

# regards croisés



newsletter number 4 - February 2006

École Centrale Paris



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## Research

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New! The first "Meetings around breaks" at School



## FOCUS

### *\*Mastères Spécialisés'* 20<sup>th</sup> anniversary: a great Ecole Centrale Paris success

More than 1,600 french and international students have been awarded a *Mastère Spécialisé*, leading to responsibility positions in the main industrial and service companies.

*Mastères Spécialisés* graduates represent 18% of all graduates of Ecole Centrale Paris.

The whole *Mastères Spécialisés* Community will meet Hervé Biauresser at the "Grand Amphi" for the 2006 Graduation Ceremony on 9<sup>th</sup> June. We look forward, on this occasion, to celebrating the 20<sup>th</sup> Anniversary of these programmes at ECP.


*\* Mastère Spécialisé is a specialised, postgraduate training programme.*

**Read more in "FOCUS"**

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## Bubbles in space

Engineers frequently use boiling to cool equipment because the bubbles carry heat away from the surface where they form. But this only works if the bubbles can escape from the surface of the liquid, a problem in space, where the lack of gravity keeps this from happening.

The demands of space systems such as communication satellites and space missions are expected to grow rapidly. More appropriate thermal management systems to deal with greater loads will need to be designed.

**The objectives of the research** carried out by Herman (1) and Iacona (1,2), in collaboration with 12 international academic institutions and industry are to see if an applied electric field could help dislodge the bubbles in a low-gravity environment. Experiments conducted in terrestrial gravity (at the Johns Hopkins University, Baltimore, USA), in low gravity (into NASA parabolic flight) and from theoretical studies (carried out at **EM2C laboratory**, Ecole Centrale Paris), have shown that a single air bubble detaches two times faster under the influence of a static and uniform 12kV/cm electric field.

If the project succeeds, boiling could become a useful method to cool high-powered hot space systems and space missions could become more efficient.

(1) *NASA Research in Fluid Physics project (2002-2005)*

(2) *European Space Agency MAP project (2004-2007)*

### ► To know more:

Herman C., Iacona E., Foldes I.B., Suner G., Milburn C. (2002), *Experiments in Fluids*, 32 (3), pp 396-421.

► **Contact:** Estelle Iacona - estelle.iacona@ecp.fr

## EM2C laboratory: Plasma to reduce pollution

The Nonequilibrium Plasma group of EM2C laboratory specializes on weakly ionized gases, also called "cold" plasmas, at atmospheric pressure and above. Experiments and modeling are conducted in parallel, and advanced optical diagnostic techniques ranging from quantitative emission spectroscopy to ultrasensitive laser-based techniques such as Cavity Ring-Down Spectroscopy are currently being developed. **Our main direction of study is the development of strategies to reduce pollutant emissions and fuel consumption in aircraft and automotive engines**, using an original approach based on ultrashort (10 nanoseconds) high voltage pulses at high repetition frequency (up to 30 kHz). A second area of interest is the radiation of plasmas. In 2004-2005, the group was mandated by a joint task force of the European Space Agency and NASA to predict the radiative heat fluxes on the Huygens probe during its entry into the atmosphere of Titan. The group has also recently initiated a collaboration with Institut Gustave Roussy (Villejuif) **to study the benefits of nanosecond pulses on the treatment of cancerous cells and on gene transfer therapy.**

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► **Optimal design of injection plastics moulding processes**  
A research area of the **Applied Maths laboratory (MAS)** is about computer-aided optimal design of internal fluid flow. This research activity is funded. A feature is the design of a software application that can be deployed on Grid architectures (extended network of high-performance computers). Such a distributed application has to do the rapid optimization of a shape or a process. Several innovating techniques will be implemented: particle methods for the natural tracking of material fronts, meshless approximations for the stable computation of the gradient of the cost functional, and hybrid stochastic-deterministic algorithms of optimization for global research and parallelization purposes. The target application is the design of plastics injection moulding processes that are made of several stages: injection, packing, holding and cooling.

This work is part of the wide Regional Research program from "Pôle de Compétitivité" System@tic and the IOLS project, Infrastructure and Software Tools for Simulation.

A part of this work is funded by the national RNTL Project OPENPLAST and by the region Ile de France . The topic « Scientific Computing on Grid Architectures » is also a research area of the Multi-Training Program ECP-ENS Cachan-Orsay University called TAMARIS-HPC, Advanced Techniques, Models and Architectures of the region Ile-de-France Sud Excellence Network for High-Performance Computing.

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## Creation of innovative products: A joint programme between Ecole Centrale Paris and ESSEC

Ecole Centrale Paris (ECP) and ESSEC have launched a joint programme for the creation of Innovative products: Coeducational teams, made of Ecole Centrale and ESSEC students, will work on the creation of Innovative Products.

### The major objectives are:

- To support the innovation, a combined population of engineers and managers working together;
- To develop the entrepreneurship by realizing of concrete projects with the companies;
- To practise the joint innovation, by approaching the aspects of design and marketing of a new product, in a simultaneous and complementary way.

Students will be proposed by **12 selected Project-Companies** to work on the creation of a product, from its design to its prototyping up to its marketing plan.

Each project will be managed by a coeducational **team made of 5 ESSEC/ECP students**, in coordination with its *Project-Company*, from November to June 2006.

**A methodological support** will be brought with a Marketing "Innovation and New Products" seminar done by Prof. E. Le Nagard and Prof. J-M Xuereb, from ESSEC.

A marketing coach from ESSEC and a technical coach from ECP will follow-up the project in a personalized way, directed by a project leader within the *Project-company*.

The ECP Research Center Technical Platform will propose a technical support for the realization of the prototypes and the models.

Privileged meetings as conferences, visits and coaching with the **Partner-Companies CapGemini and Faurecia** will also be organized.

Trade-shows will be organized, by next 4<sup>th</sup> April at ESSEC and 18<sup>th</sup> May at ECP: each team will present its successfully completed project to a jury and to all the students of both institutions.

**The Project-Companies** will propose development concret projects, bearing on an innovative product, having a direct application with their own business. The commercial exploitation rights of the prototype developed by the students will be given away to the Project-Companies per contra their financial commitments.

Project-Companies for 2005/2006 are Faurecia, Pierre & Vacances, Cesta, Mairie de Paris, Schneider Electric, Philips (LED), Leroy-Merlin, OPAC de Paris.



## The 2006 catalogue of Ecole Centrale Paris Executive Training

The 2006 catalogue of ECP Executive Training has just been released. It offers more than 70 training courses and tailor-made trainings about 4 majors fields: Complex Company Systems, Complex Social Challenges, Coaching of Engineers, Technologies.




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### ■ Languages at ECP

The language and cultural programme at ECP offers a wide range of possibilities for improving language and communication skills as well as increasing cultural awareness. It is widely understood now that English is the working language of scientific and business communities, so the study of English is compulsory. As well as classical language classes, a wide range of thematic options are proposed, enabling the in-depth study of Anglo-Saxon culture. A number of scientific courses are given directly in English, giving our students regular access to English in a scientific context.

It is mastery of another language which gives engineering students the competitive edge in the workplace, and students have a rich choice of languages from which to choose: Arabic, Chinese, French, German, Italian, Japanese, Portuguese, Russian, Spanish, and Swedish. Many study the language of their future exchange country in the international TIME programme, while international students studying at ECP follow French courses. All students have the objective of having a sufficient level in three languages by the time they graduate.

Cultural and language activities also extend well beyond the classroom. For example, exchanges with Berlin and Cambridge, or cultural evenings, are organised each year by student clubs and there is a lively English language parliamentary debating community. The keen participation of our students in these activities and in class clearly indicates their openness to the international community.

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## One degree? Two Degrees? The Double Degree at Ecole Centrale Paris

Ecole Centrale Paris has signed Double Degree partnerships with many international higher institutions. At the end of extended studies, while each student receive a long period training in the two institutions, two degrees are delivered to them: one from Ecole Centrale Paris and the other from the Partner-Institution. This double degree testifies to the students' double culture: the teaching is indeed delivered in the language of the host country, excluding any specific teaching.

These agreements allow students exchanges, as follow:

### For the incoming students:

- They spend two years in their university, and get a comparable level to the one of our Engineer-Students joining at the end of the Competitive Entrance Examination, after two years of *Classes Préparatoires*;
- They integrate the Ecole Centrale Paris after being selected, and follow two years of Common Core, thus acquiring the general pluridisciplinary training, which is seldom proposed outside the French *Grandes Ecoles*;
- They finally return to their home institution to finish their studies, generally via two additional academic years.

### For the Engineer-Students, issued from the Common Competitive Examination:

- Two years of *Classes Préparatoires*, then selection through the Competitive Entrance Examination;
- Two years of Common Core at Ecole Centrale Paris, then during the second year, selection among the best numerous candidates wishing to study abroad;
- Two years in the Partner-Institution, registred in an area of concentration and a 3rd year professional track of ECP.

In both ways, the best students are selected twice, initially by the home institution, then by the host institution.

These Double Degree programmes concern Europe with the T.I.M.E. (Top Industrial Managers for Europe) programme (42 universities out of 18 countries), but also the non european institutions : China (4 universities), Brazil (6 universities), Singapore (N.U.S), Chile (2 universities), Canada, (EP Montreal) and Indonesia. Promising beginnings concern Japan (agreement signed with 2 universities, and a 3<sup>rd</sup> one is envisaged in February 2006), and the USA (Cornell).

For the distant countries, the means are organized within the international framework of CGS CI (Centrale Graduate School - Centrale International), an association of the 4 current Ecoles Centrale (Lille, Lyon, Nantes, Paris) and of the future Ecole Centrale of Marseille (currently EGIM).

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## School communicates on its strategic stakes: the companies appreciate it !

On January 17, 2006, at breakfast, twenty companies joined a meeting organized by the School to talk about : "The strategic stakes of Ecole Centrale Paris : Perspectives and partnerships with companies".

Hervé Biaisser, Director of Ecole Centrale Paris, presented the following subjects:

- Schools engineers: a world in fast evolution;
- Strategic view of Ecole Centrale Paris: 2005-2015;
- The international expansion;
- Ecole Centrale Pekin;
- New services to the companies;
- Financing: how are the supports of companies involved in the ECP strategy (Partnerships, Apprenticeship Tax, Executive training...).

► **Contact:** corporate partnership – sylvie.mazurat@ecp.fr

## New ! The first "Meetings around breaks" at School

More and more often, students engineers make a break between the second and the third year (50 in 2005); therefore, Ecole Centrale Paris organizes on next March 21, "Meetings around Breaks" which will allow the companies to be better known by this group of people.

The Breaking Internship is the first structurally experience in company for the students. During 6 or 12 months, they have the opportunity to get a professional experience which counts and helps them for their future (particularly to choose their 3<sup>rd</sup> year Area of Concentration).

This event will allow the students candidates to departure to have a bigger choice (today limited) and exchanges of quality with companies in a privileged space.

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## IT Prospective : we are just at the beginning...

A lecture has been given on 10 January, 2006 by Jean-Louis Pierrel, Executive Briefing Manager at IBM France, a company partner of the 3<sup>rd</sup> year Area of Concentration "Information and Technology". Information technologies progress continues to develop in an exponential way.

What are the foreseeable limits and technologies of the future through semi-conductor roadmap, new storage mediums, irruption of the nanotechnologies, contributions of quantum mechanics, the merge of life sciences and IT, telecommunications explosion, Grid, pervasive computing...

► **Contact:** pierre.lecoy@ecp.fr

## In a few words

■ Centrale Forum Entreprises 2006  
The Centrale Forum Entreprises will take place, November 28-29, on the campus.

■ **Contact :** forum@ecp.fr

■ Don't forget to send your training tax in February 2006

Without the training tax, the school would not be able to maintain its high education level. Please join the companies which support the ECP !

■ **Contact:** lara.wolfman@ecp.fr

■ Forward your offers of training courses and jobs

## YOUR TRAINING COURSES OFFERS

### Operator training:

At least 6 weeks at the end of the 1st year  
(from 2006/06/19 to 2006/09/08)

### Internship Abroad:

At least 6 weeks at the end of the 2nd year  
(from 2006/06/19 to 2006/09/01)

### Final internship:

6 months at the end of the 3rd year  
(from 2006/04/24 to 2006/11/17)

### Contact:

The Office of the Training in Companies:  
**de-bfe-stages@ecp.fr**

## YOUR JOB OFFERS

### Contact:

Association des Centraliens,  
Service Carrières & Emploi  
**carrieres@centraliens.net**

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## A great premiere: ECP and Supélec signed a collaboration agreement

Ecole Centrale Paris and Supélec have shared a common culture since they were created: the training of innovative engineers and entrepreneurs. As of January 2006, the two institutions will engage, under an agreement signed on 16<sup>th</sup> December 2005, a specific programme of cooperation in the three following fields:

- **Research:** to take up the challenge of energy, of processes and information systems, a scientific Lobby will be created to accommodate co-directed thesis and a chair.
- **Valorization of the experiment assets:** to allow an academic recognition of the acquired competences, several courses of both Ecole Centrale Paris and Supélec or joint courses will be elaborate with an accredited common way of recruitment.
- **Social opening:** teamwork, at the request of the lycées of the Versailles Academy, to promote the access of their pupils to higher education.

In 2006, the two institutions will go on developing their cooperation in other fields such as:

- The international: support for the export of small and medium size companies;
- The entrepreneurship, the innovation and the valorization of research;
- The economy and management in connection with partners of higher education and companies;
- The educational innovations based on communication and information technologies applied to education.

In the structure of their cooperation, not exclusive to common participations to one or wider alliances, the two higher institutions will participate to the most appropriate items of the *Pact for Research*.

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Supélec: [Marie-Josephe.Conchon@supelec.fr](mailto:Marie-Josephe.Conchon@supelec.fr)

## Creation of a new musical comedy

After the success of *Revolution* (showed last year), a new musical comedy is under preparation (April 2006): "*L'Homme qui rit*" adapted on Victor Hugo's novel. This time, the company is made up 27 actors of whom a ten-years old child. The company's members are from ECP (half of them) or students from Grandes Ecoles (HEC, Essec, Supoptique,...) and parisian universities. The "*L'Homme qui rit*" company is hoping to see you all at the performance.

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## Aérocampus, the Aeronautics day in Centrale Paris

For the first time, Aérocampus will take place on March 16, 2006 at Ecole Centrale Paris. During this day, professionals and students can meet. At the programme:

- A lecture on the Rafale by Dassault and Safran;
- Presentations of students projects with demonstrations (flight of drones, miniature planes, show of rockets, piloteless planes.. );
- Stalls for the greatest actors in Aeronautics;
- A meeting with student associations in Aeronautics in view to create a federation.

Associations in Aeronautics of the following schools will attend: Ecole Centrale Paris, Estaca Paris, Estaca Laval, Ensma, Ecole Centrale Lyon, MatMéca, EGIM, etc.

► **Contact:** [www.airpiston.org](http://www.airpiston.org) - [air.piston-ja@campus.ecp.fr](mailto:air.piston-ja@campus.ecp.fr)

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## In a few words

■ **Brazil:** a challenge for the small and medium size companies of Hauts de Seine

Ecole Centrale Paris has just been chosen- thanks to its involvement in the definition of the Engineering double degree with 6 Brazilian Universities- to organize, on Thursday 6<sup>th</sup> April 2006, a seminar on the theme: "Brazil: a challenge for the small and medium size companies of Hauts de Seine". This seminar is organized by the Club 92 (West Paris district) devoted to Relations between Companies and Higher Education Institutions.

■ **Conferences Heat and Mass Transfer**

■ **Wednesday February 22<sup>th</sup> - A4 - 5:30 pm:**  
Energy in the world in 10, 50, 100 years: Bernard Tamain, Professor at the University of Caen.

■ **Monday March 20<sup>th</sup> (or march 27<sup>th</sup>) - A4 - 5:30 pm:**  
Hydrogen: a possible answer to the energy challenges of the 21<sup>th</sup> century: Paul Lucchese, CEA, Head of the Hydrogene and fuel cell program.

■ **Monday April 3<sup>rd</sup> - A4 - 5:30 pm:**  
Nuclear fission for the future: Bernard Frois : head of the ANR delegation, CEA, New Energy Technologies.

■ **Week of sustainable development at ECP**

The Sustainable Development Club has organized this year the second edition of this week from 6 to 9 February 2006. This week matched with the seminar of the inter-Centrale group for the students with the option "environmental conservation".

The agenda of this event was:

- Monday 6 February: roundtable on the theme of rural sustainable development;
- Tuesday 7 February: screening of the film "The Gods Must Be Crazy" followed by a presentation on the various faces of sustainable development;
- Wednesday 8 February: debating session (in english);
- Thursday 9 February: forum and workshop on fair trade.

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## \**Mastères Spécialisés*' 20<sup>th</sup> anniversary: a great Centrale success

(following the first page)

### A wide range of specialisations

The Ecole Centrale Paris offers exceptional additional training at the cutting-edge of progress.

- PROCESS & MANAGEMENT ENGINEERING, in 2 branches: Applied Physics or bioengineering and Chemical branch
- ELECTRONICS – INFORMATION TECHNOLOGY in 3 branches: Information Technology, Applied Mathematics and Advanced Systems
- MECHANICAL ENGINEERING & ENERGY, in 3 branches: Mechanical & Aerospace Engineering, Industrial Engineering, and Civil Engineering & Development.
- INDUSTRIAL SYSTEMS ENGINEERING
- OPEN INFORMATION SYSTEMS ENGINEERING
- TECHNOLOGY & MANAGEMENT
- ENGINEERING OF INFORMATION & KNOWLEDGE IN HEALTH CARE INSTITUTIONS
- ENGINEERING OF MEDICAL RESEARCH & BIOTECHNOLOGICAL DATA
- MANAGEMENT & TECHNOLOGY OF HEALTH CARE INSTITUTIONS & NETWORKS
- RISK & SAFETY MANAGEMENT IN HEALTH CARE INSTITUTIONS & NETWORKS
- STRATEGY AND INTERNATIONAL BUSINESS DEVELOPMENT (in co-accreditation with Ecole de Management de Lyon)

### An wide range of competences

All Ecole Centrale *Mastères Spécialisés* students have at least a qualification level of five years of higher Education. They can be Engineers, have a degree from Management higher institutions or have completed postgraduate studies. 15 to 20% come from outside France and 20% are female. All of them are ready for immediatly employment in positions cut responsibility.

### An ambitious project

In the framework of its "2015" strategic project, the school's ambition is to reach 300 *Mastères Spécialisés* Students, and even more, in the next 10 years, compared to the current 100 students.

The *Mastères Spécialisés*' day next 9<sup>th</sup> June.

The *Mastères Spécialisés* Community will meet at the "Grand Amphi" for the 20<sup>th</sup> degree on 9<sup>th</sup> of June. They will have the opportunity to meet again and to take up a great challenge for the next ten years, where most certainly companies will have a major role.

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\* *Mastère Spécialisé* is a specialised, postgraduate training programme.