

## Research Group of Biological Effects of Geomagnetic Field Variations Institute of Geology and Geophysics, Chinese Academy of Sciences



模拟地磁场变化装置(线圈和零磁屋)  
Magnetic coils and magnetically shielded room

The research group has focused on how and to what extent the geomagnetic field variations influence the biosphere, and successfully initiated and developed the interdisciplinary research of biogeomagnetism in China in the past two decades. Their original works have revealed extreme variations of the geomagnetic field during the last seven thousand years, provided novel insights into the effect of geomagnetic field on magnetotactic bacteria, proposed a neural mechanism for the influence of hypomagnetic field exposure on mammalian cognition, and made a breakthrough in the biomimetic synthesis of tumor-targeted magnetoferritin nanoparticles for biomedical applications. Their innovative findings have expanded the new research area of biogeomagnetism and promoted the deep integration of geophysics and life sciences.

### Outstanding contributors of this research group

#### Pan Yongxin

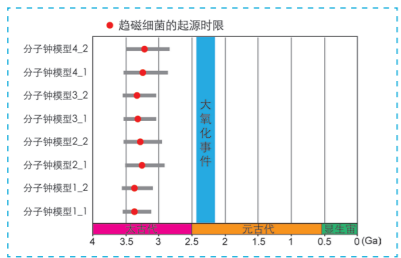
He proposed and established the co-evolution system of the geomagnetic field and the biosphere and expanded the applications of magnetoferritin nanoparticles in medicine and geoscience.

#### Tian Lanxiang

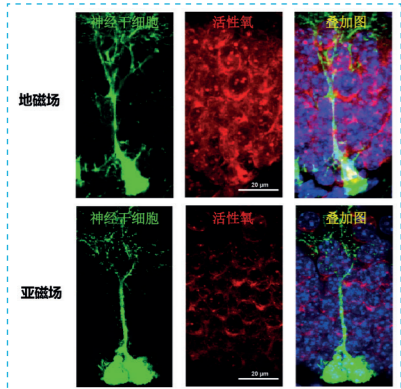
She presented a series of new evidence of bats using magnetic cues for compass orientation and demonstrated the molecular mechanism by which long-term hypomagnetic field exposure impairs adult hippocampal neurogenesis and cognition in mammals.

#### Lin Wei

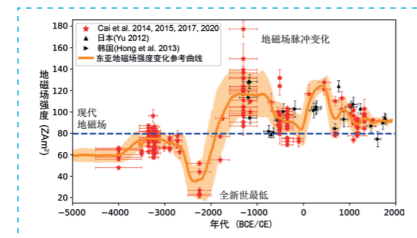
He expanded the taxonomic and phylogenetic diversity of magnetotactic bacteria, proposed a novel model for the evolutionary origin of microbial magnetoreception, and demonstrated that magnetotactic bacteria have evolved since at least three billion years ago in the Archean Eon.



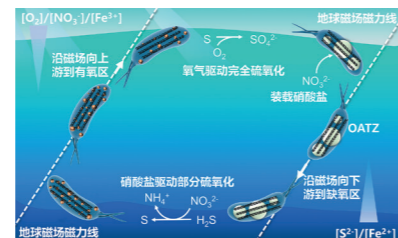
微生物感磁至少起源于 32-34 亿年前的太古代  
Magnetotaxis evolved in bacteria during the Archean



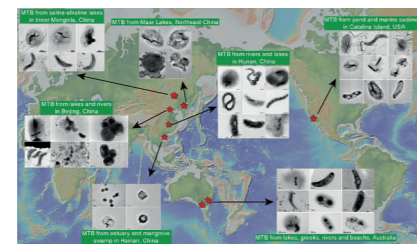
磁场调节干细胞内活性氧 (ROS) 水平  
Magnetic fields modulating the endogenous ROS levels



建立首条东亚古强度变化参考曲线  
Establishing the first archeointensity reference curve of Eastern Asia



建立趋磁细菌主动趋磁新模型  
Establishing the new model of MTB driving biogeochemical elemental cycling



全球趋磁细菌地理分布特征  
Global diversity and biogeography of magnetotactic bacteria



仿生合成磁性铁蛋白纳米颗粒实验平台  
The experimental platform of biomimetically synthesized magnetoferritin nanoparticles



研究集体成员合影  
Research group photo

### 地磁场变化的生物效应研究集体

推荐单位: 中国科学院地质与地球物理研究所

#### 研究集体主要科技贡献:

该研究集体聚焦地磁场变化如何影响生物圈这一地球系统科学前沿的重大研究课题, 发展交叉研究平台和方法, 在过去二十年致力于地磁场变化影响生物圈的作用过程及规律研究, 取得了一系列原创性成果, 开拓并引领国内生物地磁学研究。揭示了近七千年来地磁场快速变化规律, 建立了地磁场影响趋磁细菌新模型, 发现亚磁场影响哺乳动物的神经生物学效应及机制, 制备出生物源性铁蛋白纳米材料等, 推动地球物理学与生命科学深度融合。

#### 研究集体突出贡献者



潘永信 Pan Yongxin

#### 潘永信 中国科学院地质与地球物理研究所

主要科技贡献: 提出生物与地磁场共演化新观点; 拓展生物地磁学在医学和地学的应用研究。



田兰香 Tian Lanxiang

#### 田兰香 中国科学院地质与地球物理研究所

主要科技贡献: 提出蝙蝠利用磁性罗盘定向的新认识; 首次阐明亚磁场调控哺乳动物成体海马神经发生的分子机制。



林巍 Lin Wei

#### 林巍 中国科学院地质与地球物理研究所

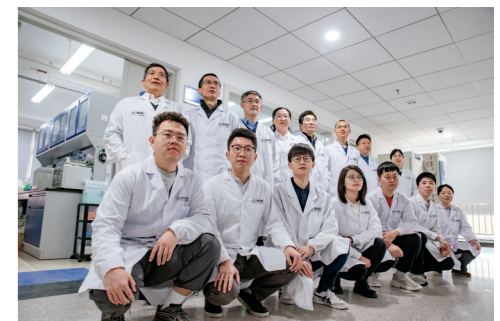
主要科技贡献: 提出感磁微生物的起源演化新模型; 揭示感磁微生物的太古代起源。

#### 研究集体主要完成者

李金华 邓成龙 郭伟翔 曹长乾 蔡书慧 张同伟 秦华峰



研究集体讨论数据现场  
The group members discussing the data



集体成员和学生实验现场  
The group members and students in laboratory