



# OBJECTIVES

The main objectives of the chair are:

To build on and expand the three research projects (Design, Manufacturing and Supply Chain) to provide an integration framework for implementing these projects in Siemens' Aeroderivative Gas Turbines (AGT) division.

To position Siemens Power Generation (PG) as a world leader in academic collaboration for Industry 4.0 technologies and training.

To promote communication and share best practices between the three projects and between the projects and other Siemens divisions.

To provide a training platform for Siemens software at the three partnering universities, in order to train the next generation of highly qualified personnel (HQP).

## COLLABORATORS

### CHAIR PARTNERS

**Universities:** ÉTS, Concordia University, McGill University

**Industry:** Siemens AGT

### RESEARCHERS

#### DMADO

**McGill:** Michael Kokkolaras (Project Leader) and Daniel Varro

**ÉTS:** Hany Moustapha, Sylvie Doré, Patrice Seers and Francois Garnier

#### AMADO

**ÉTS:** Antoine Tahan (Project Leader), Amin Chaabane, Pierre Bélanger, David Labbé, Kurt Landau, Sylvie Nadeau, Hany Moustapha and Carlos Vázquez

**Concordia:** Anjali Awasthi and Jia Yuan Yu

**McGill:** Yaoyao Fiona Zhao

#### DTPSC

**Concordia:** Nadia Bhuiyan (Project Leader), Anjali Awasthi, Satyaveer Chauhan and Jia Yuan Yu

**ÉTS:** Yvan Beauregard, Roland Maranzana and Hany Moustapha

### OTHER COLLABORATIONS

- Siemens Software
- Siemens Digital Factory

**SIEMENS**  
Ingenuity for life

**Concordia**  
UNIVERSITY

**McGill**  
UNIVERSITY

**CRSNG**  
**NSERC**

**Mitacs**

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**SIEMENS RESEARCH CHAIR  
ON INDUSTRY 4.0  
TECHNOLOGY INTEGRATION**



**ÉCOLE DE  
TECHNOLOGIE  
SUPÉRIEURE**  
Université du Québec

# SIEMENS RESEARCH CHAIR ON INDUSTRY 4.0 TECHNOLOGY INTEGRATION 2018-2023



**CHAIRHOLDER  
HANY MOUSTAPHA**

After a long career spanning 30 years with Pratt & Whitney Canada (P&WC) as senior manager of P&WC technology programs, Hany Moustapha joined ÉTS in 2010 as professor and director of AÉROÉTS. He was named P&WC Senior Research Fellow in 2011 and is a Fellow of ASME, CASI, CSME and CAE. He has also authored or coauthored over 100 publications, including two books on gas turbines.

Dr. Moustapha is the cofounder of CRIAQ, GARDN, Aéro Montréal and the Montreal Aerospace Institutes. He is an ambassador emeritus and the president of the Palais des congrès de Montréal's Ambassadors Club and represents Canada on the NATO-AVT panel. He has received more than 30 national and international awards, including: Chevalier de l'Ordre national du Québec, James C. Floyd Award AIAC, Montréal Inspiration-Innovation Award, CASI Senior McCurdy Award, ADRIQ Prix Carrière industrielle and the House of Commons of Canada Award.

In 2016, Dr. Moustapha started exploring the challenges of Industry 4.0 and created an integrated research and education program on Industry 4.0 technologies for the aerospace sector at ÉTS called Aerospace 4.0™.





## BACKGROUND AND MISSION

Since the fall of 2017, Hany Moustapha has been the key driver towards establishing three major research projects funded by Siemens, NSERC and MITACS on Industry 4.0 technologies. These projects combine the expertise of 20 professors from École de technologie supérieure (ÉTS), Concordia and McGill Universities in the following fields:

- Digital Multidisciplinary Analysis and Design Optimization (DMADO, led by McGill University and involving 6 professors)
- Advanced Manufacturing Automation, Digitization and Optimization (AMADO, led by ÉTS and involving 11 professors)
- A Digital Technology Platform for Supply Chain (DTPSC, led by Concordia University and involving 7 professors)

This research chair's mission is to develop an **integration platform** to leverage the results of these projects for Siemens, researchers and students. This unique chair aims to integrate Industry 4.0 technologies into three distinct engineering fields: design engineering, manufacturing and repair, and supply chain management.

## RESEARCH FOCUS

The chair's three research projects will focus on the following aspects:

**DMADO:**

1. Digital Design Platform
2. Multidisciplinary Design Optimization (MDO)
3. Parametric Design Correlations

**AMADO:**

1. Advanced Condition Monitoring (ACM) and Predictive Maintenance
2. Augmented Reality (AR) for Green Manufacturing Automation
3. Operational Logistics Digitization Technologies
4. Factory Data Analytics and Optimization

**DTPSC:**

1. Scenario Planning and Forecasting
2. Supplier Collaboration Platform
3. Transportation Management Supplier
4. Quality Management
5. Geometric and Data Mining for Extended Data Analytics
6. Cross-disciplinary Workforce Development

## IMPACTS



- Supporting the implementation of the outcomes of the three projects at Siemens, through integration projects, in order to advance the Siemens AGT PLM (Product Life Management) Vision.
- Expanding the ÉTS Numérix Laboratory, which uses Siemens software.
- Supporting the creation of a “Digital Enterprise” minor at ÉTS with courses focused on skills needed for Industry 4.0.
- Training the next generation of HQP so that they will be able to meet the needs of Siemens and other companies as they face new Industry 4.0 challenges.
- Holding an annual forum on integrating Industry 4.0 technologies, in collaboration with Siemens.

