

郑海永 博士，教授

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☆ 性别：男

出生年月：1982 年 8 月

☎ +86 18661867997

籍贯：山东临朐

✉ zhenghaiyong@ouc.edu.cn | zhenghaiyong@gmail.com

🌐 ouc.ai | vision.ouc.edu.cn



1. 个人简介

1.1 教学

主要负责“程序设计”专业核心课程群建设，自主开发“中国海洋大学在线程序评测平台”，开展任务驱动的混合课程教学改革，推行全过程多元化学生学习评价机制，改革实验课程学生考核评价体系及实验室管理制度，打造全新的智能化、网络化、自主化实践实验教学模式，引导激发学生学习潜能，得到学生好评并“意犹未尽”。主持山东省本科高校教学改革研究项目 1 项、山东省研究生教育质量提升计划建设项目 2 项，发表教学论文 2 篇。

1.2 科研

聚焦智能信息感知与处理研究，在视觉合成、视频分析、水下视觉清晰化、海洋生物识别等方面取得系列成果，主持包括国家自然科学基金在内的科研项目 10 余项，发表包括计算机视觉顶级期刊 TPAMI、IJCV 和三大顶级会议 CVPR、ICCV、ECCV 以及多媒体顶级会议 ACM MM 在内的学术论文 80 余篇，授权国家发明专利 10 多项。

1.3 学术

担任 IEEE Journal of Oceanic Engineering、Intelligent Marine Technology and Systems 和 IEEE Access 期刊编委，IEEE 海洋工程学会水下光学与视觉技术委员会主席（2023-2024），中国图象图形学学会青年工作委员会委员、执行委员，山东电子学会理事会理事，北太平洋海洋科学组织 PICES 工作组 WG-48 成员，Valse 首批常务领域主席等；IEEE Senior Member，CSIG 高级会员。

1.4 获奖

荣获生物信息学国际权威会议 InCoB 2017 最佳论文奖、山东省省级教学成果奖、山东省优秀硕士学位论文指导奖，以及中国海洋大学本科教学优秀奖、天泰优秀人才奖、东升课程教学卓越奖、五四青年奖等，入选山东省泰山学者青年专家。

2. 教育背景

- 中国海洋大学 博士，海洋信息探测与处理专业，导师：姬光荣教授 青岛，中国 2004 年 9 月 - 2009 年 6 月
- 中国海洋大学 本科，电子信息工程专业，工学学士学位 青岛，中国 2000 年 9 月 - 2004 年 6 月

3. 工作经历

- 中国海洋大学 教授，信息科学与工程学院电子工程系 青岛，中国 2020 年 1 月 - 至今
- 英国邓迪大学 访问学者，科学与工程学院数学系 邓迪，英国 2018 年 8 月 - 2019 年 8 月
- 中国海洋大学 副教授，信息科学与工程学院电子工程系 青岛，中国 2014 年 12 月 - 2019 年 12 月
- 中国海洋大学 讲师，信息科学与工程学院电子工程系 青岛，中国 2009 年 7 月 - 2014 年 11 月

4. 学术服务

- 学术兼职: IEEE Journal of Oceanic Engineering 编委 (Associate Editor), Intelligent Marine Technology and Systems 编委 (Associate Editor), IEEE Access 编委 (Associate Editor); IEEE Senior Member, CSIG 高级会员; IEEE 海洋工程学会水下光学与视觉技术委员会主席 (2023-2024); 中国图象图形学学会青年工作委员会委员、执行委员; 山东电子学会理事会理事; 北太平洋海洋科学组织 PICES 工作组 WG-48 (WGISMP) 成员; VALSE 首批常务领域主席 (LACC)、首届在线理事会理事 (VODB); ISAIR 首届指导委员会委员。
- 客座编辑: Deep Learning for Marine Science, Volume II, Frontiers in Marine Science, 2023; Deep Learning for Marine Science, Frontiers in Marine Science, 2022; Advanced Machine Learning Methodologies for Underwater Image and Video Processing and Analysis, IEEE Journal of Oceanic Engineering, 2021.
- 特邀报告: 水下视觉: “未见其人, 先闻其声”, 中国模式识别与计算机视觉大会 (PRCV) 专题论坛: 蓝色经济下的海洋环境感知与理解, 中国深圳, 2022; Image Harmonization Methods and Applications, Wireless Silk Road International Lecture Series, Virtual, 2022; Image-to-Image Translation: Advances and Trends, International Symposium on Artificial Intelligence and Robotics (ISAIR), Daegu, Korea, 2019; Underwater Vision from Optics and Imaging to Vision and Learning, Vision And Learning SEminar (VALSE), Xiamen, China, 2017.
- 期刊审稿: IEEE TPAMI, TNNLS, TII, TSMC, TMI, TCSVT, TAI, JOE, Access, SPL, GRSL; IEEE/ACM TCBB; ACM CSUR; Elsevier FGCS, KNOSYS, P&RS AESCTE, PR, PRLETTERS, NEUCOM, CVIU, JVCI, JOLT, COMPELECENG, FISH, ASOC, OPT COMMUN, ECOINF; SPIE JEL, JARS, OE; Springer MONE, COE, MTAP, NCA, WINE; Wiley LOM, MRT, CCPE; CLP COL; Nature SREP; Hindawi CIN; ...
- 会议审稿: CVPR (2019-), ICCV (2019-), ECCV (2020-), ICML (2023-), NeurIPS (2022-), ICLR (2022-), AAAI (2020-), ACM MM (2021-), MICCAI (2022-), WACV (2021-), OCEANS (2016-).

5. 获奖荣誉

- 2023 年, 山东省泰山学者青年专家 (2022)。
- 2023 年, 中国图象图形学会 (CSIG) 高级会员。
- 2022 年, IEEE Senior Member。
- 2020 年, 山东省优秀硕士学位论文指导奖。
- 2020 年, 中国海洋大学第二十届“五四青年奖”。
- 2020 年, 中国海洋大学第九届本科教学优秀奖三等奖。
- 2019 年, 中国海洋大学第二十一届“天泰优秀人才奖”二等奖。
- 2018 年, “卓越计划”背景下电子信息类人才培养模式的构建与实践, 山东省第八届高等教育教学成果奖二等奖 (第二位)。
- 2018 年, 中国海洋大学第四届“东升课程教学卓越奖”二等奖。
- 2017 年, “卓越工程师”背景下电子信息类人才培养模式的构建与实践, 中国海洋大学第十届校级优秀教学成果奖二等奖 (第二位)。
- 2017 年, “Automatic plankton image classification combining multiple view features via multiple kernel learning”, 第十六届国际生物信息学会议 InCoB 2017 最佳论文奖 (第一作者)。
- 2016 年, 中国海洋大学 2016 届本科生毕业论文 (设计) 优秀指导教师。
- 2013 年, 中国海洋大学优秀教师。

6. 科研项目

6.1 图像翻译与水下视觉

- 受限场景下自监督图像翻译方法及其水下视觉应用研究
批准号: 62171421 项目直接费用: 57 万元

国家自然科学基金(负责人)
研究期限: 2022 年 01 月 - 2025 年 12 月

6.2 海洋浮游生物图像分析与识别

- 类别不平衡条件下海洋浮游生物图像精细识别及其原位应用研究
批准号: 61771440 项目直接费用: 67 万元
- 基于深度学习的类别不平衡条件下海洋浮游生物图像精细识别
批准号: 17-1-1-5-jcb 项目经费: 10 万元
- 基于视觉注意结合生物形态特征的海洋浮游植物显微图像分析
批准号: 61301240 项目经费: 26 万元
- 基于生物形态特征的中国海常见有害赤潮藻显微图像识别
批准号: 61271406 本人经费: 30 万元
- 基于生物形态学的有害赤潮藻显微图像自动识别研究
批准号: ZR2010DQ002 项目经费: 5 万元

国家自然科学基金(负责人)
研究期限: 2018 年 01 月 - 2021 年 12 月

青岛市科技计划源头创新计划(负责人)
研究期限: 2017 年 03 月 - 2019 年 03 月

国家自然科学基金(负责人)
研究期限: 2014 年 01 月 - 2016 年 12 月

国家自然科学基金(第二位)
研究期限: 2013 年 01 月 - 2016 年 12 月

山东省自然科学基金(负责人)
研究期限: 2010 年 11 月 - 2013 年 11 月

6.3 水下目标视觉信息获取与处理

- 海洋中小型浮游生物原位光学观测关键技术研究
批准号: 41776113 项目直接费用: 70 万元
- 基于逻辑随机共振理论的水下视觉目标检测方法研究
批准号: 61703381 项目直接费用: 25 万元
- 海洋浮游动物原位探测与分析系统
批准号: 201562023 项目经费: 95 万元

国家自然科学基金(第二位)
研究期限: 2018 年 01 月 - 2021 年 12 月

国家自然科学基金(第二位)
研究期限: 2018 年 01 月 - 2020 年 12 月

中央高校基本科研业务费(负责人)
研究期限: 2015 年 11 月 - 2017 年 12 月

6.4 垂直探测电离图自动解译与度量

- 基于图像分析的垂测电离图自动判读研究
批准号: 13-1-4-223-jcb 项目经费: 5 万元
- 电离层垂直探测频高图自动解释及度量
批准号: 201313011 项目经费: 16 万元
- 典型垂测电离图自动识别方法
编号: 20140106 项目经费: 10 万元

青岛市科技计划基础研究项目(负责人)
研究期限: 2013 年 01 月 - 2015 年 09 月

中央高校基本科研业务费(负责人)
研究期限: 2013 年 01 月 - 2015 年 12 月

电波环境特性及模化技术国防科技重点实验室开放课题(负责人)
研究期限: 2013 年 06 月 - 2015 年 05 月

7. 主要论著

期刊论文 (* 通讯作者 / # 同等贡献)

- [1] Zhensheng Shi, Haiyong Zheng*, Junyu Dong*. *OceanVP: A HYCOM based Benchmark Dataset and A Relational Spatiotemporal Predictive Network for Oceanic Variable Prediction*. *Ocean Engineering*, 2024, DOI: 10.1016/j.oceaneng.2024.117748.
- [2] Guangzhe Si, Zhaorui Gu, Haiyong Zheng*. *Duet of ViT and CNN: multi-scale dual-branch network for fine-grained image classification of marine organisms*. *Intelligent Marine Technology and Systems*, 2024, DOI: 10.1007/s44295-023-00019-8.
- [3] 刘英杰, 黄嘉琦, 姜玉凤, 邵宇琪, 杨文韬, 于紫凝, 郑海永*. 融合电磁和地声特征的地震预测集成学习方法. *计算机技术与发展*, 2024.
- [4] Lin Li, Haiyong Zheng*. *Multidomain Transfer Ensemble Learning for Wireless Fingerprinting Localization*. *IEEE Internet of Things Journal*, 2023, DOI: 10.1109/JIOT.2023.3330736.

- [5] Hongsheng Bi*, Yunhao Cheng, Xuemin Cheng, Mark C. Benfield, David G. Kimmel, **Haiyong Zheng**, Sabrina Groves, Kezhen Ying. *Taming the data deluge: a novel end-to-end deep learning system for classifying marine biological and environmental images*. *Limnology and Oceanography: Methods*, 2023, DOI: 10.1002/lom3.10591.
- [6] Yanan Li#, Zhimin Wang#*, Rongbing Han, Shangshang Shi, Jiaxin Li, Ruimin Shang, **Haiyong Zheng**, Guoqiang Zhong, Yongjian Gu*. *Quantum recurrent neural networks for sequential learning*. *Neural Networks*, 2023, DOI: 10.1016/j.neunet.2023.07.003.
- [7] Zhaorui Gu, Xiuhan Liu, Zhiqiang Hu, Guoyu Wang, Bing Zheng, John Watson, **Haiyong Zheng***. *Underwater computational imaging: a survey*. *Intelligent Marine Technology and Systems*, 2023, DOI: 10.1007/s44295-023-00009-w.
- [8] 郭冬升, 顾肇瑞, 郑冰, 董军宇, 郑海永*. 面向图像内补与外推问题的迭代预测统一框架. *中国图象图形学报*, 2023, DOI: 10.11834/jig.230144.
- [9] Qi Qi, Kunqian Li*, **Haiyong Zheng**, Xiang Gao, Guojia Hou, Kun Sun. *SGUIE-Net: Semantic Attention Guided Underwater Image Enhancement With Multi-Scale Perception*. *IEEE Transactions on Image Processing*, 2022, DOI: 10.1109/TIP.2022.3216208.
- [10] Zonghui Guo, Zhaorui Gu, Bing Zheng, Junyu Dong, **Haiyong Zheng***. *Transformer for Image Harmonization and Beyond*. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2022, DOI: 10.1109/TPAMI.2022.3207091.
- [11] Juan Li, Wenkai Xu, Limiao Deng, Ying Xiao, Zhongzhi Han, **Haiyong Zheng***. *Deep learning for visual recognition and detection of aquatic animals: A review*. *Reviews in Aquaculture*, 2022, DOI: 10.1111/raq.12726.
- [12] Zhensheng Shi#, Cheng Guan#, Qianqian Li#, Ju Liang, Liangjie Cao, **Haiyong Zheng***, Zhaorui Gu*, Bing Zheng. *Detecting Marine Organisms via Joint Attention-Relation Learning for Marine Video Surveillance*. *IEEE Journal of Oceanic Engineering*, 2022, DOI: 10.1109/JOE.2022.3162864.
- [13] Hafiza Sadia Nawaz, Zhensheng Shi, Yanhai Gan, Amanuel Hirpa, Junyu Dong*, **Haiyong Zheng**. *Temporal Moment Localization via Natural Language by Utilizing Video Question Answers as a Special Variant and Bypassing NLP for Corpora*. *IEEE Transactions on Circuits and Systems for Video Technology*, 2022, DOI: 10.1109/TCSVT.2022.3162650.
- [14] Peng Liu#, Yueyue Wang#, Angang Du, Liqiang Zhang, Bin Wei, Zhaorui Gu*, Xiaodong Wang*, **Haiyong Zheng**, Juan Li. *Disentangling Latent Space Better for Few-Shot Image-to-Image Translation*. *International Journal of Machine Learning and Cybernetics*, 2022, DOI: 10.1007/s13042-022-01552-4.
- [15] Peng Liu#*, Chufeng Zhang#, Hao Qi, Guoyu Wang, **Haiyong Zheng***. *Multi-Attention DenseNet: A Scattering Medium Imaging Optimization Framework for Visual Data Pre-Processing of Autonomous Driving Systems*. *IEEE Transactions on Intelligent Transportation Systems*, 2022, DOI: 10.1109/TITS.2022.3145815.
- [16] Qi Zhao#, Ziqiang Zheng#, Huimin Zeng, Zhibin Yu*, **Haiyong Zheng**, Bing Zheng. *The Synthesis of Unpaired Underwater Images for Monocular Underwater Depth Prediction*. *Frontiers in Marine Science*, 2021, DOI: 10.3389/fmars.2021.690962.
- [17] Ziqiang Zheng, Zhibin Yu, Yang Wu, **Haiyong Zheng***, Bing Zheng, Minhoo Lee*. *Generative adversarial network with multi-branch discriminator for imbalanced cross-species image-to-image translation*. *Neural Networks*, 2021, DOI: 10.1016/j.neunet.2021.04.013.
- [18] Ziqiang Zheng, Zhibin Yu, **Haiyong Zheng**, Yang Yang*, Heng Tao Shen. *One-shot image-to-image translation via part-global learning with a multi-adversarial framework*. *IEEE Transactions on Multimedia*, 2021, DOI: 10.1109/TMM.2021.3053775.
- [19] Zhensheng Shi#, Liangjie Cao#, Cheng Guan, **Haiyong Zheng***, Zhaorui Gu*, Zhibin Yu, Bing Zheng. *Learning attention-enhanced spatiotemporal representation for action recognition*. *IEEE Access*, 2020, DOI: 10.1109/ACCESS.2020.2968024.
- [20] Chao Wang#, Wenjie Niu#, Yufeng Jiang#, **Haiyong Zheng***, Zhibin Yu*, Zhaorui Gu, Bing Zheng. *Discriminative region proposal adversarial network for high-quality image-to-image translation*. *International Journal of Computer Vision*, 2019, DOI: 10.1007/s11263-019-01273-2.
- [21] Yan Zhao, Ziqiang Zheng, Chao Wang, Zhaorui Gu, Min Fu, Zhibin Yu*, **Haiyong Zheng**, Nan Wang, Bing Zheng. *Fine-grained facial image-to-image translation with an attention based pipeline generative adversarial framework*. *Multimedia Tools and Applications*, 2019, DOI: 10.1007/s11042-019-08346-x.
- [22] Peng Liu, Guoyu Wang, Hao Qi, Chufeng Zhang, **Haiyong Zheng**, Zhibin Yu*. *Underwater image enhancement with a deep residual framework*. *IEEE Access*, 2019, DOI: 10.1109/ACCESS.2019.2928976.

- [23] Jia Yu, Xuewen Yang, Nan Wang*, Gavin Tilstone, Elaine Fileman, **Haiyong Zheng**, Zhibin Yu. *Video-based real time analysis of plankton particle size spectrum*. IEEE Access, 2019, DOI: 10.1109/ACCESS.2019.2914727.
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- [27] Nan Wang, Jia Yu, Biao Yang, **Haiyong Zheng***, Bing Zheng. *Vision-based in situ monitoring of plankton size spectra via a convolutional neural network*. IEEE Journal of Oceanic Engineering, 2018, DOI: 10.1109/JOE.2018.2881387.
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- [37] Yan Wang, Na Li, Zongying Li, Zhaorui Gu, **Haiyong Zheng***, Bing Zheng, Mengnan Sun. *An imaging-inspired no-reference underwater color image quality assessment metric*. Computers and Electrical Engineering, 2017, DOI: 10.1016/j.compeleceng.2017.12.006.
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- [41] Nan Wang, Bing Zheng*, **Haiyong Zheng**, Zhibin Yu. *Feeble object detection of underwater images through LSR with delay loop*. Optics Express, 2017, DOI: 10.1364/OE.25.022490.

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- [43] **Haiyong Zheng***, Nan Wang, Zhibin Yu, Zhaorui Gu, Bing Zheng. *Robust and automatic cell detection and segmentation from microscopic images of non-setae phytoplankton species*. IET Image Processing, 2017, DOI: 10.1049/iet-ipr.2017.0127.
- [44] 于芝涛, 姬婷婷, 程孝龙, 赵红苗, 姬光荣, **郑海永***. 基于自适应幅度谱分析的显著目标检测. 中国海洋大学学报 (自然科学版), 2017, DOI: 10.16441/j.cnki.hdxh.20150080.
- [45] Bing Zheng, Nan Wang*, **Haiyong Zheng**, Zhibin Yu, Jinpeng Wang. *Object extraction from underwater images through logical stochastic resonance*. Optics Letters, 2016, DOI: 10.1364/OL.41.004967.
- [46] Xiaodong Wang, Jialun Dai, Yafei Zhu, **Haiyong Zheng***, Xiaoyan Qiao. *Spectral saliency via automatic adaptive amplitude spectrum analysis*. Journal of Electronic Imaging, 2016, DOI: 10.1117/1.JEI.25.2.023020.
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发明专利

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- [17] 姬光荣, **郑海永**, 张浩, 王国宇, 于志刚. 一种角毛藻显微图像细胞目标提取方法. 专利号: ZL 201010115606.1. 授权公告日: 2012年01月04日.
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Haiyong Zheng PhD, Professor

Last updated: April 17, 2024

☆ Gender: Male

Birth Date: August 1982

☎ +86 18661867997

Hometown: [Linqu County Shandong](#)

✉ zhenghaiyong@ouc.edu.cn

| zhenghaiyong@gmail.com

🌐 [ouc.ai](#) | [vision.ouc.edu.cn](#)



Haiyong Zheng received the B.E. degree in electronic information engineering and the Ph.D. degree in ocean information sensing and processing from the Ocean University of China, Qingdao, China, in 2004 and 2009, respectively. In 2009, he joined the College of Electronic Engineering, Ocean University of China, where he is currently a professor. He focuses on the cutting-edge research fields of deep learning and artificial intelligence, including computer vision, underwater vision, signal processing, and artificial intelligence oceanography. He has published over 80 papers in leading journals and conferences, such as IJCV, IEEE TPAMI and JOE, as well as CVPR, ICCV, ECCV, ACM MM, etc., and has patented over 10 inventions. He is an IEEE and CSIG Senior Member, and on the editorial boards of the *IEEE Journal of Oceanic Engineering*, *Intelligent Marine Technology and Systems* and *IEEE Access*, as well as the chair of IEEE OES Technology Committee on *Subsea Optics and Vision* and a member of PICES WG-48 (WGISMP: *Towards best practices using Imaging Systems for Monitoring Plankton*). He is a recipient of the Best Paper Award in InCoB 2017 and the TaiShan Scholars Youth Expert Program of Shandong Province (2022). Now he leads the research group of Micronano Perception and Information Intelligence (MPII) at Ocean University of China.

1. Education Experience

- **Ocean University of China** Qingdao, China
DSc: Ocean Information Sensing and Processing, Supervisor: Prof. Guangrong Ji Sep. 2004 - Jun. 2009
- **Ocean University of China** Qingdao, China
BEng: Electronic Information Engineering Sep. 2000 - Jun. 2004

2. Work Experience

- **Ocean University of China** Qingdao, China
Professor, College of Electronic Engineering Jan. 2020 - present
- **University of Dundee** Dundee, UK
Visiting Scholar, Department of Mathematics Aug. 2018 - Aug. 2019
- **Ocean University of China** Qingdao, China
Associate Professor, Department of Electronic Engineering Dec. 2014 - Dec. 2019
- **Ocean University of China** Qingdao, China
Lecturer, Department of Electronic Engineering Jul. 2009 - Nov. 2014

3. Professional Service

- **Professional Position:** *IEEE Journal of Oceanic Engineering* Associate Editor, *Intelligent Marine Technology and Systems* Associate Editor, *IEEE Access* Associate Editor; IEEE Senior Member, CSIG Senior Member; *IEEE OES Technology Committee on Subsea Optics and Vision* Chair (2023-2024); VALSE LACC, VODB; ISAIR Steering Committee.
- **Guest Editor:** Deep Learning for Marine Science, Volume II, *Frontiers in Marine Science*, 2023; Deep Learning for Marine Science, *Frontiers in Marine Science*, 2022; Advanced Machine Learning Methodologies for Underwater Image and Video Processing and Analysis, *IEEE Journal of Oceanic Engineering*, 2021.
- **Invited Talk:** Underwater Vision: “Hearing before seeing”, Chinese Conference on Pattern Recognition and Computer Vision (PRCV) Workshop, Shenzhen, China, 2022; Image Harmonization Methods and Applications, Wireless Silk Road International Lecture Series, Virtual, 2022; Image-to-Image Translation: Advances and Trends, International Symposium on Artificial Intelligence and Robotics (ISAIR), Daegu, Korea, 2019; Underwater Vision from Optics and Imaging to Vision and Learning, Vision And Learning SEminar (VALSE), Xiamen, China, 2017.

- **Journal Review:** IEEE TPAMI, TNNLS, TII, TSMC, TMI, TCSVT, TAI, JOE, Access, SPL, GRSL; IEEE/ACM TCBB; ACM CSUR; Elsevier FGCS, KNOSYS, P&RS AESCTE, PR, PRLETTERS, NEUCOM, CVIU, JVCI, JOLT, COMPELECENG, FISH, ASOC, OPT COMMUN, ECOINF; SPIE JEI, JARS, OE; Springer MONE, COE, MTAP, NCA, WINE; Wiley LOM, MRT, CCPE; CLP COL; Nature SREP; Hindawi CIN; . . .
- **Conference Review:** CVPR (2019-), ICCV (2019-), ECCV (2020-), ICML (2023-), NeurIPS (2022-), ICLR (2022-), AAAI (2020-), ACM MM (2021-), MICCAI (2022-), WACV (2021-), OCEANS (2016-).

4. Project Grants

4.1 Image-to-Image Translation and Underwater Vision

- **Self-Supervised Image-to-Image Translation under Limited Situation and its Underwater Vision Application** NSFC (Principal Investigator)
Grant No. 62171421 ¥570 Thousand Duration: January 2022 - December 2025

4.2 Marine Plankton Image Analysis and Recognition/Classification

- **Fine-Grained Image Recognition of Marine Plankton under Class Imbalance and its *In Situ* Application** NSFC (Principal Investigator)
Grant No. 61771440 ¥670 Thousand Duration: January 2018 - December 2021

- **Fine-Grained Image Recognition of Marine Plankton under Class Imbalance based on Deep Learning** QDSTC (Principal Investigator)
Grant No. 17-1-1-5-jcb ¥100 Thousand Duration: March 2017 - March 2019

- **Microscopic Image Analysis of Marine Phytoplankton Based on Visual Attention Combined with Biomorphic Characteristics** NSFC (Principal Investigator)
Grant No. 61301240 ¥260 Thousand Duration: January 2014 - December 2016

- **Automatic Identification of Harmful Algal Blooms in Chinese Coast Areas by Microscopic Images Based on Biomorphic Characteristics** NSFC (Main Investigator)
Grant No. 61271406 ¥300 Thousand Duration: January 2013 - December 2016

- **Automatic Identification of Harmful Algal Blooms by Microscopic Images Based on Biological Morphology** SDNSF (Principal Investigator)
Grant No. ZR2010DQ002 ¥50 Thousand Duration: November 2010 - November 2013

4.3 Underwater Target Visual Information Acquisition and Processing

- **Research on Key Technologies of *In-Situ* Optical Observation for Marine Meso- and Micro-Plankton** NSFC (Main Investigator)
Grant No. 41776113 ¥700 Thousand Duration: January 2018 - December 2021

- **Logical Stochastic Resonance Based Underwater Image Object Detection** NSFC (Main Investigator)
Grant No. 61703381 ¥250 Thousand Duration: January 2018 - December 2020

- ***In-situ* Sensing and Analyzing System of Ocean Zooplankton** FRFCU (Principal Investigator)
Grant No. 201562023 ¥950 Thousand Duration: November 2015 - December 2017

4.4 Vertical Sounding Ionogram Parsing/Interpretation and Scaling

- **Automatic Scaling of Vertical Sounding Ionogram Based on Image Analysis** QDSTC (Principal Investigator)
Grant No. 13-1-4-223-jcb ¥50 Thousand Duration: January 2013 - September 2015

- **Automatic Interpretation and Scaling of Ionospheric Vertical Sounding Ionogram** FRFCU (Principal Investigator)
Grant No. 201313011 ¥160 Thousand Duration: January 2013 - December 2015

- **Automatic Identification of Typical Vertical Sounding Ionogram** CRIRP (Principal Investigator)
No. 20140106 ¥100 Thousand Duration: June 2013 - May 2015

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