

**Distinguished Lecturer Visit by Prof. Haibin Zhu at Fudan University, Shanghai, China  
May 11, 2026**

Prof. Haibin Zhu visited Fudan University, Shanghai, China on May 11, 2026, where he delivered an IEEE Distinguished Lecture (of IEEE Systems, Man and Cybernetics Society) titled " **E-CARGO/RBC: Enabling Research Innovations in the Era of AI**", organized by Prof. Xingming Zhao. The lecture attracted many attendees, including students, researchers, and professionals from the fields of engineering and technology (Fig. 1).



Fig. 1 The audience is listening to Prof. Zhu's lecture.

In the AI (Artificial Intelligence) time, many AI tools, such as LLMs (Large Language Models), can help people accomplish many low-level intelligent tasks, such as coding and reporting. Many low-level routine jobs have high potential to be replaced by such LLMs. Traditional programmers need to master powerful high-level modelling tools to meet these new challenges. E-CARGO/RBC (Environments - Classes, Agents, Roles, Groups, and Objects /Role-Based Collaboration) is a modelling methodology, which helps people deal with complex problems by designing systematic strategies other than using low level programming skills.

RBC is a computational methodology that uses roles as the primary underlying mechanism to facilitate collaboration activities. It consists of a set of concepts, principles, models, processes, and algorithms. RBC and its E-CARGO model have been developed into a powerful tool for investigating collaboration and complex systems. Related research has brought and will bring in exciting improvements to the development, evaluation, and management of systems including collaboration, services, clouds, productions, and administration systems. RBC and E-CARGO grow gradually into a strong fundamental methodology and model for exploring solutions to problems of complex systems including Collective Intelligence, Social Networking, Scheduling, Smart Cities, Internet of Things, Cyber-Physical Systems, and Social Simulation Systems.

E-CARGO assists scientists and engineers in formalizing complex problems originally not well-defined and finally points out solutions to such problems including programming. The E-CARGO model possesses all the preferred properties of a computational model. It has been verified by formalizing and solving significant problems in collaboration and complex systems, e.g., Group Role Assignment (GRA). With the help of E-CARGO, the RBC methodology can be applied to solve various real-world challenges. E-CARGO itself can be extended to formalize abstract problems as innovative research investigations. On

the other hand, the details of E-CARGO components are still open to renovations in specific fields to make the model easier to apply. For example, in programming, we need to specify the primitive elements for each component of E-CARGO. When these primitive elements are well-specified, a new type of modelling/programming language can be developed and applied to solve general problems with software design and implementations.

In this lecture, the speaker examines the requirement of research on collaboration systems and technologies, discusses RBC and its model E-CARGO; reviews the related research achievements on RBC and E-CARGO in the past years; illustrates those problems that have not yet been solved satisfactorily; presents the fundamental methods to conduct research related to RBC and E-CRAGO and discover related problems; and analyzes their connections with other cutting-edge fields. This lecture aims to inform the audience that E-CARGO is a well-developed model and has been investigated and applied in many ways. The speaker welcomes queries, reviews, studies, applications, and criticisms.