

## TESTIMONIALS

*"Good balance of theory and practical. Very well structured and organized."*

Anvit Gupta, Customer & Application Development Engineer  
ExxonMobil Chemical, Baytown, TX

*"As someone new to plastics, this class is the perfect mix of presentations, networking, and hands-on lab work for getting up to speed quicker."*

Doug Vandenberg, Process Engineer  
Bemis Company/Amcor, Neehah, WI

*"This material and how it was presented provided a broad understanding of this technology. This understanding can be applied to future applications."*

Doug Gaus, New Process Development Engineer  
W. L. Gore & Associates, Elkton, MD

*"It helped me learn more about important properties to consider when analyzing raw materials."*

Sierra Cleaver, Quality Specialist  
SEKISUI KYDEX, Bloomsburg, PA

*"The Thin and Heavy-Gauge Workshop is information packed and well presented. Attending this workshop has given us a better understanding of what we do."*

Ralph Huihui, Director of Operations  
Jamestown Plastics, Inc., Brocton, NY

*"Overall, this course greatly increased my familiarity and knowledge of the thermoforming process and will definitely benefit me while helping my customers work through their issues."*

Kathy Webb, Technical Service Engineer  
Ineos Olefins and Polymers USA, La Porte, TX



## PLASTICS INNOVATION & RESOURCE CENTER (PIRC)

The PIRC is one of the top plastics technology centers in the nation for research, development, and education related to injection molding, extrusion, blow molding, rotational molding, and thermoforming.

Partnering with the PIRC gives plastic manufacturers the opportunity to increase productivity while decreasing capital expenditures, operating costs, and development costs.

Services offered to plastics manufacturers include:

- New product development
- Material selection
- Testing and analysis
- Custom compounding
- Process technology
- Education and training

PIRC clients have access to:

- Industrial-scale process equipment and extensive material testing laboratories
- World-class training programs (including customized, on-site training programs, workshops, online courses, and national seminars)
- Expert consulting staff, including Penn College faculty
- Student interns and graduates that bring education and experience to the workplace

**Penn College is one of only six colleges in the nation offering plastics degree programs accredited by the Engineering Technology Accreditation Commission of ABET.**

B.S. – Plastics & Polymer Engineering Technology  
A.A.S. – Plastics & Polymer Technology

Penn College graduates are in high demand for positions in manufacturing operations, process technology, supervision, research and development, product and machine design, and more. Companies that employ our graduates include: Becton Dickinson, Berry Global, Carrier Plastics, First Quality, General Cable, Google, Greiner Packaging, Honda, Johnson & Johnson, Mitsubishi Chemical Advanced Materials, Tessa Plastics, The Plastek Group, Toyota, Reynolds Consumer Products, Truck-Lite, W. L. Gore & Associates, West Pharmaceutical Services, and many more.

PIRC, Dept. 26  
Pennsylvania College of Technology  
One College Avenue  
Williamsport, PA 17701  
570.321.5533 • pirc@pct.edu • pct.edu/pirc

Penn College encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact Disability Services at 570.320.5225, TTY: 570.321.5528, or fax 570.327.4501 in advance of your participation or visit.

Penn College® is registered in the U.S. Patent and Trademark Office.

PC-1454 1/17/20

**Pennsylvania  
College of Technology**  
A Penn State Affiliate

One College Avenue | Williamsport, PA 17701-5799



## HANDS-ON THERMOFORMING



**PENNSYLVANIA  
COLLEGE OF  
TECHNOLOGY**

### THIN-GAUGE/ROLL-FED

**JUNE 22–24, 2021**

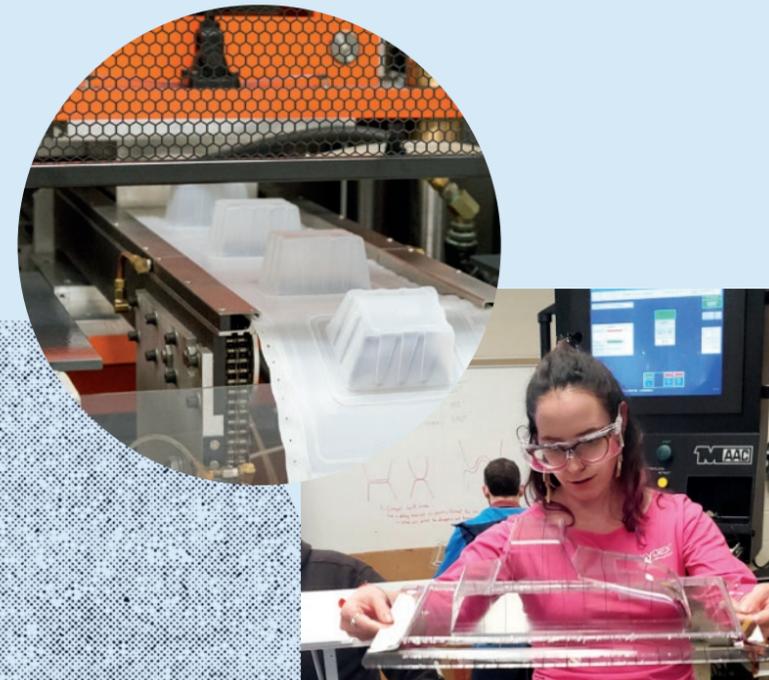
WITH Mark Strachan

### HEAVY-GAUGE/CUT-SHEET

**JULY 13–15, 2021**

WITH Jay Waddell

**WILLIAMSPORT**



**Sponsors: American Wick Drain and SEKISUI KYDEX**

**PLASTICS INNOVATION & RESOURCE CENTER**

# THERMOFORMING WORKSHOPS

Pennsylvania College of Technology's Plastics Innovation & Resource Center is proud to offer these national training workshops.

## PROGRAM OUTLINE lecture and hands-on instruction

### THIN-GAUGE/ROLL-FED THERMOFORMING

JUNE 22–24, 8:30 A.M.–4:30 P.M.

Mark Strachan to lead this workshop with special guest speakers to be announced.

#### Advanced Forming Techniques

- Pre-stretching – pre-billow and vacuum bleed
- Sheet/cavity clamping
- Techniques for superior part definition – high pressure forming, coining, 3rd motion plug assist, and matched metal
- Vacuum and compressed air requirements to achieve faster cycle times and improved part definition

#### Trimming 101

- Basic thin-gauge trimming techniques
- Steel rule die options
- Die nicking

#### Advanced Trimming

- Floating knives and locators
- Heated knives and anvils
- Match metal trim
- Punch dies
- Trim in-place

### HEAVY-GAUGE/CUT-SHEET THERMOFORMING

JULY 13–15, 8:30 A.M.–4:30 P.M.

Jay Waddell to lead this workshop with special guest speakers to be announced.

#### Advanced Forming Techniques

- Billow, snap-back, vacuum bleed, and pressure forming
- Twin-sheet forming
- Vacuum and compressed air requirements to achieve faster cycle times and improved part definition
- Articulating frames
- Oven profiling

#### Trimming 101

- Basic heavy-gauge trimming techniques
- Trimming methods – band saw, knives, drilling, routing
- Part holding fixture material and construction options

#### Advanced Trimming and Assembly

- CNC, robotics, laser, and water-jet
- Ultrasonics
- Adhesives

### BOTH SESSIONS

#### Plastics Material for Thermoforming

- Basic definitions of plastic materials
- How plastics are made and the effect on material characteristics
- Molecular characteristics and the importance of understanding them
- Structures and the effect on material properties
- Simple, but necessary overview of chemistry
- Material properties and what you need to know about them
  - Material test methods – the good, the bad, and the worthless
  - Significance to thermoformers
- What thermoformers need to know about sheet extrusion
- Definitions and the process
- Equipment and how it impacts your sheet
- Process variables and the effects on extruded sheet problems
- Writing sheet specifications – tips, clues, and pitfalls
  - What you need to tell your extruder
- Getting sheet quality you want every time

#### Tooling

- Mold design, venting, and cooling
- Plug assist design and materials
- Positive vs. negative tooling
- Undercut features

#### Thermoforming Techniques

- Heating the sheet, hardware, and important set-up conditions
- Heated sheet measuring devices
- Cooling the part
- Basic thermoforming processes and techniques
- Blur between sheet-fed and roll-fed forming techniques

#### Diagnostic Tools

#### Machine Maintenance and Safety

#### Ample Networking Opportunities

#### Final Wrap-Up/Questions to Thermoforming

## INSTRUCTORS

Mark Strachan's career in the packaging industry started in 1982 while serving his apprenticeship as an Electronics Engineer for Metal Box South Africa. He started his own plastics blister manufacturing business (PacMark) in the garage of his home, which quickly grew to a prominent packaging and thermoforming business. Strachan's hunger to learn more about the plastic industry led him to sell PacMark and move to Germany where he worked for a large plastics packaging firm and gained valuable hands-on experience in thermoforming and extrusion processes. During the past 30 plus years, he has held engineering and technology positions with companies located in Europe and the United States.



With increased requests for his expert knowledge and his continued interest in teaching, Strachan formed Global Thermoforming Training Technologies, Inc. He has been presenting classroom and hands-on training to thermoforming and sheet-extrusion companies worldwide.

Strachan is the former Chairman and board member of SPE Thermoforming Division.

Jay Waddell is the founding partner and key management principal of Plastic Concepts & Innovations, LLC, bringing the skills from more than 30 years of consulting and manufacturing in heavy-gauge thermoforming at Curd Enterprises, dba Multiplastics. He held numerous positions from Manufacturing Manager to Executive Vice President while at Multiplastics.



In the plastics industry, Waddell is considered to be an expert in materials and manufacturing techniques, including twin-sheet thermoforming, pressure forming, and CNC operations.

Waddell developed unique processes for fabrication and bonding of dissimilar materials, such as twin-sheet forming of talc-filled polyolefins. He was involved in the development of PVF and PVDF film technology for heavy-gauge thermoforming and the use of TPO materials in automotive interior and exterior applications.

Waddell earned his B.A. at the Citadel and continued his graduate studies in business there. He is a Senior Member of SPE and has been a member of the national Board of Directors for the Thermoforming Division for more than 20 years.



## REGISTRATION

Pre-registration is required, and includes course instruction with handout materials, morning refreshments, and lunch for three days. A complimentary networking dinner will be held day one and two. **Registrants are responsible for all other meals and lodging.**

Registration is limited and on a first-come, first-served basis. **Please wait for confirmation of enrollment before booking your flight.**

## LOCATION

Pennsylvania College of Technology  
Breuder Advanced Technology & Health Sciences Center (ATHS)  
206 College Avenue, Williamsport, PA 17701

## DATES & TIMES

Thin-Gauge/Roll-Fed Thermoforming - June 22–24 or  
Heavy-Gauge/Cut-Sheet Thermoforming - July 13–15  
Both: Tuesday–Thursday, 8:30 a.m. to 4:30 p.m.

## COST & REGISTRATION

\$1,295 (\$1,195 if registered by April 5, 2021)

The registration fee may be paid by check, MasterCard, Visa, Discover, purchase order, or authorization to invoice your company.

Register online at [pct.edu/pirc](http://pct.edu/pirc) or call 570.321.5533.

## HOTELS

Registrants will receive a confirmation email with discounted rates at participating hotels. Registrants are responsible for making their own lodging arrangements.

## AIRPORTS

The Williamsport Regional Airport (IPT) provides commuter air service via American Airlines through Charlotte, NC. Free shuttle service will be provided to and from the Williamsport Regional Airport and College from our preferred hotels, so a car rental is not necessary (before 11 p.m.). Other airport options, with approximate driving times (rental car needed):

- University Park (SCE) – 1 hour
- Wilkes-Barre/Scranton International (AVP) – 1.5 hours
- Elmira/Corning (NY) Regional (ELM) – 1.5 hours
- Harrisburg International (MDT) – 2 hours
- Philadelphia International (PHL) – 3 hours

## APPROPRIATE DRESS

Casual business/jeans attire is recommended for plastics processing and testing lab. Safety glasses are required.

## CANCELLATION

Penn College reserves the right to cancel a seminar. Registrants will be notified in case of cancellation. Penn College is not responsible for penalty fees or any costs incurred by the registrant due to cancellation of a seminar.

*Registration cancellations will be accepted and full refunds issued when notified at least two weeks prior to the class start date. For cancellations within two weeks of the class start date, the company is responsible for the full cost. Companies may substitute alternate personnel for paid seats at any time.*

## PLATINUM SPONSORS

THIN-GAUGE THERMOFORMING



HEAVY-GAUGE THERMOFORMING

