Location
Penn College is located in central Pennsylvania with easy access off Interstate 180, Maynard Street Exit 23. Instruction and labs will be held in the Breuder Advanced Technology & Health Sciences Center (ATHS), Pennsylvania College of Technology, 206 College Avenue, Williamsport, PA 17701. A campus map, which includes major routes to the campus and location of campus buildings, will be emailed to all registrants.

Hotel Reservations
Participants are responsible for making their own lodging arrangements. Your registration fee does not include hotel accommodations. Registrants will receive a confirmation email with information on hotel room blocks with discounted rates. Hotels book quickly so it is important not to delay in reserving a room.

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

- University Park (UNV) – 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

Please wait for confirmation of enrollment before booking your flight.

Attire
Appropriate dress for the shop floor is recommended. Casual business/jeans recommended, focusing on appropriateness for plastics processing and testing lab. Safety glasses will be provided.

Cancellations
Registrant 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.

The PIRC may cancel or postpone any course because of insufficient enrollment or other unforeseen circumstances. If a program is canceled or postponed, the PIRC will refund registration fees, but cannot be held responsible for any other related costs, charges, or expenses (including cancellation/change fees assessed by airlines or travel agents).

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.
THIN-GAUGE/ROLL-FED THERMOFORMING JUNE 11–13

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
- Pre-stretching – pre-billow and vacuum bleed

Trim in-place
- Punch dies
- Trim in-place

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

Basic heavy-gauge trimming techniques
- Billow, snap-back, vacuum bleed, and pressure forming

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

Basic heavy-gauge trimming techniques
- Trimming methods – band saw, knives, drilling, routing

Diagnostic Tools
- Machine Maintenance and Safety
- Final Wrap-Up/Questions to Thermoforming

Expert Panel Discussion

Plastics Materials 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
- Final Wrap-Up/Questions to Thermoforming

Expert Panel Discussion

Platinum Sponsors

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 THERMOFORMING

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Expert Panel Discussion

Platinum Sponsors

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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. In 2015, Strachan began work as the Senior Technology Director with First Quality Packaging Solutions.

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 of SPE for more than 20 years.

TESTIMONIALS

Thin-Gauge
“...The speakers/leaders are very knowledgeable and welcome questions about anything. I knew some, but this has given me more info in three days than I could ever hope to do on my own. Thank you!”

Nicholas Benjick, Safety Coordinator/Quality Control, Jamestown Plastics Inc., Boston, NY

Heavy-Gauge
“The workshop covered all aspects of thermoforming in a very detailed manner.”

David Arcaute, Process Engineer, Corvac Composites LLC, San Marcos, TX

REGISTRATION
$1,295 per workshop, pre-registration required; includes course registration, handout material, morning refreshments, and lunch for three days. $100 Early Bird Discount by April 1, 2019. Registration is limited and on a first-come, first-served basis. Please wait for confirmation of enrollment before you book your flight.

Register online at pctl.edu/ptc and use “TB2019” in comments or call 570-321-5533.