

**University of Cincinnati -Siemens Simulation Technology Center:
A New Type of Industry University Collaboration for Engineering
Education and Research**

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While powerful modern simulation software and computing resources have become readily available for today's engineering students, most schools still teach engineering courses largely in the same way as decades ago. Fundamental courses such as solid mechanics and fluid mechanics are taught on theory with simple example problems, but simulation tools such as finite element method or computational fluid dynamics are introduced in the senior year elective courses. This may explain why simulation is considered as a task for a special group of engineers in industry. University of Cincinnati-Siemens Simulation Technology Center (UC-Siemens Center) was launched recently with a gift by Siemens PLM aiming at revolutionizing engineering education to change this situation. Simulation tools are introduced across the curriculum of the UC Mechanical Engineering program (UC-ME) starting from early-year courses in a carefully coordinated way. The new approach enables students to connect fundamental theories taught in the course to realistic engineering applications and solve complex engineering problems beyond text book examples, thus motivates them to learn fundamental knowledge. The new paradigm also nurtures students to become engineers who can better collaborate with other engineers across different disciplines: design, test, research and development. NX-Graphics, NX-Nastran, Simcenter 3D, Star-CCM+ and AMESim have been taught at UC-ME in several courses in a vertically integrated manner. A few projects assigned in the freshmen graphics course are brought back in upper-year courses: manufacturing, fluid mechanics, solid mechanics and heat transfer. This provides our students with ability to attack real-world problems that often require multi-physics simulations. Several engineering course modules developed to implement this new education paradigm are presented with example problems and intended learning outcomes. Research capabilities of the faculty and students of the Center are also presented, which offers an ideal platform to conduct industry research that requires advanced simulation technologies.