Twin Screw Course America
October 7th and 8th 2015

Why Twin Screw Course America?
Twin screw extrusion used since more than 70 years, is nowadays a key process for manufacturing advanced products with high added-value in a wide array of applications such as engineering plastics, drug products, medical devices, and agro-food products. Focusing on this complex process is thus interesting for improving productivity and product quality.

From extrusion principles to simulation

Hosted by the University of Massachusetts Lowell

Twin Screw Course America
The Twin Screw Course America consists in a 2-day event aimed at a first approach of numerical simulation of twin screw extrusion.

As an introduction, Day 1 is dedicated to the state-of-the-art of the twin screw extrusion brought by academic and industrial experts. In addition, the mechanical principles of extrusion will be presented.

To go further, Day 2 consists in a training on the Ludovic® software. The mechanical principles of extrusion seen the first day will be translated in the numerical simulation model. During this training, you will handle Ludovic® and learn how to set up a case and how to analyze the different kind of results proposed.

Following the training, you will be able to solve your industrial issues with Ludovic® with the 2-month license.

About the Ludovic® software
Ludovic® is a 1D software aimed at analyzing the twin screw extrusion process. Within a mathematical model, resolving the physics equations (as presented in Day 1), Ludovic® performs a thermo mechanical analysis of the process and predicts the material behavior.

Ludovic® is used for product formulation, process set up and scale up issues. Proposing a fast learning curve, Ludovic® is easily integrated as complementary tool for saving time to market (50% of trials saved).
Who should attend?

The **Twin Screw Course America** is aimed at process engineers, product development technically-oriented engineers working in both researching and manufacturing environment.

This extrusion course proposes to establish a concrete link between mechanical principles in extrusion process and their translation into simulation languages.

Two targeted packages to fit your personal needs

**Gold package:** full experience of twin screw extrusion simulation. Within a hands-on experience (2-month free Ludovic® license) with the full technical support of SCIENCES COMPUTERS CONSULTANTS in addition to the 2-days course.

**Silver package:** a great insight on the twin screw extrusion. Within one day seminar focus on the state-of-the-art in extrusion and one day Ludovic® training to get quickly and efficiently the basis of the Ludovic® software.

Immediate benefits

Attending the **Twin Screw Course America** will allow you to:

- **get a global understanding** of twin screw extrusion,
- **get fully trained** on the Ludovic® software,
- **solve your industrial issues** (scale-up, product formulation, process optimization).

Testimonials following the **Twin Screw Course Europe 2014 (French Riviera)**

« The course was well structured with a high level of instructions. »

« From my experience, it was the most interesting, organized and valuable course I have ever attended. »

« I see immediate solutions that I can directly use in my daily job. »

« The theoretical introduction of mechanics gave great insights for the second day on the software. »
Welcome
Pr Francis Lai, Professor, UNIVERSITY OF MASSACHUSETTS LOWELL, USA

Introduction
Eric Chassagnolle, Business Developer, SCIENCES COMPUTERS CONSULTANTS Inc, CANADA

MORNING SESSION
EXTRUSION: VERSATILE PROCESSES FOR ADVANCED PRODUCTS

Single-screw, twin-screw, quad-screw, octa-screw extrusion technology.
Pr Francis Lai, Professor, UNIVERSITY OF MASSACHUSETTS LOWELL, USA

Coffee Break

Residence Stress Distribution: Development and Application.
Pr David Bigio, Associate Professor, UNIVERSITY OF MARYLAND, USA

Why Twin Screw Extrusion?
Pr Nick Schott, Professor, UNIVERSITY OF MASSACHUSETTS LOWELL, USA

Lunch Break

AFTERNOON SESSION
TWIN-SCREW EXTRUSION: GETTING INSIGHT

Application of Ludovic® in Pharma Process Development.
Rick Peng, Associate Engineer, MERCK & CO INC, USA

Introduction to the twin screw extrusion process. Material flow in the screw elements and the kneading blocks.
Dr Chantal David, General Manager, SCIENCES COMPUTERS CONSULTANTS, FRANCE

Coffee break

Ludovic® software presentation: global functioning of a twin-screw extruder.
Dr Chantal David, General Manager, SCIENCES COMPUTERS CONSULTANTS, FRANCE

ROI of the Ludovic® software.
Eric Chassagnolle, Business Developer, SCIENCES COMPUTERS CONSULTANTS Inc, CANADA

Questions and conclusion

Wine & Cheese cocktail (5:00 pm)
LESSON 1: GLOBAL INTRODUCTION TO THE SOFTWARE

What you will learn:
• Ludovic® software principles.
• Resolution of physics equation.
• the computation principles.

LESSON 2: HOW TO DEFINE A COMPLETE SIMULATION

What you will learn:
• How to design the screw profile in Ludovic®.
• Import a material.
• Define the operating conditions.

Coffee Break

LESSON 3: COMPUTATION AND RESULTS ANALYSIS

What you will learn:
• Define the numerical parameters and execute a simulation.
• Global results: analysis of the energies involved in the process.
• RTD results: analysis of the residence time of the process.
• F(x) results: analysis of the thermo-mechanical results along the screw profile.

Lunch Break

LESSON 4: THE METHODOLOGY FOR OPTIMIZING THE PROCESS

What you will learn:
• Explore a functioning domain.
• Compare the results get from the simulation to experimental results.
• Determine relevant material/parameters criteria.

LESSON 5: PERFORMING DESIGN OF EXPERIMENTS

What you will learn:
• Run a Design of Experiments (DoE) in Ludovic®.
• Handle the surface of answer of the DoE.
• Identify the impact of the screw speed and throughput changes on output results.

Questions and conclusion (4:00 pm)
A 2-month Ludovic® license

After this course, the attendee is self-reliant in the use of the Ludovic® software for analyzing and optimizing his own cases/applications. He is thus provided with a 2-month temporary license of the Ludovic® software.

During the 2 months, the attendees benefits are:
- a Ludovic® v5.6 version (full options and functionalities),
- an access to the eSupport site,
- an access to the Technical Support (via hot line).

Fees

Gold package includes:
- Day 1: seminar on the state-of-the-art of twin screw extrusion,
- Day 2: training on the Ludovic® software,
- the lunches,
- the 2-month Ludovic® license.

Price: 1500$

Silver package includes:
- Day 1: seminar on the state-of-the-art of twin screw extrusion,
- Day 2: training on the Ludovic® software,
- the lunches.

Price: 500$

N.B.: both Gold and Silver packages include 2 months of interface visualization of the Ludovic® software. This allows to display and analyze the simulations performed during the day 2.
Schedule

**October 7th, 2015**: Day 1 from 09:30 AM to 05:00 PM followed by a Wine & Cheese cocktail.

**October 8th, 2015**: Day 2 from 08:30 AM to 04:15 PM.

Location

**UMass Lowell Inn & Conference Center**
50 Warren Street
Lowell, MA 01852
978 934 6920

Access

Lowell is located at the North/North-East of Boston (Massachusetts – USA).

The UMass Lowell Inn & Conference center is located in the heart of the historic Lowell, just a few minutes from the intersection of I-495, I-93, Route 3 and the Lowell Connector.

Hotel & Accomodations

As the Twin Screw Course America takes place in the UMass Lowell Inn & Conference Center, rooms are available for your stay:

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Address</th>
<th>Contact</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>UMass Lowell Inn Conference Center</td>
<td>50 Warren Street, Lowell, MA-01852, 978 934 6920</td>
<td>For reservation: 877 886 5422</td>
<td>Xx $ per night</td>
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Pre required equipment

In order to attend the Twin Screw Course America, some pre-required equipments are necessary. Indeed, attendees will be provided with a 2-months license of the Ludovic® software during this training.

<table>
<thead>
<tr>
<th>Windows XP, Vista, 7 or 8</th>
<th>The Ludovic® software will be installed on the attendees laptop prior to the Twin Screw Course America for performing the training (Day 2).</th>
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<td>Details for technical installation of the Ludovic® software will be provided at the registration.</td>
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<td>After the training, you will keep the performed work on your laptop.</td>
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Pre registration

If you are interested by the Twin Screw Course America, please pre-register as of now, it is fast, simple and non-binding.

For pre-registrations, simply send an email with your details (see below) to Eric Chassagnolle at echassagnolle@scconsultants.com. We will confirm your registration.

- Name of participant.
- Company.
- Email address.
- Phone number.
- Package option.

Registration

You are able to validate your participation and registration on our website:


1000$ will be deducted on the Ludovic® permanent license price in case of purchase within the next 6 months (after the end of the 2-month license).

SCC Inc keeps the right to cancel this course if a minimum registrations has not been reached.

Contact

For any information, do not hesitate to contact SCC.

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