# ESI and Cardenal Herrera University Team Up to Offer a Technological Leap in Virtual Manufacturing

## Initiating a ground-breaking research program in the virtual engineering of manufacturing processes

**Paris, France – February 22, 2018 – ESI Group, leading innovator in Virtual Prototyping software and services for manufacturing industries, announces the launch of a 5-year joint research program with the CEU Cardenal Herrera University (CEU-UCH) in Valencia, Spain. The aim of this program is to achieve a significant technological leap in the field of virtual manufacturing of materials through the creation of an Endowed Chair at the University and by facilitating high level training in this field.**

The Endowed Chair created with CEU-UCH enables both ESI and the Spanish university to conduct, over the next 5 years, advanced research on the topic of virtual manufacturing. The University aims to advance the state of the art of modeling manufacturing processes, to expand its spectrum of competences, and to consolidate its position as a national and international leader in the fields of real time control and the numerical simulation of materials and manufacturing processes. To this initiative, ESI brings its expertise and its software platform for Smart Virtual Prototyping, in expectation of the further development of modeling techniques and numerical methodologies that provide the strong predictive capacity needed to optimize industrial processes and the performance of those processes over time.


Image: Rosa Visiedo Claverol, Chancellor of CEU Cardenal Herrera University, and Vincent Chaillou, COO of Edition Operations at ESI Group, launch a 5-year joint research program.

**Antonio Falco Montesinos**, Professor of Applied Mathematics at CEU-UCH, is appointed Chairman and the research operations of the Chair will be overseen by **Anne Chambard**, Systems Simulation Platform Product Manager at ESI Group. Over the next 5 years the following topics will be investigated, leveraging the competences available at CEU-UCH, ESI and national, European and international partners:

- robotized systems and processes
- transport and optimal trajectories
- composites forming
- image, vision and uncertainty
- bioengineering and topological optimization involving composites

This joint program will tackle recurring engineering challenges in different sectors. In particular geometric data analysis will be used to achieve better control of automated systems and processes and to reduce computing time for models of equipment, such as robots, that move in trajectories. Here ESI and its partners hope to make progress in robot systems by building a generic mechanism to determine the optimal trajectory. On the subject of Additive Manufacturing, or 3D printing, the program will seek to understand the relationship between a physical object and its discrete combinatorial counter-parts and thereby to create geometric based algorithms for better error control during the manufacturing. Regarding predictive maintenance, this new chair will investigate quality inspection based on artificial vision by extracting the information from real-time images. The team hopes to develop procedures that compute local material parameters and match the empirical data with the real-time simulation, with the objective of developing computational procedures for real-time damage and fracture detection. In the field of image-based decision making related to autonomous vehicles, the research is expected to enable pattern recognition model discovery in both static and dynamic situations.

To support this new program, various cycles of continuous training on virtual manufacturing and advanced numerical simulation will be organized in collaboration within the CEU-UCH and their industrial partners. One important function of the Chair is to create an educational network of national and international experts to support this educational initiative. The joint program will also fund four PhD theses on the above research projects. Overall, these actions seek to address the current shortage of expertise in these critical domains.

The creation of this latest endowed Chair strengthens the link between CEU-UCH and ESI and is complementary to the Chair with Centrale Nantes in France, currently held by, Teacher-Researcher **Emmanuelle Abisset-Chavanne** at Centrale de Nantes. In sponsoring both Chairs, ESI expresses its commitment to deepen scientific research for the benefit of all industries.

For more information about the UCH-ECU, please visit: www.uchceu.com/en

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## About ESI Group

ESI Group is a leading innovator in Virtual Prototyping software and services. Specialist in material physics, ESI has developed a unique proficiency in helping industrial manufacturers replace physical prototypes by virtual prototypes, allowing them to virtually manufacture, assemble, test and pre-certify their future products. Coupled with the latest technologies, Virtual Prototyping is now anchored in the wider concept of the *Product Performance Lifecycle*™, which addresses the operational performance of a product during its entire lifecycle, from launch to disposal. The creation of a *Hybrid Twin*™, leveraging simulation, physics and data analytics, enables manufacturers to deliver smarter and connected products, to predict product performance and to anticipate maintenance needs.

ESI is a French company listed in compartment B of NYSE Euronext Paris. Present in more than 40 countries, and addressing every major industrial sector, ESI Group employs about 1200 high-level specialists around the world and reported annual sales of €141 million in 2016. For more information, please visit www.esi-group.com.

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