



**ENAC**

**School of Architecture, Civil  
and Environmental Engineering**

# Activity Report 2005



## Activity Report 2005

## **Impressum**

Ecole Polytechnique  
Fédérale de Lausanne

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## Editorial

2005 will stand as a record year in terms of faculty appointments and promotion. Altogether, fifteen new professors added their teaching and research skills to strengthen our effort towards building a better and sustainable world. They come from all continents, bring different cultures, cover various ENAC disciplines but share a common interest in educating the best engineers and architects: bright young men and women not only for the current needs of industry, but also able to invent the world of tomorrow. Our new colleagues will team with their groups to offer top quality innovative research - an absolute must for a competitive and healthy economy, a positive social impact and adequate use of natural resources.

Some of these colleagues (seven to be precise) are ENAC senior researchers promoted to adjunct professor. This follows an in-depth effort to recognize scientists inside EPFL, as recently put forward by the EPFL Direction in the form of a new directive for internal promotion. We are glad to now see the initial results of what was a lengthy process. We are proud to finally be in a position to acknowledge the immense qualities of these talented and internationally recognized personalities.

2005 was also a year of intense interdisciplinary actions. The first "ENAC Weeks", a case-based new learning initiative, have been acclaimed by the students. Deployment of teaching offers in the field of urban and regional planning and design has started. A new transdisciplinary

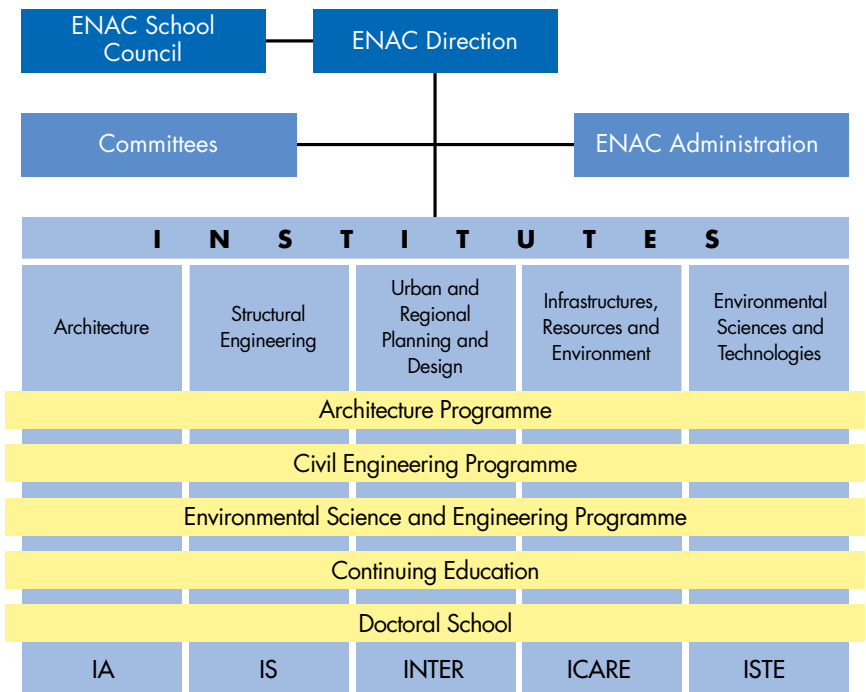
research project grouping all ENAC Institutes has been launched. Several projects have been funded by the Swiss NSF in the framework of the PNR54 research programme on "Sustainable Development of the Built Environment". Contacts with neighbouring universities have been strengthened. We have also been very active in the creation of the new ETH-domain centres of competence in Energy and in Environment.

2005 was also the end of the four-year term of the ENAC governing boards. I would like first to sincerely thank the members of the ENAC Direction for their dedicated work: Eugen Brühwiler, Claire Guenat, Vincent Mangeat and Joseph Tarradellas. Without them, ENAC would not be what it is now. The ENAC Council, institute/programme heads and some committees will be renewed next year. To all of them, I wish to convey my sincere gratitude. Serving the Institution, if a duty, is also an honour and a major responsibility. With this in mind - and at the request and with the support of EPFL President Patrick Aebischer - I shall serve one more term as Dean of the ENAC School.



*Professor Laurent Vulliet  
Dean, ENAC School*

ENAC Organisation



# Institutes and Laboratories

IA	Institute of Architecture	Claude Morel
LIV	Informatics and Visualisation Laboratory	Georges Abou Jaoudé
CRE	Chair of Representation and Expression	Arduino Cantàfora
LAMU	Urban Architecture and Mobility Laboratory	Inès Devanthery-Lamunière
LTH3	Theory and History of Architecture Laboratory 3, since 2005	Roberto Gargiani
LAPA	Laboratory for the Production of Architecture, since 2005	Harry Guggen
LTH1	Theory and History of Architecture Laboratory 1	Jacques Lucan
LTH2	Theory and History of Architecture Laboratory 2	Bruno Marchand
AIC	Studio of Architecture and the City's institutions	Patrick Mestelan
LCC1	Construction and Conservation Laboratory 1	Claude Morel
LCC2	Construction and Conservation Laboratory 2	Luca Ortellì
LHAB	Urban Housing Laboratory	Martin Steinmann

IS	Structural Engineering Institute	Ian Smith
MCS	Structural Maintenance and Safety Laboratory	Eugen Brühwiler
LSC	Structural and Continuum Mechanics Laboratory	François Frey
ICOM	Steel Structures Laboratory	Manfred Hirt
CCLAB	Composite Construction Laboratory	Thomas Keller
IS-BETON	Concrete Construction Laboratory	Aurelio Muttoni
IMAC	Applied Computing and Mechanics Laboratory	Ian Smith
IBOIS	Chair of Timber Construction	Yves Weinand



<b>INTER</b>	<b>Institute of Urban and Regional Planning &amp; Design</b>	<b>François Golay</b>
UTA	Urban, Rural and Architectural Planning Laboratory	Patrick Berger
ACM	Archives of Modern Building	Pierre Frey
LASIG	Geographic Information Systems Laboratory	François Golay
LASUR	Urban Sociology Laboratory	Vincent Kaufmann
PHOT	Photogrammetry Laboratory, until end 2005	Otto Kölbl
LAC	Chôros Laboratory	Jacques Lévy
TOPO	Geodetic Engineering Laboratory	Bertrand Merminod
LATER	Regional Architecture Laboratory	Vincent Mangeat
LITEP	Intermodality, Transport and Planning Laboratory	Robert Rivier
REME	Economics and Environmental Management Laboratory	Philippe Thalmann
CEAT	Urban and Regional Planning Association	Michèle Tranda-Pittion

<b>ICARE</b>	<b>Institute of Infrastructures, Resources and Environment</b>	<b>Jean-Louis Scartezzini</b>
LHE	Environmental Hydraulics Laboratory	Christophe Ancey
LAVOC	Traffic Facilities Laboratory	André-Gilles Dumont
LASEN	Energy Systems Laboratory	Edgard Gnansounou a.i
GEOLEP	Engineering and Environmental Geology Laboratory	Aurèle Parriaux
LESO-PB	Solar Energy and Building Physics Laboratory	Jean-Louis Scartezzini
LCH	Hydraulic Constructions Laboratory	Anton Schleiss
LMS	Soil Mechanics Laboratory	Laurent Vulliet
LMR	Rock Mechanics Laboratory, since 2005	Jian Zhao

ISTE	Environmental Sciences and Technologies Institute	Marc Parlange
ECOL	Ecological Engineering Laboratory, since 2005	David Andrew Barry
EML	Environmental Microbiology Laboratory, since 2005	Rizlan Bencheikh-Latmani
LMCA	Atmospheric Chemistry Modelling Laboratory	Isabelle Bey
ECOS	Ecological Systems Laboratory	Alexandre Buttler
LBE	Laboratory for Environmental Biotechnology	Christof Holliger
HYDRAM	Hydrology and Land Improvement Laboratory	André Mermoud a.i.
LASEP	Laboratory of Soil and Environmental Physics, since 2005	Dani Or
EFLUM	Environmental Fluid Mechanics Laboratory	Marc Parlange
GECOS	Ecosystem Management Laboratory, until end 2005	Rodolphe Schlaepfer
CECOTOX	Environmental Chemistry and Ecotoxicology Laboratory, until end 2005	Joseph Tarradellas
LPAS	Air and Soil Pollution Laboratory	Hubert van den Bergh
WTV	Group Waste Treatment and Valorization, since 2005	Christian Ludwig
EBC	Group Environmental Biophysical Chemistry	Vera Slaveykova

	Hosted units	
WSL-AR	French-Swiss branch of the Swiss Federal Institute for Forest, Snow and Landscape Research	Jean Combe
CDT	Chair of Law	Isabelle Romy
IER-AR	French-Swiss branch of the Institute for Agricultural Economics	Olivier Roque

## ENAC Books



### **Hydraulique fluviale**

Flow and transport phenomena in geometrically simple canals  
Traité de Génie civil Volume 16

*Walter H. Graf, in cooperation with Altınakar Mustafa*  
Editions PPUR, 2005

The fruit of twenty-five years of research and teaching, this work, which previously appeared in 2 volumes, presents an exposé of the hydrodynamic aspects that form the basis of fluvial hydraulics. Defined as the study of the physical behaviour of natural and artificial waterways, fluvial hydraulics are explained here in a style suitable for both students and engineers.



### **Des Alpes à la mer, l'architecture d'André Gaillard**

*under the supervision of*  
*Martine Jaquet*  
Editions PPUR, 2005

André Gaillard, born in 1921 in la Chaux-de-Fonds and a student of Eugène Beaudouin at the School of Architecture in Geneva, took part with his successive associates in all the adventures of the years 1950 to 1970, a key period in the development of modern architecture in Switzerland: new districts, massive housing construction thanks to prefabrication, the creation ex nihilo of winter sports and seaside resorts. This work presents a selection of emblematic creations and projects by André Gaillard, from individual houses to residential estates, and including industrial buildings and religious edifices. The authors offer an initial approach to this abundant and diverse production, interspersed with the formal debates of the time.



### **L'ordre et la règle**

Vers une théorie du projet d'architecture

*Patrick Mestelan*  
Editions PPUR, 2005

This book offers a theory of architectural studio work, deals with the methodological questions raised and emphasises the instrumental aspect, as the aim is to master architectural draughtsmanship.

The author converses with the great archetypal shapes, by studying cultures and civilisations from West to East. Through their significance, he seeks to highlight the lasting quality of typological and constructive choices beyond the many stylistic expressions.



## **Analyse du cycle de vie**

Comprendre et réaliser un écobilan

*Olivier Jolliet, Myriam Saadé, Pierre Crettaz*  
Editions PPUR, 2005

The analysis of a life-cycle – or life style assessment - evaluates the environmental impact of a product, a service or a system, taking into consideration all stages of the life-cycle, allows one to identify points where a product can be improved

and aims to warn against impacts linked to human activities.

This work approaches the general principles, then the sequential step in the analysis of the life-cycle, with the definition of objectives and the system, the inventory of emissions and extractions, the analysis of their environmental impact and how to interpret these. The work identifies the key points and uncovers coherence criteria. It sets out databases and existing methods, taking into account the most recent research results.



## **Pathfinder**

Contemporary Architecture in Switzerland

*Devanthery & Lamunière*  
Editions Infolio, 2005

Joseph Abram analyses in 11 points the factors that have led to the emergence of a new architecture for the firm Devanthery & Lamunière.

1. Modernity and materiality. 2. The concrete within the abstract. 3. The whole and its fragments. 4. Image and tectonics. 5. Solidity and deployment. 6. Volume, mass, colour. 7. Matter and energy. 8. Bodywork and earthworks. 9. Obsolescence and reactivation. 10. The city – a permanent fallow ground for reconversion. 11. Slight gravity (colouring the world).



## **Les sens du mouvement**

Modernité et mobilités dans les sociétés urbaines contemporaines

*Under the supervision of Sylvain Allemand, François Ascher, Jacques Lévy*  
Editions Belin, 2004

Movement, mobility - what do we mean exactly with these apparently ordinary words, which are the very essence of modernity? Beyond the differences in sensitivity and concerns between sociologists, economists, geographers or town planners, the intellectual and political stakes of mobility clearly come out. How does one measure speed in an almost totally urbanised world? What are the mobility trends in the near future? What do mobility habits and their context tell us about life choices, values and civilisation ?



## **Études d'impact sur l'environnement**

Civil Engineering Treatise, volume 23

*Jacques-André Hertig  
Editions PPUR, 2005*

Environmental Impact Assessment emerges as a planning tool to monitor projects and their integration into the environment and shows that, despite constraints linked to environmental protection, notably at a legislative level, a rigorous methodological approach is possible. The new edition of this work, entirely revised and improved, describes more closely the link with the EIA, sustainable development and town and country planning. A new chapter is dedicated to the effects of recent accidents on the security of road tunnels.



## **Galletti & Matter : Etat des lieux**

*Bruno Marchand & Pierre-Alain Croset  
Collection Archigraphy Lémaniques, Editions InFolio 2005*

The Collection Archigraphy Lémaniques, directed by Bruno Marchand, simultaneously covers the theoretical and historical fields and pursues its aim to publish works developed by contemporary architects and to collect documentation to encourage critical reflection on the evolution of architectural practices in Switzerland.



## **La violence des villes**

*Yves Pedrazzini  
Editions Enjeux Planète, 2005*

The tendency, both in the North and in the South, is to attribute the causes of violence in towns to the poorest inhabitants, and then to adopt security strategies in order to combat them. Town planning divides the space into fortresses and shantytowns and we cannot continue to plan urban development from police stations.

When everything appears deadlocked, the «poor man's vision» opens a path for the pacification of urban territories. In order to counter the security obsession, creative dialogue with those demonised by the authorities is indispensable. This book is aimed at all those who seek to understand the meaning of the city, those who fear it as well as those who love it and are not ready to give it up.



## **Mobilités et temporalités**

*Bertrand Montulet, Michel Hubert, Christophe Jemelin, Serge Schmitz  
Publication des Facultés Universitaires de Saint-Louis, Bruxelles, 2005,*

The issue of links between mobility and temporality appears extremely complex as it attempts to assess social changes in time, the effects on socio-spatial structures, the organisation of means of transport or temporal attitudes related to these. This book collects ten articles from the «Mobilités et temporalités» conference (Brussels, 2004) of the working party on «Spatial Mobility and Social Fluidity» of the Association Internationale des Sociologues de Langue Française (AISLF).



## **Photography, Modern Architecture and Design**

*The Alberto Sartoris Collection / Objects from the Vitra Design Museum*

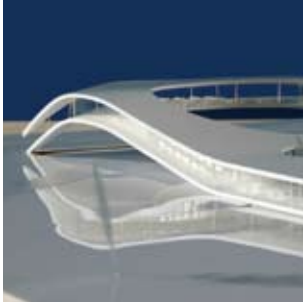
*Antoine Baudin  
Editions PPUR, 2005*

Architect and propagandist of the modern movement, Alberto Sartoris (1901-1998) assembled a remarkable photography collection of modern architecture, partly published in two anthologies that have since achieved mythical stature: «Gli Elementi dell'architettura funzionale» and «l'Encyclopédie de l'architecture nouvelle». These photographs document architectural works around the world, from Le Corbusier to Luis Barragán, photographed by the best specialists of their period.

This work presents the collection that Alberto Sartoris donated to EPFL. It also sheds light on a poorly understood aspect of twentieth century architecture, namely the mechanisms behind the creation and diffusion of the «image of modern architecture», as well as the decisive role played by photography in this process.

## ENAC Exhibitions

8 December 2004 - 18 February 2005



### 12 projects for the EPFL Learning Center

*Exhibition realised by the EPFL Presidency and the Architecture Programme*

Abalos + Herreros, Madrid  
Ateliers Jean Nouvel, Paris  
Diller & Scofidio + Renfro, New-York  
Herzog & de Meuron, Basel  
Livio & Eloisa Vacchini, Locarno  
Mecanoo, Delft  
OMA Stedebouw BL, Rotterdam  
Pierre du Besset et  
Dominique Lyon, Paris  
SANAA Kazuyo Sejima +  
Rye Nishizawa, Tokyo  
Valerio Olgiati, Zurich  
Xaveer de Geyter, Bruxelles  
Zaha Hadid, Londres

Projects for a new space for study, life and exchange.

The winners of the competition, Kazuyo Sejima and Rye Nishizawa, have imagined a building which is convincing on account of its simplicity and its spatial qualities. Their project concentrates the entire programme on one single level, an undulating rectangular block in light concrete covered by a light steel structure.

7 - 24 March 2005



### Bonnard+Woeffray, Architects, Monthey

*Exhibition realised by the EPFL Architecture Programme*

The work of the architects Geneviève Bonnard and Denis Woeffray, who have been based in Monthey since 1992, is one of the strongest and most original contributions to the architecture of the French-speaking part of Switzerland. Although it would appear to subscribe to minimalism, its formal reduction is not an end in itself but an architectural response to increasingly harsher economic conditions. For this reason, their projects are launched by casting doubt on all the relevant data, which forces all partners to concentrate on essentials. This explains the differences between their buildings, which are not linked by an architectural style, but rather by a «architectural thought process» in response to today's prevalent conditions.

Catalogue of projects by Bonnard + Woeffray  
Published by ENAC Media and Communication, March 2005.

23 March - 22 April 2005



### Science City-ETH-Zurich

*Exhibition realised by the Federal Institute of Technology Zurich*

“Science City” is the name under which the Federal Institute of Technology Zurich has planned its development to ensure international competitiveness and, to enhance the status of Switzerland as a prime location for universities. The project, which has already been presented in Berlin, Zurich and Barcelona, explains why universities, beyond places of learning and research, must become genuine living spaces through the establishment of student residences, congress centres, sports centres, hotels, restaurants and shops. The exhibition underlines the objectives that have dominated the expansion of the ETHZ ever since 1855 and whose consequences are social and urban in nature. The exhibition also presents four of the main outlines for Science City, of which one – that of Kees Christiaanse – has laid the groundwork for the future urban development plan.

6 - 29 April 2005



### **Adriano Olivetti and Urbanist Thought**

*Exhibition realised by the Olivetti Foundation, Ivrea*

Adriano Olivetti realised that town planning could serve to give shape to a political and cultural project which began to emerge as early as the 1930s. At the same time, Olivetti started to supervise plans and projects and to develop an intense commitment in the field of specialist publications on architecture and town planning. For this purpose, he surrounded himself with intellectuals from various disciplines and with different outlooks, who were nonetheless united in the same ideal of political and social engagement. The exhibition presents projects launched by Olivetti for the development of the Aosta Valley and for post-war reconstruction, as well as his participation in moral reconstruction and in the improvement of the development conditions of Southern Italy.

Catalogue published by ENAC Media and Communication, May 2005.

21 June - 4 November 2005



### **The Heat of the Earth**

*Exhibition realised by the Swiss Geothermal Society in cooperation with the EPFL Engineering and Environmental Geology Laboratory (GEOLEP)*

At a time when a majority of heating systems are responsible for a considerable amount of air pollution and use fossil energy resources whose price continues to climb, geothermics offers a particularly interesting alternative because it makes use of a source of energy that is natural, renewable and non-polluting: the heat of the Earth. Geothermics makes use of a variety of exploitation technologies with the integration of heat exchangers in the foundation posts of large-scale buildings or with geothermal source heat pumps for houses. The naturally hot underground thermal water recuperated from tunnels provides enough energy to heat entire living quarters of leisure centres near the tunnels' entrance.

12 October - 20 November 2005



### **From the Alps to the Sea: the Architecture of André Gaillard**

*Exhibition realised by the Archives of Modern Building, EPFL*

André Gaillard – who was born in la Chaux-de-Fonds and was a student of Eugène Beaudouin at the School of Architecture of Geneva – and his successive associates took part in all the adventures of the years 1950-1970, a key period of modern architectural development in Switzerland: new residential areas, massive housing construction thanks to prefabrication, creation of winter sport or seaside resorts from scratch. The exhibition presents a selection of realisations and projects that are emblematic of André Gaillard's activities, from individual houses to large-scale developments, and from industrial buildings to religious edifices.



7 December 2005 - 20 January 2006



**Aldo Favini,  
Architecture and  
Engineering at Work**

*Exhibition realised by Politecnico  
di Milano*

Aldo Favini, born in 1916, is a major figure of contemporary Italian engineering. With Silvio Zorzi and Riccardo Morandi, he introduced the culture and practice of prestressed concrete, thus making a crucial contribution to the development of prefabrication in Italy, a country where in post-war years, the urgency of reconstruction clashed with a lack of qualified manpower, massive migration towards the north and an increase in labour costs. As a structural engineer, he devoted himself to the overall construction process and paid attention not only to the rigour of calculation but also to the development of technologies and building site techniques. He united the search for novelty with elegance of form, the perfection of construction detail and fastness of assembly.

ENAC Exhibitions in Switzerland and Abroad



**Bonnard & Woeffray,  
Architectes, Monthey**

*2 April - 22 May 2005  
Architekturmuseum, Basel*

**Inventioning Architecture  
Four Swiss Schools of  
Architecture on Display**

*3 - 27 October 2005  
California College of the Arts,  
San Francisco, US*

**Building the Future of  
Learning  
12 Projects for the EPFL  
Learning Center**

*14 April - 11 May 2005  
ARchENA, ETH-Zürich*

**Der Blick der Moderne :  
Architekturfotografien  
der Sammlung Sartoris im  
Dialog mit Objekten des  
Vitra Design Museums**

*12 March - 29 May 2005  
Vitra Design Museum,  
Weill am Rhein, DE*

*6 October - 20 November 2005  
Hofmobiliendepot – Möbel  
Museum Wien, AT*



**Visiones de Arquitectura  
Moderna  
Fotografías de arquitectura  
de la colección de Alberto  
Sartoris en dialogo con  
objetos del Vitra Design  
Museum**

*6 October - 20 November 2005  
Antiguo Convento de Santa  
Maria de Los Reyes,  
Sevilla, ES*



## Awards and Distinctions

### Teaching and Research

**Dr Marylin Andersen**

*ICARE, LESO-PB*

**Prix EPFL de la Fondation Dimitris N. Chorafas**

For her thesis «Innovative bidirectional video-goniophotometer for advanced fenestration systems». (This award encourages exceptional work in the framework of Information and Communication Technologies, as well as in the field of sustainable development).

**Dr Katrin Habel**

*IS - MCS*

**Prix René Wassermann**

For her thesis « Structural behaviour of elements combining ultra-high performance fibre reinforced concretes (UHPFRC) and reinforced concrete ».

**Professor Thomas Keller**

*IS - CCLAB*

**Best Applied Research Paper 2004**  
Journal of Composites for Construction.

"Adhesively Bonded and Translucent Glass Fiber Reinforced Polymer Sandwich Girders".

**Dr Jean-Paul Lebet**

*IS, ICOM*

**Tanaka Prize 2004 awarded in May 2005**

The Tanaka Prize, created in 1966 and awarded by the Japanese Society of Civil Engineers, rewards a scientific publication of outstanding value in the field of research and development in bridge engineering. In this case, a contribution entitled «Study of the grouped arrangement of stud connectors on the shear strength behaviour» concerning research work carried out at ICOM (Steel Structures Laboratory) with Jun Okada and Professor Teruhiko Yoda and then completed in Japan. The publication approaches the question of the steel – concrete joint used in the construction of the loadbearing systems of composite bridges.

**Maria Cristina Munari-Probst**

**Christian Roecker**

*ICARE-LESO-PB*

**PLEA 2005-Best Paper Award**

(Scientific Committee).

"Integration and formal development of solar thermal collectors"

**Professor Julius Natterer**

*ICARE-IBOIS*

**Schweighofer Award**

For R & D and Life's Work 2005.

**Professor Luca Ortelli**

*IA-LCC2*

**Prix des étudiants AGEPOLY-EPFL**

For his teaching.

**Professor Ian Smith**

*IS-IMAC*

**Computing in Civil Engineering Award, American Society of Civil Engineers**

This is the first time that this award has been given to a person outside the United States. For several years, Ian Smith has been teaching that computing is a science and not just a trade to be mastered in order to carry out, for example, digital simulation. Ian Smith received this distinction for such teaching and for innovative applications of computing in engineering.

**Professor Martin Steinmann**

*SAR – IA-LHAB*

**Bruno Zevi CICA Book Award 2005**

This distinction, awarded by the International Committee of Architectural Critics, rewards the book published in 2003, *Formeforte. Ecris/Schriften 1972-2002* by Professors Jacques Lucan and Bruno Marchand, Editions Birkhäuser. This collection of texts constitutes a veritable guide through experiences that marked XXth century architecture and the debates that motivate contemporary research. The graphic form and precise layout, the soberness of the iconography in black and white, make this a unique book which is destined to outlast fashions, as a constant reminder of the need for intelligent criticism.

**Scott Walbridge**

*Doctoral candidate at IS, ICOM*

**Eurosteel 2005 Prize**

The prize was awarded to the four best contributions by young engineers and researchers at the Eurosteel Conference on Steel and Composite Structures in Maastricht (NL). One of these four prizes was awarded to Scott Walbridge and Alain Nussbaumer for their contribution entitled "Post weld treatment to improve the fatigue performance of tubular bridge structures".

**Dr Pierre Zignani**

*SAR*

**Prix de doctorat EPFL**

**EPFL Press Distinction**

The first EPFL Press Distinction was awarded to Dr. Pierre Zignani for his work dedicated to the Hathor Temple in Dendera. Created in the framework of the 25th anniversary of the establishment of the PPUR (Polytechnic and University Press), the EPFL Press Distinction honours scientific work displaying remarkable qualities in didactic and editorial terms.

**SAR Students**

**Delphine Ding**

**Monica Knechtle**

**Vincent Roesti**

**Stéphane Schers**

*Architects, Master Students*

*Mentions d'architecture SIA.*

**Antoine Barc**

**Aurélien Blanchard**

**Raphaël Dessimoz**

**Raphaël Hilan**

**Josiane Imhof**

**Guillaume Laplane**

**Christine Moser**

**Vincent Roesti**

*Architects, Master Students*

*Prix Banque Cantonale Vaudoise.*

**Arnaud Zein El Din**

*Architect, Master Project*

*Prix Architecture et Préfabrication.*

**Frédéric Frank**

**Sophie Lufkin**

*Architects, Master Project*

*Prix de l'Ass. des diplômés A3-EPFL.*

**Jong-Jin Park**

*Architect, Master Project*

*Prix Orlando Lauti.*

**Daniel Brulhart**

**Raphaël Dessimoz**

*Architects, Master Students*

*Prix SIA vaudoise.*

**Luca Camponovo**

**Guillaume de Morsier**

**Audran Valloggia**

*Architects, Bachelor Students*

*Prix UPIAV.*

## SGC Students

**Sabrina Kost**  
**Marc Lachenal**  
**Gwendoline Perazzini**

*Civil Engineers, Masters Students*

**Défi Bouygues Construction**

Launched in 1977, the Défi Bouygues Construction is an original competition in which multidisciplinary teams confront each other over an actual case of project management.

The GC team, working together for the financial management part with students from EN CET from Paris X, had the task of developing a proposal for a property project comprising a centre for marine research and a university and then submitting their solution to an imaginary client, all within 36 hours and respecting certain compulsory parameters.

**Rémi Martinerie**

**Joëlle Rast**

**Pierre-Olivier Spagnol**

*Civil Engineers, Master Project*

**Prix IM - Bureau d'ingénieurs**

**Maggia.**

**Etienne Raess**

*Civil Engineer, Master Project*

**Prix VSS - Association suisse des professionnels de la route et des transports.**

**Michael Wilhelm**

*Civil Engineer, Bachelor Student*

**Prix UPIAV - Union patronale des ingénieurs et architectes vaudois.**

## SSIE Students

**Bastien Roquier**

*Environmental Engineer, Master Project*

**Prix Bonnard & Gardel.**

**Christian Bodgal**

*Environmental Engineer, Master Project*

**Prix de Cérenville**

**Prix de la Société suisse des mensurations et améliorations foncières.**

**Alexandra Seiler**

*UNIL*

**Prix de l'Ecole Lémanique des Sciences de la Terre et de l'Environnement.**

## ENAC Professors

Appointments 2005



### Andrew Barry

*Full Professor, Ecological Engineering*

Andrew Barry's research covers several fields, such as the numerical modelling of multi-phase processes, the flow of reactive biogeochemical substances, the influence of heterogeneity and scale factors on transport processes in porous mediums, as well as the analysis of coastal aquifers.

To provide an answer to the tricky question of land remediation, Andrew Barry has developed a sophisticated model to chart flows and chemical reactions of underground water. He has also proposed a transport model for the solutions

in the soil based on a new variability concept of "flux fields", which in turn is based on the physical interpretation of non-equilibrium states.



### Rizlan Bencheikh-Latmani

*Tenure Track Assistant Professor, Environmental Microbiology*

Dr Bencheikh-Latmani, a Swiss national, was awarded her BS natural resources by Cornell University in Ithaca in 1993, her MS civil and environmental engineering in 1995, and then her PhD by Stanford University in 2001.

Dr Bencheikh-Latmani has made significant contributions towards questions of speciation and the biodegradation of uranium in connection with organic materials. Her field of research is located in the context of the biodegradation of toxic materials and radionuclides through micro-organisms. Today, only little

is known about the mechanisms at molecular level which play a part in the reduction of metals. For this reason, Dr Bencheikh-Latmani focuses her efforts on the identification of reduction processes which are active in the degradation of U(VI), Cr(VI) and Se(IV) through the bacterium *Shewanella oneidensis*. She conducts her research work in the laboratory and in on-site experiments. By way of concrete results, these fundamental scientific investigations will allow for an optimal selection of bacteria that are capable of degrading toxic metals and radionuclides while inhibiting their transfer into the various areas that would contain them in the biosphere.



### **Harry Gugger**

*Full Professor, Production of Architecture*

Audacious projects have forged Harry Gugger's reputation, a partner in the prestigious firm of Herzog and de Meuron in Basel, whose creative visions are remodelling contemporary architecture. The attention of the world as a whole has been drawn to the new silhouette of the Tate Modern in London, a project directed by him and born from the transformation of a former electrical factory. Or to the beautiful and unusual creation of the Laban Dance Centre, also in London, of the Schaulager in Basel, the extension of the Aarau Museum of Art

and the project for the Beijing Olympic Stadium for the forthcoming Games.

Professor Harry Gugger took his first professional steps as a tool-maker, then a carpenter, before taking an academic path which led him to study in turn technical engineering, German literature, history and then architecture. An eclectic mix that is found in his work, which includes a great diversity of creations, such as libraries, museums, stadiums and industrial buildings.

Harry Gugger was born in 1956 in Grezenbach, Switzerland. He obtained an engineering diploma from Winterthur Higher Technical School. After a stay at the University of Columbia (New York) in 1989, he returned to Switzerland and the following year received his architect's diploma from the ETHZ. He joined the research consultancy Herzog & de Meuron in Basel and rapidly became an associate partner.



### **Jeffrey Huang**

*Full Professor, Media and Design*

Professor Huang's major contributions are to be found in the design and realisation of interactive information systems and special interfaces. His research aims to fill the obvious lacunae that exist today in the systematic understanding of what constitutes a high-performance virtual environment, which will in turn influence human and sociological behaviour patterns.

Professor Huang's joining both the the School of Computer & Communication Sciences (IC) and the School of Architecture, Civil and Environmental

Engineering (ENAC) represents an interesting model for the EPFL.

Jeffrey Huang is a Swiss national and was born in Rome on 30 May 1966. After a Diploma in Architecture from the Federal Institute of Technology in Zurich in 1991, he was awarded the degree of a Master of Design Studies in Computer-Aided Design at the University of Harvard in Cambridge, Massachusetts. In 1997, he was awarded his doctorate by the same university. He began his career as a researcher at the Center for Coordination Sciences of the Massachusetts Institute of Technology (M.I.T) in Cambridge. In 2001, he was appointed Associate Professor at the University of Harvard's Graduate School of Design (GSD).

Since 2003, he has taught at Harvard's Faculty of Arts and Sciences. From 1995 to 2005, Jeffrey Huang has been involved in design projects focusing on the intersection of architecture and information systems.



### **Christian Ludwig**

*Adjunct Professor, Solid Waste Treatment, Joint Professor PSHENAC*

Christian Ludwig's major contributions are concerned with the study of material flows and of thermochemical processes at high temperatures and large scales, as well as with the use of spectroscopy for the resolution, identification and elimination of heavy metals during, say, the conversion of biomass into energy. The processing, recycling and reutilisation of waste represents part of his research objectives.

His teaching at the ENAC School focuses on the low-temperature chemistry of the interfaces between solids and water and on the thermochemistry that comes into play in waste processing. At the Bachelor's and Master's levels, he is concerned with waste management.

Christian Ludwig participated in more than 13 research projects between 1995 and 2003. In 1998, he applied for a patent in Germany with research entitled Interface for the On-line Measurement of Heavy Metal Vapor with Conventional Detections.

Born in Berne in 1963, Christian Ludwig was awarded his Diploma in Chemistry in 1990, and in 1993 received a doctorate from the University of Berne. He obtained a post-doctoral degree at the Department of Land, Air and Water Resources of the University of California in Davis. From 1995 to 1997, he worked in the EAWAG's Resources and Waste Management Department as a research assistant. In 1997, he joined the Paul Scherrer Institute as a Senior Scientist, and in 2000 was promoted to lead the Group for Chemical Materials and Processes.



### **Dani Or**

*Full professor, Soil and Environmental Physics*

Professor Dani Or is recognised worldwide as one of the best soil physicists. He has made major contributions to the understanding of the distribution and transfer of mass and energy in porous media. He is an authority in the field of the stochastic modelling of unsaturated flows, of modelling for the determination of the scale of pores, and of the simulation of unstable flows in fractured rock.

Recently, he completed a study of microbial films which have an impact on particular interface phenomena and are able to exert an influence on the transfer of nutrients and energy. Finally, the scientist has attracted attention for his work on the electromagnetic properties of soils. These play a predominant part in reflectometry, the depth of radar penetration and the determination of the water content.

Born in 1955, Dani Or was motivated by soil science early on, as he spent his youth in a community of arable farmers in Israel. In 1987, he obtained the degree of a Master of Soil and Water Sciences at the Hebrew University of Jerusalem. He then worked at the University of Utah in Logan, where he was awarded the degree of a Doctor of Soil Science and Biometrology in 1990. He then joined the University of California in Davis, and later in Berkeley, as a post-doctoral student. He returned to the University of Utah, where he was Assistant Professor, Associate Professor and Professor of Soil Physics.



## **Jian Zhao**

*Full Professor, Rock Mechanics*

As a specialist in rock mechanics and engineering geology, as a doctor of the Royal School of Mines of the Imperial College of London, and as an associate professor of rock mechanics and engineering geology at the School of Civil and Environmental Engineering of Nanyang Technical University in Singapore, Jian Zhao has made great contributions to the development of this scientific field through his activities in international rock mechanics organisations. He is vice-president for Asia of the International Society of Rock Mechanics.

In terms of research, Professor Zhao's major contributions have focused on the problems of rock, the dynamism of fractures, the propagation of shock waves in fractured environments, the stability of rock structures subjected to static or dynamic loads, as well as on numerical modelling in connection with continuum/discontinuum mechanics. In particular, he has developed innovative concepts concerning the criterion of unified force and the application of the model of the sliding fissure to the dynamic behaviour of rock.

Jian Zhao is the author of a great number of publications and has received prizes and distinctions from the Japan Society for the Promotion of Science, from the Chinese Ministry of Education, from the International Association of Engineering Geology and the Environment and from the Vice-Chancellors and Principals Committee of the United Kingdom.



## ENAC Professors

Promotions 2005



### **Ian Smith**

*Full Professor, Applied Computing and Mechanics*

For Ian Smith, structural engineers are central actors in the construction industry. Through more rational use of opportunities such as those offered by measurement systems and information technology, engineers are increasing their capacities to carry out key tasks. For example, fibre-optic sensors permit the measurement of phenomena that were previously not measurable in structures; algorithms support more systematic and rational use of sensors; measurements improve the quality of modelling, and a combination of measurement and computing leads

to bio-inspired control of active structures.

In addition, implementation and testing of software that is compatible with full-scale engineering tasks helps advance information science within areas such as model-based reasoning, search in complex non-linear solution spaces, diagnostic decision support and engineer-computer interaction.

Of Swiss and Canadian nationality, Ian Smith was born in 1955. After obtaining his Bachelor degree in civil engineering at the University of Waterloo (Canada) in 1978, he went to work in industry for a consultant. In 1982, he obtained his Doctorate at Cambridge University (Great Britain) and then came to the EPFL, where he was successively a Research Associate and a Research Assistant in the Civil Engineering Department and for five years in the Computer Science Department. He became an Assistant Professor in 1996 and then an Associate Professor in 2000. It was at this time that he took over the direction of IMAC (Applied Computing and Mechanics Laboratory). He was appointed Director of the Structural Engineering Institute in 2001.



### **Jean-Claude Bolay**

*Adjunct Professor, Sustainable Development and Technology*

Jean-Claude Bolay joined the Swiss Federal Institute of Technology in Lausanne (EPFL) as a research assistant in 1989 and has since been in charge of several projects funded by the Swiss National Fund, the Swiss Agency for Development and Cooperation (SDC) and other international organisations. In his capacity as a member of the research staff of ENAC's Laboratory of Urban Sociology, he led an interdisciplinary research team that contributed to the North-South National Research Competence Centre. At the EPFL, he teaches

students of architecture and runs a Master of Advanced Studies Course on Development, which is jointly organised by the EPFL and the Ecole inter-états d'ingénieurs de l'équipement rural (EIER) in Ouagadougou, Burkina Faso.

In 2001, Jean-Claude Bolay was put in charge of the cooperation mission, a unit which he has led ever since and which is integrated in the Vice-Presidency for International Relations.

In this capacity, Jean-Claude Bolay coordinates the SDC-EPFL Fund, which integrates five research projects in Asia, Africa and Latin America. He further supervises the progress of the ISCB (Indian Swiss Collaboration in Biotechnology) programme and supports the launch and funding of new projects initiated by EPFL teams. Moreover, he has repeatedly been employed as a quality expert in the field of scientific cooperation for development by several organisations.



### **Pierre Frey**

*Adjunct Professor, Archives of Modern Building*

Curator of the Archives of Modern Building, Pierre Frey, a Swiss national born in 1949, read geography, German and history of art at the Universities of Geneva and Lausanne. He was awarded a licentiate's degree in 1984 and then pursued a dual career as a secondary school teacher and as a researcher into the history of architecture.

On account of his exhibitions and publications – *Viollet-le-Duc et la montagne* in particular - he was invited to join the Institute of Theory and History of Architecture at the EPFL in 1988. In 1993, he established a centre for the documentation, collection, exploration and improvement of a fund of archive material for architects, engineers and enterprises; this centre's activities continue to develop. In this centre, Pierre Frey contributed to the integration of the formation of useful sources into the history of architecture, and in 1998, in a doctoral thesis at the EPFL, he formalised the relevant IT tools, which resulted in a recommendation from the International Council of Archives. His membership of international organisations such as the International Confederation of Architectural Museums and the International Council of Archives earned him the chairmanship of ICA's Section on Architectural Records. He was one of the main organisers of the International Congress on Archives in Madrid in 2004, for which he drafted the central issues. He has organised numerous exhibitions that were accompanied by publications and were intended to present teaching materials and to disclose research results, and he ensures that the Archives of Modern Building receive both public attention and private patronage.



### **Ulrich Lemmin**

*Adjunct Professor, Environmental Hydraulics*

Director of a research team on environmental hydrodynamics at the EPFL since 1984, Dr. Ulrich Lemmin obtained his Diploma in Mechanical Engineering from the University of Karlsruhe in 1968 and a "Master of Applied Sciences" from the University of Waterloo in Canada. PhD in "Atmospheric Sciences and Limnology" from the State University of New York, Albany, USA, he took part in the International Field Year of the Great Lakes, then worked until 1978 as a researcher on mixing and transport problems in rivers at the Federal Institute of

Hydraulic Constructions in Karlsruhe. From 1978 to 1984 he studied the hydrodynamics of lakes at EAWAG in the framework of an extensive Swiss national programme on "Fundamental problems of the water cycle in Switzerland".



### **Pramod Rastogi**

*Adjunct Professor, Optical Metrology*

Pramod Rastogi is among the leading specialists in the optical metrology of rough surfaces. His contributions to holographic interferometry, speckle metrology, moiré and phase displacement deserve particular mention.

Pramod Rastogi has been awarded several prestigious prizes. In recognition of the excellence of his work, the Optical Society of America (OSA) and the International Society for Optical Engineering both appointed him a Fellow in 1993 and 1995, respectively. Between June 1999 and May 2003, he was

an honorary visiting professor at the Indian Institute of Technology in Delhi.

A Swiss national born in 1951, Pramod Rastogi obtained two degrees in India: a Master of Physics from the University of Lucknow in 1973, and a Master in Applied Optics from the Institute of Technology in Delhi in 1975. He was then awarded a doctorate in France at the University of Besançon in 1979. He joined the Federal Institute of Technology in Lausanne (EPFL) in 1978. Evidence of his extensive knowledge in his field of activity was notably provided by his edition of a dozen special issues, among them three devoted to optics in Switzerland, in the journal *Optical Engineering* in 1995. Today, these issues still serve as an international reference to target and identify optical activities in Switzerland, both at an academic and industrial level.



### **Martin Schuler**

*Adjunct Professor, Land Planning*

Martin Schuler, a Swiss national born in 1946, read geography at the Universities of Zurich and Reykjavik, where he wrote his degree thesis on regional migration. In 1973 he joined an office of urbanism and area planning in Zurich, where he worked in the fields of demography and regional policy and participated in infrastructure projects in Switzerland, Iraq and Bhutan. He has been a scientific assistant at the EPFL since 1981, and he also runs his own office specialising in territorial statistics. With his excellent knowledge of

Switzerland's spatial, historical, economic and political dimensions, and with the support of efficient research teams, Martin Schuler has contributed to territorial knowledge in Switzerland on a grand scale - from the conception of measures and definitions to be used in social and spatial statistics to sensitive interpretations and elaborate cartographical realisations, as well as the management of research into issues of emigration and mobility, of territorial development and futurology. He is the author of a dozen or so books and of numerous publications, and he has been called upon to help with census projects in the Khirgiz Republic and to represent Switzerland in such international organisations as the OECD, Eurostat and ESPON.

He is also a member of various professional and cultural organisations.



### **Claude-Alain Roulet**

*Adjunct Professor, Building Energetics*

An international leader on the subject of the indoor environment quality and energy in buildings, Claude-Alain Roulet became a physics engineer at the EPFL in 1964 and Doctor of Sciences in 1973, completing a thesis on surface physics. After spending a brief period of time in industry, where he developed a laser for piercing tiny holes in watch rubies, he began a career as a building physicist in the Laboratory of Building Materials at the EPFL. He studied the effects of frost on construction materials, then developed mathematical models

and measurement methods in relation to the energy performances of buildings.

With Niklaus Kohler, architect and now professor at the University of Karlsruhe, he introduced the teaching of building physics at the EPFL. In 1982, he joined the Solar Energy and Building Physics Laboratory (LESO) and progressively took over the administration of a research group on the indoor environment in buildings, which presented him with the opportunity to participate in numerous national and international research projects.

Author of many publications and a lecturer much appreciated by his students in civil engineering and architecture, in 1973 Claude-Alain Roulet participated in the creation of the society Energie Solaire SA, a leading company in Switzerland in the production of solar thermal collectors.



### **Thomas Zimmermann**

*Adjunct Professor, Structural Mechanics and Numerical Simulation*

Thomas Zimmermann's field of research extends to numerical simulation techniques applied to the static and dynamic analysis of continuum mechanics and structures, with a distinct orientation towards the understanding of non-linear behaviour patterns and behaviour patterns in rupture phases. Among Thomas Zimmermann's major contributions are his work on the Arbitrary Lagrangian Eulerian (ALE) Method and its developments in the object-oriented programming with finite elements. In terms of research vision, this scientist has

identified several questions that still remain unanswered today, such as those concerning stabilised formulations, the analysis of the propagation of errors and objects of artificial intelligence.

Born in 1945, Thomas Zimmermann obtained his Diploma in Civil Engineering from EPFL in 1970 and was awarded the degree of Doctor of Technical Sciences by the EPFL in 1979. With a grant from the Swiss National Fund, he pursued his post-doctoral research at the University of Berkeley from 1976 to 1977, and then at Caltech from 1977 to 1979. From 1979 to 1981, he worked for Motor Columbus as an expert on the dynamism of structures. He joined the EPFL at the former Institute of Energy Economics and Management in 1982. Since 1988, he has occupied the position of a member of the research staff and course leader at the Laboratory of Structural and Continuum Mechanics.

## ENAC Senior Scientists

Promotions 2005



### **Kristin Becker Van Slooten**

Of German descent, Kristin Becker Van Slooten was awarded a biology diploma from Geneva University in 1988. In 1989 she obtained her Master Thesis in Environmental Sciences from EPFL and in 1990-1994 completed her PhD dissertation in the EPFL Laboratory for Environmental Chemistry and Ecotoxicology. As a Senior Scientist, she is responsible for the CECOTOX Laboratory's Experimental Ecotoxicology Group with Professor Joseph Tarradellas and provides teaching in ecotoxicology (bachelor, master and post-graduate levels) at EPFL, Geneva University and Metz University.

Her research focuses on coordination and realisation of research projects and contracts in the field of ecotoxicology, use of ecotoxicity tests and biomarkers to evaluate effects of pollutants on aquatic and soil ecosystems, endocrine disruption in soil invertebrates, fate and behaviour of antifouling products in the environment, impact of endocrine disrupters on soil invertebrates, ecological risk assessment of contaminated sites.

Appointed Senior Scientist in the summer of 2005, Kristin Becker Van Slooten will be joining the ECOL laboratory as from 1 January 2006. She is the author of many publications in reputed journals in her discipline. A Member of the ETH Board as the representative of both the EPFL and ETHZ School Assemblies, she also participates in several commissions such as the Scientific Commission for Chronic Risks of INERIS, France.



### **Edgard Gnansounou**

Born in Benin in 1957, Edgard Gnansounou obtained his EPFL diploma in civil engineering in 1983 and went on as an assistant in the Institute of Energy Economics and Management (IENER) and in the Energy Systems Laboratory (LASEN) where he completed a doctoral thesis on electricity supply and demand in Switzerland. From 1991 onwards he led a research group in the same laboratory and has been Acting Head of LASEN since November 2003. His research relates to the planning of energy systems – particularly modelling uncertainty, imprecision and stakeholders' behaviour in the process

of matching energy supply to demand. This research relies on multi-agent simulation and essentially focuses on the energy and biofuels markets in Switzerland, in other industrialised countries or emerging / developing countries (China, Gambia, Guinea, Guinea-Bissau, Senegal). Edgard Gnansounou is the co-developer of the DEMEELEC-PRO, PLANELEC-PRO and MAGES software used in particular to plan the electricity sector of Shandong Province in China and to assess the economic and environmental impact of introducing nuclear fusion for electricity production in various regions of the world (EURATOM/Switzerland). He is involved in various activities towards the introduction of biofuels in Switzerland. In 2002, Edgard Gnansounou was a visiting researcher at Thayer College, Dartmouth School of Engineering, Hanover, New Hampshire (USA). At EPFL he teaches at various levels (master; master of advanced studies in hydraulics and energy; Doctoral School). He is a member of several professional associations: International Hydropower Association (IHA), International Association for Energy Economics (IAEE), Swiss Committee of the World Energy Council. He is an Associate Professor at the Shandong Electric Power Research Institute (China). Edgard Gnansounou is the author and co-author of some forty publications.



### **Jean-Paul Lebet**

Born in Buttes (NE, Switzerland) in 1950, Jean-Paul Lebet obtained a civil engineering diploma from EPFL in 1975 and a doctorate in technical science in 1987.

In 1975 he joined the EPFL Steel Structures Laboratory (ICOM) as a research assistant and engineer. In 1991 he was appointed as a lecturer to teach the basics of steel structures, structural design and steel and steel-concrete composite bridges.

In charge of composite structures at ICOM, Jean-Paul Lebet supervises several research projects in the field of steel-concrete composite bridge behaviour, loads and load modelling, knowledge-based systems and, more recently, glass-steel structures. He has supervised several theses in these fields. He has widened his related knowledge and experience through numerous contacts abroad, including two visits of several months to the USA and Japan.

He is the author and co-author of several dozen research publications and received the 2004 Tanaka award from the Japanese Society of Civil Engineering. He is currently drawing up civil engineering treatise n° 12 devoted to steel bridges.

Alongside his research activities, Jean-Paul Lebet is a member of several research associations and international technical commissions and is actively involved in drawing up Swiss and European standards relating to composite bridges and loads.

## ENAC Professors

Departures 2005

*Several colleagues left us in 2005. The ENAC School thanks them all for the outstanding quality of their work at EPFL.*



### **Olivier Jolliet**

*Assistant Professor, GECOS*

Since 1999, Olivier Jolliet has been an assistant professor in sustainable development at the EPFL. His research focuses on the development of environmental assessment methods to determine action priorities, especially for bio-materials and for land planning. Emphasis is given to Life Cycle Impact Assessment and to the fundamental modelling of pollutant transport, fate and exposure in air, water, soil and food. The interdisciplinary teaching of O. Jolliet relates the technological and environmental dimensions of sustainable

development.

He graduated in Physics at the EPFL in 1983 and then developed and commercialised the HORTICERN model to predict energy consumption in greenhouses, obtaining his PhD in Physics at the EPFL in 1988. From 1989 to 1991, he carried out research on optimisation of humidity and water balances at the Silsoe Research Institute, GB. In 1992, he initiated the European concerted action.

He left the Programme on 31 October 2005 to take up the post of Associate-Professor at the Centre for Risk Science and Communication at the University of Michigan in Ann Arbor, United States.



### **Otto Kölbl**

*Full Professor, PHOT*

Otto Kölbl, born in Austria in 1940, studied surveying in Vienna. From 1965 to 1968 he was a scientific collaborator and lecturer at the ITC in Delft, Netherlands (now International Institute for Aerial Surveys and Earth Sciences in Enschede). He then became a research assistant at the University of Karlsruhe where he obtained his PhD on the «Combined Restitution of Aerial and Satellite Photographs for Topographic Mapping».

In 1972, he joined the Forest Research Institute of Switzerland in Birmensdorf where he directed a research group on remote sensing, which was engaged in forest inventory and forest damage mapping. There he also developed a technique for the inventory of land use based on point sampling on aerial photographs. This technique is now applied for the 4th national inventory.

In 1978 he was appointed Professor of Photogrammetry at the EPFL, where he taught photogrammetry, photointerpretation, digital cartography and virtual reality.

His research is very practice minded, so in the eighties he developed a system for stereo-image injection in analytical plotters which was successfully commercialised by Leica. Further developments concerned cadastral renovation and the renovation of utility mapping (EUREKA project), the analysis of instable grounds, vegetation mapping and the mapping of the snow cover. Various studies on the quality of aerial cameras and photogrammetric scanners led to decisive improvements of these systems. In this line he engaged in the development of an autonomous digital imaging system which was recently complemented by a laser scanner and GPS and INS for navigation.

He also was called as consultant for the modernisation of various national mapping agencies like in Colombia and Jordan and currently supervises an inventory of the cultural heritage of South Morocco, a project which is executed by the Ministry of Culture of Morocco and includes the revitalisation of the region.



### **André Musy**

*Full Professor, HYDRAM*

Ph. D. in soil sciences, Agricultural Engineer and Surveyor, André Musy has developed numerous fundamental and targeted research activities in the field of soil physics and remote sensing applied to hydrology and management of water resources. From 1978 to 1983, he led several important projects as chief technical advisor of WMO/UNDP in Guinea (Conakry) and then as director of applied research in agrometeorology and operational hydrology in Niamey (Niger). He spent several periods of many years abroad and

has therefore acquired an international expertise in the field of hydrology, soil science and land improvement techniques.

Since 2002, he was the director of both the Environmental Sciences and Technologies Institute (ISTE) and of the Hydrology and Land Improvement Laboratory (HYDRAM) at the EPFL where he taught a wide range of themes and topics in those many disciplines to bachelor, graduate and postgraduate students at the EPFL and abroad. He is an expert to many international organisations.

He left EPFL to take up the general management of OURANOS, Consortium on Regional Climatology and Adaptation to Climate Change, Montreal, Canada.



### **Rodolphe Schlaepfer**

*Full Professor, GECOS*

Born in Sainte-Croix, Switzerland. He studied forestry at the Swiss Federal Institute of Technology in Zurich (1959-1964), obtained a Master in Forest Science from Laval University (Canada) and a diploma in Statistics from the University of Edinburgh (UK).

He worked as a statistician for Ciba-Geigy from 1969 to 1975, was professor for statistics and physics at the Swiss School for Agricultural Engineering (1975 to 1982) and became professor for forest management at the Swiss Federal

Institute for Technology in Zurich (ETHZ) in 1982. From 1987 to 1996 he was director of the Swiss Federal Institute for Forest, Snow and Landscape Research in Birmensdorf (WSL), while remaining a professor for forest sciences at the ETHZ. In 1996, he was a visiting professor at the Oregon State University College of Forestry. From 1997 to 2006, he was a professor for ecosystem management and laboratory director at the EPFL.

He supervised about 60 master and 20 PhD theses, with projects in Europe, Africa, Latin America and Asia.

He is a member of the Editorial Advisory Board of the Journal of Tropical Forest Science. He was a member of the Scientific Advisory Board of the European Forest Institute, Joensuu, Finland (1994-1999), Coordinator of the IUFRO Task Force «Forests, Climate Change and Air Pollution» (1990-1995) and member of the IUFRO Executive Board (1995-2000).

His main research interests are landscape ecology (including landscape dynamics and landscape functioning), sustainable use of biological resources (including forest resources), biological diversity and ecosystem management processes, including forest certification.

He left EPFL in October 2005 for an active retirement.





### **Joseph Tarradellas**

*Adjunct Professor, CECOTOX*

In 1979 Joseph Tarradellas created the Ecotoxicology Research Group of the IGE-EPFL, integrating IATE-GECOS from 1997 to 2001. He was Head of the CECOTOX (Environmental Chemistry and Ecotoxicology) laboratory, EPFL from 2002 to 2005.

CECOTOX was working on the problems brought in aquatic and terrestrial ecosystems by organic priority pollutants and pesticides (ex: POPs, polychlorobiphenyls, dioxins and dibenzofuranes, polycyclic aromatic hydrocarbons,

alkyl-, nitro- and chlorophenols, surfactants, organotins, triazines, sulfonylureas, endocrine disruptors and medicine drugs) and by solid and liquid waste.

CECOTOX research included the development of new analytical methods for assessing traces of pollutants in aquatic and soil environments and of bioassays for assessing the environmental toxicity of organic pollutants.

Prof. J. Tarradellas and the CECOTOX Group were involved in several International Programmes. They have also developed their activities in the fields of developing countries and environment and of sport and environment.

Prof. Tarradellas has written 4 books and more than 100 refereed papers in scientific reviews.

He was in charge of courses in Environmental Chemistry, Ecotoxicology and Sustainable development at the EPFL from 1986 to 2005.

He was a visiting professor at the Universities of Dijon and Toulouse, Montreal, Montevideo, and Ho Chi Minh City.

Prof. Tarradellas took early retirement at the end of December 2005.



### **Jean-Philippe Leresche**

*UNIL Professor, OSPS*

Born in 1959, PhD in political science and Director of the Science, Politics and Society Observatory since its opening in September 1999 in the Architecture Department of the EPFL. Before creating this new unit, he worked for ten years as a scientific collaborator and lecturer at the Institute for Research into the Built Environment (IREC-EPFL). In 1998 he also became a part-time Professor at the Institute for Political and International Studies (IEPI), Faculty of Social and Political Sciences (SSP) at the University of Lausanne (UNIL) and then full-time

from 1st January 2005, when the Observatory was transferred from the EPFL to UNIL. Author and co-author of 11 works, sixty or so scientific articles and about twenty research reports, his teaching and research mainly concern the politics of higher education and research in Switzerland, as well as urban and regional politics in Switzerland and Europe. Since winter 2005, he has also directed the first postgraduate, then continuing education course in Switzerland dedicated to the "politics of higher education and research".



## Institute of Architecture (IA)

The main event in 2005 is the appointment of two professors: Prof. Roberto Gargiani (LTH3 Laboratory) for Theory and History of Architecture, and Prof. Harry Gugger (LAPA Laboratory) for Production of Architecture.

The LTH3 Laboratory promotes research, studies, seminars and other initiatives aimed at surveying the techniques, materials, working processes and structural systems that have characterised architectural construction in several historical eras, from antiquity to the present.

The LAPA Laboratory investigates all factors which influence the process of creating architecture. Using the term «production» underscores a view of architecture as an intellectual, crafted, machine-made and artistic product.

### Mission Statement

The IA Institute, through its research and contribution to teaching, focuses on enhancing the education of future architects by harmonizing their work with sustainable development and the concomitant cultural legacy.

To find new solutions, both for today and in the future, the IA is involved in investigating approaches to project conception and in research designed so that architecture, quality of construction, harmonization with surroundings, respect for natural and urban landscapes and our cultural legacy remain primarily of public interest.

Organized into four areas of research – urban architecture, theory and history, construction and conservation, and representation and computer-based visualization – the IA is involved in a broad range of interdisciplinary, innovative research whose results come together within the School of Architecture and in the doctoral programme «Architecture, City, History».

The IA assumes the role of guarantor of the specificity of the discipline where the four areas of research are in contact with those of other ENAC institutes and university research institutions.

### Main Research Activities

As a support measure for architectural research, the Secretary of State for Education and Research Charles Kleiber has given mandates to representatives of three Swiss schools. The EPFL Institute of Architecture and Architecture Programme are involved in drawing up a research project in collaboration with the ETHZ and the «Accademia di Architettura» in Ticino. This research project entitled «Urban Density and Territorial Transformations» should materialize into a PNR (national research programme) as part of FRT 2008-11. This orientation already includes two projects accepted into PNR 54, namely:

- **Densification of disused railway areas:**  
LAMU Laboratory - Prof. Lamunière, in cooperation with the LASUR Laboratory - Prof. Kaufmann.

To encourage urban development which is not structured around automobiles needs the conjunction of three ingredients: an efficient urban railway transport network, a policy of speed restrictions, road capacity limitations and access control to city centres, and a link-up between transport and urban development.

- Urban sustainable housing  
LASUR Laboratory - Prof. Kaufmann, in cooperation with the LCC2 Laboratory - Prof. Ortelli.

This project also covers activities of the LHAB, LTH, LCC1 Laboratories and AIC Studio:

- Urban Density – LHAB Laboratory, Prof. Steinmann.

Research into the field of urban housing is founded on the notion of density. It attempts to determine the technical, economic, sociological, physiological and psychological modes of density and to identify architectural measures to manage the interaction of these *modi*.

- Urban density, architecture and the quality of life in neighbourhoods of contemporary collective housing in Switzerland – LTH 2 Laboratory, Prof. Marchand.

The starting point for this research work is the observation that it is becoming urgent to put a brake on the urban sprawl that is continuing to make inroads into the rural landscape and its natural environment without considering the accompanying irreversible effects of change and pollution.

- The LTH1 Laboratory's mission, directed by Prof. Lucan, is to pursue research work into the theory of architecture and its history and to apply the results of this research to its teaching programme: – history of compositional and non-compositional procedures.
- Tools for Sustainable Construction Management and Rehabilitation – LCC1 Laboratory, Prof. Morel.

The obsolescence and ageing of existing building components can have a significant effect on aesthetic urban quality, on the comfort and health of occupiers and on management costs. In particular, housing built from 1947 to 1980 represents almost half the existing building heritage.

- Urban Institutions – AIC Studio, Prof. Mestelan.  
The city and its organisation in the territory are the result of political, social, cultural and economic will. They are the image of the social group which demands and designs them. Institutions are to be considered as an ensemble of essential founding, collective values which give birth to the group's organization, the "polis" - the city. So the study of architectural know-how (the "techné") and the theory which leads to it are concerned with the meaning and the rational and symbolic values of architecture and its critical reasoning.

Representation, Visualization and Computer Technology are grouped together in the

- LIV Laboratory, Prof. Abou-Jaoudé, for development of tools for the scientific visualisation and development of the graphic language and appropriate geometric models, specifically linking gaps between high power computing and visualising of results, and the
- CRE Laboratory, Prof. Cantafora, defining a link between private and collective memory to situate oneself in history, deal with the symbolic and allegoric language of communication and define the function of artistic expression.



Professor Claude Morel  
Director, IA Institute



## Structural Engineering Institute (IS)

The Structural Engineering Institute (IS) is responsible for research, teaching and transfer of scientific and technical knowledge in the following fields:

- Design and analysis of structures
- Construction methods
- Maintenance (monitoring, diagnosis, durability, preservation, modification and rehabilitation) of existing structures.
- New materials and new structural systems

This mission creates needs for competence in the following fields:

- Cultural, temporal and environmental dimension of structures
- Computer-aided engineering
- Risk management
- Measurement systems

The mid-term goals of Structural Engineering Institute are to:

- Formulate and initiate Institute research projects
- Coordinate teaching activities, particularly for the Structural Engineering Minor in the Masters programme
- Maintain excellence and efficiency in experimental testing
- Continue renovation of testing equipment through maintaining the EPFL label of the testing facilities as an «instrumental testing platform»

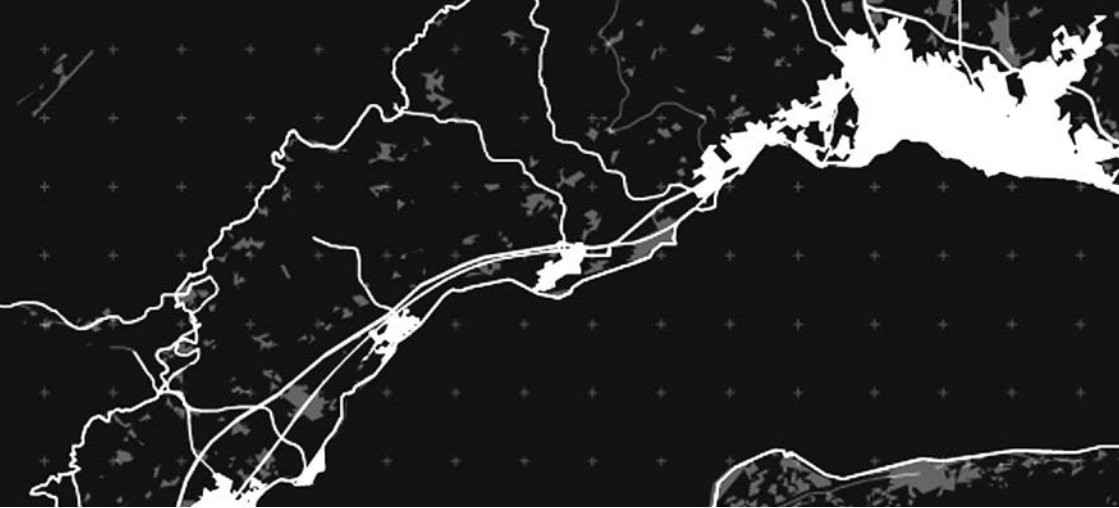
### Important events in 2005

- Thirteen internationally invited lectures were given of which six were «Keynotes»

- Forty enthusiastic doctoral students worked towards completion of their theses
- Dr. Jean-Paul Lebet was promoted to Senior Scientist (MER)
- ICOM organized a one-day conference on composite bridge design in Bern that attracted 180 participants
- LSC organised a short course on the extended finite element method in the School of Continuing Education
- ICOM organised a short course on fire safety of steel structures in the School of Continuing Education
- ICOM published the new edition of TGC 11 «Steel Construction» (in French)
- Two laboratories (CCLab and ICOM) became involved with work on the Solar Impulse Project by Bertrand Piccard.



*Professor Ian Smith  
Director, IS Institute*



## Institute of Urban and Regional Planning & Design (INTER)

At the hinge between environmental engineering, civil engineering and architecture, INTER laboratories develop transdisciplinary research approaches, built on the convergence of the skills, methods and culture of their disciplines and scientific fields. Today's relevant problems to be tackled are for example:

- urban and regional change management
- multimodal mobility and transportation systems
- landscape ecology and spatial planning
- social implications of urban and technological development
- land related information and decision processes
- urbanisation in information societies
- urban development and dynamics in southern countries.

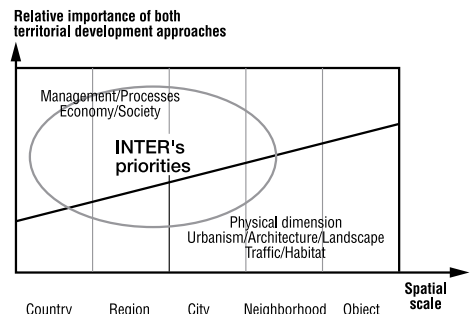
Innovative solutions to these problems rely on several key research trends such as:

- scale integration from local to global
- scope broadening from sectorial to global
- paradigm shift of territorial projects from products to processes.

The figure illustrates INTER's positioning in a scale/approach framework. On the whole, INTER wants to foster new approaches to «territorial project», relying on revisited theories of urban and regional development.

INTER's interdisciplinarity is not only an asset for the development of innovative research

projects in territorial development, but also for the development of original, integrated research methodologies, relying on INTER's involvement in theoretical, experimental, empirical and projectual research. Typical research processes are action-research and case studies.



Two research examples illustrate INTER's interdisciplinary approaches :

### • Urban Morphogenesis

The culture of the city is mainly physical. In this project led by the UTA Lab, the city is considered as a global phenomenon with constantly changing physical states. The analysis of the states and their sequences requires considering the natural and built environment as a global organism. Once represented, the city can be understood, programmed and designed.

The project aims at developing a software platform for urban morphogenesis simulation based upon the architects' expertise (Vector Agent modelling of buildings and their physical neighbourhood, their spatial and topological relationships and their states and behaviours). Relying on a basic map of the urbanising areas north of Lake Geneva, the most significant spatial structures for understanding city structures and growth are established.

Such a platform will provide efficient help in decision-making, by allowing end-users to assess scenarios of impacts induced by new architectural programmes in the city. The approach also requires deep GIS expertise in developing high-level spatial analysis tools, a mathematics background in adapting vector-based agent modelling to urban dynamics and computer science skills for dynamic 3D representation.

- **Cartograms**

Cartograms are innovative technical and cartographic solutions to support scientific analysis and interpretation of social phenomena. They rely on the stepwise deformation of a polygonal map coverage

(for examples municipalities or districts) to obtain mapped areas proportional to a relevant factor (the population, in most cases) instead of the geographical area.

This type of representation can easily be read by citizens as well as by experts and decision makers. The largest surfaces are also the most significant for the factors considered. Moreover, cartograms are fully featured scientific tools supporting heuristic analysis of spatial phenomena.

The CHÔROS Laboratory has developed innovative concepts for the efficient production of cartograms and has implemented them on an ArcView 3 based GIS platform. A map was published in a Swiss newspaper (*Le Temps*) in support of a critical analysis of the poll results.



*Professor François Golay,  
Director, INTER Institute*



## **Institute of Infrastructures, Resources and Environment (ICARE)**

The year under review comes within the framework of the first four-year period spanned by the Institute of Infrastructures, Resources and Environment (ICARE) since its creation in 2002. This last year has allowed the Institute to consolidate a certain number of experiences in the fields of teaching, research and the transfer of technology and to reach several objectives fixed in the framework of its strategic planning. 2005 also stands out in the increase in the numbers of doctoral candidates connected to the Institute (36 doctoral students registered in 2005) and the number of scientific publications (184 publications in 2005, of which 118 are referenced), which reflects the dynamism of the Institute in matters of research: in 2005 this generated a financial flow in the Institute's favour from outside (research funds, government agencies and industrial mandates) which alone amounted to nearly CHF 7 million.

This last year was a particularly happy one for the ICARE Institute, as it allowed putting efforts undertaken since 2003 into concrete form toward the implementation of 6 research subjects important to the Institute. Four interdisciplinary research projects within

the framework of the subjects «Development of Resources and Subterranean Spaces» and «Sustainable Management of Infrastructures and the Urban Fabric», calling for cooperation between several units of the Institute, are also the subject of support from the Swiss National Science Foundation within National Research Programme 54 «Sustainable Development of the Built Environment». Two other subjects with priority - «Management of Natural Risks» and «Design and Integrated Management of Energy Infrastructures» should soon evolve in this direction thanks to the Institute's active participation in the new National Centres of Competence, set up during the year by the Board of Federal Institutes of Technology (principally «Environment and Sustainable Development» and «Energy and Sustainable Mobility»).



*Professor Jean-Louis Scartezzini  
Director, ICARE Institute*





## **Environmental Sciences and Technologies Institute (ISTE)**

2005 was a year of major transitions for ISTE.

Professors Musy, Schlaepfer and Tarradellas formally retired from the Institute - André Musy accepted the post of Executive Director of the Ouranos Consortium in Montreal - Quebec concerned with climate change and water resources (we admire his continued energy and enthusiasm in taking on new international challenges); Rodolf Schlaepfer continues to maintain a very active and dynamic interaction with ISTE in teaching and research and his regular presence is especially valuable as the Institute evolves - we are delighted that he is able to share with us his knowledge of Switzerland and the Swiss environment; Joseph Tarradellas has maintained a very active and hectic international collaboration and has truly kept the EPFL flag flying in a variety of important scientific exchanges in Africa and Asia. All three Professors gave absolutely superb and positive presentations at their Departure Lectures and truly presented a wonderful account of their interactions in the EPFL to overflowing audiences. We sincerely wish them all the best in the coming years and are in their debt for all they have done on behalf of the EPFL and the Institute in particular.

In 2005 we also wished our very best to Assistant Professor Olivier Jolliet who was appointed as Associate Professor at the University of Michigan and is a founding member of the Center for Risk Sciences at

Michigan. We wish him and his family every success in Ann Arbor and are certain that he will pursue a very productive and exciting research programme.

Professors Barry, Or and Bencheikh-Latmani joined the Institute during the second half of 2005. Andrew Barry comes from the University of Edinburgh where he was Professor and Head of Environmental Engineering Department and his research concerns among others ecohydrology, biogeochemical mathematical modelling, site remediation and wetlands. Andrew was also on the faculty as Associate Professor in Environmental Engineering at the University of Western Australia prior to making the move to Europe. Dani Or was chaired professor in Civil and Environmental Engineering at the University of Connecticut and works in the area of soils and subsurface physics including the unsaturated zone and the role of biology in soils. Previously Dani Or was on the faculty at Utah State University and post-doced at the University of California at Berkeley. Rizlan Bencheikh-Latmani joins us as Assistant Professor (tenure track) in environmental microbiology. She completed her BS with honours at Cornell University and earned her MS and PhD at Stanford University in Civil and Environmental Engineering. Most recently she was post doc at the Marine Biology Research Division in La Jolla, California and has a broad interest in microbiology and environmental remediation. We are extremely happy that they are all



here and have added greatly to the level of activity of the EPFL environmental engineering research and teaching programmes.

We have been fortunate to have the strong encouragement of the EPFL and ENAC leadership and, during 2005, we have also seen rapid changes in the GR building with the construction of new laboratories, computer workshops, computer and teaching rooms. We now have better space for the environmental engineering students to study and have opened up laboratories to allow students more 'hands on' and 'open ended' problem solving experiences. In 2006 a new set of changes and upgrades to our facilities are well underway with detailed plans now approved. Similarly this past year saw a number of additional new faculty posts open and we are now in the recruitment stage for some three positions - I look forward to reporting on this next year with some additional positions designated for 2007.

I am happy to report that the weekly Environmental Engineering seminar series continues to be a great success with some 80 participants regularly attending. We have been especially fortunate to have a number of active visiting professors here on a sabbatical year including Professors Francois Morel and Anne Kraepiel of Princeton University (it was a special treat to see Francois Morel win the 2005 Ewing Medal at the American

Geophysical Union meeting in San Francisco in December); John Selker of Oregon State University (who has done an incredible job leading a major design course for our Masters students - this experience has truly enriched the education of all the students); Robert Anex of Iowa State University who is working in the area of renewable energy; and Samuel Assouline of the Volcani Institute in Israel who is working on hydrological and statistical aspects of water resources. Their presence has enriched the EPFL environment greatly and has stimulated a number of new research directions and activities at EPFL.

Finally the environmental engineering faculty members have begun to establish a number of new research and engineering contacts within ENAC, EPFL and across Switzerland and Europe. Please feel welcome to come and visit us and learn more about what we are doing and participate with us in the growth of this programme. I look forward to hearing from you and discussing how we can help each other.



*Professor Marc Parlange  
Director, ISTE Institute*



## Hosted Units

### Institute of Agricultural Economics, ETHZ Regional Office

The regional office of the Institute of Rural Economy of the ETH, Zurich developed two lines of research in 2005: the marketing of food processing channels and sustainable territorial development. The six associates in the office worked on different research mandates, amongst which were two European research projects: Suschain (Marketing Sustainable Agriculture) and Imalp (Implementation of sustainable agriculture and rural development in Alpine mountains). Furthermore, they were involved in different courses within the EPFL, notably the course on "Economy of Territorial Development" in the Master cycle, on "Sustainable Development in Mountain Regions" from the Postgraduate Territorial and Spatial Mutations Projects and the course during the interdisciplinary week entitled "Gruyère Civilisation". The Romandie branch will be closed permanently from 31st March 2006.

*Olivier Roque*

### Swiss Federal Institute for Forest, Snow and Landscape Research WSL Regional Office

The AR-WSL dedicates its research, training and service activities to natural habitats in the French-speaking part of Switzerland. In 2005, as in 2004, its ties with the EPFL again strengthened following the appointment at the end of 2003 of one of its research associates, Professor A. Buttler, to Head of the EPFL ECOS Laboratory as Adjunct Professor. This «joint venture» fosters excellent contact and exchanges between the two institutions. The personnel of ECOS forms, with the staff of AR-WSL, a team of about twenty people. At the moment there are 12 research associates, 6 doctoral students, 1 secretary/translator and one trainee.

#### *Research Subjects*

Sustainable management of woodland-pastoral landscapes  
Ecological processes  
(2 theses in preparation)  
Modelling landscapes  
(1 thesis in preparation).

*Jean Combe*

### Chair of Law

The Chair of Law, which has been formally integrated into the ENAC Faculty since the restructuring of the EPFL in 2001/2002, is made up of three Professors and a lecturer from the Law Faculty of the University of Fribourg, in addition to two assistant PhD students.

Courses deal with the rudiments of law (introduction to public and private law) with specific approaches for architects and engineers, such as regional development law, construction law, environmental law and private construction law. Several duplicated lecture notes have been prepared for them. Teachers from the Chair of Law also develop research activities in these fields, especially on the law on contaminated sites, coordination between regional development and the law on the protection of the environment and also civil liability.

*Isabelle Romy*



## Architecture Programme (SAR)

On the academic plane, this year was marked by the coming into effect of new study plans in accordance with the Bologna Agreement. The Bachelor Cycle is complete from now on.

As for architecture studio work, visiting professors allow us to ensure a good level of supervision for the students, who discover various teaching methods. In 2005 the Programme welcomed Visiting Professors Philippe Gueissaz, Franz Graf, Mathias Müller, Daniel Niggli and Dominique Salathé (Switzerland), Myrto Vitart, Jean-Marc Ibos and Philippe Gazeau (France), Luis Moreno Mansilla and Emilio Tunñon (Spain).

Since the 1st March Professor Roberto Gargiani's contributions to teaching cover the whole of our students' training, from the propaedeutic year to the Master cycle. Professors Jean-Pierre Adam, Pier Nicola Pagliara and Hans Ibelings will also participate in teaching as visiting professors.

Since the 1st May, following his appointment, Professor Harry Guger's contributions to teaching will be concentrated on the Master cycle. Notably, he directs an architectural project workshop, which is situated, along with his Unit's offices, in the GC (Civil Engineering) premises. Near to the LAPA premises is the IBOIS Laboratory of Professor Weinand, attached to the GC Programme, which this year offers project lessons to architecture students, with the intention of including these students in industrial design and in Civil Engineering.

This logistical, thematic and methodological proximity is part of the spirit of the School and reinforces the growing links.

This year, important figures from the School of Architecture have retired:

- Plemenka Soupitch participated in first year teaching, notably in the framework of practical and theoretical exercises for Professor Frédéric Aubry. She then ensured the upkeep and the influence of the Centre for Vernacular Architecture (CE/DAV), the fruit of research and teaching carried out from 1965 to 1992.
- François Iselin (LCC1) contributed for many years to the teaching of construction techniques, putting his skills in the field of construction at the students' disposal.
- Jean-Bernard Gay (LESO) trained the architects in the field of building energetics through his teaching, extended from the first cycle to postgraduate level.



*Professor Luca Ortelli  
Director, Architecture  
Programme*



## Civil Engineering Programme (SGC)

Faithful to our academic mission, we focus our efforts on high quality education thanks to our highly qualified teachers and to the support of the following Committees: the Teaching Committee, the College of Professors and the College of Teachers.

### Study Plan:

In accordance with the Bologna Convention (3 years for the Bachelor and 2 years for the Master), our study plan has been in its final version since the beginning of the academic year 2004-2005.

### Bachelor :

The Bachelor in GC is now operating efficiently according to official standards.

### Master :

This is the first group of students to participate in the new extended Master's degree which requires a four week pre-study during the summer break. These students will finish their Master project in summer 2006.

### Minors :

Our offer in minors has increased to 7, including one School-wide minor:

1. Infrastructure and Environment
2. Geotechnics
3. Transportation and Mobility
4. Structural Engineering
5. Water and Energy
6. Geomatics (with SIE)
7. Territorial Development (ENAC-wide)

### Interdisciplinarity within ENAC:

The ENAC week, courses and projects, together with the courses in Structures, in the spirit of «Projeter ensemble», provide the opportunity to put into practice this concept of exchange and to share teaching with the other two Programmes.

### Diplomas:

The exhibition of the first Master projects and the Diploma award ceremony were successfully organized jointly with SIE in April. SGC celebrated 33 new graduates, among whom 9 women.

### Inaugural Lecture :

Professor Yves Weinand : 21 April.

### Vacancies :

The positions to replace Professors Bovy (MDT) and Sarlos (IASSEN) are still vacant.



*Professor Aurèle Parriaux  
Director, Civil Engineering  
Programme*



## Environmental Sciences and Engineering Programme (SSIE)

For the last time, the practical work in the Master's cycle, formerly called diploma work, was submitted in March. The Diploma Award Ceremony followed in April during Graduation Day. The students receiving their diploma were the last to have followed the old study plan corresponding to the period "before" the Bachelor / Master system introduced by the Bologna Directives.

The students who had started their Master cycle during the 2004-2005 winter semester will begin their Master's project during the summer semester of 2006, after three semesters of Master studies.

On the study plan level the PIT (Interdisciplinary Field Project) started at the beginning of the academic year with the four laboratories EFLUM, HYDRAM, LASIG and LBE. The last STS projects were handed in at the end of 2005. The STS programme has from now on been entirely replaced by the SHS (Human and Social Sciences) programme.

2005 was marked by an important change in the teaching corps of the SIE Programme. On the 1st October 2005, Professor Christof Holliger succeeded Professor Joseph Tarradellas and took over as Director of the SIE Programme.

2005 saw the appointment of several professors. As Professor with tenure, Mr. Andrew Barry from the University of Edinburgh in Scotland, has been directing the Ecological Engineering Laboratory and has been giving courses in "remediation of soil and groundwater" and "water quality modelling". Professor Dani Or, from the

University of Connecticut in the United States, as a Professor with tenure has been directing the Laboratory of Soil and Environmental Physics since 1st November, 2005. He is in charge of teaching the courses on "Soil Science" and "Scientific Communication".

2005 also saw the appointment of Ms Rizlan Bencheikh-Latmani as a tenure-track Assistant Professor, taking over as Head of the Environmental Microbiology Laboratory on 1st October 2005 and teaching in the fields of environmental microbiology and bioremediation. Mr. Christian Ludwig, Adjunct Professor, began teaching from the beginning of the 2005 academic year. Professor Ludwig's position, common to both the PSI (Paul Scherrer Institute in Villigen) and the EPFL, is dedicated to the study of the processing of solid waste.

Interviews took place for Professor positions in Environmental Chemistry and Ecotoxicology, Environmental Process Engineering, Environmental Systems Engineering and Remote Sensing.



*Professor Christof Holliger  
Director, Environmental Sciences  
and Engineering Programme*





## Continuing Education

The year 2005 was the last stage in the restructuring of the financing of postgraduate training at EPFL. Despite this, ENAC's long-term continuing education offer (Masters of Advanced Studies) remained broad:

- the 3<sup>rd</sup> edition of the Postgraduate Programme in Hydraulic Schemes (2003-2005), organised by the Hydraulic Constructions Laboratory (LCH), was completed in December 2005 with the award of 19 diplomas. This training course has now been integrated into the course below.
- The MAS in Water Resources Management and Engineering is a joint offer from the Hydraulic Constructions Laboratory (LCH) and the Hydrology and Land Improvement Laboratory (HYDRAM). It includes 2 specialisations, respectively in hydraulic schemes and hydrology. The 1<sup>st</sup> edition began in October 2005 with 32 students of 14 different nationalities.
- The International Postgraduate Programme in Engineering and Environmental Geology (2004-2005), organised by the Engineering and Environmental Geology Laboratory (GEOLEP), was concluded at end 2005 with the award of 17 diplomas. No further edition is foreseen at this stage.
- The MAS in Environment: Sciences, Engineering and Management (2004-2005/2006), offered by the Laboratory of Environmental Chemistry and Ecotoxicology (CECOTOX), was followed by 28 participants of 10 different nationalities. 25 of these conducted a 4-month research in a professional environment which ended in October 2005, while 3 participants

did a 9-month-long research within ENAC laboratories, concluded in March 2006. This training offer will not be renewed.

- The MAS in spatial development, "Mutations Spatiales et Développement Territorial", is offered by the Geographic Information Systems Laboratory (LASIG) and the Urban and Regional Planning Community (CEAT) in partnership with the Swiss Graduate School of Public Administration (IDHEAP). The 1<sup>st</sup> edition (2004-2005) attracted 15 students of 4 different nationalities. The 2<sup>nd</sup> edition started in autumn 2005 with 10 students of 4 nationalities and will end in summer 2006. It is planned to reorganise this training in 2007.
- The MAS in Energy (2004-2006), organised by the Energy Systems Laboratory (LASEN), totals 40 participants, 85% of whom are Swiss or European nationals.
- The training in Real Estate Expertise (2003-2005) is offered by the Economics and Environmental Management Laboratory (REME). It includes 3 modules which may be followed individually, each leading to a certificate of continuing education. In 2005, 20 participants were awarded such a certificate and 8 participants having completed the whole programme were awarded an MAS.



*Jean-Denis Bourquin  
ENAC Delegate  
for Continuing Education*



## Doctoral School

The School participates in the EPFL's Doctoral School by offering three PhD programmes. Each programme groups together within itself the laboratories involved in the same discipline. It is up to the programme to proceed with the acceptance of doctoral candidates, offer them a range of high level courses and to follow the progress of their research.

### Architecture, City, History

This programme is offered by the laboratories of the Institute of Architecture (IA) and of the Institute of Urban and Regional Planning and Design (INTER). The main objective is to provide methodological support for a multidisciplinary approach to the relationship between the city and architecture, whilst bringing to light certain emerging problems brought on by current urban and architectural evolution. This programme also seeks to encourage original efforts and notably to create ties between research and the process of urban and architectural design through the notion of the doctoral project. At the end of 2005, this PhD programme counted 33 registered students. (Prof. Bruno Marchand, Programme Director).

### Structures

This programme is offered by the Laboratories in the Structural Engineering Institute and the Construction Material Laboratory of the School of Engineering (STI). The aim of this programme is to allow candidates to acquire the necessary scientific knowledge for the development of engineering methods and tools to be used in:

- the design and analysis of new structures and new materials, particularly innovative structural systems using high performance materials and elements.
- the verification of existing structures and the development of intervention methods which would allow us to prolong their length of service.

For 2005, of the 22 candidatures received, 8 people were admitted to this programme. No grants. (Prof. E. Brühwiler, Programme Director).

### Environment

The Doctoral Programme "Environment" is principally aimed at laboratories in the INTER, ICARE and ISTE Institutes of the ENAC School, as well as a certain number of units in the School of Basic Sciences (SB): today it counts almost 50 thesis supervisors.

The preoccupations at the heart of this programme include the perspectives of climate change (greenhouse effect, ozone layer), the resulting increase in natural hazards (geological catastrophes, floods), the preservation of the greater equilibrium of the biosphere (ecosystems, biodiversity), the foreseeable depletion of natural resources (fossil energy, sub-soil) and the continuous attacks on the environment (air and water pollution, soil contamination). Those taking part in the programme are in a position to acquire solid scientific and methodological knowledge through basic and advanced

courses, allowing them to address complex environmental problems in the framework of their thesis work.

More than 800 application forms were downloaded at the end of 2005 from the Doctoral Programme website, leading to the submission of 170 requests for admission. After examination of the dossiers by the Doctoral Programme Committee, 70 candidates for doctorates were finally accepted, with a matching number of registrations. Dozens of applications were provisionally accepted in the Programme (without a grant for the doctorate being accorded) pending a possible position of

doctoral assistant in a research unit. Until now, four candidates have obtained a grant from the EPFL aimed at attracting doctoral students. Initiated in 2002, the Doctoral Programme in «Environment» will see its first presentation of theses in the course of 2006.



*Professor Thomas Keller  
Chair, ENAC Research  
Committee*





## **“Projet ensemble” (Design and Build Together)**

“Projet ensemble” expresses the need for more and more joint projects between the various disciplines within the School. These projects touch the teaching provided by the Architecture, Civil Engineering and Environmental Sciences and Engineering Programmes, research in ENAC laboratories as well as interaction between the School and society. The ambition behind this project is to design and build projects together for sustainable development.

### **“Projet ensemble” – Teaching platform**

ENAC teaching activities revolve around land planning themes for all three Programmes. The teaching platform aims at developing learning synergies between students so as to train, from the early stages of higher education, both engineers and architects able to work together on spatial development issues.

This joint teaching started in the 2003-2004 academic year with 1st year courses for some 300 students on apprehending and representing the natural and built environment. As a logical follow-up to this basic training, 2nd year ENAC courses were introduced into the curriculum in 2004-2005. These courses involve over 200 students and are made up of two distinct parts:

- ENAC Courses III (winter term) and IV (summer term). ENAC Course III deals with the issue of the development of the Rhône Valley in a sequence of four modules: existing natural resources and their use, the role of infrastructure and river engineering, the main challenges,

issues and procedures of multimodal transport planning and the development of urban areas. ENAC Course IV again takes up the four thematic approaches of the first semester, but in a territory extending from the Lausanne area to the Jura. The emphasis is placed on the elements of the territorial project, a complex, interdisciplinary process.

- 2005 ENAC weeks. These were one-week courses that the students were able to choose from a selection and that allowed them to learn to work together on the same theme, but making the most of their specific knowledge. Twelve ENAC weeks were offered by various groups of ENAC lecturers and each brought together some twenty students.

The subjects proposed in 2005 were :

- Space – Light – Time
- Travel diary on the banks of Lake Geneva
- Once upon a time in the West
- Planning contemporary public spaces together
- Natural hazards in mountain regions
- Pathology of historical buildings
- Medium altitude mountain resorts; alternatives to development faced with climate warming
- Development and renaturation of waterways and alluvial plains - applied to the Rhône plain in Valais
- Design and architecture: “Ma cabane au Canada”
- Gruyère civilisation: folklore or innovation ?

2005 also allowed for the preparation of ENAC Learning Units aimed at third year students. Like the ENAC weeks, this course will enable students from all three Programmes to review a specific theme in depth with four hours of courses and exercises per week. Twelve Learning Units have been retained for the 2006 summer term.

#### **“Projeter ensemble” – Research Platform**

In the framework of “Projeter ensemble” ENAC fosters research cooperation between the various School laboratories by putting people working on the same themes in touch with each other and encouraging the inception of multidisciplinary research projects. One example of such cooperation is the Institute of Urban and Regional Planning & Design (INTER) which brings together specialists in all the fields represented within the School. A second example is the project initiated in 2005 by the journal *Espaces-Temps.net*, which raises questions on the great diversity of research (“What is research?”).

#### **“Projeter ensemble” – Platform for Exchange**

Communication between the various professions and disciplines is key to the success of “Projeter ensemble”. A working party met on a monthly basis to review the project itself and its discussions and reflections are about to be published. Another working party studied the Land Planning – Mobility – Transport themes

so as to envisage concrete meeting places (a joint database, an event to allowing annual meetings). Finally, three times a year, the ENAC School – as a privileged forum for meetings between professional associations – organises discussions between the representatives of architects, town planners, builders, engineers and land planners to gather information and discuss recent developments of interest to their various disciplines. These meetings serve to take stock of the challenges and development of these professions and of related ENAC vocational training.



*Emmanuelle Tricoire  
In charge of promoting “Projeter ensemble”*



*Pascal Turberg  
ENAC Teaching Coordinator*



## CDENAC and Students

The year 2005 was principally marked by a common desire to improve relations between students from the three Programmes making up the ENAC School. They already have lessons in common since the beginning of the 2003 academic year, but mentalities take time to change and there is still a long way to go before being able to work together.

### CDENAC at the Heart of the School

Founded right at the creation of the School, the ENAC Delegates' Conference (CDENAC) works in favour of students in the Civil Engineering, Environmental Sciences and Engineering and Architecture Programmes. It is active through its representatives in the Teaching Committees of each Programme. This year it has taken part in discussions which brought together professors and students on the subjects of «Projeter ensemble» and the organisation of ENAC courses.

CDENAC continues to maintain close links with the Representative Team of the AGEPoly, which allows it to play an important role in decisions concerning our School. For example, it plays a part in seeing that the new academic calendar is as favourable to students as possible. The fact of working with AGEPoly allows it to complete the chain between the student and representatives at the federal level.

### An example being Followed

CDENAC is the first Delegates' Conference to be organised within the EPFL. Students from the other Schools have recognised the importance of this

body and are beginning to put similar structures in place. Our team has involved itself in sharing the experience already acquired and helping to form these new Conferences.

### ENAC on the Move

The activities which were very successful in 2004 were repeated this year to the delight of all! Amongst these we can mention the « ENAC Ball » and the football tournament, both much appreciated by the students.

Within the different Programmes, the traditional Civil Engineering «raclette» and the Architecture Ball (DARC) were once again occasions to bring together students from the three Programmes in a festive atmosphere.

### Constant Progression

«Projeter ensemble» remains a real challenge for everybody, but mentalities are beginning to change little by little. Prejudices still exist, but are lessening and the students are more and more aware of the importance of working together. This awareness is encouraged by the efforts of the School Direction and the Professors to pass on this new ideology.

*Olivia Boutay*  
Chair CDENAC

*Laure Müller*  
Vice-Chair CDENAC

## ENAC Direction

The ENAC School Direction for the period 2002-2005 is composed as follows:

Prof. Laurent Vulliet, Dean  
Dr Claire Guenat  
Prof. Eugen Bruehwiler  
Prof. Vincent Mangeat  
Prof. Joseph Tarradellas.

The Direction is in charge of the School's strategic vision and defines the major trends relating to teaching, the Doctoral School, continuing education, research, professor appointments, assessment of ENAC units, human resources, finance and logistics.

During 2005, the ENAC Direction dealt with the following issues in particular:

### Strategy

- Strategic planning for 2008-2011
- Planning of professor positions for the period 2005-2008.
- Appointments (through competitive selection or invited applications) to seven professor positions in the fields of environment, civil engineering and architecture.
- Promoting in-house applicants to Adjunct Professor and Senior Scientist ("MER") positions
- Defining the procedure for auditing the ENAC School as required by the EPFL Presidency.
- Joint professorships between academic institutions.
- Organising the publications and model collections from the former Vernacular Architecture unit.
- Future of the Expert Center for the Conservation of our Built Heritage.
- Media & Communication: strategy and budget.
- Proposals for Doctorates Honoris Causa.
- New federal decree on School Councils.
- Consultations on Masters of Advanced Studies, the new wage system, the PhD decree and the EPFL Strategic Plan for 2008-2011.

### Finances & Human Resources

- Allocation of financial resources for 2005 and supervision of the salary and operating budgets.

- Strategic budget forecasts for the period 2006-2008.
- Human resource management – staff of 585 including some 40 professors and 30% of women.

### Teaching & Research

- Introduction of Masters of Advanced Studies within the ENAC School.
- Reviewing Bachelor and Master teaching assessments.
- Allocating the necessary means to implement a 3D rapid prototyping service.
- Urban and Land Planning courses at MSc level.
- Campus survey carried out among EPFL students.
- "Projeter ensemble" project – analysis and prospects.

### Logistics

- Supervising Facility Management.
- Re-organising work space in the GR and GC buildings.
- Company vehicles.

### External Relations

- Cooperation agreement with the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL).
- Strategic coordination meetings with the management and representatives of the Department of Civil, Environmental and Geomatic Engineering (BAUG) of ETH Zurich.
- Involvement in the national platform "Zukunft Bau" on the future of construction.
- National Centres of Competence in Research (NCCR) in the fields of environment, materials and energy
- Drawing up of a PSI (Paul Scherrer Institute)-EPFL agreement.
- Creation of the Center of Competence on «Environment and Sustainability» within the ETH Domain.

The ENAC Direction met on fifteen occasions and also attends the various ENAC Boards and Councils.

## ENAC Administration

The ENAC Administration is in charge of Finance and Human Resource management. It provides management services for the teaching programmes, IT, media and communications, logistics, libraries and workshops. All Administration staff members are part of a pool of approximately 40 persons, several of whom work part-time.

In addition, the Administration provides support to the ENAC Direction in the day-to-day management of staff turnover, financial and logistics planning and updating of management data.

A few Milestones in 2005:

### Headquarter Staff

- Finalised appointment dossiers for the ETH Board for seven new professors in environment, architecture and civil engineering; finalised application files for the ETH Board for seven promotions to Adjunct Professorship; initiated and managed applications for nine new professor positions (drawing up announcements, processing applications, liaising with the search committees, organising lecture/interview sessions and compiling appointment dossiers).
- Designed, planned and prepared for auditing the ENAC School at the request of the EPFL Presidency.
- Financial analyses and planning relating to the arrival of new professors, professor retirements and cost transfers; management of the operating budget and controlling of third-party funding.
- Development of new facility management software for 800 premises. Reviewed plans to reorganise the premises in the GR and GC buildings to accommodate new professors. Management of the CAMIPRO access cards and of the School's vehicle fleet.
- Coordination of ENAC standpoints relating to four consultations submitted to the School Council.
- Organised two meetings with those professional associations concerned by ENAC activities.

### Media & Communication

- Set up the EPFL Learning Center exhibition and ensured its transfer to ETH Zurich; created the Bonnard & Woeffray architects' exhibition and ensured its transfer to the Basel Architecture Museum and to the Holcim Day (cement industry) - published the exhibition catalogue; hosted the Science-City-Zurich exhibition; set up the exhibition on Adriano Olivetti and Urbanist Thought - published the exhibition journal; hosted and complemented the exhibition of engineer Aldo Favini in the framework of the «Projeter ensemble» project - published the exhibition catalogue.
- Created 21 posters to announce conferences, appointments and exhibitions; published the ENAC 2004 Annual Report; provided content for the ENAC diary and web site.
- Along the lines of «Projeter ensemble», development of the online social sciences journal [EspacesTemps.net](http://EspacesTemps.net) (<http://EspacesTemps.net>) which invites all fields in the production of knowledge to reflexivity.

### Information Technology

- Day-to-day management of 325 student workstations and over 500 staff workstations; provision of file servers, printers and plotters.
- Adjustment of the IT infrastructure as a function of the movement, establishment or closing of laboratories; brought all IT rooms together on the ground floor of the GR building; provision of further space to accommodate students' laptops.
- Further development of the New Professor application to support the professor appointment process. The IT application was also handed to the School of Basic Sciences for its own use. Developed a new web application to collect data for the 2006 ENAC audit.
- Replacement and migration of servers and IT rooms; installed over 60 tailored business applications; continued the Solaris to Linux migration in the labs; developed extensive online MATLAB/Octave documentation, strengthened the graphic acquisition and restitution service used by the Architecture Programme.

### **Library**

- Installed a pilot security system in the architecture library in the prospect of the Learning Center; catalogued three library collections under the NEBIS network; started bringing together the three laboratory libraries; developed a proposal to reorganise all the School's scientific documentation. The head of the SAR library, François Michaud, has

retired. His successor, Jean-Philippe Schmitt, will from now on take over the management of the ENAC libraries as a whole.

### **Workshops**

- Production of approximately 2000 models by students, staff and third parties; launching of a 3D rapid prototyping service.

# ENAC in Figures

ENAC is :

1531 students including doctoral students and continuing education  
585 colleagues

The budget amounts to CHF 72.9 million, of which more than 80% is personnel costs and 30% comes from third parties.

## ENAC Personnel

Full-Time Equivalent Positions (including apprentices)  
Status at 31 December 2005

Distribution by Institute and by Funding Source		EPFL Budget	3 <sup>rd</sup> -Party Funding	Total
IA	Institute of Architecture	37.35	1.55	38.90
IS	Structural Engineering Institute	46.70	27.45	74.15
INTER	Institute of Urban and Regional Planning & Design	57.30	36.40	93.70
ICARE	Institute of Infrastructures, Resources and Environment	63.00	49.80	112.80
ISTE	Environmental Sciences and Technologies Institute	61.95	36.15	98.10
ENAC-SG	Administration, including IT, workshops, libraries, media and communication and the staff of the 3 Master Programmes	43.75	0.00	43.75
Total		310.05	151.35	461.40

Distribution by Position and by Institute	IA	IS	INTER	ICARE	ISTE	Admin.	Total
Professors and MER	10.00	9.00	9.30	11.15	11.80	0.00	51.25
Research Associates	5.20	14.10	35.10	21.40	30.40	10.70	116.90
Administrative and Technical Staff	4.50	13.35	11.90	24.30	14.70	22.45	91.20
Assistants	19.20	36.70	37.40	45.95	34.20	6.60	180.05
Apprentices	0.00	1.00	0.00	10.00	7.00	4.00	22.00
Total	38.90	74.15	93.70	112.80	98.10	43.75	461.40

**ENAC Expenditure for the Year 2005**  
 In kCHF

By Funding Source	IA	IS	INTER	ICARE	ISTE	Program mes	Admin	Total	%
EPFL Budgets	5'876	7'809	9'210	8'915	9'806	2'197	5'194	49'007	67
EPFL Multi-Year Budget	79	573	136	221	1'244	0	80	2'332	3
Third-Party Funding	136	2'674	5'653	5'462	7'402	33	200	21'560	30
<b>Total</b>	<b>6'091</b>	<b>11'056</b>	<b>14'999</b>	<b>14'598</b>	<b>18'452</b>	<b>2'230</b>	<b>5'474</b>	<b>72'899</b>	100

By Nature of Spending	IA	IS	INTER	ICARE	ISTE	Program mes	Admin	Total	%
Personnel Costs	5'497	8'976	12'457	12'199	13'854	1'949	4'225	59'157	81
Operating Costs	375	950	2'524	2'187	3'766	281	1'119	11'201	15
Investments	219	1'130	18	212	832	0	130	2'541	4
<b>Total</b>	<b>6'091</b>	<b>11'056</b>	<b>14'999</b>	<b>14'598</b>	<b>18'452</b>	<b>2'230</b>	<b>5'474</b>	<b>72'899</b>	100



## ENAC Students

Bachelor / Master		SAR		SGC		SSIE		TOTAL	
Bachelor 1st year		183		66		99		348	
Bachelor 2nd year		103		32		46		181	
Bachelor 3rd year		148		52		57		257	
Master 1st year		86		32		65		183	
Master 2nd year				23		45		68	
Masters' Degree		72		2		1		75	
Architecture Internships		57						57	
Students with tailored curricula		3		5		14		22	
Exchange Students*		55		23		17		95	
Total BSc/MSc Students		707		235		344		1286	
% of women	% of foreigners	44%	30%	17%	35%	34%	22%	32%	29%
Diplomas Awarded		53		37		28		118	

\* Foreign exchange students studying at EPFL except for 7 Swiss exchange students from other Universities

Continuing Education		SAR		SGC		SSIE		TOTAL	
Total Students in Cont. Education		23		1		22		46	
% of women	% of foreigners	43%	83%	0%	0%	50%	45%	31%	43%
Postgraduate Diplomas Awarded		24		26		61		111	
Postgraduate Certificates Awarded		11		0		18		29	

Doctorates		SAR		SGC		SSIE		TOTAL	
Total Doctoral Students Registered		59		72		68		199	
% of women	% of foreigners	41%	54%	15%	61%	29%	63%	28%	60%
Doctorates Awarded		6		13		13		32	

N.B.: The percentage of foreigners includes those residing in Switzerland

As at 1st December 2005  
Source : EPFL Registrar's Office