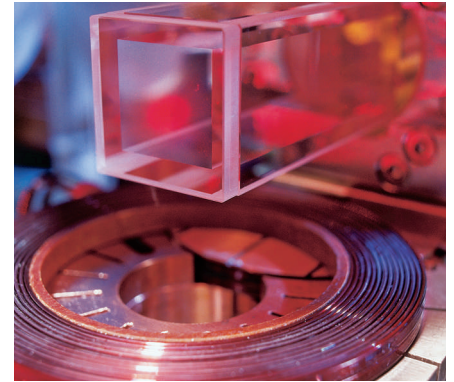




Contents



20 NEUROBIOLOGY

The Flexible Brain

20 Memories Leave Their Traces

In the early days, only a small path connected the Max Planck Institute of Neurobiology in Martinsried with the outskirts of Munich. Now a huge biocampus is located on the periphery of Munich, and the path has been transformed into a wide road. Learning and memory function in a very similar way: intensively used pathways are expanded, while unimportant routes and dead ends are eliminated.

28 Construction in the Head

Not many Max Planck institutes can claim to have a fitness room – and that for research purposes, no less. But researchers at the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig aren't interested in hardening muscles. They want to use the training equipment to study how training motion sequences changes the brain.

36 The Anatomy of Learning

Our brain is a work in progress. From childhood to old age, it is continually modifying its structure and connectivity to support behavioral flexibility and plasticity (modifiability). Scientists at the Max Planck Institute for Human Development are examining how the brain is rebuilt in the course of development. The brains of children are generally more plastic than those of adults, but recent findings show that structural plasticity is not entirely lost in adulthood.

ON THE COVER: The cosmos of the brain is in a constant state of change. Useless connections are cut and new ones are formed to keep the brain flexible and adapt to the constantly changing requirements. Scientists use sophisticated techniques to visualize the brain's circuit diagrams. Diffusion tensor imaging, for instance, shows the complex patterns of nerve fibers.

50

In the vacuum: Physicists produce a Bose-Einstein condensate in a glass cell.

PERSPECTIVES

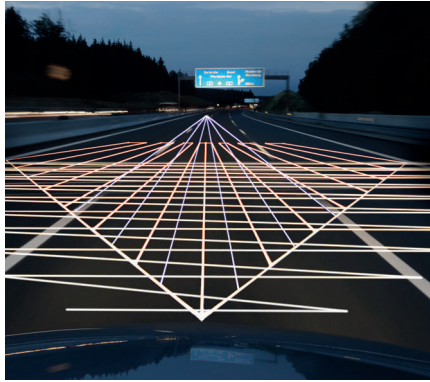
- 08 Strengthening Cutting-Edge Research throughout Europe
- 08 A Roundworm Named *Pristionchus maxplancki*
- 09 "All in the same boat"
- 09 Research Doesn't Have to Be Heavy
- 10 Science on the Silver Screen
- 10 Max Planck Society Ranks among Top Employers
- 11 New Technology for Animated Film Specialists
- 11 Cancer Drugs Clear the Next Hurdle
- 12 From Idea to Industry
- 12 On the Net

VIEWPOINT

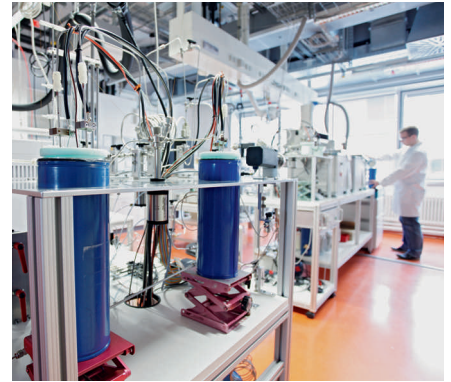
- 14 **Make Science into a TV Series**
Research in movies or TV series? Not a chance – not in Germany anyway! Yet this is actually an area with huge potential to crack open the gender-typical study and career choices and the distance felt (by females) toward scientific and technical professions in business and academia.



58 In balance: Petra Schwillie manages the daily balancing act between research and family life.



64 In view: Anticipatory computer programs help drivers avoid traffic accidents.



70 In the lab: Scientists uncover how plants and fungi form the greenhouse gas methane.

FOCUS

- 20** Memories Leave Their Traces
- 28** Construction in the Head
- 36** The Anatomy of Learning

SPECTRUM

- 42** Olfactory Code for Partner Selection
- 42** Blackbirds in the Spotlight
- 43** A Folding Ceramic
- 43** Sun Block for a Big Canine
- 44** A Nanoelectronics Gold Mine
- 44** Toxins Return from the Depths
- 45** Navigating along Earth's Magnetic Field
- 45** Two Second Earths
- 46** Australians with a Migration Background
- 46** When Is a Film Not a Film?
- 47** The Tail of Venus
- 47** Growth without Limits?
- 47** Stepping Stones on the Ocean Floor
- 48** Electronics Comes to Paper
- 48** A Near-Perfect Universe
- 48** Genes without Templates

PHYSICS & ASTRONOMY

- 50** **Quantum Magic in Artificial Crystals**
Quantum physics effects facilitate a completely new kind of data processing. Atoms in optical lattices help researchers understand them better.

BIOLOGY & MEDICINE

- 58** **Essentials of Life**
Personal Portrait: Petra Schwillie

MATERIAL & TECHNOLOGY

- 64** **Onboard Computer with a Sixth Sense**
It is hoped that future electronic assistants won't only prevent accidents by pulling the emergency brake at the last moment, but that they will anticipate traffic situations.

ENVIRONMENT & CLIMATE

- 70** **Greenhouse Gas from the Garden**
The common view of how methane forms must be expanded, as it is created in more ways than were previously assumed.

CULTURE & SOCIETY

- 78** **A Hard Piece of Work**
Axel Börsch-Supan, Director at the Max Planck Institute for Social Law and Social Policy, explains how the social insurance system must be reformed to take the pressure off contributors and still prevent poverty in old age.

FEATURES

- 03** **On Location**
- 06** **Spotlight**
The Engine of Progress
- 84** **Flashback**
Coffee Withdrawal
- 88** **Community**
88 By Young Scientists, for Young Scientists
- 89 "Exist" Offers a Path to Independence
- 90 Building Networks for Equality
- 91** **Research Establishments**
- 91** **Imprint**