



Constructing a Better Tomorrow: For Peter A. Wilderer, childhood dreams of life as an architect gave way to a life-long career in water education, engineering and interdisciplinary enlightenment.

Climbing High on Innovative Technology



With imposing facades and a National Romantic style inspired by the palaces of the Renaissance, the Stockholm City Hall will more than ever before be an appropriate venue for awarding the Stockholm Water Prize to a Laureate well-equipped to appreciate its beautiful form and function.

"I was actually determined to become an architect, just like my father," the soft-spoken 2003 Stockholm Water Prize Laureate, Professor Peter A. Wilderer, says with a smile, "but things just turned out differently."

So differently, in fact, that on August 14 he will receive the world's top water honour from the King of Sweden. Yet, standing high up, tangled amidst the inner workings of a reacidification plant which transforms

flue gas wash water into hydrochloric acid, it becomes clear that there still is a lot of architecture and construction design in Professor Wilderer's heart – not to mention his daily work – at the Institute of Water Quality Control and Waste Management in the beautiful surroundings at the Technical University of Munich, Germany.

There, *Water Front's* Stephanie Blenckner met him recently to explore the secrets behind his exciting work.

Interdisciplinary is the key

Though still the exception in research circles today, Professor Wilderer's interdisciplinary approach and interest in experimenting with methods from neighbouring disciplines is one of the keys to his success.

"It is so advantageous that we just have the physics and chemistry departments next door," Professor Wilderer points out when gliding through the campus setting. "It gives many options for exchange and co-operation."

Excitedly, he recalls the time when he met an eye doctor at one of the few interdisciplinary conferences on biofilms during the 1980s.

"It was her three-dimensional microscope technology, called Confocal Laser Scanning Microscope (CLSM), for optical investigations which we use today for our biofilm analyses," he says. Professor Wilderer is confident that in the future, interdisciplinary approaches and discussion across professional borders will only increase. "It is through funding of interdisciplinary workshops that we have a chance to steer this, and I can see a tendency shift there already."

Successful concepts do not have to be reinvented

Another impressive example of successful integration of approaches already found in other disciplines is a current project tenderly dubbed "Resi" by the Institute.

"Resi" originates from the name of a cow and led to the concept of the Ruman Enhanced Solid Incubator.

"In the search for a faster method for the dissolution of particulate organic material, we wondered aloud: where do we find these processes already in nature which we can explore and copy?" he said. "The stomach of a cow manages in 20 hours something our technology needs days to accomplish. Time and again we found that agricultural scientists had already analysed everything we needed to know in order to conceptualise, in essence, a technical cow stomach with the ideal biological organisms we were looking for."



Photo: Stephanie Blenkner

From *Humble Beginnings*: Future air travellers, refreshed after an on-board shower, will have the closed-loop water recycling technology being pioneered by Professor Wilderer's institute to thank.



Learning from Nature: **The Ruman Enhanced Solid Incubator (RESI)** developed under Professor Wilderer's leadership led not just to a doppelganger of the same name, but to more efficient biological processes to break down organic matter in wastewater treatment plants around the world.

“Human societies have to remain adaptive in order to be able to survive.”

Curiosity and openness

In an effort to revive the concept of trans-boundary thinking and cross-cutting interdisciplinary conferences, Professor Wilderer organised a conference earlier this year on the view on water and sustainability in different cultures.

“I have to stress that I am not a philosopher, but I think that human societies have to remain adaptive in order to be able to survive”, he says. “When the surroundings are changing, the society must be able to respond positively to those changes, or it will die out.” This, he says, also applies to technological concepts, which have to be adjustable to individual cultural preconditions.

”For me,” he says, ”sustainability does not mean that we have enough oil for the next generation, but that the coming generations will be able to adjust to any energy resource available in future.”

Waste is an energy resource

A major conceptual mistake made today according to Professor Wilderer is that a main ambition with modern waste management is the destruction of molecules and materials which required terrific amounts of energy to construct.

“The Institute’s small organic transformation unit—our technical ‘cow stomach,’ if you will – could idealistically be implanted



Looking Ahead: Life in post-war Germany was difficult, but 10-year-old Peter A. Wilderer's determined expression mirrored his determination to make a difference.



Phd Party: A 30-year-old Dr. Wilderer celebrates in 1969 - with all the due pomp and circumstance accorded on such occasions.

Professor Peter A. Wilderer was born in Germany in 1939 and educated as a civil engineer at the University of Karlsruhe. He habilitated in 1976, served as Professor at the Universities of Karlsruhe, Hamburg and Munich, and today also serves as Director of the Institute on Advanced Studies on Sustainability. He is married to Jaroslava Wilderer and has three children.

His favourite holiday place is at home in a small village in Southern Germany, where he enjoys relaxing after his many research-related travels.

Inspiration during his career has among others come from Professor Ludwig Hartmann from Karlsruhe University, whose fascination with biological degradation processes ignited the interest of Professor Wilderer, as well as the late Professor Art Bush from the United States, who like the Laureate was a civil engineer who combined biological and social approaches within his work.



Photo: Stephanie Blenckner

Defying Disciplinary Boundaries: A trained civil engineer, Professor Wilderer nonetheless realised the need for interdisciplinary understanding and became, among other things, an expert in microbiological processes.

under the sink, for instance, in a household so that you have your own personal reuse station which could provide purified water for cleaning and biogas as an energy end product,” he says. “Sao Paulo, in Brazil, has already indicated that they would like to distribute these small units. Flexibility is a major challenge for any future technology.”

Airbus with recycling shower

Want to take a shower with only 15 litres of water, and do it above the clouds on your next flight? A project of Professor Wilderer’s Institute just might make it possible through its research into a recycling shower for the world’s biggest and newest

jumbo jet the European Airbus consortium is developing.

“A recycling shower has to be simple, hygienic, fresh and based ideally on already existing technology,” a visibly animated Professor Wilderer says. “A similar approach could also be applied for washing machines, where you use recycled water again and again until the very final wash with potable water. The technical model of this washing machine already exists.”

But having flashy commissioned research projects implies also some risks. “Industry often requires fast and single-target oriented solutions to complex challenges,” he says. “But fast is something that

often is not possible.” He cites Australia as an example of a country where research funding comes almost exclusively from private bodies, and that because of that there is a risk that rapid, profit-oriented solutions may dominate over well-elaborated, long-term concepts.

Professor Wilderer knows what he is talking about. His Sequencing Batch Reactor, which today is commonly applied in biological wastewater treatment around the world, took more than ten years to become implemented and accepted.

“Figuratively speaking, the scientific community smiled, mildly and patiently, when I first presented the idea,” he said. Through persistency, though, he finally succeeded. As a university educator, he finds the lesson appropriate.

“This is also something I tell my students: be persistent if you have a good idea and be flexible with your future career,” Professor Wilderer says. “One cannot be determined to head only one direction in life; life will turn out different anyway.”

For Professor Wilderer, his early ambition to become an architect is still reflected in his career. Creative construction and curiosity are the essential building blocks for any path in life.

“Even if you do not have the technical equipment or an expensive analysis kit, it is all in your mind,” he says. “The Internet offers wonderful possibilities to learn and to know, but it is the individual’s creativity and ability to find adapted solutions which is the key.”

Such creativity, he concludes, already exists in, for example, developing countries and will help them in their search for solutions to their specific water problems.



The Heart of Bavaria: Professor Wilderer knows there is no place like home, where he always returns to relax after criss-crossing the globe on his many research-related travels.



All that Jazz: Professor Wilderer lets his fingers do the talking on his stand-up bass.

Future research perspective on risk management in the Danube River Basin

An exciting initiative under development by Professor Wilderer is the **Safe Blue Danube**, a project for risk management with focus on integrative communication. With 13 countries involved, the project will establish a concrete risk management plan for the whole Danube area. The focus is partly on flood prevention but mainly on how to protect sensitive industrial and waste areas from spreading pollutants into the Danube during flood events.