

#### **Cover Story:**

The Chinese Academy of Sciences celebrates its 70<sup>th</sup> birthday on November 1 2019. As a locomotive for science, technology and innovation of the country, the Academy has made many milestone achievements on the frontiers of science and technology since its founding. Particularly over the past four decades since the Opening Up and Reform, the Academy has made remarkable progress in different fields, making important contributions to the S&T advancement and econsocial development of the country. To celebrate this special moment, *BCAS* is presenting, in installments, some of the hallmark achievements scored by CAS scientists in a variety of fields as a salute to the extraordinary age. Read more on pages from 195 to 225.



Vol.33 No.4, 2019 Pages 193 – 256

Editor-in-chief
BAI Chunli
Executive Vice Editor-in-chief
ZHANG Tao
Vice Editors-in-chief

Vice Editors-in-chief Mu-ming Poo, LI Guojie, FU Bojie, GUO Huadong, TAN Tieniu, WANG Keqiang, YANG Liuchun

Editor
SONG Jianlan
Associate Editors
GUO Haiyan
YAN Fusheng
Design & Layout
YUAN Miao

General Editorial Office Tel/Fax: 86-10-62542631 Email: bulletin@mail.casipm.ac.cn P.O. Box. 8712, Beijing 100190, China

Sponsored by the Chinese Academy of Sciences Published by Science Press Domestic subscription (1 year): 400 yuan.

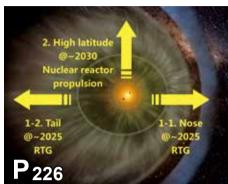
Scan to subscribe





The views expressed in the *Bulletin of the Chinese Academy of Sciences* are those of the authors, and are not necessarily those of the Academy or the editors.

# Contents



The Interstellar Express, a mission proposed by CAS scientists, is expected to succeed the Voyagers as the only man-made spacecraft flying toward the outer brim of the solar system in 2025.

.....



194 In This Issue

## **SPECIAL: CAS AT 70**

195	High-Temperature
	Superconductors

198 Topological States of Matter

201 Particle and Nuclear Physics

205 Nanotechnology

209 Synthetic Biology

211 Non-human Primate Model and Human Brain Atlas

213 Genomic Research

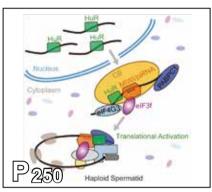
216 The *Flora of China* and Biodiversity Research

217 Large-scale Facilities for Astronomical Observation

221 BEPC and Other Big Accelerators



Entrepreneurship and innovation might help women better cope with the challenge emerging with new technologies, women scientists say.



During their formation, mouse sperms suspend their intracellular production until better timing. How do they manage to reactivate this process in due time? Now a joint team unravels this long-standing mystery.



A key feature of the fossils found in a new Cretaceous mammal (as in the reconstructed early Cretaceous environment above) provides evidence for separation of hearing and chewing modules, an important step to the evolution of the mammalians' multi-boned middle ears.

#### **InFocus**

226 "Interstellar Express":
A Possible Successor to Voyagers

# **Perspective**

230 Help Those Missing from the Table – Confronting Gender Issues in New Looks

### Science Watch

#### **Basic Research**

- 236 Observation of Nearly Quantized Majorana Conductance Plateau in an Iron-based Superconductor
- 239 Crossover from Two- to Three-dimensional Superconducting States in Bismuth-based Cuprate Superconductor
- 241 BESIII Observes New Leptonic Decay Mode for *D* Meson
- 242 Chinese Researchers Continue to Make Progress in Anti-Galvanic Reaction Research

## Life Sciences

- 244 Turtle Embryos Can Influence Their Own Sexual Destiny
- 245 *Tmap*: An Integrative Framework for Studying Population-scale Microbiome
- 247 Zoom in on DNA Cleavage by Cas9
- 249 Targeting Cholesterol Metabolism in Macrophages to Eliminate Viral Infection
- 250 PIWI/piRNA Found to Play a Critical Role in Translation Activation during Sperm Formation

#### **Earth Sciences**

- 251 Research Adds New Insight in the Formation of Moon
- 252 New Finding on Origin of Avian Predentary in Mesozoic Birds
- 254 New Cretaceous Mammal Fossil Sheds Light on Evolution of Middle Ear
- 255 New Cretaceous Mammal Provides Evidence for Separation of Hearing and Chewing Modules