WAAE 2026 Track 11 Description

Basic Information:

专栏题目 **Title**	中文：航空航天高性能作动与传动系统 英文：High-Performance Actuation and Transmission Systems for Aerospace Applications
专栏介绍和征稿主题 **Introduction and topics**	

中文：随着航空航天装备向全电化、智能化、高可靠性和轻量化方向快速发展，高性能作动与传动系统已成为飞行控制、起落架收放、空间机构驱动等关键装备的重要支撑技术。作为实现"功率电传"的重要基础，机电作动器凭借高效率、高功率密度和易于智能化集成等优势，在新一代航空航天装备中展现出广阔的应用前景。行星滚柱丝杠副因其承载能力强、刚度高、传动效率高和寿命长等特点，已成为高性能机电作动系统的重要核心部件。面向未来航空航天装备对高性能、高可靠性和智能运维的需求，高性能作动与传动系统在结构设计、动力学建模、可靠性评估、健康管理及数字化设计等方面面临新的机遇与挑战。

本专栏旨在汇集航空航天高性能作动与传动系统领域的前沿理论、关键技术与工程应用成果，促进学术界与工业界的交流合作，推动相关技术创新与工程实践发展。热忱欢迎国内外相关领域专家学者和工程技术人员投稿。

征稿主题包括但不限于：

- 行星滚柱丝杠副及先进螺纹传动技术
- 作动与传动系统设计、建模、分析与优化
- 航空航天机电作动系统与运动控制技术
- 高载荷、高效率及轻量化作动技术
- 接触力学、摩擦磨损、润滑与热力耦合行为
- 机械传动系统可靠性、寿命预测与健康管理
- 数字孪生驱动的作动系统设计、监测与运维
- 航空航天传动系统先进制造、测试与验证技术

英文：With the rapid advancement of aerospace equipment toward electrification, intelligence, high reliability, and lightweight design, high-performance actuation and transmission systems have become essential enabling technologies for critical applications such as flight control, landing gear actuation, and space mechanism drives. As a key foundation for the realization of Power-by-Wire systems, electromechanical actuators offer significant advantages, including high efficiency, high power density, and ease of intelligent integration, making them increasingly attractive for next-generation aerospace applications. Owing to their high load-carrying capacity, high stiffness, superior transmission efficiency, and long service life, Planetary roller screw mechanism has emerged as core components in high-performance electromechanical actuation systems. To meet the growing demands of future aerospace systems for enhanced performance, reliability, and intelligent operation and maintenance, high-performance actuation and transmission systems face new opportunities and challenges in structural design, dynamic modeling, reliability assessment, health management, and digital development.

This track aims to bring together researchers and engineers from academia and industry to share the latest advances in fundamental theories, key technologies, and engineering applications of high-performance actuation and transmission systems for aerospace applications. Original contributions that promote technological innovation and engineering practice are highly welcome.

Topics of interest include, but are not limited to:

- Planetary roller screw mechanism and advanced threaded transmission technologies

- Design, modeling, analysis, and optimization of actuation and transmission systems
- Aerospace electromechanical actuation systems and motion control technologies
- High-load, high-efficiency, and lightweight actuation technologies
- Contact mechanics, tribology, lubrication, and thermo-mechanical behaviors
- Reliability, life prediction, and health management of mechanical transmission systems
- Digital twin-driven design, monitoring, and maintenance of actuation systems
- Advanced manufacturing, testing, and validation technologies for aerospace transmission systems

Track Chair(s):

姓名 **Name**	马尚君 Shangjun Ma
称谓 **Prefix**	研究员 Professor
部门 **Department**	机电学院 School of Mechanical Engineering
单位 **Organization**	西北工业大学 Northwestern Polytechnical University
城市/地区 **City/Region**	西安/陕西 Xian/Shannxi
邮箱 **Email**	mashangjun@nwpu.edu.cn

Organizer's Brief Biography

中文：

马尚君，西北工业大学机电学院，研究员，博士生导师，长期从事机电伺服作动系统和行星滚柱丝杠传动设计、分析、制造等基础理论与关键技术研究。担任某重点型号车载平台副总师、兵器江山重工研究院有限公司和南京晨光集团外聘专家。主持首个“智能机器人”国家重大专项关于一体化直线伺服关节重点研发计划项目，担任首席科学家。此外，主持和参与国家自然科学基金重点、面上项目、军口国家纵向、国家重点研发计划、省部级重点研发计划及科研院所项目 50 余项。获省部级技术发明二等奖 1 项，出版国际上首部“行星滚柱丝杠-啮合原理”专著，发表学术论文 100 余篇，授权发明专利 35 件，连续入选 2023 年度和 2024 年度斯坦福全球前 2%顶尖科学家榜单。

研究成果形成了行星滚柱丝杠及机电伺服系统设计-分析-加工制造体系，提升了国内精密机电传动技术研发水平。通过核心技术产业化，实现了行星滚柱丝杠制造全流程自主可控，打破国外封锁，实现了进口替代。相关成果应用于飞行器进气控制系统、起竖系统、发动机叶片驱动、无人机起落架、人形机器人直线关节等型号装备及产品。解决了 30 余个重要型号装备伺服驱动与传动设计技术难题，得到了本领域国内外同行广泛认可。打造出 5 大类 8 种型号 30 余种规格产品并批产应用，创造经济效益 6891.41 万元，产生了良好的经济和社会效益。

英文：

Shangjun Ma is a Research Professor and Ph.D. Supervisor at the School of Mechanical Engineering, Northwestern Polytechnical University, China. He has long been engaged in fundamental theories and key technologies related to electromechanical servo actuation systems and planetary roller screw transmission, including design, analysis, and manufacturing. He serves as Deputy Chief Engineer of a key vehicle platform program and as an external expert for Jiangshan Heavy Industry Research Institute Co., Ltd. and Nanjing Chenguang Group.

He is the Chief Scientist of China's first national major R&D program in intelligent robotics, leading a key project on integrated linear servo joints. In addition, he has led and participated in more than 50 research projects, including key and general programs of the National Natural Science Foundation of China, national defense-related programs, national key R&D programs, provincial and ministerial key R&D projects, and institutional research projects. He has received one provincial-level Second Prize for Technological Invention. He is the author of the world's first monograph on the “Meshing Principles of Planetary Roller Screw Mechanisms,” has published more than 100 academic papers, and holds 35 authorized invention patents. He has been consecutively listed among Stanford University’s World’s Top 2% Scientists in 2023 and 2024.

His research has established a comprehensive framework for the design, analysis, and manufacturing of planetary roller screw mechanisms and electromechanical servo systems, significantly advancing precision electromechanical transmission technologies in China. Through technology commercialization, he has achieved full-process independent control of planetary roller screw manufacturing, breaking foreign technological monopolies and enabling import substitution. His achievements have been applied to aircraft inlet control systems, erection systems, engine blade actuation, UAV landing gear, and humanoid robot linear joints. He has solved more than 30 key engineering challenges in servo actuation and transmission design for major equipment programs, earning wide recognition from domestic and international peers. His work has led to the development of over 30 product variants across 5 major categories, which have been mass-produced and applied, generating economic benefits of 68.9141 million RMB and significant social impact.

姓名 **Name**	姚琴 Qin Yao
称谓 **Prefix**	副教授 Associate Professor
部门 **Department**	机械工程学院 Department of Mechanical Design
单位 **Organization**	苏州科技大学 Suzhou University of Science and Technology
城市/地区 **City/Region**	苏州/江苏 Suzhou/Jiangsu
邮箱 **Email**	yaoqin@usts.edu.cn

Organizer’s Brief Biography

中文：

姚琴，副教授，硕士研究生导师。2021 年博士毕业于西北工业大学，现任教于苏州科技大学机械工程学院。2023 年进入南京理工大学—苏州亚太精睿传动科技股份有限公司联合博士后流动站。2025 年至 2026 年，赴意大利都灵理工大学机械与航天工程系开展国家公派访问学者研究。主持国家自然科学基金青年项目、中国博士后科学基金面上项目等多项科研课题，入选江苏省高层次创新创业人才引进计划（双创博士）和江苏省科技副总项目。发表学术论文 30 余篇，其中 SCI 一区 Top 期刊论文多篇，授权国家发明专利及软件著作权多项。研究方向主要包括行星滚柱丝杠副精密螺纹传动、结构优化设计、接触力学与可靠性分析。

英文：

Qin Yao is an Associate Professor and Master's Supervisor at the School of Mechanical Engineering, Suzhou University of Science and Technology. She received her Ph.D. degree from Northwestern Polytechnical University in 2021. In 2023, she joined the joint postdoctoral program of Nanjing University of Science and Technology and Suzhou Asia-Pacific Elite Transmission Technology Co., Ltd. From 2025 to 2026, she conducted research as a China Scholarship Council (CSC) Visiting Scholar at the Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Italy.

She has led several research projects, including the Young Scientists Fund of the National Natural Science Foundation of China and the General Program of the China Postdoctoral Science Foundation. She was selected for the Jiangsu High-Level Innovation and Entrepreneurship Talent Program and the Jiangsu Science and Technology Vice President Program. She has published more than 30 academic papers, including multiple papers in top-tier SCI journals, and holds several invention patents and software copyrights. Her research interests include planetary roller screw mechanisms, precision threaded transmission systems, structural optimization, contact mechanics, and reliability analysis.