ENAC—School of Architecture,
Civil and Environmental Engineering
2007 & 2008

Finding solutions for a sustainable future

Design & Build Together

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Foreword

The world is facing lots of challenges including economic, environmental, questions of resource management and problems of social justice. ENAC is preparing students to be able to make a difference in this rapidly changing world and via our research finding innovative solutions to some of these challenges.

Among the many important highlights over the past two years we are happy to report that the academic accreditation for all our undergraduate majors was officially obtained and that vibrant connections with the professional associations and engineering and architecture communities in Switzerland are growing. I am grateful to Raphaël Verona (student at ECAL) who has helped to give a wonderful new look to this report and Claire Hofmann and Jean-Denis Bourquin for their superb work to bring this to fruition.

Please do not hesitate to contact us at ENAC— we look forward to hearing from you.

Marc Parlange, Enac Dean

The disciplines united in the School of Architecture, Civil and Environmental Engineering seek solutions to the most pressing problem of our time: guaranteeing a sustainable environment for humanity through a successful integration of human activities within the biosphere.
In this context, our School is deeply committed to producing solutions to meet a wide range of global challenges, such as global warming, population growth, the formation of megacities, land use pressures, increased demand for energy and transportation, the need for improvement and maintenance of the built environment, ecosystem preservation, and the management of natural and man-made risk. And while we're equipping our students with the knowledge and tools that pertain to the profession today, our overarching goal is to prepare them to take leadership roles in solving these challenging issues of the 21st century.

Design and build together

Central to this endeavor is our very original Design and Build Together Programme (Projeter ensemble). It supports interdisciplinary teaching and research involving laboratories, institutes and programmes across ENAC, in recognition of the fact that solutions to complex challenges demand collaboration across multiple fields.
Design and Build together takes concrete form in the curriculum at the bachelor's level through classwork, seminars and ENAC teaching programmes that bring students from the three sections—Architecture, Civil and Environmental Engineering—together. It continues at the Master's and PhD level with interdisciplinary research projects.
This programme helps students develop an broad understanding of our planet and the intersections of its natural and human systems, and provides them with the tools required to meet the challenges they will encounter.

"After having spent several full days in discussions, seminars, projects and various other visits, the majority of civil engineering students attest to the fact that this initiative is the best that has been taken by the School since we started our studies here…" it enabled us to "get a better feeling for the atmosphere in which the majority of us will have to work—that of confrontation, compromise but above all discussions with the two other major players in the field—architects and environmental engineers, with the overall goal of bringing to fruition the projects of tomorrow…"
ENAC Energy week May 2008,
Aurélien Odobert,
currently in the third year of civil engineering

"Another important point is the fact that we were together the whole week. This closeness undoubtedly led to an openness and a very constructive dialog about the various jobs and components particular to each section. We also learned a lot about interdisciplinarity…"
ENAC week, the Third Rhone Correction, May 2008,
Maxime Trolliet,
currently in the third year of environmental sciences and engineering

"The teaching staff has been continually impressed by the generally remarkable quality of the reports done on various themes by groups of students that include up-and-coming architects, civil engineers and environmental engineers…"
ENAC 2008,
Professor André Mermoud,
Laboratory of Ecohydrology

A promising low cost treatment option :

Flushing out micro-pollutants and viruses with the help of sunlight

Turn on the tap ; flush the toilet ; take a shower. Water is a fundamental part of everyday life, and most of us take it completely for granted. Professor Tamar Kohn, however, doesn't. This environmental chemist knows that water never travels alone. Antibiotics, unabsorbed prescription medications, hormones, pesticides, herbicides, detergents, psychotropic drugs, disinfectants, and plasticizers all hitch a ride in this life-giving liquid as it goes down the drain. Viruses can hang around for years in water looking dead, only to spring alarmingly into life when they encounter a host. Most of these contaminants are present in such minuscule quantities in our drinking water that we assume they don't pose a health threat. And they're so dilute that measuring them is almost impossible. But Kohn is determined to try.

In her Environmental Chemistry lab at EPFL, Kohn is collaborating with researchers at Universities of Geneva and Lausanne and the Swiss Federal Institute of Aquatic Science and Technology to develop the analytical tools needed to pin these tiny contaminants down.

They've drawn up a list of the 60 most-wanted compounds that are relevant to Lake Geneva, and are working on measuring all of them simultaneously. When it comes to getting rid of them, Kohn looks to nature for inspiration, studying how natural water systems clean themselves up.

Are there natural processes taking place in the lake that remove contaminants ? If so, what can we do to promote them ? Kohn has found that sunlight plays a starring role : shining indirect light in water that is rich in organic matter causes a reactive species to form, which then gobbles up herbicides or other chemical contaminants. This kind of understanding could perhaps be used to design a low-cost treatment system that could treat water in developing countries. The soup recipe is complex : Kohn has discovered that getting the balance right requires a combination of (photo-) chemical and molecular biological methods managed on a case-by-case basis.

<u>A drop to drink</u>, Prof. Tamar Kohn

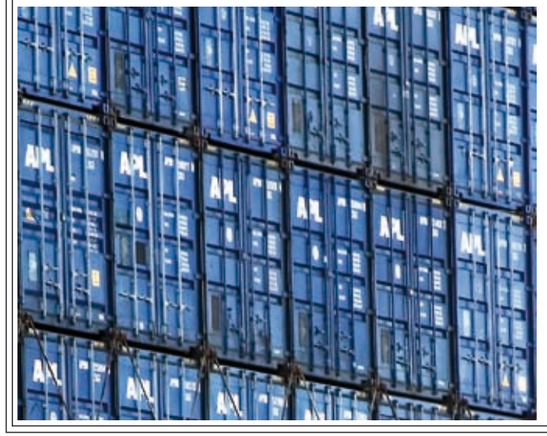
In another project, Kohn and her students are exploring how viruses die in surface water. As with other contaminants, she has found that the right combination of light and chemicals will kill a virus, but in this case her task is made difficult by the biological complexity of viruses. It's hard to tell if a virus is dead or alive—the only real test is to see if it infects someone. That runs into obvious ethical problems. The best way to deactivate a virus is to damage its protein capsule. Then, even with its DNA intact, the virus can't infect anything. Kohn is working on determining just how much of the capsule needs to be damaged to render the virus inactive. Fundamental understanding like this is extremely important in a world where water-borne pathogens kill millions of people every year.

"Water has been called the 'issue of the century'. Climate change will have a huge effect on our relationship with water. In Switzerland, our drinking water supply is not a problem, but our hydropower capacity may be an issue, and changes in rainfall patterns may create runoff that will bring many more pathogens and micro-pollutants into the water supply. Around the world we need to do a better job of protecting water sources, and we need to maintain a certain quality of water, rather than having to go and clean it up after the fact. I hope we see an increase in the use of recycled water—we should be using wastewater, not groundwater, for agriculture. The challenges of climate change will make it even more important for us to find effective, low-cost methods for water treatment".

http://lce.epfl.ch

Demand-driven transportation systems : a new solution for reducing emissions and energy consumption

Where are you going today ? Most likely to work or school, maybe to the grocery store or a meeting in another country ; you might go out, to dinner, a concert or a movie. We're a society in motion, and with humanity's carbon budget way out of balance, the simple question of how to get where you're going has become important like never before. Professor Michel Bierlaire is convinced that the science of mobility will generate new paradigms for transportation systems. For society to be sustainable, all the negative consequences of human activities, particularly the mobility of people and goods, will have to decrease substantially.



Bierlaire is a proponent of demand-driven transportation systems, in which self-organizing forces will dramatically change patterns of energy consumption and emissions. He envisions a "zero-delay" society, one in which reliability is the primary target of transportation systems, instead of efficiency. He argues that this will end up being more efficient in the long run, satisfying the mobility needs of travelers while at the same time reducing negative impacts on the environment.
In his Transport & Mobility Laboratory at EPFL, Bierlaire and his students and colleagues are working on the nuts and bolts of this vision.

Operations research projects develop advanced optimization tools used for simulating applications like congestion—on the freeway, or the flow of human traffic in buildings.

Destination : mobility, Prof. Michel Bierlaire

He also studies behavior using discrete choice models, a domain in which his expertise is internationally recognized. This is the science of quantitatively reconstructing a series of qualitative decisions, for example a trajectory—the choice of routes, tollbooths, public transport system. The laboratory focuses on putting these research areas together, modeling transportation systems by integrating operations research tools and discrete choice models. The researchers can then study mobility schemes, looking at points of congestion and modifying access conditions—all for traffic and community scenarios that don't even exist yet. It's a way to see into the future, and it's vastly important in land use planning. To make that connection, these studies are done in collaboration with other labs in ENAC.

What motivated you to specialize in this domain ?

" I find the interdisciplinary approach fascinating : mobility science integrates aspects of sociology, economics, physics, mathematics, engineering, and geography. I'm always on the lookout for methods that can be transferred from one discipline to another.

Can you des cribe a couple of current projects ?

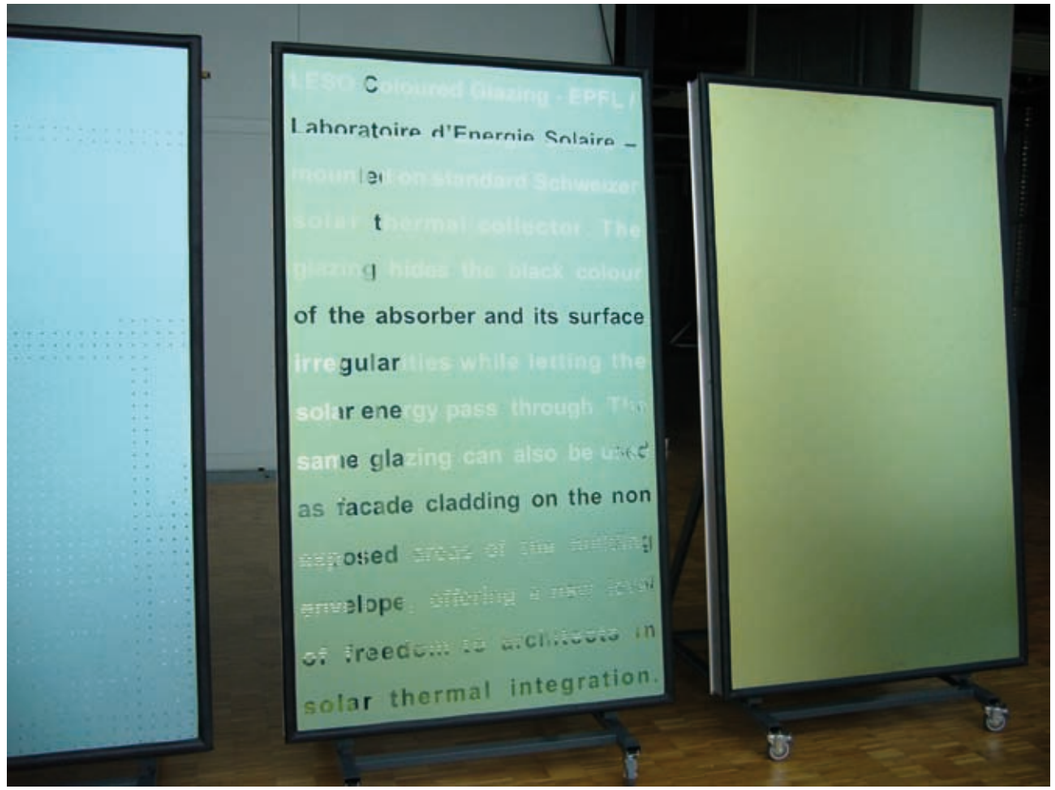
" How do travelers select an itinerary to reach their destination ? This question is central to understanding and predicting mobility patterns, and it's quite complex. In a recent project funded by the Swiss National Science Foundation, we proposed, implemented and applied new methods for data analysis, new behavioral models and new algorithms to generate itineraries.

I'm proud to report that former PhD student Emma Frejinger recently won a prize from the Institute for Operations Research and the Management Sciences for her dissertation in this area. We've applied these methodological tools to develop route choice models for long distance trips in Switzerland. These models will be used to assess the impact of hypothetical congestion pricing schemes developed in collaboration with ETHZ and Università della Svizzera Italiana."

http://transp-or.epfl.ch

Low-cost nanostructured coatings for thermal solar collectors— the energy of the future

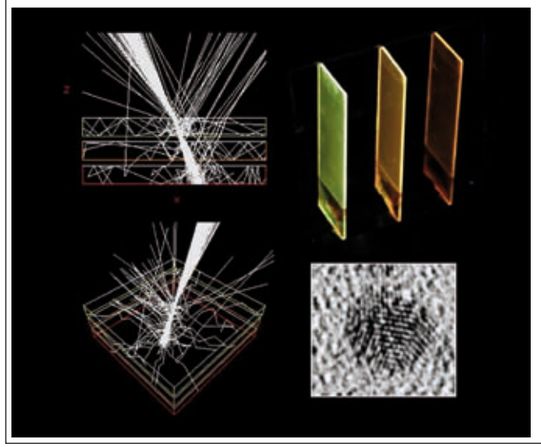
We spend more than 80 % of our time indoors. Buildings shield us from the elements, but at a relatively high environmental cost. Taken as a sector, which includes their operation as well as the embodied energy in their construction (manufacturing of cement, carpet, tile, and glass, for example), buildings are among the largest energy consuming and greenhouse-emitting things on the planet, responsible for more that 40 % of humanity's CO2 emissions. In Switzerland however, and thanks to the progress of building research and technology, the overall heating energy demand for buildings has remained stable since the first oil crisis in 1974 : this, despite a considerable increase in the building stock and living standard. The major remaining challenge is the generation and dissemination of construction technologies, such as the Minergie standard, which would enable a four-fold reduction in building-related energy consumption. These energy-efficiency strategies go hand-in-hand with a substantial increase of the use of renewable energy in buildings, such as taking full benefit of daylight and passive or active solar energy.



Professor Jean-Louis Scartezzini uses a physicist's approach to tackle these architectural and engineering challenges. In his Solar Energy and Building Physics laboratory at EPFL, researchers focus on renewable energy, building science and urban physics. He has several different projects on the drawing board at once ; renewable energy and sustainable development in cities, building technologies that mimic nature, development of new solar collectors, the health and quality of indoor environment and the intensive use and perception of day light.

Building a better future, Prof. Jean-Louis Scartezzini

In one of the lab's research groups, Dr. Andreas Schüler is exploring how nanometer-scale structures, in the form of ultra-thin coatings or tiny quantum wells, can improve solar energy conversion. At the nano-scale, Schüler explains, a material's optical and electronic properties change, and this opens up all kinds of possibilities. They're developing color coatings with high solar transmittance that could be used for solar active façades, photoluminescent "quantum dots" for planar concentrators to convert solar energy, novel "smart" thermochromic coatings, and optically selective absorber coatings for thermal solar collectors. Solar energy is quite efficient when used in space heating, domestic hot water production, industrial process heat, desalination, and thermal electricity generation. All solar thermal systems have one thing in common: a coating on the solar absorber, which should absorb a maximum of incoming solar radiation and avoid energy losses by infrared radiation.



The lab has just started a new project to develop a low-cost process for producing nanostructured coatings. They're trying to come up with an environmentally-friendly manufacturing process for selective absorbers of solar collectors. Preliminary results are promising: the novel coatings resist corrosion and are stable at high temperatures.

The lab is also developing nanocomposite film coatings for solar thermal façade collectors. These coatings combine a colored reflection with a high solar transmittance, and open up new possibilities for architecturally integrating solar collectors in building façades.

"Nature is a source of inspiration and extraordinary understanding, perhaps going beyond the capacities of the human brain.
I've been convinced for a long time that we need to let nature inspire us to develop a built environment that is sustainable, with buildings that function appropriately. That's why we are using and developing approaches based on biomimetics, urban metabolism or evolutionary algorithms. From this perspective, solar is undeniably the energy of nature… and the energy of the future."

http://leso.epfl.ch

What is an acceptable level of competition with natural ecosystems?

The Chair “ Innovations for a Sustainable Future ” was created as the result of a convergence of values between EPFL and Landolt & Cie, Swiss Private Bankers : to contribute to build a sustainable world for the future generations. On one hand, EPFL is educating future leaders, as well as developing cross disciplinary research, both for facing sustainability challenges. On the other hand, Landolt & Cie, Swiss Private Bankers are promoting high ethical standards and awareness of transmitting patrimony to the future generations.

The new Chair, anchored in our School of Architecture, Civil and Environmental Engineering, was officially inaugurated in September 2008. It will build its strength from a multitude of concrete and innovative initiatives in teaching, research and technology transfer. As its primary objective, the program will bring every year to the EPFL campus a world-renowned specialist in an area essential to sustainable development. While at EPFL, this invited professor will extend their research, teach EPFL students, help guide semester and Master’s projects and organise interdisciplinary and public-oriented activities.

Sustainability starts with water, Prof. Amilcare Porporato

Amilcare Porporato is the first occupant of the new Chair. He comes from Duke University, where he's professor in the Department of Civil and Environmental Engineering and an expert in Ecohydrology. This emerging, interdisciplinary field studies the critical role of water in all kinds of ecosystems.

Even though he's an engineer, Porporato is interested in plants. They underpin our very survival, sitting as they do at the bottom rung of the food chain. Plants suck up sixty percent of the available fresh water on the Earth's surface, and return it, through transpiration, back into the atmosphere, to fall as rain on other plants somewhere else. Plants thus play a critical role in the planet's hydrological cycle – and hence Porporato's intense interest.

The problem of sustaining a society is not only a problem of providing water to drink, but also providing water for growing food. And as water is diverted from biologically diverse natural ecosystems into huge swaths of single-crop agriculture to feed livestock and growing populations (or produce biofuels), concerns about biodiversity and sustainability become more and more worrying.

Porporato and other ecohydrologists would like to answer the million-dollar questions: what is an acceptable level of competition with natural ecosystems? How much water can we take for our own needs without catastrophically altering planetary biodiversity and thus shooting ourselves in our collective feet?

As if that were not complicated enough, climate change also threatens to throw everything for a loop. Rising temperatures in themselves are not the biggest problem, but rather the resulting change in rainfall patterns, which could have catastrophic consequences. And because rainfall drives ecosystem dynamics—not only natural ecosystems, but agricultural and urban ones as well—ecohydrologists agree that it's critical for us to get a grip on what these changes might be.

"I'm looking forward to this year at EPFL", Porporato said on his arrival, planning to work with EPFL hydrologists and statisticians to refine stochastic models of plant dynamics – roots, water uptake and energy synthesis—and rainfall patterns. "It's a great opportunity to gather our expertise and make some real progress on tackling these complex and pressing problems".

http://chaire-landoltetcie.epfl.ch

Research highlights

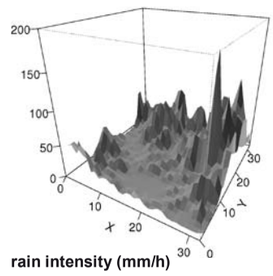
In our laboratories, some 70 investigators and their groups are advancing knowledge in the most challenging areas of architecture, civil engineering and environmental engineering research today. Highlighted here is a sampling of some of the research conducted in 2007 & 2008.

To learn more about the latest research by ENAC scientists, visit http://enac.epfl.ch/

MODELING DISTRIBUTION OF RAINDROP SIZE

The distribution of rain drop size (DSD) reflects the complex interactions between atmospheric dynamics and cloud microphysics. It is a fundamental characteristic of rainfall, from which all rain variables can be derived. Using DSD measurements collected from optical disdrometers and geostatistical tools, we have developed a stochastic model of 2-dimensional fields of DSDs. This model provides a controlled simulation framework that makes it possible to investigate many issues related to the propagation of electromagnetic signals through a rainy atmosphere. This work has direct applications for the improvement of the measurement of rainfall in general, and for the quantification of the uncertainties associated with rain-rate estimation using weather radar in particular.

Prof. A. Berne—Environmental Remote Sensing Laboratory—http://lte.epfl.ch



rain intensity (mm/h)

BUFFER REQUIREMENTS FOR GROUNDWATER REMEDIATION

Chlorinated solvents are widespread and persistent groundwater contaminants. Their longevity has prompted environmental engineers to devise better bioremediation treatments based on fermentation of specific organic compounds. Unfortunately, along with rapid remediation rates, this cleanup increases the acidity of the groundwater, which in turn can drastically inhibit microbial activity, stopping the groundwater cleanup.
The solution is to add buffering agents to groundwater to neutralize the acidity.
The Ecological Engineering Laboratory has developed a software, Buchlorac, enabling precise calculation of the amount of buffer required. Buchlorac allows users to estimate the buffer requirements for their specific operating situation and design conditions including, for example, site water chemistry, mineralogy, amount of chlorinated solvent to be degraded, type of organic substrate and buffering additive and design inhibition pH.

Prof. A. Barry—Ecological Engineering Laboratory—http://ecol.epfl.ch

PREDICTING BIODIVERSITY PATTERNS

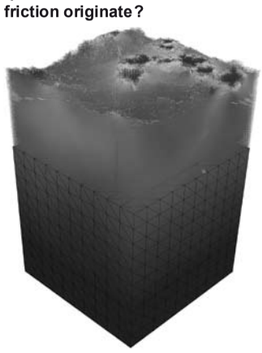
In the Laboratory of Ecohydrology, we accurately predicted the distribution of fish species in the Mississippi-Missouri river basin system with a simple method that uses only the geomorphology of the river network and rainfall measurements. Using geomorphological data from the US Geological Survey, we identified 824 sub-basins in the network. In these, the simple presence (or not) of 433 species of fish was established from a database of US freshwater fish populations. Data on the average runoff production was then used to calculate the habitat capacity of each sub-basin. The model results were compared to data on actual fish species distributions, and various measures of biodiversity were analyzed: the model captured these complex patterns quite accurately.
Our ability to predict biodiversity in this enormous river basin using only hydrological parameters is a powerful reminder of the importance of water and the water-defined landscape in determining patterns of life.
We are planning to use this as a framework to explore the consequences of large scale climate change on biodiversity patterns, or assessing the impact of local human activities, such as damming on biodiversity patterns in river networks.

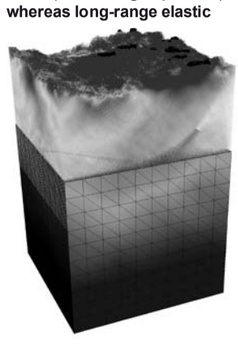
Prof. A. Rinaldo—Laboratory of Ecohydrology—http://echo.epfl.ch

UNCOVERING THE ORIGINS OF FRICTION AND WEAR

Contact occurs in all structures and machines, from the rubbing of joints in structural components to the adhesion of tires on roads. The high societal cost of friction and wear, together with the advancement of surface-science-dominated nanotechnologies, are leading to exciting advances in contact mechanics.
Yet, a central still-unresolved question remains: where does friction originate? Answering this question is key to designing components with tailored friction and wear properties. In the Computational Solid Mechanics Laboratory, we have embarked on this quest through simulation-based engineering science.
The challenge of scales in contact mechanics is daunting as frictional forces arise at the atomic scale (contacting asperities) whereas long-range elastic forces determine the overall contact response. This difficulty is being addressed by harnessing massively-parallel multiscale simulations and gathering statistics of particle detachment during the sliding of rough surfaces.

Prof. J.-F. Molinari—Computational Solid Mechanics Laboratory—http://lsms.epfl.ch





JANUARY 07

Reining in the Rhone

The Minerve system, developed by ENAC's Hydraulic Constructions Laboratory, can prevent flooding. Operational since 2007 in the Valais canton, it's designed to predict the flow rate of the Rhone 72 hours ahead of time, based on MeteoSwiss weather forecasts. This tool is part of the intervention project known as the Third Rhone Correction.

Geology for Engineers

Aurèle Parriaux, from the Engineering and Environmental Geology Laboratory, was awarded the Roberval Prize for a high-level teaching manual entitled "Géologie: bases pour l'ingénieur."

Eco-monitoring goes online

Swiss and European companies can now asses their ecological footprints online. They can see not only their own environmental impact, but that of their products as well. The project is led by Ecointesys, a start-up company created by former members of the ENAC's Ecosystem Management Laboratory.

MARCH 07

Respect for the fifties

A group of students from the Laboratory for the Production of Architecture spent two week in Cuba convincing local authorities in Havana to adopt their development plan for the Diez de Octubre neighborhood. They shared the story of their unpredictable adventures with the local Swiss press once they returned.

Good for the environment

Estia, a company founded by former members of the Solar Energy and Building Physics Laboratory, is committed to finding solutions that reduce the environmental cost of economic activity. They have developed several methods and software packages, one of which, Estia-Via, allows companies to identify the potential energy savings they could realize by optimizing their logistics.

Tents on campus

Led by the Composite Construction Laboratory, EPFL students tested 16 tents for the United Nation's High Commission for Refugees. Students recorded their subjective experiences, and appreciated being able to participate in a humanitarian project to produce tents that are designed for use in cold climates.

JULY 07

An artistic architect

Arduino Cantáfora is not just a professor in the Institute of Architecture and the City in ENAC, he is also an internationally recognized painter, sculptor and scriptwriter. His two passions, architecture and machinery, can be seen in his work, exhibited for the first time in Western Switzerland.

AUGUST 07

Genes and weather

Stéphane Joost, and his colleagues from the Geographic Information Systems Laboratory have developed a method that lets them relate genetic adaptations observed in a species to environmental parameters. The researcher hopes to develop his idea further by making the method available to the scientific community, and marketing applications derived from it to organizations such as the United Nations for use in agriculture and food programs.

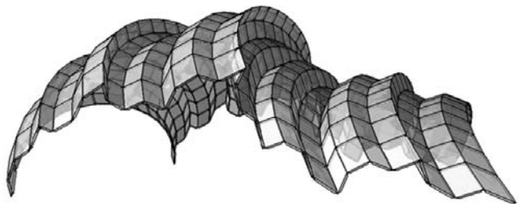
Seeing Switzerland from below

Earthquakes, landslides, floods, avalanches… Natural disasters occur regularly, in Switzerland and around the world. The Insurance Agency for the canton of Vaud has assigned two EPFL labs, the Engineering and Environmental Geology Laboratory and the Geographic Information Systems Laboratory, to put together a geological map of Switzerland to help determine potential risk zones. A pilot study was undertaken in the Morges region, resulting in the first "geotypes" map, at a scale of 1/25000.

ITERATIVE GEOMETRIC DESIGN FOR ARCHITECTURAL USE

Close studies of iterative geometric design methods provide a solid understanding of the mathematical construction of free-form geometry for architectural use and structural optimization. The iteratively constructed figures allow a large variety of form-finding possibilities that combine smooth classical figures with folded and fractal shapes. In the Laboratory of Timber Construction, an interdisciplinary team of architects, mathematicians and computer scientists explores new methods for efficiently constructing complex architectural shapes. The goal is to develop computer-aided solutions which optimize the design and production of free-form surfaces. The method we have developed provides control over certain topological and geometrical constraints representing specific criteria that are necessary for the construction. The established relationship between the geometric figure and its built counterpart optimizes the production of the constructional elements for complex architectural objects.

Prof. Y. Weinand—Chair of Timber Construction—http://ibois.epfl.ch



DURABILITY OF ULTRA-HIGH PERFORMANCE FIBER REINFORCED CONCRETE (UHPFRC)

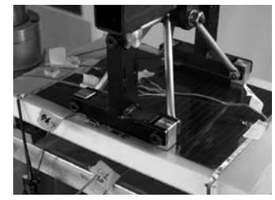
Constructing and maintaining concrete structures efficiently and sustainably means that the required performance goals are met while keeping construction time, costs, and life-cycle costs to a minimum. Ultra-high performance fibre reinforced concretes (UHPFRC) are very dense and show extraordinary mechanical properties. They offer a unique potential to significantly improve the durability and load-carrying capacity of existing and new structures, with minimum cross sections and rapid construction times. UHPFRC have been developed at the Structural Maintenance and Safety Laboratory, and composite UHPFRC—reinforced concrete elements have been tested in the laboratory and investigated by numerical and analytical models. The outcomes of this research have been implemented in several full-scale applications on highway structures and buildings with immediate benefit to the stakeholders and end-users.

Prof. E. Brühwiler—Structural Maintenance and Safety Laboratory—http://mcs.epfl.ch

MULTIFUNCTIONAL SANDWICHES FOR SUSTAINABLE INFRASTRUCTURE

Today, civil infrastructure typically involves the use of structural materials such as concrete or steel applied in a multilayered and function-separated way, which is time-consuming, and a frequent cause of errors during construction. New materials such as a fiber-reinforced polymer (FRP) composites assembled in large-scale sandwich structures avoid these problems because they enable the prefabrication of lightweight, single-layer and function-integrated components for rapid on-site installation. Structural functions, building physics functions (thermal insulation in particular), architectural functions (freeform shapes, transparency, color) and energy supply (encapsulated solar cells) are integrated into single components. Low-energy standards are easily met while lightweight construction is maintained. In a multidisciplinary approach, one of the Composite Construction Laboratory's main lines of research focuses of the development of multi-functional FRP sandwiches for sustainable infrastructure.

Prof. Th. Keller— Composite Construction Laboratory—http://cclab.epfl.ch



MORPHOGENESIS

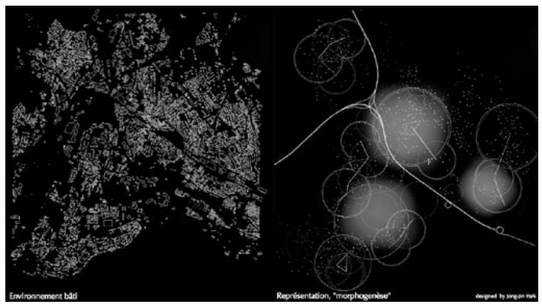
If we want to be able to manage the development of our cities, we must produce an intelligent system that integrates all our knowledge—architectural, geographical, mathematical, computational, physical, even biological. In this context, our laboratory is working on three main projects :

• Modeling : Any urban analysis must be both qualitative and quantitative : this makes it possible to identify the laws that control the dynamics of natural and built constituents of the city, in order to quantify them in the form of probability functions and model them mathematically.

• Simulation : We model the metropolis as a cognitive geographical information system whose physical states are continuously evolving. The objects that make up the city (housing, shops, schools, factories, train station, streets and paths, etc.) are agents. They interact in the system with their environment. They are given actions (formation, conservation, change in function, abandonment) that engender chain reactions with other agents.

• Representation : we are developing both a teaching tool and a platform for simple, realistic and efficient decision-making. It allows us to visualize dynamically and at multi-scales : from the global level through the intermediate level (neighborhood), to the local level (building) ; or through time. A tool like this makes it possible to manipulate the dynamical rules in order to observe and analyze evolution scenarios for the city (e.g. with regard to major planning efforts), and to validate our hypotheses.

Prof. P. Berger—Urban Rural and Architectural Planning Laboratory—http://uta.epfl.ch



OCTOBER 07

It's good to be green

Is it better to throw away vegetables that have gone bad or take them in the car to the nearest compost station ? Elisa Tatti, an environmental sciences and engineering student in ENAC, has developed a method that lets household consumers measure the impact their behavior has on the environment. Her model analyzes an individual's actions as a function of 4 parameters—reduction in resources, global warming, human health and ecosystem health—taking into account all areas of consumption, including food, clothing, and leisure activities.

Pleading for a 3D city

There's not enough space in our cities ? So let's go underground ! The "Deep City" project, initiated by Aurèle Parriaux, director of ENAC's Engineering and Environmental Geology Laboratory, advocates a wider use of subterranean resources, such as space, water, energy and raw materials. It's all carried out within a sustainable development framework.

DECEMBER 07

Climate, up close and personal

The temperature of a stream, the snow depth, windspeed on the flank of a mountain—thanks to the Swiss Experiment Project, in which many ENAC laboratorie are participating, scientists will have access to a wide range of data on a multitude of parameters that affect climate and its evolution. Gathered in real time by wireless sensors mounted on small tripods that are installed in mountainous regions, these measure-ments will enable scientists to refine their understanding of environmental phenomena and better predict natural hazards.

There's glass in my concrete

How can an extension be built for a primary school, without encroaching on exterior installations ? This was the dilemma that the city of Zug faced. With a technique that uses glass fibers to reinforce concrete—used here for the first time—the volume of the building was doubled while only adding some 450 square meters to its footprint. The feat was made possible thanks to specialist companies and EPFL's Composite Construction Laboratory.

FEBRUARY 08

On a warm island…

Alain Clappier, a member of the Air and Soil Pollution Laboratory, and Darren Robinson from the Solar Energy and Building Physics Laboratory, have developed a software tool that can simulate the "urban heat island" effect. They verified that their system was reliable by comparing their calculations with thermal photography of a Basel neighborhood. This decision-making tool will make it possible to take the heat accumulated by build-ings into account in urban planning and development.

APRIL 08

Portable weatherman

At an altitude of 3,160 meters in the dark hours before dawn, a team from EPFL's Sensorscope project clambered out of a helicopter to install thirteen autonomous weather stations in order to provide organizers, competi-tors and the public with real-time weather conditions during the Patrouille de Glaciers mountain ski race. A start-up company created by the Sensorscope team is working on marketing these ready-to-install kits.

MINIMIZING TRAVEL TIME IS NOT NECESSARILY COMMUTERS' TOP PRIORITY

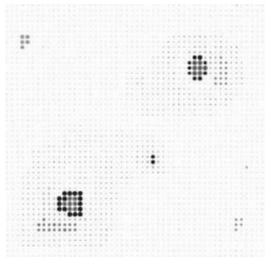
The time it takes to get from A to B is less and less of a rupture in daily life, not necessarily considered a break between different activities that must be limited at all costs. On the contrary : the daily commute is becoming a lived activity in itself, with its own qualities. People don't always try to minimize commuting time, but they do want to maximize its quality. A good commute gives one time to work, relax, or socialize, activities that are very much appreciated, for example, by those making journeys by train. This observation leads us to review our tools for assessing, modeling and forecasting traffic activities.

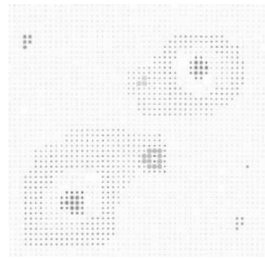
Prof. V. Kaufmann— Urban Sociology Laboratory— http://lasur.epfl.ch

THE CITY WE WANT

What if the city emerged from the choices of ordinary individuals ? In the project "Our Inhabited Space", a team from the Chôros Laboratory (Jacques Lévy, André Ourednik, Mathis Stock) has developed a formal, realistic model that takes as its initial conditions an urban network that is similar to typical networks in contemporary Switzerland. The model is based on the hypothesis that individual actors create their urban space, clearly respecting various constraints that weigh in their decision-making, but also mobilizing and putting in place their concept of the ideal city. The opposition between allophilia (accepting to cohabit with a group that is not one's own) and allophobia (refusing to live within a group that is different) turns out to be highly predictive, so much so that it trumps urban public policy efforts.

Prof. J. Lévy—Chôros Laboratory—http://choros.epfl.ch

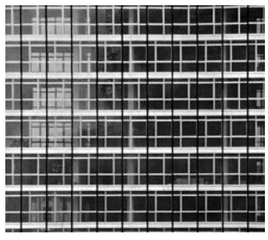




EXISTING STRUCTURES AS PROJECT STRATEGY

The project begins by understanding the building : defining its existence, its character, its potential ; then continues to a deeper analysis, a careful inspection, a real examination. This requires an expertise in ad hoc project methods and strategies, based on appropriate historical-critical tools and methods. The "Critical Encyclopedia for the Renovation and Restoration of 20th century Architecture" systematically explores knowledge related to modern and contemporary buildings. Designed as an inventory—multidisciplinary, accessible and open to including progressive additions— the project is a tool for understanding and a practical support for architectural practice and education. This research is based upon a collaboration between Swiss architectural schools, and the teaching support that it produces is a top priority.

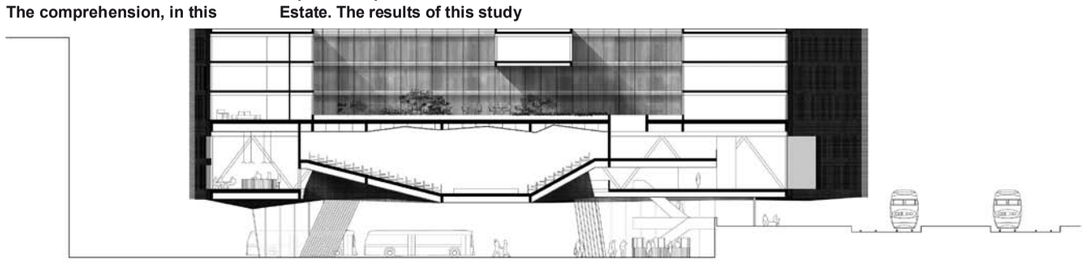
Prof. F. Graf—Laboratory of Techniques and Preservation of Modern Architecture— http://tsam.epfl.ch



DENSIFICATION OF DISUSED RAILWAY AREAS

The densification of disused railway areas is a key element for the implementation of a sustainable urbanity. The symbiotic relationship between an efficient railway system and a targeted urban densification adjacent to stations is a solution whose value is clearly recognized but which meets numerous resistance factors. The comprehension, in this context, of the appropriate mechanisms and strategies for the development of these sites constitutes the guideline of a study led in the framework of the National Research Programme 54 by our Laboratory of Architecure and Urban Mobility (LAMU) and the Urban Sociology Laboratory (LASUR) in partnership with SBB Real Estate. The results of this study have led to the current LAMU research projects on Swiss railway interfaces and stations in connection with the forecasts for increase of passenger activity by 2030.

Prof. I. Lamunière—Laboratory of Architecture and Urban Mobility—http://lamu.epfl.ch



MAY 08

A pain in the Eurofoot

An event like the European football championships (Eurofoot) is an ordeal for host cities, reveals a study done by two ENAC professors—Valérie November, from the Study Group on the Spatiality of Risks and Vincent Kaufmann, from the Urban Sociology Laboratory. The two researchers focused on special measures that cities had to take while organizing large events, as well as on tensions and other perturbations that the events caused.

JULY 08

A wooden chapel

The deaconesses of Saint-Loup have been congregating in a unique wooden chapel since July 2008. Conceived by ENAC's Laboratroy of Timber Construction, the chapel's design is inspired by origami, the ancient Japanese art of paper folding.

AUGUST 08

Seeing the sky in 3D

The MeteoSwiss weather office in Payerne has inaugurated a new Lidar system developed under the leadership of ENAC's Environmental Fluid Mechanics Laboratory. The Lidar operates much like radar, but uses a laser instead of radio waves, and can make continuous vertical measurements of temperature and humidity high into the atmosphere. Use of the Lidar system will enable forecasters to improve their prediction capabilities. It's a shining example of technology transfer.

OCTOBER 08

Tomorrow's landscape

In 50 years, will the vegetation on the crest of the Jura mountains resemble what we see now on the Lake Geneva shore ? Alexandre Buttler and Antoine Margot, two scientists from the Ecological Systems Laboratory, are forwarding this hypothesis. They are conducting a study on the consequences of global warming on the landscape. To measure the extent of the changes foreseen, they are doing experiments on soil samples taken from the Marchairuz Pass.

A bridge between Lausanne and Dübendorf

The new Swiss Center for Applied Ecotoxicology has been inaugurated. This institution, under the double leadership of Eawag (the Swiss Federal Institute of Aquatic Science and Technology) and EPFL, is charged by the Confederation to strengthen independent research, consulting activities and continuing education in the field of ecotoxicology. The Lausanne branch of the center, specializing in problems of terrestrial ecotoxicology, is directed by Christof Holliger, director of ENAC's Section of Environmental Science and Engineering.

NOVEMBER 08

Predicting natural disasters

Christophe Ancey, head of the Environmental Hydraulics Laboratory, has once again attracted the attention of the media with simulations of natural disasters—his team's research will help us better understand these phenomena and reduce their costly consequences.

DECEMBER 08

Neighborhoods in a nutshell

EPFL researchers have established a classification scheme for neighborhoods in Swiss cities that makes it possible to observe how demographics change over time. Led by Martin Schuler, the team from the Choros Laboratory pinpointed significant differences in terms of social integration, distribution of nationalities and housing structures. The analyses resulting from this method could become a tool for urban planning.

source : http://actualites.epfl.ch/presse

Key moments

ARCHIZOOM

On 20th September 2007 took place the inauguration of Archizoom, the new name for the exhibition & conference programme at ENAC/EPFL.
The name Archizoom clearly evokes the notion of zooming in on architecture, but the exhibition space is also named after a movement born in Florence in the 1960s, which epitomized the links between architecture and society. This movement has been the subject of Archizoom's inaugural exhibit, created after the important research by Professor Robert Gargiani.
Archizoom exhibition space is in the hands of a new director, Cyril Veillon, and of a board of ENAC's Professors constituted of Harry Gugger, Dieter Dietz, Jean-Paul Jaccaud and Jeffrey Huang.

Each semester Archizoom explores a central topic, thus presenting 2 exhibitions per year, and 7 talks per exhibition. With these 14 occasions to discuss, debate and share a drink, Archizoom wishes to create a lively space for congregation and exchange of ideas. It offers the public an opportunity to engage in and explore the evolution of our living spaces. The Archizoom venue and program would like to be a space with a spirit of curiosity, experimentation and vibrant discussion. Without boundaries.

ARCHIZOOM
EPFL—Building SG—Station 15
1015 Lausanne/Ecublens
Entry free
Tel. +41 (0) 21 693 32 31
Website : http://archizoom.epfl.ch
06/11/2008 – 05/12/2008

Jean-Marc Lamunière, architect,
"Théories et pratique de 1950 à nos jours"
Curator Bruno Marchand—
Theory and History of Architecture
Laboratory 2—
Archizoom

EXHIBITIONS IN ARCHIZOOM

20/09/2007 – 30/11/2007 Archizoom Associati
17/04/2008 – 09/05/2008 Edith Bianchi—35 ans d'affiches d'architecture—1973 – 2008
21/02/2008 – 04/04/2008 Julius Shulman
18/09/2008 – 24/10/2008 Jean Tschumi : Architecture Echelle Grandeur
20/10/2008 – 05/11/2008 Prix Acier 2005/2007
06/11/2008 – 05/12/2008 Jean-Marc Lamunière, architecte

Events since 1974 : http://archizoom.epfl.ch/archives

INTERNATIONAL EVENTS

The laboratory for the Production of Architecture (LAPA) and the Design Studio on the Conception of Space (ALICE) were selected to represent EPFL at the 2008 Venice Architectural Biennale—the world's most prominent public celebration and exhibition of architecture.
The aim of the exhibition in the Swiss Pavilion was to bring into focus the conflicts and complexities of spatial, organizational, and technological dynamics that characterize any discussion of the discipline. Key questions were : How can research be grasped semantically in a design-oriented, creative-technical discipline ? What contribution can be made through treating instruction as an apparatus of research ?
The works exhibited aimed to present the concepts of methodology, networks, pedagogy, and technology, and show how architectural research reaches it potential by associating fields of knowledge in a way that does not follow any academic convention.

Websites : http://lapa.epfl.ch—http://alice.epfl.ch

In what ways do you feel connected to the exhibition theme ?
Harry Gugger :
Our Laboratory's applied research has deepened our teaching themes : integrating digital production methods in the project and the construction, comparative analysis of determining factors for the production of architecture and the development of a teaching method that prepares master's level students to operate in a highly complex professional context.
Dieter Dietz :
The center of our research is the process of the project itself. In our teaching, we emphasize an approach that is based both on the design and production of architectural concepts. We offer a method of intense confrontation not only with the notion of "doing" in a physical sense (making models, plans, sketches), but also with the production of numerical models, visuals, databases, images, and so on. The process of the project is constantly questioned by catalytic "reactions" in the respective areas of production. This "synthetic approach" is tied to the concept of "learning by doing" and embodiment—a central idea, used in artificial intelligence research.

SAMPLING OF SOME OF THE INTERNATIONAL EVENTS, ORGANIZED BY OUR SCHOOL'S LABORATORIES

2007
08 – 09/06/2007 Urban Networks and Network Theory Seminar—Urban Sociology Laboratory
27 – 28/08/2007 Joint Operations Research Days—Transport and Mobility Laboratory
04 – 05/09/2007 CISBAT 2007, International Scientific Conference : Renewables in a Changing Climate—Innovation in the Built Environment, Solar Energy and Building Physics Laboratory
14 – 18/10/2007 2nd Workshop Viscoplastic Fluids : From Theory to Application—Environmental Hydraulics Laboratory
26 – 30/11/2007 European workshop on Hazard analysis—Rock Mechanics Laboratory and Soil Mechanics Laboratory

2008
30/06 – 01/07/2008 Operations Research Symposium, Transportation and Mobility Laboratory
22 – 24/07/2008 4th International Conference on FRP Composites in Civil Engineering—Composite Construction Laboratory
28 – 29/08/2008 9ème édition des Journées Scientifiques du (RF) 2B—Structural Maintenance and Safety Laboratory
11 – 1 2/09/2008 Joint Operations Research Days—Transport and Mobility Laboratory
14/11/2008 Symposium international Densification of disused railway areas—Laboratory of Architecture and Urban Mobility

Faculty

MANAGEMENT

Dean of the newly launched School of Architecture and Civil and Environmental Engineering from 2002 until December 2007, Laurent Vulliet chose to take on a new challenge outside EPFL. In 2008 he became President of the Engineering Firm Bonnard and Gardel, a Lausanne-based company with more than 240 employees and projects in Switzerland and around the world. To succeed him, Marc Parlange was appointed the new Dean of our school January 1, 2008.
Luca Ortelli, director of the Architecture Bs/Ms Programme was succeeded by Inès Lamunière on september 1, 2008.

PASSAGE

† Robert Rivier
Full professor and director of the Laboratory for Intermodality and Transport Planning passed away on May 10, 2007.
He was 64 years old. Professor Rivier was an internationally recognized expert whose research spanned a wide range of fields in transportation engineering, particularly the field of railroad engineering. He played a visionary and pioneering role in the development of innovative methodologies used for analyzing the capacity and quality of railway network services. He was charged with conducting an audit of the French national train network, which went on to become a reference work known as the "Rapport Rivier" that is cited systematically far beyond the French border. More recently, with his impetus, EPFL participated in multiple EU projects such as Interface, Improverail, Optirails and Optirails II, Alpnet, Primola, Softice, Hint, and Aiuto. Thanks to Professor Rivier, the Laboratory for Intermodality and Transport Planning was able to acquire recognition as a research pole in public and railroad transportation—a blossoming field that is benefiting from new technology and the increasing necessity of sustainability in the movement of people and products.
Website : http://litep.epfl.ch

DEPARTURES

M. Tranda-Pittion
T. Vallée
Prof. M. Hirt
Prof. Cl. Morel
Prof. D. Or
Prof. H. van den Bergh

SIX NEW PROFESSORS APPOINTED IN ENAC

Jean-François MOLINARI
Associate Professor of structural mechanics
scientific computing
multiscale modeling from atoms to continuum
damage mechanisms in materials and structures Nanotribology for building

Andrea BASSI
Associate Professor of architecture
responsible for a project studio, construction technologies, energy considerations for buildings

Andrea RINALDO
Full professor of hydrology and water resources
groundwater and surface hydrology, solute transport processes, fluvial geomorphology, ecohydrology

Alcherio MARTINOLI
Associate professor for distributed intelligent systems
swarm Intelligence, distributed and Networked, robotics,
S&A Networks

Jeremy Samual AREY
Tenure-Track Assistant Professor of environmental chemical processes
(as part of a joint agreement between EPFL and EAWAG)
environmental chemical processes affecting organic pollutants, computational quantum chemistry and thermodynamics, phase partitioning and sorption models, oil spills two-dimensional gas chromatography

Jed Oliver KAPLAN
SNF Assistant Professor
climate change and global biogeochemical cycles, earth system modeling, land-atmosphere interactions, evolution of agriculture, technology and civilizations, paleoclimate and paleo-environmental change

PROMOTIONS

Prof. T. KELLER
promoted Full Professor

J.-P. LEBET
promoted Adjunct Professor

A. NUSSBAUMER
promoted Adjunct Professor

Prof. Ch. ANCEY
promoted Associate Professor

Senior Scientists
E. Cogato-Lanza
E. Denarié
L. F. de Alencastro
D. Robinson

Research and Teaching Associates
P.-Y. Gilliéron
T. Vallée
D. Emery
G. De Cesare
A. Vasilopoulos

VISITING PROFESSORS AND ACADEMIC HOSTS

2007

Architecture
Jean-Pierre Adam
Patrick Aeby
Stephen Bates
Patricia Capua Mann
James Fobert
Olivier Galletti
Christian Gilot
Johannes Ibelings
Jean-Paul Jaccaud
Maria Soledad Madridejos
Graeme Mann
Claude Matter Galletti
Ryue Nishizawa
Pier Nicola Pagliara
Jan Perneger
Gilles Perraudin
Philippe Rahm
Juan Carlos Sancho
Kazuyo Sejima
Jonathan Sergison
Charles Tashima
Bernard Zurbuchen
Maria Zurbuchen-Henz

Civil Engineering
Antonio Cardoso
Roberto Croce
Pierre-Alain Croset
Michael Flach
Yaojun Ge
John Hudson
Tomasz Hueckel
Bruce Melville
Alejandro Perez Caldentey
Michel Pirotton

Environmental Engineering
Grace Somers Brush
Ismail Colomina
Nicholas Hedley
Mark Hines
Ling Li
Derek Lichti
Seyed Majid Hassanizadeh
Dorothy Parker
Hong Zhang

2008

Architecture
Jean-Pierre Adam
Nicola Braghieri
Andreas Bründler
Daniel Buchner
Christian Gilot
Jean-Paul Jaccaud
Bernard Khoury
Pier Nicola Pagliara
Camilo Rebelo
Dominique Rouillard
Deborah Saunt
Bernard Zurbuchen
Maria Zurbuchen-Henz

Civil Engineering
Gil Anderi da Silva
Robert Connor
Roger Denlinger
Jun Dong
John Mark Gray
Bruce Melville
Takashi Oguchi
Michael Ortiz
Ashok Pandey
Kaliat Ramesh
Nayan Sharma

Environmental Engineering
Luca Bragazza
Wilfried Brutsaert
Fengxiang Jin
Günter Langergraber
Dorothy Parker
Von Patrick Walden

Enac
Amilcare Porporato

Selection of distinctions and awards

ALICE AT LONDON ARCHITECTURE FESTIVAL

A group of 12 architecture students from EPFL returned from the London Festival of Architecture (19 June-19 July 08), where their contribution, "Overflow", a structure that reacts to tides in the Thames River, was chosen as the best overall project among all the student installations, as well as the best at "signposting" the festival to passersby. The EPFL team was one of thirteen teams of student architects that created temporary installations in public locations in downtown London. All the teams had the same basic goals: to reveal a quality about the space that is lost, hidden or underestimated, and to "signpost" the London Festival of Architecture to the public. The EPFL students, under the guidance of Dieter Dietz and his team of the Design Studio on the Conception of Space (ALICE) installed a huge, flexible polystyrene structure along the railing of the Thames River embankment in front of the Tate Modern. The whole structure, fastened to the railing, pivots according to the tidal amplitudes in the Thames, leaning low over the walkway at high tide and retreating to a more vertical position at low tide.
"The installation attempts to accentuate our awareness of the tides, and then to transfer it into a physical experience," explains Dietz.

THE EUROPEAN RESEARCH COUNCIL (ERC) ADVANCED INVESTIGATOR GRANT

The European Research Council (ERC) Advanced Investigator Grant funding scheme targets researchers who have already established themselves as independent research leaders in their own right. ERC Advanced Grants, of up to € 3.5 million for 5 years, allow them to pursue pioneering frontier research of their choice, while encouraging risk-taking and interdisciplinarity.

Professor R. Gargiani is winner of the ERC Advanced Grants competition in the domain Social
Sciences and Humanities with a project entitled "The surfaces of cement and reinforced concrete. A history of the formworks and processing of the surface, 1870-2008"

Website: http://ltha.epfl.ch

Professor A. Rinaldo is winner of the ERC Advanced Grants competition in Interdisciplinary Research with a project entitled "River networks as ecological corridors for biodiversity, populations and waterborne disease (RINEC)"

Website: http://echo.epfl.ch

STUDENT AWARDS

Prix Arditi
Leopold Banchini, Architecture
Claire Bufflier, Architecture

Prix SIA suisse et section vaudoise (mention)
Aurélie Blanchard, Architecture
Loïc Fumeaux, Architecture
Salomé Gutscher, Architecture
Sonja Huber, Architecture
Sara Formery, Architecture
Sibylle Kössler, Architecture
Claire Bufflier, Architecture

Prix Beton Holcim
Stefano Campana, Civil Engineering

Prix Architecture et Préfabrication
Aurélie Blanchard, Architecture

Prix Zanelli
Albin Viquerat, Environmental Engineering
Léda Gerber, Environmental Engineering

Prix UPIAV—Union patronale des ingénieurs et architectes vaudois
Stefano Campana, Civil Engineering

Prix BG Ingénieurs-conseils: construction et développement durable
Loïc Fumeaux, Architecture
Oliver Regazzoni, Architecture
Katleen Vercauteren, Architecture
Cédric Liardet, Architecture
Jean Wagner, Architecture
Denis Dorsaz, Architecture

Prix Bureau d'ingénieurs Maggia
Laurence Delplace, Civil Engineering
Sébastien Micheloud, Civil Engineering

Prix Stücky
Pedro Miguel Vilas Boas Antunes da Costa, Civil Engineering
Martin Bieri, Civil Engineering

Prix UPIAV
Stefano Campana, Civil Engineering

Prix BG ingénieurs-conseils: systèmes et développement durable
Baptiste Antille, Environmental Engineering

Prix de l'Association des Ingénieurs géomètres de Suisse Occidentale
Stéphane Guerrier, Environmental Engineering

Prix de l'Association suisse des Mensurations et Améliorations foncières
Jonas Margot, Environmental Engineering

Luce Grivat Awards
Serge Baechler, Environmental Engineering
Flavio Malaguerra, Environmental Engineering
Nicolas Ackermann, Environmental Engineering
Chantal Imhof, Environmental Engineering
Camille Roquier, Environmental Engineering

CSD Award
Jonas Margot, Environmental Engineering

TEACHING AND RESEARCH AWARDS

Albayrak, Ismail: 2nd prize John F. Kennedy Student Paper Competition, 32nd Congress of International Association of Hydraulic Engineering and Research, Venice, 2007

ALICE (Students from the laboratory): prize for the "Signpost" theme and prize for the best overall project, London Festival of Architecture, London, 2008

Bassi, Andrea:
1st prize "Concours Centre de services de l'UEFA", Nyon, 2008
1st prize "Concours Conservatoire et jardin botanique de la Ville de Genève, extension de l'herbier et Pavillons d'accueil", Geneva, 2008

Berger, Patrick: 1st prize "Concours international pour la rénovation du Forum des Halles", Paris, 2007

Bey, Isabelle: Young Researcher Award, ENAC PhD students and research days, Lausanne, 2007

Bierlaire, Michel: Ranked 5 in the top 25 hottest articles of Transportation Research Part B for April-June 2007

Bierlaire, Michel; Frejinger, Emma: Ranked 2 in the top 25 hottest articles of Transportation Research Part C for January-March 2008

Blanckaert, Koen: Harold Jan Schoemaker Award for the most outstanding paper published in the International Association of Hydraulic Engineering and Research Journal in the two years preceding the congress", with U. Lemmin (Environmental Hydraulics Laboratory), Venice, 2007

Chabbey, Jean-Paul:
1st prize, "Concours Aménagement du centre de Vionnaz", Valais, 2007
1st prize and mandate "Salle de spectacle St-Marc, Le Châble", Valais, 2008

Dietz, Dieter; Egg, Urs; Meili, Christian; Baur, Raffael; Vischer, Dieter (UNDEND Architecture Zurich):
1st prize "Concours Studio Building Lehrterstrasse 57", Berlin, 2007
1st prize "Concours Bächtelen 5, Housing Project", Bern, 2007

Duret, Aurélie: Best Poster Prize for the doctoral program in environment, EPFL research day, Lausanne, 2008

Fernandez Ruiz, Miguel:
ENAC Scientific Collaborator Research Excellence Award, ENAC PhD students and Research Days, Lausanne, 2007
Best Guess Award, Netherlands Organisation for Applied Scientific Research, Rotterdam, 2007

Frank, Frédéric: "Prix d'encouragement à la recherche en histoire de l'art de la Fondation Alfred Richterich et de l'Association Suisse des Historiens et Historiennes de l'art", senior category, Zürich, 2008

Frejinger, Emma:
Neil Mansfield Award for best paper presented at the European Transport Conference, The Netherlands, 2007
Dissertation Prize of the Transportation Science & Logistics Society of INFORMS (Institute for Operations Research and the Management Sciences), 2008

Graf, Franz: 1st prize, "Concours pour la rénovation de l'Alhambra", Geneva, 2008

Holliger, Christof: Paper award at International Water Association Biofilm Technologies Conference, Singapore, 2008

Keller, Thomas: JEC Composites Innovation Award, Energy&Industry/ Construction category, Paris, 2007

Koliji, Azad: ALERT Geomaterials PhD Prize, 2008

Kostro, André: Asea Brown Bovery (ABB) Award, EPFL Lausanne, 2007

Laloui, Lyesse: Excellent Contributions Award by the International Association for Computer Methods and Advances in Geomechanics (IACMAG), octobre 2008

Lemmin, Ulrich: Harold Jan Schoemaker Award for the most outstanding paper published in the International Association of Hydraulic Engineering and Research Journal in the two years preceding the congress", with Koen Blanckaert (Hydraulic Constructions Laboratory), Venice, 2007

Lestuzzi, Pierino:
Munro Prize for the best paper published in Engineering Structures Journal, 2007
"Prix Polysphère" for the best teacher of ENAC School, EPFL Lausanne, 2008

Lévy, Sarah: Best Poster Prize for the doctoral program in mechanics, EPFL research day, Lausanne, 2008

LITEP (prize to EPFL via the laboratory): "Grand Prix de l'Expertise du 16e Palmarès de Ville & Transports Magazine", Paris, 2007

Lochmatter, Samuel; Gonzalez-Gil, Graciela: 3rd poster prize, poster Annual Assembly of the Swiss Society for Microbiology (SSM), Interlaken, 2008

Lufkin, Sophie: Erna Hamburger Prize, EPFL Lausanne, 2008

Mestelan, Patrick:
1st prize and mandate, "Concours pour l'aménagement du village historique à Saxon", Valais, 2007
2nd prize, "Concours pour l'aménagement de la mobilité douce dans le quartier du Croset", Ecublens (VD), 2008

Munari Probst, Maria Cristina: Best Poster Prize (Grand Prize Sustainable Development) for the doctoral program in environment, EPFL research day, Lausanne, 2008

Nuth, Mathieu: 1st prize "Prix René Houpert" for his PhD, Association Universitaire de Génie Civil, 2008

Oesterlee, Cornelius: Best Poster Prize for the doctoral program in structures, EPFL research day, Lausanne, 2008

Ortelli, Luca: "Prix Polysphère" for the best teacher of ENAC School, EPFL Lausanne, 2007

Parriaux, Aurèle:
Roberval Prize for his book "Géologie: bases pour l'ingénieur" published at the PPUR, 2007
appointed "Chevalier dans l'Ordre des Palmes académiques" by the Prime Minister of the French Republic, for major contributions to the French culture, 2008

Pasqualini, Isabella; Dietz, Dieter; Pokora, Daniel: prize, Greater Helsinki Vision 2050 – International Ideas Competition, Finland, 2007

Renaudin, Valérie: Best paper award, TimeNav'07, Geneva, 2007

Robinson, Darren: Napier Shaw (Bronze) Medal, Chartered Institution of Building Services Engineers (CIBSE), 2007

Scartezzini, Jean-Louis: Solar Energy Journal Valued Associate Editor for Exceptional Contribution to the Quality of Solar Energy, 2008

Schueler, Andreas: Solar Energy Journal Best Paper in Energy Conversion (Editorial Board), 2007

Staufer, Astrid; Hasler, Thomas: 1st prize, "Concours de l'Hôpital de Coire", Valais, 2008

Stoos, Maja Christina:
1st prize and mandate, "Concours pour l'école d'Ennetbaden", Argovie, 2008
1st prize and mandate, "Concours pour la rénovation complète du bâtiment de la voirie de Schafisheim", Argovie, 2008

Wägli, Adrian:
Young investigator scientific award (innovation award), 4th International Congress on Science and Skiing, St. Christoph, Austria, 2007
Best paper award, Institute of Navigation GNSS Meeting, Fort Worth, Texas, USA, 2007

Books

The full list of ENAC Scientific production and competences is available online: http://infoscience.epfl.ch/ENAC

2007

Guide à la mise en place du management environnemental en entreprise selon ISO 14001
Baracchini, Paolo
Lausanne: Presses Polytechniques et Universitaires Romandes, 2007
ISBN 978-2-88074-760-2

Paul Waltenspühl. Architecte
Bischoff, Christian; Claden, Isabelle; Oberwiler, Erwin
Gollion: Infolio Editions, 2007
ISBN 978-2-88474-451-5

EU COST C13 Glass and Interactive Building Envelopes. Final Report
Crisinel, Michel (ed.); Eekhout, Mick (ed.); Haldimann, Matthias (ed.); Visser, Ronald (ed.)
Delft: Delft University Press, 2007
ISBN 978-1-58603-709-3

Archizoom Associati 1966-1974, de la vague pop à la surface neutre
Gargiani, Roberto
Milan: Electa, 2007
ISBN 978-88-370-5334-5

Stahlbau (TGC Band 10). Grundbegriffe und Bemessungsverfahren
Hirt, Manfred A.; Bez, Rolf; Nussbaumer, Alain
Lausanne: Presses Polytechniques et Universitaires Romandes, 2007
ISBN 978-2-88074-702-2

Enjeux de la sociologie urbaine
Bassand, Michel (ed.); Kaufmann, Vincent (ed.); Joye, Dominique (ed.)
Lausanne: Presses Polytechniques et Universitaires Romandes, 2007
ISBN 978-2-88074-676-6

Milton Santos. Philosophe du mondial, citoyen du local
Lévy, Jacques
Lausanne: Presses Polytechniques et Universitaires Romandes, 2007
ISBN 978-2-88074-709-1

Jean-Marc Lamunière. Regards sur son œuvre
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Gollion: Infolio Editions, 2007
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Ingénierie des eaux et du sol.Processus etaménagements
Soutter, Marc; Mermoud, André; Musy, André
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Favarger, Philippe; Thalmann, Philippe
Lausanne: Presses Polytechniques et Universitaires Romandes, 2007, 2008, 2ème édition revue et augmentée
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2008

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Lausanne: Presses Polytechniques et Universitaires Romandes, 2008
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Lausanne: Presses Polytechniques et Universitaires Romandes, 2008
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Gargiani, Roberto
Lausanne: EPFL Press, 2008
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matières 9: espace architectural
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Lausanne: Presses Polytechniques et Universitaires Romandes, 2008
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Les paradoxes de la mobilité. Bouger, s'enraciner
Kaufmann, Vincent
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Canzler, Weert (ed.); Kaufmann, Vincent (ed.); Kesselring, Sven (ed.)
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The Social Fabric of the Networked City
Pflieger, Géraldine (ed.); Pattaroni, Luca (ed.); Jemelin, Christophe (ed.); Kaufmann, Vincent (ed.)
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Lausanne: Presses Polytechniques et Universitaires Romandes, 2008
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L'invention du Monde. Une géographie de la mondialisation
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The City. Critical Essays in Human Geography
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Graeme Mann et Patricia Capua Mann
Marchand, Bruno; Fretton, Tony; Mann, Graeme; Capua Mann, Patricia
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ISBN 978-2-88474-452-2

Graeme Mann & Patricia Capua Mann
Marchand, Bruno; Fretton, Tony; Mann, Graeme; Capua Mann, Patricia
Basel: Birkhäuser, 2008
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Hedonic Methods in Housing Markets. Pricing Environmental Amenities and Segregation
Baranzini, Andrea (ed.); Ramirez, José V. (ed.); Schaerer, Caroline (ed.); Thalmann, Philippe (ed.)
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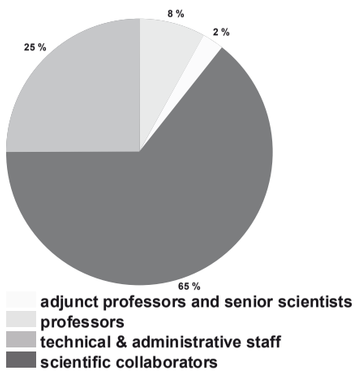
Campagne-ville: Le pas de deux. Enjeux et opportunités des recompositions territoriales
Sous la direction de Monteventi Weber, Lilli; Deschenaux, Chantal; Tranda-Pittion, Michèle
Lausanne: Presses Polytechniques et Universitaires Romandes, 2008
ISBN 978-2-88074-737-4

Facts and figures

PEOPLE

about our staff (31/12/2008), in % Full time equivalent



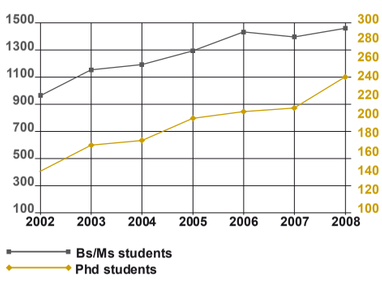
% women by category (31/12/2008)

professors	15
adjunct professors and senior scientists	6.7
Scientific collaborators	28.3
Bs/Ms students	37
PhD students	31

% foreigners by category (31/12/2008)

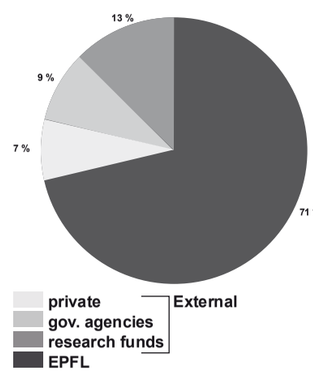
professors	43
adjunct professors and senior scientists	47
Scientific collaborators	42
Bs/Ms students	31
PhD students	65

student numbers (2002-2008)

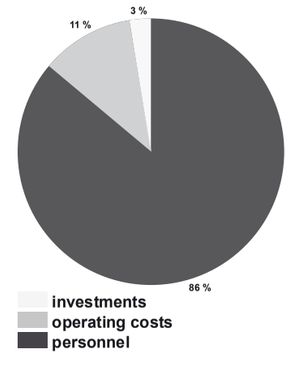


FINANCES

income (2008)



expenditures by category (2008)



Income by funding source 2002-2008 (in Mio CHF rounded up)

	2002	2003	2004	2005	2006	2007	2008
EPFL	51	49	48	51	50	53	50
External	24	24	21	22	17	20	20
Total	75	73	69	73	67	73	70

Expenditures by category 2002-2008 (in Mio CHF rounded up)

	2002	2003	2004	2005	2006	2007	2008
Pers.	51	49	48	51	50	53	50
Op. costs	24	24	21	22	17	20	20
Total	75	73	69	73	67	73	70

1795 students,
including 243 PhD students, who contribute to ENAC's long-term research
622 collaborators, or 479 full-time equivalent positions
69.9 million CHF—total budget of ENAC
62 % of staff between 20 and 40 years old
58 nationalities
For more information, please visit: http://enac.epfl.ch/figures

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