

Clouds – A Silver Lining for Climate Researchers

What happens inside clouds? How do they change under varying environmental conditions? Clouds remain a source of uncertainty in model-based forecasts for our future climate. Now researchers at the Max Planck Institute for Meteorology are seeking to change that – in the coming months, they will be launching a two-year empirical field study on the Caribbean island of Barbados. The scientists will concentrate on the interaction between aerosols, clouds, precipitation and climate. How is the distribution and structure of clouds controlled where the trade winds blow, and how do they react to changing environmental conditions? These are the central issues this project will address.

In close cooperation with the Caribbean Institute for Meteorology and Hydrology, the Max Planck researchers will be installing the latest remote sensing instruments – such as LIDAR and cloud radar – on the windward side of the island's bluff. They will also analyze satellite data and measurements taken by the research aircraft *HALO*.

Conditions on Barbados are ideal for the measurements. The island lies in the eastern approaches to the Caribbean and there are no other land masses to disturb the trade wind flow. The flow patterns and cloud formations also vary widely on Barbados, depending on the season. In winter and early spring, the trade winds dominate, with occasional human interference through the burning of biomass. In early summer, mineral dust is carried all the way from the Sahara, while bursts of deep tropical convection become the defining feature as the season draws to a close. The location is also attractive for the unique long-term series of measurements of dust and aerosol concentrations conducted by scientists from the University of Miami.



Science in paradise: Researchers intend to carry out a field study of the effect of clouds on climate on the Caribbean island of Barbados.

The field study offers the opportunity to collect large quantities of ground measurement data that serves to support research into the relationships between cloud cover and precipitation, as well as ambient meteorological conditions such as moisture and aerosol composition and concentration. The resulting database will also allow the results of previous field studies to be generalized and substantially improve the interpretation of data from the new sensor generation aboard remote sensing satellites. The capabilities of the new German research aircraft *HALO* also offer the opportunity to combine local measurements with the overall structure of the trade winds.

Photo: MPI for Meteorology

Astrocenter in China

The long and successful cooperation between Max Planck astronomers and their colleagues at the Chinese Academy of Sciences is taking on a new dimension: A Max Planck China Center for Cosmology and Astrophysics is being set up at the renowned University of Science & Technology in Hefei, and will also be closely linked to a graduate

school. Scientists there will be studying the origin and development of galaxies, supermassive black holes, gamma bursts, dark matter and dark energy. They will use both computer simulations and statistical methods to analyze the data from their observations. Max Planck scientists will also teach at the Graduate School as guest lecturers.

This new instrument of international cooperation is an inter-institutional initiative headed by the Max Planck Institute for Astrophysics; other MPis taking part in the project include the Institutes for Astronomy, Radioastronomy and Extraterrestrial Physics. The new Center will begin official operation in January 2010.

Nobel Prize in Chemistry for Ada E. Yonath

"I am delighted that Dr. Yonath's award honors a scientist who was associated with the Max Planck Society for more than 20 years. It was during this time that the key foundations were laid for the research for which she has now been awarded the Nobel Prize," said President Peter Gruss on learning of the distinction for Ada E. Yonath.

The researcher worked from 1979 until 1984 under the leadership of Heinz-Günter Wittmann in the department of ribosomes and protein biosynthesis at the Max Planck Institute for Molecular Genetics in Berlin. During this period, she began her study of the structure and function of ribosomes. From 1986 to 2004, she headed the Max Planck ribosome structure research group at DESY (the German Electron Synchrotron) in Hamburg. Ada E. Yonath now works at the Weizmann Institute of Science in Rehoboth, Israel. She shares the Nobel Prize with

Venkatraman Ramakrishnan (MRC Laboratory of Molecular Biology, Cambridge, England) and Thomas A. Steitz (Yale University, USA).

Ribosomes are the protein factories of cells, following a specific plan in producing the proteins needed for life. More than 20 years ago, Ada E. Yonath succeeded in deciphering this plan, as well as the structure and function of ribosomes, using crystallographic techniques. She was a pioneer in this field and had to develop the appropriate methods herself. The breakthrough came in 1995. By this time, ribosomes had already been captured on film. However, it was Yonath who, by inserting "signposts" – using iridium and mercury compounds to mark specific points in the ribosomal subunit – succeeded in making the data and images genuinely readable and thus meaningful. In doing so, she opened the door to the study of these cellular protein factories.



Award-winning scientist: Ada E. Yonath received the 2009 Nobel Prize for Chemistry.

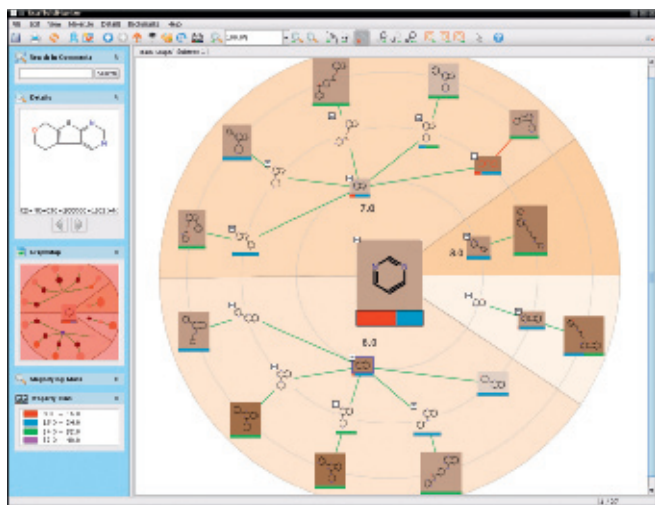
Navigating the Molecular Ocean

Tracking down new active agents to help in the fight against cancer and malaria may soon become easier – thanks to a computer program called Scaffold Hunter. Scientists at the

Max Planck Institute for Molecular Physiology and their colleagues at the Universities of Frankfurt and Eindhoven, as well as at the University of New Mexico in the US, are using this program to speed the search for suitable substances.

Chemical space contains an estimated total of as many as 10,160 different molecules. However, only a few of these – perhaps 1,060 molecules – are potential active agents. Identifying these islands of biological activity in the ocean of possible compounds is a difficult task. The new navigation system generates a map of chemical space based on structural criteria that it then uses to locate biologically active compounds. Scaffold Hunter can also be used to predict new candidate agents that do not occur in nature.

The scientists concentrate on the medically relevant section of chemical space in which molecules contain ring-shaped structures. To do this, they reduce the molecules to their characteristic scaffolds. Scaffold Hunter then arranges these structures in a kind of family tree based on their similarities: the program assigns smaller "parent" scaffolds to each scaffold by gradually removing rings from the original "child" scaffold. This generates innumerable "parent-child relationships" – structurally related molecules of varying complexity. The advantage of this is that chemically similar compounds are very likely to display similar biological activity.



Family tree of active agents: The Scaffold Hunter program helps identify new candidate substances.

An Attack on Science

In July this year, the young Egyptian Marwa El-Sherbini was stabbed to death inside the district court building in Dresden. In a vain attempt to save her, her husband, Elwi Ali Okaz, a doctoral student at the Max Planck Institute for Molecular Cell Biology and Genetics, suffered serious injury. The Max Planck Society was utterly dismayed by this act of racial intolerance. Our thoughts and sympathies remain with the family, especially the three-year-old son who was present in the courtroom.

This murder in Dresden gave us all pause for thought and for deeper reflection. Some foreign scientists put aside their timidity and spoke – some for the first time – about the resentment they encounter on a daily basis. Our institutes are becoming more aware and sensitive to discrimination against foreigners, whether in their search for accommodation or in dealing with immigration authorities.

More than any other German scientific organization, the Max Planck Society is internationally oriented: a third of all Directors hold a foreign passport; 80 percent of post-docs and almost half our doctoral students come from abroad – from China, India, Russia, South and Central America, Italy, the US, France and Poland. Day in, day out, our institute laboratories and libraries are the scene of intercultural and highly successful research.

Indeed, we have expended considerable effort in recent years to encourage this. Our visitor advisors provide excellent, caring support, and their work is reinforced by the international offices already established at some institutes. The assistance they provide



Flowers in memory of Marwa El-Sherbini. The young Egyptian woman was stabbed to death in the district courthouse in Dresden.

ranges from finding suitable schools, accommodation and language courses to opening bank accounts and addressing problems of integration. Still, we have to admit that simply providing optimum working conditions and grants for a global scientific elite is not enough.

Jonathan Howard, himself an Australian and Director at the Max Planck Institute for Molecular Cell Biology and Genetics, confirms that Saxony enjoys a good image worldwide; the institute actively seeks to recruit young scientists with the promise of living and working here in Dresden. However, he was incensed that, during the election campaign for the state parliament, his Chinese, Indian and Scandinavian staff

were, on their way to work each day, forced to pass dozens of NPD placards promoting racism. He and his colleagues thus took their protest straight to the parliament of Saxony.

We must not close our eyes to the fact that xenophobia is becoming a negative factor for those considering relocating to Germany. According to a recent study by the University of Halle-Wittenberg, it is actually growing harder and harder to recruit skilled foreign workers in regions such as Thuringia, Brandenburg and Saxony. But xenophobia is not an East-German phenomenon.

Nevertheless, a range of studies show that, 20 years after the fall of the Berlin Wall, East Germans still feel at a distinct disadvantage compared with their Western counterparts. For this reason, xenophobia, Islamophobia and racist attitudes are far more widespread here than in the former West Germany, as stated in a parliamentary

report in July 2009.

But there are instances of xenophobia in Western Germany, too, often manifesting itself as day-to-day racism. Examples include the difficulties our staff members have encountered in finding an apartment, from the dark-skinned Indian and his family in Hamburg to the single Muslim male in Stuttgart; and the employee in Heidelberg whose black South African roots provoked an attack by drunken youths. Thus far, our institutes have responded on a case-by-case basis. The incident in Dresden has caused us to reconsider this position. An initial discussion was thus held in mid-August with foreign scientists working

at Max Planck locations, and clearly underscored the explosive nature of the current situation.

In the future, we must do more at the institute level to ensure that our foreign guests feel comfortable, even outside of our Max Planck Institutes. Consideration must be given to establishing more international offices, as well as to providing welcome packages, intercultural training and expanded professional training for our visitor advisors. It is also beneficial to mutual understanding if foreign scientists who intend to remain in Germany for an extended period also speak the national language and become familiar with the idiosyncrasies of German culture. To this end, we intend to introduce

Welcome Days. We also intend to plead our case at the city, state and federal levels – gladly in concert with other scientific organizations.

We regard respect for each other's culture, tolerance of each other's religion and deference for each other's skin color as fundamental conditions for the shared research we aim to promote on a sustained basis. Not least because of our history, the world has a keen and sensitive eye for the way foreigners are treated in Germany. We proved convincingly that Germany is an open-minded and hospitable country when we hosted the soccer World Cup three years ago. It would be wonderful if we could now pick up where the World Cup left off.



Peter Gruss,
President of the Max Planck Society

On the Net



Climate Change Time Line

Is climate change a purely modern phenomenon, or has it always been a part of the Earth's history? How great an influence does mankind have over the climate? In a series of events held by the Max Planck Institute for Chemistry and the Geocycles Research Center at the Johannes Gutenberg University, Mainz, 12 scientists will be leading the discussion. Among them, Tillman Spohn of the German Aerospace Center will be describing how a life-supporting climate came to develop on Earth. Besides the role of the Sun and aerosols, the program will also address the risks of global warming: "Can we actually stop climate change?" Marc Laurence of the Max Planck Institute for Chemistry will explain the rewards and risks of geoengineering – a branch of research that endeavors to halt catastrophic climate change through targeted intervention in the environment. The website set up by the organizers offers an overview of the events, as well as an opportunity to view the presentations in video form.

<http://www.klimazeitreise.de>

Research Live

In November, the New Technology Center (ZNT) at the Deutsches Museum in Munich launched a unique platform for current science and technology topics. The Max Planck Society is among those taking part. Temporary island displays on topical subjects, presentations by partners in industry and science, a forum and

two large areas for special exhibitions are grouped around a permanent core display devoted to nano- and biotechnology. The theme is "Transparent Science," and visitors can not only carry out experiments themselves in a variety of laboratories, but also watch scientists "live" as they go about their work. The following website (in German only) offers a taste of what visitors can expect:

<http://www.deutsches-museum.de/ausstellungen/neue-technologien>

Election Blog

Doctoral students with an interest in university and science policy will find little to satisfy their curiosity in the governmental programs of the political parties – and yet they constitute a substantial body at universities and research institutions. Reason enough for the Max Planck Society's PhDnet to dig a little deeper. Together with Helmholtz Juniors and the doctoral student network Thesis, they sent a whole list of questions, in the run-up to Germany's federal parliamentary elections, to the SPD, CDU, FDP, Grüne and Linke parties requesting information on four issues: "science as a career", "science in society", "doctoral student education" and "science communication". After the elections, the parties are measured against their promises. The parties' replies and a discussion of them are available at

<http://jrresearchersgermany.wordpress.com/>