Based on Science, Built on Trust

Sixteen interviews showcasing Sino-Dutch scientific cooperation
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Prologue

It is with great pride that the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Netherlands Organisation for Scientific Research (NWO), with support of the Dutch Ministry of Education, Culture and Science (OCW), present this booklet on the scientific cooperation between China and the Netherlands. In it, sixteen Dutch and Chinese scientists describe how they experience Sino-Dutch research collaboration.

This booklet shows the success of over thirty years of bilateral cooperation in research. Throughout that period, NWO, KNAW and their Chinese partners have developed scientific programmes accommodating the ambitions of both countries and building a relationship of mutual trust and benefit to each. The programmes have successfully achieved their goals: to produce outstanding scientific results, to train talented young scientists, and to establish lasting scientific networks.

The framework for this cooperation consists of the KNAW and NWO China programmes, but it is the researchers themselves who make it a success. That is why we want to give them the opportunity to speak: sixteen researchers from a variety of different scientific fields, engaged in collaboration based on science, built on trust.

Professor Martin Stokhof
Chairman, KNAW NWO China Committee

Dr Jan Karel Koppen
Director of Policy, Netherlands Organisation for Scientific Research

Dr Hans Chang
Director General, Royal Netherlands Academy of Arts and Sciences
Foreword

This year we are celebrating forty years of diplomatic relations at ambassadorial level between China and the Netherlands. Sino-Dutch relations in fact date back to the seventeenth century.

Historical records show that a Dutchman, Isaac Titsingh, visited the Chinese court in 1795 on behalf of the Dutch East India Company, on the occasion of the sixtieth anniversary of Emperor Qianlong's reign. The first Dutch consul-general, Jan Ferguson, was stationed in the thriving city of Shanghai as early as 1872 and the first Chinese diplomat, Li Hongzhang, visited The Hague in 1896.

Throughout this period, science and technology have been important pillars of our bilateral relations. Already in 1876, the Dutch engineer Johannis de Rijke introduced Dutch water management technology in Shanghai, and a few decades later the Dutch multinational Philips presented one of world's first X-ray devices to the last Qing emperor.

It is obvious that research collaboration will improve the quality of our research results. Exchanging people, and with them scientific knowledge, will benefit not only our two countries but will also assist the international community in tackling global issues such as food security, climate change and global health.

I congratulate KNAW and NWO on this special publication showcasing Chinese and Dutch researchers and research projects, and I do not doubt that our continued cooperation will contribute to the further development of both our countries.

Aart Jacobi
Her Majesty's Ambassador to China
Foreword

I was already irrevocably committed to promoting friendly relations between China and the Netherlands when I began my diplomatic career at the Chinese Embassy in the Netherlands in 1982. As our reform and opening-up policy intensified over the past three decades, I have witnessed the rapid, healthy development of our bilateral relations, in which Sino-Dutch cooperation on science and technology has played a unique and irreplaceable role.

Our cooperation on science and technology is based on complementary needs, innovativeness and mutual trust. The fifteen-year Sino-Dutch Programme Strategic Scientific Alliances was the first strategic long-term scientific cooperation programme between China and a developed country. Because of this and other joint programmes, the Dutch Ministry of Education, Culture and Science, KNAW and NWO, and the Chinese Ministry of Science and Technology, Chinese Academy of Sciences, Chinese Academy of Social Sciences etc. have produced valuable results and established excellent reputations.

In this publication, sixteen Dutch and Chinese scientists share their memories of this exciting cooperation. Their vivid stories are moving and encouraging, and their knowledge and insights are inspiring and meaningful. After reading this booklet, I am sure that more and more scientists will be inspired to engage in Sino-Dutch cooperation on science and technology and to build an even brighter future for our bilateral relations.

Zhang Jinxiong
Chargé d'Affaires a.i. of the Embassy of the People's Republic of China in the Netherlands
Timeline KNAW NWO China cooperation

Late 1970’s

First scientific contacts between Chinese and Dutch Ministries of Education and between KNAW and CAS
Introduction

A shared passion for their subject and a constant quest for innovation – Chinese and Dutch researchers have long had these in common. Thanks to investments from both countries, new contacts have developed in recent decades, resulting in long-term co-operation.

Anyone who visits Delft University of Technology or the faculty of dentistry at Radboud University Nijmegen will notice that there are quite a few Chinese researchers working alongside their Dutch colleagues. And the visitor may also notice that there are subtle references to China in the offices of many Dutch university professors: a print, a teacup, a lucky cat... all tell-tale signs of the scientific and scholarly links between China and the Netherlands.

Dutch and Chinese researchers collaborate in agriculture, linguistics, medicine, technology and numerous other fields. Hundreds of researchers are involved in some one hundred projects supported by the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Netherlands Organisation for Scientific Research (NWO). The projects form part of the large-scale programmes listed on pages 93-95 and represent a national effort alongside the many programmes set up by universities and scientific institutes and involving researchers from the two countries. Bilateral scientific collaboration goes back to the late nineteenth century and has really taken off in recent decades.

First foundations
Dutch and Chinese researchers first began collaborating in 1876. As already mentioned by Ambassador Jacobi in his foreword, the Dutch hydraulic engineers Johannis de Rijke and George Escher
“The Dutch Ministry of Education, Culture and Science together with its Chinese counterparts has been investing in scientific and scholarly cooperation between China and the Netherlands for more than thirty years. Starting out with a single programme and small-scale projects, our two countries now collaborate successfully in several larger programmes involving both Chinese and Dutch partners, resulting in countless research publications. The Ministry attaches great importance to this collaboration with China, which is based on equality, mutual benefits, and the deployment of large numbers of researchers from the two countries.”

Mr Leo le Duc, Acting Director Research and Science Policy,  
Dutch Ministry of Education, Culture and Science

“Sino-Dutch science and innovation collaboration offers us a unique opportunity to combine the strengths of both countries in major strategic priorities. Based on equal partnership and outstanding quality, our collaboration with Dutch partners now covers the whole spectrum, from fundamental research to applied science and industrial innovation, and addresses both immediate priorities and long-term strategies. It is an impressive vehicle for international science and innovation cooperation. We would like to congratulate partners from academia and industry for the outstanding results, and expect that their achievements will drive progress in both countries.”

Mr Zhou Longchao, Director European Division,  
Bureau of International Cooperation, Ministry of Science and Technology
(father of the famous artist M.C. Escher) helped to canalise the Huangpu River with the aim of improving access to the harbour at Shanghai. Dutch engineers returned to China in the 1930s, when Francois Bourdrez worked on rebuilding the dikes along the Yangtze (1931–1939) and Niek van den Heuvel helped to establish the Nanjing Hydraulic Research Institute, which is still one of the leading institutes in its field. As the interview with Professor Dick Swaab shows (page 44), there were also early contacts with China in the neurosciences.

Programmatic collaboration between Chinese and Dutch researchers began more than thirty years ago in the late 1970s, a few years after the two countries entered into relations at ambassadorial level. That collaboration became possible because funding was made available by the Dutch Ministry of Education, and because the Chinese also felt the time was ripe for cross-border science. In 1978, Deng Xiaoping introduced the open-door policy, thus facilitating international contacts. The “Four Modernizations” were promoted, aimed at strengthening Chinese agriculture, industry, defence, and science and technology. The fact that not only China and the Netherlands, but also the universities and research institutes signed agreements and memoranda of understanding – including an overarching cultural agreement and a scientific and technological agreement – led to structural, successful collaboration.

**KNAW and NWO: natural partners**

Funding for scientific collaboration and exchange programmes with China comes from the Dutch Ministry of Education, Culture and Science, and implementation is dealt with by KNAW and NWO. KNAW monitored the quality of the research programmes from the moment the governments of China and the Netherlands
“Collaboration between the National Natural Science Foundation and NWO now spans more than two decades, and a close relationship has developed between the two organisations. In addition to their exchange programmes, both sides have successfully launched three rounds of thematic calls and together funded around twenty joint research projects. This has created a unique and valuable platform for collaboration between scientists from both countries. The professionalism and efficiency of our Dutch partners and their enthusiasm and commitment to collaboration with China have made a deep impression. That and the deep interest shown by senior officials on both sides have convinced us that collaboration will continue to prosper in the years ahead.”

Professor Lu Rongkai, Deputy Director-General, Bureau of International Cooperation, National Natural Science Foundation of China

“The NWO and KNAW China programmes provide numerous opportunities for the best researchers in the Netherlands and China to work together. The long-term bilateral research co-operation between the Netherlands and China has delivered many fruitful results and offers great potential for the future. Collaboration by researchers from both countries provides new inspiration and generates valuable new insights into science and culture.”

Dr Jan Karel Koppen,
Director of Policy, Netherlands Organisation for Scientific Research
first decided to collaborate on science. In 2008, KNAW and NWO initiated a joint strategy for the Netherlands-China programmes. Their partnership was an obvious step because NWO had already been financing research projects in China for many years. NWO and KNAW jointly appoint a China committee, made up of university professors, which decides on the design, implementation, and monitoring of scientific collaboration with China.

**From observation to joint research**

NWO and KNAW collaborate closely with their partners in China: the Ministry of Science and Technology, the Ministry of Education, the National Natural Science Foundation of China, the Chinese Academy of Sciences, the Chinese Academy of Social Sciences and the China Scholarship Council.

In the 1990s, after many years of successful cooperation between Dutch and Chinese researchers, there was a need for more substantial research programmes that would ensure a new kind of structural, long-term collaboration. Not only KNAW and NWO but also the Chinese partners see great value in such programmes, which provide for the long-term funding of fundamental research. The focus of international scientific collaboration has shifted from the exchange of researchers to joint research: researchers do not merely observe each other’s research but actually undertake research projects together. That means that earlier programmes such as the China Exchange Programme – which focused on mobility – differ from later ones focussing more on joint research, for example the Programme Strategic Scientific Alliances (PSA). This publication includes interviews (pages 40 and 56) with Professor Hu Zhihong and Dr Guusje Bonnema, two researchers who are cooperating successfully with their partners in PSA.

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1 More information about these organisations is given on pages 90-92.

2 The programmes are listed on pages 93-95.
“The Chinese Academy of Sciences attaches great importance to scientific cooperation with Dutch research organisations. In recent decades, both sides have developed various forms of cooperation at different levels, for example the China Exchange Programme, the CAS-KNAW Joint PhD Training Programme, and the Joint Scientific Thematic Research Programme. We firmly believe both sides can move ahead, develop closer partnerships at the cutting edge of scientific knowledge, and engage in new forms of cooperation in the future.”

Professor Cao Jinghua, Deputy Director-General Bureau of International Cooperation, Chinese Academy of Sciences

“As the director of research policy at the Dutch Ministry of Education, Culture and Science, I travelled to China in the summer of 1980 to promote relations between that country and the Netherlands. Science is an effective initial catalyst in international relations. The Ministry later made the first funds available for collaboration, with KNAW as the designated administrator. Now, many years later, KNAW is proud of how collaboration has developed, from the very start right up to the current portfolio of long-term strategic programmes involving all the major partner organisations in China. Scientific quality is still top priority.”

Dr Hans Chang, Director General, Royal Netherlands Academy of Arts and Sciences

TIMELINE

2005
Start of CO-REACH (Coordination of Research between EU and China)
Mutual interest
In this era of globalisation, collaboration is almost inevitable. Many of the issues that countries face transcend their borders. Whether these concern climate change, raw materials, agriculture, or trade and the economy – different countries will in many cases have the same long-term interests. They will find solutions sooner if they collaborate and share their knowledge with one another. The scientific programmes developed by NWO, KNAW and their Chinese partners have been set up for this very purpose. One important feature of international collaboration nowadays is the thematic focus of many research programmes, for example the NSFC-NWO Programme and the Joint Scientific Thematic Research Programme. A particular theme is selected jointly each year that reflects current scientific developments in China and the Netherlands. Water, for example, is an important theme for both countries, as illustrated by the interviews with Professors Xia Jun, Nick van de Giesen and Zheng Jinhai (pages 32, 36 and 60). It is not only the Dutch government but also the European Union that is promoting collaboration with China. The year 2005 saw the launch of CO-REACH, a network of sixteen European policy and funding organisations in science and technology, involved in promoting research co-operation with China. CO-REACH boosted the social sciences and humanities by organising a pilot call for research proposals with the Chinese Academy of Social Sciences.

Besides governments, businesses are also interested and participating with increasing frequency in research programmes, for example in the Programme for Science Industry Cooperation. This programme involves four parties: a Chinese industrial partner, a Dutch industrial partner, a Chinese academic research
“The academic cooperation between the Chinese Academy of Social Sciences and the Netherlands has become a very important destination country in Europe for scholars and students sponsored by the China Scholarship Council. So far, the Council has established formal partnerships with a number of Dutch institutions, including KNAW and NWO, and publicly funded research universities. The expectation is that both parties will take full advantage of these excellent connections, share the benefits of joint activities, and encourage long-term collaboration between the two countries.”

Ms Yang Xinyu, Deputy Secretary-General European Affairs, China Scholarship Council

“Renowned for its high-quality, open-minded teaching and research, the Netherlands has become a very important destination country in Europe for scholars and students sponsored by the China Scholarship Council. So far, the Council has established formal partnerships with a number of Dutch institutions, including KNAW and NWO, and publicly funded research universities. The expectation is that both parties will take full advantage of these excellent connections, share the benefits of joint activities, and encourage long-term collaboration between the two countries.”

Ms Zhang Lihua, Director European Division, Bureau of International Cooperation, Chinese Academy of Social Sciences
institution, and a Dutch academic research institution. This approach enables both countries to benefit from one another’s strengths in order to accelerate innovation in predetermined focus areas.

**Nurturing talent**

Every idea, research result, and insight finds its origin in the brain of a researcher, so it comes as no surprise that both China and the Netherlands are investing a great deal in talent development. NWO and KNAW have set up a number of programmes promoting mobility among PhD candidates and will continue to do so. China is similarly investing heavily in talented young researchers. Each year, the China Scholarship Council makes no fewer than six thousand scholarships available to PhDs allowing them to obtain their PhD degree abroad. The Netherlands also makes grateful use of these scholarships, which are funded by the Chinese government. In the future, KNAW and NWO hope to focus more on encouraging Dutch PhDs to conduct research in China for both shorter and longer periods, so that they will benefit from the scientific knowledge and systems of both countries.

**Based on science, built on trust**

It is researchers who are at the core of scientific collaboration between the Netherlands and China, and they are hence the ambassadors for that collaboration. This booklet includes interviews with sixteen top researchers from the two countries who – supported by the KNAW and NWO China programmes – have collaborated successfully with their counterparts in the other country. All of them hope to continue collaborating for a long time because of their shared passion for their subject.
More than ten years ago, chemists in Eindhoven and Dalian discovered that they each held a crucial piece of a puzzle. The Chinese researchers were experts in Raman spectroscopy, an analytical technique for examining catalysts. The Dutch were leaders in theoretical catalysis, which supports that technique. It would have been illogical not to collaborate.

Contact between the two groups was initiated by Professor Li Can of the Dalian Institute of Chemical Physics and Professor Rutger van Santen of Eindhoven University of Technology. At the Eindhoven end, Professor Emiel Hensen is now directing the research, a bilateral collaboration programme in the context of the Programme Strategic Scientific Alliances and the Joint Scientific Thematic Research Programme. “It’s very unusual for scientific collaboration to be as close as ours with Dalian. There’s not a single publication where either one of us can say ‘That was your idea and that was mine’.” Another sign of their solidarity consists of the double doctorates: candidates can gain their doctorate simultaneously in Dalian and Eindhoven by doing two years of research in the Netherlands and two years in China.

Sustainable fuel
Professor Hensen’s group and their research partners at the Dalian Institute of Chemical Physics are working on catalysis. Catalysts are substances that speed up chemical reactions so that less energy is necessary for all kinds of production processes. The aim of the Sino-Dutch project is to design a new generation of catalysts to extract chemicals and fuels from biomass, for example from
agricultural and industrial waste. Professor Hensen explains: “At the moment, fuel extracted from biomass cannot compete with oil and coal. With fifty years of experience and research behind them, refineries have optimised the process, meaning that they have a high output. Conversion of biomass is still in its infancy. We chemists are constantly looking for – and finding – new catalysts that can optimise the conversion step by step. That increases output, meaning that energy from biomass is becoming increasingly more attractive as an alternative to coal and oil.”

**Envious**
The research is urgently needed. With its rapidly growing economy, China has put CO2 reduction high on the agenda, and that means making less use of coal-fired power stations. The Netherlands, in turn, is aiming to acquire a third of its chemical raw materials from renewable sources by 2025. The Chinese government is investing heavily in research and will continue to do so in the years ahead. Professor Hensen visits China twice a year and looks enviously at the Dalian National Laboratory for Clean Energy, which will eventually have a staff of more than one thousand people. But it is not just the Dutch and Chinese governments that are interested in the research: so is the commercial sector. “It is extremely important for the Dutch economy to continue to invest, says Professor Hensen. “China is more specific in the choices it makes than the Netherlands: all the money goes to a select group. In the Netherlands, I think we tend to spread funds across too many different programmes.”

**Commercial sector**
According to Professor Hensen, the State Key Laboratory of Catalysis in Dalian is among the best in the world. “We find China’s best PhD students there, with an average of three a year coming to the Netherlands. Some of those PhD students are now professors at other Chinese universities, while two are working for Dutch companies. So the network is slowly expanding. China is particularly interested in the way Dutch universities and companies collaborate. Professors who spend part of the week working in the commercial sector are an unknown phenomenon in China.”
Dalian and Eindhoven also encourage one another in terms of actual scientific content. Professor Hensen says that both universities have the same major ambition: to discover a way of storing solar energy in molecules in order to produce a fuel that can be stored and transported.

“China is more specific in the choices it makes than the Netherlands.”

Professor Emiel Hensen
Professor Li Aijun
Looking for milestones together

Research in Beijing and Utrecht could help identify speech or psychiatric disorders in children at a much earlier stage than currently possible.

When does a Dutch baby stop hearing the difference between the Chinese words for horse and mother? Both are spelled “ma”, but pronounced differently. Meanwhile, how do Chinese babies learn to discriminate between these tones? These are the questions at the heart of research being carried out jointly by René Kager, Professor of Linguistics at Utrecht University, and Li Aijun, Professor and Director of the phonetics laboratory at the Institute of Linguistics, part of the Chinese Academy of Social Sciences in Beijing. Their joint project is funded by the China Exchange Programme.

“Up to six months old, infants are able to hear the difference between both native and non-native sounds, but as they grow older, their listening ability is tuned by the native language,” says Professor Li in her laboratory in the heart of the Chinese capital. “The Chinese tones are extremely difficult for adult foreigners to learn. We are trying to find out at what age the Dutch babies lose their ability to hear Chinese tones.”

Experiment
Chinese and Dutch infants aged six, nine, eleven, and fourteen months are participating in the experiment. Professor Li shows the room where the Chinese part of the research is carried out. A red sofa is situated in front of a flat-screen TV. She explains:
“We present the baby with repetitions of the word ‘can’ in a rising tone together with an image on the screen until they get used to it and stop looking at the screen.” Meanwhile, the TV shows images of Disney characters playing in the snow. “We let the baby hear the word ‘can’ again now carrying a low tone while showing them the same picture. We observe whether the baby looks at the screen longer. If so, then this indicates that they hear a difference between the two tones.”

The aim of the joint research is to learn more about child language development, especially how babies learn to perceive and understand a tonal language like Chinese. “Tonal perception is a very hot topic worldwide,” says Professor Li. “The focus used to be more on non-tonal languages. The two teams, in Utrecht and Beijing, are together the first group of scientists to test Mandarin tone perception in both tonal-language infants and non-tonal language infants, i.e. Dutch babies. It’s a new field, so our cooperation is pushing our knowledge to a new level.”

**Milestones**

That knowledge may become useful for diagnosing speech or even psychiatric disorders at a much earlier stage than is currently possible. “We are looking for milestones in the development of infants at which they learn to discriminate tones,” says Professor Li. “In the future, that data can serve as a reference to determine whether a baby is displaying atypical language development.” She gives another example: “Autism is usually not discovered until children start to speak. That’s when their difficulty in communicating with others becomes noticeable. But traces of autism can be seen earlier. Our research lets us observe whether an infant in the pre-speech stage has problems perceiving tones. If so, the doctor might need to examine the child more closely.”

Professor Li says that previous scientific cooperation has never been as close as it now is with Utrecht University. “Professor Kager gives lectures here and we present papers together at international conferences: both sides are truly benefitting from this joint research.”
“Our cooperation pushes our knowledge to a new level.”

Professor Li Aijun
Both China and the Netherlands face challenges to their water supply. Scientists from both countries have pooled their collective knowledge and experience to come up with solutions.

Even though China and the Netherlands are two countries with very different natural and social environments, they face many similar problems related to water. One particular problem is the threat that climate change poses to water security. Professor Xia Jun points to his cup of tea: “Everybody needs water,” he says. “We need to find a way to manage our water resources so that everybody actually gets the water they need.” Professor Xia is director and head professor at the Center for Water Resources Research in Beijing, part of the Chinese Academy of Sciences. He is also the president of the International Water Resources Association and head professor and dean at the Research Institute for Water Security (RIWS) at Wuhan University.

End of the story
“People understand that water is very important, but then they turn on the tap and water runs out. For them, that’s the end of the story. They don’t understand that water comes from a reservoir which is drying up, so they also don’t understand why they have to save water. We need to start educating people from an early age.” One of the threats to water security in both China and the Netherlands is the intrusion of salt sea water into the river deltas. The result of climate change, this intrusion threatens food production, the supply of usable water, and the vulnerable ecosystems in the deltas. Together with Nick van de Giesen,
Professor of Water Management at Delft University of Technology, Professor Xia is working on a project to monitor and model the salt water intrusion into the deltas of the Rhine and the Yellow River. Professors Xia and Van de Giesen met many years ago and began to cooperate in 2007.

Best match
Their current cooperation is funded by the Joint Scientific Thematic Research Programme (JSTP). Professor Xia explains: “The Chinese and the Dutch are the best possible match. They have a long tradition in monitoring water and the quality of their work is very high. At the same time, China faces water problems on a scale the Dutch do not know. This is exciting for them, and it motivates them to come work in China. It makes our cooperation very interesting.” Professor Xia mentions another area where the two sides benefit from each other’s experience: “Europe has the Rhine as an international river, which flows through several countries before reaching the Netherlands, where it flows into the sea,” he says. “We have the Yellow River and the Yangtze River, which both flow through many different provinces of China. Regions farther upstream want more water for themselves, which causes problems for regions downstream. We need to establish a central water governance system that combines the interests of all the regions while managing the water resources.”

Evidence
In order to provide the government, companies, and the public with enough evidence about the current status of China’s water supply, and to suggest solutions for more efficient and productive use of water, more monitoring is necessary, according to Professor Xia. “A lot of scientists simply comment from a distance, but I’m someone who likes to get the water out of the river myself. We like to do fieldwork. That’s what I appreciate about the Dutch: they choose to come to China to try to understand our problems in the field and then research and find solutions with us. Therefore, our cooperation is very normal for me – in fact, it’s natural.”
“The Chinese and the Dutch are the best possible match.”

Professor Xia Jun
China shows what we can expect in the Netherlands

On his wall, there’s a reproduction of Hokusai’s famous woodblock print Great Wave off Kanagawa. It’s obvious that Professor Nick van de Giesen’s main interest is water. Water is high on the scientific agenda for both China and the Netherlands.

Climate change, agriculture, urbanisation, and industry – there are all kinds of factors that affect the availability of both salt water and fresh water. Nick van de Giesen, Professor of Water Management at the Faculty of Civil Engineering and Geosciences, Delft University of Technology, and his colleague Professor Xia Jun, Center for Water Resources Research at the Chinese Academy of Sciences, are collaborating on research within the Joint Scientific Thematic Research Programme. Professor Van de Giesen explains: “It all started in 2007 when we both attended an international symposium in Perugia. I got on immediately with Professor Xia Jun. We had the same ideas on how to do research on the salt water infiltration in river deltas. But it wasn’t just that – we also agreed on how to collect and share data, which is essential if you want reliable results. We started collaborating shortly after, and we expect to continue for a long time.”

Rain
One major joint project involves a scenario study: what will the future bring? “We are collecting as much data as possible about the impact of change on water management,” says Professor Van de Giesen. “What will happen if people use more water? What if there is more rainfall or less? That’s extremely difficult to predict – something we are becoming increasingly aware of. A student
from China is working here in Delft to process data from both countries. That’s very convenient for us, because some of the data is only available in Chinese.”

There are also two other research projects. The first is being conducted in China, where students and scientists are taking measurements and doing experiments in the delta of the Yellow River. One of the things they are studying is how canal construction and other measures lead to more salt water entering the delta. In Delft, researchers are carrying out a technical study on monitoring flows of water. The two universities share their data, their researchers are in regular touch, and they inspire new insights in one another.

**Revolutionary technique**

“The study being carried out in the delta of the Yellow River, where water depletion is already far advanced, shows what we can expect in Dutch river deltas,” says Professor Van de Giesen, “and how we can take action when necessary.” The Chinese partner is also benefiting from Dutch research. Professor Van de Giesen’s team recently developed a revolutionary technique for measuring salt water and fresh water flows precisely using fibre-optic cable. The technique is now being used to measure the Rhine delta in the Netherlands and the Yellow River delta in China. Master’s degree students from Delft are working on the project in China.

**Clever, but also communicative**

Professor Van de Giesen, who is also conducting research in West Africa, is an enthusiastic advocate of international projects. “Eighty percent of the PhD students in Delft come from outside the Netherlands. We select people who are not just clever and motivated but also communicative, because knowledge-sharing serves to advance science. The joint projects with China are giving us more and more contacts there, for example with Hohai University in Nanjing, the leading university in China for hydrology and water management. Professor Xia Jun is now the President of the International Water Resources Association. That’s the great thing about international collaboration: it gives you access to the best brains in the world.”
“International collaboration gives you access to the best brains in the world.”

Professor Nick van de Giesen
The trend towards the future is green

Close collaboration with Wageningen University has helped the Wuhan Institute of Virology develop into a world-class laboratory and enables ongoing scientific exchanges between the two institutes.

Trust may well be the most important result to emerge from the long collaboration between the Wuhan Institute of Virology, located in central China, and Wageningen University. “In science, trust is crucial,” says Professor Hu Zhihong in her office at the Institute, which is part of the Chinese Academy of Sciences. “You need to be able to trust one another’s lab results. After so many years of working together, we know exactly what each of us can do and we trust one another’s work without question. That makes it easy to focus on science and on what we want to achieve together, instead of having to deal with side issues.”

Tea pests
Professor Hu’s relationship with the Wageningen University Laboratory of Virology started in 1993, when she obtained her PhD there with research on the use of the baculovirus to fight tea pests. “Back then,” she says, “the laboratory in Wuhan was very poorly equipped, so I went to the Netherlands for training.”

Professor Hu returned to Wuhan in 1998 not just with a PhD, but with a plan she had developed with Professor Just Vlak, her supervisor in Wageningen, to build a joint laboratory in Wuhan. “Wageningen helped us a lot in the initial stages. We modelled our laboratory after theirs. We were already receiving funding from the China Exchange Programme.”
Close collaboration
The close collaboration allowed the Wuhan Institute of Virology to develop into one of the world’s top laboratories in its field, on a par with Wageningen. “Nowadays, our collaboration goes both ways,” says Professor Hu. “We also work with partners in other countries, with each partner doing research. We then meet a number of times to discuss the project. Once the project is finished, so is the collaboration. In the case of Wageningen, however, we do a lot more than simply swap research data. Our institutes also exchange staff and students. Our collaboration would be less intense without support from the Programme Strategic Scientific Alliances.”

At the moment, Professor Hu and her counterparts in Wageningen are studying the baculovirus as an alternative to chemical pesticides, specifically in cotton cultivation. She explains: “We focus on cotton, but the baculovirus can also be used on other crops. It’s even useful in vaccine production.”

Cleaner and greener
The joint project will shed light on the workings of what Professor Hu describes as “a very complicated virus”. Once we know which genes determine how the virus kills which pests, it becomes possible to replace chemical pesticides with a baculovirus in an ever wider variety of crops. “Our joint project can help tea companies in China switch from using pesticides to using the baculovirus exclusively. That makes tea production cleaner and greener. I think the public wants that,” she says. “Viruses are natural and can remain active in a field for a long time, unlike pesticides. There is a trend towards using natural products, and companies would like to use the eco-label for their products. That makes our research necessary.”
“We don’t need to think about practical difficulties anymore. Instead, we can put science first.”

Professor Hu Zhihong
Discussing the brain with monks

Brain researchers in China and the Netherlands have been in touch for quite some time. Research on the causes of such conditions as depression and dementia have produced pioneering results. Professor Dick Swaab notes that in China, it is not just scientists who are interested in how the brain works but also the public.

In 1923, Cornelius Ariëns Kappers, the first director of the Netherlands Institute for Neuroscience (NIN), spent a year in China as a guest professor at Beijing Union Medical Hospital. An old photo shows the director at the gate of the hospital – with a hat on – amongst Chinese students in traditional costume. “That’s how far our contacts go back,” says Professor Dick Swaab, Emeritus Professor of Neurobiology at the University of Amsterdam and from 1978 to 2005 himself the director of the NIN, where he still leads a research team. Professor Swaab shows a recent photo taken at the same hospital gate, but this time with himself standing amongst his Chinese colleagues.

Transsexuals
Professor Swaab’s introduction to China came in 1989 when he received a letter from Zhou Jiangning, who wanted to do research in Amsterdam. Professor Swaab was already famous for his pioneering research on the physiology of the brain and the influence of hormonal and biochemical factors on its development. He agreed to Zhou’s request, and after obtaining a scholarship from the Netherlands Organisation for International Co-operation in Higher Education (NUFFIC), the Chinese researcher came to
Amsterdam to study the reversal of male-female characteristics in the brain of transsexuals. Professor Swaab explains that “how they felt turned out to be in line with the structures within their brain and not with their birth certificate.” The research resulted in an article in *Nature*. “That was marvellous,” says Professor Swaab. Zhou was able to stay on as a postdoctoral researcher, partly thanks to funding from the China Exchange Programme (CEP), after which he started his own research group at the University of Hefei. His wife Liu Rongyu also did her PhD with Professor Swaab and is now a professor in Hefei.

**Brain diseases**
Professor Swaab has now supervised a total of thirty-six Chinese PhDs and has held four guest professorships in Beijing, Hangzhou, and Hefei. The collaboration with China has resulted in publications in journals including *Brain, Molecular Psychiatry, Archives of General Psychiatry*, and *Nature*. When he dissects a brain in the lecture theatre, students press forward to follow from close up. “In China, they do a lot of fundamental research at cell level, for example on the synapses, the points of contact between brain cells. The work is exclusively cellular and conducted on laboratory animals because no human brain material is available. In the Netherlands, we do have that material and we can investigate the molecular causes of diseases in the brain of deceased people. We pool our findings, meaning that we complement one another very effectively.” For the next three years, Professor Swaab will be holding the Chao Kuang Piu Chair, a special professorship at Zhejiang University in Hangzhou. He will be working there with the research group directed by Professor Bao Aimin and will also be involved in setting up the first Chinese brain bank.

**Great-grandchildren**
On Professor Swaab’s desk is the Chinese translation of his bestselling book *Wij zijn ons brein* [We are our brain]. “It’s very satisfying that the book has also been published in China,” he says, “because there is growing public interest there in how the brain works and this was the first book on that topic suitable for the general public. It has already led to interesting discussions
with philosophers and Buddhist monks.” The foreword was written by Zhou Jiangning. “That was really marvellous. I call my 76 PhD students my scientific children. I now have scientific grandchildren too, and even some great-grandchildren! Zhou blames me, by the way, for the fact that he can’t yet speak Dutch because I told him in 1990 that he shouldn’t waste any time on learning it.” During a recent lecture at the Medical Military University in Shanghai, Professor Swaab received a text message from someone in the audience. “It was from Zhou Jiangning’s son,” he explains. “He is now studying to be a neurosurgeon.”

“Exceptionally good people come from China to the Netherlands. They are highly motivated, they work extremely hard, and they enjoy what they do.”

Professor Dick Swaab
Professor Yang Guang
Handling high energy prices together

Now that China and Europe both face permanently high oil and gas prices, it is more crucial than ever for the two sides to work together and understand each other. Professor Yang Guang wants his joint research to contribute to mutual understanding.

The current trend of rising consumption, declining oil and gas reserves, and a deteriorating environment means the time is ripe for Europe and China to learn from each other about solar, wind and biomass energy. That is the belief of Professor Yang Guang, Director General at the Institute of West Asian and African Studies of the Chinese Academy of Social Sciences in Beijing. To further the relationship between Europe and China, he has been working with political scientist Professor Mehdi Amineh of the University of Amsterdam and the University of Leiden, whom he first met when he went to the Netherlands in 2006 to lecture on Chinese investment in Africa.

Mobilise

“As scientists, we cannot promote cooperation between countries directly, but we can show how important it is to work together. The time of permanently high oil and gas prices has arrived, so we need to move forward on this.” He puts his hand on the book in front of him: The Globalization of Energy, which he co-edited with Amineh. “We have produced two big volumes like this in the past five years. That’s a very real result and proof of how solid our cooperation is.” Professor Yang explains that his work with Amineh goes beyond most scientific exchanges. “In producing
these books,” he explains, “we mobilised twenty Chinese and Dutch authors, each of them good researchers and experts in their fields. That led to more cooperation between all these people, even beyond just China and the Netherlands. So yes, our project is quite successful.”

**Challenge**

Their joint project, which is funded by the China Exchange Programme, focuses on the challenges both China and the European Union face in ensuring energy security. As Professor Yang explains, “Both Europe and China are oil importers that face permanently high prices. We need to secure our imports by cooperating and we need to work together on developing sustainable energy sources.” Professor Yang thinks China can learn a lot from Europe about sustainable development: “Europe was the first region in the world to take up this concept in the late 1980s, so we have to look at that.” On the other hand, he expects that the joint work can help Europeans understand China better: “It’s commonly believed that China is seeking oil everywhere and exhausting the global oil supply. That is not true. In these books, we show how China is also developing alternative energy sources like solar and wind. We are now the world’s largest producer of photovoltaic cells, for example.”

**Understand**

“When a country is developing as rapidly as China, a lot of things change at breakneck speed. Other countries might worry, so we need to help the world understand these changes better. I’m happy these books and our joint project do that,” says Professor Yang. “I think that joint research is international academic cooperation at the highest level. Everyone gains more experience, and that helps us collaborate with scientists elsewhere too. In the end, that is what leads to more mutual understanding between countries.”
“Joint research is international academic cooperation at the highest level.”

Professor Yang Guang
Fascination with large systems

*How does an emerging economy deal with environmental, healthcare and tax legislation? Professor Benjamin van Rooij is attempting to answer that question and has set up the first Dutch research centre for Chinese law.*

China and the law: two topics that have been an ongoing theme in the scholarly career of Professor Benjamin van Rooij. Professor Van Rooij studied both law and Chinese language and culture, obtaining his PhD with a dissertation entitled *Regulating land and pollution in China, lawmaking, compliance and enforcement, theory and cases*. The dissertation brought together his two main interests. Professor Van Rooij – now Professor of Chinese Law and Regulation at the University of Amsterdam – thinks it essential to build bridges. “A lot of studies look at the way the law and legislation are applied in China from an entirely internal perspective. Implicitly or explicitly, the thinking is that ‘China is strange; China is different,’ whereas what you need to do is zoom in and then zoom back out to your own conceptual framework. In my teaching, I try to make students more aware of our own system by looking at China. I’ve followed that approach since I wrote my dissertation and it was with that in mind that I set up the Netherlands China Law Centre (NCLC).”

**Souvenirs**
Professor Van Rooij set up NCLC in 2009 with the aid of a NWO Veni scholarship. He is also its director. “The Centre is the culmination of more than ten years involvement with China.” It is now the world's largest research group studying how Chinese
legislation functions and is complied with. It has ten Chinese PhD candidates at the moment, some of them with a scholarship from the China Scholarship Council “They come from the London School of Economics, Harvard, and King’s College,” says Professor Van Rooij. “I apply very strict selection criteria and I scout out talented researchers when they are still doing their Master’s degree.” The NCLC is located in the heart of the old part of Amsterdam, but the atmosphere is decidedly Chinese, with photos on the walls and souvenirs on the desks. When they drink tea, it’s in the proper Chinese manner: loose green leaves directly in the cup. But Professor Van Rooij is not just a sinophile. “For me,” he says, “China is above all an extremely interesting case study. I find large countries and large systems fascinating. Legal theory about compliance with legislation comes from the WEIRD countries – Western Educated Industrialized Rich and Developed – but much of the world is very different to those countries. In emerging markets such as China, India and Brazil, regulation is crucial in order to make risks manageable.”

**Conceptual framework**

Together with Chinese researchers, Professor Van Rooij is studying enforcement and compliance in relation to environmental, work, food safety, and tax rules. In recent years – partly with CO-REACH funding – they have studied cases involving farmers and pesticide use, occupational safety in the building industry, and lawyers and the payment of taxes. PhD and Master’s degree students accompanied labour and food inspectors in both China and the Netherlands. Research was also carried out in the field, including in a Chinese village, the site of a large factory, which was suffering environmental damage. Rather than pressing for prevention, the local residents were satisfied receiving financial compensation for the damage they had sustained. “You zoom out from actual practice to a conceptual framework,” says Professor Van Rooij. “We are examining at the fundamental level whether people respect the law. It turns out that it is not the government or social norms that determine things, as is often thought, but the market, the customers, and the organisational culture.”
**Common objective**
Some of the research took place under the auspices of Yunnan University of Law, where Professor Van Rooij has been a guest professor since 2010. “When I met Vice Dean Wang Qilian there, we both turned out to have the same thing in mind. That’s how I like to work. Our collaboration is based on common objectives. A lot of doors are open to me thanks to Wang Qilian.” Professor Van Rooij is also a guest professor at Wuhan University and a research fellow at Jiaotong University in Shanghai, where he works at the Centre for Law and Society with legal sociologists from all over China. He explains: “With their assistance, I will be setting up the first methodology course in Chinese for researchers who want to understand why a piece of legislation does or does not work. That discipline doesn’t exist yet, and the knowledge involved is also extremely important for western legal theory.”

“I work with people, not with institutes. You need to have the same drive.”

Professor Benjamin van Rooij
Investing makes you a sought-after partner

“Shooting up like cabbage,” says a common Dutch expression. It’s actually true because cabbage grows faster than most other kinds of vegetable. Dr Guusje Bonnema and Dr Wang Xiaowu know precisely why. They have collaborated to chart the genes of Brassica rapa.

Bok choy, turnip, rapeseed, Chinese cabbage, and broccolietto are members of the Brassica rapa family. Dr Guusje Bonnema has a poster in her office at Wageningen University showing them all. Each species is accompanied by a corresponding passport photo of a member of Dr Bonnema’s Brassica research group, a varied collection of scientists from northern and southern Europe, China, Pakistan and Nepal. “It’s just for fun,” says Dr Bonnema with a smile, “but it does illustrate the enormous variety within the Brassica family. Some species form turnips, others have curly leaves or remain in flower longer. Our research essentially involves understanding how that variation has come about.”

Chinese markets
Dr Bonnema is working with Dr Wang Xiaowu of the Institute of Vegetables and Flowers, part of the Chinese Academy of Agricultural Sciences in Beijing. “When I’m in China, we visit the markets to see all kinds of species of Brassica.” The two scientists have set up a highly successful system of collaboration within the Programme Strategic Scientific Alliances (PSA). They recently achieved a major breakthrough when they were the first in the world to map the genome sequence of the genes of Chinese cabbage. “Wang Xiaowu was the main initiator. In China, he is now known
as the Number 1 *Brassica rapa* researcher. Both of us want to internationalise our research further, and other researchers want to collaborate, for one thing because our PSA project is considered prestigious. There is interest in the United States, Canada, the UK, and Korea. Investing in genetic material makes you a sought-after partner.

**Healthy compounds**
The team is cultivating and cross-breeding several different types of *Brassica rapa* at the universities’ greenhouses in Wageningen and Beijing. “Now that we have mapped the genome sequence, we can carry out a lot of fast genetic analyses, and we can determine what properties correspond with what genes. We’ve built up respected *Brassica* research groups in just a short time, with publications in journals like *PlosOne* and *Nature Genetics*. The knowledge we gain is extremely fundamental in nature, but it can also be applied by commercial parties. For example, we are focusing on glucosinolates, health-promoting compounds in cabbage that produce that typical smell – the smell of Brussels sprouts. If we can find out how to get more glucosinolates into a *Brassica*, we can cultivate one that is really super-healthy.”

**Ceremony**
Dr Bonnema was made an honorary professor at CAAS this year. “That is naturally both an honour and very gratifying.” PSA has also led to contacts with Nanjing Agricultural University. “They have already produced an enviable number of genome sequences for bok choy there, which is extremely relevant for us.” Dr Bonnema recently returned from Nanjing, where she attended Xiao Dong’s defence of his dissertation *Genetic analysis of flowering time and leaf traits in Brassica rapa* as one of his supervisors. “It was on Sunday morning, because the professors are too busy during the week,” says Dr Bonnema. In 1985, she spent a year in Nanjing doing research on rice. “I hardly recognised the place because so much has changed. I did go out to eat with my professor from back then – he’s now 92.”
“PhDs who go back and forth between the Netherlands and China bring knowledge with them for both sides.”

Dr Guusje Bonnema
A glance at the map shows how sensible it is for Professor Zheng Jinhai to work with Dutch scientists. After all, the challenges in the Pearl River delta are similar to those facing the Rotterdam Rijnmond delta.

People in the Pearl River delta in southern China face the same risk as those living in the Rotterdam Rijnmond delta: flooding. The risk comes not just from a rising sea level; what happens upstream in both river networks plays a major role as well. “There are many common issues in the Pearl River and Rotterdam Rijnmond deltas,” says Professor Zheng Jinhai, dean of the College of Harbor, Coastal and Offshore Engineering at Hohai University in Nanjing. He shows satellite photos of both deltas. “Both are well developed river networks which are challenged by climate change and by runoff sediment discharge from upstream.”

Sensible
That is why Professor Zheng finds it perfectly sensible to research these challenges by joining forces with his Dutch counterpart, Dr Ton Hoitink of the Institute for Marine and Atmospheric Research at Utrecht University. In their joint project, which is supported by the NSFC (National Natural Science Foundation) – NWO Programme, Professor Zheng and Dr Hoitink aim to determine how changes in the river beds caused by the impact – both natural and human – on sediment discharge influence the flood hazards in the Pearl River and Rotterdam Rijnmond deltas. In the Pearl River delta, the volume of sediment discharged into the South China Sea has decreased significantly since the 1980s.
“Dam construction upstream is one of the biggest triggers,” says Professor Zheng. The decrease, which is seen in a majority of river deltas worldwide, is causing the delta to retreat. “The effects of the decreasing sediment load are not yet fully understood,” he says, “but they are certain to be serious.”

**Unique approach**
In their research, Professor Zheng and Dr Hoitink focus on bifurcations in the river deltas: the points where a river splits into smaller channels. “We look at how a bifurcation developed and what this means for sediment discharge,” says Professor Zheng. “We want to know how a change in the bifurcation upstream effects water levels in the mid-stream and downstream areas of the deltas. Our approach is unique in the world.”

More than fifty years of research data on both deltas is available for analysis. Professor Zheng explains: “We also do field research at the bifurcation of the North and West rivers in the Pearl River delta, to collect information on discharge, water level, current velocity, and sediment concentration. Ultimately, we hope to understand how runoff and sediment are changing due to both climate change and human activity.” That understanding can then lead to a model that helps predict future changes in water levels, in sediment transport, and in the bottom topography of the river channel networks.

**Focus**
The project is Professor Zheng’s first cooperation with Utrecht University. “It’s a very good academic programme,” he says. “We exchange not just people but also ideas, research, and knowledge. That allows us to focus on very special issues and locations in both China and the Netherlands. Without support from the NSFC-NWO Programme, cooperation would not be as close.”

The Chinese government is very interested in the project, says Professor Zheng. “Flood defences were built to withstand once-in-a-century floods, but now we see the risk of those floods occurring once every fifty years. The Netherlands also needs to
know the potential impact on flood hazards of both upstream changes in river networks and changes in the topography of the seabed downstream. If our research leads to more people being better protected against flooding, then I think it’s a very good thing.”

“The exchange of ideas, research, and knowledge allows us to focus on very special issues.”

Professor Zheng Jinhai
During her long international career, Professor Mineke Schipper has collected and studied proverbs and stories from all over the world. In China, she discovered a whole range of creation myths. “I want to encourage young people to learn about those rich narratives.”

“For a long time, scholars believed that China did not have any creation myths,” says Professor Mineke Schipper, Emeritus Professor of Intercultural Literature Studies at Leiden University. “This book is proof to the contrary,” she says, pointing to a copy of *China’s Creation and Origin Myths. Explorations in Oral and Written Traditions* on the table in her sunny waterside home close to Amsterdam. The volume – published thanks to funding within the China Exchange Programme – is a richly illustrated and finely bound collection of essays and narratives. It provides a wide-ranging overview, from Pangu, who emerges from an egg, to the goddess Nüwa, who melts stones in order to restore cosmic order. This is the first book in English about this exceptional heritage, the product of China’s more than fifty ethnic cultures. The essays are the result of years of research in villages, during festivals, in temples, and in people’s homes. “There’s an African saying that when an old person dies, a library burns down,” says Professor Schipper. “The same applies to China. People want to pass on their oral traditions because they think it’s important that they do not die out.”
**Overall picture**

Professor Schipper edited the collection together with Dr Yin Hubin of the Institute of Ethnic Literature at CASS in Beijing and Professor Ye Shuxian, former director of the Centre for Comparative Literature at CASS and now working at Shanghai Jiaotong University. A year before the book was published, Dr. Yin and Professor Ye came to Leiden to prepare the text for the press. “We toiled day and night to get it finished,” says Professor Schipper. “We worked together at the university during the day, and in the evening each of us continued to polish the text before we met up again at nine o’clock the next morning.” Professor Schipper had previously studied creation myths in other parts of the world and considers the Chinese material to be a valuable addition. “It sheds new light on traditions in other parts of the world,” she says. “It makes our overall picture more complete. Did you know that in creation myths it is often man who is created first, and sometimes from better material than woman? You also find that among the Oroqen in northern China. In one of their creation narratives, the first men are created from the flesh and bones of birds but the first women from clay that God picks up from the ground.”

**Passion**

Collaboration with the Institute of Ethnic Literature at CASS began in 1999, after a chance meeting in Leiden between Professor Schipper and the renowned Tibetologist Yang Enhong. “She didn’t know many people yet, so I took her out for lunch. At the time, both of us were researching heroic poems.” Yang Enhong invited Professor Schipper to give a number of lectures in Beijing. “It turned out that there was a need in China for the theoretical framework that I use to analyse and compare narratives,” says Professor Schipper, “but I also always get a lot back from Chinese colleagues and students.” The research project on heroic poems led to a fine book on *Epics and Heroes in China’s Minority Cultures*. This appeared in both Chinese and English, edited by Professor Schipper and Dr. Yin jointly.
Dynamic
Professor Schipper has seen rising interest among young people. “It would be a pity not to take advantage of that,” she says. “There is so much more waiting to be discovered. What about myths concerning the end of the world? Isn’t that an interesting topic? I find China extremely stimulating and dynamic. The people I work with are open to ideas and they want to know everything there is to know. Students are sometimes surprisingly critical. I ask questions that are new for them, but the same is true vice versa.”

“We toiled day and night to get it finished.”
Professor Mineke Schipper
The cooperation between Professors Lü Yonglong and Arthur Mol gives China multiple tools to investigate environmental issues and Dutch scientists a chance to tackle challenges of a scale and complexity not found at home.

“I’m an international guy,” says Professor Lü Yonglong, chair of the Regional Ecological Risk Assessment and Environmental Management Group at the Research Center for Eco-Environmental Sciences. The Center is part of the Chinese Academy of Sciences in Beijing. Professor Lü works with scientists from all over the world. “But our joint work with the Netherlands is quite special,” he says. “It combines the natural science approach we use here and the social science method of analysing environmental issues applied by Professor Arthur Mol and his team at Wageningen University. We complement one another extremely well.” With financial support from the China Exchange Programme and the CAS-KNAW Joint PhD Training Programme, the teams led by Professors Lü and Mol work on developing methods to assess the environmental impact of large-scale projects.

Common interest
“We share a common language and a common interest in solving environmental issues,” says Professor Lü. “At the request of the National Auditing Office in China, we developed a method for environmental auditing. We spend lot of money on pollution control, for example, but we need to know how many of the environmental goals have ultimately been achieved. The Netherlands is very advanced in this field, so we discussed this with our Dutch
colleagues and brought together scientists from both sides to develop a methodology for environmental auditing which is usable in China.”

The complementary approaches of the Chinese and the Dutch scientists are very useful for measuring the environmental performance and impact of large projects, Professor Lü finds. “We need to know the environmental impact of China’s rapid urbanisation, of the expansion of the chemicals industry, or the ongoing construction of the express railway network. What are the potential risks posed by these developments for the local environment? What is the impact of these projects on the living standard of people who have to be relocated?”

**Understand**
Professor Lü also sees the need to develop a method for assessing what happens if an environmental disaster occurs. He explains: “We need to be able to assess whether the economic value of an industry or project outweighs the damage that it might cause if disaster strikes.” At the same time, tools are needed to measure people’s awareness and behaviour regarding environmental issues. “If we get people to understand these issues, they may change their lifestyle or dietary habits to benefit the environment. To really understand human action, we need to look at this matter from the perspective of environmental sociology too. That is something the Dutch are very good at, which makes our cooperation very useful.”

**PhDs**
According to Professor Lü, the sheer size of China gives the Dutch scientists unique opportunities. “Our cooperation gives them the chance to tackle problems of a scale and complexity unknown in the Netherlands. In addition, we have a large number of young and very smart people who can conduct the fieldwork for our research.”

Since 2004, the teams led by Professors Lü and Mol have published more than forty papers in international peer-reviewed journals and jointly supervised several PhD candidates. Together, they have promoted the application of strategic environmental assessment, auditing, and risk management in policy-making.
“We share a common interest in solving environmental issues.”

Professor Lü Yonglong
Keep investing in scientific relationships

China and sustainability: that’s a hot topic, and not just for Professor Arthur Mol. Scientists all over the world are focusing on the phenomenon of China’s rapid growth and its impact on the environment. Thanks to the Programme Strategic Scientific Alliances, the Netherlands is a leading partner in research.

“Whenever I’m in China, I come up with new ideas,” says Professor Arthur Mol, chair of the Environmental Policy Group at Wageningen University. Professor Mol has been visiting China since 1996, and is studying how China’s transition to a market economy is influencing the way it uses natural raw materials. “China is good at implementing clever technology, for example biogas plants and solar boilers, and innovative institutions, for example environmental insurance and complaints systems. We are looking at the role and effect of those institutions and the level of confidence people have in them.”

Within the project phase of the Programme Strategic Scientific Alliances (PSA), the research concentrated on the water and land use. Professor Mol worked closely with Professor Qu Futian of Nanjing Agricultural University and Professor Chen Jining of Tsinghua University, who is now the university’s president. “These are creative people,” says Professor Mol, “who constantly come up with new perspectives and who are incredibly good at finding new talent, data, and money.”
A bond for life
After the project was allocated to the programme phase of PSA ("a special milestone"), its scope could be extended to renewable energy. For example, Professor Mol is collaborating with Professor Lü Yonglong of the Chinese Academy of Sciences (CAS) on research into the environmental risks posed by the chemicals industry and nuclear energy. "This relatively small-scale study is generating a lot of publications," says Professor Mol. Professors Lü and Mol meet at least once a year and are both on the editorial board of the journal Environmental Development. A Master’s degree student from Wageningen is currently doing a PhD at CAS and is working hard to learn Chinese. An associate professor from CAS regularly spends a couple of months in Wageningen writing a research plan and articles. “Our methods of analysis and social theories are new and interesting for them,” says Professor Mol. “We collaborate on articles and we discuss the interpretation of field survey results.” Besides a CAS-KNAW Joint PhD Training Programme project, Professors Mol and Lü have also set up a programme for jointly supervising PhD students. “We carry out the selection procedure jointly,” says Professor Mol. “and we set the same requirements.” Two PhD students have now finished their research, a third is continuing work, and a fourth PhD is in the pipeline. The students will stay in close touch after they have finished. “Chinese researchers are very loyal,” says Professor Mol. “When you’ve trained someone, you’ve got a bond for life. If I don’t know how to tackle something in China, I just send one of them an e-mail. I then follow their advice more or less blindly!”

New trend
Professor Mol now has three honorary professorships and he has received a “lifetime achievement award” from the International Sociological Association. “My work in China definitely played a role,” he says.” In the next few years, Professor Mol and his partners also intend studying how China operates abroad. They have already published on Chinese involvement in the mining sector in southern Africa and the timber sector in Suriname. “I think it's a new trend to view the relationship between China
and sustainability and the environment in an international context,” says Professor Mol. “As a researcher, I consider it a privilege to be able to track developments from up close in this part of the world, at this point in history. We can be very proud that we saw this coming early on, of course, but having good partners and financial opportunities were just as important.”

According to Professor Mol, China is “hot”: “Scientists from all over the world are knocking at China’s door. We need to be realistic: the Netherlands is a small country and China is gigantic. Thanks to PSA, we have a long-term collaboration at top scientific level. That is now paying off, and that’s why it’s strategically clever to continue investing in scientific relationships with China.”

“Whenever I’m in China, I come up with new ideas.”

Professor Arthur Mol
There is a unique alga that produces both starch and lipids, making it the focus of joint research by Qingdao and Wageningen.

“Who cared about this alga twenty years ago?” says Xu Jian, Professor and Director of the BioEnergy Genome Center at the Qingdao Institute of BioEnergy and Bioprocess Technology, part of the Chinese Academy of Sciences. “The perception then was that there was an abundance of oil and nobody needed to use sunlight as a fuel for their car.” Now that the limits to that abundance are becoming apparent, Professor Xu’s research team and his Dutch collaborators are leading efforts to get sunlight into cars after all, using the unique alga. The joint project has Professor Xu and Professor René Wijffels of Wageningen University collaborating in the search for a “Micro-algal cellular factory for sustainable production of starch and lipids”.

Energy
“Starch and lipids are where the energy of a cell is stored,” says Professor Xu in his laboratory in the coastal city of Qingdao. “Starch is used for food. In this research, we are focusing on lipids, which contain a lot more energy than starch. That means that we need fewer lipids than starch to get the same amount of energy, which makes lipids suitable for producing biofuel. Professor Wijffels has discovered an alga that can produce both starch and lipids,” Professor Xu explains. “We need to understand how that alga switches from producing starch one moment to producing lipids the next. Which genes decide what the alga does, and can we manipulate the genes to get them to switch when we
want it?” Understanding that and being able to reproduce the process on a large scale would make it possible to farm algae that would either produce starch for use in food production or lipids for biofuels, depending on market conditions.

Impact
The Dutch-Chinese team is already able to make the alga switch between starch and lipids production in the lab. “It’s nice to be able to make a little oil in a test tube,” Professor Xu says. “But the key is to upscale the process. The only way our research, however fancy it is, can have an impact on society is if we can manipulate this switch on a large scale, outdoors. Professor Wijffels is an amazing engineer. He knows about big things. I work on a micro level, looking at test tubes. To engineer algae for fuel production requires both micro and macro skills. If our process is to be useful to society, it has to work on a large scale. But to achieve that, we first need to understand what happens within a single cell inside the alga.”

Reason
The joint project demonstrates how complementary the Qingdao and Wageningen institutes are. Professors Xu and Wijffels started the project even before securing additional funding for it. “That shows that our primary reason for cooperating is scientific,” says Professor Xu. The funding and support from both China and the Netherlands are crucial. “The Chinese government, for example, has set ambitious goals to reduce emissions and increase the production and use of clean energy. As for the Dutch, their agricultural research is among the very best in the world. Today, agriculture is no longer just about producing food, it’s also about energy. Together, we need to be the first to discover how to farm algae on a large scale as a sustainable source of bio-energy.”
“Agriculture is no longer just about food.”

Professor Xu Jian
Joint research by the dental colleges at Wuhan University and Radboud University Nijmegen has produced spectacular results, including the discovery that force is irrelevant when straightening teeth. This realisation is changing the methods used by orthodontists worldwide.

There is no doubting the success of the collaboration between Wuhan and Nijmegen. A joint publication on tooth relocation won the 2005 DMO award presented by the Dutch Association of Orthodontists. The lead author was Ren Yijin of – as it is now called – the Key Laboratory for Oral Biomedicine at Wuhan University. She was the first orthodontics researcher to come to the Netherlands as part of the China Exchange Programme and is now professor of Orthodontics at Groningen University. Professor Anne Marie Kuijpers-Jagtman, chair of the Orthodontics and Craniofacial Biology sector at Radboud University Nijmegen Medical Centre, directed the research. She is proud of Ren Yijin and all the other researchers from Wuhan: “Twenty years ago, when we first made contact, dentistry was still a developing field in China. Today we are evenly matched. That is thanks to Professor Bian Zhuan and his predecessor Professor Fan Mingwen, who dared to look beyond their country’s borders in their drive to make the dental college in Wuhan so good.”

Into the bin!
“We used to assume that pulling on teeth harder meant you could straighten them faster. Our research has shown that a minimum traction force of 10 to 25 centinewtons (cN) is necessary,” says
Professor Kuijpers-Jagtman, “but any more than that does not produce better results.” Straightening a tooth in fact means pulling it through the jawbone. That is a biological process, and the trick is to make it happen as quickly as possible without causing any damage. “Less force means less pain for the patient. Orthodontists can also work more easily and more effectively: the amount of force exerted is not as critical, and they no longer need enormous supplies of springs.” It has taken time for the research results to find their way into actual practice, but Professor Kuijpers-Jagtman is doing her very best to change things. Her message at international conferences is “Into the bin with all those unneeded wires!”

**Status**
The dental college in Nijmegen is very keen to have experienced researchers come over from China. “We have a major shortage of young dentistry researchers in the Netherlands,” says Professor Kuijpers-Jagtman. “Our own students want to become practising dentists as soon as possible after graduating. To some extent, it’s a question of money: you earn more as a dentist than as a researcher. That’s different in China, where science has high status. There are enormous numbers of candidates for every research position there. We select the very best of them.”

**Schisis**
The Dutch-Chinese research programme is focusing increasingly on identifying the factors that cause abnormalities in facial and dental development. If something goes wrong during early development of the foetus in the womb, parts of its face may fail to align properly, leading to abnormalities such as schisis – a split upper lip, jaw, and palate.

More and more of the focus is on the genetic background: What combination of genes increases the likelihood of schisis? Here too, collaboration is very valuable according to Professor Kuijpers-Jagtman: “In genetic research, it’s the power of big numbers that counts. Because it has a much bigger population than the Netherlands, China provides not just experienced researchers but also crucial clinical data.”
“The first researcher from Wuhan who came to the Netherlands is now a professor in Groningen.”

Professor Anne Marie Kuijpers-Jagtman
How to deal with ageing societies

Professor Zeng Yi, the only Chinese member of the Royal Netherlands Academy of Arts and Sciences, considers the global ageing trend as serious a challenge as climate change and one which requires international cooperation.

Professor Zeng Yi appreciates the importance of international cooperation in science and puts it into practice himself. For example, he has made the data from the largest study on healthy longevity in the world – the China Longitudinal Healthy Longevity Survey (CLHLS) – available to scholars and researchers from China and around the globe, free of charge. “That decision was motivated by my desire to enhance scientific research,” says Professor Zeng. The data of this still ongoing longitudinal survey, which started in 1998, has since been used by at least six hundred researchers, resulting in hundreds of papers in peer-reviewed journals in China, Europe, and the United States and in the publication of nine books so far. At least eighteen PhD dissertations and 24 MA theses have also been based on data from the CLHLS. As Professor Zeng explains, “It is clear that CLHLS data benefits not only Chinese researchers, but also scholars in other countries by promoting international comparative and collaborative research.”

Foreign member
Professor Zeng is currently working as a professor at the Center for Study of Ageing and Human Development at the Medical School of Duke University and as a professor at the Center for Healthy Ageing and Development Studies of the National School of Development at Peking University in China. In 2010, he was
elected as a foreign member of the Royal Netherlands Academy of Arts and Sciences. His own PhD research was conducted between 1984 and 1986 at the Netherlands Interdisciplinary Demographic Institute (NIDI), a KNAW institute. His PhD was the first collaboration between Professor Zeng and emeritus professor Frans Willekens, who at the time was NIDI's vice-director. Professor Zeng's PhD paper *Family Dynamics in China* was judged the year's best by the Population Association of America. Later, Professors Zeng and Willekens jointly supervised Chinese PhD students, who did part of their research in the Netherlands and part in China. Willekens contributed a chapter to Professor Zeng's book, which was published in the *Encyclopedia of Life Support Systems* series.

**Threat**
Professor Zeng is a leading researcher internationally in the field of healthy ageing and family household demography. “Global ageing, especially in developing countries, deserves at least the same attention as climate change”, he argues. Global ageing is threatening the funding of pensions for the rapidly growing group of elderly people. It is also leading to too many of them relying on support from the working-age population, whose numbers are limited due to low fertility. Professor Zeng explains: “The solution to these problems lies in tremendous domestic efforts and in international cooperation. We need international agencies, governments, and public media to work together to draw attention to ageing problems.”

The Lifelines research project being carried out in Groningen in the Netherlands is collecting data on a large sample of the population over an extended period of time. One of its aims is to identify the elements that determine healthy ageing. “For this data to be meaningful,” says Professor Willekens, “and, in turn, serve as a basis for government policies, it is extremely important for us to access similar data from Professor Zeng's CLHLS in China and from similar research in other countries.”
**Scientific agenda**
Healthy ageing and family household dynamics belong on the scientific agenda of both China and the Netherlands, says Professor Zeng. Willekens points to the joint proposals that Dutch and Chinese demographers have submitted to the European Union. In their proposals, the scientists from the two countries aim to develop technology together enabling them to process large data files derived from large-scale, long-term studies into healthy ageing. As the only Chinese KNAW member, Professor Zeng argues that the joint scientific agenda of China and the Netherlands should include many other important topics as well. “The current level of scientific cooperation between our countries is good,” he says, “and I hope it will get even better. Institutions like the Royal Netherlands Academy and the Chinese Academy of Sciences and the Chinese Academy of Social Sciences are very helpful in coordinating and promoting Dutch-Chinese collaboration.”

“Healthy ageing and family household dynamics belong on the scientific agenda of both China and the Netherlands.”

Professor Zeng Yi
# Overview of the nine partners

## Ministry of Science and Technology (MoST), China

The Ministry of Science and Technology coordinates science and technology activities at national level and is the main government funding agency supporting several national science and technology programmes. The Ministry takes the lead in drawing up science and technology development plans and policies, drafting related laws, regulations and department rules, and guaranteeing their implementation. It aims to serve socio-economic growth by coordinating basic research, frontier technology research, research on social services, key technology, and mainstream technology. It compiles and implements plans for national laboratories, innovative bases, national science and technology programmes, and research conditions so as to promote infrastructure construction and resource sharing.

Website: [http://www.most.gov.cn/eng/](http://www.most.gov.cn/eng/)

## Ministry of Education (MoE), China

The Ministry of Education regulates all aspects of the educational system in China. Its major tasks are to study and draft policies and guidelines in the field of education, to draft laws and regulations related to education, to put forward educational reform and development strategies and national plans for educational projects and programmes, to formulate reform policies for the educational system and policies concerning key issues, structures, and the pace of progress in education, to provide guidance, and to coordinate policy implementation.

Website: [http://www.moe.edu.cn](http://www.moe.edu.cn)

## Ministry of Education, Culture and Science (OCW), The Netherlands

The Ministry of Education, Culture and Science (OCW) develops policy and legislation for primary, secondary, senior secondary vocational and higher education. In addition, the Ministry supports culture and science. The Ministry of OCW is responsible for maintaining the quality of the cultural offering and it ensures that all citizens have access to a wide variety of culture. Furthermore, OCW preserves cultural heritage from being damaged or destroyed. In order to promote excellent research, the Ministry of OCW encourages talented researchers and allows them room to make their own choices. Scientific research is also of assistance in solving societal challenges and it delivers economic benefits. The government therefore also supports special research areas like ICT and nanotechnology.

Website: [http://www.government.nl/ministries/ocw](http://www.government.nl/ministries/ocw)
National Natural Science Foundation of China (NSFC)

The National Natural Science Foundation is directly affiliated with the State Council with respect to managing the National Natural Science Fund. It cooperates with the Ministry of Science and Technology to formulate principles, policies, and plans for basic research in China. The Foundation supports basic research and some applied research, identifies and fosters talented researchers in the realm of science and technology, accelerates the progress of science and technology, and promotes socio-economic development in China.
Website: www.nsfc.gov.cn

Chinese Academy of Sciences (CAS)

The Chinese Academy of Sciences is China's top academic institution in science and technology and the national integrated R&D centre in the natural sciences and advanced technology. Above all, it engages in basic research, strategic high-tech research, and research relevant to the sustainable development of the economy and society. CAS focuses on solving science and technology issues that are of fundamental and strategic importance in China’s modernisation process, and provides a scientific basis and technological resources for promoting the sustainable development of China's economy and society.
Website: http://english.cas.cn/

Chinese Academy of Social Sciences (CASS)

The Chinese Academy of Social Sciences is China’s national research centre in the humanities and social sciences and the top think tank of the Chinese government. Its basic tasks are to organise and promote research in the social sciences and humanities, to organise research focusing on significant issues as well as key national research projects based on the requirements of national economic and social progress, to undertake tasks entrusted to it by central government, to organise international academic exchanges and collaboration, and to foster high-level social science research and management personnel.
Website: http://www.cssn.cn/english.html

China Scholarship Council (CSC)

The China Scholarship Council is affiliated with the Ministry of Education. It provides financial assistance (scholarships) to Chinese citizens wishing to study abroad and to foreigners wishing to study in China, the aim being to develop educational, scientific and technological, and cultural exchanges and to develop economic and trade cooperation between China and other countries.
Website: http://en.csc.edu.cn/
Overview of the nine partners

Netherlands Organisation for Scientific Research (NWO)

The Netherlands Organisation for Scientific Research (NWO) is the national research council in the Netherlands and has a budget of more than 500 million euros per year. NWO promotes quality and innovation in science by selecting and funding the best research. It manages research institutes of national and international importance, contributes to strategic programming of scientific research, and brings science and society closer together. Research proposals are reviewed and selected by researchers of international repute. More than 5,000 scientists can carry out research thanks to funding from NWO.

Website: www.nwo.nl/english

Royal Netherlands Academy of Arts and Sciences (KNAW)

As the forum, conscience, and voice of the arts and sciences in the Netherlands, KNAW promotes quality in science and scholarship and strives to ensure that Dutch scholars and scientists contribute to cultural, social, and economic progress. As a research organisation, KNAW is responsible for a group of outstanding national research institutes. It promotes innovation and knowledge valorisation within these institutes and encourages them to cooperate with one another and with university research groups.

Website: www.knaw.nl/english
Overview of China programmes

**China Exchange Programme (CEP)**

1980  
**KNAW, MoE, CAS, CASS**  
The China Exchange Programme offers “seed money” for individual researcher mobility and for joint research projects in all fields of science. The programme supports long-term research collaboration.  
Website: www.knaw.nl/china

**Programme Strategic Scientific Alliances (PSA)**

2001  
**KNAW, MoST**  
The Programme Strategic Scientific Alliances aims to establish a new form of structural, long-term scientific cooperation, the “Strategic Scientific Alliance”, within three priority areas: biotechnology and drugs research, environmental science, and material science. PSA uses a “funnel” model whereby the number of projects decreases in each phase but the amount of funding remains the same.  
Website: www.knaw.nl/china

**NSFC-NWO Programme (National Natural Science Foundation)**

2002 (short visits) / 2009 (joint research projects)  
**NWO, NSFC**  
The NSFC-NWO programme encourages sustainable Sino-Dutch research collaboration in key areas identified in the Netherlands and China. An annual call for proposals demonstrating complementary expertise is published, featuring a different thematic priority every year. The programme also gives Chinese researchers the opportunity to pay a short visit to the Netherlands and Dutch researchers the chance to visit China. It also helps fund joint seminars held in China or the Netherlands.  
Website: www.nwo.nl/nsfc

**CAS-KNAW Joint PhD Training Programme**

2002  
**KNAW, CAS**  
The CAS-KNAW Joint PhD Training Programme supports joint PhD training for outstanding Chinese and Dutch PhD candidates within the context of successful joint research projects undertaken by CAS institutes and Dutch universities or research institutes.  
Website: www.knaw.nl/china
Overview of China programmes

Coordination of Research between Europe and China (CO-REACH)

2005
Consortium of sixteen organisations including KNAW, NWO
CO-REACH, 2005–2010, was a network of sixteen European Science and Technology policy and funding organisations that aimed to create synergy and cohesion in Europe’s Science and Technology relations with China, for example by coordinating China-related policy and funding programmes. In 2008 CO-REACH and the Chinese Academy of Social Sciences jointly launched a multilateral pilot call for proposals in the social sciences.

Joint Scientific Thematic Research Programme (JSTP)

2008
KNAW, NWO, MoST, MoE, CAS, CASS
The Joint Scientific Thematic Research Programme offers funding opportunities for bilateral research cooperation between Dutch and Chinese research groups. JSTP supports research collaboration between Sino-Dutch research teams that wish to work together in sustainable joint research projects by providing multi-year research funding. It issues calls for proposals demonstrating complementary expertise between Dutch and Chinese research teams in predetermined thematic areas in which both countries excel.
Website: www.nwo.nl/jstp

Talent and Training China–Netherlands (T&T)

2009
KNAW, NWO, CSC
Talent and Training China–Netherlands aims to improve the quality and volume of PhD research at universities and research institutes in the Netherlands by recruiting talented Chinese PhD candidates interested in coming to the Netherlands to carry out their research at top Dutch graduate schools.
Website: www.ttchina.nl
Programme for Science Industry Cooperation, 合 (Hé) Programme

2011
NWO, MOST

The 合 programme is a unique Sino-Dutch cooperation programme for research and innovation. Four parties work together in research projects within the programme: a Chinese industrial partner, a Dutch industrial partner, a Chinese academic research institution, and a Dutch academic research institution. This unique approach – with four parties combining their individual strengths – enables both countries to benefit from one another in order to accelerate innovation. The research projects within the Hé programme correspond to innovation focus areas in the Netherlands and China.

Website: www.nwo.nl
Colophon

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