



FINDING
SOLUTIONS
FOR



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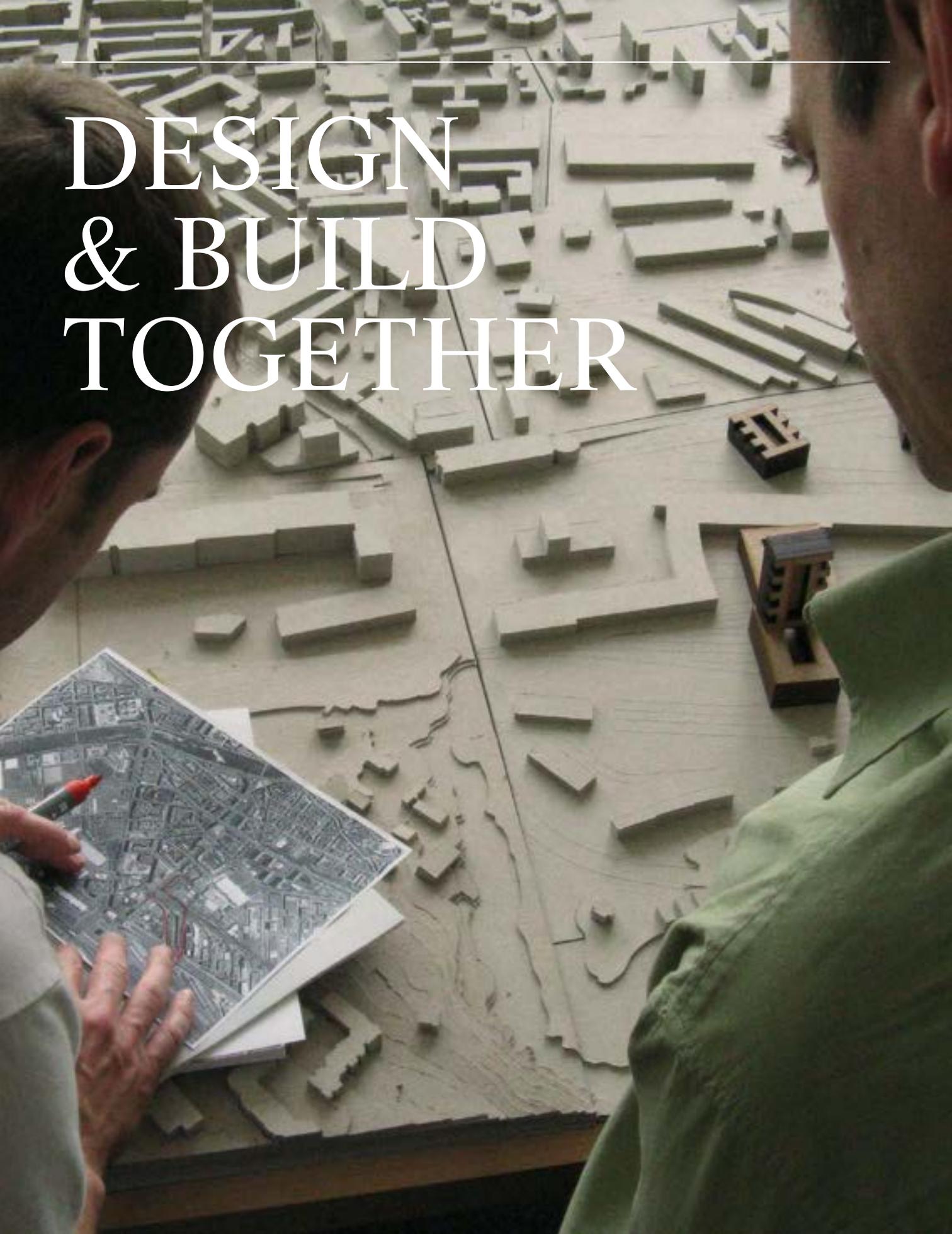
SUSTAINABLE

FUTURE



ENAC
SCHOOL OF ARCHITECTURE,
CIVIL AND ENVIRONMENTAL
ENGINEERING

DESIGN & BUILD TOGETHER



FOREWORD

We are delighted to present our 2011 ENAC Annual Report, highlighting a small selection of the superb research and teaching we do in sustainable development, energy, urban systems, and the built environment.

2011 was another fantastic year in ENAC with continued steady growth in the number of outstanding Bachelor, Master and PhD students. Among many others, we dispatched two research submarines to explore the depths of Lake Geneva, held 'Semaine ENAC' courses in Paris, continued the prestigious Archizoom and Landolt Chair seminar series, expanded our research connections across Switzerland through the transportation center, and defended our team title in the Vivapoly fun run.

We are especially happy about the arrival of new faculty members and are proud to announce the opening of the new Chair in CO2 Sequestration, directed by Professor Lyesse Laloui. We continue to strengthen our ties to other research institutes in the EPF domain, with Professor Urs von Gunten joining us from

EAWAG in Dübendorf and Professor Michael Lehning from the SLF in Davos, and are pleased to welcome our new assistant Professor Satoshi Takahama, an air quality engineer joining us from the SCRIPPS Institute in the USA. Also, we are excited about the arrival of Professor Anders Meibom, whose work will build bridges between the schools at EPFL as well as to the Earth Sciences faculty at the University of Lausanne.

We would like to congratulate Professor Bruno Marchand, the laureate of ENAC's 2011 teacher-of-the-year prize.

Please plan to join us on October 9th, 2012, for the next ENAC general assembly to learn more about all our School does.

We hope you'll enjoy reading and discovering more about ENAC and would be glad to warmly welcome you the next time you are in town.

Best personal regards,

Marc Parlange, ENAC Dean

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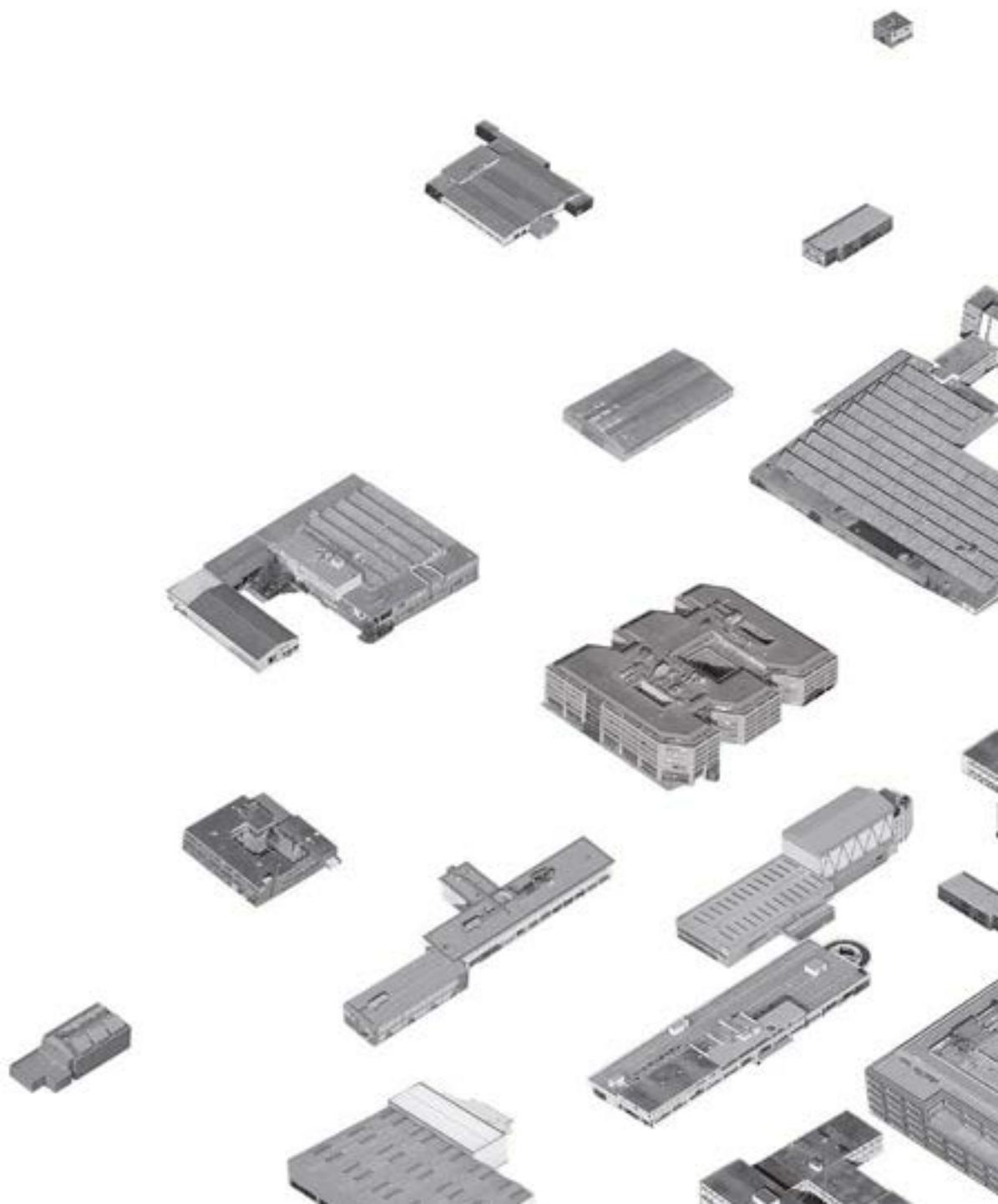
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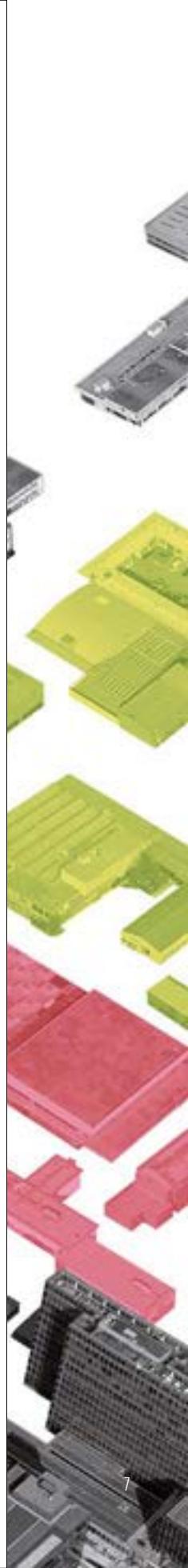
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THE
UPSIDE OF
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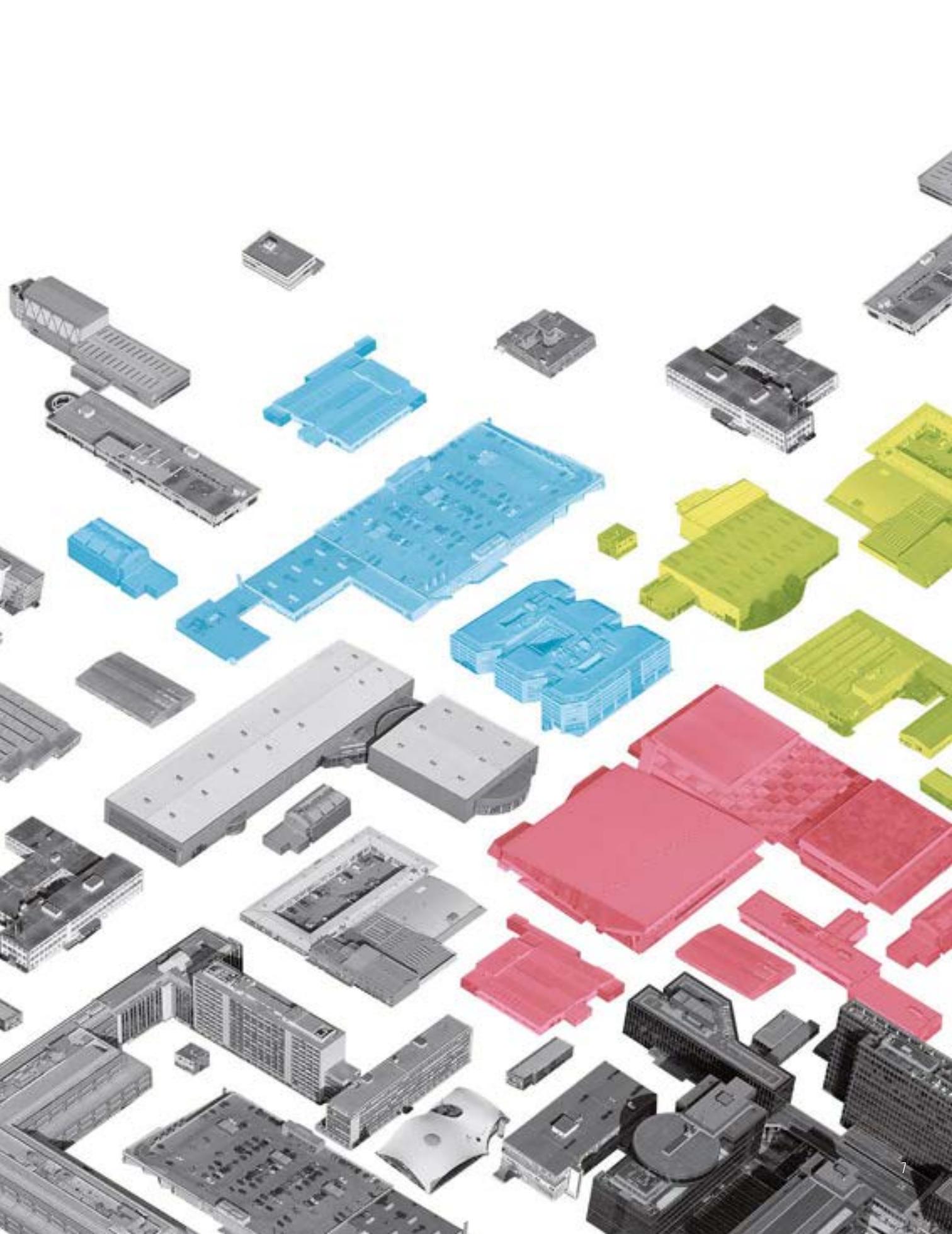


DENSE, DIVERSE CITY CENTERS REDUCE
THE NEED FOR PERSONAL MOBILITY,
MAKING CITIES MORE SUSTAINABLE.

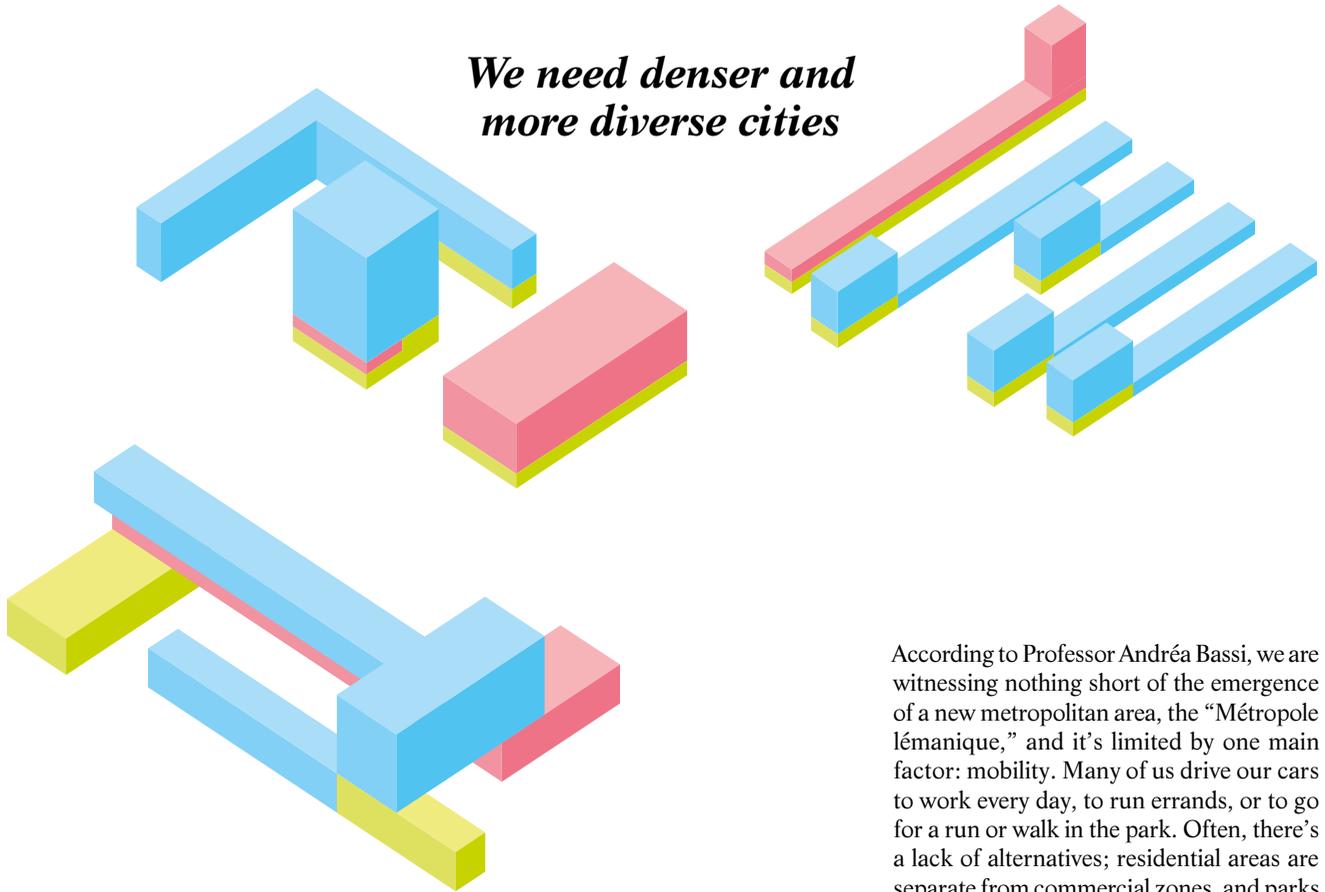
Laboratory of Urban Architecture (LAURE)

<http://laure.epfl.ch>

Andrea Bassi, Director



We need denser and more diverse cities



The population of the Lake Geneva Region is growing rapidly. According to the Federal Institute for Statistics, the population of the cantons Vaud and Geneva combined is projected to grow by 21.5% to hit 1.4 million inhabitants by 2035. With the main transportation arteries already at or beyond maximum capacity during peak hours, housing prices surging, and social services such as daycare often hard to come by, the debate is heated on whether the region can sustain this runaway growth, and if so, how.

According to Professor Andréa Bassi, we are witnessing nothing short of the emergence of a new metropolitan area, the “Métropole lémanique,” and it’s limited by one main factor: mobility. Many of us drive our cars to work every day, to run errands, or to go for a run or walk in the park. Often, there’s a lack of alternatives; residential areas are separate from commercial zones, and parks and recreational areas are sparsely distributed within urban centers. This separation has made us increasingly dependent on our cars, to the point that we willingly put ourselves through the endless stop-and-go of driving on congested streets.

This separation didn’t come about by chance. In emerging industrial societies, it was important to separate residential and industrial areas, primarily to protect residents from the noise and pollution of factories. Different uses of land that were considered incompatible were segregated into zones, and “zoning” was born. But with the shift towards a silent, less polluting tertiary economy, the arguments in favor of zoning are no longer convincing. Nonetheless, the practice still prevails.

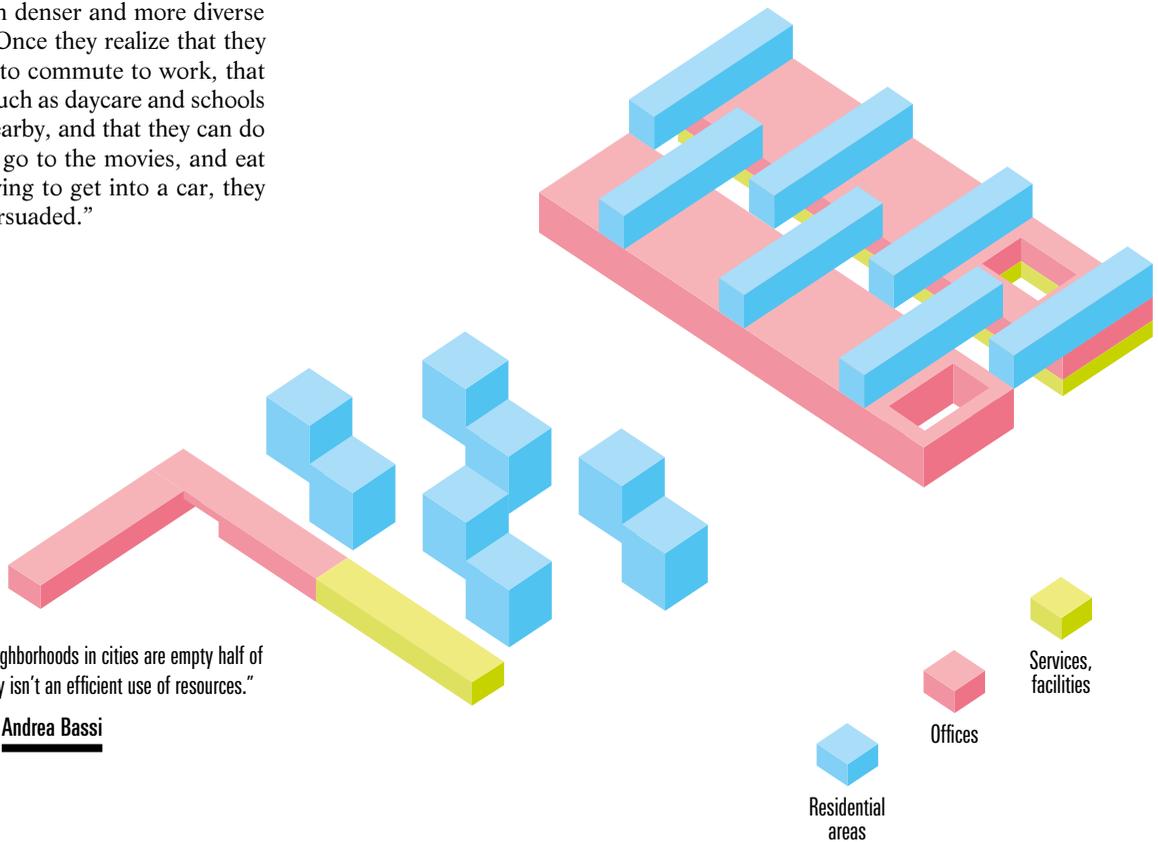
As physical mobility reaches its limits, Bassi predicts that it will be replaced by virtual mobility: that of different types of media and information. For the past four years, he and his team of architects and urban planners in the Laboratory of Urban Architecture (LAURE) have been studying urban solutions to adapt to this new reality. Rather than protecting inhabitants by creating distance between them and industry, he argues that today's urban planning should focus on optimizing flows – of people, goods, information – by building denser, more diverse cities. The response developed in his research group, is to limit our dependence on mobility by designing multifunctional urban spaces that combine residential, commercial, and recreational roles.

Humans, however, are creatures of habit, and the ideal of living in the tranquil countryside and working in the city is deeply rooted in our culture. "As architects," says Bassi, "we have to show people other alternatives and convince everyone, from the businessman to the baker, of the advantages of living in denser and more diverse urban centers. Once they realize that they no longer have to commute to work, that social services such as daycare and schools can be found nearby, and that they can do their shopping, go to the movies, and eat out without having to get into a car, they just might be persuaded."

Although some neighborhoods are spontaneously converting to a more mixed format, they can only do so if their buildings allow for it. In Switzerland, many buildings built in the 1960s can't be renovated, so spontaneous adaptation has been slow, with the exception of a few industrial parks. New projects must keep this in mind; although they can be designed with multifunctional use in mind, the design should include a degree of ambiguity, allowing them to evolve.

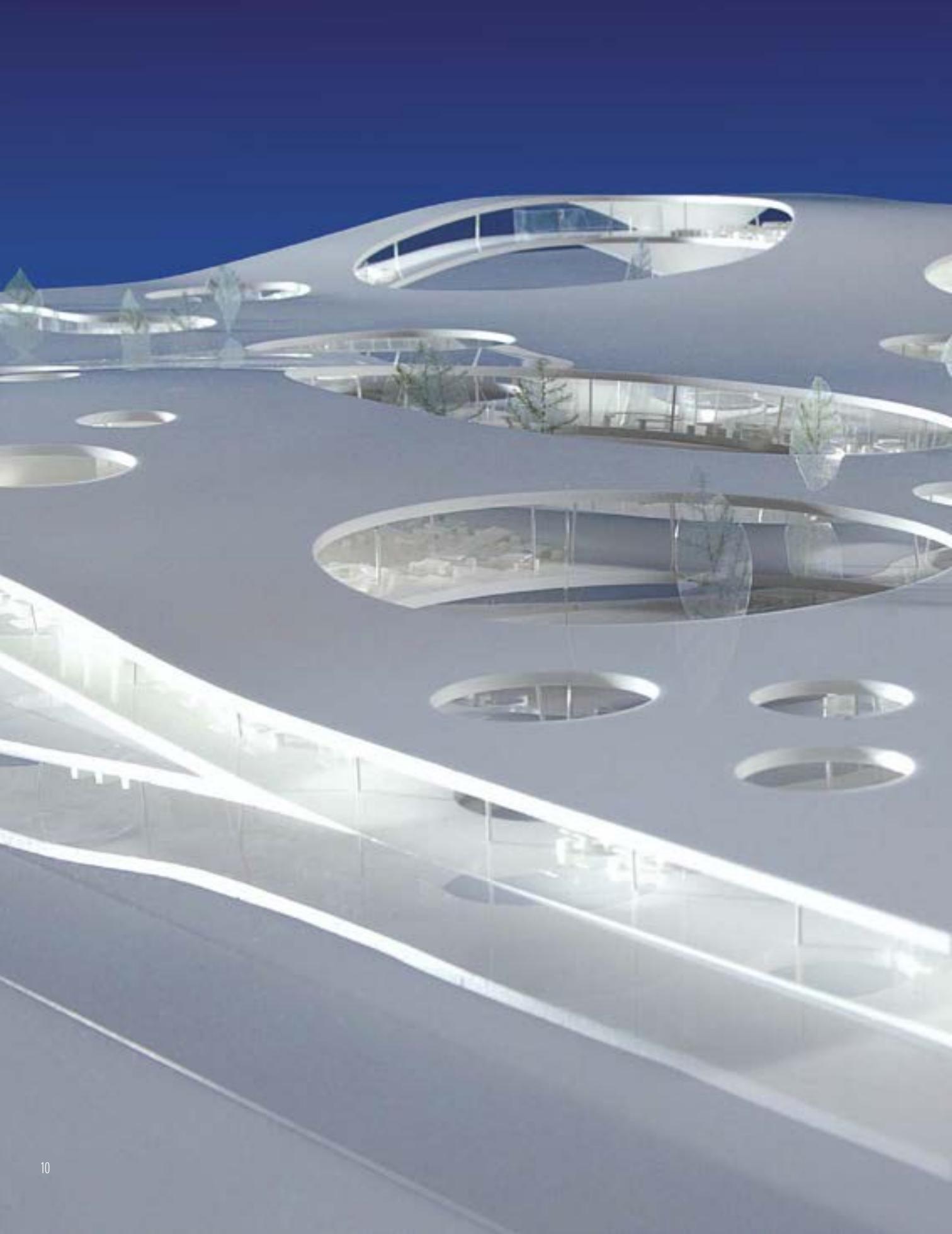
The acceptance barrier to these new concepts is still quite high, says Bassi. Residents will only feel comfortable downtown if they perceive the quality of life to be at least as high as that in the suburbs. Without a feeling of space, of openness, they are not likely to be convinced. "These are exciting times to be an architect," says Bassi, who participated in the urban plan of the Praille area in Geneva. "For years we've been drawing solids. Now we get to start drawing empty spaces."

And the challenges go beyond persuading the residents of the advantages of dense, diverse urban centers; urban planners run into obstacles on an administrative level as well. Zoning, still the predominant urban planning paradigm, requires the unambiguous attribution of a zone type to each area. The result is a two dimensional map. But what about multifunctional buildings that have commercial and residential spaces on different floors? It's high time for a new approach – with any luck, before long, farmers will be planting crops on urban rooftops!



"Certain commercial neighborhoods in cities are empty half of the time. That clearly isn't an efficient use of resources."

Andrea Bassi



CONVERGING
ON
NEUTRALITY



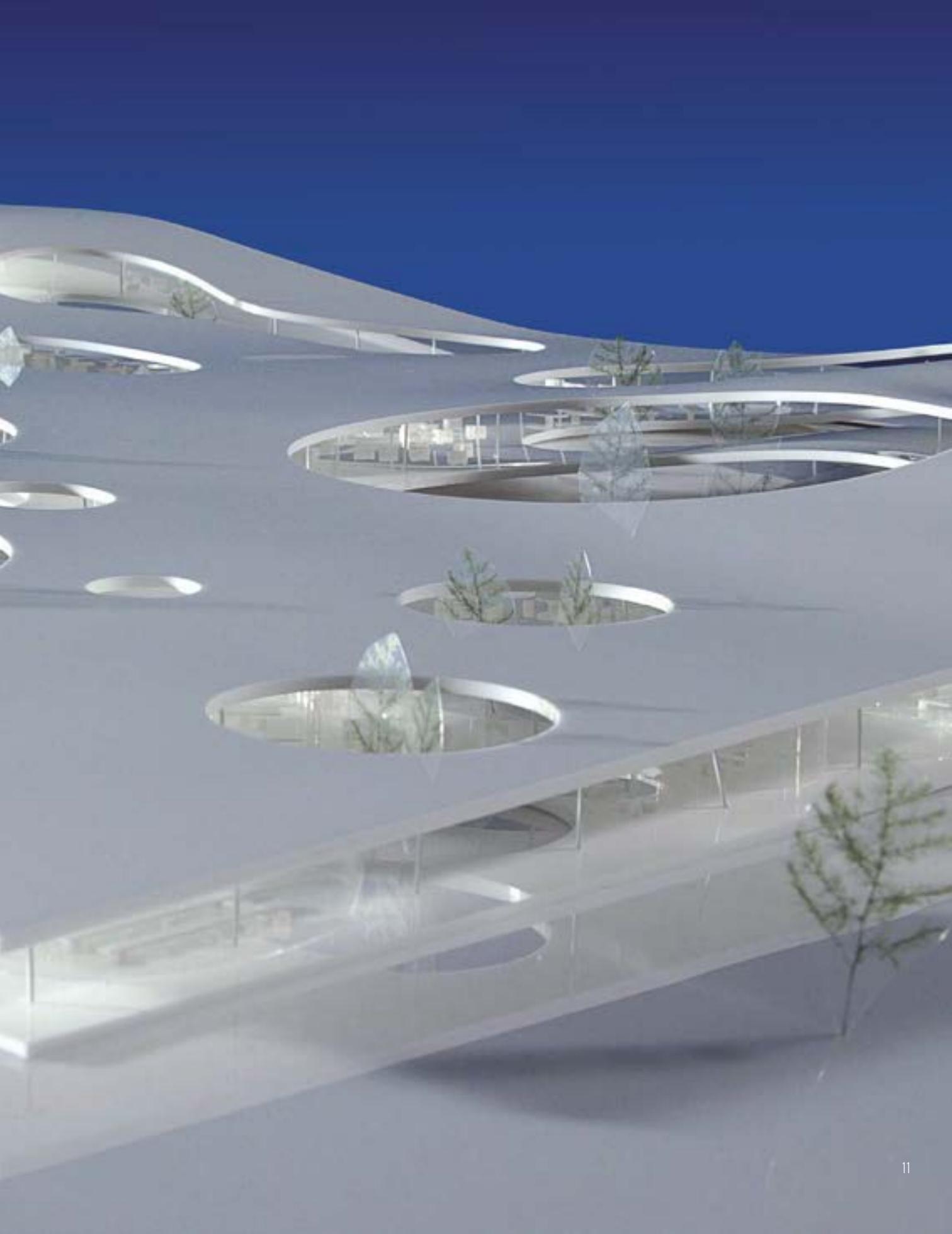


ARCHITECTURAL HISTORIAN
JACQUES LUCAN EXPLAINS HOW
ARCHITECTURE CAN'T HELP BUT EVOLVE
TOWARDS MORE SUSTAINABILITY.

Theory and History of Architecture Laboratory 1 (LTH1)

<http://ltha.epfl.ch>

Jacques Lucan, Director



“Today, sustainability is on everyone’s minds, including architects’,” says Jacques Lucan, Professor of Architectural History at ENAC and author of a treatise on the history of theories of architectural design over the past two centuries. “Just like everyone else, we are caught up in the social movement that is calling for sustainable development. For us, the challenge has become: how can we, as architects, incorporate the transformations that are taking place in society into our projects in a positive way, without simply bowing to them?”

“Take solar panels as an example,” he continues. They come from the realm of engineering. Until recently, they’ve been added to buildings after their completion, without being included in the architectural design process. But today, solar panels are starting to be seamlessly integrated into architectural building blocks such as facade elements. As they evolve from mere technological add-ons to actual building components, Lucan predicts that they will begin to drift into the architectural design process.

The evolution of architecture doesn’t always proceed along such a linear path. As Lucan puts it, “Architecture is more like a turbulent stream, with new ideas continuously being generated and put into practice, and this confrontation of ideas constantly leads to new visions.” With each project, new ideas are tested. In a Darwinian sense, some successful ideas are retained and many less successful ones are rejected. “Over time,” says Lucan, “the various visions diverge and an entire geography of architecture is drawn, only to converge again around a few fundamental ideas. These are the basis of what we call the history of architecture.”

“As architects, we cannot afford to turn our backs on the lessons that the history of our field has to offer.”

Jacques Lucan

Functionally neutral buildings can more easily respond to changing demands

So-called “functional neutrality” has become one of the more recent points of convergence in contemporary architecture. It made its first appearances in the second half of the twentieth century, in opposition to the then dominant vision of functionalism. Functionalism, with its “form follows function” mantra, postulates that a building be designed with a particular function in mind. But buildings often outlived their function. Some avant-garde architects rocked the boat: Why not design buildings that could evolve with societal demands? This, in a nutshell, is “functional neutrality.” And now, decades later, this sustainable vision of adaptive, functionally neutral buildings is still gaining momentum. The Rolex Learning Center, built on the EPFL campus, is a good case in point. Picture it empty and try to imagine ways in which it could be put to use. There’s nothing in the building’s design to indicate that its use should be a library, a bookshop and a restaurant. It is neutral by design; its users are given the task of defining its function.

A number of societal changes are underway that today’s and tomorrow’s architects will need to address. How will we live in our houses and apartments in the future? Work habits are changing as more and more people work from home. And traditional family structures are giving way to increasing numbers of patchwork families. Will our homes be designed to be more functionally neutral, giving us extra leeway in deciding how to best take advantage of the rooms? Will they provide spaces that can be tailored to satisfy a range of needs of work at home parents, by transforming them into offices, meeting rooms, workshops or depots? Or will other avenues be pursued, leading to yet unexplored, alternative solutions? “These are just some of the important questions that a faculty like ours has to address,” says Lucan.



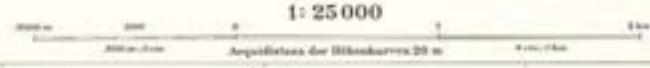


Höhenlinien: 100m
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622
 Wiedertourne unterhalb der Zillertalpassage
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 Alpenverein, Plan der Zillertalpassage

I T A L I A

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THE BUSINESS OF EMISSIONS



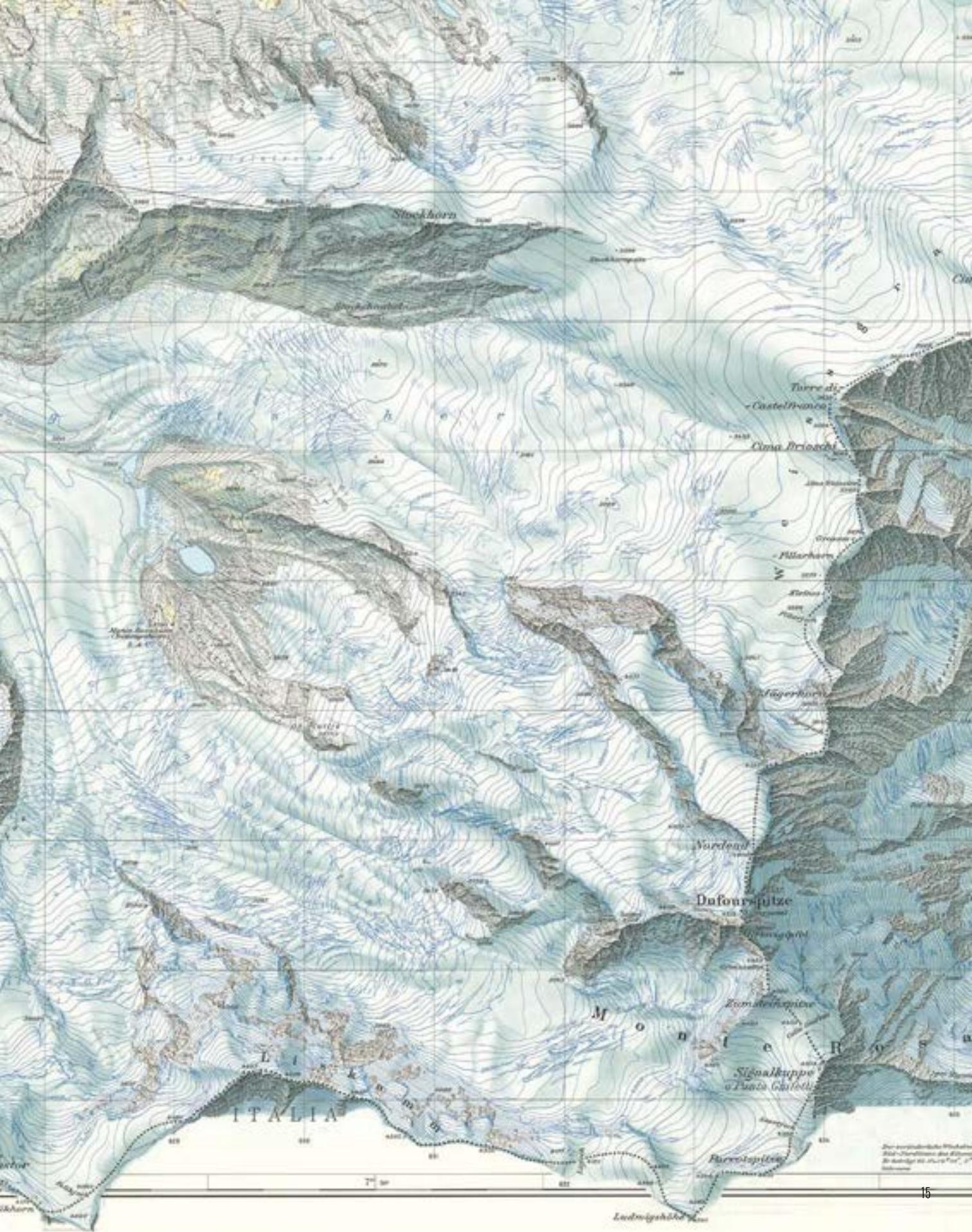
A vertical strip on the left side of the page shows a topographic map of a mountainous region. The map features contour lines, roads, and some text labels, though they are partially cut off. The colors range from light green at the bottom to yellow and brown at the top, indicating elevation changes.

SIMULATIONS SHOW THAT
NATIONAL CO₂ EMISSIONS CAN BE
REDUCED WITHOUT HURTING
THE ECONOMY.

Economics and Environmental Management Laboratory (REME)

<http://reme.epfl.ch>

Philippe Thalmann, Director





***Limiting national CO₂ emissions
and raising public welfare
can go hand in hand***

"There is clearly a readiness in the Swiss population to take action to reduce green house gas emissions."

Philippe Thalmann

A few extra degrees on the thermometer might sound appealing when you are walking through campus on a cold, snowy day. But stop and consider other consequences of global warming – glaciers melting, crops drying up, or sea levels rising – and the need for urgent action against climate change becomes obvious. Measures to mitigate climate change tend to raise fears of sacrifice and economic burden, making them difficult to enforce. But according to ENAC professor Philippe Thalmann, reducing greenhouse gas emissions and raising public welfare can go hand in hand.

The Federal Office for the Environment commissioned Thalmann and his team to put a price tag on various national CO₂ emissions reductions targets, ranging from modest to extremely ambitious. Using a computable model of the Swiss economy and the rest of the world, his team showed that in almost all the cases studied, limiting emissions could actually have a positive economic impact on Swiss households – provided that a smart climate policy is adopted.

An effective climate policy is based on three instruments, says Thalmann. The first, voluntary measures, was successfully applied in the context of Energy 2000, the Swiss energy policy from 1990 to 2000. The two other instruments, which are more binding, are taxing CO₂ sources (mainly fossil fuel imports), and setting a cap on annual CO₂ emissions. Both approaches have their shortcomings. The first approach unfairly punishes industries that are by nature slow in adapting to less polluting technologies, and the second is difficult to enforce.

Emissions trading has aroused much interest as an effective way of overcoming these problems, because it allows a country to enforce strict emissions quotas on

its companies without unnecessarily hampering economic activity. At the beginning of each year, companies are given certificates granting them permission to emit a set fraction of their previous year's emissions. If they are able to keep emissions under this level, they can sell their surplus certificates to other companies. Likewise, if they exceed their quota, they must buy certificates to offset the difference. "Emissions trading essentially transforms a quota on CO₂ emissions into an instrument that acts like a price on those emissions," explains Thalmann. This provides an incentive for companies to adopt less polluting technologies while granting them full flexibility for when and how they do so. Corporations that adapt by developing more sustainable production practices are given an economic advantage; those that don't must pay the price.

This strategy is also applied on the international level; countries that are signatories to the Kyoto protocol can trade emissions reductions certificates internationally to help reach their national greenhouse gas reduction targets. Both the economic cost of enforcing national climate change goals and the strategy to be pursued, therefore, depend on the price of these emissions certificates on the global market.

Thalmann and his group used a numerical model to assess the economic impact of a variety of different CO₂ policies on Swiss households and production sectors. The simulations point to a number of interest-

ing conclusions. Switzerland can reduce its net emissions without economic welfare losses by using a hybrid approach, imposing a national tax on carbon and then using the proceeds to buy international certificates to compensate for remaining emissions. The rate of the carbon tax needed to achieve emissions reductions depends on international climate policy. If global reduction targets are low, Swiss goals can be achieved merely through the purchase of cheap emissions certificates. If global policy is more ambitious, certificate prices will rise, thus necessitating a higher national carbon tax, which would encourage companies to transfer to greener technologies. Interestingly, the cost of both the higher CO₂ tax and technology developments would be largely mitigated by a reduced dependence on foreign imports of fossil fuels, which would benefit Switzerland's overall trade balance.

If we can demonstrate that measures taken to mitigate climate change actually end up benefiting the Swiss people, then its fears of sacrifice and economic hardship can finally be laid to rest. In this area, as in so many others, Switzerland can serve as an example for other countries to follow.



CONCRETE SOLUTIONS





GIVING INFRASTRUCTURE A SECOND LIFE.

Structural Maintenance and Safety Laboratory (MCS)

<http://mcs.epfl.ch>

Eugen Brühwiler, Director



Today we tend to be all too quick to throw away clothes, furniture, or other belongings when they start to show signs of wear and tear or simply go out of style. We're victims of the same mentality outside our homes, too, just on a larger scale. In an act of questionable sustainability, entire buildings are demolished to make way for newer, more sustainable ones. But when it comes to infrastructure, it's not so simple. The throw-away mentality would dictate that we tear up and replace roads, bridges and railroad tracks when they begin to show signs of aging, such as corrosion or cracks. But surely a more sustainable, not to mention more cost-effective, solution would be to fix them.

"I hate the term 'to fix'," says Professor Eugen Brühwiler, head of the Structural Maintenance and Safety Laboratory and director of the recently concluded National Research Program 54 on the sustainability of the built environment. "We are interested in the question of how far we can take and use our existing built structures," he explains. 'Fixing' infrastructure, to him, is simply patching over defects without identifying their root cause. "Five years later, you have the same problem all over again — what a waste!" Rather than just being patched up, a road or a bridge should come out of any intervention improved. Over the years, Brühwiler and his collaborators have worked tirelessly to find strategies to do just that, and they've come up with a convincing solution: concrete!

"In the context of sustainable development I've always been interested in the following question: How far can we take existing infrastructure?"

Eugen Brühwiler

Conventional concrete, composed primarily of cement, gravel, and water, cast around reinforcing steel bars and left to harden, is used widely in construction. Buildings, bridges, tunnels, walls, as well as roads and railroad tracks have been built with it for more than a century. The concrete Brühwiler proposes as a cure for many weaknesses civil structures suffer is of a different type, however: Ultra-High Performance Fiber Reinforced Concrete (UHPFRC). Though a mouthful, this novel formulation for concrete is actually quite simple: by adding a specific fraction of short, thin metal fibers to the powdery components, the resulting building material resists loads better than conventional concrete, and gravel can be eliminated from the mix. As a result, it is more dense, and thus becomes completely impermeable to water and gases, an extremely durable building material.

Corrosion, often implicated in the degradation of built structures, is most commonly caused by exposure of building materials to moisture. Thanks to its density and impermeability, the ultra-high performance fiber-reinforced concrete developed in Professor Brühwiler's lab acts as a tight seal, protecting the structure's interior. Thanks to significantly shorter hardening times, roads can be rehabilitated much faster than previously possible, saving time, money, and drivers' nerves. And Brühwiler has already successfully demonstrated that with the right formulation, the concrete will stay put long enough to harden even when applied to steep slopes. But that's not all. New structures can also be made lighter and with less raw materials, all without sacrificing performance. Imagine concrete bridges with elements only one fourth their current thickness.

The concept of high performance fiber reinforced concrete may not be entirely new, but the EPFL civil engineers have been able to position themselves successfully in the field. These experts are global pioneers in using fiber-reinforced concrete to repair and enhance existing civil structures. The economic and environmental benefits of their approach has struck a chord beyond our borders. As Brühwiler explains: "We are now attracting interest from abroad, where the frame of mind is much more focused on building costly new structures. Here in Switzerland, we have understood that we can get a lot more out of what we already have."

With ultra-high performance fiber-reinforced concrete, infrastructure can be improved, not just repaired





EVERY
DROP
COUNTS





ALEXIS BERNE EXPLAINS HOW COUNTING
RAINDROPS CAN CONTRIBUTE TO MORE
RELIABLE RADAR READINGS.

Environmental Remote Sensing Laboratory (LTE)

<http://lte.epfl.ch>

Alexis Berne, Director



Have you ever paid attention to the pitter patter of raindrops against your umbrella and noticed just how different it can sound from one moment the next? During summer rainstorms, the drops strike heavily, each one making a separate splash. During a spring drizzle, the droplets can hardly be distinguished and all you hear is a constant hum. And if you look through your umbrella, you'll notice that at any given time, the drops fall in a wide range of sizes. There are more small ones than large ones, and they don't all seem to fall at the same speed.

Rain isn't simply rain. Many complicated microphysical processes are involved in determining the final size of each raindrop, from its birth in a cloud to its final demise upon the ground. Professor Alexis Berne and PhD students in his lab have spent four years measuring the size of raindrops. "When we tell people that we count raindrops, it often makes them laugh. They probably wonder, 'Don't you have anything better to do?'" says Berne.

But Berne is quick to point out that information on raindrop size distributions is actually quite useful, particularly for weather services. Weather prediction models rely on all kinds of data to make weather forecasts as accurate as possible. Weather radars, for example, are used to monitor huge swaths of the atmosphere for precipitation. "What meteorologists and hydrologists are interested in," says Berne, "is the intensity of the precipitation. But rather than giving us a direct measurement of intensity, radar measurements tell us how strongly the emitted radio waves are reflected by raindrops in the atmosphere." Using an empirically determined power law, this reflectivity can be used to estimate the rainfall intensity.



There are always more small raindrops than large ones



But to today’s weather radars, rain is simply rain. Although different types of precipitation reflect more or less of the radar signal, the same empirical relationships are used to convert reflectivity to rainfall intensity without distinguishing between different types of rain events. And because these empirical relationships were determined using a single point measurement to infer the amount of rain falling onto a large area, they fail to account for the rainfall’s spatial variability. These two issues lead to errors that end up creeping into weather forecasts and natural disaster predictions. The upcoming generation of weather radars will be able to distinguish between different types of rain events and provide better data on raindrop size distributions, thus significantly reducing these two sources of error.

In a four-year research project, PhD student Joël Jaffrain studied the spatial variability of raindrop size distributions. He set up a network of disdrometers – sensors that can determine the number, size and speed of raindrops. Using the data, he produced a detailed picture of the rain intensity and drop sizes. “This is the very first experimental dataset that captures the variability within one-pixel of a radar image (1 square km),” says Berne.

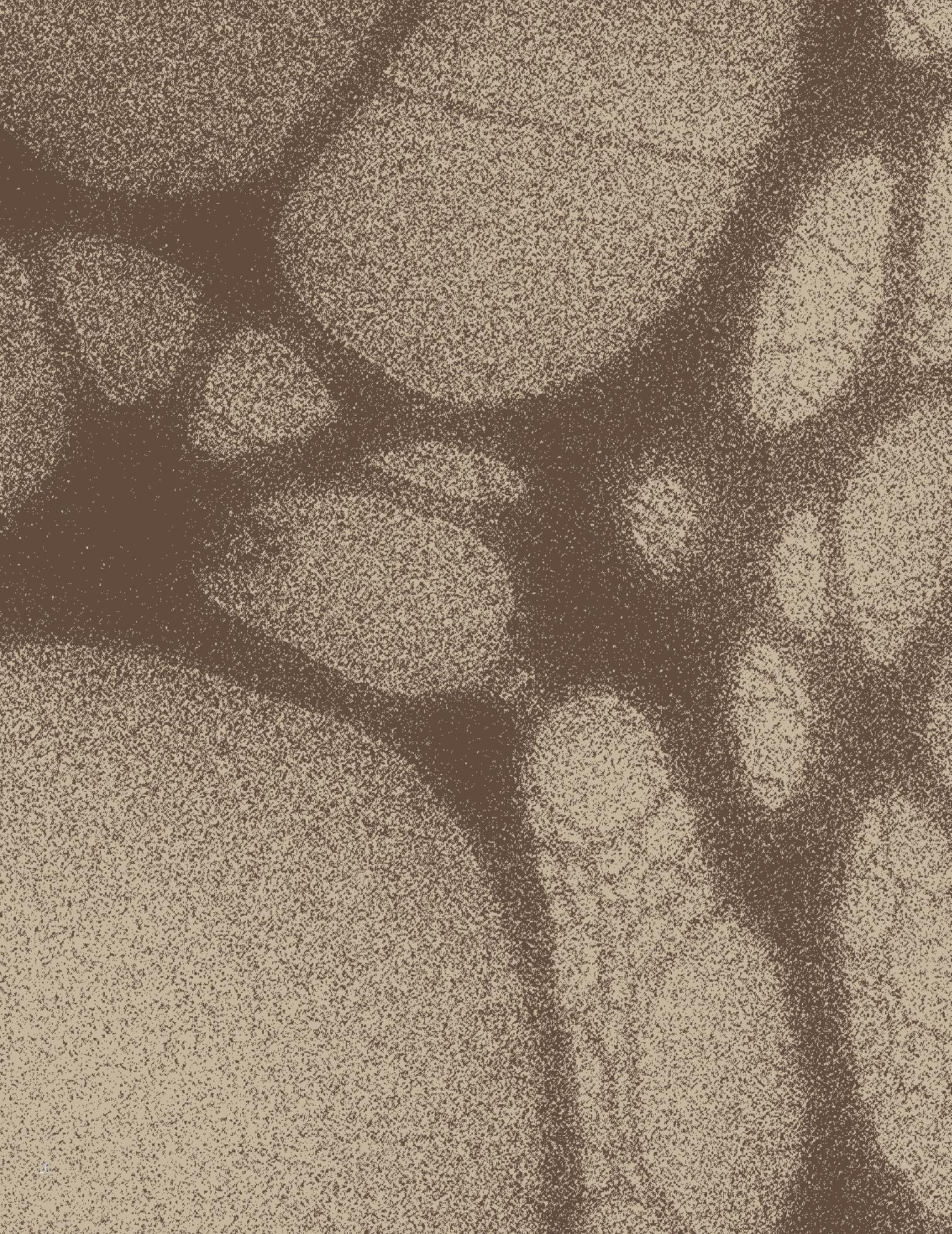
The experimental campaign took place on the EPFL campus. Jaffrain showed that the uncertainty in rain amount derived from radar measurements can reach 15%. It might not sound like much, but when radar measurements are used to “nowcast” the potential of extreme weather events, such as floods and land-slides, improved accuracy both in the measured value and the associated uncertainty can save lives.

Although the research project has come to an end, the disdrometer network is being used in a number of other field experiments. The data obtained during the campaign will be made public in the hope that other research groups around the world will use them to further improve the performance of weather radars. In the meantime, next time it rains and you’re lucky enough to be carrying an umbrella, why not tune into the sound of the drops and imagine how different they all are, how unique, each one ending its trip with a signature flourish on the fabric above your head.



“We have made our data available to the scientific community for further study.”

Alexis Berne



MUNCHING

ON

URANIUM



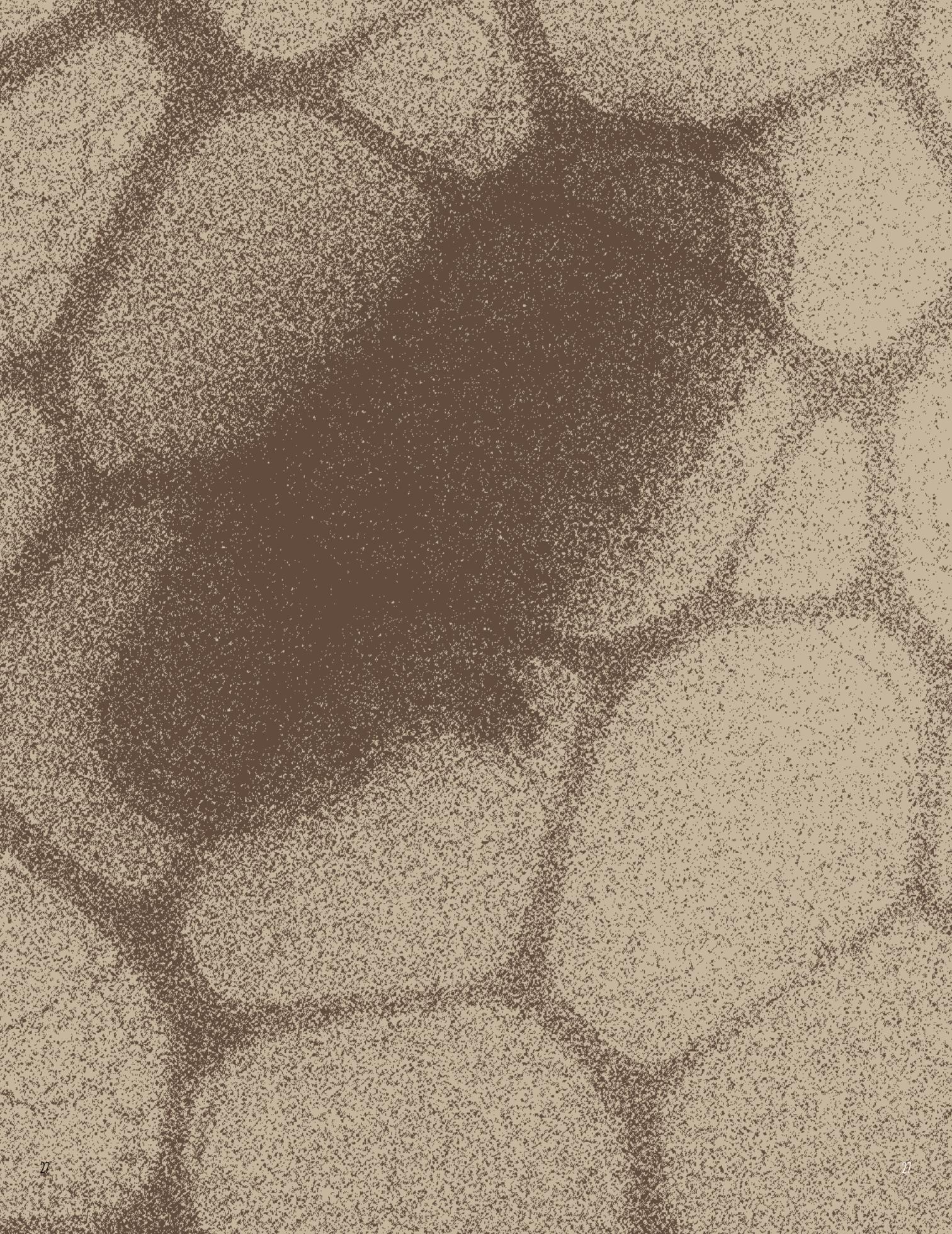


RIZLAN BERNIER-LATMANI IS
STUDYING HOW THE BACTERIA'S
NATURAL APPETITES CAN HELP PREVENT
GROUNDWATER CONTAMINATION.

Environmental Microbiology Laboratory (EML)

<http://eml.epfl.ch>

Rizlan Bernier-Latmani, Director



Just like our bodies, the earth's subsurface is teeming with bacteria

Rizlan Bernier-Latmani is studying how the natural appetites of bacteria can help prevent groundwater contamination.

Until about one year ago, the nuclear power industry had the wind in its sails, thanks to increasing global energy consumption and public support for carbon neutral power generation. Then came Fukushima. Almost overnight, the future of nuclear energy became less certain – Switzerland and Germany, for example, have decided to abandon it altogether. Nonetheless, the demand for uranium is not expected to decrease; the United States recently approved funding for two new nuclear reactors. Additionally, numerous nuclear power plants are planned in Asia and Eastern Europe.



Uranium is a naturally occurring radioactive element that can be found in low concentrations throughout the earth's crust, primarily as uraninite ore. This uraninite ore is mined and processed, yielding oxidized uranium, which is water soluble – and extremely toxic. If it is released into the environment, it can easily reach the groundwater, contaminating drinking water and ultimately rivers. What strategies could be applied near uranium former mining and milling sites to keep the contaminant from reaching the groundwater?



“You can't degrade a metal or a radionuclide per se, but what you can do is transform it into something that isn't very soluble,” explains Professor Rizlan Bernier-Latmani, head of ENAC's Environmental Microbiology Laboratory. And nature already appears to have found a way to accomplish this. It turns out that various bacteria process uranium while carrying out their metabolism. In so doing, they transform the soluble uranium into tiny insoluble uraninite nanoparticles. So how do we get the bacteria close enough to the uranium to process it? That's the easy part: they're already there!



What exactly is this new compound and where is it coming from? “We don’t know exactly what causes its formation, because theoretically, according to thermodynamics, uraninite should form,” says Bernier-Latmani. Changes in small parameters, such as the exact composition of the microbial population, the soil, or the groundwater, might be playing an important role in the process. To capture these elusive details, Bernier-Latmani’s team has taken the research out of the lab to a former uranium milling site. There they can capture all of the natural variability that occurs in the “real world,” but is easily lost in lab experiments.

Understanding how the bacteria metabolize uranium requires expertise in chemistry, microbiology and environmental engineering, a combination matched perfectly by Bernier-Latmani and her team. And this understanding could help them solve the problem of directing the bacteria’s behavior. “Ideally,” says Bernier-Latmani, “we would find a way to control which product is formed to make sure insoluble uraninite nano-particles are formed immediately.”

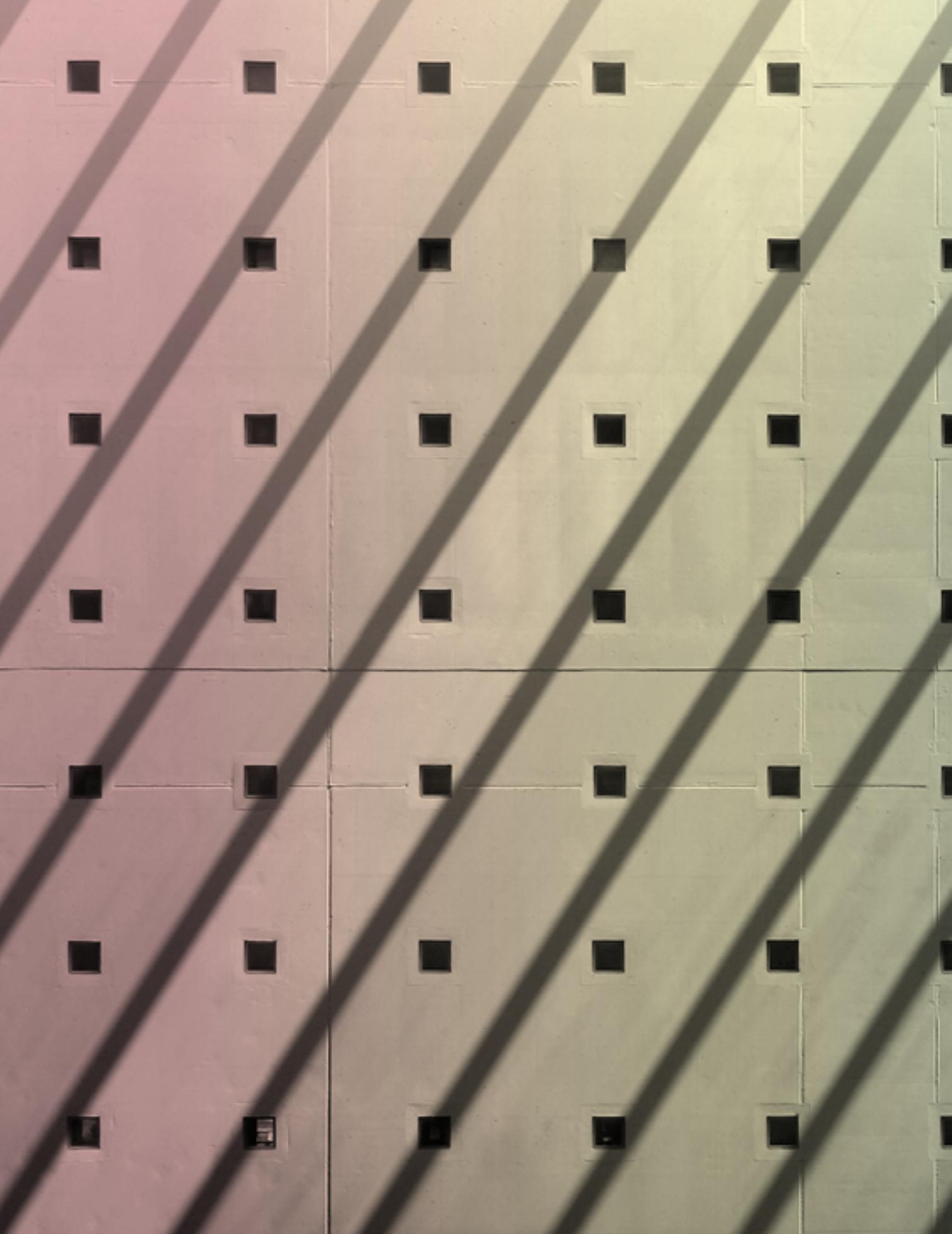
Just like our bodies, the earth’s subsurface is teeming with bacteria. These microbial communities spend much of their time underground in a dormant state. With the right kind of “food,” bacteria could be forced into an active state, where, through their own metabolism, they would immobilize the uranium by transforming it into insoluble uraninite, keeping it far away from groundwater and people. Problem solved – or at least so it seemed.

“We have to try to understand exactly what these bacteria are doing.”

Rizlan Bernier-Latmani

“We started studying these uraninite nano-particles, in particular their stability to oxidation, which is what you want to avoid, but then we realized that uraninite was not the only product that was being formed,” explains Bernier-Latmani. In fact, the majority of the uranium was taking an alternate route through the bacterial metabolism. Instead of being efficiently immobilized underground in the form of tiny insoluble nano-particles, the uranium somehow wound up dangling off hair-like strands that stick out of the bacteria like tentacles. The bad news is that this compound is much more reactive than uraninite, increasing its chances of entering the water cycle.







RESEARCH HIGHLIGHTS

In our laboratories, some 70 lead researchers and their groups are advancing knowledge in the most challenging areas of architecture, civil engineering and environmental engineering today. Highlighted here is a sampling of some of the research conducted in 2011. To learn more about the latest studies by ENAC scientists, visit <http://enac.epfl.ch/research>

AN INTERACTIVE PERFORMANCE-BASED EXPERT SYSTEM FOR DAYLIGHTING DESIGN

The amount of natural daylight that enters a building has a significant impact on the occupants' energy consumption and well-being. PhD candidate J. Gagne from MIT and Prof. Marilyne Andersen from the Interdisciplinary Laboratory of Performance-Integrated Design developed and tested a computational framework that acts as a virtual daylighting consultant, assisting architects in optimizing the quantity and the quality of daylight that enters a building. Starting from an initial architectural design and a set of daylighting objectives, the software suggests a series of design modifications that are likely to lead to improvements in daylighting performance, which the architect can either accept or reject. They presented their approach at the Passive and Low Energy Architecture (PLEA) conference in Belgium and received the Best Paper Award for their work. Currently they are investing development efforts into making this a robust simulation platform to bridge with architectural practice and education.

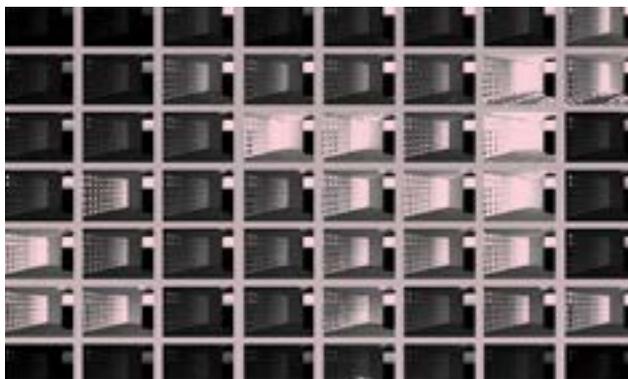
J. M. L. Gagne, M. Andersen. *An Interactive Performance-Based Expert System for Daylighting Design.* PLEA 2011 - Architecture and Sustainable Development, Louvain-la-Neuve, Belgium, July 13-15, 2011.

J. M. L. Gagne, M. Andersen, L. K. Norford. *An Interactive Expert System for Daylighting Design Exploration,* in *Building and Environment*, vol. 46, num. 11, p. 2351-2364, 2011.

Prof. Marilyne Andersen

Interdisciplinary Laboratory of Performance-Integrated Design (LIPID)

<http://lipid.epfl.ch>



THE URBAN BODY OF SINO-SWISS COOPERATION

Urban Body brought together researchers, architects, and students from ENAC's Design Studio on the Conception of Space and from the Department of Environmental Art Design at Tsinghua University's Design Academy in Beijing, China. Defying cross-cultural, cross-disciplinary and linguistic barriers, they joined forces at the 751 Design Park, an industrial site neighboring the 798 Art Area to explore the conception of architectural space by the use of a module. Wooden industrial pallets were chosen, as they best seemed to foster the iconic ambiguity between the site's industrial past, its characteristic railway line, and the other exhibit pieces. The students hand-built two outdoor structures using 500 pallets, woven together with two kilometers of polyester rope. The structures were re-assembled for display at the Beijing Design Week and Triennial 2011. Urban Body was conceived as a long-term cooperation between the two faculties and the success of the '751 space modules' has prompted the pursuit of a further series of workshops.

Isabella Pasqualini — PhD thesis in progress

Prof. Dieter Dietz

Design Studio on the Conception of Space (ALICE)

<http://alice.epfl.ch>

SUSTAINABLE NEIGHBORHOODS

In the latter half of the past century, urban sprawl and functional specialization of urban areas have led to inefficient land-use, an increase in socio-cultural disparities, and harm to the environment. In the context of a national program on sustainable neighborhoods, the Federal Office for the Environment (OFEN) and the Federal Office for Spatial Development (ARE) have made it a national priority to reverse these trends, beginning at the neighborhood scale. Prof. Emmanuel Rey was commissioned to write a report on the conceptual, methodological, and operational challenges involved in building sustainable neighborhoods, which he presented at the Forum for Sustainable Development in Bern. The report further outlines methods developed to evaluate the sustainability of such projects, and introduces an online tool (Sustainable Neighborhoods by Sméo) to assist communities in planning such projects.

E. Rey. Quartiers durables. Défis et opportunités pour le développement urbain. Office fédéral du développement territorial ARE / Office fédéral de l'énergie OFEN, Berne, 2011. (edited in German, French, and Italian)

Prof. Emmanuel Rey

Laboratory of Architecture and Sustainable Technologies (LAST)

<http://last.epfl.ch>



PREDICTING FUTURE DEMAND FOR "GREEN" CARS

The development of new propulsion technologies has been a major focus of the car industry recently. In particular, many car manufacturers are planning to release electric vehicles on the market in the near future. In this context, the Transport and Mobility Laboratory (TRANSP-OR) directed by Prof. Michel Bierlaire has conducted a joint project with Renault Suisse S.A. to model and forecast the future demand for such vehicles. This research project was initiated by EPFL's Transportation Center (TraCE) under the executive direction of Dr Michaël Thémans. Using mathematical models of behavior based on the theory of random utility and latent variables, Aurélie Glerum, a PhD student at TRANSP-OR, identified the factors affecting individuals' car purchase choices and the socio-economic determinants defining the target customer's profile. Interestingly, she showed that more qualitative aspects played a significant role in the decision-making process, such as the perception of a car's design.

A. Glerum, M. Thémans, M. Bierlaire. Modeling demand for electric vehicles: the effect of car users' attitudes and perceptions. ICMC 2011, Leeds, UK, July 06, 2011.

A. Glerum, M. Thémans, M. Bierlaire. Emergence of electric mobility: a nested approach to vehicle choice modeling. Swiss Transport Research Conference, Ascona, May 11, 2011.

Prof. Michel Bierlaire

Transportation and Mobility Laboratory (TRANSP-OR)

<http://transp-or.epfl.ch>

RESEARCH HIGHLIGHTS

SEISMIC BEHAVIOR OF MASONRY SPANDRELS

Buildings with unreinforced brick walls are particularly vulnerable to earthquake damage. They can be found all around the world, and represent also a large fraction of the existing building stock in Switzerland. Spandrels – the horizontal structural elements in a building façade – are strongly implicated in a building’s response to an earthquake. Nonetheless, their force-deformation behavior during seismic events has received little attention from civil engineers. Prof. Katrin Beyer has developed a mechanical model that allows to estimate the strength of clay brick masonry spandrels, before and after the formation of cracks in the spandrel due to seismic excitation. Her model further allows to account for the contribution of a wooden beam or a masonry arch to the spandrel’s resistance. These findings, to be published in *Engineering Structures*, lay a foundation for more accurate seismic assessments of unreinforced masonry buildings.

K. Beyer. Peak and residual strengths of brick masonry spandrels, accepted in *Engineering Structures*, vol. 41, p. 533-547, 2012.

Prof. Katrin Beyer

Earthquake Engineering and Structural Dynamics Laboratory (EESD)

<http://eesd.epfl.ch>



USING MULTIFUNCTIONAL “SANDWICHES” AS BUILDING MATERIAL

In a research project funded by EPFL’s campus in Ras Al Khaimah, United Arab Emirates, scientists and engineers from the Composite Construction Laboratory are working on a new generation of structural building components, composed of a polyurethane foam layer sandwiched between two layers of glass-fiber reinforced polymers. These new pre-fabricated composite building components provide a lightweight, thermally insulating, and architecturally stimulating alternative to reinforced concrete, which is traditionally used as the load bearing core of a building and has to be wrapped by the facade. The focus of the current project is on optimizing the integration of a thin photovoltaic film beneath the translucent outer glass-fiber reinforced polymer layer, thus adding electricity generation to this already highly multi-functional building component.

T. Keller, A. P. Vassilopoulos, B. D. Manshadi. Thermomechanical behavior of multifunctional GFRP sandwich structures with encapsulated photovoltaic cells, in *Journal of Composites for Construction*, vol. 14, num. 4, p. 470-478, 2010.

Carlos Pascual Agullo – PhD thesis in progress

Prof. Thomas Keller

Composite Construction Laboratory (CCLAB)

<http://cclab.epfl.ch>

IMPROVING THE SAFETY OF KARIBA DAM

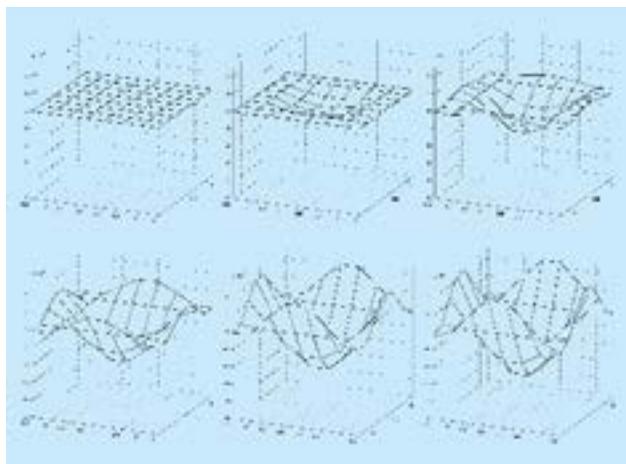
Heavy seasonal rains in the Zambezi catchment feeding Lake Kariba, on the border between Zimbabwe and Zambia, have repeatedly forced authorities to open the gates of the spillway to prevent the Kariba Dam from uncontrolled overtopping. The excess water gushes out of the orifices as high-velocity jets with such force that, over time, it has gnawed a hole over 80 meters deep into the riverbed, threatening to undermine the dam's foundations if left unchecked. Thanks to their reputation accrued over the past decades in studying the process of rock scour at civil hydraulic structures, ENAC's Hydraulic Constructions Laboratory was mandated to find a solution to attenuate the destructive scouring of the Kariba riverbed. Professor Anton Schleiss and his team used a hybrid numerical and physical modeling approach to test and validate a solution, which they have submitted to the Zambezi River Authority. The solution proposed involves reshaping of the geometry of the scour hole in the downstream direction to reduce pressure fluctuations of the impacting jets and achieve stable conditions without scouring.

Fundamental research performed on rock scour at LCH: E. Bollaert (PhD thesis 2002), P. Manso (PhD thesis 2005), M. Federspiel (PhD thesis 2011), R. Duarte (PhD thesis in progress).

Prof. Anton Schleiss

Hydraulic Constructions Laboratory (LCH)

<http://lch.epfl.ch>



NEW ALGORITHMS TO STUDY COMPLEX SURFACES

Wooden beams and planks are bent, pleated and braided to create a new generation of light structures, which are aesthetically appealing, economically viable, and environmentally sustainable by design. The extreme deformation of the timber elements and the complexity of the resulting surfaces make them sometimes difficult to analyze using standard approaches, since these occasionally fail to reliably capture certain mechanical properties. In an interdisciplinary collaboration, the Chair of Timber Construction has reached out to a group of theoretical mathematicians at the Chair of Geometric Analysis to derive the theory needed for the development of a structure preserving algorithm to aid in the design and analysis of these thin wooden structures. The tool, which is under development, is based on discrete variational mechanics and uses asynchronous variational integrators (AVI) to study the stability and load-bearing capacity of a given structure, and will allow to assess the feasibility of ever more daring designs.

F. Demoures, F. Gay-Balmaz, J. Nembrini, T. S. Ratiu, Y. Weinand.

Flexible beam in R^3 under large overall motions and Asynchronous Variational Integrators. IABSE-IASS Symposium 2011, London, Great-Britain, September 20-23, 2011.

F. Demoures, J. Nembrini, T. S. Ratiu, Y. Weinand et al.

AVI as a Mechanical Tool for Studying Dynamic and Static Euler-Bernoulli Beam Structures. 1st EPFL Doctoral Conference in Mechanics, Advances in Modern Aspects of Mechanics, Lausanne, February 19, 2010.

Prof. Yves Weinand

Chair of Timber Construction (IBOIS)

<http://ibois.epfl.ch>

RESEARCH HIGHLIGHTS

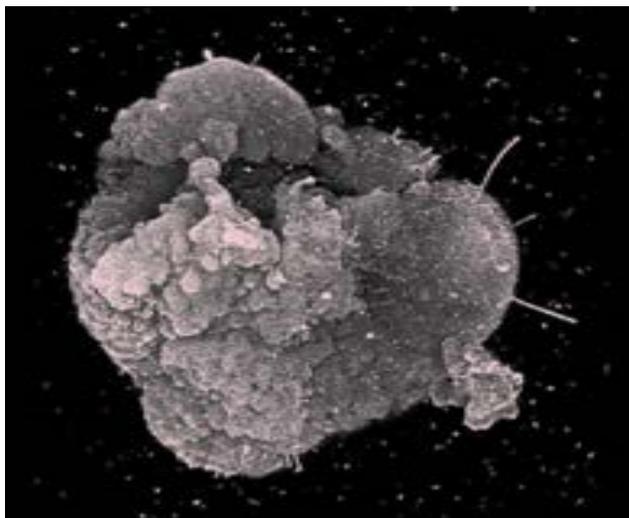
TREATING WASTEWATER WITH AEROBIC GRANULES

Under the right conditions, the sludge of bacterial and protozoan organisms which are used to remove carbon, nitrogen, and phosphate from water in wastewater treatment plants will aggregate into solid granules. Their higher density, faster settling rates and microbiological diversity give these granules the potential to outperform the floccular bacterial sludge traditionally used in today's wastewater treatment facilities. At the same time they allow to reduce the footprint of the facilities and the cost of the treatment. Researchers from the Laboratory for Environmental Biotechnology are tackling two of the remaining obstacles that stand in the way of successfully applying this technology: accelerating the aggregation and maturation of the granules, and increasing their microbiological and physical stability. In a recent publication they demonstrated the importance of growing the right microbiological population, down to the bacterial subtype, to ensure efficient removal of the pollutants.

G. Gonzalez-Gil, C. Holliger. Dynamics of Microbial Community Structure of and Enhanced Biological Phosphorus Removal by Aerobic Granules Cultivated on Propionate or Acetate, in *Applied and Environmental Microbiology*, vol. 77, p. 8041-8051, 2011.

David Weissbrodt – PhD thesis in progress
Samuel Lochmatter – PhD thesis in progress

Prof. Christof Holliger
Laboratory for Environmental Biotechnology (LBE)
<http://lbe.epfl.ch>



HUNTING DOWN MICROPOLLUTANTS IN LAKE GENEVA

Even following treatment, wastewater continues to carry trace amounts of a variety of micropollutants, ranging from hormones, pharmaceuticals, and pesticides to anti-corrosive agents used in dishwashing detergents. Lausanne's treated wastewater is released into Lake Geneva at a discharge site 700 m from shore, 30 m below the water surface. PhD student Florence Bonvin sampled the lake water above and around the discharge site over a period of ten months. Her results demonstrated the presence of a micropollutant plume and showed that thermal stratification of the lake water during the warmer months traps the plume at a depth where its density matches that of the surrounding water. As a result, the concentration of certain micropollutants, mainly antibiotics, can reach levels that pose a risk to the environment. In an ongoing follow-up study, data obtained using a submarine from the elemo field campaign are being evaluated to delineate the plume's boundaries.

F. Bonvin, R. Rutler, N. Chèvre, J. Halder, T. Kohn. Spatial and temporal presence of a wastewater-derived micropollutant plume in Lake Geneva, in *Environmental Science and Technology*, vol. 45, p. 4702–4709, 2011.

Prof. Tamar Kohn
Environmental Chemistry Laboratory (LCE)
<http://lce.epfl.ch>

COMPUTER-AIDED DISEASE CONTROL

The outbreak of cholera that followed the January 2010 earthquake in Haiti demonstrated the difficulty in predicting the progression of this often fatal disease and in optimally allocating the resources available to fight it. Professor Andrea Rinaldo and his co-workers have developed a numerical model to simulate the disease's spatial evolution. Their model, which was validated against a past cholera epidemic, simulates both major mechanisms of diffusion of the waterborne disease: along river networks and via the mobility of infected human carriers. Supplemented by knowledge gained on site in Haiti, their studies offered predictions on the spread of the epidemic and provided a means to test the effectiveness of various intervention strategies. It was found that, at an advanced stage of the epidemic, providing clean drinking water and education campaigns aiming to reduce exposure to the pathogens would have the greater impact in slowing the progression of the disease than mounting a large scale vaccination campaign.

A. Rinaldo, M. Blokesch, E. Bertuzzo, L. Mari, L. Righetto et al.

A transmission model of the 2010 cholera epidemic in haiti, in *Annals of internal medicine*, vol. 155, num. 6, p. 403-4, 2011.

E. Bertuzzo, L. Mari, L. Righetto, M. Gatto, R. Casagrandi et al.

Prediction of the spatial evolution and effects of control measures for the unfolding Haiti cholera outbreak, in *Geophysical Research Letters*, vol. 38, p. L06403, 2011.

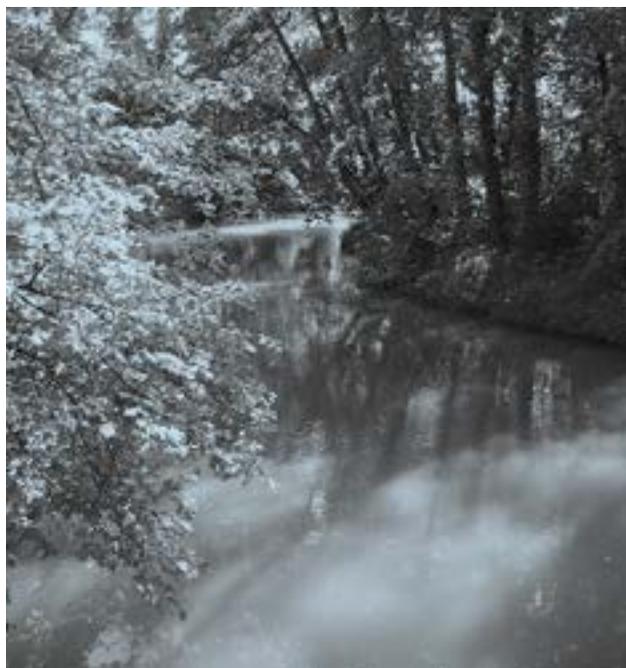
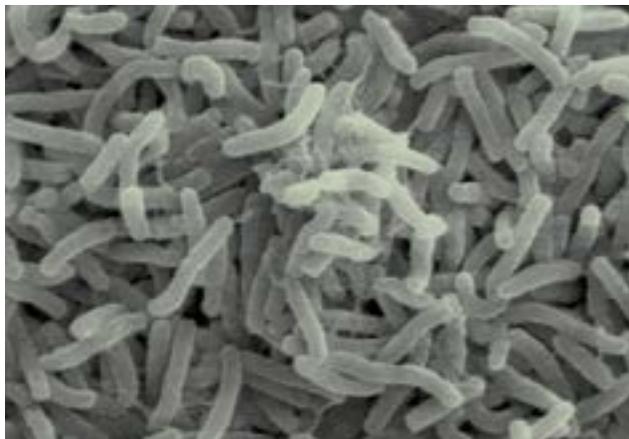
L. Righetto, E. Bertuzzo, R. Casagrandi, M. Gatto, I. Rodriguez-

Iturbe et al. Modelling human movement in cholera spreading along fluvial systems, in *Ecohydrology*, vol. 4, p. 49-55, 2011.

Prof. Andrea Rinaldo

Laboratory of Ecohydrology (ECHO)

<http://echo.epfl.ch>



TRACKING DOWN PCBs IN THE VENOGÉ RIVER

Identifying low or trace concentrations of micropollutants in water remains a challenge for water quality monitoring. Although polychlorinated biphenyls (PCBs) have been prohibited in Switzerland since the 1970s, these molecules continue to contribute to the micropollutants found in our streams. PCB concentrations in fish exceeding the sanitary limit have demonstrated the need for efficient tools to locate the sources of pollution. In recent years, investigations conducted by the Central Environmental Laboratory have identified several pollution sources through the use of passive sensors in low-density polyethylene (LDPE), which allow to integrate pollution over time. In 2011, they carried out investigations in the Venogé River to understand the cause of the contaminated fish found there. Potential sources identified were an industrial zone and landfills. This work was supported by the Canton of Vaud (SESA) and the Federal Office for the Environment and will continue in 2012.

Dr Luiz Felipe De Alencastro

Central Environmental Laboratory (GR-CEL)

<http://gr-cel.epfl.ch>

ENAC AT LARGE

ALUMNI NEWS

In September 2011, President Barack Obama awarded the Presidential Early Career Award for Scientists and Engineers to Dr Reuben Kraft. This award is considered the highest honor for an early-career scientist in the United States. Kraft is a former PhD Student of Prof. J.F. Molinari and is currently a research scientist at the US Army Research Laboratory (ARL). During his PhD thesis, Kraft developed innovative numerical models to understand the behavior of high-performance ceramics under extreme loading conditions. Currently at ARL, he is leading a Biomechanics research program to understand and prevent traumatic brain injuries.

On October 1, 2011, Darren Robinson was named Full Professor in Building and Urban Physics at the University of Nottingham. Prior to this, Robinson held a position as lecturer and researcher at the Laboratory of Solar Energy and Building Physics (LESO-PB) at ENAC, where he initiated the group's activities in sustainable urban development. He played a key role in building LESO-PB's international reputation of in this field, and received several awards for his work (Building and Environment Best Paper Awards 2009 & 2010, CIBSE Napier-Shaw Bronze Medal 2007).

Emma Frejinger has been appointed Assistant Professor at the division Transport and Location Analysis, KTH Royal Institute of Technology, Stockholm, Sweden. She graduated from EPFL in 2008, with a PhD thesis under the supervision of Prof. Michel Bierlaire in the Transportation and Mobility Laboratory. Her thesis, entitled "Route choice analysis : data, models, algorithms and applications" received two prestigious awards: the 2008 Eric Pas Dissertation Prize from the International Association for Travel Behaviour Research (IATBR), and the 2008 Dissertation Prize of the Transportation Science & Logistics Society of INFORMS.



Reuben Kraft



Darren Robinson



Emma Frejinger



AN EXTRAORDINARY SCIENTIFIC
AND HUMAN ADVENTURE

Elemo, a research campaign focused on exploring the depths of Lake Geneva, took off in 2011, as announced in last year's ENAC Annual Report. EPFL took over the campaign's scientific lead. Honorary Professor Ulrich Lemmin and three other groups from ENAC were heavily involved in the project.

From May to August 2011, 30 scientists worked hand in hand with a team of 24 Russian scientists and technicians. In the course of over 60 dives, they collected water and sediment samples and measured dissolved gas concentrations, water temperature, and underwater lake currents. The huge mass of data obtained during the campaign is being analyzed as part of several PhD theses, scheduled to be completed by 2014.

Preliminary results shed light on the types of sediments in the lake, and their distribution throughout the lake's basin. The researchers are gaining insight into the production and distribution of methane in the Rhone delta and have been able to quantify micropollutant concentrations and circulation in Vidy Bay. Other preliminary results provide data on bacterial populations in the Grand Lac (the deepest part of the lake) and in the Dranse Delta. More detailed information will be available in the course of 2012. All the data obtained during the dives is being assembled into a database, which will be made available to the scientific public.

The spectacular campaign received extensive coverage by the media and was the subject of a communication published in the journal *Nature* on July 29, 2011 (doi:10.1038/news.2011.445). An outdoor exhibit on Lake Geneva and the dives, held from June to August, attracted over 15,000 visitors to Ouchy. An educational program was put together in collaboration with the School Council of the Canton of Vaud to share the exciting research with 12 to 15 year old students.

<http://www.elemo.ch>

QUANTIS

AN EXPERT IN QUANTIFYING ENVIRONMENTAL IMPACT

Quantis was founded in 2006 as Econtesys by a group of adventurous engineers from ENAC, who had decided to help companies reduce their environmental impact. Among them, Yves Loerincik, a former ENAC PhD student. Quantis began providing its services in Life Cycle Analysis (LCA) with just two employees. Today, Quantis is a multinational company, employing over 70 collaborators in Switzerland and around the world. Its client portfolio includes both local companies and big names from all sectors of the economy, such as Nestlé, Firmenich, Kraft, Veolia, or L'Oréal. On the rise since day one, their turnover reached six million francs in 2011.

<http://www.quantis-intl.com>

HELIMAP SYSTEM

A FULL VIEW OF THE MOUNTAIN

After finishing his PhD thesis at ENAC in 2008, Julien Vallet co-founded Helimap System. Three successful years later, the company employs ten people and has a client base in which foreign clients, from as far away as Ukraine or Equatorial Guinea, make up 60%. Helimap found its niche using hand-held laser cameras to acquire terrain data to draft high resolution topographical maps from onboard a helicopter. Helimap System focuses on mapping small areas of five to ten hectares, and has specialized in alpine cartography of cliffs, avalanche corridors, and glaciers. With close to 100 clients and an annual turnover of more than 2.5 million francs, this young start-up can serenely look into the future.

<http://www.helimap.ch>

THERMOPILE

A NEW COMMERCIAL SOFTWARE FOR THE DESIGN OF GEOTHERMAL FOUNDATIONS

Tunnel anchors, raft foundations, piles, and diaphragm walls are examples of geostructures that are increasingly being used to exchange heat between built structures and the ground. They have been used to either heat buildings in the winter via a heat pump, or to cool them in the summer by injecting excess heat back into the ground. Using geostructures for energy transfer can, however, induce significant thermal stresses and strains that must be accounted for during their design – especially in the case of pile foundations. To facilitate the design of energy piles, ThermoPile, a new software tool, was developed, incorporating expertise acquired in this field at the Laboratory of Soil Mechanics at ENAC.

<http://lms.epfl.ch/thermopile>

PRESS REVIEW 2011

<http://actualites.epfl.ch/presse>

FEBRUARY

Timber on display

The Timber Project exhibition was put together by the Laboratory for Timber Constructions at ENAC. On display were the results of five years of research, underscoring the potential of wood as a sustainable and versatile building material. The exhibit was held in the context of the Energy Forum organized by the European FEDRE foundation in Geneva. It was also displayed at the Pont et Chaussées exhibition center in Luxembourg in July.

MARCH

Some micropollutants leave waste water treatment plants unscathed

To comply with new water protection rules, one in seven Swiss waste water treatment plants is in need of an upgrade. Two studies led by research groups from ENAC and Ecotox Center Eawag/EPFL showed that both ozone and powder activated carbon treatment of waste water could significantly improve the elimination of micropollutants of pharmaceutical and other origins.

Mobility on demand at the center of researchers' attention

The idea of mobility on demand goes back some twenty years and is constantly under development. For Nikolaos Geroliminis, director of the Laboratory of Urban Transport Systems, it is a serious field of research.

APRIL

A merger between canton Jura and the Bernese Jura under scrutiny

Were the Bernese Jura to merge with canton Jura, members of Bienné's French-speaking minority might find themselves in a tough spot, as several services they rely on could decide to leave the city. The city's economy, however, would not suffer; on the contrary, it would improve. These were the main findings of a comprehensive study conducted on request of the government by the Urban and Regional Planning Community at ENAC.

JUNE

A different kind of neighborhood

A new impressive eco-neighborhood designed to promote social mixing has been drafted for the city of Gland, comprising 21 apartment buildings, housing a total of 1200 residents. Losinger, the construction firm behind the project, called on an ENAC lab to conduct a study on the expectations of the future residents.

Vegetables under scientific surveillance

The days when farmers relied on their senses to decide whether or not to water their crops may be a thing of the past. Fruit and vegetable farmers in canton Valais have decided to equip the Rhone Valley with a network of climate sensors. The data collected can be retrieved from remotely using a computer or a smartphone. The project was established in collaboration with Sensorscope Sàrl, a start-up that emerged from ENAC.

JULY

A fresh and original look

Students of architecture and urbanism from Paris, Bruxelles, Montréal and the EPFL in Lausanne have taken a critical look at the city of la Chaux-de-Fonds and its urban future. Responding to a mandate to address specific questions, they made original proposals that strongly caught the attention of the local authorities.

Twelve trips a day

Three ENAC laboratories in EPFL's Transportation Center were mandated by CarPostal SA to conduct a study on the needs and expectations of the Swiss population for "combined mobility." One finding of note was that it takes a minimum of twelve return trips per day to make a bus route attractive to users.

Population, accommodation, transportation: we need to slow down!

P. Dessementet, a geographer at the Urban and Regional Planning Community at ENAC is one of the authors of an evaluation of the real-estate landscape in and around Lausanne. The results highlighted a disturbing disconnect between supply and demand in the region since 2007.

A horizontal plume

The oil released into the Gulf of Mexico following the explosion of the Deepwater Horizon drilling platform in April 2010 didn't diffuse just as one would have expected. Researchers from ENAC's Environmental Chemistry Modeling Laboratory contributed to a study that found that, instead, it spread out horizontally in the depths of the ocean, forming a second chemical plume that was larger than predicted.

AUGUST

Under a helium moon

Students of the Design Studio on the Conception of Space have found a way to add a touch of modernity and lightness to the medieval village of St. Prex for the 2012 edition of the St. Prex Classics. They designed a temporary and modular stage above which a huge helium balloon would float like a giant new moon. In the event of bad weather, the balloon could be lowered, to form a dome to protect both artists and concert-goers from the rain.

OCTOBER

A facelift for the facades at Lignon

The owners of the Lignon apartment buildings in Vernier (GE) have received three proposals for the renovation of their buildings' facades. The proposals are the result of a several year long collaboration between the Laboratory of Techniques and Preservation of Modern Architecture and the Institute of Environmental Science at the University of Geneva. Once in place, the new facades are expected to reduce the neighborhood's energy use by a half.

Spatial and Urban installation

The Swiss are still slow in adopting a holistic approach to planning and developing their built environment, their infrastructure, and their countryside. The National Research Program on the "Sustainable development of the built environment" (NRP 54), directed by ENAC professor Eugen Brihwiler, concluded this leads to losses in quality of life and high costs to the national economy and that a better coordination in territorial development is of the essence.

DECEMBER

From facades to streams

Fungicides and antibacterial agents added to outdoor paints can be washed off of building facades by strong rain. S. Coutu, a PhD candidate from the Ecological Engineering Laboratory at ENAC has developed a mathematical tool that is able to estimate, to high degree of accuracy, the level of contamination of streams by three of these micropollutants after rainstorms.

Swisswoodhouse – for the city and the countryside

Emmanuel Rey, director of the Laboratory of Architecture and Sustainable Technologies at ENAC, has taken some time to think about urban densification and the right scale for housing buildings. One of his solutions fits into a single word: Swisswoodhouse: a modular, adaptive and sustainable alternative to the private villa. The project is the result of a collaboration between various research groups.

Well grounded in its foundations

When the ground a building is built on calls for deep foundations, why not kill two birds with one stone and use geothermal heat drawn from the foundations to heat the building in the winter, or cool it in the summer? Professor Lyesse Laloui, director of the Laboratory of Soil Mechanics is pursuing this promising approach that lies right on the interface between geotechnology and geothermics.

KEY MOMENTS

ARCHIZOOM

ARCHIZOOM, ENAC'S PERMANENT EXHIBITION GALLERY, IS DEDICATED TO THEMED PUBLIC EXHIBITIONS OF RESEARCH AND PROJECTS ACCOMPANIED BY SEMINAR SERIES, WITH THE GOAL OF ILLUSTRATING THE MULTIDISCIPLINARY ASPECTS OF ARCHITECTURE.

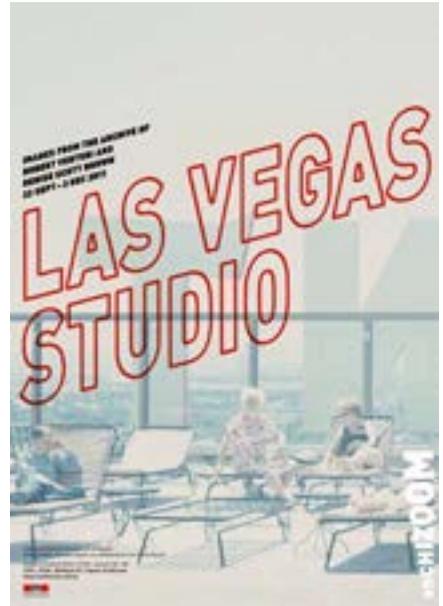
Archizoom hosts exhibitions and public conferences to foster the relationship between the academic and professional community, and provides a platform for open dialogue on the faculty's various fields.

The spring's exhibition, **WORK-PLACE**, offered visitors a glimpse into the environment in which architectural ideas come to life. Studio Mumbai's architectural production, on display there, showed how the logical foundations of architecture draw on observations of nature. At Studio Mumbai, masons, carpenters, and stonecutters are far more than just artisans; they are consultants, called on repeatedly throughout the project. Taking full advantage of local resources, they rediscover and promote traditional construction practices.

During the exhibition, Martin Rauch held a lecture on clay architecture, Emilio Caravatti presented his construction projects in Mali, Robert Mangurian presented **BASE** Beijing, his new China-based studio, and Bijoy Jain, founding architect of Studio Mumbai, discussed his way of doing architecture in India. Archizoom published a book, distributed around the globe, on the exhibition.

In September, the traditional "Best of Architecture EPFL" exhibition presented the crème de la crème of the previous year's students' projects in the SG building at the EPFL. The exhibition then traveled on to the Getaz showroom in Etoy. For the first time, the top 40 projects to come out of student project workshops were presented in a catalog.

During the autumn semester, a new exhibit, **LAS VEGAS STUDIO**, displayed still frames and motion pictures from Venturi & Scott Brown's archives, capturing their now famous research, conducted in the 1960s, entitled "Learning from Las Vegas." This historic exhibition touched on a wide range of themes, from research in architecture, urbanism, and postmodernism to the relationship between art and architecture. Denise Scott Brown held a memorable inaugural lecture, followed by a lecture series by architecture theorists Martino Stierli, Sarah Goldhagen, Valéry Didelon and Glenn Adamson of the Victoria and Albert Museum in London, as well as architect Luca Merlini.



ARCHIZOOM

EPFL — Building SG — Station 15
1015 Lausanne
Exhibition Room SG 1212 — Entry free
+41 (0) 21 693 32 31
<http://archizoom.epfl.ch>

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



LANDOLT & CIE CHAIR

INNOVATIVE STRATEGIES FOR A SUSTAINABLE FUTURE



In 2011, the Chair welcomed Professor Megan Murray of the Harvard School of Public Health. Murray specializes in the epidemiology of infectious diseases in emerging countries. At ENAC, she applied her expertise in a joint project with the Laboratory of Ecohydrology, directed by Professor Andrea Rinaldo, to understand, model and predict the dissemination of the cholera bacteria in Haiti.



The Chair financed a survey into the effects of climate change on winter tourism in Valais. The study, conducted by Professor Philippe Thalmann (Economics and Environmental Management Laboratory), was presented at the Green Pioneers Summit 2011 in Verbier.

THREE PUBLIC LECTURES WERE HELD IN THE PAST YEAR

“Meeting Future Water Demands: Creative Solutions for Managing Water Scarcity and Related Financial Risks,” by Gregory W. Characklis, professor at the University of North Carolina – March 10, 2011. The conference outlined physical and economic trends influencing water management and explored creative solutions for addressing some of the problems that will be encountered.

In September 2011, the Chair received Professor José Torero of the University of Edimbourg. Torero, a top expert in fire safety engineering, contributed to the report on the collapse of the World Trade Center towers. At EPFL, he will emphasize the importance of interdisciplinary collaborations, including materials scientists, structural engineers and architects, to improve the fire safety of buildings on a case by case basis.

“Bamboo Structures,” by Simon Velez, the Colombian architect who helped revolutionize bamboo architecture – May 12, 2011. The conference presented a selection of Velez’s bamboo buildings.

“Extreme Weather Conditions in a Changing Climate,” by Dr Ghassem Asrar, Director of the World Climate Research Program – October 6, 2011. In his conference, Dr Asrar outlined the current state of scientific knowledge of extreme weather events and presented projections into the future, based on climate models.



INNOVATIONS FOR A
SUSTAINABLE FUTURE

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<http://chaire-landoltetcie.epfl.ch>

KEY MOMENTS

ENAC's public relations activities promote the school's research and teaching activities to the outside world and bring valuable feedback from institutions, future students, lecturers, researchers, political bodies and professional associations.

ECOVEG7

THE FRANCOPHONE CONFERENCE ON PLANT
COMMUNITY ECOLOGY IN ITS SEVENTH EDITION

The Laboratory for Ecological Systems (ECOS) organizes these annual Research Days to promote the exchange of the latest findings in aquatic and terrestrial plant community ecology. The event focused on the theoretical foundations of plant community ecology and related environmental issues: global changes and ecological perturbations, the function of plant communities along environmental gradients, conservation and restoration of ecosystems, biotic interactions and biological invasions, biodiversity and rules on combining species, biological traits and functional groups.

<http://ecos2.epfl.ch/ecoveg7>

SYMPOSIUM LATSIS EPFL 2011

"MAPPING ETHICS. NEW TRENDS IN CARTOGRAPHY AND SOCIAL RESPONSABILITY"

Does cartographic co-production erase the individual contributor's responsibility? Can self-organizing collections of geographical data still be considered maps? How technical choices can be seen as actors of public debates, political controversies, or geopolitical conflicts? Can maps as hybrid of iconic, semiotic and symbolic systems, deal with the clarification of values? These questions and other hot topics were on the agenda of symposium organized by the Chôros Laboratory. The symposium aimed to explore cartography not only as knowledge but as ethics, too. Issues all the more stimulating since debates on the nature of maps and ethics are far from being closed. Moreover, thanks to new technologies, specialists hold no longer a monopoly over map-making and cartographic data are no longer restricted to a small group of experts, but, thanks to new technologies, have become accessible to anyone.

http://www.eidolon.ch/eidolon/En_Symposium.html

ENAC RESEARCH DAY

THE FUTURE AND CHALLENGES OF THE RISING "MÉTROPOLE LÉMANIQUE"

Over the past several years, the concept of a "Metropole Lémanique" has made its way into public discourse and that of the population at large. The intense territorial development taking place around Lake Geneva will not occur without its share of problems. These problems will have to be addressed at a local level, and will demand a concerted effort between the various parties involved: politicians, economists, sociologists, engineers, architects, geographers, urban planners, etc. Last June, ENAC made this the topic of its Research Day 2011. On the program were a presentation on ProDoc Léman 21, a research program looking into the dynamics of micropollutants; a lecture held by Dr Xavier Comtesse from the Swiss-French section of Avenir Suisse; and a poster session, displaying posters by the School's PhD students.

<http://enac.epfl.ch/research-day>

AN URBAN DESIGN LABORATORY IN BASEL

Laboratory Basel (LABA) moved to Basel in fall 2011 to establish CERBERUS, a platform for research and teaching on urban design, in collaboration with the ETH's Studio Basel. With this move, LABA, lead by Professor Harry Gugger, also widens its focus to include regional and territorial planning issues. With the development of a GIS research and teaching unit, LABA has started to explore projects that use this technology to better analyze complex urban and regional developments. Urban morphology – the implementation of larger regional strategies on the architectural and urban design scale remains the crucial focus.

<http://laba.epfl.ch>



CISBAT 2011 INTERNATIONAL SCIENTIFIC CONFERENCE

CLEANTECH FOR SUSTAINABLE BUILDINGS — FROM NANO TO URBAN SCALE

CISBAT is a biannual conference organized by the Solar Energy and Building Physics Laboratory of the Swiss Federal Institute of Technology Lausanne (EPFL). The 2011 program featured internationally known keynote speakers, technical sessions, visits as well as networking events for specialists from academic institutions, industry and the public sector. Around 200 building scientists from universities and companies around the world to present their latest research and developments towards a sustainable and sound built environment, in the fields of design and technological innovation of building skins, sustainable urban development, solar energy capture systems, and the integration of natural and artificial daylighting systems.

<http://cisbat.epfl.ch>



A LIFE FOR BRIDGES — BRIDGES FOR LIFE!

“I have dedicated my life to building bridges with some of the poorest people on the planet. My dream was never to build bridges, but to cure the injuries and reduce suffering, the bring together willpower and energy from multiple horizons and to do something useful,” said Toni Rüttimann, who had been invited to hold a conference at the Rolex Learning Center. His conference drew an audience of 600 people — local residents, but also many students and researchers from EPFL. To date, Toni Rüttimann and his local teams of bridge builders have erected almost 560 bridges, touching the lives of over 1.5 million farmers in Latin America and South-East Asia.

SAMPLING OF INTERNATIONAL EVENTS ORGANIZED BY OUR SCHOOL'S LABORATORIES

16-20/01/2011

Spring Seminar of the “3ème cycle romand de Recherche Opérationnelle” — Transportation and Mobility Laboratory

17-18/02/2011

European Network for Housing Research (ENHR), Housing Economics Group Workshop — Economics and Environmental Management Laboratory

15-18/05/2011

River Corridor Restoration Conference, RCRC11 — Ecological Engineering Laboratory

20-24/05/2011

Discrete Choice Analysis: Predicting Demand and Market Shares — Transportation and Mobility Laboratory

50/05-01/04/2011

7ème congrès francophone d'écologie des communautés végétales (ECOVEG 7) — Ecological Systems Laboratory

01-03/04/2011

Atelier Weinand: Le Chalet Nouveau'ter, Rossinière — Chair of Timber Construction

11-30/04/2011

Exhibition “Répons. Portrait de carte avec groupe” — Chôros Laboratory

14-15/04/2011

LATSIS Symposium “Mapping Ethics. New trends in Cartography and Social Responsibility” — Chôros Laboratory

15/04/2011

Swiss Geodetic Commission, seminar “New challenges in kinematic geodesy and navigation” — Geodetic Engineering Laboratory

04/05/2011

Navigare 2011, Navigation und Robotics — Geodetic Engineering Laboratory

11/05/2011

Colloque interdisciplinaire “Le béton matière en devenir” — Laboratory of urban architecture

11-15/05/2011

Swiss Transport Research Conference — Transportation and Mobility Laboratory

26-27/05/2011

“Thèses et controverses sur la mobilité de demain”, SNCF-Forum Vies Mobiles, Maison Rouge, Paris — Urban Sociology Laboratory

29/05-03/06/2011

International Symposium on Dams and Reservoirs under Changing Challenges, 79th ICOLD Annual Meeting — Hydraulic Constructions Laboratory

25-24/06/2011

International Conference “Understanding and Conserving Industrialised and Prefabricated Architecture” — Laboratory of Techniques and Preservation of Modern Architecture

24-25/06/2011

Ecoparc Forum.11 — (Re)construire la ville autrement? Stratégies pour un futur urbain durable — Laboratory of Architecture and Sustainable Technologies

28/06/2011

Continuing education course “Evaluation de la sécurité parasismique des bâtiments en maçonnerie” — Applied Computing and Mechanics Laboratory

25-27/08/2011

Seventh Workshop on Discrete Choice Models — Transportation and Mobility Laboratory

01/09/2011

“Forschungsmarkt regionsuisse & Tagung Regionalentwicklung 2011” — Urban and Regional Planning Community

14-16/09/2011

CISBAT 2011 International Scientific Conference, CleanTech for Sustainable Buildings — From Nano to Urban Scale — Solar Energy and Building Physics Laboratory

06/10/2011

Discrete Mechanics and Integrators Workshop — Chair of Timber Construction

22-25/11/2011

International Exploratory Workshop “De quoi la ville est-elle le nom? Une approche interdisciplinaire de l'urbanisation contemporaine” — Urban Sociology Laboratory

11/11-17/12/2011

Exhibition “Dessins d'architecture. Les travaux de l'élève architecte Frédéric de Morsier à l'Ecole des Beaux-Arts de Paris 1882-1890” — Archives of Modern Building

11/11-17/12/2011

Exhibition “Invention, construction, communication. Revues d'avant-garde de la collection Sartoris” — Archives of Modern Building

FACULTY

NEW PROFESSORS APPOINTED AT ENAC IN 2011



Urs von Gunten

*Full Professor of Drinking Water
Quality and Treatment*

Urs von Gunten joins ENAC in a joint appointment between the EPFL and the Aquatic Research Institute EAWAG, where he will continue his previous activities as Deputy Head of the Department of Water Resources and Drinking Water and Full Professor of Drinking Water Purification. Throughout his career, von Gunten has won numerous research awards and has become recognized as a specialist in the field of drinking water treatment and water quality analysis. At ENAC, his research will focus on two main axes: (i) studying climate change induced biochemical processes and their consequences on the quality and the supply of drinking water, and (ii) developing chemical and photochemical techniques to disinfect water, focusing in particular on oxidative destruction of micropollutants, typically of pharmaceutical origin.



Michael Lehning

Full Professor of Cryospheric Science

Professor Michael Lehning joins ENAC in a joint appointment with the Swiss Federal Research Institute for Forest, Snow and Landscape Research, WSL. Lehning is internationally recognized for his innovative approach to studying the dynamics of snow-cover and the prevention of alpine risks. He pioneered the SNOWPACK and Alpine3D modeling tools. These analytical tools, which he continues to update, have become indispensable for the prevention of avalanches in high-risk environments. Lehning has also contributed to developing measurement networks in alpine regions, taking into account the physics and dynamics of snow and climatic variations, as well as the risks of avalanches.



Anders Meibom

Full Professor of Earth Sciences

Professor Anders Meibom's academic path is quite extraordinary. Drawing on his physics background, he was able to work his way into three distinct research fields – geochemistry, cosmochemistry and biomineralization – and become an international authority in each of them. His appointment as full professor at ENAC is part of a joint effort between the EPFL and the University of Lausanne to pro-

mote life science, planetary science and environmental science. One research area at ENAC focuses on modeling and analysis of environmental transfer processes and on technologies for preventing and monitoring pollution. Recruiting a specialist in analytical geochemistry should open the door to future developments both at ENAC and in other EPFL schools, as well as in the Earth Sciences Department at the University of Lausanne.



Satoshi Takahama

*Assistant Professor of Atmospheric Chemistry
and Quality of the Air*

Assistant Professor Satoshi Takahama's research addresses, in particular, the quantitative characterization and modeling of atmospheric particles on one hand, and of the interaction between gas particles that affect atmospheric air quality and the climate on the other. One of his goals is to study the links between the emission, the production, the transformation and the distribution of atmospheric particles, and their interactions with the gaseous phase. Through this in-depth study, he aims to better define the extent to which air quality and climate change are affected by human activity. Takahama will teach atmospheric chemistry and air quality, environmental engineering, thermodynamic chemistry and statistical analysis.



Lyesse Laloui

*Associate Professor of Geoengineering
and CO₂ storage*

Professor Lyesse Laloui's research focuses on five themes: civil engineering, energy production and storage (energy geostructures), land stability and the impact of climate change and associated natural risks, geo-environmental engineering, and underground storage of nuclear waste. Professor Laloui is internationally renowned for his innovative research on modeling soil behavior with thermo-hydro-mechanical couplings. In recent years, his work has focused on analyzing the impact of environmental elements on the behavior of geostructures such as underground nuclear waste storage sites, energy geostructures and carriageway structures.

PROMOTION

Adjunct Professor
Edgard Gnansounou

DEPARTURES

**Prof. A. Cantàfora, Prof. T. Hasler,
Prof. P. Keller, Prof. A. Mermoud,
Prof. V. November, Prof. A. Parriaux,
Prof. A. Stauffer, Dr D. Robinson**

ENAC FACULTY MEMBERS APPOINTED OUTSIDE EPFL

Prof. Marilyne Andersen
Visiting Scientist
Massachusetts Institute of Technology, Cambridge, USA

Prof. Fernando Porté-Agel
Adjunct Research Professor
Department of Civil Engineering, University of Minnesota, USA

Prof. Nikolaos Geroliminis
Adjunct Assistant Professor
Department of Civil Engineering, University of Minnesota, USA

Prof. Andrea Rinaldo
Full Professor
Dipartimento Di Ingegneria Civile, Edile E Ambientale,
Università degli Studi di Padova, Italy

Prof. Franz Graf
Full Professor
Academy of Architecture, Università della Svizzera italiana

Prof. Kristin Schirmer
Adjunct Professor
University of Waterloo, Ontario, Canada

Prof. Lyesse Laloui
Adjunct professor
Department of Civil and Environmental Engineering,
Duke University, Durham, USA

Prof. Ian F.C. Smith
Affiliate Professor
Volgenau School of Engineering, George Mason University, Virginia, USA
Adjunct Professor
Carnegie Mellon University, Pittsburgh, USA

Prof. Marc Parlange
Adjunct Professor
School of Engineering, Johns Hopkins University, Baltimore, USA

VISITING PROFESSORS AND ACADEMIC HOSTS 2011

ARCHITECTURE

Jean-Pierre Adam, Thirugnanasuntharan Aravinthan, Marco Bakker, Stefan Behnish, Stéphanie Bender, Philippe Bébox, Alexandre Blanc, François Charbonnet, Jeanne Della Casa, Pia Durisch, Urs Egg, Yvonne Farrel, Daniel Ganz, Christian Gilot, Uli Kirchhoff, Jeannette Kuo, Anne Lacaton, Eric Lapierre, Francisco Mangado, Shelley McNamara, Aldo Nolli, Pier Nicola Pagliara, Charles Pictet, Sylvie Pfachler, Camilo Rebelo, Marie Sacconi, Edouardo Souto de Moura, Isa Sturm, Michel Thévoz, Jean-Philippe Vassal

CIVIL ENGINEERING

Olivier Bayerel, Johan Bettum, Alan Carter, Philippe Hubert Geubelle, Qiuming Gong, John Mark Gray, Daniel Kuchma, Xiao-Zhao Li, William O'Brien, Alexander Puzrin, Colin Rennie, Victor Saouma, Robert Skelton, Elowyn Yager

ENVIRONMENTAL ENGINEERING

Richard David Bardgett, Gregory William Characklis, Marino Gatto, Jason Ian Gerhard, David Johnson, Amos Maritan, Paolo d'Odorico, Antonio José Pais Antunes, Palakurthi Rao, Timothy Strathmann, Elizabeth Wentz, Adrian Deane Werner, Christopher Alan Williams

URBAN & REGIONAL PLANNING

Adesoji Adesina, Marie-Christine Costa, Winston Soboyejo, Theodoros Tsekeris

ENAC

José Luis Torero

DISTINCTIONS & AWARDS

Our school has made an impact in the world: here is a sampling of awards received in 2011

PATRICK DEVANTHÉRY AND INÈS LAMUNIÈRE AWARDED THE 2011 MERET OPPENHEIM PRIZE

Every year, the Federal Office of Culture awards the Meret Oppenheim Prize to acknowledged Swiss artists and architects, aged forty years or more. Among the recipients in 2011 were two EPFL alumni, Patrick Devanthéry and Inès Lamunière. Lamunière is currently professor and director of the Laboratory of Architecture and Urban Mobility, and was at the head of the Section of Architecture from 2008 to 2011. Devanthéry and Lamunière share an architectural office in Geneva, which was involved in the renovation of the Lausanne Opera, the tower of Radio Télévision Suisse building in Geneva, the Philip Morris International headquarters in Lausanne, and the Life Sciences building at EPFL.

<http://lamu.epfl.ch>



TAMAR KOHN RECEIVES GRAND CHALLENGES EXPLORATIONS GRANT

Grand Challenges Explorations, by the Bill and Melinda Gates Foundation, fosters creative projects that show great promise to improve the people's health in the developing world. In November 2011, more than 100 researchers were awarded new Grand Challenges Explorations grants. One of these grants went to Peter Vikesland of Virginia Polytechnic Institute in the US, joined by Tamar Kohn, director of ENAC's Environmental Chemistry Laboratory, and Krista Wigginton of the University of Maryland. Together, they are developing a cheap and simple paper-based diagnostic tool to be used for poliovirus screening. The detection strip containing embedded reactive nano-particles can be made using a simple inkjet printer.

<http://lce.epfl.ch>



J.F. KENNEDY STUDENT PAPER PRIZE GOES TO ENAC STUDENT, AGAIN

Fereshteh Bagherimiyab, a PhD student at the Environmental Fluid Mechanics Laboratory at ENAC, received the first prize of the J.F. Kennedy Student Paper Competition – the most prestigious award for PhD students in the field of hydraulics. She was rewarded for her work on flow structure, highlighting the relationship between flow structure and fine sediment suspensions in non-stationary flows. The objective of the study was to improve management of running water resources in the context of sustainable development. Fereshteh Bagherimiyab is the fourth PhD student from the same research group, headed by prof. U. Lemmin, to receive the prize. In the 2001 edition, D. Hurther received the first prize; in 2005, M. Franca was awarded the third prize, and in 2007, I. Albayrak came in second – a record in the history of the competition.



THREE DISTINCTIONS FOR ONE MASTER'S DISSERTATION

Maria-Gracia Riera Pérez, PhD student at the Laboratory of Architecture and Sustainable Technologies, received three distinctions for her Master's dissertation in Environmental Engineering: The BG Consulting Engineers Award for 2011 – System and Sustainable Development, the 2011 Commune of Ecublens Prize, and the 2011 University Interfaculty Organization for Sustainable Development (OUI-DD) Prize. Under the supervision of Prof. Emmanuel Rey, she studied the dynamics of the sustainability of a neighborhood and its buildings through a multi-criteria analysis of various possibilities of urban renewal.

<http://last.epfl.ch>



Teaching and Research Awards

ANDERSEN Marilyn

Best Paper Award (with Jaime M. L. Gagne and Leslie K. Norford), 27th International conference on Passive and Low Energy Architecture (PLEA), Louvain-la-Neuve, Belgium

BEAUDE Boris, GUILLEMOT Luc

2nd prize, Concours de Géovisualisation et cartographies dynamiques 2011, Salon de la Géomatique, Saint-Dié-des-Vosges, France

BIERI Martin

Best Paper Presentation, 34th IAHR World Congress, Brisbane, Australia

BONVIN Florence

Civil and Environmental Engineering Doctoral Program, PhD Mobility Award, EPFL Lausanne

CEOLA Serena

Honorable mention, Civil and Environmental Engineering Doctoral Program, PhD Mobility Award, EPFL Lausanne

DI DONNA Alice

1st Runner-up Position, Student Paper Competition, 36th Annual Conference on Deep Foundations, Boston, USA

EGGENBERG Niklaus

Prize for outstanding PhD thesis in the field of Operations Research, Swiss Operations Research Society

EVANS William C.

3rd Best Poster Award, ENAC Research Day, EPFL Lausanne

FAUST Anne-Kathrin

Poster award, 12th Swiss Global Change Day, Bern

FORMERY Sara, KÖSSLER Sibylle

4th prize, "Théâtre de Carouge", Carouge

GLERUM Aurélie

Civil and Environmental Engineering Doctoral Program, PhD Mobility Award, EPFL Lausanne

GUGGER Harry / Harry Gugger Studio Basel

Invited competitions: Study for the conversion of the main restaurant and event space, Basel Zoo, Basel; Mixed use development, Dietikon, Zurich; Nouveau Musée cantonal des Beaux-Arts, Lausanne; Study for Conversion of the Transitlager at Dreispitz, Basel; Residential development, Gellertstrasse, Basel

HALDI Frédéric, ROBINSON Darren

Journal of Building Performance and Simulation 2010/2011 Best Paper Award

JAFFRAIN Joël

Runner-up for best student paper award, 35th Conference on Radar Meteorology, Pittsburgh, USA

KAWAMURA Key / Kawamura Ganjavian

1st prize, Gandía-Blasco Design Award, Valencia, Spain

KOSEKI Shin

In the 2011 "Next Generation" selection of the Wallpaper* magazine

KOHN Tamar

Excellence in Review Awards; Environmental Science & Technology Journal

LACROIX Elsa

Best Poster Award, ENAC Research Day, EPFL Lausanne

LAMUNIÈRE Inès, DEVANTHÉRY Patrick

Prix Meret Oppenheim 2011, Swiss Confederation, Office fédéral de la culture OFC

LECOULTRE Cyril / bunq architectes, Rolle et Corsier

1st prize Caserne intercommunale de Bernex et Confignon, Genève; 3rd prize Collective housing in Vandoeuvres, Genève

LENHERR Lukas

Among the "12 best architects," on the website www.competitionline.com

LÉPINE Estelle

In the 2011 "Next Generation" selection of the Wallpaper* magazine

LIU Ning, JOBARD Nicolas

Jeffrey Cook Awards, 27th International conference on Passive and Low Energy Architecture (PLEA), Louvain-la-Neuve, Belgium

MARCHAND Bruno

"Prix Polysphère" 2010-2011 for the best teacher of ENAC School, EPFL Lausanne

MARGOT Jonas

Civil and Environmental Engineering Doctoral Program, PhD Mobility Award, EPFL Lausanne

MENZEL Götz / Roland Gay bureau d'architecture, Monthey

Open competitions 2nd round: Maison de Commune, Evolène, Valais; Cycle d'orientation de Fully, Valais; Ecole primaire de Bex, Vaud

MERMOUD Grégory

2nd Best Poster Award, NanoTera.ch annual meeting 2011, Bern

MUTZNER Raphaël

2nd Best Poster Award, ENAC Research Day, EPFL Lausanne

NADEAU Daniel

ENAC PhD fellowship in "Earth Sciences", EPFL Lausanne

NICÒTINA Ludovico

Aleardo Zuliani Award for PhD thesis, Venezia, Italy

NIETO Jessica

Best Poster Award, 8th Leading Edge conference on Water and Wastewater Technologies, Amsterdam, The Netherlands

NOËL Alexandre, VAN DER WOUDE Wynd

2nd prize, "Construction d'un centre administratif communal", Evolène; 3rd prize, "Construction d'une seconde salle de sport et agrandissement du bâtiment du centre scolaire des Plantys", Vétroz; Winners of the INVENT! Competition 2011, Centre d'art de Fribourg, Fribourg

OSORIO PIZANO Carolina

Graduate Student Best Paper Award, Annual Meeting of the Transportation Research Forum (TRF), Long Beach, California

PETRY Sarah

2nd Best Poster Award, ENAC Research Day, EPFL Lausanne

REY Emmanuel / BAUART Architectes et Urbanistes SA, Neuchâtel

1st prize Research Center, Boudry; 4th prize Swatch Omega Center, Biel

SAREY KHANIE Mandana

Honorable mention, Civil and Environmental Engineering Doctoral Program, PhD Mobility Award, EPFL Lausanne

SATCHMO François Jesop, GUERRY Gilles

3rd prize W 2010, "Ancien Dépôt des archives de la Bibliothèque Nationale à Versailles," Fondation d'entreprise Wilmotte, France

SCHLEISS Anton

Listed among the 20 international personalities that "have made the biggest difference to the sector of Water Power & Dam Construction over the last 10 years", International Water Power and Dam Construction magazine

UEBERSCHLAG Audrey

2nd prize, "Prix de l'AFT 2010" received in 2011, Association Française de Topographie, Egletons, France

WEISSBRODT David

Civil and Environmental Engineering Doctoral Program, PhD Mobility Award, EPFL Lausanne; Best Paper Award, IWA Biofilm Conference 2011, Shanghai

WISSMEIER Laurin

Luce Grivat Award for best doctoral research, EPFL Lausanne

ZIMMERMANN Saskia

Otto Jaag Water Protection Prize for PhD thesis, ETH Zurich

DISTINCTIONS & AWARDS

BS/MS student awards

PRIX A3-EPFL — ARCHITECTURE

Marie Grob / Architecture

VILLE DE LAUSANNE, FONDS DE COOPÉRATION DE L'ASSOCIATION INTERNATIONALE DES MAIRES FRANCOPHONES

Aurélie Monet Kasisi / Architecture

PRIX ARDITI

Damien Carugati / Architecture

PRIX BCV

Jessica Angel / Architecture

Konstantinos Dell'Ollivo / Architecture

Antoine Doms / Architecture

Axel Ferret / Architecture

Bruna Filipa Gomes Magalhaes / Architecture

Salomé Houllier / Architecture

Audrey Lambiel / Architecture

Alexandre Moser / Architecture

Kaori Pedrazzoli / Architecture

Carlo Romano / Architecture

Jérôme Rudaz / Architecture

Renaud Rudaz / Architecture

PRIX BETON HOLCIM

Marie-Rose Backes / Civil Engineering

PRIX BG INGÉNIEURS-CONSEILS: CONSTRUCTION ET DÉVELOPPEMENT DURABLE

Didier Callot / Architecture

Fanny Christinaz / Architecture

Julie Devayes / Architecture

Léonard Kanapin / Architecture

PRIX BG INGÉNIEURS-CONSEILS: SYSTÈMES ET DÉVELOPPEMENT DURABLE

Maria Gracia Riera Perez / Environmental Engineering

PRIX DE LA COMMUNE DE CHAVANNES

Julien Omlin / Environmental Engineering

PREMIO DI LAUREA "CLAUDIO BERTUZZI", ISTITUTO VENETO DI SCIENZE, VENICE, ITALY

Serena Ccola / Environmental Engineering

CSD AWARD

Dario Del Giudice / Environmental Engineering

PRIX DE LA COMMUNE D'ECUBLENS

Maria Garcia Riera Pérez / Environmental Engineering

DISTINCTION GCO — GROUPE SPÉCIALISÉ POUR LA CONSERVATION DES OUVRAGES SIA

Markus von Bergen / Architecture

Chloe Butscher / Architecture

Raphaël Chatelet / Architecture

Jessica Matthey-de-L'Endroit / Architecture

Christel Metrailler / Architecture

Nathalie Pochon / Architecture

PRIX GEOSUISSE — SOCIÉTÉ SUISSE DE GÉOMATIQUE ET DE GESTION DU TERRITOIRE

Dario Del Giudice / Environmental Engineering

LUCE GRIVAT AWARDS

Nicolas Sommer / Environmental Engineering

PRIX IM — BUREAU D'INGÉNIEURS MAGGIA

Andreas Simonsen / Civil Engineering

Raphaël Sprenger / Civil Engineering

PRIX DE LA JEUNESSE EPFL

Marie Texier / Civil Engineering

PRIX JACQUES MARTIN-ZWAHLEN & MAYR

Benoit Baer / Civil Engineering

Philippe Schiltz / Civil Engineering

MASTER OF SCIENCE IN ARCHITECTURE STUDIES PRIZE FOR THESIS

Siobhan Rockcastle / Architecture

PRIX MAURHOFER

Augustin Clément / Architecture

Aliénor Zaffalon / Architecture

PRIX ORLANDO LAUTI

Jonathan Hermann / Architecture

PRIX DE L'ORGANISATION UNIVERSITAIRE INTERFACULTAIRE POUR LE DÉVELOPPEMENT DURABLE (OUI-DD)

Maria Gracia Riera Perez / Environmental Engineering

PRIX SGBE — SOCIÉTÉ SUISSE DU GÉNIE PARASISMIQUE

Thomas Kartalovski / Civil Engineering

Suleidy Perez / Civil Engineering

PRIX SHS — SCIENCES HUMAINES ET SOCIALES EPFL

Marie-Laure Bourquin / Architecture

Julie Devayes / Architecture

Isabelle Mori / Architecture

Etienne Peiergiovanni / Architecture

Marcel Perrin / Architecture

Dimitri Burnier / Civil Engineering

James Fern / Civil Engineering

Christian Schmuckle / Civil Engineering

Michel-Jan Van Mark / Civil Engineering

Alexander Yazdani / Civil Engineering

Pauline Emery / Environmental Engineering

Eulalie Sauthier / Environmental Engineering

Manfred Schoger / Environmental Engineering

PRIX SIA SECTION VAUDOISE

Mélanie Althaus / Architecture

Fanny Julie Christinaz Devayes / Architecture

Guillaume Youri Clivaz Kravtchenko / Architecture

Paola Grimaldo / Architecture

PRIX STUCKY

Raphaël Sprenger / Civil Engineering

PRIX UPIAV — UNION PATRONALE DES INGÉNIEURS ET ARCHITECTES VAUDOIS

Adélie Aeberhard / Architecture

Pierre Chevrement / Architecture

Lucien Favre / Architecture

Caroline Naef / Architecture

Christophe Waber / Architecture

Mathilde Charier / Civil Engineering

TROPHÉES PERFORMANCE VEOLIA ENVIRONNEMENT

Dario Del Giudice / Environmental Engineering

PRIX VSS — ASSOCIATION SUISSE DES PROFESSIONNELS DE LA ROUTE ET DES TRANSPORTS

Marc-Antoine Fenart / Civil Engineering

The full list of ENAC's scientific output is available online:

<http://infoscience.epfl.ch/enac>

INVENTION, CONSTRUCTION, COMMUNICATION

Revue d'avant-garde de la collection Alberto Sartoris

Antoine Baudin

Presses Polytechniques et Universitaires Romandes, Lausanne 2011

ISBN 978-2-88074-940-8



ANALYSE SPATIALE DE L'INFORMATION GÉOGRAPHIQUE

Régis Caloz, Claude Collet

Presses Polytechniques et Universitaires Romandes, Lausanne 2011

ISBN 978-2-88074-902-6



LA RICOSTRUZIONE DEL CRYSTAL PALACE

Per un ripensamento del progetto urbano

Antonio Di Campli

Edizioni Quodlibet, Macerata 2011

ISBN 978-8-87462-359-4



LE CORBUSIER

Béton Brut and Ineffable Space 1940-1965

Roberto Gargiani, Anna Rosellini

EPFL Press, Lausanne 2011

ISBN 978-2-940222-50-6



NUMERICAL ECOLOGY WITH R

Daniel Borcard, François Gillet,

Pierre Legendre

Springer, Berlin 2011

ISBN 978-1-4419-7975-9



BIOFUELS

Alternative Feedstocks and

Conversion Processes

Ashok Pandey (ed.), Christian Larroche (ed.),

Steven C. Ricke (ed.), Claude-Gilles

Dussap (ed.), Edgard Gnansounou (ed.)

Elsevier, Amsterdam 2011 – ISBN 978-0-12385-099-7



GLASS IN THE 20TH CENTURY ARCHITECTURE: PRESERVATION AND RESTORATION

Franz Graf (ed.), Francesca Albani (ed.)

Mendrisio Academy Press, Mendrisio 2011

ISBN 978-88-87624-50-2



LA COSTRUZIONE DELLE SCUOLE IN CANTON TICINO 1953-1984

Franz Graf, Massimo Cattaneo, Paolo Galliciotti

Mendrisio Academy Press, Mendrisio 2011

ISBN 978-88-87624-49-6



RE-THINKING THE CITY

Urban Dynamics and Motility

Vincent Kaufmann

EPFL Press, Lausanne 2011

ISBN 978-2-940222-47-6



MOBILE IMMOBILE

Quels choix, quels droits pour 2030

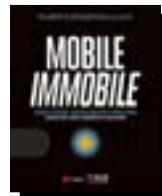
Vincent Kaufmann (ed.),

Christophe Gay (ed.), Sylvie Landrière (ed.),

Stéphanie Vincent-Geslin (ed.)

Editions de l'Aube, La Tour d'Aigues 2011

ISBN 978-2-8159-0258-8



FATIGUE OF FIBER-REINFORCED COMPOSITES

Anastasios P. Vassilopoulos, Thomas Keller

Springer, Berlin 2011

ISBN 978-1-84996-180-6



DEVANTHÉRY / LAMUNIÈRE

Images d'architecture – Deux entretiens avec

Anne Kockelkorn et Laurent Stalder

Patrick Devanthéry, Inès Lamunière

Archibooks + Sautereau éditeur, Paris 2010 – ISBN 978-2-35733-091-7



BOOKS

EUROPE

une géographie – La fabrique d'un continent

Jacques Lévy

Hachette, Paris 2011

ISBN 978-2-01146-146-9



QUARTIERS DURABLES

Défis et opportunités pour le développement urbain

Emmanuel Rey

Office fédéral du développement territorial ARE, Office fédéral de l'énergie

OFEN, Berne 2011 – No d'art. 812.092.f / 3000 / 05.2011



RENATO SALVI

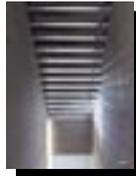
Architecte

Bruno Marchand, Martin Steinmann,

Jean-Claude Girard

Infolio Editions, Gollion 2011

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COMPUTER MODELLING FOR SUSTAINABLE URBAN DESIGN

Physical Principles, Methods and Applications

Darren Robinson (ed.)

Earthscan, Taylor & Francis, London 2011

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ARCHITECTURAL INTEGRATION AND DESIGN OF SOLAR THERMAL SYSTEMS

Maria Cristina Munari Probst,

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EPFL Press, Lausanne 2011 – ISBN 978-2-940222-46-9



LES BARRAGES

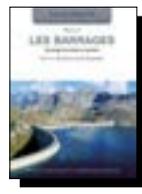
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Du projet à la mise en service

Anton J. Schleiss, Henri Pougatsch

Presses Polytechniques et Universitaires Romandes, Lausanne 2011

ISBN 978-2-88074-831-9



THE ART OF STRUCTURES

Introduction to the functioning of structures in architecture

Aurelio Muttoni

EPFL Press, Lausanne 2011

ISBN 978-2-940222-38-4

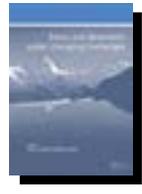


DAMS AND RESERVOIRS UNDER CHANGING CHALLENGES

Anton J. Schleiss (ed.), **Robert M. Boes** (ed.)

CRC Press, Taylor & Francis, London 2011

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DESSINS D'ARCHITECTURE

Les travaux de l'élève architecte Frédéric de Morsier à l'Ecole des Beaux-Arts de Paris 1882-1890

Joëlle Neuenschwander Feihl

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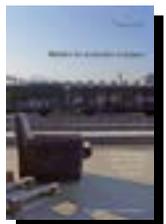
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Marion Penelas (ed.), **Pascal Viot** (ed.)

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Olivier Walser (ed.), **Laurent Thévoz** (ed.),

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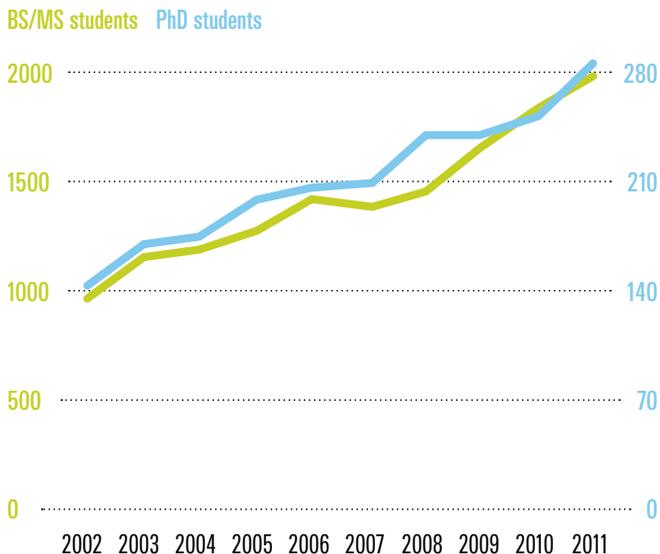
2281 students, including 288 PhD students who contribute to ENAC's long-term research
 663 collaborators, or 544 full-time equivalent positions
 81 million CHF — total ENAC budget
 66 % of staff between 20 and 40 years old
 78 nationalities
 25 research and technology transfer agreements, totaling 4.9 million CHF

PEOPLE 31.12.2011

	EPT	% Women	% Foreigners
Professors	42.9	11%	46%
Adjunct professors & Senior scientists	12.7	6%	50%
Scientific collaborators	370.9	34%	64%
Technical & administrative staff	116.4	43%	11%

	No.	% Women	% Foreigners
BS/MS students	1993	38%	30%
PhD students	288	38%	73%

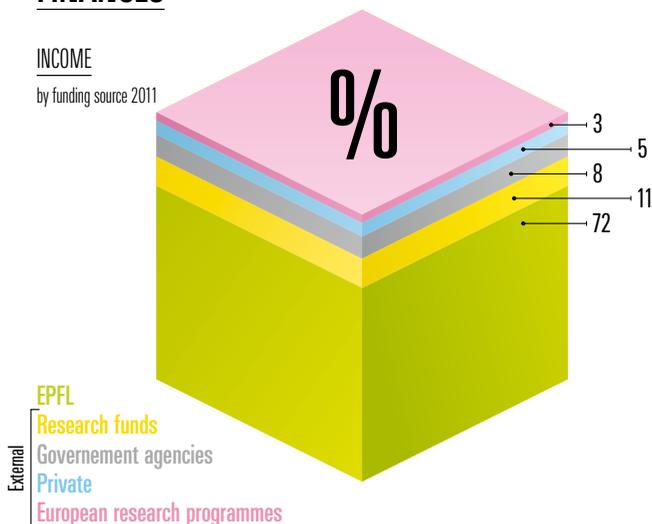
STUDENT NUMBERS



FINANCES

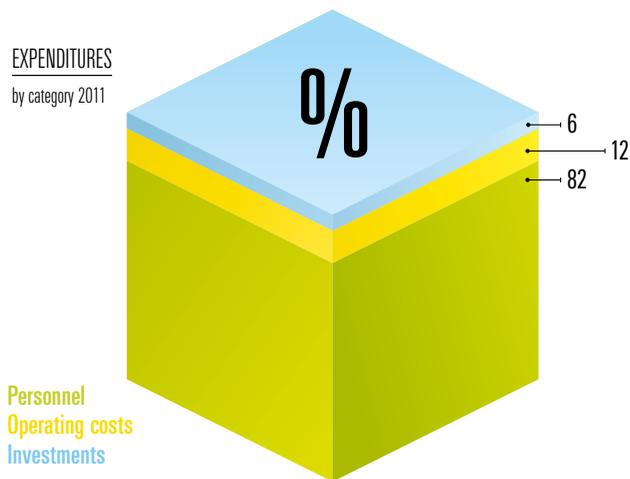
INCOME

by funding source 2011



EXPENDITURES

by category 2011



INCOME BY FUNDING SOURCE 2004-2011

in Mio CHF rounded up

	2004	2005	2006	2007	2008	2009	2010	2011
EPFL	48	51	50	53	50	53	54	59
External	21	22	17	20	20	20	21	22
Total	69	73	67	73	70	73	75	81

EXPENDITURES BY CATEGORY 2004-2011

in Mio CHF rounded up

	2004	2005	2006	2007	2008	2009	2010	2011
Personnel	58	59	57	59	60	62	64	66
Operating c.	9	11	8	10	8	8	9	10
Investments	1	3	2	3	2	3	2	5
Total	69	73	67	73	70	73	75	81

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Basile Geiser
www.basilegeiser.ch

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PRINTING

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AREAS OF EXPERTISE

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ARCHITECTURE

ABOU JAOUDE Georges – Associate Professor

The architectural and digital model as representation of the project, Photography and digital photo architecture and hyperreality of the domain of computer science

Informatic and Visualization Laboratory (IV)



ANDERSEN Marilynne – Associate Professor

Sustainable architecture, Daylighting strategies, Energy-efficient design, Façade technology, Human comfort and health in buildings, Climate-responsive envelopes

Interdisciplinary Laboratory of Performance-Integrated Design (LPIID)



BASSI Andrea – Associate Professor

Urban project, Construction technologies, Energy considerations for building

Laboratory of urban architecture (LAURE)



BERGER Patrick – Full Professor

Understanding and representation of the natural and built environment, The project at different scales of environment and architecture

Urban, Rural and Architectural Planning Laboratory (URAP)



COGATO LANZA Elena – Senior Scientist

Theory of urban and territorial design, History of urbanism

Construction and Conservation Laboratory (LCC)



DIETZ Dieter – Associate Professor

Processual knowledge in architectural training, Cultural analysis at the interface between the theory and practice of a project

Design Studio on the Conception of Space (ALICE)



FREY Pierre – Adjunct Professor

History of Architecture, archiving and recording of projects in architecture and civil engineering

Archives of Modern Building (ACM)



GARGIANI Roberto – Full Professor

Theory and history of techniques, materials, working processes, structural systems, Analysis of constructive aspects of buildings

Theory and History of Architecture Laboratory 3 (LTH3)



GRAF Franz – Associate Professor

Building and comfort technologies, Preservation and reuse project of the modern architecture

Laboratory of Techniques and Preservation of Modern Architecture (TSAM)



GUGGER Harry – Full Professor

Architectural Design, Urban planning, Project management, Construction management, Research in teaching methods, Research in architectural production

Laboratory Basel (LABA)



HUANG Jeffrey – Full Professor

Design thinking, Interactive space smart buildings, Digital architecture

Media and Design Laboratory (LDM)



LAMUNIÈRE Inès – Full Professor

Architectural history in urban environments, New typologies of buildings, Contemporary re-qualifications of the notion of "city"

Urban Architecture and Mobility Laboratory (LAMU)



LUCAN Jacques – Associate Professor

Theory of architecture, History of the theories of composition

Theory and History of Architecture Laboratory 1 (LTH1)



MARCHAND Bruno – Full Professor

Theory of architecture, Rational architecture, Relationships between public spaces and collective housing

Theory and History of Architecture Laboratory 2 (LTH2)



MESTELAN Patrick – Full Professor

Theory and critic of architectural and urban design, The institutions and the public space

Studio of Architecture and the City's institutions (AIC)



ORTELLI Luca – Full Professor

Architectural design within historic contexts, Re-use and transformation of existing buildings, Housing as urban project

Construction and Conservation Laboratory (LCC)



REY Emmanuel – Assistant Professor Tenure Track

Sustainable architecture, Urban and architectural project, Sustainable construction technologies, Regeneration of urban wastelands, Sustainable districts

Laboratory of Architecture and Sustainable Technologies (LAST)



AREAS OF EXPERTISE

CIVIL ENGINEERING

ANCEY Christophe – Associate Professor

Rheology & fluid dynamics of geophysical flow and the resulting hazards, Modeling of natural hazards induced by water and avalanches, Physics of bed load transport

Environmental Hydraulics Laboratory (LHE)



BEYER Katrin – Assistant Professor Tenure Track

Performance-based seismic design and assessment of structures, Displacement-based design, Seismic behaviour of reinforced concrete and unreinforced masonry structures, Large-scale testing, Structural dynamics

Earthquake Engineering and Structural Dynamics Laboratory (EESD)



BRÜHWILER Eugen – Full Professor

Safety and reliability of existing structures, Durability of reinforced concrete structures, Ultra-high performance fibre-reinforced concrete for the rehabilitation of structures

Structural Maintenance and Safety Laboratory (MCS)



DENARIÉ Emmanuel – Senior Scientist

Rehabilitation of reinforced concrete structures, Engineering and applications of ultra-high performance fibre-reinforced concretes, Time dependent response of cementitious materials

Structural Maintenance and Safety Laboratory (MCS)



DUMONT André-Gilles – Full Professor

Design of traffic facilities and transport infrastructures, Transport and telematic, Infrastructure maintenance management

Traffic Facilities Laboratory (LAVOC)



KELLER Thomas – Full Professor

Structural design, Advanced composite materials, Multifunctional sandwich structures

Composite Construction Laboratory (CCLAB)



LABIOUSE Vincent – Senior Scientist

Cliff instabilities, Design of deep tunnels, Mechanical behaviour of poor rocks, Foundation engineering

Rock Mechanics Laboratory (LMR)



LALOUT Lyesse – Associate Professor

Geomechanics, Geotechnical and environmental engineering, Mechanics of multiphase porous materials

Soil Mechanics Laboratory (IMS)



LEBET Jean-Paul – Adjunct Professor

Design evaluation of structures, Failures analyses, Steel-concrete composite bridge behaviour, Steel-concrete composite columns and beams

Steel Structures Laboratory (ICOM)



LESTUZZI Picirino – Senior Scientist

Seismic behavior of reinforced concrete and masonry structures, Seismic evaluation of existing structures, Seismic vulnerability of cultural heritage buildings

Applied Computing and Mechanics Laboratory (IMAC)



MOLINARI Jean-François – Associate Professor

Damage mechanisms in materials and structures, Contact mechanics, Multiscale modeling: from atoms to continuum, Scientific computing

Computational Solid Mechanics Laboratory (LSMS)



MUTTONI Aurelio – Full Professor

Conceptual design and dimensioning of structures, Mechanical behavior of ultra-high performance concrete elements and soil-structure interaction

Structural Concrete Laboratory (IBETON)



NUSSBAUMER Alain – Adjunct Professor

Structural design of steel and steel-concrete composite structures, Tubular structures and bridges, Fatigue and fracture of new and existing steel and aluminum structures, Probabilistic fracture mechanics and size effects

Steel Structures Laboratory (ICOM)



RASTOGI Pramod – Adjunct Professor

Development of new speckle techniques, Development of new holographic techniques, Fringe analysis using phase shifting techniques

Applied Computing and Mechanics Laboratory (IMAC)



SCARTEZZINI Jean-Louis – Full Professor

Daylighting systems, Photometry & colorimetry, Biomimetic control, Optimal stochastic control, Energy in buildings, Decision tools

Solar Energy and Building Physics Laboratory (LESO-PB)



SCHLEISS Anton – Full Professor

Hydraulic engineering and design of hydraulic structures and schemes, Interaction hydraulic structures with water, air, sediments and rock, Numerical and physical modeling, Flood modeling and forecast

Hydraulic Construction Laboratory (ICR)



SMITH Ian – Full Professor

Active structures, Structural identification, Sensor network design, Computer-aided engineering, Engineer-computer interaction

Applied Computing and Mechanics Laboratory (IMAC)



VULLIET Laurent – Full Professor

Design and testing of geostuctures, Constitutive modeling, elasto-visco-plasticity, numerical modeling, Natural hazards: risk management

Soil Mechanics Laboratory (IMS)



WEINAND Yves – Associate Professor

Composite frames of wood and glass, Timber rib shells, Origami, Fractal geometry, Welding for wood, Stability of ribbed wooden shells

Chair of Timber Construction (IBOS)



ZHAO Jian – Full Professor

Rock dynamics, TBM excavation, Rock engineering of tunnels: slope and foundation, Testing characterisation and monitoring, Earthquake and blast protection

Rock Mechanics Laboratory (LMR)



URBAN AND REGIONAL SCIENCES

BIERLAIRE Michel – Associate Professor

Transportation analysis, Operations research, Discrete choice models, Nonlinear optimization

Transportation and Mobility Laboratory (TRANSP-OR)



BOLAY Jean-Claude – Adjunct Professor

Social practices in urban societies, Rural-urban interface, Urban environment and social disparities, Director of international cooperation

Urban Sociology Laboratory (IASUR)



GEROLIMINIS Nikolas – Assistant Professor Tenure Track

Traffic flow and control, Transport analysis, Transport operations

Urban Transport Systems Laboratory (UTS)



GNANSOUNOU Edgard – Adjunct Professor

Integrated energy planning, Vulnerability of energy supply, Life-cycle analysis of energy systems, Sustainability of renewable energies (incl. bio-energy)

Bioenergy and Energy Planning Research Group (BPE)



KAUFMANN Vincent – Associate Professor

Mobility, Habitat and residential history, Violence and security, Urban sprawl and gentrification, Commuting

Urban Sociology Laboratory (IASUR)



LÉVY Jacques – Full Professor

Urbanism, Land use planning and territorial development, Globalization, Political space, Epistemology of social science

Chères Laboratory (IAC)



PEDRAZZINI Yves – Senior Scientist

Urban sociology, Urban studies, Violence and insecurity, Urban planning and development, Southern urbanization

Urban Sociology Laboratory (IASUR)



SCHULER Martin – Adjunct Professor

Territorial development and town planning Urban planning, mobility and environment

Urban and Regional Planning Community (CEAT)



THALMANN Philippe – Associate Professor

Environmental economics, Economics of sustainable development, Housing economics, Real estate economics

Economics and Environmental Management Laboratory (REME)



AREAS OF EXPERTISE

ENVIRONMENTAL ENGINEERING

AREY J. Samuel – Assistant Professor Tenure Track

Environmental chemical processes affecting organic pollutants, Computational quantum chemistry and thermodynamics, Phase partitioning and sorption models, Oil spills, Two-dimensional gas chromatography (GCxGC)

Environmental Chemistry Modeling Laboratory (EMCE)



BARRY D. Andrew – Full Professor

Water quality, Contaminated land/soils, Numerical modeling, Constructed wetlands

Ecological Engineering Laboratory (ECOL)



BERNE Alexis – Assistant Professor Tenure Track

Remote sensing (radar, microwave...), Hydrometeorology, Geostatistics

Environmental Remote Sensing Laboratory (LRE)



BERNIER-LATMANI Rizlan – Assistant Professor Tenure Track

Metal-microbe interactions, Metal bioremediation, Gene expression, Biogenic nanoparticles, Geobiology

Environmental Microbiology Laboratory (EML)



BUTLER Alexandre – Adjunct Professor

Ecology, Quantitative methods, Ecosystem and landscape restoration and management, Biodiversity, Biogeochemical cycles, Wetlands, Pasture woodlands, Invasions

Ecological Systems Laboratory (ECOS)



DE ALENCASTRO Luiz Felipe – Senior Scientist

Analytical chemistry of environmental trace pollutants, Fate and impact of contaminants in the ecosystem, Water quality, Scientific cooperation with developing countries

Central Environmental Laboratory (GR-CEL)



GOLAY François – Full Professor

GIS application design, Spatial decision support systems, Geospatial data infrastructures, GIS for environmental management and for urban studies and design

Geographic Information Systems Laboratory (IASIG)



HERING Janet – Full Professor

Biogeochemical cycling of trace metals and metalloids, Mineral weathering and reactions at mineral surfaces, Water treatment processes for removal of inorganic contaminants

Prof. Hering Group in Environmental Chemistry (UPRCE)



HOLLIGER Christof – Associate Professor

Bioremediation, Wastewater treatment, Environmental microbiology, Anaerobic digestion, Biogas and biofuels

Laboratory for Environmental Biotechnology (LBE)



KAPLAN Jed Oliver – SNF Assistant Professor

Climate change and global biogeochemical cycles, Earth system modeling, Land-atmosphere interactions, Evolution of agriculture, technology, and civilizations, Paleoclimate and paleoenvironmental change

Soil-Vegetation-Atmosphere Research Group (ARVE)



KOHN Tamar – Assistant Professor Tenure Track

Degradation and elimination of chemical pollutants, Solar disinfection of viruses, Low-cost water treatment

Environmental Chemistry Laboratory (LCE)



LEHNING Michael – Full Professor

Interaction Cryosphere – Atmosphere in particular Snow Processes, Natural Hazards Warning and Forecasting, Turbulence and Boundary Layer Flows over Alpine Terrain, Mountain Hydrology and Permafrost Modelling

Laboratory of Cryospheric Sciences (CRYOS)



LUDWIG Christian – Adjunct Professor

Waste processing, Materials cycles and resource recovery, Thermochemical processes, Trace compounds in hot process gases, Chemistry at the solid/water interface

EPFL-PSI Joint Professorship on Solid Waste Treatment



MARTINOLI Alcherio – Associate Professor

Swarm intelligence, Distributed and networked robotics, SSA networks

Distributed Intelligent Systems and Algorithms Laboratory (DISAL)



MEIBOM Anders – Full Professor

Isotope Geochemistry and Cosmochemistry, Biomineralization processes, Environmental proxies, Ion-microprobe analyses

Laboratory for Biological Geochemistry (LGB)



MERMINOD Bertrand – Full Professor

Acquisition of topographical data, Geodesy, Satellite positioning, Pedestrian navigation, Indoor positioning, Least squares estimation, Kalman filtering

Geodetic Engineering Laboratory (TOPO)



PARLANGE Marc – Full Professor

Land-atmosphere exchange, Large Eddy Simulation (LES), Evaporation, Snow physics, Atmospheric boundary layer

Environmental Fluid Mechanics Laboratory (EFLUM)



PERONA Paolo – SNF Assistant Professor

River mechanics and erosion processes, Alpine catchments ecohydrology, Rheology and fluid mechanics, Time Series Analysis, Stochastic and dynamical systems theory, Optimization and decisional techniques

Applied HydroEconomics & Alpine environmental Dynamics Group (AHEAD)



PORTÉ-AGEL Fernando – Full Professor

Fluid Dynamics (environmental and computational), Wind Energy, Hydrokinetic Energy, Large-Eddy Simulation, Turbulence

Wind Engineering and Renewable Energy Laboratory (WIRE)



RINALDO Andrea – Full Professor

Groundwater and surface hydrology, Solute transport processes, Fluvial geomorphology, Ecohydrology

Laboratory of Ecohydrology (ECHO)



SCHIRMER Kristin – Adjunct Professor

Ecotoxicology, Environmental toxicology and risk assessment, Nanotoxicology

Laboratory of Environmental Toxicology (TOX)



SKALoud Jan – Senior Scientist

Kinematic positioning and attitude estimation mobile mapping, Satellite and inertial navigation, Sensor integration and calibration, Direct georeferencing

Geodetic Engineering Laboratory (TOPO)



VON GUNTEN Urs – Full Professor

Drinking water quality, Physical chemical water treatment, Oxidation and disinfection processes, Micropollutant elimination, Disinfection by-product formation

Laboratory for Water Quality and Treatment (ITQE)



TAKAHAMA Satoshi – Assistant Professor Tenure Track

Measurement, analysis, and modeling of atmospheric aerosols, Simulation of multiphase chemistry and physics, Spectroscopy and spectromicroscopy analysis for particle composition and morphology characterization

Atmospheric Particle Research Laboratory (APRL)



CHAIR OF LAW

DUBEY Jacques – Associate Professor

Law, Environmental and construction law

Chair of Law (COT)



ROMY Isabelle – Associate Professor

Law, Environmental and construction law

Chair of Law (COT)



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Prof. Christof Holliger
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ENVIRONMENTAL ENGINEERING
Prof. Andrea Rinaldo
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ARCHITECTURE AND SCIENCES OF THE CITY
Prof. Jacques Lévy
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<http://phid.epfl.ch/edice>

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Prof. Lyesse Laloui
<http://phid.epfl.ch/edime>

MANUFACTURING SYSTEMS AND ROBOTICS
Prof. Achiello Martinoli
<http://phid.epfl.ch/edipr>