


南京农业大学人工智能学院师资队伍（个人信息）

姓 名	张保华	性 别	男	
学 位	博士	职 称	副教授	
部 门 (系别)	自动化系	E-mail	bhzhang@njau.edu.cn	
通信地址	江苏省南京市点将台路 40 号			
个人简介	<p>● 教育经历（从高中毕业后起）： 2006.09-2010.06 西北农林科技大学 机械电子工程专业 本科 2010.09-2016.06 上海交通大学 机械电子工程专业 博士</p> <p>● 工作经历 2016.08-今 南京农业大学 自动化专业 讲师、副教授</p>			
研究领域	1. 人工智能与农业机器人；2. 智慧农业信息感知技术与装备；3. 智能化农业装备			
教授课程	《人工智能导论》、《人工智能与现代农机》、《农业自动化与信息化专题》			
承担项目	<p>主持国家重点研发计划子课题、国家自然科学基金、江苏省自然科学基金、南京农业大学高层次引进人才科研启动经费等 5 项，参与国家重点研发计划项目、国家科技支撑计划、国家自然科学基金、江苏省重点研发计划、中央高校基本科研业务费重点项目等近 10 项。</p> <ol style="list-style-type: none"> 1. 国家重点研发计划项目子课题-精准定位播种作业决策系统研究，项目编号：2017YFD0700502-2，经费 163 万，主持； 2. 国家自然科学基金-电-气混合式农业机器人抓手设计及自适应主动柔顺抓取控制研究，项目编号：31901415，经费 25 万，主持； 3. 江苏省自然科学基金-农业机器人抓取模型辨识与柔顺抓取决策实时构建方法研究，项目编号：BK20180515，经费 20 万，主持； 4. 国家自然科学基金-基于多光谱成像和近红外点阵结构光的苹果表面缺陷快速检测方法研究，项目编号：31301236，经费 23 万，参与； 5. 国家自然科学基金-基于光谱和图像特征融合的苹果内外部多品质指标同步在线检测方法研究，项目编号：31671927，经费 62 万，参与； 6. 国家科技支撑计划项目-苹果产地分级处理及储运品质监测装备研发与示范，项目编号：2014BAD21B01，经费 970 万，参与； 			

	<p>7. 江苏省重点研发计划项目-多功能自走式果园管理机器人研发，项目编号：BE2017370，经费 100 万，参与；</p> <p>8. 中央高校基本科研业务费重点项目-矮化密植果园偏置式除草施肥联合作业机器人研究，项目编号：KYGX201701，经费 50 万，参与。</p>
<p>学术成果 (论文、专利、 软著等)</p>	<p>主要从事人工智能、机器学习、数据挖掘技术及其在农业机器人、智能农业装备、农产品品质与安全无损检测技术及装备方面的应用研究。在上述领域发表 SCI 论文 50 余篇、EI 论文 10 余篇，ESI 高被引论文多篇；获得国家发明专利授权 8 项、实用新型专利 4 项、计算机软件著作权 10 项，出版学术专著“图-谱分析技术在农产品质量与安全无损评估中的应用”（武汉大学出版社，30 万字），主编国际专著“Agricultural Robots: Fundamentals and Applications” (ISBN: 978-953-51-6740-2)，参编国际专著 3 本。</p> <p>论文精选：</p> <p>[1] Zhang Baohua, Dai Dejian, Huang Jichao, Zhou Jun*, Gui Qifa, Dai Fang. Influence of physical and biological variability and solution methods in fruit and vegetable quality non-destructive inspection by using imaging and near-infrared spectroscopy techniques: A review [J]. Critical Reviews in Food Science and Nutrition, 2018, 58(12): 2099-2118. (SCI, IF=7.862, JCR Q1)</p> <p>[2] Zhang Baohua, Baoxing Gu, Guangzhao Tian, Zhou Jun*, Huang Jichao, Yingjun Xiong. Challenges and solutions of optical-based nondestructive quality inspection for robotic fruit and vegetable grading systems: A technical review [J]. Trends in Food Science & Technology, 2018, 81: 213-231. (SCI, IF=11.077, JCR Q1)</p> <p>[3] Zhang Baohua, Zhou Jun, Meng Yimeng, et al. Comparative study of mechanical damage caused by a two-finger tomato gripper with different robotic grasping patterns for harvesting robots[J]. Biosystems engineering, 2018, 171: 245-257. (SCI, IF=3.215, JCR Q1)</p>

- [4] Mao Shihan, Li Yuhua, Ma You, **Zhang Baohua***, Zhou Jun, Wang Kai. Automatic cucumber recognition algorithm for harvesting robots in the natural environment using deep learning and multi-feature fusion[J]. Computers and Electronics in Agriculture, 2020, 170: 105254. (SCI, IF=3.858, JCR Q1)
- [5] **Zhang Baohua**, Xie Yuanxin, Zhou Jun*, Wang Kai, Zhang Zhen. State-of-the-art robotic grippers, grasping and control strategies, as well as their applications in agricultural robots: A review[J]. Computers and Electronics in Agriculture, 2020, 177: 105694. (SCI, IF=3.858, JCR Q1)
- [6] Tian Guangzhao, Li Xiaona, **Zhang Baohua***, Zhou Jun, Gu Baoxing. Comparative Study of Two Different strategies for Determination of Soluble Solids Content of Apples From Multiple Geographical Regions by Using FT-NIR Spectroscopy[J]. IEEE Access, 2019, 7: 179734-179745. (SCI, IF=3.745, JCR Q1)
- [7] Guo Ning, **Zhang Baohua***, Zhou Jun, Zhan Ketian, Lai Shuang. Pose estimation and adaptable grasp configuration with point cloud registration and geometry understanding for fruit grasp planning[J]. Computers and Electronics in Agriculture, 2020, 179: 105818. (SCI, IF=3.858, JCR Q1)
- [8] Zheng Wei, Bai Yuhao, Luo Hui, Li Yuhua, Yang Xi, **Zhang Baohua***. Self-adaptive models for predicting soluble solid content of blueberries with biological variability by using near-infrared spectroscopy and chemometrics[J]. Postharvest Biology and Technology, 2020, 169: 111286. (SCI, IF=4.303, JCR Q1)
- [9] Chen Yi, **Zhang Baohua***, Zhou Jun, Wang Kai. Real-time 3D unstructured environment reconstruction utilizing VR and Kinect-based immersive teleoperation for agricultural field robots[J]. Computers and Electronics in Agriculture, 2020, 175: 105579. (SCI, IF=3.858, JCR Q1)
- [10] Wu Gangshan, Jiang Qiyu, Bai Yuhao, Pan Wei, Jin Xinxin, **Zhang Baohua***. Nitrogen status assessment for multiple cultivars of strawberries

using portable FT-NIR spectrometers combined with cultivar recognition and multivariate analysis[J]. IEEE Access, 2020, 8: 126039-126050. (SCI, IF=3.745, JCR Q1)

[11] Xie Yuanxin, **Zhang Baohua***, Zhou Jun, Bai Yuhao, Zhang Meng. An Integrated Multi-Sensor Network for Adaptive Grasping of Fragile Fruits: Design and Feasibility Tests[J]. Sensors, 2020, 20(17): 4973. (SCI, IF=3.275, JCR Q1)

[12] **Zhang Baohua**, Huang Wenqian, Liang Gong, Li Jiangbo, Zhao Chunjiang*, Liu Chengliang, Huang Danfeng. Computer vision detection of defective apples using automatic lightness correction and weighted RVM classifier [J]. Journal of Food Engineering. 2015, 146: 143-151. (SCI, IF=4.499, JCR Q1)

[13] **Zhang Baohua**, Huang Wenqian, Li Jiangbo, Zhao Chunjiang*, Fan Shuxiang, Wu Jitao, Liu Chengliang. Principles, developments and applications of computer vision for external quality inspection of fruits and vegetables: A review [J]. Food Research International. 2014, 62: 326-343. (SCI, IF=4.972, JCR Q1)

[14] **Zhang Baohua**, Liu Longshen, Gu Baoxing, Zhou Jun* Huang Jichao, Tian Guangzhao. From hyperspectral imaging to multispectral imaging: Portability and stability of HSI-MSI algorithms for common defect detection, Postharvest Biology and Technology, 2018, 137: 95-105. (SCI, IF=4.303, JCR Q1)

[15] Bai Yuhao, Xiong Yingjun, Jichao Huang, Jun Zhou, **Zhang Baohua***. Accurate prediction of soluble solid content of apples from multiple geographical regions by combining deep learning with spectral fingerprint features, Postharvest Biology and Technology, 2019, 156: 110949. (SCI, IF=4.303, JCR Q1)

[16] **Zhang Baohua**, Fan Shuxiang, Li Jiangbo, Huang Wenqian*, Zhao Chunjiang, Qian Man, Zheng Ling. Detection of Early Rottenness on

Apples by Using Hyperspectral Imaging Combined with Spectral Analysis and Image Processing [J]. Food Analytical Methods. 2015, 8: 2075-2086.

(SCI, IF=2.667, JCR Q1)

[17] **Zhang Baohua**, Huang Wenqian, Wang Chaopeng, Gong Liang, Zhao Chunjiang*, Liu Chengliang*, Huang Danfeng. Computer vision recognition of stem and calyx in apples using near-infrared linear-array structured light and 3D reconstruction [J]. Biosystems Engineering. 2015, 139: 25-34. (SCI, IF=3.215, JCR Q1)

[18] **Zhang Baohua**, Li Jiangbo, Fan Shuxiang, Huang Wenqian*, Zhao Chunjiang, Liu Chengliang, Huang Danfeng. Hyperspectral imaging combined with multivariate analysis and band math for detection of common defects on peaches (*Prunus persica*) [J]. Computers & Electronics in Agriculture. 2015, 114: 14-24. (SCI, IF=3.858, JCR Q1)

[19] Wu Jingui, **Zhang Baohua***, Zhou Jun, Gu Baoxing, Yang Xiaolong. Automatic Recognition of Ripening Tomatoes by Combining Multi-Feature Fusion with a Bi-Layer Classification Strategy for Harvesting Robots. Sensors, 2019, 19(3): 612. (SCI, IF=3.275, JCR Q1)

[20] Li Xiaona, Huang Jichao, Xiong Yingjun, Zhou Jun, Tan Xiangyu, **Zhang Baohua***. Determination of soluble solid content in multi-origin 'Fuji' apples by using FT-NIR spectroscopy and an origin discriminant strategy. Computers & Electronics in Agriculture, 2018, 155: 23-31. (SCI, IF=3.858, JCR Q1)

[21] Zhang Xiya, Li Xiaona, **Zhang Baohua***, Zhou Jun, Tian Guangzhao, Xiong Yingjun, Gu Baoxing. Automated robust crop-row detection in maize fields based on position clustering algorithm and shortest path method. Computers & Electronics in Agriculture, 2018, 154: 165-175. (SCI, IF=3.858, JCR Q1)

[22] Zhang Lin, **Zhang Baohua***, Zhou Jun, Gu Baoxing, Tian Guangzhao. Uninformative biological variability elimination in apple soluble solids

content inspection by using Fourier transform near-infrared spectroscopy combining with multivariate analysis and wavelength selection algorithm [J]. Journal of Analytical Methods in Chemistry, 2017, 1-9. (SCI, IF=1.878, JCR Q2)

[23] **Zhang Baohua**, Li Jiangbo, Zheng Ling, Huang Wenqian*, Fan Shuxiang, Zhao Chunjiang, Meng Qingda. Development of a Hyperspectral Imaging System for the Early Detection of Apple Rottenness Caused by Penicillium [J]. Journal of Food Process Engineering. 2015, 38: 499-509. (SCI, IF=1.703, JCR Q2)

[24] **Zhang Baohua**, Huang Wenqian, Li Jiangbo, Zhao Chunjiang*, Liu Chengliang, Huang Danfeng, Gong Liang. Detecting of Early Rottenness in Apples Using Hyperspectral Machine Vision with Effective Wavebands [J]. Sensor Letters. 2014, 12: 932-937(936). (SCI, IF=0.56)

[25] **Zhang Baohua**, Li Jiangbo, Huang Wenqian, Wang Chaopeng, Zhao Chunjiang*, Liu Chengliang, Huang Danfeng. A study on spectral analysis combining with image processing for lightness correction in spherical fruits by using hyperspectral imaging; proceedings of the 2015 ASABE Annual International Meeting, F, 2015 [C]. American Society of Agricultural and Biological Engineers. (EI)

[26] **张保华**, 黄文倩, 李江波, 赵春江*, 刘成良, 黄丹枫, 贡亮. 基于高光谱成像技术和 MNF 检测苹果的轻微损伤 [J]. 光谱学与光谱分析. 2014: 1367-1372. (SCI, IF=0.344)

[27] **张保华**, 李江波, 樊书祥, 黄文倩*, 张驰, 王庆艳, 肖广东. 高光谱成像技术在果蔬品质与安全无损检测中的原理及应用 [J]. 光谱学与光谱分析. 2014: 2743-2751. (SCI, IF=0.344)

[28] **张保华**, 黄文倩, 李江波, 赵春江*, 刘成良, 黄丹枫. 用高光谱成像和 PCA 检测苹果的损伤和早期腐烂[J]. 红外与激光工程. 2013: 279-283. (EI)

[29] **张保华**, 黄文倩, 李江波, 赵春江*, 刘成良, 黄丹枫. 基于 I-RELIEF

和 SVM 的畸形马铃薯在线分选 [J]. 吉林大学学报. 2014, 44: 1811-1817. (EI)

[30] 张保华, 黄文倩, 李江波, 赵春江*, 刘成良, 黄丹枫. 基于亮度校正和 AdaBoost 的苹果缺陷在线识别 [J]. 农业机械学报. 2014, 45: 221-226. (EI)

[31] Fan Shuxiang, **Zhang Baohua**, Li Jiangbo, Liu Chen, Huang Wenqian*, Tian Xi. Prediction of soluble solids content of apple using the combination of spectra and textural features of hyperspectral reflectance imaging data [J]. Postharvest Biology and Technology. 2016, 121: 51-61. (SCI, **IF=4.303, JCR Q1**)

[32] Fan Shuxiang, **Zhang Baohua**, Li Jiangbo, Huang Wenqian*, Wang Chaopeng. Effect of spectrum measurement position variation on the robustness of NIR spectroscopy models for soluble solids content of apple [J]. Biosystems Engineering. 2016, 143: 9-19. (SCI, **IF=3.215, JCR Q1**)

[33] Li Jiangbo, Huang Wenqian, Zhao Chunjiang*, **Zhang Baohua**. A comparative study for the quantitative determination of soluble solids content, pH and firmness of pears by Vis/NIR spectroscopy [J]. Journal of Food Engineering. 2013, 116: 324-332. (SCI, **IF=4.499, JCR Q1**)

[34] Li Jiangbo, Chen Liping*, Huang Wenqian, Wang Qingyan, **Zhang Baohua**, Tian Xi, Fan Shuxiang, Li Bin. Multispectral detection of skin defects of bi-colored peaches based on vis-NIR hyperspectral imaging [J]. Postharvest Biology and Technology. 2016, 112: 121-133. (SCI, **IF=4.303, JCR Q1**)

[35] Fan Shuxiang, Huang Wenqian, Guo Zhiming, **Zhang Baohua**, Zhao Chunjiang*. Prediction of soluble solids content and firmness of pears using hyperspectral reflectance imaging [J]. Food analytical methods. 2015, 8: 1936-1946. (SCI, **IF=2.667, JCR Q1**)

[36] Fan Shuxiang, Guo Zhiming, **Zhang Baohua**, Huang Wenqian*, Zhao Chunjiang. Using Vis/NIR diffuse transmittance spectroscopy and

multivariate analysis to predicate soluble solids content of apple [J]. Food Analytical Methods. 2016, 9: 1333-1343. (SCI, IF=2.667, JCR Q1)

[37] Li Jiangbo, Huang Wenqian, Chen Liping, Fan Shuxiang, **Zhang Baohua**, Guo Zhiming, Zhao Chunjiang*. Variable selection in visible and near-infrared spectral analysis for noninvasive determination of soluble solids content of 'Ya'pear [J]. Food analytical methods. 2014, 7: 1891-1902. (SCI, IF=2.667, JCR Q1)

[38] Li Jiangbo, Tian Xi, Huang Wenqian*, **Zhang Baohua**, Fan Shuxiang. Application of Long-Wave Near Infrared Hyperspectral Imaging for Measurement of Soluble Solid Content (SSC) in Pear [J]. Food Analytical Methods. 2016, 9: 3087-3098. (SCI, IF=2.667, JCR Q1)

[39] Huang J. C., J. Yang, **B. H. Zhang**, M. Huang, K. J. Chen, X. L. Xu, and G. H. Zhou. Effect of electrical stunning frequency on meat quality, plasma parameters and protein solubility of broilers [J]. Poultry Science, DOI: 10.3382/ps/pex050, (SCI, IF=1.685)

[40] Li Jiangbo, **Zhang Baohua**, Zhao Chunjiang*, Huang Wenqian. Qualitative Analysis of Soluble Solid Content and Firmness of Pear Based on Successive Projections Algorithm and Least Square Support Vector Machine [J]. Sensor Letters. 2014, 12: 575-580. (SCI, IF=0.56)

[41] Zheng Ling, Zhu Dazhou, **Zhang Baohua**, Xiao Guangdong, Wang Cheng, Zhao Chunjiang*. Correlation Analysis of the Mechanical Property of Wheat Stalk and the Fresh Biomass [J]. Sensor Letters. 2014, 12: 924-927(924). (SCI, IF=0.56)

[42] Zheng Ling, Zhu Dazhou, Liang Dong, **Zhang Baohua**, Wang Cheng, Zhao Chunjiang*. Winter wheat biomass estimation based on canopy spectra [J]. International Journal of Agricultural & Biological Engineering. 2015, 8: 30-36. (SCI, IF=1.007)

[43] Liu Chen, Wang Qingyan, Huang Wenqian, Chen Liping*, **Zhang Baohua**, Fan Shuxiang. Comparison of Four Types of Raman Spectroscopy for

Noninvasive Determination of Carotenoids in Agricultural Products [M]. Springer International Publishing, 2015. (EI)

- [44] Wang Chaopeng, Huang Wenqian, **Zhang Baohua**, Yang Jingjing, Qian Man, Fan Shuxiang, Chen Liping*. Design and Implementation of an Automatic Grading System of Diced Potatoes Based on Machine Vision [M]. Springer International Publishing, 2015. (EI)
- [45] Qian Man, Wang Qingyan, Chen Liping*, Huang Wenqian, Fan Shuxiang, **Zhang Baohua**. Penetration Depth of Near-Infrared Light in Small, Thin-Skin Watermelon [M]. Springer International Publishing, 2015. (EI)
- [46] 樊书祥, 黄文倩, 郭志明, **张保华**, 赵春江*, 钱曼. 苹果产地差异对可溶性固形物近红外光谱检测模型影响的研究 [J]. 分析化学. 2015: 239-244. (SCI, IF=0.554)
- [47] 樊书祥, 黄文倩, 李江波, 赵春江*, **张保华**. LS-SVM 的梨可溶性固形物近红外光谱检测的特征波长筛选 [J]. 光谱学与光谱分析. 2014, 34: 2089-2093. (SCI, IF=0.27)
- [48] 李斌, Ning Wang, 张伟立, 赵春江*, **张保华**. 基于太赫兹光谱技术的山核桃内部虫害检测初步研究 [J]. 光谱学与光谱分析. 2014, 34: 1196-1200. (SCI, IF=0.27)
- [49] 李江波, 郭志明, 黄文倩, **张保华**, 赵春江*. 应用 CARS 和 SPA 算法对草莓 SSC 含量 NIR 光谱预测模型中变量及样本筛选 [J]. 光谱学与光谱分析. 2015, 35: 372-378. (SCI, IF=0.27)
- [50] 钱曼, 黄文倩, 王庆艳, 樊书祥, **张保华**, 陈立平*. 西瓜检测部位差异对近红外光谱可溶性固形物预测模型的影响 [J]. 光谱学与光谱分析. 2016, 36: 1700-1705. (SCI, IF=0.27)
- [51] 田喜, 黄文倩*, 李江波, 樊书祥, **张保华**. 高光谱图像信息检测玉米籽粒胚水分含量 [J]. 光谱学与光谱分析. 2016, 36: 3237-3242. (SCI, IF=0.27)
- [52] 肖广东, 郑玲, 董大明, 张东彦, **张保华**, 廖同庆*. 基于长光程的土壤氧化亚氮排放规律的 FTIR 光谱法研究 [J]. 光谱学与光谱分析. 2015:

3063-3067. (SCI, IF=0.27)

授权的发明专利或实用新型专利:

- [1] 张保华,刘成良,赵春江,贡亮,李彦明,黄丹枫.水果表面缺陷检测方法, 2013.06,中国,ZL201310061313.3.
- [2] 张保华,刘成良,贡亮,李彦明,李子枫,林昌建,郭凯峰,金理钻,邵达.基于图像处理的水果分选装置,2013.05,中国,ZL201310009241.8.
- [3] 刘成良,张保华,贡亮,屠珺,金理钻,李子枫,郭凯峰,林昌建.水果分选机可控旋转角度齿纹托盘装置,2013.02,中国,ZL201210505918.2.
- [4] 黄文倩,李江波,张保华,张驰,郭志明,王庆艳,樊书祥.基于图像处理的小型农产品分选机,2013.09,中国,CN203170604U.
- [5] 武继涛,黄文倩,李江波,杨晶晶,张保华,樊书祥,王超鹏.小型农产品分选系统, 2014.12,中国, CN204018236U.
- [6] 黄文倩,李江波,张保华,张驰,王庆艳,武继涛,樊书祥,郭志明,杨晶晶.农产品形状检测方法及装置,2014.04,中国,ZL201310747003.7.
- [7] 黄文倩,李江波,张保华,杨晶晶,王超鹏,樊书祥,刘宸,钱曼.一种水果果梗花萼的识别系统,2015.09,中国,CN104897671A.
- [8] 黄文倩,李江波,武继涛,张驰,郭志明,王庆艳,张保华,樊书祥.用于水果无损检测和称重卸料的果杯机构及水果处理系统,2014.09,中国,ZL201410150603X.
- [9] 李子枫,郭凯峰,张保华,林昌建,贡亮.带有连接管的机械式容积调节装置.发明专利授权号: ZL201210388986.5.
- [10] 林昌建,张保华,郭凯峰,等.双压气机同轴相连装置.实用新型专利授权号: CN202883099U.
- [11] 黄文倩,李江波,张保华,等.农产品形状检测方法及装置.发明专利授权号: ZL201310747003.7.
- [12] 李斌,陈立平,张保华,等.基于太赫兹光谱的肉类内部金属检测装置.发明专利公布号: CN104897671A.
- [13] 刘成良,李子枫,贡亮,苗中华,王双园,张保华.双行苗稀疏可调的半自动插秧机.发明专利授权号: ZL201210546073.1.
- [14] 张保华,宋佳昊,雷威,等.左右移动式机械调节系统.发明专利公布

	号：CN102913320A.
奖励荣誉	<p>[1] 张保华，基于机器视觉和光谱成像技术的苹果外部品质检测方法研究，上海交通大学机动学院，优秀博士学位论文，2017</p> <p>[2] 张保华，北京市科学技术协会，北京市青年优秀科技论文三等奖，2014</p> <p>[3] 张保华，教育部，博士研究生国家奖学金，2014</p> <p>[4] 张保华，共青团中央、全国学联，中国大学生自强之星，2010</p> <p>[5] 张保华，上海交通大学，研究生优秀奖奖学金，2013</p> <p>[6] 张保华，上海交通大学，柳工成绩优异奖学金，2015</p> <p>[7] 张保华，国家农业信息化工程技术研究中心、国家农业智能装备工程技术研究中心，研究生年度考核一等奖，2013、2014、2015、2016 共四次</p> <p>[8] 周兴虎，黄继超，杨静，张保华，刘冬梅，翟洋，昂云，黄明，基于生物技术的绿色传统肉制品现代化加工技术研发与产业化，江苏省科学技术协会，首届江苏省科协青年会员创新创业大赛二等奖，2016</p> <p>[9] 张保华，本科毕业设计一等奖优秀指导教师，南京农业大学，2020</p>
社会兼职	<p>[1] 国际期刊 <i>Artificial Intelligence in Agriculture</i> (AIIA, ISSN: 2589-7217) 创刊人、执行主编；</p> <p>[2] <i>Biosystems Engineering, Computers and Electronics in Agriculture</i> 等 30 余本国内外学术期刊的审稿人或同行评审专家；</p> <p>[3] 中国农业工程学会青年委员会委员、中国农业机械学会青年工作委员会委员；中国人工智能学会、中国图形图报学会会员。</p>
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