



## **Appendix 3 - 4 Scientific Research Achievements and Awards**



### Appendix 3 - 4 Scientific Research Achievements and Awards

## Horizontal projects

Serial number	Project Name	Project Host	Contract - signing entity	Amount of funds entering the school (in ten thousand yuan)	Signing time
1	Engineering Quality Inspection for the Construction Project of Heshan Electronic Science and Technology Park (Phase I)	Xie Qiang	Yiyang Longling Construction Investment Co., Ltd.	78.9	2024
2	Pipeline Detection Project of the PPP Project for Comprehensive Water Environment Treatment in the Central Urban Area of Yiyang City (Phase I)	Zhu Xin	China Construction Fifth Engineering Division Co., Ltd.	61	2024
3	Detection of Subgrade, Pavement, Bridges and Culverts for Section A and Section B of G536	Yang Tao	Yiyang Longling Construction and Investment Co., Ltd.	47.1	2024
4	Phase I of the Integrated Industry - City Project in Datonghu District	Yang Tao	Yiyang Datonghu District Village and Town Construction Investment and Development Co., Ltd.	37.8	2024
5	Detection of Pile Foundations and Main Structures for Phase I	Xie Qiang	Yiyang Heshan District Development Group Co., Ltd.	34.7	2024



### Appendix 3 - 4 Scientific Research Achievements and Awards

	of the New Material Industrial Park				
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## Invention patent

Serial number	Patent Name	Accomplisher	Authorization time (year)	Category	Patent number
1	Pipe - jacking experimental box and experimental method	Li Yongsuo	2024	Invention patent	ZL 2019102223469
2	An Adaptive Control Device for Tidal Variable Lanes	Cai Jianrong	2023	Invention patent	ZL 2021102721974
3	A stress - applying device for pre - bent prestressed beams and its construction method	Chen Qiang	2023	Invention patent	ZL 2020108322687
4	A matrix material for mine rock slopes and its preparation method	Ding Xingyu	2023	Invention patent	ZL 2022102853164
5	A non - destructive testing system and method for prestressed concrete beams	Feng Haoxiong	2023	Invention patent	ZL 2019104216243
6	A swinging gap grouting device for construction	Peng Zhaohui	2023	Invention patent	ZL 2018108887492
7	Bridge crack measuring device for bridge engineering	Peng Zhigao	2023	Invention patent	2023/01524
8	Novel Testing Device for Concrete Material Permeability	Peng Zhigao	2023	Invention patent	2023/02503
9	A method applicable to underground floor addition of	Xie Jin	2023	Invention patent	ZL 2018103933121



### Appendix 3 - 4 Scientific Research Achievements and Awards

	buildings with brick - and - concrete structure				
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## Representative papers

Serial number	Major	Author's name	Article title	Published journal	Publication date and volume (issue) number
1	Civil Engineering major	Tang Huang	Test and Theoretical Investigations on Flexural Behavior of High- Performance H-Shaped Steel Beam with Local Corrosion in Pure Bending Zone	STEEL RESEARCH INTERNATIONAL	2024-12-15
2	Civil Engineering major	Cai Jianrong	A speed optimization model for connected and autonomous vehicles at expressway tunnel entrance under mixed traffic environment	PLOS ONE	2024-12-09
3	Civil Engineering major	Wu Yuexing	Research on the cross-sectional geometric parameters and rigid skeleton length of reinforced concrete arch bridges: A case study of Yelanghu Bridge	STRUCTURES	2024-11-15
4	Civil Engineering major	Ding Le	Experimental Study on the Performance Factors of Ceramsite Foam Concrete Based on Chemical Foaming	The New Era of Science and Technology	2024-10-30



### Appendix 3 - 4 Scientific Research Achievements and Awards

5	Civil Engineering major	Zheng Liangfei	Plane rectangular elements and their applications in structural topology optimization	Journal of Hunan City University (Natural Science Edition)	2024-10-30
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## Scientific research awards

Serial number	Name of the achievement	The first principal investigator	Name of the Award	Level	Time
1	Research on the ICM Method for Structural Topology Optimization and Key Technologies for Architectural Generative Design	Peng Xirong	Hunan Provincial Natural Science Award	Third Prize	2024
2	Research on Key Technologies for Personalized Intelligent Traffic Control and Guidance	Long Qiong	Hunan Provincial Natural Science Award	Third Prize	2022
3	Key Technologies for Settlement Control of Small - spacing Pipe Jacking and Their Applications	Li Yongsuo	Hunan Provincial Science and Technology Progress Award	Third Prize	2021
4	Research and Application of Key Technologies for Reinforcement Construction of Deck - type Arch Bridges	Chen Qiang	Hunan Provincial Science and Technology Progress Award	Third Prize	2020



### Appendix 3 - 4 Scientific Research Achievements and Awards

Serial number	Project Name	Project type	Fixed number of years	Person in charge	Amount (in ten thousand yuan)	Project approval time
1	Research on Optimization Method of Variable Lanes in Urban Road Networks Based on Coupling Degree Theory (52302389)	National Natural Science Foundation of China Youth Project	2024-2027	Cai Jianrong	30	2023
2	Research on the Long - term Mechanical Performance of Steel - All - Light Shale Ceramsite Concrete Composite Beams under the Coupling Action of Stud Corrosion and Load (52278174)	General Program of the National Natural Science Foundation of China	2023-2026	Cao Guohui	54	2022
3	Probabilistic Prediction of Chloride Ion Concentration in the Interface Zone of Precast - Cast - in - Place Concrete Based on Mesoscopic Simulation (52208166)	National Natural Science Foundation of China Youth Project	2023-2025	Yang Yiming	30	2022
4	Research on Interface Bond Degradation Behavior and Deformation Calculation Method of CFRP - strengthened Corroded RC Beams under Fatigue Loads	National Natural Science Foundation of China Youth Project	2022-2024	Tang Huang	30	2021



### Appendix 3 - 4 Scientific Research Achievements and Awards

	(52108135)					
5	Research on the Seismic Energy Dissipation Mechanism of Concrete - Filled Circular - End Multi - Chamber Steel Tube Bridge Piers (52008159)	National Natural Science Foundation of China Youth Project	2021-2023	Liu Jin	24	2020
6	Probabilistic Prediction Method for Fatigue Life of CFRP - Strengthened Corroded RC Beams Based on the Development of Steel Bar Bond - Slip (2023JJ30111)	General Program of the Provincial Natural Science Foundation	2023-2025	Tang Huang	5	2023
7	Flexural Failure Mechanism and Design Method of Steel - Ceramsite Concrete Composite Beams (2022JJ30112)	General Program of the Provincial Natural Science Foundation	2022-2024	Liu Jin	5	2022
8	Theoretical Research on the Failure - Safety Topology Optimization Design of Lateral Bracing Structures in RC Frames under Seismic Rare Earthquakes (2022JJ30113)	General Program of the Provincial Natural Science Foundation	2022-2024	Peng Xirong	5	2022
9	Influence of the Construction Sequence of Pipe - jacking in the Pipe - curtain Pre - construction Method on Ground Deformation (2021JJ30078)	General Program of the Provincial Natural Science Foundation	2021-2023	Li Yongsuo	5	2021



### Appendix 3 - 4 Scientific Research Achievements and Awards

10	Research on the Damage Evolution Mechanism and Analysis Method of the Residual Soil Slope Foundation of Alpine Wind Turbines under the Coupling Action of Storm (2020JJ4156)	General Program of the Provincial Natural Science Foundation	2020-2022	Deng Zongwei	5	2020
11	Evaluation and Characterization of the Skeleton Structure during the Compaction Process of Asphalt Mixture and Its Formation Mechanism (2024JJ6111)	Provincial Natural Science Foundation Youth Project	2024-2026	Zhu Xuan	5	2024
12	Research on Damage Mechanism and Performance - based Design Method of RC Columns under Random Variable - amplitude Loading Histories (2022JJ40023)	Provincial Natural Science Foundation Youth Project	2022-2024	Wang Yukui	5	2022
13	Mesoscopic Simulation of Chloride Ion Transport and Durability Evaluation in the Interface Zone of Compressed Prefabricated Concrete Structures under Dry - Wet Cycling (2022JJ40024)	Provincial Natural Science Foundation Youth Project	2022-2024	Yang Yiming	5	2022





### Appendix 3 - 4 Scientific Research Achievements and Awards

14	Construction Timing and Optimization Method of Variable Lanes in Urban Road Networks (2021JJ40025)	Provincial Natural Science Foundation Youth Project	2021-2023	Cai Jianrong	5	2021
15	Research on Ecological Restoration of Geotechnical Slopes in Typical Mines in Southern Hunan Region (2020JJ5015)	Provincial Natural Science Foundation Youth Project	2020-2022	Ding Xingyu	5	2020
16	Experiment and Evaluation on In - plane Rigidity Performance of Grouted Joint Prefabricated Steel Truss - Concrete Composite Floor System (2020JJ5018)	Provincial Natural Science Foundation Youth Project	2020-2022	He Ran	5	2020
17	Research on the Influence of Residual Stress Distribution on the Stability Performance of Cellular Beams (2020JJ5020)	Provincial Natural Science Foundation Youth Project	2020-2022	Li Jingchao	5	2020
18	Research on the Long - term Deformation Performance of Corroded Reinforced Concrete Beams Strengthened with Basalt Fiber Reinforced Composite Materials (2019JJ50023)	Provincial Natural Science Foundation Youth Project	2019-2021	Tang Huang	5	2019



### Appendix 3 - 4 Scientific Research Achievements and Awards

19	Research on the Influence Mechanism of High - speed Train Wake Structure on Train Aerodynamic Performance (2019JJ50032)	Provincial Natural Science Foundation Youth Project	2019-2021	Fu Min	5	2019
20	Coupled Mechanical Behavior of Skeleton - Concrete and Optimal Arch - forming Method for Long - span Cantilever - cast RC Arch Bridges (2024JJ7077)	Provincial Natural Science Foundation Joint Project	2024-2026	Wu Yuexing	5	2024
21	Research on the Design Method for Seismic Function Restoration of Steel - Ceramsite Concrete Composite Shear Walls with Replaceable Base Components under Severe Earthquakes (2024JJ7081)	Provincial Natural Science Foundation Joint Project	2024-2026	Hu Zhangqi	5	2024
22	Research on the Mechanical Properties, Strengthening and Optimization of Cracked Reinforced Concrete Simply - supported Beam Bridges (2024JJ7082)	Provincial Natural Science Foundation Joint Project	2024-2026	Zhou Shuming	5	2024
23	Research on the Mechanical Characteristics of the Contact Surface between the Slope	Provincial Natural Science Foundation Joint Project	2023-2025	Ding Xingyu	5	2023



### Appendix 3 - 4 Scientific Research Achievements and Awards

	Protection Base Material and Rock Mass and the Base Material Ratio of Rock Slopes (2023JJ50339)					
24	LBM Modeling and Experimental Research on Methane Diffusion - Adsorption and Desorption in Meso - scale Unsaturated Coal Seams (2023JJ50345)	Provincial Natural Science Foundation Joint Project	2023-2025	Peng Zhigao	5	2023
25	Research on the Preparation and Working Mechanism of Lightweight Partition Walls Made of Ceramsite Recycled Concrete (2023JJ50350)	Provincial Natural Science Foundation Joint Project	2023-2025	Yu Fang	5	2023
26	Research on Shear Performance and Calculation Theory of Prestressed Concrete Beams with Reinforcement Corrosion Damage (2022JJ50267)	Provincial Natural Science Foundation Joint Project	2022-2024	Li Hai	5	2022
27	Research on the Micro - mechanism of Copolymerization and Rheological Behavior of Polymer Powder Composite Modified Asphalt (2022JJ50270)	Provincial Natural Science Foundation Joint Project	2022-2024	Mao Yu	5	2022
28	Research on Variable Speed Limit Control Strategies for Large - scale Highway Bridges Oriented to Safety Risks	Provincial Natural Science Foundation Joint Project	2022-2024	Zheng Liangfei	5	2022



### Appendix 3 - 4 Scientific Research Achievements and Awards

29	Research on the Corrosion Mechanism of Reinforced Concrete Columns under Load - bearing Conditions (2021JJ50139)	Provincial Natural Science Foundation Joint Project	2021-2023	Cao Guohui	5	2021
30	Research on the Development and Working Mechanism of Bamboo - Timber Composite Columns (2021JJ50140)	Provincial Natural Science Foundation Joint Project	2021-2023	Chen Qiang	5	2021
31	Research on the Shear Performance and Failure Mechanism of Concrete Beams in Complex Loading Environments (2021JJ50141)	Provincial Natural Science Foundation Joint Project	2021-2023	Feng Haoxiong	5	2021
32	Research on the Working Mechanism of Pile Foundations of Abutments on Lacustrine Soft Soil Foundations Based on Time - effect (2021JJ50142)	Provincial Natural Science Foundation Joint Project	2021-2023	Fu Guihai	5	2021
33	Research on the Mechanism and Control of Suspension Bridge Abutment Displacement under the Coupling Action of Multiple Loads (2021JJ50143)	Provincial Natural Science Foundation Joint Project	2021-2023	Huang Guoping	5	2021
34	Research on Bridge Structure Damage Identification Method Based on Long - term Monitoring	Provincial Natural Science Foundation Joint Project	2021-2023	Li Miao	5	2021



### **Appendix 3 - 4 Scientific Research Achievements and Awards**

	Data under the Influence of Ambient Temperature (2021JJ50145)					
35	Research on the Bearing Capacity of Reinforced Basalt Fiber Reinforced Concrete (BFRC) Members under Compression - Bending (2021JJ50153)	Provincial Natural Science Foundation Joint Project	2021-2023	Wang Xinzhong	5	2021
36	Research on the Secondary Stress Transfer, Anchorage Performance and Component Bearing Capacity of PPC Beams after the End - anchorage Failure of Prestressed Tendons (2021JJ50156)	Provincial Natural Science Foundation Joint Project	2021-2023	Yang Rihua	5	2021
37	Research on the Shear Performance of High - strength Reinforced Concrete Beams with Variable Cross - sections (2021JJ50157)	Provincial Natural Science Foundation Joint Project	2021-2023	Yu Dong	5	2021