agence d'évaluation de la recherche
et de l'enseignement supérieur

Section des Unités de recherche

Report from the visiting committee

Research unit :

Laboratoire d'Informatique de l'école Polytechnique (LIX) – UMR 7161

Ecole Polytechnique

February 2008

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Research unit :

Laboratoire d'Informatique de l'école Polytechnique (LIX) – UMR 7161

Ecole Polytechnique

Section des unités de recherche

Le Directeur

Jean-Jacques Aubert

february 2008

Report from the visiting committee

The research unit :

Name of the research unit : Laboratoire d'Informatique de l'école de Polytechnique (LIX)

Requested label : UMR

N° in case of renewal : 7161

Head of the research unit : Mr Jean-Pierre JOUANNAUD

University or school :

Ecole Polytechnique

Other institutions and research organization :

CNRS

Date(s) of the visit :

4 Février 2008

Members of the visiting committee

Chairman of the commitee :

Mr Maxime CROCHEMORE

Other committee members :

Pr. J. BLAZEWICZ, TUPoznan, PL

Pr. M. GERLA, UCLA, USA

Dr. T. JENSEN, INRIA Evaluation Committee, France

Pr. A. PITTS, Cambridge, UK

Pr. A. SHOKROLLAHI, EPFL, CH

CNU, CoNRS, CSS INSERM, représentant INRA, INRIA, IRD... representatives :

Pr. P. LE GALL, CNU

Pr. E. SANLAVILLE, National committee

Observers

AERES scientific representative:

Mr Luis FARIÑAS DEL CERRO

University or school representative:

Dr. Y. GNANOU

Research organization representative (s) :

Pr. Véronique DONZEAU-GOUGE, Deputy scientific director,CNRS

Dr. J-M. MULLER, Scientific Officer,CNRS

Report from the visiting committee

1 • Short presentation of the research unit

- Numbers of lab members including researchers with 9 teaching duties, 27 full time researchers, 4 ingineers, 46 Phd students, 4 technicians and administrative assistants
- Numbers of HDR : 21 and of HDR who are PhD students advisors
- Numbers of PhD students who have obtained their PhD and average length of a PhD during the past 4 years : 20
- Numbers of "publishing" lab members : 33/36 EC, C

2 • Preparation and execution of the visit

The meeting was well prepared and organised; it was informative both on the organisation of the structure presented by the past and present directors, and on the scientific aspects presented by team leaders.

3 • Overall appreciation of the activity of the research unit, of its links with local, national and international partners

The unit's prime interest is to develop software tools targeting at real applications and based on mathematical properties. Its teams shave precise scientific goals and software development objectives.

A significant part of the unit has strong interaction with teaching at Ecole Polytechnique including the master "Ingénierie des systèmes industriels complexes" and with teaching in "Master Parisien de Recherche en Informatique".

These PhD students are not equally distributed among teams. The lab has good publication records in international journal and conferences, and is by and large well visible with good reputation on this aspect. Some of its members have been the recipients of several national or European awards.

LIX is composed of ten fairly small research teams dispatched into three scientific domains : algorithms, communication networks, and formal methods. They share a collaborative project on "network centric" systems.

LIX is a member of Digiteo (RTRA) jointly with local research operator sand CNRS. It participates in Systematic (Pôle de compétitivité) aimed at promoting industry-lead projects with industrial partners like Thalès, Hitachi, Alcatel, and Microsoft. LIX has other industrial collaborations via projects with France Telecom, Philip Morris, Axalto, Cril, Ergelis, Eurocontrol, Gemplus, Ilog, and Trusted Logic, to quote a sample of them.

The 2007 budget of the lab is around 4900 Keuros. It includes about 3900 Keuros of salaries - of which 24% are funded by Ecole Polytechnique, 47% by CNRS, and 29% by INRIA - and 1000Keuros from contracts - of which 37% are from industrial contracts and 63% from public contracts and institutions basic funding.

The perspectives for the next period, as presented by the director, are: to strengthen small teams (cryptology, combinatorial models, Comete, Parsifal) ; to develop MAX and MeASI teams ; to build new teams on Computer vision and Photography and on Distributed heterogeneous data management; to provide all projects with engineers ; to hire new members who can help with teaching needs ; to create new chairs in Complex systems, Bioinformatics, Networking, and Optimisation in cooperation with DGA, Microsoft, Paris Tech, Alcatel, Hitachi, and Veolia. It is planned that the lab moves to a new building in a few years.

4 • Specific appreciation team by team and/or project by project

Algebraic models and symbolic computations (MAX):

The research of the group is internationally recognised and of highest quality. The group manages research, finances, and personnel very well. The committee appreciates collaborations of this group with other groups at LIX, and INRIA, as well as groups in other parts of the world. The committee notes with concern, however, that the group lacks both a critical mass and PhD students to sustain the level and quality of their research in the years to come, and recommends rejuvenation of the group by hiring another, preferably young, permanent member, and attracting graduate students and postdocs.

Algorithms and optimisation:

The team succeeds in mixing pure and applied research that feed each other. The recent recruitment should increase its scientific productivity without impairing its scientific consistency.

Bio-informatics:

The team works in potentially very rich research topics area.

Remarks are:

- Lack of publications in 2007 and possibly in 2008.
- Weak cooperation with biologists.
- Weak participation in international cooperation/contest, including EU grants and CASP competition.

The committee advices are:

- Narrow down the scope of research subjects.
- Strengthen cooperation with biologists.
- Apply for grants.
- Participate in international contests.

Combinatorial models :

This is topmost research in theoretical computer science with an excellent production quality. The team is fragile as the main stream research and publication depend mainly on the team leader. The permanent CNRS researcher, the professor, and the PhD students have so far played a minor role in publications (especially, journals). The team has a lack of PhD students considering its potential to supervise them.

The recommendations are:

- Narrow down the number of different topics to concentrate on few ones. The declared plan to focus on the Explore Maps project is step in the right direction.
- Increase collaborations with existing teams (from INRIA and European Academic Institutions) on the subjects treated.
- Attract more PhD student, possibly from abroad.

Hipercom :

The team has a strong position in the Research Community because of its IETF association and its technical contributions. The team has maintained critical mass through careful selection of research programs and of collaborators. A potential"weak point" is the relative low level of collaboration with INRIA projects and University colleagues apart from the two above-mentioned OLSR partners. Several INRIA projects, for example, could benefit of collaboration with HIPERCOM and vice versa. The HIPERCOM team so far has focused on the "network layer"—routing, multicast, mobility, autoconfiguration, etc. There could be new opportunities in exploring "cross layer" interactions between the OLSR network layer and MAC Physical layer, on one side, and applications (sayP2P), on the other side. Since it would be difficult to increase the current team size, these interactions should be explored through collaborative efforts; for example, with INRIA teams working on Wireless Physical and application layers.

Cryptology :

The committee is delighted about the culture entertained by the group which has its roots in strong mathematics, and core computer science. The group is well positioned to remain an international leader, provided that it has enough influx of Master and PhD students, as well as postdocs. Possibly be more flexible with hiring new PhD students despite this is a difficult field to enter because it is between mathematics and programming.

LOGICAL:

The team is the official maintainer of a mature software tool, Coq, with a large user community. At this "middle aged" stage in Coq's development there is a temptation to experiment with new and sexy features.

Whatever happens, backwards compatibility with the huge legacy of proved results needs to be maintained as far as possible. Many aspects of the Coq system are not well documented: although documentation activity is not intellectually exciting, it is crucially important and should be addressed. The team's emphasis on using Coq for formal mathematics is distinctive and allows scope for interesting new research.

PARSIFAL:

It is not clear that there is much collaboration between the two permanent researchers in this team. Since 2008 the team has been strengthen in an interesting way by the arrival of CNRS CR. It is expected that his work will act as a bridge between this team and the TypiCal (was LogiCal) team; although the two teams have distinctive research plans, from an external perspective they occupy a similar space and synergy between them is welcome. At present the Parsifal team has no Polytechnique personnel or "professeur chargé de cours", may be putting them at a disadvantage for attracting locally-produced students to work in this area.

COMETE:

The Comete team has quickly become a strong research team in models and verification of concurrent and distributed computation, with a very good publication record, high international visibility, and a good number of PhD students. The team should envisage using its international visibility to join EU funded basic research projects and should think about how to develop a technology transfer strategy. In terms of manpower, it would seem reasonable to hire one full-time researcher in the project within a short time frame.

MeASI:

The group has been created recently and the setting up had apparently required a substantial amount of work. There is both an interesting perspective and a possibility of failure in the integration of the two sub-groups of the team, but this seems a risk that is worth taking. There was mentioning of the possibility of Ecole Polytechnique hiring a person with skills in validation and soft ware analysis in order to reinforce its side of the joint team. This would no doubt be beneficial to the success of the team.

5 • Appreciation of resources and of the life of the research unit

The management structure of the unit is fairly flat: director and members. The role of team leaders seems to be restricted to scientific aspects and management of their own team. Administrative staffs have good relations with institutions concerning financing.

The management structure of the unit is unlikely to scale up if the growth continues.

Teams of the lab involved in soft-ware design and development are under staffed; this is pretty obvious when compared with other units in computer science or applied mathematics. The future projects of the lab, if approved by Ecole Polytechnique and CNRS, may require even more scientific and technical staff.

The unit has a rich and informative Web site which is its main communication tool.

6 • Recommendations and advice

— Strong points :

LIX unit is a strong team with a great potential. It has a few distinguished leaders and good PhD students— almost none fail and very few graduate after three years, thanks mainly to the high skilled students at Ecole Polytechnique. Its research out put is of international quality with important achievements both on theoretical aspects and software production. LIX receives a strong support from CNRS which provides about half of its scientific permanent members. The way CNRS researchers end up at LIX is an indicator of its quality. The committee also notes that the previous director has a large contribution in the formation of the unit and its achievements. This work has to be continued.

— What needs to be improved :

However, the present organisation of the lab and its procedures are not scalable. For example, removal or creation of teams is not safely addressed. There is no strict organisation; administrative roles are not clearly defined for team leaders and some other active members. There are not enough communication channels between the leaders and the rest of the unit. As for the scientific animation, teams are rather independent of each others, they do not much interact, and they have no common seminar. The unit includes a relatively small number of full-time teaching staff (6 compared to 36 researchers), and their recruitment is decided in the teaching department, not in LIX. Among the weak points is also the small number of postdocs and the relatively small number of PhD students compared with the number of potential supervisors, for which the lab is not enough proactive.

— Recommendations :

The recommendations are :

- To set up better management structures that will scale with LIX's planned growth.
- To strengthen the scientific animation of the whole unit.
- To be more active in finding PhD students including foreign students.

CENTRE NATIONAL
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Sciences et technologies de l'information et de l'ingénierie (ST2I)

D/20081269

Paris, le 08/04/2008

Monsieur le Directeur,

J'ai bien reçu le projet de rapport du Comité d'évaluation de l'UMR 7161 « LIX » transmis par vos soins et je vous joins la réponse du directeur de l'unité.

Dans l'attente de l'avis définitif de l'AERES sur cette unité, je vous prie de bien vouloir agréer, Monsieur le Directeur, l'expression de mes salutations les meilleures.

Véronique DONZEAU-GOUGE
Directrice scientifique adjointe

Monsieur Jean-Jacques Aubert
Directeur de la section des unités
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ÉCOLE
POLYTECHNIQUE

Le Directeur Général Adjoint
Chargé de la Recherche

Palaiseau, le 28 AVRIL 2008

N.Réf : MR/mfp/08. 74
V.Réf : votre rapport AERES-UMR 7661

Monsieur Jean-Jacques AUBERT
Directeur de l'AERES
20, rue Vivienne
75002 – PARIS

Monsieur le Directeur,

Je vous prie de trouver ci-dessous les éléments de réponse relatifs au rapport d'évaluation concernant le laboratoire LIX (UMR 7661) :

- corrections et commentaires sur le rapport établi par le comité d'experts.

Je vous prie de croire, Monsieur le Directeur, à l'expression de mes sentiments les meilleurs.

Michel BLANC

Copie : Karell Rebiard
Chargée de Gestion des Evaluations

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ÉCOLE POLYTECHNIQUE

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

Laboratoire d'Informatique de l'X

Philippe Baptiste
Ecole Polytechnique, LIX
F-91128 Palaiseau

M. Jean-Jacques Aubert,
Directeur de la section des établissements
Agence d'évaluation de la recherche et de l'enseignement supérieur

Objet : Evaluation du LIX, réponse du laboratoire (ref. `AER_ECPX_020-UMR7161-LF-V1`)

Monsieur le Directeur,

Le laboratoire a pris connaissance du rapport scientifique long établi par les experts. Le LIX se félicite des conclusions très positives du rapport et remercie les évaluateurs pour la qualité de leur travail.

Malheureusement, le rapport officiel de l'AERES est un résumé succint du rapport rédigé par les experts. Il ne reflète qu'imparfaitement l'image scientifique du LIX et il ne rend pas totalement compte de la qualité du travail mené par les évaluateurs. Le laboratoire regrette que des contraintes administratives limitent arbitrairement la taille d'un rapport d'évaluation et imposent un format difficilement compatible avec une évaluation scientifique raisonnable des équipes.

Me tenant à votre disposition pour toute information complémentaire, je vous prie de croire, Monsieur le Directeur, à l'expression de ma considération distinguée.

Philippe Baptiste
Directeur du LIX

Michel BLANC
Directeur Général Adjoint
Chargé de la Recherche

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