Theme

The focus of this meeting was on the mathematical and computational challenges for development, resources and environment.

A group of attendees during a field trip to the Maya ruins at Tulum.

- Dr. David Emerson, Computational Science and Engineering Department, Daresbury Laboratory, United Kingdom
- Dr. X Gu, Computational Science and Engineering Department, Daresbury Laboratory, United Kingdom
- Dr. Agnès Maurel, École Supérieure de Physique et de Chimie Industrielles, Paris, France
- Dr. Christophe Josserand, Laboratoire de Modélisation en Mécanique, Université Pierre et Marie Curie, Paris, France
- Dr. Lydie Staron, Laboratoire de Modélisation en Mécanique, Université Pierre et Marie Curie, Paris, France
- Dr. Patrice Meunier, Institut de Recherche sur les Phénomènes Hors Equililbre, France.
- Prof. Oscar Orellana, Department of Mathematics, Universidad Técnica Federico Santa María, Valparaíso, Chile
- Prof. Luis Salinas, Department of Informatics, Universidad Técnica Federico Santa María, Valparaíso, Chile
- Dr. Andre Nachbin, Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, Brazil

The local participants from the Mexican partners were the following, in addition to about a dozen Mexican students:

- Dr. Susana Gómez
- Dr. Ismael Herrera
- Dr. Mario Chavez
- Dr. Emilia Dorantes
- Dr. Gerardo Dorante
- Dr. Cesar Estrada
- Dr. Pedro González Casanova
- Dr. Gabriel Ibarra Salinas
- Dr. Aron Jazcilevich
- Dr. Andreas Koster
- Dr. Miguel Robles
- Dr. Ernesto Rubio

The Programme of this meeting is included in the Appendix. One important ingredient of this event was the participation of the students, who presented their ongoing work in brief research talks. Their face-to-face contact with potential supervisors allowed many students to visualize a mobility stay in Europe, and receive answers to many questions, thereby encouraging them to apply for a SCAT grant.

Another comment which is opportune at this time, is that the core of SCAT partners who have participated in most meetings have now grown to know and like each other, and are increasingly keen on working together thanks to this. This meeting in particular was full of camaraderie and friendships were solidified. It is an important ingredient for collaboration, after all.

We acknowledge additional funding by CONACyT for the local participants and students.

3.3 Upcoming SCAT Meetings

The following SCAT meetings will be held in calendar year 2008, and will finalize the full programme of meetings of the project:

24–28 March 2008 Third Latin American SCAT Workshop, Brazil — co-organized by IMPA. The topic is *Computational and Mathematical Challenges in Wells, Waves & Weather*.

June 2008 4th European SCAT Workshop, Bristol — organized by the University of Bristol. The topic is *Vision for Computational Science and Engineering Education*.

November 2008 4th Latin American SCAT Workshop, Chile — co-organized by University of Chile. The topic is *Developing a Vision for Advanced Computational Scientific Research in the Region*.

Section 4

Dissemination and Impact

Summary Dissemination efforts have continued similar to the first year, including posters being sent to all partner institutions to advertise selection rounds for mobility grants as well as meetings. Moreover, the project actions have been made known to an increasing number of participants to the international meetings. Beneficial impact of the project has exceeded expectations and goes beyond the network partners. New agreements have been signed among partner institutions, promoting collaboration in both research and teaching.

Goals
Dissemination goals at the proposal stage were quite standard, including a website and materials from meetings. In fact, results have exceeded these expectations.

4.1 New Agreements between Institutions

One unexpected but very welcome result of the SCAT project has been the recent signing of a general agreement of academic and cultural collaboration between Universidad Nacional Autónoma de México (UNAM), and Universidad Técnica Federico Santa María (UTFSM), Chile.

On 17 January 2007, a four-page agreement was signed by the Rector of UTFSM and the Secretary General of UNAM, whose objective is promoting collaboration between the two institutions aimed at scientific and cultural activities. The scope of collaboration includes, for example, joint projects in both research and teaching, the exchange of academic personnel for both research and teaching and also for advisement and dialogue. It also contemplates the mobility of students at both under-graduate and post-graduate level, and the exchange of information, documentation, media and publications. The agreement is of indefinite duration. (A scanned copy of the signed document is included in the Appendix.)

4.2 Meetings

As mentioned in §3, the two most recent SCAT meetings have been widely attended by scientists and students from beyond the network, who participate either self-funded or funded by additional support from local research funding bodies (CNRS in France and CONACyT in Mexico).

For the meeting in France, there were in total 58 registered participants (included SCAT members listed in §3. We include an extended list in the Appendix.

Therefore, the SCAT project activities, as well as the ALFA programme, have been disseminated to numerous scientists and students that may not have been aware of such a programme. On each meeting, a brief presentation by the project coordinator explained the programme objectives and the project actions.

4.3 SCAT Project Web Site

The project web site has been kept up to date, announcing each selection round for mobility grants and international meetings. News items have been added periodically to maintain the interest of SCAT partners in our achievements, and to celebrate the successes of the grant holders. Some samples are included in the Appendix, showing screenshots of the website.

The web site continues to operate from an .EU domain for high visibility of the ALFA programme and the EU contribution: http://www.scat-alfa.eu/

4.4 Other impacts

There is one story of impact beyond the network partners that is important to report. Dr Susana Gómez, SCAT interlocutor for UNAM has realized an extended visit to Puna, India, where she has become involved with supporting Indian girls in getting involved with scientific research. Through the personal links created by SCAT, Dr Gómez arranged with Dr David Emerson, Head of the Computational Engineering group at Daresbury Laboratory, UK, that her mentored female students from India have access to computers at Daresbury. Thus, the girls are carrying out computational research, remotely on the machines at Daresbury, under the guidance of Dr Gómez.

This is an example of what an open mind for collaboration, and people who are leaders in science coming together, with a rapport brought through the regular meetings organized by SCAT, is accomplishing — having an impact on the lives and aspirations of young students as far away as India.

Section 5

Conclusion

This 2nd Interim Report covers 10 months of activity of the SCAT project (which has a total duration of 36 months), between February and November 2007. In this time, all the international meetings that were scheduled have been held, completing a total of six meetings in the first two years of the project (as planned). The meetings have been increasingly well-attended. In the last two events, there was ample participation from outside the network, which was made possible by additional funding from CNRS in France and CONACyT in Mexico.

The SCAT project has so far awarded 19 mobility grants —of which one was declined and one deferred due to health reasons, leaving 17 active grantees. The original proposal included a minimum of 20 grants (twice the number of institutions in the network). We are holding a new selection round in the next meeting (Rio de Janeiro, March 2008), when the last grants will be awarded. It is possible that more than 20 grants are awarded in the end, due to some extra budget under Actions being available from savings on trips to meetings. This will fall under the provision of changes of budget within the same heading, therefore a notification to the contracting authority will be made in a timely manner.

The SCAT coordinating team has continued its efforts in the dissemination aspects of the project. Our professionally designed, standards-compliant project web site continues to be maintained, offering News and information about the international meetings and short courses. Moreover, all mobility grant applications continue to be received via the online system.

The next events of the SCAT project are in course of preparation. There will be a meeting in Rio de Janeiro in March 2008, locally organized by the partners at IMPA. Next, a meeting with short courses is to be held in Bristol, in June 2008. Finally, the project is brought to a close with the last meeting, to be held in Santiago, Chile. These activities will complete the programme of three-yearly meetings for the three years of operation of the project.

The present 2nd Interim Report is not accompanied by a Financial Report, due to the fact that the project expenses up to this point have not reached the threshold of 70% of the previous pre-financing amount, as stipulated in Article 15.1 of the General Conditions (Annex II) of the contract. We can foresee that after the upcoming project meeting in Rio de Janeiro, we will be in a situation to comply with the "rule of 70%" and call our auditors in to proceed with the Financial Report. Therefore, the estimated date for the Financial Report should be May 2008.

Bristol, January 2008.

Notes

Written in LaTeX 2$_\varepsilon$ (book class) and typeset in Palatino font.

Appendix A

Documentation for Grant Holder Mobility

A.1 Poster: Call for Applications, Last Round of Selection.

A.2 Screen shots of Online Application Form.

A.3 Minutes of Selection Rounds in the Period of the Report.

A.4 Responsibilities of Grant Holders (revised document).

A.5 The SCAT Experience, contributions by grant holders.

A.6 Certificate of Completion, SCAT Mobility Grant

Call for Applications

Research mobility in Europe

a project financed
by EuropeAid

SCAT
SCIENTIFIC COMPUTING ADVANCED TRAINING

Mobility grants worth €16,520.

You must be a graduate student (MSc or PhD) or a post-doc at one of the partner institutions, and wish to take a research project of approximately 8 months duration at a European partner institution.
You must be skilled with computers, proficient in English, a good team worker and an independent thinker.
Next round of selection: 15 March 2008. *Apply now!*

More information:

`info@scat-alfa.eu`
`http://www.scat-alfa.eu`

Partners:

Departamento de Física, Universidad de Chile

Deptos. de Matemática, Informática & Mecánica
Universidad Técnica Federico Santa María, Chile

Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas,
Instituto de Geofísica & Facultad de Estudios Superiores Cuautitlán
Universidad Nacional Autónoma de México

Instituto Nacional de Matemática Pura e Aplicada
Rio de Janeiro, Brazil

Department of Mathematics, University of Bristol, U.K.

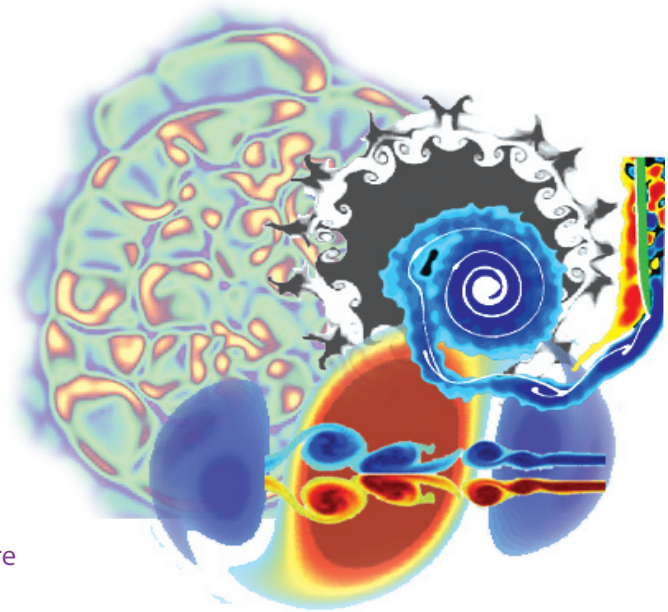
Centre Tecnològic de Transferència de Calor
Universitat Politècnica de Catalunya, Barcelona

Laboratoire de Modélisation en Mécanique
Université de Paris VI - Pierre et Marie Curie

Computational Science and Engineering Department
Daresbury Laboratory, CCLRC, Warrington U.K.

Institut de Recherche sur les Phénomènes Hors Equilibre
Universités d'Aix-Marseille I et II, Marseille, France.

École Supérieure de Physique et de Chimie Industrielles de la Ville de Paris
Laboratoire Ondes et Acoustique & Physique et Mécanique des Milieux Hétérogènes



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Mobility Grants

- FAQs
- Applications

Scholarships Team

Lorena Barba
Agnes Maurel
Andre Nachbin
Carlos Perez-Segarra
Luis Salinas
Vladimir Tchijov

Contact Information

Project manager:
Mr. Boris Drappier
+44 117 331 1805
Dept. of Mathematics
University of Bristol

Contact us:
scat-alfa@bristol.ac.uk

Applications

Note: Please make sure that you are eligible, and that you have read the FAQs and the Guidelines for Applicants.

Personal Information

* **Last Name:**
* **First Name:**
Middle Initials:
Title: Mr
* **Nationality:**
* **Address:**
* **Zip code:**
* **City:**
* **Country:**
* **Email:**
* **Telephone:**
Fax:
Personal URL:
* **Home Institution:**
Department of Mathematics, University of Bristol, UK

* **Hosting Institution:**

Department of Mathematics, University of Bristol, UK

Comments:

* **Submission of Documents**

Please submit any supporting documentation for your application. This should include at least a CV. If you have several documents please zip them into a single file before uploading.

Browse...

Please enter the names and addresses of two referees who may be contacted.

* **Primary Reference:**

* **Secondary Reference:**

* **To the applicants : please tick the box to confirm that you have read the Guidelines for Applicants and the FAQs posted on the website, and that you accept the conditions of the programme.**

Reset Send

back to top

SCAT
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Minute of the Selection procedure for the SCAT Grant-holders

15 May 2007 – Web-based

Introduction

This selection is the first one to be held on Blackboard, with virtual participation of the involved tutors and of the scholarship team.

Access to Blackboard is given to the tutors (origin) and supervisors (host), plus all the Scholarship Team members.

There will be a screening stage, and a selection stage. During the **screening** period, only tutors and supervisors are expected to comment on the applicants and their files. At the **selection** stage, only members of the Scholarship Team will participate.

Screening

Application files are first revised by the project manager, in order to check administrative compliance and eligibility.

All received files have been revised against the criteria detailed in the application procedure (*ApplicationProcedure_en_v1-6.pdf* and *Selection_CheckList_en_v3.pdf*)

The supporting documents are posted on Blackboard, where a special folder has been created for each applicant, with reserved access for the tutors, supervisors and Scholarship team members.

The group folders include, when available, their CV, their online application, evidence of the knowledge of the English language, their reference letters (or referee forms if they don't have original letters yet) the abstract of their research project, and their personal statement.

A "Selection Check List" is also posted for each applicant, in order to summarize the application dossier and the eligibility of the applicant.

Results of the selection procedure:

The outcome of this process is shown in the table (below) and summarizes as follows:

- Seven applicants have been pre-selected;
- Gustavo Ramos: not eligible due to an incomplete application.

#		Origin	Tutor	Elegibility	Host Institution	Approved Supervisor
1	**Víctor Romero**	DFI	Marcel Clerc (Enrique Cerda)	**YES**	ESPCI	Benoit Roman (Agnes Maurel)
2	**Natalia Rodríguez**	DFI	Felipe Barra	**YES**	ESPCI	Agnes Maurel
3	**César Gómez**	IMPA	Jorge Zubelli	**YES**	LMM	Joel Frelat (Christophe J.)
4	**Guillermo Ovando**	UNAM	Vladimir Tchijov	**YES**	DL	X Gu
5	Gustavo Ramos	UNAM	Susana Gomez	**NO**	DL	**None**
6	**Eduardo Sufán**	USM	Franco Perazzo	**YES**	UPC	Manel Soria
7	**Georgette Pavez**	USM	Oscar Orellana	**YES**	UPC	Manel Soria
8	Marcelo Abarca	USM	Oscar Orellana	**YES**	UPC	**None**

Table 1: results of the screening process, showing eligibility and acceptance by host supervisors

Selection

The SCAT scholarship team has revised the applications, with the following remarks:

SCAT Participants at this stage were:

- Lorena Barba*
- Boris Drappier
- Andre Nachbin
- Luis Salinas
- Agnès Maurel
- Vladimir Tchijov
- Carlos Pérez-Segarra

* Acted as the Chairman

Discussion of the dossiers

Regarding the recommendations given in the screening process, 3 applications raised further comments, all applying to UPC-Barcelona:

1. **Marcelo Abarca** (from USM-Valparaiso)

   Manel Soria and the UPC team could not accept the applicant, mainly due to lack of space and time. Indeed, 4 potential grant holders were considered simultaneously for the UPC.

   Marcelo was therefore put aside, although his application has been considered successful.

2. **Eduardo Sufán** & **Georgette Pavéz** (from USM-Valparaiso)

   Both applicants were pre-selected, and accepted by the UPC team. However, Agnès Maurel asked Manel Soria to be more explicit about the willingness of the UPC to receive the selected students. So did the UPC do via a Blackboard comment.

   It is pointed out that all scholarship members didn't participate to the debate. This has been considered as a tacit approval of the screening and selection.

Results of the Selection Round

The results are summarised as follows:

1. **Víctor Romero**: Selected. Will start his mobility asap at ESPCI under the supervision of Benoît Roman.
2. **Natalia Rodríguez**: Selected. Will start her mobility asap at ESPCI under the supervision of Agnès Maurel.
3. **César Gómez**: Selected. Will start his mobility asap at LMM under the supervision of Joel Frelat.
4. **Guillermo Ovando**: Selected. Will start his mobility asap at DL under the supervision of X Gu.
5. **Gustavo Ramos**: Not selected, not approved. This applicant should apply again and submit a comprehensive file, should he want to be considered for a grant.
6. **Eduardo Sufán**: Selected. Will start his mobility asap at UPC under the supervision of Manel Soria.
7. **Georgette Pavéz**: Selected. Will start her mobility asap at UPC under the supervision of Manel Soria.
8. **Marcelo Abarca**: Not selected, although approved. This applicant must find another host institution and supervisor willing to receive him. His selection would be checked with a fast track procedure.

Lorena Barba, chairman

Bristol, 01 May 2007

SCAT
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Minute of the Selection procedure for the SCAT Grant-holders

15 November 2007 – Mexico

Introduction

This round of selection geared a new procedure for the process of scrutinising applications. In past selection rounds, applications were checked against the check list -"Selection_CheckList_en_v3.pdf"- and the files were handed over to the SCAT selection committee. They would then check each applicant, revise the supporting documents, and comment on it. The selection would take place afterwards, leading sometimes to debates during the sessions.

Learning from the success of the web-based selection (15 March 2007), and following the suggestion raised by David Emerson in the previous round of selection, the project manager decided to adopt the following procedure:

1. Screening of grant holders, whereby the files are individually checked against the selection criteria in order to ensure suitability and eligibility of all applicants. Only suitable applicants would be submitted for selection, with a screening sheet detailing the essential information regarding the applications.
2. Selection is made by the proposed supervisor of the grant holder. Therefore, only potential supervisors are given an application dossier for revision. In this process, only qualitative information is given: the check list, the CV, the proposed project abstract and the recommendation letters.

All in all, these improvements have reduced substantially the selection procedure.

Screening

Application files are first revised by the project manager, in order to check administrative compliance and eligibility.

All received files have been revised against the criteria detailed in the application procedure (*ApplicationProcedure_en_v1-7.pdf* and *Selection_CheckList_en_v3.pdf*)

The supporting documents are posted on Blackboard, where a special folder has been created for each applicant, with reserved access for the tutors, supervisors and Scholarship team members.

The group folders include, when available, their CV, their online application, evidence of the knowledge of the English language, their reference letters (or referee forms if they don't have original letters yet) the abstract of their research project, and their personal statement.

A “Selection Check List” is also posted for each applicant, in order to summarize the application dossier and the eligibility of the applicant.

Results of the selection procedure:

The outcome of this process is shown in the table (below) and summarizes as follows:

- Five applicants have been pre-selected;

#		Origin	Tutor	Elegibility	Host Institution	Suggested Supervisor
1	**Christopher Cooper**	USM	Franco Perazzo	**YES**	UoB-UK	Lorena Barba
2	**Gustavo Ramos**	UNAM	Susana Gomez	**YES**	Daresbury-UK	David Emerson
3	**Carlos Valdivia**	USM	Franco Perazzo	**YES**	LMM-Paris	Joel Frelat
4	**Fabien Ternat**	IRPHE	Stephane Le Dizes	**YES**	DFI -Chile USM-Chile	Sergio Rica Oscar Orellana
5	**Claudio Torres**	USM	Luis Salinas	**YES**	UOB-UK	Lorena Barba

Table 1: results of the screening process, showing eligibility and acceptance by host supervisors

Selection

The SCAT scholarship team has revised the applications, with the following remarks:

SCAT Participants at this stage were:

- Christophe Josserand*
- Lorena Barba
- Lydie Staron
- Patrice Meunier
- Boris Drappier
- Andre Nachbin
- David Emerson
- Xiaojun Gu
- Luis Salinas
- Oscar Orellana
- Agnès Maurel
- Susana Gomez

* Acted as the Chairman

Discussion of the dossiers

Regarding the recommendations given in the screening process –all applicants are eligible- it is up to the supervisor to accept the applicants. The following are the observations raised during the selection:

1. **Christopher Cooper** (from USM-Valparaiso)

   Lorena Barba sees no objection to accept his application.

   Christopher is therefore granted a SCAT scholarship for an initial period of 8 months at Bristol.

2. **Gustavo Ramos** (from UNAM-Mexico)

   This is the second application coming from Gustavo. In March 2007, he was considered not eligible, due to lack of supporting documents (see Minute of Selection of 15 March 2007. David Emerson is happy to receive Gustavo in early 2008 and raises no Objection.

   Gustavo is therefore granted a SCAT scholarship for an initial period of 8 months at Daresbury.

3. **Carlos Valdivia** (from USM- Valparaiso)

   Christophe Josserand scrutinises the file together with Lydie Staron. Event though Carlos is deemed to work with Joel Frelat, Christophe approves the application on behalf of his laboratory.

   Carlos is therefore granted a SCAT scholarship for an initial period of 8 months at IJLRA-Paris.

4. **Fabien Ternat** (from IRPHE- Marseille)

   Fabien is applying to both the DFI-Santiago and the USM in Valparaiso. No representative is there to speak for the DFI, thus only Oscar Orellana and Luis Salinas, from Valparaiso, revise the file. They are interested in working with Fabien (the only PhD in this round)

   Fabien is therefore granted a SCAT scholarship for an initial period of 8 months at USM-Valparaiso.

5. **Claudio Torres** (from USM-Valparaiso)

   Carlos is applying for a second scholarship. Indeed, his supervisor –Lorena Barba- is very happy with his work, which has proved accurate and fruitfull, and she thinks that an extension of the stay of Claudio could lead to a publication in a scientific journal.

   Claudio is therefore granted a second SCAT scholarship for an period of 8 months at Bristol.

Results of the Selection Round

The results are summarised as follows:

1. **Christopher Cooper** : selected

   Christopher is granted a SCAT scholarship for an initial period of 8 months at Bristol under the supervision of Lorena Barba.

2. **Gustavo Ramos** : selected

   Gustavo is granted a SCAT scholarship for an initial period of 8 months at Daresbury under the supervision of David Emerson.

3. **Carlos Valdivia** : selected

   Carlos is granted a SCAT scholarship for an initial period of 8 months at IJLRA-Paris under the supervision of Joel Frelat.

4. **Fabien Ternat** : selected

   Fabien is granted a SCAT scholarship for an initial period of 8 months at USM-Valparaiso under the supervision of both Oscar Orellana and Luis Salinas.

5. **Claudio Torres** : selected

   Claudio is granted a second SCAT scholarship for a period of 8 months at Bristol under the supervision of Lorena Barba.

Christophe Josserand, chairman

Cozumel, 15 November 2007

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Responsibilities of Grant Holders

SCAT Project Mobility Grants

Availability of the Grant-Holder:

By submitting the application, the applicant undertakes to accept the grant if his/her application is successful. This entails willingness to travel abroad and availability for the whole length of the scholarship, with a full time dedicated stay at the host institution.

Administration requirements:

The grant-holder is asked to ensure his/her registration at the host institution, the completion of the language improvement (when required), and to comply with all required steps in the host country (customs, visa and passport, etc).

The grant-holder is also asked to buy a full health insurance adapted to the country of the host institution (if applicable). Those administrative costs would eventually be met by the SCAT mobility scheme, but please consult with the co-ordination office for applicable conditions.

Stipend payments:

Monthly stipends of €1500 will be paid to the grantee for the duration of his/her mobility. The grantee will be responsible for sending the co-ordination office a request for payment/declaration, duly signed and in ample time for the processing of the monthly stipend.

Travels:

The successful applicant will be required to make all necessary arrangements for his/her mobility (i.e. travel arrangements and booking –including cancellation insurance with full refundable airfare-, accommodation, subsistence, etc). He/she will have support from the SCAT members, as needed.

The main ticket should have the following conditions:

- Must be valid for one year
- Must be a direct route from your institution of origin to your host institution.
- Must be an economy ticket (tourist class)
- Must be changeable (in case the grant holder must changes dates of departure/return)
- Must be a return ticket for the length of stay according to the scholarship granted (but within a minimum of 6 month and a maximum one year)
- Must have cancellation possibility (hence being refundable in case the grant holder cannot travel, for any reason)

University of BRISTOL

This project is co-financed by the European Union

- Since the scholarship is paid on a monthly basis, the actual stay of the grant holder must be an entire number of months

Furthermore, the grant holder must:

- have signed this declaration of conformity "ResponsibilitesGrantHolders_en"
- have a valid VISA for the host country, valid for at least 6 month after the end of the planned stay.
- Have a full insurance coverage (for loss of baggage + medical insurance)

The reimbursement is made according to the actual price paid by the traveller, against invoice, ticket or receipt. The maximum amount paid is 1.500 EUR (or its equivalent in foreign currency when exchanged at the official rate of the ALFA programme). Any amount above the mentioned limit won't be reimbursed.

VISA costs are not included. The grant holder must arrange his/her own VISA

The grant holder will receive his/her reimbursement when:

- He/she fill in the form corresponding to the currency claimed (detailing every single expense, mentioning the currency, the exchange rate, and the detailed requested in the form). Please contact the Project Manager for more information regarding this matter.
- He/she provides all supporting documents in original (invoices, tickets, receipts, etc) for every single expense
- He/she accompany the claim with boarding passes justifying that he/she has taken the plane that is shown on the supporting documents.

Please beware that without those documents in original, no payment will be issued!

Acknowledgements:

The grant-holder must acknowledge the SCAT project and the ALFA Programme of EuropeAid in any publications derived from the research carried out during the mobility grant.

General provisions:

The SCAT mobility scheme will under no circumstances be responsible or liable for any loss, damage, injury, sickness, disease, death, delay, expense, or inconvenience caused to or by the grant-holder or any third party, resulting directly or indirectly from any act, negligence, default or omission of any kind.

Furthermore, the SCAT mobility scheme has the right to put an end to the scholarship at any moment, under justified circumstances or by decision of the majority of the members of the SCAT Scholarship Team.

Do we require you to write a summary report?

YES: we ask all grant holders to write a synthesis of the research project undertaken at their host institution. This is a short report accounting for the scientific aspect of the mobility. It doesn't need to be long, although we expect the report to show the achievements and/or developments of the mobility for both the grantee and the host institution.

What you will get at the end?

Certificate of completion: Besides the experience gained within the programme, SCAT will issue a certificate at the end of the mobility grant, with the details of the project carried out and the results obtained. This document could be used to justify the stay abroad and the research undertaken to the grant-holder's institution of origin.

By signing acceptance of the grant, you agree to these terms and your responsibilities:

_____

Grantee signature, date

For further information, contact

Boris Drappier

boris.drappier@bristol.ac.uk
44+(0)117 331 1805
Mathematics, University of Bristol
Bristol BS81TW, United Kingdom

This project is co-financed by the European Union

The SCAT Experience
Testimonials of Grant Holders

Felipe Cruz did a mobility from Universidad Técnica Federico Santa María, in Chile, to University of Bristol, UK. He obtained an MSc in computer science (in Spanish, *informática*), and is now a PhD student in Bristol. His doctoral studies are being funded by a new grant obtained by Dr L. Barba from BAE and Airbus.

> From my experience as a SCAT grantee, I can say that the project has the potential of being a life changing experience.
>
> In my case, the SCAT scholarship offered me the possibility to carry out high level research in one of the best Universities of the UK (University of Bristol) and it opened the door to the possibility, that I had hardly considered before, of pursuing higher education (a PhD. in Applied Mathematics in my case) with the goal of following a career in scientific research.
>
> The experience of the SCAT grant is something that is very difficult to summarize in a few lines, because it is so rich in so many senses, but I think that I can describe the most important gains (in an academic sense):
>
> - I had the chance to experience a short, but very intensive, training period in high level research.
> - I had the chance to collaborate and learn from highly trained, bright and amazing people from all around the globe.
> - I had the chance to see what scientific research is about, and realize that I wanted to keep doing this, for a long time.
>
> Now, I can say that after my SCAT is grant finished, the way I look at the future is completely different.

Felipe Cruz, Bristol, January 2008.

Eduardo Sufán went from Universidad Técnica Federico Santa María in Chile, to Barcelona, and he joined the computational fluid dynamics group there at the Heat and Mass Transfer Technological Centre.

> I think that the difference between a scientist and a philosopher is that the philosopher is amazed by the things that surround him, while the scientist is also amazed, but he observes them as a physical phenomenon that can be explained by mathematical models. I think that this is what moves the heart of any scientist, the tireless curiosity and the desire to answer the questions that we all have, why are things the way they are and not otherwise? I think that I am a philosopher of the second type, since I wonder about the nature and phenomena and the riddles of nature.
>
> *What does it mean to me, to have this opportunity?*
>
> The idea of being a scientist has been on my mind since I was a little boy watching on TV the Discovery Channel, and wondering what makes these people leave everything behind and dedicate their entire life trying to solve a question that sometimes the only person that has asked is them. So for me to have this opportunity is to find myself in that very same position. The alternative of living life like a normal person or living as a scientist searching for answers kept me awake at night. I think now I know the answer, and it's thanks to SCAT that this possibility is given to me.
>
> *How has it helped in my career?*
>
> I think that as an engineer you have to be studying always to keep up to date, but in most the cases you just take a book and that's it, end of the problem. With numerical simulation it's different because you need someone to help you understand and then you can follow on your own, and it is something you can't learn in books. This kind of formation has been given to me thanks to the SCAT project.
>
> *What have I gained?*
>
> There are two main things that I've gained in this mobility.
>
> The first one, is a human one, because in my entire life I've never been outside my country, and

> now I've been having an incredible experience by knowing people from all kinds of countries, like Russia, Serbia, Mexico, etc. and that's something I've always wanted to do, but the money was a problem with no solution.
>
> The second one, is an academic one, the fact of being in a lab like the CTTC (Technological Center of Heat Transfer) has shown me how a scientist works and how I should confront the problems in the future in a scientific way. So to me it has been a great opportunity to learn, learn the culture of other countries and learn the meaning of being a real scientist.

Eduardo Sufán, Barcelona, January 2008.

Natalia Rodríguez is from the University of Chile, and she is doing her mobility at École Supérieure de Physique et Chimie Industrielles de Paris. She has been there since August 2007, so is only half-way through the visit.

> This scholarship has given me the oportunity of working directly with researchers in my area of interest. It has also made my learning easier and showed me questions that could be subject for new studies.
>
> Looking at the big picture, I would have to say it has helped me for my future in life, as what I have learned both in studies and life is immeasurable.
>
> I don't think I can make a list of all I've gained, but I think the most important thing is that I have learned how to face a problem, an academic problem or an everyday problem.

Natalia Rodríguez, Paris, January 2008.

Luis M. de la Cruz Salinas is from Mexico and he obtained his PhD in computer science in 2005. For his SCAT grant, he traveled to Daresbury Laboratory in the UK as a post-doctoral fellow.

> This program is a great opportunity to meet people with an excelent background in Scientific Computing and especially in Computational Fluid Dynamics. In my interaction with these people I

have learned several strategies in numerical methods, parallel algorithms and scientific visualization to get good and efficient solutions to large-scale problems in CFD.

Also, it has been invaluable to know the way in which an institution like the Daresbury Laboratory organizes several research projects and concentrates experts in different fields of knowledge to deal with complicated real life problems.

My stay in the UK has been exciting and has allowed me to change my point of view of the world. Now, I know many facts about the British culture and the European countries. Besides, I have improved my English language.

I forecast a good future in my career, because now I can state in my CV this great and exciting stay at Daresbury Laboratory, and this is very important to get new and more opportunities in the research institutions in my country. Now I am more confident with my knowledge about Scientific Computing.

Luis M. de la Cruz Salinas, Daresbury, January 2008.

January 25, 2008

SCAT-ALFA Project
Mr. Boris DRAPPIER
Department of Mathematics,
University of Bristol
Bristol BS8 1TW, United Kingdom

Dear Sr.:

As you requested me, I am writing down a few lines about my experience with the mobility grant I got from SCAT. At the very beginning there was a possibility to work some time in the PMMH at the ESPCI, doing some work in order to start my thesis work. The opportunity to come to Paris shows up because of the friendship between my advisor in Chile and Benoit ROMAN.

Scat project allows me to came to Paris and work with Benoit ROMAN, and start my thesis work in fracture mechanics in thin sheets. Until now this work has been successful and I will show it in the APS march meeting in New Orleans Louisiana.

Also come to Paris was an opportunity to start a cotutelle program, which is a contract between my University and University Pierre et Marie Curie that allow me to do my thesis in both Universities with two advisors, one in Chile and one here in Paris, but also it is a possibility to get my PhD degree in physics gave by both Universities together.

Because of this program I will need to come again to Paris and the support of this will be given by a scholarship from CONICYT in Chile, with the program *Colegio Doctoral Franco Chileno*, for more information the website of this is:

http://www.conicyt.cl/573/article-7630.html

This second part in Paris will start around september 2008.
Until this point this has been my expirence in Paris, I hope this will be useful for you.

Best,

Victor ROMERO
PMMH-ESPCI, 10 Rue Vauquelin
CEDEX 5 75231, Paris- FRANCE

SCAT

SCIENTIFIC COMPUTING ADVANCED TRAINING

Certificate of Completion

Latin America-Europe Mobility Grant

Awarded to : *Claudio E. Torres López*

Host Institution: *Department of Mathematics, University of Bristol, United Kingdom*

Home Institution: *Universidad Técnica Federico Santa María, Valparaíso, Chile*

Project Title: *Desingularized panel method & Iterative solution of field interpolation by localization.*

University of BRISTOL

Dr Lorena Barba, SCAT project coordinator

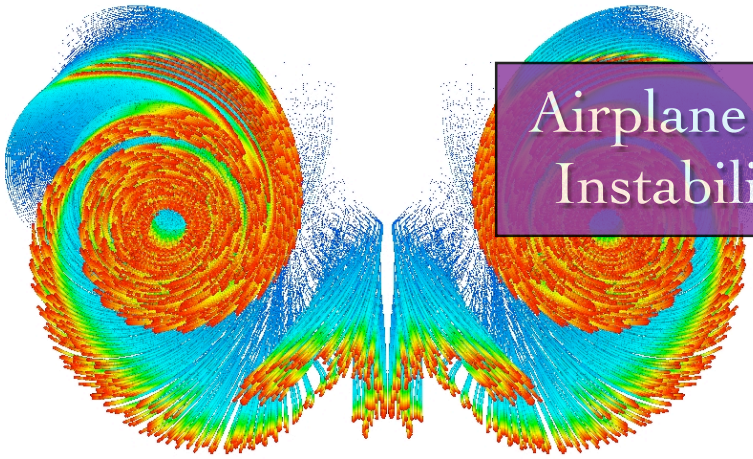
Bristol, on the 18 of January 2008

Appendix B

Documentation for International Meetings and Courses

Third European SCAT Workshop & Summer School
in partnership with IRPHE and CNRS

"Vortices and Vortex Sheets: theories, numerics and applications"



Airplane Trailing Vortices, Instabilities, and Control

One of a series of mini-courses taking place 4-10 June 2007, Centre IGESA

Description

Trailing vortices are a natural byproduct of finite-span lifting wings. An airplane encounter with trailing vortices poses a potential hazard, which has resulted in airplane separation requirements that adversely impact airport capacity. Airplanes with landing flaps deployed generate a complex system of vortices that may admit rapidly-growing instabilities. Active-control schemes that excite these instabilities offer the potential for breaking up the trailing vortices, and thus enabling reduced airplane separations.

Lecturer

Dr Jeffrey Crouch, Boeing (Seattle)

Syllabus

- Vortex systems behind flaps-down aircraft
- Multiple vortex-pair instabilities
- Active control for enhanced vortex breakup
- Flight-simulator studies of vortex encounters

For more information, email info@scat-alfa.eu or visit www.scat-alfa.eu

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CNRS CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

A project funded by EuropeAid

Third European SCAT Workshop & Summer School
in partnership with IRPHE and CNRS

"Vortices and Vortex Sheets: theories, numerics and applications"

Numerical global stability analysis and control in non-parallel open flows

One of a series of mini-courses taking place 4-10 June 2007, Centre IGESA

Description

In non-parallel open flows, global temporal eigenmodes of the linearized Navier-Stokes operator become a natural tool of stability analysis. The projection on the set of non-normal global eigenmodes is shown to be suitable for optimal perturbation analyses. The resulting finite-dimensional system is then used for control and estimation via Riccati-based feedback and the flow is coupled to the controller through appropriate sensor and actuator locations.

The approach is illustrated considering a separated boundary layer flow at the rear of a bump.

Lecturer

Prof. Uwe Ehrenstein, Université de Provence, France

Syllabus

- Direct and adjoint global modes using Krylov subspace computations
- Eigenmode basis and optimal perturbation analysis
- Non-normal flow dynamics
- Riccati based approach for control and estimation
- Design of controller via model reduction using global modes

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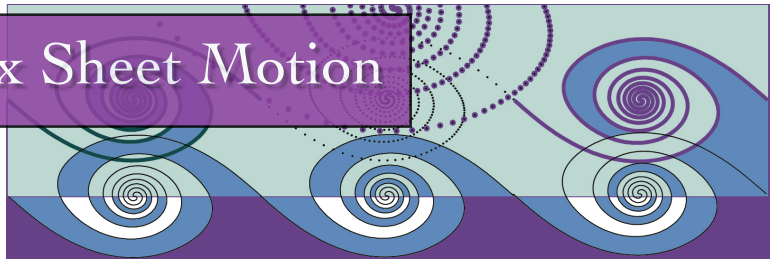
Computing Vortex Sheet Motion



One of a series of mini-courses taking place 4-10 June 2007, Centre IGESA

Description

The course will present Lagrangian particle methods for computing vortex sheet motion. The point vortex method can be used to study the formation of a Moore singularity and the vortex blob method can be used to study spiral roll-up past the singularity time.

Results will be presented concerning chaos in vortex sheet flow and a Cartesian multipole treecode for fast summation. A panel/particle method for vortex sheets in 3D flow will be described.

Lecturer

Prof Robert Krasny, University of Michigan

Syllabus

- Vortex sheets in 2D flow
  - Lagrangian formulation, flow map, Birkhoff-Rott equation
  - Point vortex method, Fourier filter, Moore singularity
  - Vortex blob method, linear stability of regularized equations, roll-up
  - Chaos in planar and axisymmetric vortex sheet flow
- vortex sheets in 3D flow
  - Governing equation
  - Cartesian multipole treecode
  - Panel/particle method
  - Applications to vortex rings

For more information, email info@scat-alfa.eu or visit www.scat-alfa.eu

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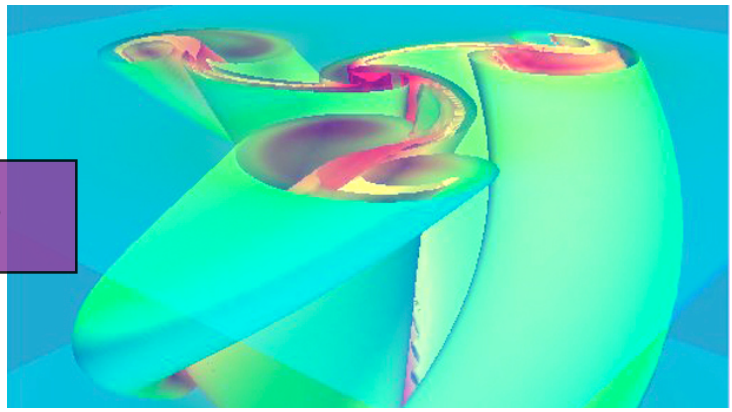
"Vortices and Vortex Sheets: theories, numerics and applications"

Vortex Instability



One of a series of mini-courses taking place 4-10 June 2007, Centre IGESA

Description

This course will cover some basic concepts of vortex stability when only one vortex is present. We will focus on the asymptotic instability mode when a shear or centrifugal mechanisms is involved. The case of a swirling jet will also be discussed.

Lecturer

Dr Maurice Rossi, CNRS and University of Paris, France

Syllabus

- General instability concepts
- Shear instability for vortices
- Centrifugal instability
- Swirling jet : some basic concepts
- Swirling jet Instability.

For more information, email info@scat-alfa.eu or visit www.scat-alfa.eu

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"Vortices and Vortex Sheets: theories, numerics and applications"

General Concepts in Stability Theory

One of a series of mini-courses taking place 4-10 June 2007, Centre IGESA

Description

This course will give an introduction to general concepts for stability analysis of shear flows. It is based on a mathematical framework that will allow the description of short-time and long-time instabilities, the response to deterministic and stochastic excitations and the extension to time-dependent and nonlinear flows.

Lecturer

Prof. Peter J. Schmid, Laboratoire d'Hydrodynamique (LadHyX), École Polytechnique

Syllabus

- Introduction to stability theory
- Eigenvalues in hydrodynamic stability theory
- Transient growth and initial amplification
- Response behavior of linear systems
- Response to stochastic forcing
- A framework for time-dependent flows
- Stability analysis of flows in complex geometries
- Nonlinear stability analysis

For more information, email info@scat-alfa.eu or visit www.scat-alfa.eu

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"Vortices and Vortex Sheets: theories, numerics and applications"

Theory of Vortex Sheets

One of a series of mini-courses taking place 4-10 June 2007, Centre IGESA

Description

The course will present the basic foundations of vortex sheet theory, commencing by the Birkhoff-Rott equation, and continuing with Kelvin-Helmholtz instability and the effect of strain on the stability of a vortex sheet. As an application of the theory, we will describe the advection of a vortex sheet by a point vortex.

In order to illustrate these topics, we will show some experimental results obtained at IRPHE.

Lecturer

Prof Alberto Verga, Institut de Recherche sur Phénomènes Hors Equilibre (IRPHE), France

Syllabus

Theoretical Foundation

- The Birkhoff-Rott equation
- Kelvin-Helmholtz instability
- Stability of a vortex sheet; effect of strain

Applications

- Advection of a vortex sheet by a point vortex
- Experimental realizations of vortex sheets at IRPHE

For more information, email info@scat-alfa.eu or visit www.scat-alfa.eu

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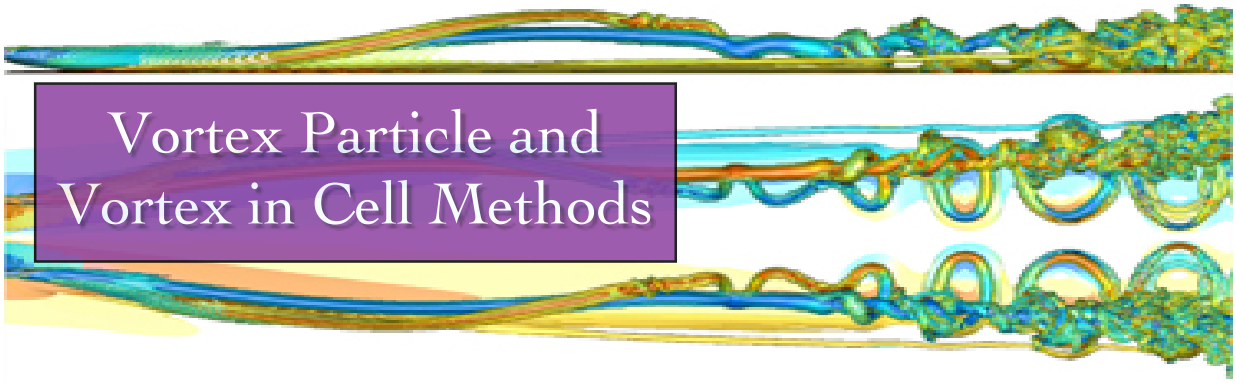
"Vortices and Vortex Sheets: theories, numerics and applications"



One of a series of mini-courses taking place 4-10 June 2007, Centre IGESA

Description

The course will present both the theoretical and practical aspects of simulating unsteady 3-D incompressible vortical flows (also turbulent flows) using the "vortex particle" method. The "vortex-in-cell" version of the method is also presented. Those methods can be used for direct numerical simulation (DNS) at moderate Reynolds number and for large-eddy simulation (LES, thus with added subgrid-scale modelling) at high Reynolds number.

Lecturer

Prof Gregoire Winckelmans, Université Catholique de Louvain, Belgium

Syllabus

Basics of the vortex particle method (1 hr)

- Vortex "particles": concept and definition; regularization functions (vortex "blobs"), associated Green's function for the Poisson equation that determines the stream function (also Biot-Savart) and its fast evaluation (using fast multipole methods, also parallel).
- Need for particle "redistribution" in such Lagrangian method: redistribution schemes using a underlying regular lattice.
- Diffusion: the particle strength exchange (PSE) scheme.
- Enforcing the no-slip condition at solid boundaries: evaluation of the required vorticity flux, using a boundary element method (BEM), and distribution of this flux to the neighbor particles.
- Ensuring that the 3-D vorticity field remains divergence free for all times: reprojection scheme.

Vortex-in-Cell (VIC) method (0.5 hr)

- Resolution of the Poisson equation using a fact grid solver.
- What is then Eulerian (stretching, diffusion), what remains Lagrangian (convection).

SCAT
Scientific computing Advanced Training

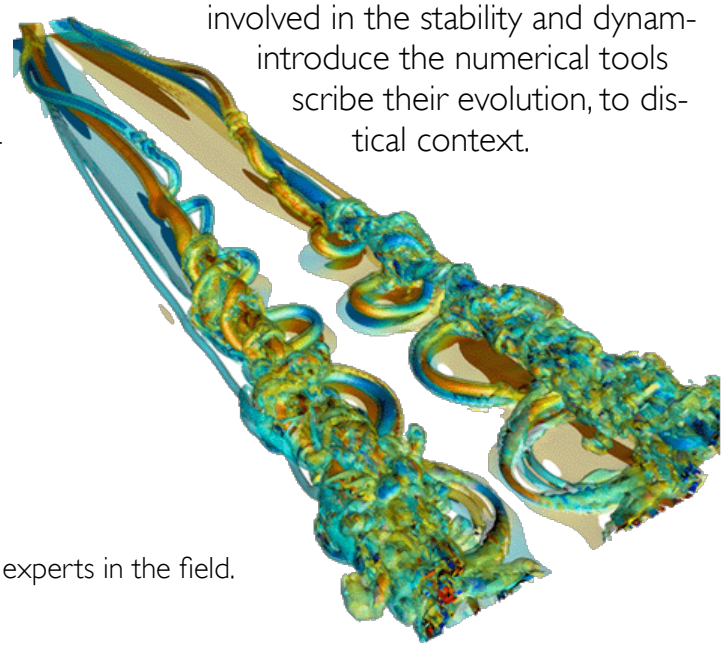
CNRS CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

Third European SCAT Workshop & Summer School in partnership with IRPHE and CNRS

"Vortices and Vortex Sheets: theories, numerics and applications"

4-10 June 2007, Centre IGESA, Island of Porquerolles, France

The objective of this summer school is to provide a comprehensive overview of the different physical mechanisms involved in the stability and dynamics of vortices and vortex sheets, to introduce the numerical tools and theoretical methods used to describe their evolution, to discuss some applications in the aeronautical context.



Short courses in

- Vortex dynamics and stability
- Transient growth and control
- Numerical methods
- Aeronautical applications

Plus research presentations from the leading experts in the field.

Lectures by

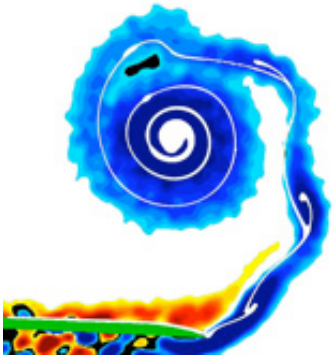
- L. Barba, P. Brancher, J. Crouch, U. Ehrensttein, L. Jacquin, R. Krasny, T. Leweke, S. Le Dizès, M. Rossi, P. Schmid, A. Verga, G. Winckelmans

Scientific Committee

- L. Barba, O. Orellana, L. Jacquin, A. Verga, S. Le Dizès

Local Organizing Committee

- A. Verga, L. Duchemin, P. Meunier, M. Abid, U. Ehrenstein, S. Le Dizès



For more information, email info@scat-alfa.eu or visit www.scat-alfa.eu

Third European SCAT Workshop and Summer School
In partnership with IRPHE and CNRS

June 04-10 2007

"Vortices and Vortex Sheets: theories, numerics and applications"

Inviting institution:

Institut de Recherche sur les Phénomènes Hors Équilibre

Institut de recherche sur les phénomènes hors-équilibre
www.irphe.univ-mrs.fr

Venue

Centre IGESA
Island of Porquerolles
Hyères - France

www.porquerolles.com

Financial Supports

Institut de Recherche sur les Phénomènes Hors-Equilibre

Centre National de la Recherche Scientifique

Université de Provence

Association Française de Mécanique

SCAT-ALFA European Project

Programme of Activities

Monday June 04th			
14h30-15h30	Thomas Leweke	IRPHE	Introduction to vortex dynamics
15h30-16h30	Alberto Verga	IRPHE	Theory of vortex sheets - Part I
16h30-17h00	Coffee Break		
17h00-18h00	Alberto Verga	IRPHE	Theory of vortex sheets - Part II
18h00-19h00	Thomas Leweke	IRPHE	Dynamics of vortex filaments

Tuesday June 05th			
8h30-9h30	Maurice Rossi	LMM, Paris	Vortex instability - part I
9h30-10h00	Coffee Break		
10h00-11h00	Maurice Rossi	LMM, Paris	Vortex instability - part II
11h30-18h30	*Boat Trip to Port-Cros Island*		

Wednesday June 06th			
9h00-10h00	Peter Schmid	LadHyX, Palaiseau	General concepts in stability theory - part I
10h00-10h30	Coffee Break		
10h30-11h30	Peter Schmid	LadHyX, Palaiseau	General concepts in stability theory - part II
11h30-12h30	Lorena Barba	Univ. Bristol	Meshless methods and vortex methods
12h30-16h00	Lunch Break		
15h00-16h00	*SCAT Meeting*	*All SCAT members*	*Discussion on the Scholarship achievements, perspectives and goals*
16h00-17h00	Lorena Barba	Univ. Bristol	Meshless methods and vortex methods
17h00-17h30	Coffee Break		
17h30-19h30	Sébastien Michelin	UCSD, San Diego	- Application of point vortices model to Maxwell's problem
	Xavier Perrot	Univ. Brest	- 2D vortex interaction in unsteady shear and strain flow
	Oscar Orellana	USM, Valparaiso	- On the circular vortex sheet problem
	Paolo Luzzatto-Fegiz	Univ. Cornell	-The stability and evolution of a family of $m = 2$ uniform vortices.
	Gonzalo Hernandez	USM Valparaiso	- Fragmentation Models with Deterministic Fracture Processes

Thursday June 07th			
9h00-10h30	Uwe Ehrenstein	IRPHE	Numerical global stability analysis and control in non-parallel open flows
10h30-11h00	Coffee Break		
11h00-12h30	Elena Vyazmina	LadHyX, Palaiseau	- Dynamics of vortex breakdown
	Ivan Delbende	LIMSI, Orsay	- A simplified model for vortex reconnection
	Jorge Zubelli	IMPA -Rio	- On a Class of Integro-Differential Models for the HIV Dynamics
	Patrice Meunier	IRPHE	- Tilt-induced instability of a stratified vortex
12h30-16h00	Lunch Break		
15h00-16h00	*SCAT Meeting*	*All SCAT members*	*Discussion on the SCAT dissemination and presentation of next meetings in Mexico & Rio*
16h00-17h00	Robert Krasny	Univ. Michigan, Ann Arbour	Computing vortex sheet motion –Part I
17h00-17h30	Coffee Break		
17h30-19h30	Frédéric Alizard	ENSAM, Paris	- Global instabilities in separated flows
	François Gallaire	Univ. Nice	- Transverse instabilities in a detached boundary layer
	Bruno Souza Carmo	Imp. College, London	- Wake instability in the flow around cylinders in staggered arrangements
	Ramiro Godoy-Diana	ESPCI, Paris	- Transitions in the wake of a flapping foil
	Andrew Sunderland	Daresbury Lab, UK	- High Performance Computing – current challenges & future solutions?

Friday June 08th			
9h00-10h00	Robert Krasny	U. Michigan, Ann Arbour	Computing vortex sheet motion –Part II
10h00-10h30	Coffee Break		
10h30-11h30	Stéphane Le Dizès	IRPHE	Vortex Kelvin waves
11h30-12h30	Pierre Brancher	IMFT, Toulouse	Transient Growth in vortices – Part I
12h30-16h00	Lunch Break		
16h00-17h00	Stéphane Le Dizès	IRPHE	Elliptic instability
7h00-17h30	Coffee Break		
17h30-19h30	Clément Roy	IRPHE	- Dynamics and stability of a pair of vortices with axial jet
	Leo Gonzalez	Madrid	- Finite element numerical methods for the BiGlobal linear instability analysis of vortical flows

	Grégory Pinon	Univ. Le Havre	- Secondary instabilities on a vortex ring : Numerical investigation
	Romain Lagrange	IRPHE	- Stability of the fluid in a precessing cylinder
	Xavier Riedinger	IRPHE	- Instability of a stratified Lamb-Oseen vortex
	Paul Billant	LadHyX	- Zigzag instability

Saturday June 09th			
9h00-10h00	Pierre Brancher	IMFT, Toulouse	Transient Growth in vortices – Part II
10h00-10h30	Coffee Break		
10h30-12h30	Frédéric Moisy	FAST, Orsay	- On the cyclone-anticyclone asymmetry in decaying rotating turbulence
	Arnaud Antkowiak	IRPHE	- Elliptic subcritical transition in vortices
	Charbel Moussa	Univ. Bath	- A novel Lagrangian vortex method for flow simulation
	Bronwyn Stewart	IRPHE – Monash	- Flow control via imposed rotation of a cylinder moving along a wall
	Jérôme Hoepffner	IRPHE	- Optimal transient growth and pseudospectra for 3D flows
12h30-16h00	Lunch Break		
16h00-17h00	Gregoire Winckelmans	UCL, Louvain	Vortex particle and vortex-in-cell methods – Part I
17h00-17h30	Coffee Break		
17h30-18h30	Gregoire Winckelmans	UCL, Louvain	Vortex particle and vortex-in-cell methods – Part II
18h30-19h30	Jeffrey Crouch	Boeing, Seattle	Airplane Trailing Vortices, Instabilities, and Control

Sunday June 10th			
9h00-10h30	Laurent Jacquin	ONERA, Meudon	
10h30-11h	Coffee Break		
11h00-12h00	To be completed		

Closure of the Meeting

SCAT
SCIENTIFIC COMPUTING ADVANCED TRAINING

Second Latin American SCAT Workshop

November 12-16 / 2007

"Mathematical Computation for Development, Resources and Environment"

Inviting institutions:

Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas (IIMAS)
www.iimas.unam.mx

Instituto de Geofísica
www.igeofcu.unam.mx

Facultad de Estudios Superiores Cuautitlán
www.cuautitlan.unam.mx

Venue

GRAND COZUMEL BY OCCIDENTAL RESORTS

www.mexicohoteles.com.mx/Cozumel/grand_cozumel.php

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Programme of Activities

Monday November 12th

09h00-09h40	Susana Gómez, Dr Lorena Barba, Dr	IIMAS-Mexico U. of Bristol - UK	Welcome and Introduction to the Alfa Programme and SCAT Project
09h40-10h30	Andre Nachbin, Dr	IMPA - Brazil	An optimal Boussinesq model for shallow water wave-microstructure interaction
10h30-11h20	Coffee Break		
11h20-12h10	Andreas Koster, Dr	Cinvestav-Mexico	Static and dynamic cluster properties from density functional theory studies
12h10-13h00	Christophe Josserand, Dr	LMM - France	Modelization of meandering dynamics for laminar flows
13h00-17h00	Lunch		
17h00-17h50	Ismael Herrera, Dr	I. Geofísica – UNAM México	Parallel Computing of Scientific and Engineering Systems: New FETI and Neumann-Neumann algorithms without Lagrange multipliers
17h50-18h40	David Emerson, Dr – X Gu, Dr	Daresbury - UK	Stretched Laminar Flamelet Modelling of Turbulent Combustion
18h40-19h00	Coffee Break		
19h00-19h50	Luis Salinas, Dr	U Sta Maria - Chile	TBD

Tuesday November 13th

09h00- 09h50	Susana Gómez, Dr	IIMAS-UNAM-Mexico	Optimization challenges in Parameter estimation inverse problems
09h50-10h40	Patrice Meunier, Dr	IRPHE -France	A physically based numerical approach for scalar mixing
10h40-11h20	Coffee Break		
11h20-12h10	Pedro González, Dr	DGSCA-UNAM-México	Node Adaptive Domain Decomposition Method by Radial Basis Functions
12h10-13h00	Lydie Staron, Dr	LMM - France	Mobility of long-runout rock flows: a discrete numerical investigation
13h00-17h00	Lunch		
17h00-17h50	Mario Chávez, Dr	I. Ingeniería-UNAM-México	Observations and 3d computing modelling of large subduction earthquakes
17h50-18h10	Aldo Figueroa, Mr	UNAM-Mexico	Oscillating Dipolar Vortex Generated by Electromagnetic Stirring
18h10-18h30	Coffee Break		
18h30-18h50	Daniel Cervantes, Mr	UNAM - Mexico	TBC
18h50-19h10	Alberto Beltrán, Mr	UNAM-Mexico	Generation of local vortical structures in electromagnetically forced flow under a localized time-dependent magnetic field

SCAT
SCIENTIFIC COMPUTING ADVANCED TRAINING

Wednesday November 14th

09h00- 09h50	Lorena Barba, Dr	U. of Bristol - UK	TBC
09h50-10h40	SCAT Meeting	Topic I	TBC
10h40-11h00	Coffee Break		
11h00-11h50	SCAT Meeting	Topic II	TBC
13h00-18h30	Cultural visit to Tulúm and/or Cuba		
19h30-21h30	Dinner in Playa del Carmen		

Thursday November 15th

09h00- 09h20	Ernesto Rubio, Mr	UNAM- México	Finite Element Methods with Optimal Functions
09h20-09h40	Iván Contreras, Mr	UNAM- México	TH-Collocation Method
09h40-10h30	Agnès Maurel, Dr	ESPCI - France	Student Round Table
10h30-11h00	Coffee Break		
11h00-11h50	Aron Jazcilevich, Dr	C. Atmósfera-UNAM México	Air quality modelling in the Valley of Mexico: Meteorology, emissions and photochemistry
11h50-12h40	Miguel Robles, Dr	C. Energía-UNAM - México	Interactive simulations for molecular solids and liquids
12h40-17h10	Lunch		
17h10-17h30	William Vásquez, Mr	UNAM- México	High resolution meteorology and air quality modeling in the urban environment of Mexico City
17h30-17h50	Flor Torres, Ms	UNAM México	The Mortar Method
17h50-18h10	Emmanuel Diaz, Mr	UNAM - Mexico	MCCM-WEPS: Coupling of Meteorological, Air Quality and Erosion Models for Mexico City
18h10-18h30	Coffee Break		
18h30-18h50	Cesar Estrada, Mr	UNAM - México	Brownian dynamics of d-dimensional hard hyperspheres
18h50-19h10	José Vidal, Mr	UNAM - Mexico	'Heat transfer analysis on horizontal tube falling film generator of NH3_LiNO3 absorption refrigeration system

Friday November 16th

09h00- 09h50	Fernando Brambila, Dr	Fac. Ciencias-UNAM México	Modelling porosity through fractals
09h50- 10h10	Gustavo Ramos, Mr	UNAM México	The adjoint method for the characterization of aquifers porous media
10h10- 10h30	Abraham Ortinez, Mr	UNAM - Mexico	TBC
10h30-11h00	**Closure of the Meeting**		

Dissemination & Impact

NÚMERO DE REGISTRO: 19068-1353-2-X-06

UNIVERSIDAD TECNICA
FEDERICO SANTA MARIA

Convenio General de Colaboración Académica y Cultural entre la Universidad Técnica Federico Santa María, Chile y la Universidad Nacional Autónoma de México

Por una parte la Universidad Nacional Autónoma de México, en lo sucesivo "LA UNAM", Representada en este acto por su Secretario General, Lic. Enrique del Val Blanco; y por otra parte, la Universidad Técnica Federico Santa María, Chile, en lo sucesivo "UTFSM", representado en este acto por su Rector, Prof. Dr. José Rodríguez Pérez, conforme a las declaraciones y cláusulas siguientes:

DECLARACIONES

I.- DECLARA "LA UNAM"

1. Que de conformidad con el artículo 1° de su Ley Orgánica es una corporación pública, organismo descentralizado del Estado, dotado de plena capacidad jurídica, teniendo por fines impartir educación superior para formar profesionistas, investigadores, profesores universitarios y técnicos útiles a la sociedad, organizar y realizar investigaciones principalmente acerca de las condiciones y problemas nacionales, y extender con la mayor amplitud los beneficios de la cultura.

2. Que su representación legal recae en su Rector Dr. Juan Ramón de la Fuente, según lo dispuesto en los artículos 9°, de su Ley Orgánica y 30 del Estatuto General, teniendo conforme a la Fracción I del artículo 34 del propio Estatuto, facultades para delegarla.

3. Que el Lic. Enrique del Val Blanco, en su carácter de Secretario General cuenta con las facultades necesarias para suscribir el presente instrumento, de conformidad con el Acuerdo que delega y distribuye competencias para la suscripción de convenios, contratos y demás instrumentos consensuales en que la Universidad sea parte, publicado en la Gaceta-UNAM el 23 de enero del 2003.

4. Que para los efectos de este convenio, señala como domicilio legal el ubicado en el 9° Piso de la Torre de Rectoría en Ciudad Universitaria, Coyoacán, México, Distrito Federal, C.P.04510.

19068-1353-2-X-06

II.- DECLARA LA "UTFSM"

1. Que de conformidad con el estatuto de la "UTFSM" del 29 de abril de 1992, la "UTFSM" es una institución académica privada, autónoma en el ejercicio de sus funciones, con personalidad jurídica reconocida por el Ministerio de Educación de Chile.

2. Que su representación legal recae en su Rector, Prof. Dr. José Rodríguez Pérez, nombrado conforme al Estatuto por el Decreto del Presidente del Consejo Superior Nº 001/05 del 13 de Septiembre 2005.

3. Que para los efectos legales de este convenio, señala como domicilio Avda. España 1680, Casilla 110-V, Valparaíso, Chile.

III.- DECLARAN AMBAS PARTES:

1. Que ambas instituciones se encuentran unidas por intereses y objetivos comunes, en los campos académicos y culturales.

2. Que para contribuir al mejoramiento económico y social de los pueblos y al acercamiento entre ellos, es de fundamental importancia que se establezcan relaciones de intercambio en los campos de la ciencia, la tecnología y la cultura.

3. Que son precisamente las universidades, por razón de su misión, esencia, finalidad y objetivos, las instituciones llamadas a establecer los canales de comunicación que permitan el intercambio del conocimiento científico, tecnológico y cultural.

4. Que tienen igualmente objetivos comunes en lo relativo al fomento de la investigación, la formación, y la difusión de la cultura.

5. Que expuesto lo anterior, están conformes en sujetar su compromiso a los términos y condiciones insertos en las siguientes:

CLÁUSULAS

PRIMERA. OBJETIVO

El objeto del presente Convenio es promover la colaboración entre las partes a fin de realizar conjuntamente actividades, científicas y culturales, en áreas de interés común.

SEGUNDA. ALCANCE

Para el cumplimiento del objeto materia de este Convenio las partes llevarán a cabo las siguientes actividades:

1. Desarrollo de proyectos conjuntos de docencia e investigación, estimulando la formación de equipos mixtos de trabajo;

2. Intercambio de personal académico con fines docentes, de investigación, de asesoramiento o para compartir experiencias;
3. Promover la movilidad estudiantil de licenciatura y posgrado;
4. Intercambio de información, documentación, publicaciones y material audiovisual.
5. Las demás que convengan las partes de común acuerdo.

TERCERA. CONVENIOS ESPECÍFICOS

Para el desarrollo de las actividades señaladas en la cláusula anterior, las partes elaborarán los convenios específicos para cada caso concreto, a efecto de delimitar el alcance de los compromisos que tendrán cada una de ellas.

Las partes se comprometen a que los convenios específicos que se desarrollen en el marco de este Convenio serán considerados como anexos al presente instrumento, y deberán contener los proyectos académicos a realizar.

Los convenios específicos una vez aprobados por las partes, serán suscritos por quienes cuenten con las facultades suficientes para comprometer a las mismas.

CUARTA. RESPONSABLES

Para el adecuado desarrollo de las actividades a que se refiere el presente Convenio, las partes designarán un responsable. En este sentido, "LA UNAM" designa al Director General de la Oficina de Colaboración Interinstitucional; mientras que "LA UTFSM" al titular de la Oficina de Asuntos Internacionales.

QUINTA. DERECHOS DE AUTOR

La titularidad de los derechos de autor en su aspecto patrimonial, corresponderá a la parte cuyo personal haya realizado el trabajo que sea objeto de publicación, dándole el debido reconocimiento a quienes hayan intervenido en la realización del mismo. Si los trabajos se realizan por personal de ambas partes, la titularidad les corresponderá por igual.

Las partes convienen que las publicaciones de diversas categorías (artículos, folletos, etc.) así como las coproducciones y difusión que llegaron a generarse del presente instrumento, se realizarán de común acuerdo.

Queda expresamente entendido que las partes podrán utilizar los resultados obtenidos en las actividades amparadas por el presente instrumento en sus tareas académicas.

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SEXTA. RELACIÓN LABORAL

Las partes convienen en que el personal aportado por cada una para la realización del presente Convenio, se entenderá relacionado exclusivamente con aquella que lo empleó, por ende cada una de ellas asumirá su responsabilidad por este concepto, y en ningún caso serán considerados patrones solidarios o sustitutos.

SÉPTIMA. RESPONSABILIDAD CIVIL

Queda expresamente pactado que las partes no tendrán responsabilidad civil por daños y perjuicios que pudieran causarse, como consecuencia del caso fortuito o fuerza mayor, particularmente por paro de las labores académicas o administrativas.

OCTAVA. VIGENCIA

El presente Convenio tendrá una vigencia indefinida, a partir de la fecha de su firma. Cualquiera de las partes podrá darlo por terminado, siempre que una de ellas comunique a la otra por escrito y con seis meses de antelación su intención de darlo por terminado.

Para el caso de terminación, ambas partes tomarán las medidas necesarias para evitar perjuicios, tanto a ellas como a terceros, en el entendido de que deberán continuar hasta su conclusión las acciones ya iniciadas.

NOVENA. MODIFICACIONES

Este instrumento podrá ser modificado o adicionado por voluntad de las partes; las modificaciones o adiciones obligarán a los signatarios a partir de la fecha de su firma.

DÉCIMA. INTERPRETACIÓN Y CONTROVERSIAS.

Este convenio es producto de la buena fe, en razón de lo cual los conflictos que llegaran a presentarse en cuanto a su interpretación, formalización y cumplimiento, serán resueltos de común acuerdo por las partes.

Leído el presente instrumento y enteradas las partes de su contenido y alcances, lo firman por duplicado en la Ciudad de VALPARAISO, a los 17 días del mes de ENERO del año 2007.

POR LA "UTFSM"

UNIVERSIDAD TECNICA FEDERICO SANTA MARIA RECTOR

Prof. Dr. José Rodríguez Pérez
Rector

POR "LA UNAM"

Lic. Enrique del Val Blanco
Secretario General

Additional Documentation

Note The documents in this Appendix are not included in the electronic version (PDF) of this document —only in the hard copy. They include:

- CD with additional files: CVs of grant holders.