

Community

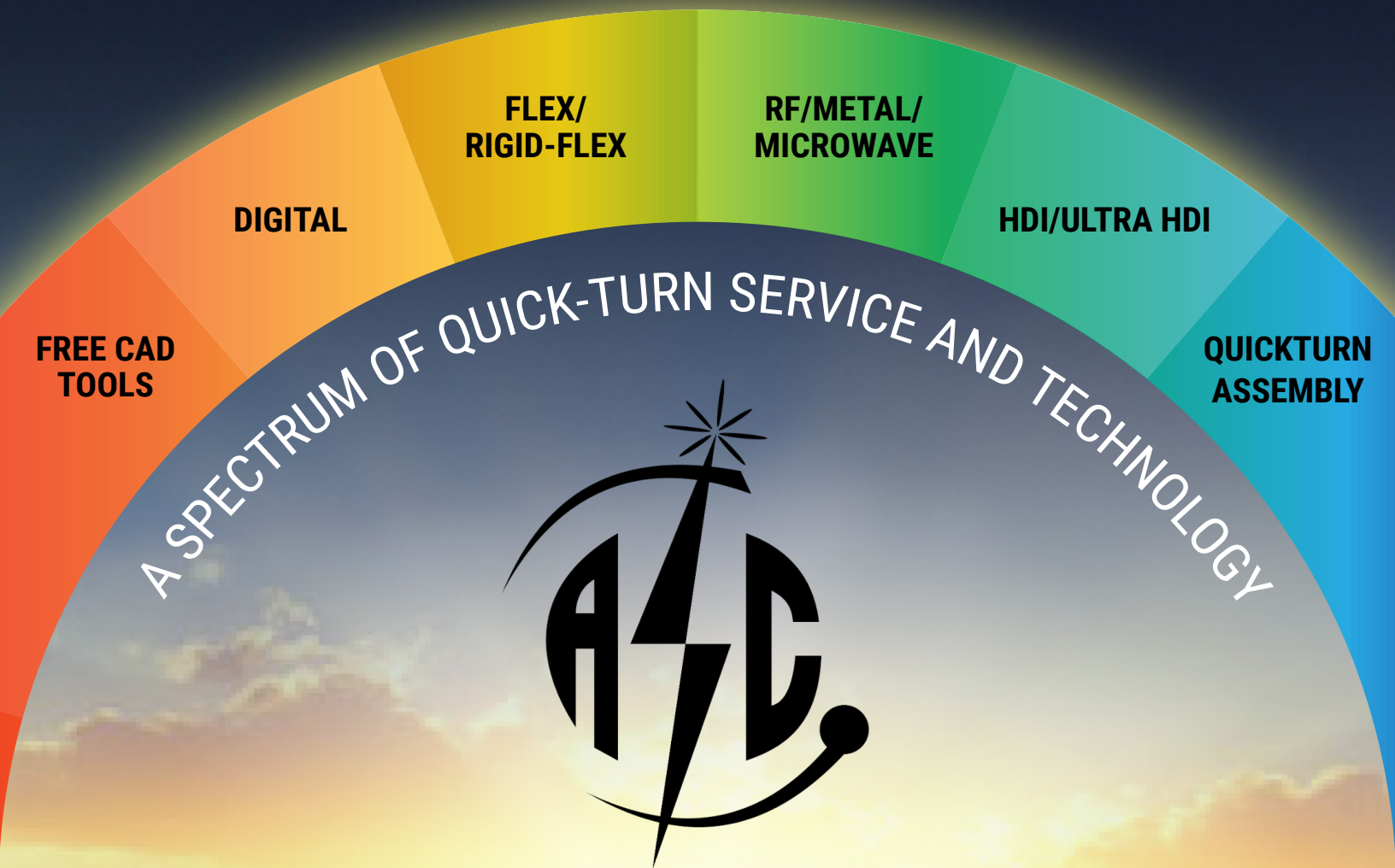
MAGAZINE



FALL 2023



A New Day Is Dawning



AMERICAN STANDARD CIRCUITS
O
SUNSTONE CIRCUITS

**THE ULTIMATE PCB SOLUTION
FROM CONCEPT TO REALITY, WE HAVE EVERYTHING
YOU NEED FROM A SUPPLIER**

www.ascsunstone.com | (630) 639-5444

Community

MAGAZINE

 VOLUME 1
NUMBER 4


PAGE 12

85 Years Strong

Meet Stark Electronics/Absolute Quality Manufacturing, a wire harness supplier thriving in a new facility



PAGE 16

Forecasting the Wind

Must-read content from expert economist Shawn DuBravac



PAGE 46

Movers and Shakers

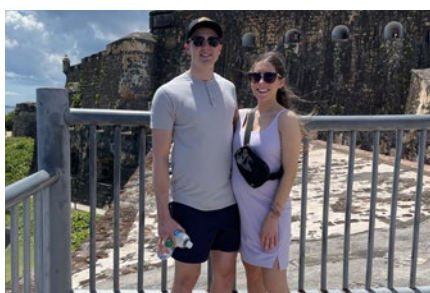
IPC member Brian Chislea is making a difference for FIRST robotics



PAGE 60

Talent Development

IPC Asia connects with local companies like TTM to improve workforce development



PAGE 66

Input From a Young Professional

Student Board Member Henry Crandall reflects on his opportunity

FEATURED CONTENT

Community

MAGAZINE




Conversations

22 Standard Bearer

Meet Tibi Baranyi, expert in engineering, standards, and fishing

36 A Passion for Helping Others

Brandy Tharp believes you can't train others unless you know how to do it yourself

Stories

30 30 Years of Collaboration

HDP's partnership with IPC makes both organizations stronger

42 The New Norm

New courses make IPC workforce training subscriptions a powerful training tool

44 IPC Standards and Electronics Sustainability

Expert Kelly Scanlon: There's more to the standards than you might think

54 Progress in Europe

IPC is leading the effort to strengthen electronics manufacturing in Europe

78 An Introverted Physicist in a Press-fit World

Erika Crandall finds her niche in the Cold Joining Press-fit Task Group

90 Testing Their Skills

Winners from the IPC Masters Competition China 2023





eptac
TRAIN. WORK SMARTER. SUCCEED.



Training that's
focused on you.
Wherever you are.

IPC CERTIFICATION, SOLDER
TRAINING AND PCB DESIGN

With 24 locations, 43 different training programs and over 1,500 scheduled classes in a year, EPTAC is the leading electronics training and certification provider in North America.

View our current training schedule to find the right course for you, wherever you are in the world.

In-Person

On-Site

Online

Community

MAGAZINE

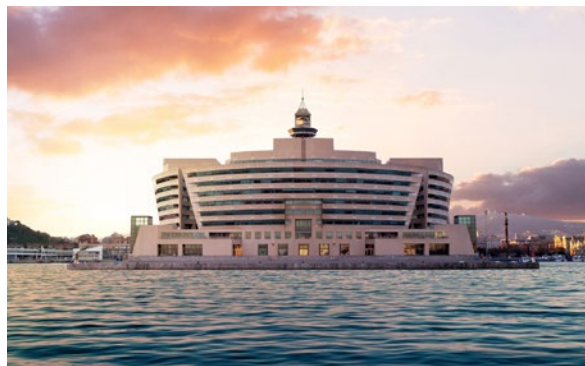


72

Spotlight

A Rousing Success

IPC India Hosts Integrated Electronics Manufacturing & Interconnections 2023



Showtime

68 Welcome to WinterCom

A preview to the January 2024 standards committee meetings

86 IPC Day Mexico

This first-time event made specific connections with the aeronautics industry

94 A New Venue

See what's new for IPC's annual trade show



In Every Issue

- 8 From the CEO: Global Strength Requires Regional Focus
- 43 Member Milestones
- 52 About the Book: Straight Talk About Today's Hiring Strategies
- 64 Instructor-led Schedule
- 82 Standards Update
- 98 IPC Around the World
- 103 Member Benefits
- 104 2023 Calendar Q4



AROUND
THE
WORLD

A Total PCB Solution from a Single Manufacturing Partner

Rigid. Flex. Rigid-Flex. HDI. RF. Assembly.

Summit Interconnect is the largest, privately held PCB manufacturer in North America offering a broad range of highly reliable, advanced technology PCBs. With eight high-tech facilities and thousands of employees, we work alongside customers to push the boundaries of what is possible, helping to create inventive and transformative electronic products.

Summit Interconnect proudly serves these high-growth markets:



Aerospace & Defense



Medical



Industrial



Semiconductor



Automotive



Space



Consumer Electronics



Computing & Datacom



Global Strength Requires Regional Focus

By John W. Mitchell, IPC President and CEO

Sometimes the meetings you arrange at the last minute, often in an informal setting, end up being the ones that move your organization forward the most. Constructive, creative meetings like these can take place anywhere, including hotel lobbies. In this instance, I'm thinking of the Platzl Hotel in Munich, mid-morning, 2022.

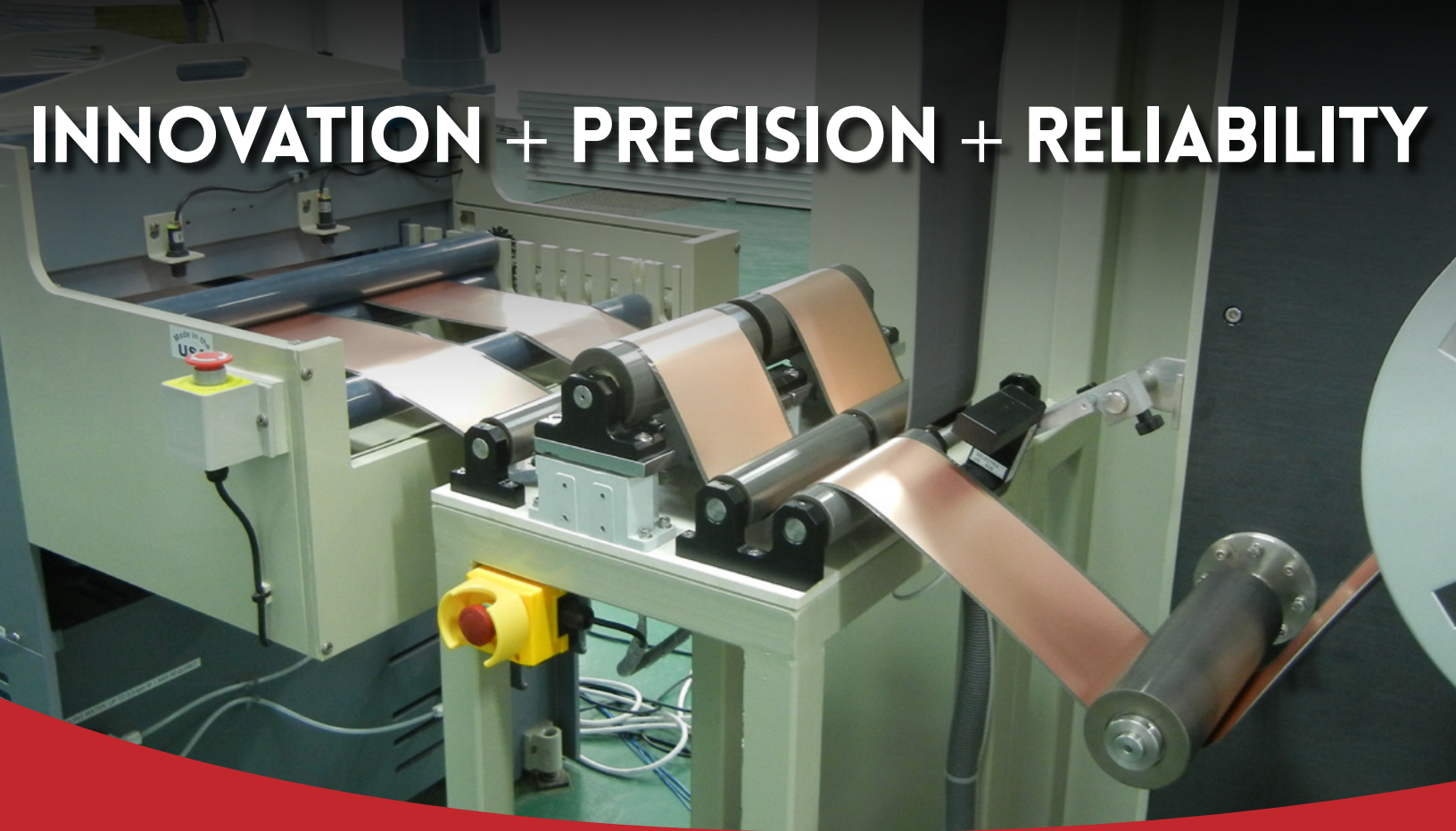
I was finishing up a busy trip to Bavaria with my colleague, Sanjay Huprikar, president, IPC Europe and South Asia Operations. We had met with many industry executives who had shared with us their experiences of the industry challenges they were facing in Europe. Because we wanted to learn more—and find ways to help our European colleagues—we



arranged another meeting in the lobby of the Platzl, the only place available on such short notice.

Amidst the sounds of that busy hotel lobby, Sanjay and I had an in-depth discussion with an EMS executive about what was happening regionally—in fact, right up the street from where we were meeting. We learned that while European EMS companies were working hard to build products, these companies were not as well-known as the European OEMs; they wanted that to change. We discussed ways to help them gain visibility with policymakers and media contacts in their region so that the importance of EMS companies would be recognized.

INNOVATION + PRECISION + RELIABILITY



ROLL-TO-ROLL PROCESSING

- Processing for metals, thin foils, flexible glass and films
- Resist developing applications
- Cleaning applications
- Etching processes, including titanium and glass
- Aqueous based resist stripping
- Electroless plating processes
- Spray or immersion stations available for most applications

www.chemcut.net
sales@chemcut.net

 **CHEMCUT**
BOUNDLESS INNOVATION | UNBEATABLE PRECISION

We were told that IPC is the only organization well-positioned enough to help the European EMS industry because of our core strength in standards development and our participation in various EU meetings in Brussels regarding the European Chips Act. This executive told us, “It would be great if we could gather the EMS companies from Europe together.” Sure enough, that following September, we hosted more than a dozen EMS companies in Europe, setting up strategies that would allow them to reach their initial goals within a few years.

When I reflect on that meeting in the Platzl lobby, I think of the saying, “Think global, act local.” Because we were there in that region and talking face-to-face with a local EMS executive about local problems, we were much better able to make suggestions on how IPC could be part of the solution. This is not information we would have gotten on a phone call or in a Zoom meeting. Because we wanted to serve the European EMS community, we had to show up, listen, share our knowledge, and most importantly, do what IPC does best: Put people in a room together where we can talk about something meaningful. We bring great minds together to address the challenges and find solutions.

Four months after that meeting in the lobby of the Platzl Hotel, and by getting the leaders and companies involved to begin building common ground, we hosted a two-day workshop with executives from the largest compa-

nies in Europe. We discussed their challenges and how to cooperate as a group to expand opportunities for the industry at large.

I remember how good it felt to be leading the organization that made these critical connections happen, furthering IPC’s commitment to a successful regional approach, and providing members with specific needs from their trade association.

The community of EMS executives that we helped to build illustrates IPC’s commitment to serving the industry. We are not only building electronics better but building relationships better and creating a community where every region feels represented.

In this issue of *IPC Community*, you’ll find many stories highlighting the successful connection IPC continues to build with our members around the world. Tibi Baranyi and Erika Crandall each share their unique journeys to leading standards committees. We hosted events in Mexico and India, both meant to connect IPC with the electronics manufacturing communities. In China, our directors are connecting PCB fabricators with students looking to further their careers. And we preview two important in-person events: WinterCom in Barcelona, and IPC APEX EXPO in Anaheim.

It is my hope that you’ll see yourselves reflected in these stories and activities. IPC grows and flourishes because of what you do every day. It’s a strategy that works. 🌈



Global One Stop Solution

for the markets we serve



Broad Product Offering

- Integrated Mission Systems for Radar, Communications, & Surveillance
- Specialty RF Products / Integrated Microwave Assemblies
- Custom Designed Microelectronics multi-chip modules & integrated circuits ("ICs") / Radiation Hardened Space Applications
- High-Density Interconnect ("HDI") and Advanced HDI
- Substrate-like PCBs ("SLP") including CoreEZ® & HyperBGA®
- Flex, Rigid-Flex & Flex Assemblies / Custom Backplane Assemblies
- High Layer Count / Large Format PCBs

Want to know how we're a leading global manufacturer of technology solutions and PCBs..

Access WWW.TTM.COM NOW!



One-Stop Solution

- Engineering concept and design
- Design to Specification, assembly & cost
- Prototype / Pilot
- Ramp to Volume
- Volume Production

Contact Us:

via <https://www.ttm.com/contact>



or follow us on

    #ttm #ttmtech

Inspiring Innovation

85 Years Strong

*Meet Stark Electronics/Absolute Quality Manufacturing,
a wire harness supplier thriving in a new facility*

By Brittany Martin, IPC/WHMA Marketing Coordinator

Staying in business for 85 years is no mean feat. For Stark Electronics/Absolute Quality Manufacturing, it's just another day as a leading electronics and wire harness distributor.

In 1938, Harry Stark established Stark Electronics in Minneapolis as a distributor of electronic parts and equipment, including capacitors, resistors, vacuum tubes, and other radio components. In 1970, Stark added cable

assemblies and other components to the business. In 1999, after listening to their customers' demands for custom wire harnesses, cable assemblies, panel builds, and enclosures, Stark created a separate company called Absolute Quality Manufacturing (AQ). For 24 years, this company has been building complex wire harnesses and control panels for renewable energy, gas and oil, semiconductor, agricultural, automotive, and construction equipment.



Centrally located in the Minneapolis-St. Paul metropolitan area, Stark Electronics/Absolute Quality Manufacturing distributes electronic components and builds custom cable assemblies, wire harnesses, and electrical panels for a wide range of OEM customers. Reed Rolfhus, general manager, shares some thoughts on how the company has transformed over the years, following a vision for the future of the wire harness industry.



How would your team members describe a typical day at your company?

A day in the life at AQ is different for everyone. Some team members call it fast paced; others note that every day is different because of the variety of the work. Most agree that each day is fun and enjoyable.

What are the daily goals and objectives that you set out for your team to achieve?

Our team's daily goal is to see continuous improvement in manufacturing efficiency throughout the organization. When the team members see improvement in the manufacturing process, they are highly motivated to find the next way to improve. The benefits of improvement are tangible. For example, a 1% improvement in efficiency of manufacturing each day yields eight times the efficiency over the course of one year.

What is the biggest challenge the wire harness industry is facing today?

From availability to the cost of the materials we use, the supply chain has been our largest challenge in the past few years. Many factors contribute to the supply chain instability, and we could write a senior thesis on it. We do expect supply chain issues to continue.





**ABSOLUTE
QUALITY**
MANUFACTURING, INC.



**STARK
ELECTRONICS**

The challenge that we are most interested in tackling, however, is how to incorporate artificial intelligence into our manufacturing process. We are fascinated to see how AI will play a part in manufacturing, supply chain, and design in the next 10 years.

What's something about your industry that has surprised you?

We have been surprised by the growth in demand for high voltage EV assemblies and the equipment to support these assemblies.

What have been the biggest accomplishments of your team(s) in the past year?

Our team came together to successfully relocate our facility after 46 years in the same location. When we explored the redevelopment costs and green initiatives, we discovered that relocating, streamlining our plant layout, and improving our technology was our best move. These changes will allow us to accommodate change and support future expansion.

What's motivating your team right now?

We are motivated by the continuous improvement we see throughout the company in our new location. We are also motivated to build highly trained and driven teams that support the organization.

What's one initiative on your whiteboard that wasn't there 30 days ago?

One new initiative is scheduling customer and supplier visits to our new facility. Now that we have the space up and running, we can show customers and suppliers the extent of our manufacturing capacity.

If you had 10x the budget, what would you spend it on?

If we had a much larger budget, we would invest it in necessary manufacturing materials such as 3TG (tungsten, tantalum, tin, and gold). With that kind of budget, we could provide more training for our team members. We might also invest in more advanced tooling and technology. A bigger budget could help us develop new green initiatives to make our manufacturing process more sustainable.

What WHMA benefits has your company utilized?

We use IPC/WHMA-A-620. We also attend the WHMA Annual Global Leadership Summit and the Electrical Wire Processing Technology Expo. IPC/WHMA-A-620 training is our favorite resource. This program allows us to present the information in a structured and comprehensive training program for our staff. 



UNLEASHING THE TITAN PSR-H

Standard Solder Mask Printing in 40 seconds*

*Print speed is based on one 18 x 24 panel side

The latest in direct imaging
technology from



CBTech®

Solder Mask and Dry Film Capable

EXCLUSIVELY AVAILABLE IN NORTH AMERICA FROM



TECHNICA, U.S.A.

1-800-909-8697 • www.technica.com

Forecasting the Wind

Must-read content from IPC's expert economist

By Shawn DuBravac, IPC Chief Economist

"We are navigating by the stars under cloudy skies." —Jerome Powell, chair of the Federal Reserve

In the enchanting world of Shakespeare's plays, prophecies often set the stage for unforeseen twists and turns. Just as Macbeth could not have anticipated the tumultuous journey that lay ahead after encountering the three witches, the financial markets and policy-makers find themselves in a similarly uncertain terrain.

Take prices, which rose sharply in 2022. The Federal Reserve was slow to respond. Although the rate of inflation has declined since reaching its zenith last year, it continues to exceed the Federal Reserve's 2% inflation goal. "Higher for longer" is likely the mantra for interest rates. This prolonged period of higher interest rates will have a ripple effect on various sectors of the economy.



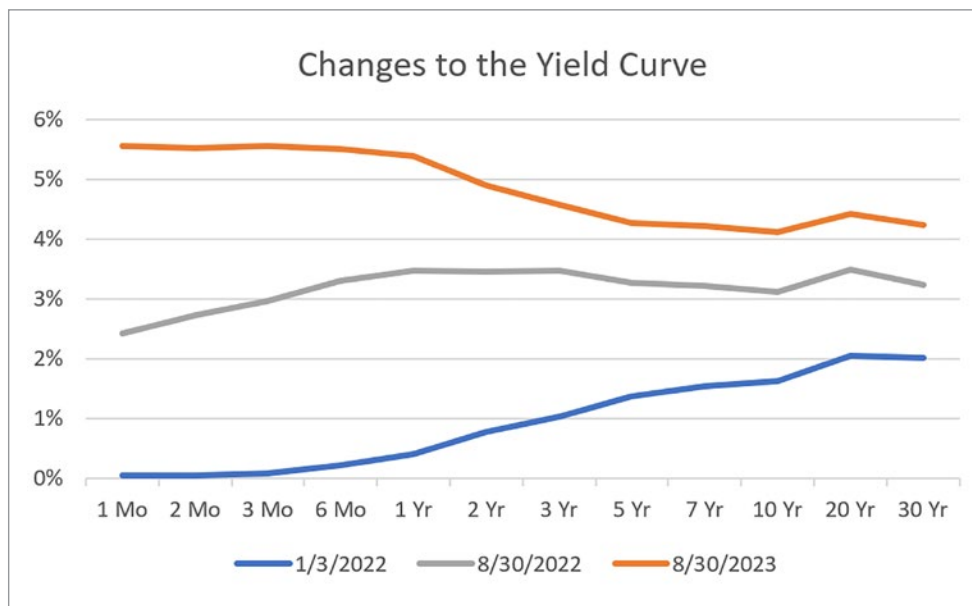
A Historic Battle with Inflation

For the past 18 months, the Federal Reserve has been battling historically high inflation with annual inflation peaking in June 2022 at 8.9%. Core price inflation, which excludes volatile categories like energy and food, peaked a few months later in September 2022 at 6.6%. Both measures remain high. Annual inflation is still running at 3.3% and core prices are 4.7% higher than they were a year ago.

The Federal Reserve was sluggish to respond to rising inflation, thinking that price increases were only temporary. The delay forced the Fed to move abruptly with a series of aggressive rate hikes. The Federal Reserve raised its target rate by 25 basis points in July, its 11th hike in 16 months. The Fed's target federal funds range of 5.25–5.5% is the highest level since January 2001.

The Implications of Higher Rates

Tightening monetary policy has pushed interest rates up across the entire yield curve, and this impacts the economy in several ways. The yield on the 10-year Treasury bond is the highest it has been in 16 years. The rate was over 100 basis points lower just this spring. The elevated interest rates can act as a dampener on both consumer spending and business investment, leading to slower economic



growth. Additionally, the shift in the yield curve can alter the risk-reward dynamics for various financial assets, influencing investor behavior.

Here are three ways higher interest rates are likely to impact the economy in the coming year.

1. Higher interest rates result in higher borrowing costs for businesses.

When interest rates rise, the cost of financing new projects, expanding operations, or even maintaining current levels of business activity become more expensive. This can lead to a reduction in capital expenditures, as companies may delay or scale back plans for growth to avoid taking on costly debt. Smaller businesses, which often rely more heavily on loans for day-to-day operations, may be particularly vulnerable to rate hikes. Ultimately, higher borrowing costs can squeeze profit margins.



How do you pick Shawn out in a crowd?

Typically by his signature bow-tie. In fact, on National Bow Tie Day earlier this year, Shawn posted on social media, “I sorta hate that everything has to have a holiday...until now! If I were to invent one holiday, this might be it. But it would definitely be two days, and everyone would have school off.” Shawn is a purist through and through—no clip-on bow ties in his closet.

Because higher interest rates curtail spending, we would normally expect to see higher rates lead to layoffs as businesses face waning demand. But companies, at least for now, appear reluctant to lay off workers for fear they will not be able to find workers to hire when the economy picks up again. As a result, we are likely to see businesses look for other ways to contain costs in the year ahead. In a high-interest-rate environment, companies may shift their focus from growth and expansion to cost-cutting and efficiency improvements. This might include pushing on suppliers for price concessions.

2. Higher interest rates create a higher hurdle for new projects.

Businesses evaluate the viability of new capital projects using a variety of financial metrics. One of these is net present value (NPV), which is widely used to assess the profitability of different investment opportunities. A positive NPV indicates that the projected earnings (in present dollars) exceed the anticipated costs, also in present dollars. NPV calculates the present value of all future cash flows generated by the investment, both incoming and outgoing, and then subtracts the initial investment cost. The present value of each cash flow is calculated by discounting it back to its value

in present terms, using a discount rate that typically reflects the cost of capital. Higher interest rates increase the discount rate used in NPV calculations, which means new projects will require higher estimated cash flows to achieve positive NPV. As a result, new initiatives will face a more stringent financial threshold to be considered viable.

3. Higher rates have shifted funds from deposit accounts, leaving banks with fewer resources to fund loans.

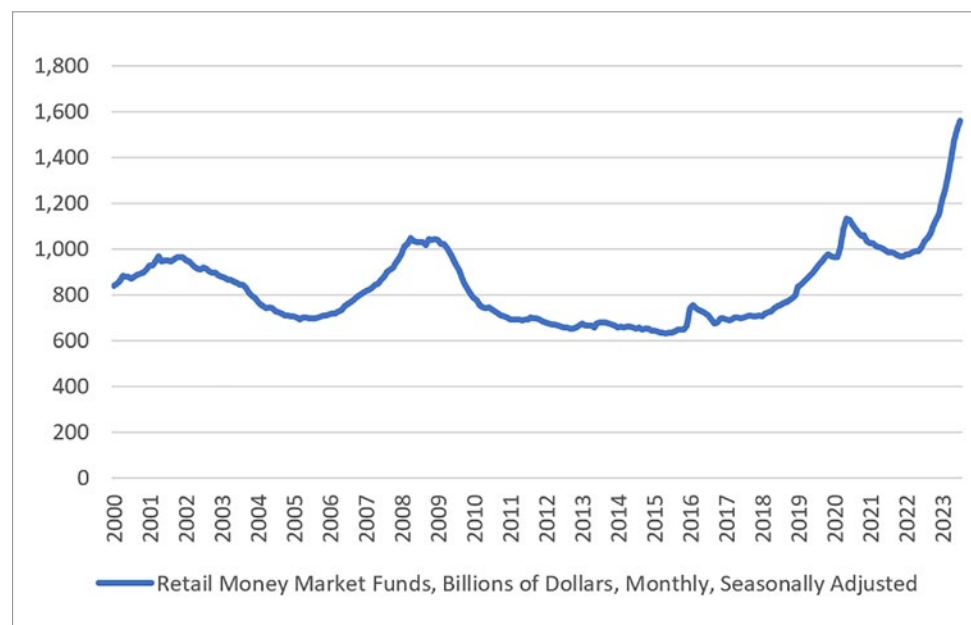
Money market yields are above 5%, the highest since the 1990s. As a result, retail money market deposits have surged by 50% compared to a year ago, indicating a significant shift in where people are choosing to park their money for better returns.

At the same time, deposits at commercial banks have decreased by nearly \$750 billion—a 4.1% decline—over the last year and are expected to continue this downward trend in the coming months. This reduction in bank deposits not only limits the banks' lending capacity but poses a particular challenge for small firms that typically rely on bank loans for their financing needs, only further exacerbating the challenges they face in a high-interest-rate environment.

There are several ways higher interest rates

might impact electronics manufacturers directly. For example, electronics manufacturers often rely on complex global supply chains. Higher interest rates can increase the cost of financing inventory and may lead to higher prices for components, affecting the overall cost structure.

Higher interest rates in the U.S. have driven the value of the dollar higher. But other countries are



In a hurry? We're the fastest in the business!

- ISO 9001:2015 Certified
- AS 9100 Rev D Certified
- MIL-PRF-31032-C Qualified
- MIL-PRF-55110 Qualified
- ITAR Registered



Prototron Circuits
America's Board Source

Serving the industry for over 35 years



prototron.com



(520) 745-8515

catching up, which could put downward pressure on the dollar and increase the cost of imported goods in the United States. For manufacturers that have existing debt, the cost of servicing that debt will increase, putting additional strain on financial resources. With banks having fewer funds to lend due to higher interest rates attracting money to other investment vehicles, electronics manufacturers may find it more challenging to secure loans.

In summary, higher interest rates can pose significant challenges for electronics manufacturers, affecting everything from capital allocation and operational efficiency to consumer demand and global competitiveness.

Don't Expect Rate Cuts Anytime Soon

The Fed has two remaining meetings in 2023. Right now, the Fed Fund futures pricing data suggests the Federal Reserve is done raising rates. There is a 52% probability that the Fed keeps rates steady in November, and about the same probability the federal funds target stays the same in December.

Fed Chair Jerome Powell, for example, took a hawkish tone during his highly anticipated speech in Jackson Hole, Wyoming, back at the end of August. “We will proceed carefully as we decide whether to tighten further or, instead, to hold the policy rate constant and await further data,” he said. “It is the Fed’s job to bring inflation down to our 2% goal, and we will do so. We are prepared to raise rates further if appropriate and intend to hold policy at a restrictive level until we are con-

fident that inflation is moving sustainably down toward our objective.”

Inflation, especially core inflation, remains high, which is the Fed’s preferred gauge of pricing pressure. The Fed paused rate hikes in September, but the Fed will stay vigilant and will be quick to raise rates again if inflation is still strong in November.

The next big question on everyone’s mind is how long the Fed will keep rates high and when a pivot to rate cuts will occur. While the Fed might raise rates again, it does appear to be reaching the top of its interest rate ladder.

Some, like former Treasury Secretary Larry Summers, see a continued risk of inflation, driven in part by wage inflation and a tight labor market. He noted recently that wage and productivity data point to an underlying inflation rate in the range of 3.5%, well above the Fed’s 2% target, and it may not be decelerating. In an interview this past summer, he noted, “If you look at wage inflation, it was faster for the month than for the quarter, faster for the quarter than for the year.” It is likely to be some time before the Fed will feel like it has accomplished its goal of returning inflation to the 2% range.

The current economic landscape, characterized by persistently high inflation, mirrors the unpredictability of Shakespeare’s witches’ prophecies. In this unfolding economic drama, the link between inflation and interest rates emerges as a central theme, and just like Macbeth’s journey to the throne, the path ahead for interest rates is poised to be longer and more convoluted than most anticipate. 🌈





MULTI AWARD-WINNING TECHNOLOGY

Insights for tomorrow. Today.



ArchFX Production Insights Suite

The ArchFX Production Insights Suite uses core Assembly, Quality, and Test Analytics modules to **understand exactly where problems are in the manufacturing processes and how to solve them** - empowering manufacturers to reclaim millions of dollars in quality, performance, and utilization losses.



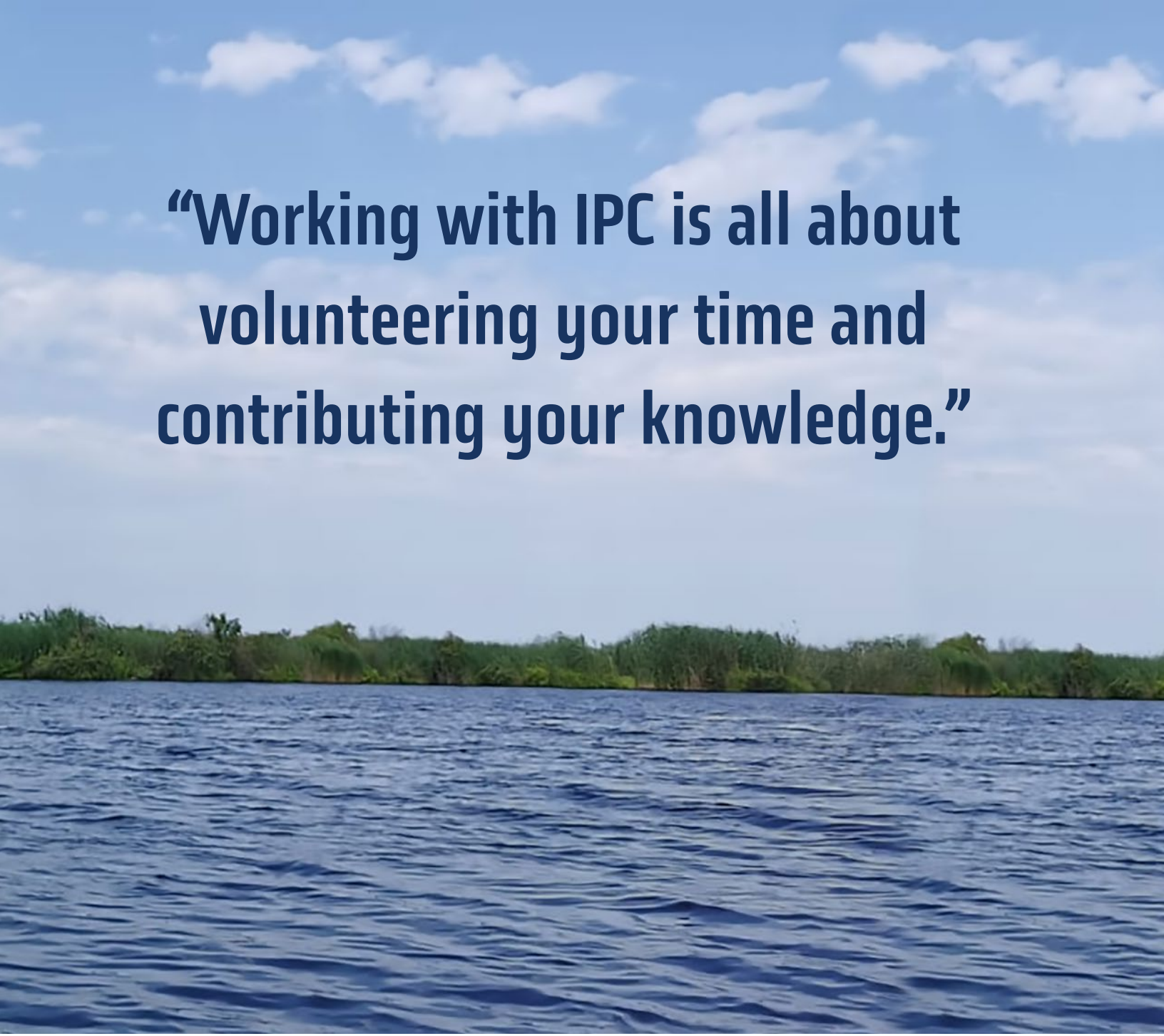
ARCHSYS.IO





Standard Bearer

Meet Tibi Baranyi: He's an expert in engineering, standards, and fishing



**“Working with IPC is all about
volunteering your time and
contributing your knowledge.”**

By Teresa Rowe, Senior Director, IPC Assembly and Standards Technology

IPC committee members come from all over the world and have a variety of educational backgrounds and life experiences. Fortunately, they bring that knowledge and diversity to the development of IPC standards. In this interview, Tiberiu (Tibi) Baranyi, technology group manager at Flextronics Romania in Timisoara, discusses Flex, fishing, and figuring out the best way to participate in IPC standards development.

What is a typical day like for you at Flextronics Romania?

Tibi Barayni: I lead the technology group, and the best thing is that there is something new every day. I am part of a team that works on projects from start to finish, mainly with manufacturing items but also projects that are under development. I never have a boring day. There is a diversity of industry segments at Flex, ranging from industrial to medical and automotive. Given the spread and diversity of the products, there is always a new challenge and a need for solutions; that is the best part of my job.

Do you have a favorite part?

I have two favorites: one is automotive because of the complexity of the work requirements and the other is telecom, which is all about the complexity of the product and, of course, the use of fiber optics.



- **Timisoara, Romania was the first city in Europe to introduce electric street lights**
- **The actor Johnny Weissmuller (who played Tarzan) was from Timisoara**



Timisoara, Romania, is your home. What makes the city special to you?

There are several reasons. This is the town that adopted me 20-something years ago. I grew up nearby, came here to attend university, and never left. I went to one of the best schools in Romania, the Politechnica University of Timisoara. This city was and still is a hub for education.

Timisoara is very mixed in ethnicities and cultures and is constantly growing and expanding. It has about 500,000 people living in the metropolitan area but had just 300,000 when I came here. It is the third largest city in Romania, and it is where the revolution started in 1989 that ended the communist regime. There are many global companies here, and the population is a mix of Romanians, Germans, Hungarians, Serbians, Bulgarians, Jewish, etc. It is well-connected to the rest of Europe, and is a short flight to Munich, Germany, with connections to London, Barcelona, and Milan.

Let's look at your IPC activities. You joined your first task group in February 2017. What drew you to standards development?

I started with the IPC-J-STD-001/IPC-A-610 Automotive Addendum Subcommittee. There are so many interpretations of the standard and people in the industry tend to know what IPC puts in the standard, but they have their own perspective on how the standard should be used.

I was mainly working with the automotive segment at Flex and it was handy for me, but I just wanted to get a deeper understanding of how to use the documents. It worked well to put together an addendum that made sense for industry use, and meets the needs of the automotive industry.

Apparently, I was doing a good job, because I was encouraged to move into the leadership position of the A-610 main group. It was very



ventec
INTERNATIONAL GROUP



VT-5A2 - Superior thermal performance where size and simplicity matter.

Thermally Conductive Laminate & Prepreg

With eight times the thermal conductivity of standard FR4, VT-5A2 handles the heat from high-power EPS and motor drives, displays, power circuitry and multi-layer constructions.

Key Features:

Thermal Conductivity: 2.2 W/mK

Tg: 190°C / MOT: 150°C

T260 >60 minutes

Get in touch

Americas / Pesh Patel

+1 714 683 7825

pesh.patel@ventec-usa.com

EMEA / Peter Coakley

+44 7976 946 138

peter.coakley@ventec-europe.com

Germany / DACH / Jürgen Knörchen

+49 173 421 4625

juergen.knoerchen@ventec-europe.com

Asia / Shawn Peh

+65 96 279 906

shawn@ventec.com.cn

ventec laminates.com

interesting to work with committee members and get them to contribute. Sometimes I only had a few days to go through up to 200 comments, and I had to steer a meeting where it was not unusual to have 130 in attendance and everyone wanted to speak—but not monopolize the discussion to debate one comment for three or four hours. I was trying to negotiate with those large communities in getting the standard published. It was challenging to get a consensus in a very limited time at face-to-face meetings.

Share a fun story about a committee meeting. Did anyone frighten you?

For 10 years I've been doing karate, a full contact sport, so it's difficult for anyone to frighten me. On the other hand, there are podcasts, books, and white papers that are done by these "monsters," these titans of the industry like Dave Hillman, Doug Pauls, Bhanu Sood, Bob Cooke, etc. There is a certain restraint and respect when you engage with them because they've been in the industry since I was in kindergarten. They've forgotten more about electronics than I'll ever learn. So, it's not frightening, but at the beginning I was trying to understand how they are dealing with things. You've read their papers and now you are face to face; it was very exciting and interesting because I was talking about the same topics with these guys.

A funny story happened at IPC APEX EXPO in 2018 when I was listening to a discussion about how you would define a kink. They were talking about it, and it was taking forever. Finally, after 45 minutes of debate, Tino Gonzalez gave the definition. Jon Vermillion looked up and said, "Nobody kinks like Tino." It was just hilarious because after all those debates and discussion, Tino dropped a definition, just like that.



IPC APEX EXPO 2020 committee awards luncheon.

What is your biggest success story or achievement?

The first automotive addendum to IPC-A-610 is at the top of my list. That was the first standard where I actively contributed with the material, and it was incorporated, so it was very memorable because it was the first one I had worked on. I'm very proud of the revisions for IPC-610, J-STD-001 that followed, and how Revision H looks today. Even though it will change, I am looking forward to an improved version.

We are very close to ballot on that revision. How do you feel about sending the standard out there into the world?

It's very interesting that after these come out, I always get phone calls, saying, "Why did you change this or that?" I'll say, "First, I didn't change it. It's the industry's consensus. Remember, just because my name is on the document amongst the leaders does not mean I can make the decisions on my own; it is not my handiwork." It's what the industry needs for today, and that's a rewarding experience.

Your guides to success.

Want to up your game in about 30 minutes? Written by industry experts, all our books contain knowledge that you can apply immediately to make you (and your company) more successful.

“I-007ebooks are like water in the desert
...it's up to you to drink it in order to survive!”

Stephen V. Chavez
Senior Product Marketing Manager
Siemens



BOOKMARK OUR LIBRARY



It is rewarding, isn't it?

Yes, it is. Most who are not directly involved in development don't realize what we as leaders and the community are dealing with. You can receive several hundred comments on a standard; you need to go through them, and

some of them are very big changes. Rev H, for example, was taking out the target condition from IPC-A-610, but it was driven by the need of the industry. It's a good feeling to know that all the work and hours you have invested are reflected in the newest version.

A FISH•Y STORY

I understand that you are an avid fisherman. Tell us more about that.

I take two trips to the same place every year—the Danube Delta in Romania. It is still largely untouched, with hundreds of thousands of hectares; it changes from month to month and week to week. There are hundreds of species of birds, like pelicans, and you are very close to nature. In most of the

spots I go to, I have no cellphone or internet connection, so it's a special opportunity to disengage. You are out on the water, in the middle of nature and, except for a few fishing boats coming and going, you just enjoy the quietness. If you catch a fish, it's a bonus. I get to kick back, chill, and enjoy being disconnected from all these megabytes and gigabytes of info buzzing around me every day and the constant ringing of cellphones in the office.

There are days when you catch many fish—perch, pike, catfish—and days when you don't find them. You go out there and it's wild and largely untouched, so it can be tough. I pack boots and a raincoat; if it rains, it rains. If there's no wind and the hot sun is really cooking you, you live with it. You make the best of it and just enjoy the disconnect from the speed of life around you. That is the most enjoyable thing.

That sounds like attending my favorite rock concert—it's how I disconnect.

I love that, too, but that is only for a few hours. In the Delta, it's for days, and you can do bird watching, take boat tours if you are not into fishing, and just enjoy nature for itself. Every morning, we motor out about a half-hour to our fishing spot. On the way, we watch birds on and above the waters, see wild horses on the shores of the canals, and enjoy the views. It's just lovely. 🌈



You are the winner of several Golden Gnome Awards and it's not easy to get a Gnome. What is your secret to success?

I wouldn't say I have done anything extraordinary. I just delivered what I signed up for. Working with IPC is all about volunteering your time and contributing your knowledge to improve the standard. I've worked on so many standards with a lot of material and contribution. For example, because we are building products with fiber optics, there was a lot of material and information that I've passed on for the newest revision of IPC-A-640. It's all about contributing and getting the information out there, answering questions, and clarifying materials that were submitted. I am just doing what I signed up for.

So, what's next for you regarding standards development?

Honestly, I don't plan in terms of what is next, it is just about what opportunities arise. Chris Jorgensen reached out to me about working with IPC-9716, *Requirements for Automated Optical Inspection (AOI) Process Control for Printed Board Assemblies*. It sounded very interesting to have a standard on how to use that equipment. IPC-A-610 is about visual acceptance and a good guide. It will be a challenge on how to bridge the starting point of visual acceptance, hold over whatever is possible in the automated and inspection environment, and to lay down based on limitations of the technology and the equipment. Not everything in IPC-A-610 is inspectable by AOI, as the industry is finding out day by day. A very aggressive timeline was set for this stan-



dard. We have an A-Team meeting weekly for checking the progress. There are busy times ahead.

What advice do you have for getting involved in IPC activities?

If you work in the electronics industry, no matter what corner of the world, sooner or later you will receive a requirement that says "you shall comply with" a specific IPC standard. IPC is driving the industry to the standards, but that is not all IPC does. IPC, for example, has training programs, certification programs, and training for project program managers. You can learn by working with IPC and with these committees and you can contribute by bringing your knowledge and experience to the table. From my perspective, in the world of electronics it is important to understand where your requirements are coming from, how they are developed, and how you can make them better than they are today.

Thank you, Tibi. 🍷



Tibi at a committee meeting in Chicago a few years ago.



30 Years of Collaboration



HDP's partnership with IPC makes both organizations stronger

By Madan Jagernauth, Marketing Director, HDP

The High Density Packaging User Group International Inc. (HDP) and IPC have partnered successfully for many years. The groups signed an MoU in 2020 to strengthen this relationship, increase technical collaboration between the groups, and provide a mutual path toward emerging and disruptive high-density interconnect (HDI) technologies.

What is HDP?

HDP, founded in 1993, is a nonprofit trade organization that offers memberships to companies involved in the electronics manufacturing industry. HDP's mission is to drive innovations in the electronics industry, reducing cost and time to market through active collaborations that solve critical and emerging problems. HDP is focused on the characterization and reliability of electronic assemblies and sub-assemblies, focusing on new technologies.

What is our area of focus?

HDP has an established technical direction with five specific focus areas to enhance understanding of emerging technologies that

may affect our members in the future and encourage associated project ideas. HDP's technical direction effort exchanges information with IPC.

HDP's technical direction areas of focus are:

- **New high-speed materials.** Areas of focus include different testing for multiple Tg points, heat transfer characteristics for next-generation networks, high speed electromagnetic performance, high frequency applications, and impedance control with new PCB construction.
- **Next generation solder alloys.** Areas of focus include low temperature solders, new high temperature solders, electromigration under high amperage conditions, and continued awareness of possible environmental restrictions.
- **Higher copper density technologies.** Areas of focus include the evolution of IC node and component packaging sizes and pin count, new PCB architectures for HDI PCB construction, signal integrity, performance, and power distribution.

- **New methods of reliability assessment.**

Areas of focus include electrochemical processes for conductive anodic filament (CAF), modeling insertion loss in circuits, modeling laser via hole (LVH) reliability, evaluating the effects of plating thickness on cycles to failure, and faster thermal testing.

- **Next generation flex materials.** Areas of focus include reinforced flex laminate for ultra-low Dk (ULDk) development, compliant conductive technologies, degradable materials, and very-high-speed electronic luminescence (EL) materials.

How does it work?

HDP's mission is accomplished by running projects of interest to members. Membership includes system integrators, PCB assemblers and fabricators, material suppliers, and test houses—representation across the electronics manufacturing supply chain. HDP was founded on the premise that by working together and sharing the risks and rewards of implementing new technology, all members and the industry would accomplish much more at a lower cost than going it alone. The activities are run in a domain where members can gain much more by joint activities rather than duplicating work in each member company. Thirty years of successful operation have proven that premise to be true.

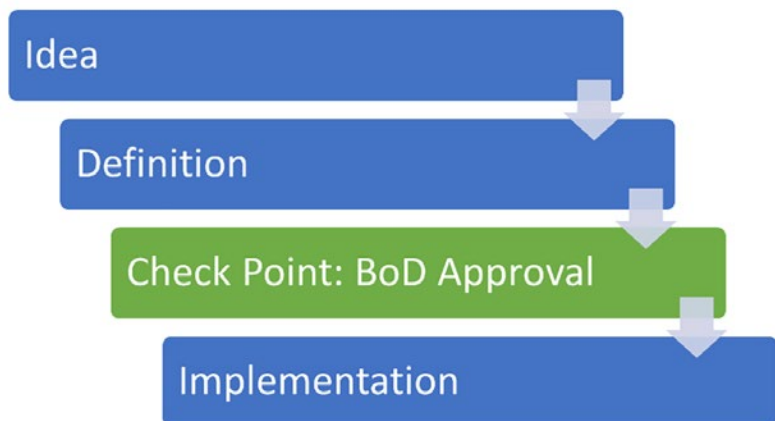


Figure 1: The project gating process.

What is our process?

HDP uses a mature, well-defined gating process to run projects. HDP is a member-driven organization; any member may propose a new project at any time. The Idea and Definition phases ensure that a proposed project has suitable member support, the scope is well defined, required resources are identified and committed, and an achievable project plan is prepared. Approval by the Board of Directors is required before the Implementation phase begins, ensuring that the value of the project aligns with HDP's mission, that the project plan is complete, and that the project makes efficient use of resources.

HDP projects are designed experiments to address challenges members face. As the need arises, HDP projects are structured to generate data that meets IPC's gauge R&R requirements as part of meeting the prerequisites of IPC-TM-650 MDP (IPC Test Method Development Packet). There are currently two such projects underway.

What are our successes?

HDP contributes significantly to our members and the industry at large. HDP runs 20 to 30 projects concurrently, completing about seven per year with a typical implementation cycle of 18 months. Sixty-six projects on various subjects were completed in the last 10 years, as shown in the chart (Figure 2).

Two examples show the long-term sustained focus that HDP brings to evaluating new and evolving technologies:

- **Pb-free solders.** HDP has been at the forefront of evaluating Pb-free solder systems for over 20 years. While early Pb-free work was done in the 1990s, the development of mainstream Pb-free materials and processes began around 2000. There was a need to converge to a shared set of requirements to enable an economically viable ecosystem, faster time-to-market,

PROVING

AMERICAN MANUFACTURING INGENUITY AND STRENGTH

Michael

Ensures chemical wet processes are in control with laboratory analysis.

Natasha

Exposes ink-coated panels with patterned UV light to define component openings.

Chris

Prepares inner core panels to promote strong adhesion during multilayer lamination.

Amy

Inspects panels for conformity before ENIG and after final surface finish is applied.

Aaron

Builds and laminates complex multilayer circuit boards for advanced applications.

Leah

Assembles drill bit cassettes for through-hole fabrication for layer-to-layer interconnection.



TAKING NEW ORDERS NOW! 906.337.1305

 **Calumet**
ELECTRONICS CORPORATION

**DOMESTIC
MANUFACTURING
READY**


**100%
MADE IN
AMERICA**

**ONSHORE
TRUSTED**
FOR DOD AND
COMMERCIAL
OEM ELECTRONICS
MANUFACTURING

**AMERICA'S ONLY
HUBZONE
PCB MANUFACTURER**

calumetelectronics.com

and adoption of Pb-free products in manufacturing. HDP did several seminal Pb-free solder projects at that time, including with the alloy that became known as SAC305, resulting in a set of guidelines and a process optimization study being published. HDP has performed 15 Pb-free solder projects over the last 20 years, including three in progress. HDP updates IPC on its Pb-free programs when requested, most recently to IPC's Pb-Free Electronics Risk Management (PERM) Council in October 2022.

- **PCB materials.** No laminate materials could be used reliably with SAC305 and other Pb-free solders when they were first introduced. The higher processing temperatures of these solders led to a range of potential defects in PCBs. HDP launched the “Pb-Free Bare Board Materials” project, with the initial report being issued in September 2008, and covering 23 materials. The evaluation of PWB materials is now in its seventh phase, with significant improvements being driven by HDP members in this phased project over the years. So far, 85 materials have been evaluated over six phases.

While project reports and associated data are retained within HDP for use by members, papers based on the results of HDP projects are presented regularly at IPC APEX EXPO and other industry events. Four papers were presented at IPC APEX EXPO in the last three years, including one that received an honorable mention.

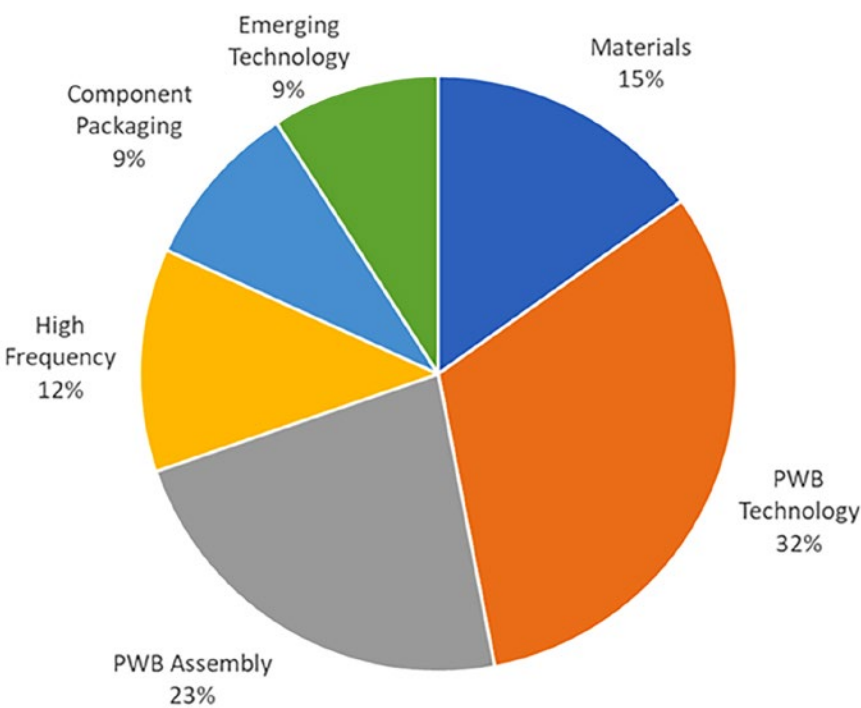


Figure 2: Distribution of projects between 2014 and 2023.

What does the future look like?

Looking forward, HDP and IPC will continue coordinating on subjects of common interest to serve the needs of our members and the industry. The PCB industry faces many emerging challenges, especially for next-generation optical and wireless networks operating at greater than 100 GHz, driving the need for high-speed, high-frequency materials and PCB structures for higher copper densities. Evaluating the performance and reliability of new and evolved materials and processes is central to the evolution of PCB technology to meet these challenges. As HDP enters its fourth decade, it is well positioned to address the industry's current and emerging challenges. HDP will continue its efforts to address the industry's critical challenges. 🌈



Madan Jagernauth,
Marketing Director,
HDP

A Distinct Evolution from DFM



Look Inside

**“In an industry racing against time,
MDD is the key to staying ahead.”**

Anmar Abusham

DFM Integration Engineer (AR EE Team)
Meta Reality Labs

A Passion for Helping Others

Brandy Tharp believes you can't train others unless you know how to do it yourself

By Michelle Te, IPC Community Managing Editor

Eleven-year-old girls hold many interests, from sports and playing games, to learning how to make more complex decisions and finding commonalities with friends and loved ones.

While Brandy Tharp may have been doing all those things at that age, she was also

learning a new skill that most of her friends probably weren't—how to solder. It lit a fire in this young girl who enjoyed math, helping others, and finding ways to harness her energy.

“My mom taught me how to solder on rechargeable battery units that she built,”



MIDDLE SCHOOL PALS
CARY AND BRANDY



POSING WITH
DAUGHTER MADISON



CRATER LAKE TRIP
WITH HUSBAND
DENNIS



APCT
Passion | Commitment | Trust



**ADVANCED
CIRCUITS**
A Division of APCT

One Company | One Team

THE APCT DIFFERENTIATORS

TECHNOLOGY CAPABILITY

- **Rigid Through-Hole**
~ Up to 40+ Layers
- **HDI; Blind/Buried/Stacked Vias**
~ Up to 8x Sequential Lamination Cycles
- **Flex Applications**
~ Up to 6 Layers
- **Rigid Flex Applications**
~ Book Binder Capability

LEAD TIME CAPABILITY

- **Corporate Cycle Times**
~ Consistently faster than industry standards
- **Premium Cycle Times**
~ Quick-Turn capabilities are "World-Class"

APCT: WHERE OUR PEOPLE ARE THE DIFFERENCE



CAPABILITY | CAPACITY | EXPERTISE

Give Us The Opportunity To Earn Your Trust And Gain Your Loyalty

APCT Leading the Printed Circuit Board Industry

APCT.com | 4PCB.com



Brandy (second from left) at a Carlisle Summer Employee Appreciation Event a few years back.

says Brandy, director of education at IPC. “It was something I grew up with. Everybody kind of fell into some facet of the field.”

When she started college, Brandy also worked for a telecommunications equipment manufacturer doing hand insertion manual assembly, then learning how to run a wave solder machine because she could work a weekend shift.

“But I’m not the kind of person who can sit still,” she says. “I like to know a little bit about everything.” Because the company was short on operators, Brandy learned how to program and run more lines and equipment, working her way through each department. That led to

a position in the training department and launched a career in training and certification.

Instead of becoming the high school math teacher she had originally planned, Brandy has spent her career either training others or developing training programs in the electronics industry. For one job, she became a master IPC trainer and did quite a bit of traveling. “I loved that job,” she says. “I loved

training and seeing all the different facilities. We would go all over the country, meet new people, and learn different processes, whether it was cable wire harness manufacturing, PCB fab, or military classes.”

Later, she became a lead trainer for Carlisle Interconnect Technologies, a certification company near Seattle, Washington, which became a private IPC master training center so that it could maintain its own CITs. “We were really invested in our people and we didn’t necessarily like going out of house,” Brandy says. “We wanted our trainers not only to be familiar with IPC specifications and have those certifications, but we wanted

Brandy's thoughts on

Training

- “Training is probably so near and dear to my heart because it really makes a huge impact on somebody’s life.”
- “The more skills you can attain leads to a higher skill level job, and that means you can grow throughout your career and become more successful.”
- “While certification is fantastic, it’s not intended to teach you a skill. The training materials will allow you to develop a core base of knowledge and help you grow in your career path. You don’t have to be an operator forever if you don’t want to be.”



them to work more closely with our employee base.”

Carlisle often hired refugees looking for their first job in the United States. With the training team’s help, they built custom materials to help students who were learning English as a second language that could help them integrate into the facility and their new surroundings.

That training involved a variety of products, including aerospace, medical, RF, and NPI builds that required specific skills from operators. “For instance, they would solder 38- to 40-gauge wire—very, very small stuff—and they would have to use different equipment and tools than, say, board areas building harnesses for airplanes.”

Remembering that Brandy isn’t one to sit still, training wasn’t always enough. Her philosophy is that to really train others, you must have done the job yourself.

“I went into training pretty naturally,” she says, “but honestly, I’m a big believer that whenever you tell someone about a task they need to do, you should have some understanding of how to do it yourself. It may seem simple to assign someone a task, but if you’re



Brandy with Dawn Cabales and Tawsha Arnold at IPC APEX EXPO.

not aware of everything that’s involved, you won’t know how to properly set them up to succeed. Do they have the right tools? Did I give them the right type of knowledge to complete this? How often do I need to check in?”

Not only has she worked with people from different backgrounds and life experiences, she has learned how to work with different personalities and approaches to learning. “You see how they interact with others, and you learn what works,” she says.

As a member of industry, Brandy worked closely with IPC standards committees. In her current role at IPC, she’s working with IPC’s

Brandy’s thoughts on *Passion*

“When I was growing up, I developed a passion for helping others. We worked in a community garden. We fished and then shared the extra with older people in the neighborhood. I grew up in a very low-income area and people didn’t have a lot, but if you had more than you needed, you shared.”

“It was instilled in me from my grandfather that you help other people. Just seeing what I was able to do from sitting on that hand-soldering line to learning how to run the machines, solder, rework and repair, then going into the training department and continuing to grow until I was leading a department with 110 people—that has improved my life so much. It really lets me know that there is a way to do this, and I’m very passionate about giving people that opportunity.”





Brandy with Kelly Allen at IPC APEX EXPO 2023.

instructional designers to take course outlines and flesh them out with narration, building them into asynchronous courses that can be used as training materials.

“Anybody can read a book to learn something, but you want to relate to your product and understand what you’re working with,” she says. “Can you read the book and apply

the criteria? That’s where we saw a gap, and we think we’re filling that gap through custom training: ‘Please show me what I need to know so I understand it enough to use the standard appropriately.’ The whole point of certification is to prove that you can comprehend and navigate a standard.”

Learning a technical language can be much like learning a second spoken language, and Brandy is fortunate for those experiences in her past employment roles that now help improve her workforce development training efforts. “Even before people start a job, we can enroll them in hands-on, company-specific training courses that will help them be more productive on day one, rather than taking four to six weeks to ramp up,” she says.

It also helps new employees know exactly what they’re getting into when they start a job in electronics manufacturing. A training course may start with 20 people and by the end of the week, only four or five remain because most can’t pass the minimum required train-

Brandy’s thoughts on

Her Own Career Path

“I originally went to Tennessee Wesleyan College, a small Methodist school, and I was studying secondary education and mathematics, but I learned that it was not the career for me. From there, I transitioned into business management. It’s in no way, shape, or form related to what I’ve ended up doing, but that’s the interesting thing, because I’ve learned on the job and through building my skills and transforming in different roles.”



ing that Electronics Assembly for Operators (EAO) would have helped them understand better.

“If we hired through a temp agency without doing any training first, it could eat up six to eight weeks of time, and the employee would still struggle,” she says. “They would be unhappy, and their efficiencies are down. Using a tool like this gives them a leg up.”

IPC has programs with these types of training materials, walking a new employee through everything they would see in a facility, from a PCB to a crimper or thermal stripper, how to use tools, what a good or bad connection looks like, and the soldering process. (See all the training courses at [IPC EDGE](#).)

“It’s all that core knowledge they can walk in with,” Brandy says. “For some larger companies, they have the money and training programs already, but they have to spend time maintaining those programs, whereas our programs allow everyone an opportunity to come in on equal footing and build specific skills.” 



Fun Fact

Brandy joined her high school’s FIRST Robotics team and they won first place in a national competition. “It was a fantastic experience,” she says. “I love seeing new things develop, how things work and how they’re put together. It’s always been really, really interesting to me.”



Brandy’s thoughts on

Technical Careers

“The traditional pathway used to be the norm for everybody: You grow up, go to high school, go to college, etc. We’ve lost our ability to show people the great things they can do in technical and vocational careers. It’s not broadcast as widely as it should be. We’re running out of those workers.”

The New Norm

New Courses Make IPC Workforce Training Subscriptions a Powerful Training Tool

By Corey Lynn, Marketing Director, IPC Education

As the electronics industry continues its rapid evolution, a workforce equipped with the latest knowledge and best practices becomes a critical factor for success. IPC's Education team has made 2023 a hallmark year for introducing comprehensive training courses to ensure electronics manufacturing professionals remain at the cutting edge.

By building on earlier successes, such as the [Electronics Assembly for Operators](#) and [Electronics Assembly for Engineers](#), our updated course catalog boasts newly developed programs on inspection and manufacturing engineering.

Now, we also offer an annual workforce training subscription, which simplifies the process for investing in consistent employee training. Embrace the continuous learning that can become your competitive advantage.

Bolstering the Training Arsenal

This year, IPC has unveiled a suite of new, self-paced courses, including:

- **Fundamentals of PCB Fabrication and Assembly**, a comprehensive introduction to printed circuit board (PCB) and printed wiring assembly (PWA) fabrication.



Trusted
Content



Proven
Methods



24/7
Access



Live
Support



Easy
Access



Flexible
Implementation

- **Inspection of Electronic Assemblies: Introduction**, using outlines of the essential tools, materials, and processes required to perform incoming inspection.
- **Manufacturing Engineering for Electronics Assembly Series**, which further breaks down into topics like stencil printing, surface mount technology, and through-hole assembly.
- **Self-Paced Troubleshooting and Defect Analysis of PCBs**, a unique collaboration with IPC Hall of Famer Mike Carano. This course offers around-the-clock accessibility, ensuring flexibility for learners across different time zones.
- **Soldering for Electronics Assembly: Introduction**, an innovative hybrid model replaces a previous course necessitating a trainer, allowing learners to progress at their own pace and engage with a hands-on exercises section.

What Lies Ahead

Rest assured, this is just the start. IPC remains committed to staying attuned to industry needs, regularly liaising with IPC members and industry stakeholders to pinpoint training requirements and design courses in collaboration with industry experts.

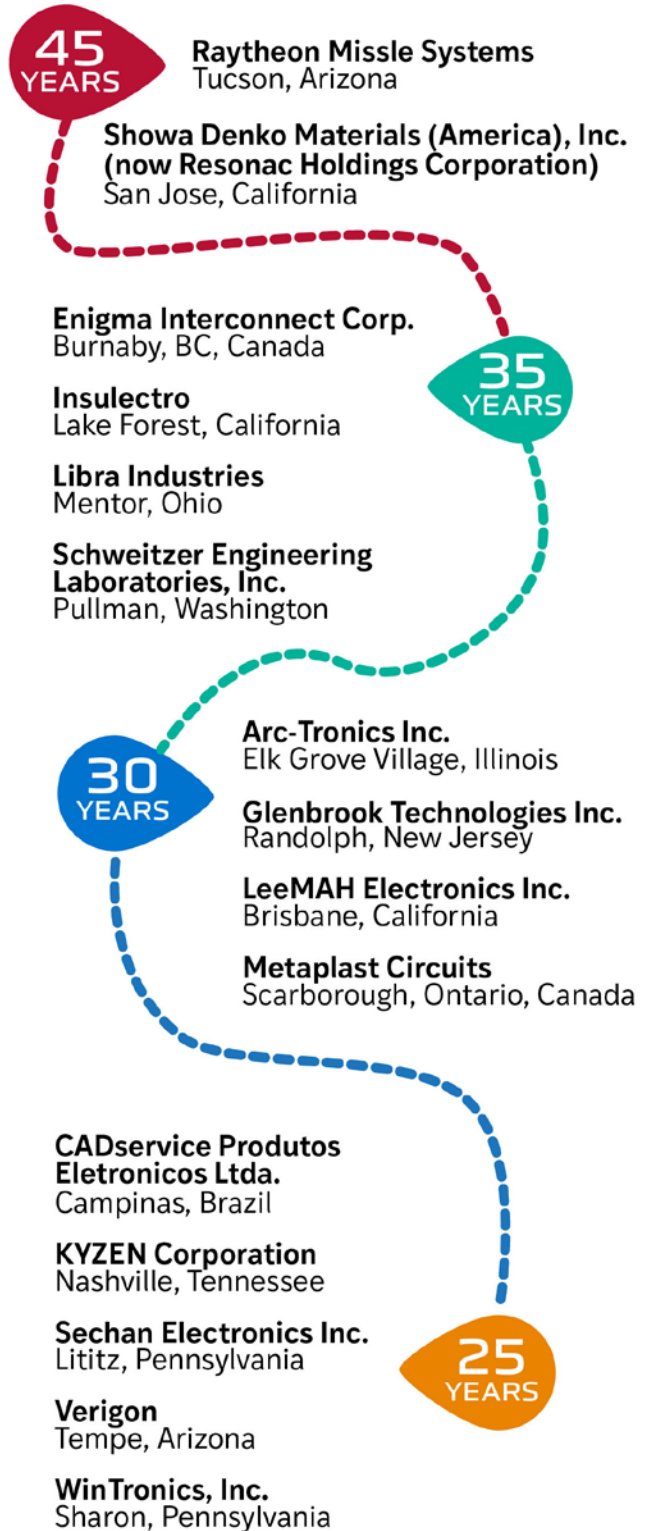
Adapting to the fast-paced world of electronics has never been easier, thanks to IPC's continued commitment to world-class workforce training.

If you're interested in learning more about how IPC's Workforce Subscription can streamline the training implementation process for your organization, contact sales@ipc.org. 

Member Milestones

Congratulations to members who celebrated milestone (25-year+) anniversaries in the third quarter. Thank you for your continued support and contributions!

IPC Anniversaries in Q3 2023



IPC Standards and Electronics Sustainability

There's more to standards than you might think

By Kelly Scanlon,
IPC Lead Sustainability Strategist

When we look at existing IPC standards, we see that most were created and intended to communicate and clarify expectations for superior quality, reliability, and consistency in electronics manufacturing. At first glance, their connection to sustainability is not obvious.

Yet as we continue to evaluate existing IPC standards against sustainability reporting best practices or requirements for companies in the electronics value chain, there are more than a dozen IPC standards that address important and relevant sustainability topics.

For example, training and education—a relevant and important industry sustainability topic covered by GRI standards—is represented in popular IPC standards, including IPC-A-610, *Acceptability of Electronic Assemblies*; IPC J-STD-001, *Requirements for Soldered Electrical and Electronic Assemblies*; and IPC-7711/21, *Rework, Modification and Repair of Electronic Assem-*



blies; and the certification programs built around these standards.

The GRI (Global Reporting Initiative) standards focus on the environmental, social, and economic impacts of a company in relation to sustainable development. They represent global best practices for reporting publicly. GRI is just one of four frameworks sustainability disclosures identified as a driver causing companies in the industry to disclose data and information on various sustainability topics and targets. A recent exploratory materiality study of dozens of industry sustainability reports revealed that GRI, along with SASB, TCFD, and CDP, was strongly preferred and most used of the four.

I provided an overview of a recent exploratory materiality study that evaluated dozens of industry sustainability reports to determine the drivers for disclosing data on sustainability targets.

Companies reporting against the GRI 404 Training and Education requirements, for example, must document their approach to training and upgrading employee skills, including training programs inside or outside the company. The IPC standards that I've mentioned require personnel proficiency at tasks, and associated IPC training programs ensure industry-traceable certification. Companies should consider these IPC standards and certification activities when they are compiling data and information for their sustainability reports in the topic area of training and education.

A new IPC standard, IPC-1402, *Standard for Green Cleaners Used in Electronics Manu-*

facturing, applies to direct-use chemicals to clean electronic products or components, as well as to clean manufacturing machines or tooling during operation and maintenance. It establishes practical criteria for cleaning products used in electronics manufacturing workplaces that can be efficiently applied by decision-makers and purchasing parties to protect workers. IPC-1402 is used as a baseline to determine qualifications for programs aimed at promoting safer chemical alternatives.

Companies reporting against the GRI 403 OHS requirements must demonstrate commitment to worker health and safety—the prevention of harm and promotion of health through processes that assess risks and apply methods to eliminate or minimize those risks.

Given the expertise and financial resources necessary to complete hazard analyses and more comprehensive risk assessments necessary to meet this GRI requirement, it is useful to have an industry standard that enables efficient risk evaluation. Companies should consider this IPC standard when looking to move toward safer chemical cleaning products and demonstrate their commitment to prevention.

There are many other relevant sustainability topics, including product life cycle management, product security, and procurement practices, that can be addressed using existing IPC standards. We continue to evaluate them to determine their utility in documenting sustainable practices for your company. Please contact me if you have questions about IPC standards and their applicability to sustainability requirements. 🌈



Dr. Kelly Scanlon is enjoying her role as the lead sustainability strategist at IPC. In a recent podcast, Kelly said, “My role at IPC is cross-functional. We do education, workforce training, advocacy, standards, events, and industry intelligence. I get to work across those functions to make sure we are doing what we can to integrate sustainability into those offerings and enable the industry’s sustainability activities.”

Kelly works to determine what IPC can do to make relevant sustainability topics more tangible and realistic for the industry and she’s able to do that because she cares a lot about our industry and a lot about sustainability.

Movers and Shakers

IPC member Brian Chislea is making a difference for FIRST Robotics

By Brian J. Chislea, Scientist and Application Engineer, The Dow Chemical Company



My passion for STEM, mentoring, and our electronics industry is both professional and personal. I'm a scientist and application engineer at Dow Chemical, as well as an IPC standards committee leader and a mentor for burgeoning engineers. Most importantly, my personal life revolves around helping kids become involved in STEM activities, so when I saw an opportunity to be a mentor for my son's middle school robotics program, I couldn't pass it up.

Within IPC, my focus is on the protective materials for PCBA. This leverages my electrical engineering (EE) background in some aspects of dielectric strength and electrochemical migration. That bridge between material science and electrical performance gives me an opportunity to learn from a broad range of industry experts. I'm now able to pay that knowledge forward through mentoring opportunities with IPC's Emerging Engineering program, the STEM events at IPC APEX EXPO, and FIRST Robotics.

My children attend the Freeland Community School District in Freeland, Michigan.



The Freeland Fabricators is the FIRST Robotics program there. In this school district, the FIRST teams are under a single umbrella of mentorship. I am one of more than two dozen mentors alongside a very dedicated group of coaches who work with students of all ages. There are nearly 90 students participating in the FIRST Lego League (FLL) for elementary school, FIRST Tech Challenge (FTC) for middle school, and the FIRST Robotics Challenge (FRC) for high school.

In 2019, when my son was a sixth grader, he joined one of the school's FTC robotics teams. This sparked for him an interest in programming, science, and engineering. Unfortunately, the 2020-21 season was lost due to the pandemic, however, he continued his advancement by taking several online programming classes.

The successes of this season created an inconceivable momentum within the program.

The following year, we were back in person and the program's growth exploded among students and mentors. My son joined the FTC team as an eighth grader and my daughter, a junior, helped with mentoring and volunteering. The successes of this season created an inconceivable momentum within the program.

The programs continued to grow in the last school year. Both my son and daughter joined the FRC high school team, and all three of us mentored the five FLL and two FTC teams. The Fabricators'

2022-23 season was quite successful for all teams. This was the first season veteran students mentored the younger teams and that created an explosion of interest; we had four rookie teams.

FIRST Robotics closely parallels how industry projects are run: Students need to manage fundraising, budget, succession planning, and community engagement. It is critical that veteran students contribute to mentoring novice students in their roles. FTC was divided into rookie and veteran teams, and both teams were invited to state competitions with the veteran team, earning an invite to the world competition. The high school FRC team earned recognition at every competition, including an Engineering Inspiration Award at the world competition.

I have always thought of mentoring as a way for an expert to teach others. I have come to realize that mentoring is more of a two-way interaction. As a proud parent, I watched both my children grow by working with the younger students. As the teams grew, we saw more diversity among the team members, and Fabricators has become a leader in embracing neurodiversity. For the 2022-23 season, the team initiated a program called Autism Understanding Through Outreach (AUTO).

AUTO is a multi-generational project led by the students. My daughter and a few other students led this project through its initial

I'm a Man With Many Nicknames



In the corporate world, it is common to hear of someone wearing many “hats.”

This usually refers to a person whose job enrichment has them doing a broad range of jobs. While I fit that, I would much prefer considering myself as having many nicknames

rather than hats, because those tend to be given out by others; nicknames are earned by being energetic, passionate, and contributing. Most of all, it's giving your whole self to a team.

Many nicknames are straightforward, modified versions or abbreviations of my name, such as “B” and “Bri.” In some of the IPC committees, I get referred to as “the Dow Guy” or “the Silicones Guy.” When I was on sports team as a youth, I earned nicknames like “Beezer,” “Chess,” “Coxswain,” and even “Coach.” I wear all these nicknames as a badge of honor, and I look forward to earning more. So, it's not surprising that while mentoring a FIRST robotics team, I've earned my share of nicknames. These names are given with affection because of the impact I'm having on these students. The nickname the Fabricator students coined for me has stood since 2019. Want to know what it is? You'll have to attend a FIRST event with us to learn it because I guarantee that the students will energetically share.





Design.
Innovation.
Engineering.

ELSYS 5800
INTELLIGENT STORAGE SOLUTIONS

Smart Manufacturing

Connectivity & Traceability
ESD / MSD Smart Cabinet



Industries We Serve

Mobile Devices / Automotive
Industrial / Medical Devices
Telecom / Wearables

Are you ready
to turn
your ideas into
reality?
Look no further!

What We Do

Design & Development
Manufacturing & Testing
Supply Chain Management

Services We Provide

Design Services
Concept
Mechanical Electrical
Firmware
Certification
Manufacturing Services
Supply Chain
SMT / Selective Solder
SPI / AOI
X-Ray / Flying probe
Plastic injection / Box Build
Functional Test
After Sales

30+ YEARS OF GLOBAL EXCELLENCE:
WE'VE MASTERED THE ART OF HIGH-TECH
DESIGN AND MANUFACTURING SERVICES
WORLDWIDE.

Work With Us

+1 (510) 556-1225
Sales@epoch-int.com
46583 Fremont Blvd.,
Fremont, CA 94538 USA





phase by handing out 3D flyers and sensory kits at events to promote awareness. They encouraged having quiet rooms during events or even “quiet matches” to accommodate the varying needs of students.

Students continue connecting with experts and creating tailored training materials to encourage neurodiversity inclusion within other FIRST teams. The goal is a global awareness about neurodiversity, along with knowledge and resources to encourage all students to be successful. This expanded level of inclusion has been well received and has empowered several of our students in these important years of growth and maturity.

My daughter has now graduated from high school and is pursuing a STEM profession, but her passion for the AUTO project has kept

her committed to mentoring a robotics team. She recognizes the value of creating diverse teams.

What the students have taught me has truly caused a paradigm shift in my life. I find myself

being more open to picking up cues from students and adjusting my approach based on the situation. I have always considered myself a student of the world and fully embrace learning. I also enjoy sharing my passion for engineering, math, and science. Now, I fully understand that mentoring is a learning experience for both the mentee and the mentor. It truly is a two-way interaction.



Brian J. Chislea is chair of IPC-5-33A; co-chair of IPC-5-33F; vice-chair of

IPC-5-33G, IPC-5-33C, IPC-5-24G, IPC-V-EVQR; and a vocal member of IPC-V-HRTPC.

What the students have taught me has truly caused a paradigm shift in my life.

High Density Packaging User Group provides its members with opportunities for unbiased comparisons through member-driven projects.

HDP User Group is a project-oriented industry consortium addressing the integration of new electronics component packaging and interconnect technologies into member company supply chains.

Our mission is to drive innovations in the electronics industry, reducing cost and time to market through active collaborations for the benefit of our members.

Projects focus on solving the most significant challenges in printed circuit board fabrication and assembly technologies, providing members with access to industry resources and excellent returns on investment.

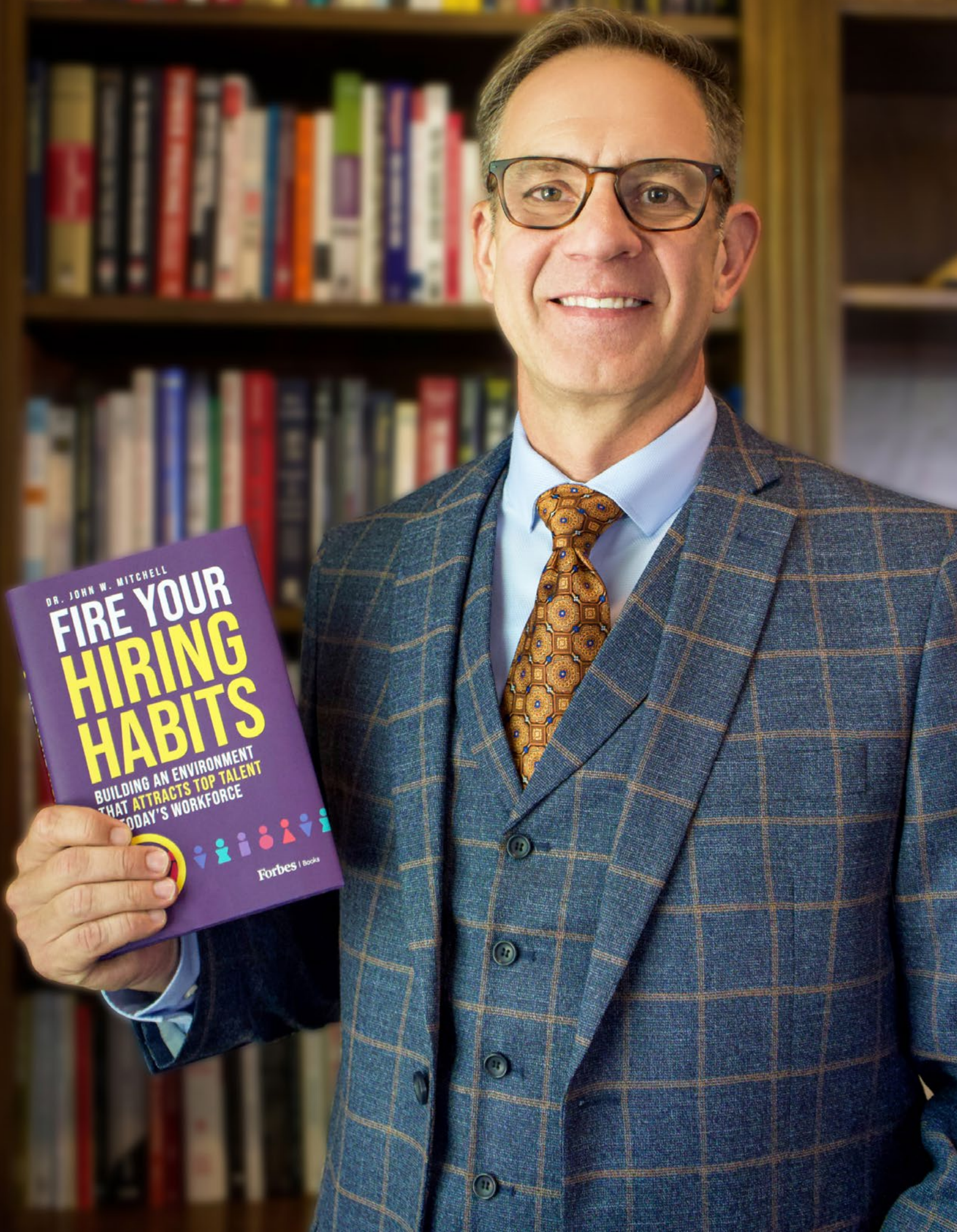
HDP has successfully brought electronics producers and suppliers together to solve component packaging and interconnect challenges for 30 years.

JOIN HDP – Join industry leaders driving the evolution of PCB technology.



Collaborate. Create. **SOLVE.**





DR. JOHN W. MITCHELL

FIRE YOUR HIRING HABITS

BUILDING AN ENVIRONMENT
THAT ATTRACTS TOP TALENT
TODAY'S WORKFORCE



Forbes | Books

Straight Talk About Today's Hiring Strategies

It's no secret that times have changed when it comes to hiring and retaining our workforce. It's an ongoing challenge for our industry that requires unconventional thinking, casting a wider net, and addressing the real issues at hand.

IPC President and CEO John W. Mitchell has written a new book titled *Fire Your Hiring Habits*. It addresses these challenges and offers real solutions. “This book is about two big pieces that align strongly with IPC’s mission in workforce development: finding and keeping the right people,” John says. “It is written in an approachable, fun way for those who are trying to hire and retain talent; it’s really meant for them.”

Keeping the right people means first finding the right people, and John

spends the most amount of time on this topic. “It’s about the kind of organization you are—that’s your culture,” he says. “It’s not something you buy off the shelf or create by putting up a few posters. It’s about who you are, what you do, and how you treat your team.”

John addresses the unique needs of the new workforce, and how that plays into a culture that has shifted over the past few decades.

He emphasizes that a corporate culture must align with the priorities of individuals as they come along. “You need to embrace that people are different; in many ways, that’s a benefit. Having a diverse

group helps you come up with better solutions. Don’t look at diversity as a challenge.” 🏳️‍🌈



**Don't look
at diversity as
a challenge.**

- » **Read more about** why John wrote this book and the influence it can have on today's hiring culture
- » **Buy your copy today!** All proceeds benefit the IPC Education Foundation



Speaking of progress...
This sustainably designed building in Brussels houses 4,500 workstations, an auditorium, a conference center, shops, restaurants, underground parking for 330 bicycles, 268 cars, and 40 motorbikes. With solar panels on the roof, the vast basement area contains 14K m³ of water (equal to four olympic-sized swimming pools) for storing thermal energy.

Progress in Europe

IPC is leading the effort to strengthen electronics manufacturing in Europe

By Chris Mitchell, IPC Vice President, Global Government Relations, and Alison James, Senior Director, European Government Relations

For far too long, electronics manufacturing has been overlooked in European policy circles, but exciting developments are taking place in Brussels. This year, IPC released a new, unprecedented SWOT analysis of the European EMS and PCB industries produced in collaboration with major stakeholders, including

electronics manufacturers, OEMs, trade associations, and trade unions.

The report came at the urging of the European Commission's Directorate General for Internal Market, Industry, Entrepreneurship (DG GROW) and SMEs. It reflects interest in the commission's part to address vulnerabil-

There are always **two sides** to every story!



New AOI system for top
and bottom inspection

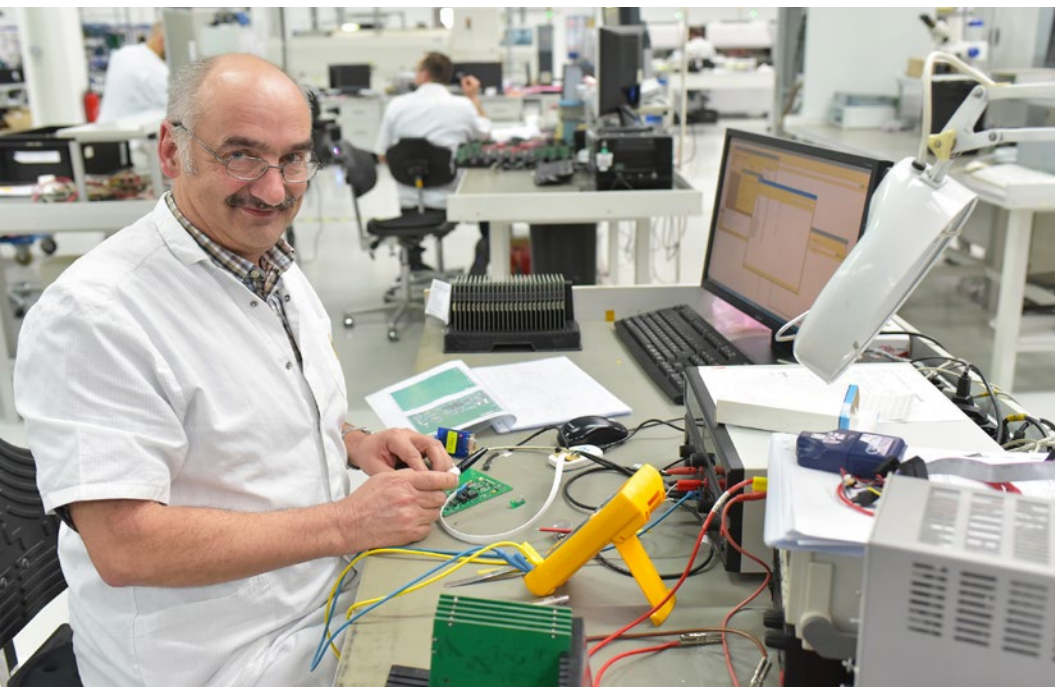
www.viscom.com



Find out more at

productronica

Booth A2.177



ment with government officials and new industry research to support the industry's policy goals.

- In 2021, IPC released [Digital Directions, Greener Connections](#). In explaining how the EMS and PCB industries drive innovation and economic growth, the report made a powerful argument for a more holistic policy approach to the electronics manufacturing industry to further the EU's digital and green transitions.

ities in European value chains. In addition to the SWOT analysis, the report lays out initial policy recommendations and calls for further dialogue amongst stakeholders and the government.

This report, delivered to DG GROW and the electronics stakeholder industry community in early August, is the result of sustained and intensifying advocacy by IPC in Brussels over a five-year period. It represents significant progress, yet the most exciting and meaningful achievements remain ahead as IPC works with electronics manufacturers to restore the strategic importance of our industry.

Background

In the past five years, IPC has intensified its commitment to European government relations:

- IPC formed a European government relations committee and the appointment of Alison James as our senior director of government relations.
- In 2020, IPC launched an initiative to bolster European Union (EU) support for the electronics manufacturing industry. This initiative emphasized direct engage-

The message in this report was important, yet industrial policy in the EU was just beginning a shift toward global developments. At that stage, the focus in Europe (as in other regions) turned to passage of its proposed Chips Act. In working with our members, IPC found new opportunities to explain the importance of complementing investments in semiconductors with investments in packaging, PCB fabrication, and electronic assembly. We were unrelenting in challenging government leaders to move beyond the silicon-only mindset and toward advancing silicon-to-system industrial policies.

We found success. With IPC and industry support, the European Parliament strengthened packaging provisions of the Chips Act and included new provisions on assessing the wider industrial base. These changes were significant and signaled greater reflection by key government leaders on the broader electronics ecosystem.

This past April, IPC hosted a meeting of industry stakeholders and government officials from the European Commission and European Parliament. At this meeting, leaders from across the electronics industry pressed for an EU strategy to strengthen silicon-to-systems

innovation and manufacturing. Once again, it highlighted a stark reality: Key EU priorities—including those for semiconductor leadership, digitalization, and circularity—are contingent upon a robust European electronics manufacturing sector that has faced significant erosion over the last two decades. The electronics industry, though largely hidden from consumers, is an enabler of innovation and resiliency across all sectors of the economy.

Officials at DG GROW attended the IPC meeting in April and responded with a desire to better understand the electronics supply chain, to define existing and future risks to EU strategic autonomy, and to identify potential policy interventions. Officials then organized a meeting focused specifically on the EMS and PCB industries within the Industrial Forum—one of the principal mechanisms for structured dialogue with industry. A wide variety of stakeholders were invited to participate in an Electronics Dialogue, including aerospace, energy, automotive, semiconductor, and industrial manufacturers.

At DG GROW's request, IPC prepared and delivered a report and state of the industry analysis during the meeting. IPC also provided policy recommendations developed in collaboration with its members. These presentations were made by two of IPC's European team members: Alison James and Dr. Hans-Peter Trantz, IPC senior director for solutions. IPC was joined in its call for regional action by executives from ACB (France), AT&S (Austria), InCap (Finland), and Zollner (Germany).

DG GROW moderated this meeting and then requested that IPC lead a stakeholder SWOT analysis with a new set of policy recommendations to provide a better understanding of the risks to downstream/end-market customers and to have one document that reflected the consensus of all relevant stakeholders.



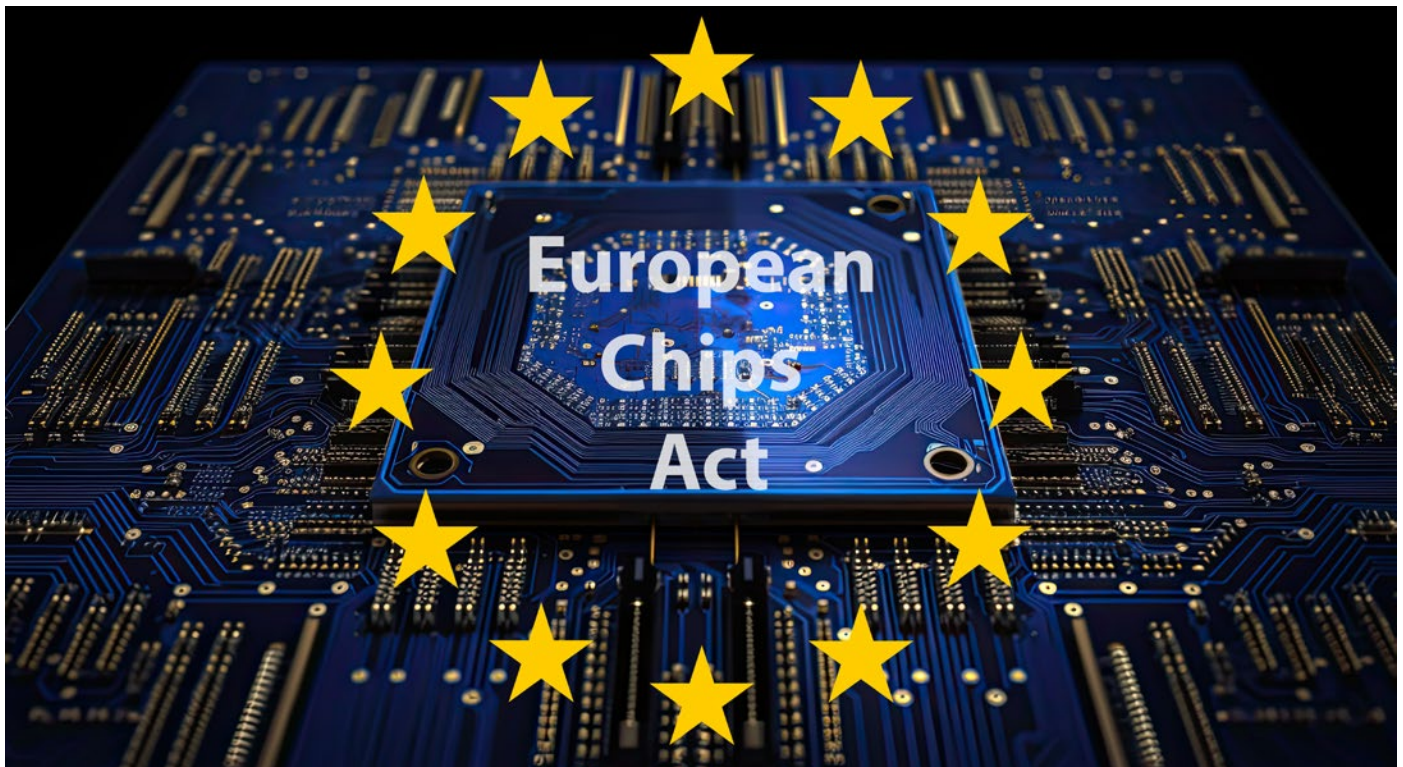
August Stakeholder Report

Completing the analysis was a true collaborative effort; we enlisted active participation from peer trade associations, companies across economic sectors, and even trade unions. Moreover, the report incorporated the results of a survey fielded by IPC and fanned out by many peer associations. In record time, the survey received 122 responses:

- PCB companies (34% of respondents)
- EMS providers (34%)
- OEMs (18%)
- Other stakeholders including trade unions (14%)

The survey results were included as an [appendix to the report](#).

The report establishes that a resilient European electronics manufacturing industry requires globally competitive component manufacturers, EMS providers, and PCB fabricators, as well as their equipment and materials suppliers. On this point, there is near universal agreement: More than 95% of companies believe a robust European electronics ecosystem, including PCB and EMS industries, is critical to regional security, industrial resiliency, and economic competitiveness. A clear majority also believes the EU lacks key PCB



(88%) and EMS (61%) capabilities. The report notes that a silicon-to-systems approach is needed to complement the Chips Act as Europe is highly dependent on electronics produced offshore for end-systems critical to its security, vitality, and strategic goals. This dependency poses a serious risk to Europe's strategic autonomy.

To address this, the report lays out a set of initial recommendations to address the industry's challenges and enable needed growth. Highlights include support for CapEx and factory modernization, and addresses workforce, R&D, and process innovation as well as tariff issues that discourage European PCB fabrication. Government recognition of the strategic importance of these industry segments is foundational.

The report also recommends next steps for additional work, reflecting the reality that sustainable re-industrialization requires support and sustainable demand. They include the following:

1. Set targets for the European share of global EMS and PCB production.

2. Establish trusted supply chains for critical systems.
3. Further data collection on end-market needs.
4. Initiate an industry roadmap that aligns EMS and PCB capabilities/capacities.
5. Establish a standing mechanism for industry/government dialogue on electronics manufacturing.

Next Steps

An important flag has been raised. The work among stakeholders and with the European Commission represents significant progress in having our industry's views heard. We have much work to do, but we now have a stakeholder community engaged in this process. We are doing what any interest group must: arm ourselves with data and then leverage that data to make strong policy arguments for interventions by government. Government is listening and engaging.

Now is the time for industry to make its voice heard and take the next steps. Get involved by reaching out to [Alison James](#). 



NEW from Heller Industries!

The MK-7 Reflow Oven

30% lower nitrogen consumption • 30% lower electrical consumption
Lower Delta T on heavy boards

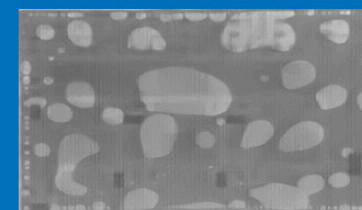
Heller revolutionizes reflow again! The new MK7 series ovens have been dramatically re-engineered with new heater modules providing lower Delta T's on board and reduced Nitrogen consumption. A newly enhanced, low-profile frame reduces heat loss, resulting in lower electrical consumption and a reduced load on your factory air conditioning.

Eliminate Voids With Heller's Hi-UPH Multi-Conveyor Vacuum Option!

- 1 board every 30 seconds
- Remove >99% solder voids
- No solder balls or splatter
- No maintenance vacuum chamber



Void-free w/vacuum



No vacuum



Talent Development

IPC Asia connects with local companies like TTM to improve workforce development

By Glenn Gong, Marketing Director, IPC Asia

Top Chinese students interning with the most influential electronics manufacturers in China through the IPC Asia Talent Development Program are producing stellar results.

Tom Edman, president and CEO of TTM Technologies—and an IPC Board member—has provided strong support for the IPC Asia Scholars Program, in particular, during its initial stages.

IPC Asia Scholars Program

The IPC Asia Scholars Program is part of the larger IPC Asia Talent Development Program, which was established in 2020 and has been committed to cultivating and developing industry professionals. The program not only provides internship opportunities and professional training for students, it establishes partnerships with multiple companies and institutions to collectively provide a stronger workforce in the industry.

To foster this more ambitious and capable workforce, IPC Asia partnered with TTM Technologies in October 2020 to jointly advance the IPC Asia Scholars Program. This program aims to connect top students with the most innovative and influential companies in the electronics industry by providing meaningful and challenging internship opportunities for students.

Since its implementation, the IPC Asia Scholars Program has achieved significant results: five sessions with 79 students from more than 10 universities participating. The students came from six regions: Hong Kong, Guangzhou, Huizhou, Zhongshan, Dongguan, and Shanghai. They cover more than 20 majors,

including electronics, mechanical engineering, computer science, and chemical engineering.

Through collaboration with TTM, the students have gained the opportunity to intern at the most influential companies in the industry, enabling them to develop their professional skills and acquire the latest industry knowledge.

Richard Xie, Asia Pacific vice president of human resources at TTM, said, "In 2020, we implemented an internship program in cooperation with IPC. Although it has only been two years, the results have shown it is a successful program. We provide valuable work experience and offer opportunities for outstanding interns to work at TTM. Through the IPC Asia program, we have now established formal internship cooperation relationships with several universities in China. This is a great opportunity for us to collaborate and inspire the future leaders of the electronics industry."

IPC Asia Talent Development Program

The students participating in the IPC Asia Talent Development Program also expressed their gratitude and affirmation for this project.



Zhang Shun, a student from Guangzhou Maritime University, said, “I am very grateful to TTM and IPC for providing me with such a great internship opportunity. During my six-month internship at TTM, I learned many professional skills and gained a clearer career plan. It was a rich and enjoyable internship.” After receiving first prize in the IPC Asia Scholars Program, he said, “This wonderful memory will motivate me to continue my efforts in learning.”

IPC Asia Education Partnership Program

In addition to collaborating with companies, the IPC Asia Talent Development Program works closely with institutions of higher education. Chengdu Aeronautic Polytechnic and Zhongshan Technician College, for example, have joined the IPC Asia Education Partnership Program. Through this program, students from these institutions learn to understand international IPC standards and obtain international IPC certification during their studies, laying a solid foundation for their future career paths. It also strengthens the connection between IPC and the institutions, which allows them to expand their course content to

better meet industry demands and engage in communication and cooperation with member companies. At the same time, the program provides member companies with a group of outstanding talent, injecting new vitality into the sustainable development of the industry.

Student Training Programs

IPC Asia has launched student training programs, with participation from 70 students at four institutions. IPC Asia invites professors from the institutions to give lectures, answer questions, and incorporate many industry best practices. Through these training programs, students not only broaden their professional knowledge but engage in in-depth exchanges with professors from universities and experts in the industry. This enhances their competitiveness in the electronics industry while obtaining international certification.

More to Come

Under the guidance of the IPC Asia Education Steering Committee, the IPC Asia Talent Development Program continues to expand, with the aim of cultivating more outstanding talent and contributing to the prosperity of the industry. The program will expand its internship programs and student training projects, providing more students with practical opportunities and professional training resources. Additionally, IPC Asia actively seeks to establish educational partnerships with more outstanding institutions as a way to promote knowledge and industry innovation.

The successful implementation of the IPC Asia Talent Development Program is not only significant for the personal growth of students, but it injects fresh energy into the entire industry. IPC Asia will continue collaborating with more professionals in a drive toward a sustainable future. 



The program provides member companies with a group of outstanding talent, injecting new vitality into the sustainable development of the industry.

IPC WINTERCOM

STANDARDS DEVELOPMENT COMMITTEE MEETINGS

January 22–25, 2024

Barcelona, Spain

save the date

IPC WINTERCOM is the major get together for all IPC Volunteers worldwide to participate in all IPC technical standardization committees & working groups & contribute to their most used industry standards & guidelines.

- For the **FIRST TIME IN EUROPE**
- **GLOBAL** — IPC WinterCom hosts all IPC technical Committees in one place & one week
- For All — **NEWCOMERS & INDUSTRY VETERANS** are welcome to learn & share knowledge & expertise



www.IPC.org

#BUILDELECTRONICSBETTER

IPC Instructor-led Training Schedule



IPC's instructor-led courses provide a personalized learning experience for highly technical material focused on PCB design and electronics manufacturing. Our instructors are active members of the industry community and have years of hands-on experience developing and manufacturing electronic products.

Since IPC introduced instructor-led courses, hundreds of engineers have benefited from in-depth discussions with our instructors and their colleagues also taking the course. Our instructors go above and beyond to ensure an understanding of the material by providing technical guides and meeting with students during office hours in addition to the virtual classes. Plus, all lectures are recorded for review.

Visit education.ipc.org to secure your spot and start learning in 2023. If you're interested in teaching a course, contact KellyAllen@ipc.org or tell us about your expertise at go.ipc.org/sme. 

Course Name	Dates	Days	Time GMT	# Weeks
October 2023				
How to Organize, Constrain and Engineer Your PCB Design	Oct 2 – Oct 18	M/W	3 PM GMT	3
PCB Design II	Oct 9 – Nov 29	M/W	4 PM GMT	8
PCB Design for Rigid-flex Boards	Oct 9 – Nov 15	M/W	6 PM GMT	6
PCB Advanced Design Concepts	Oct 9 – Nov 29	M/W	10:30 PM GMT	8
PCB Design for Military, Aerospace & Other Extreme Applications	Oct 10 – Nov 16	T/TH	3 PM GMT	6
PCB Design I	Oct 10 – Nov 16	T/TH	10:30 PM GMT	6
Introduction to Machine Data Analytics	Oct 17 – Oct 26	T/TH	10 PM GMT	2
Advanced Troubleshooting & Defect Analysis (European Time)	Oct 24 – Nov 16	T/TH	4 PM GMT	4
November–December 2023				
Traditional DFM: Is it Dead or Alive?	Nov 6 – Nov 8	M/W	10:30 PM GMT	1
Gold-Aluminum Wire Bonding Process, Quality and Reliability	Nov 7 – Nov 9	T/TH	3 PM GMT	1
Reliability of Electronics—Role of Intermetallic Compounds	Nov 14 – Nov 16	T/TH	3 PM GMT	1
How to Engineer Stable PCB Designs For All Board Types Including RF Design	Nov 27 – Dec 13	M/W	3 PM GMT	3
Solder Joint Voids—All You Should Know	Dec 5 – Dec 7	T/TH	3 PM GMT	1



Input From a Young Professional

By Henry Crandall, IPC Student Board Member

As I reflect on my opportunity to serve as the IPC Student Board Member, I'm eager to share three impressions with our wonderful community: Executive leaders of IPC value the input of students and young professionals; the electronics manufacturing industry is undergoing a changing of the guard, and many of the most experienced players are looking to share their hard-earned wisdom. I've been exceptionally fortunate to receive invaluable career advice that I wish to pass on to anyone else beginning their professional career.

1. The board values the next generation of industry members.

I naturally felt a massive sense of intimidation when I assumed this position. How was I supposed to meaningfully contribute with C-suite-level leaders who have decades of industry experience?

In an introductory meeting with IPC CEO Dr. John W. Mitchell, he erased any sense of hesitation I felt. He looked me square in the eye and, in his smooth broadcaster voice, plainly told me, "You are a full-fledged member of the board of directors." Since then, John and many other members of the board have echoed that sentiment. They don't view the student board position as second class; in fact, it's quite the opposite. Steve Pudles of Zentech, a longtime IPC board member and now member of the IPC Hall of Fame, put it best: "We haven't been in school for decades. We need your perspective."

They aren't just providing lip service; they mean it. When I have shared my opinion about student chapters, how IPC could use social media better, or adjustments to the Careers in

Henry Crandall is a graduate of the University of Utah and currently pursuing a Ph.D. in electrical engineering as the Advancing Research in College Scientists Graduate Fellow.



Electronics website, they listen. The highest leaders of IPC have a focused goal to attract the next generation of electronics manufacturing professionals and leaders, and that goal isn't unique to the board of directors. Every level of IPC values the input of young professionals, students, and newcomers.

2. *The old guard is changing.*

Simple demographics are part of the strategic emphasis on maintaining the workforce pipeline into the industry. Like many industries, electronics manufacturing has a cohort of leaders who have contributed at a high level for decades. As these leaders consider riding off into the sunset, they seek to impart as much knowledge as possible and find people to fill their shoes.

My experience has shown me there isn't a better time to be a young, hungry newcomer to the industry. I have found that many of the seasoned veterans are more than willing to meet with me and share their hard-earned knowledge. Meredith Labeau, CTO of Calumet Electronics, told me, "Play dumb and ask lots of questions. You will be amazed at how much you will learn."

3. *Board members are eager to share insightful advice.*

While the actual board meetings are infrequent and time-constrained to discuss topics most important to the organization's direction, I have tried to extract as much information as possible from the directors outside the board meetings. Their advice is rich with industry and career insights that any young professional should hear. Here are some of the things they've told me:

- Say yes.
- Stay humble.
- Never lose your creativity.
- Add value wherever you can add value.
- Great communication leads to success.
- Give yourself permission to make mistakes.

- Try to find ways to take weight from others.
- Don't be afraid to ask questions.
- Participate in industry organizations.
- Leadership is about finding solutions to help the team be successful.
- The biggest risk you took in life is the one you didn't take.
- Make sure you work for someone who will be a mentor, not a boss.
- Create an environment where success for you means success for your employer.



Fun Facts

Three words that indicate success to me:

Passion
perseverance
progress

Best book I've read in the past year:

Atomic Habits
by James Clear

Favorite outdoor activity:

Both water and snow skiing

Research focus:

Bioimpedance, digital health, and wearable health monitors. My Ph.D. thesis aims to pilot a new way to measure blood pressure without using an inflatable cuff.

Biggest inspiration:

From my earliest days on campus, Richard Brown, dean of the University of Utah's John and Marcia Price College of Engineering, has been both a mentor and a steadfast supporter, consistently encouraging me to raise my personal limits to new heights.



Henry and his wife Amy enjoyed touring Puerto Rico during the IPC Board meeting this past summer.

¡Benvinguts a
Barcelona!

Welcome to
Barcelona!

¡Bienvenidos a
Barcelona!

Welcome to WinterCom

By Francisco Fourcade, IPC Electronics Technology Standards Manager

Barcelona is the tech capital of the Mediterranean, world mobile capital, and home of Gaudi's architectural landmarks. Now, as part of IPC's expansion of its European footprint, the World Trade Center in Barcelona will be the location for WinterCom, a selec-

tion of full committee in-person standards development meetings, Jan. 22-25, 2024.

For many decades, volunteers have been developing IPC standards worldwide, collaborating across all time zones to bring the most trusted standards for electronics manufacturing to the industry. These are exciting

We Are All In!

Whether you need help with sales, marketing, recruiting or strategic direction, the sky is the limit when Dan and his team get involved.

"As Sierra Proto Express continues to grow into one of the industry's leading printed circuit board companies, Dan continues to be a consistent help to me in defining the goals, strategy, and direction of the company."



Ken Bahl
President, Sierra Circuits



Joe O'Neil
President, OAA Ventures

"I have worked with Dan for a long time. From the days when we needed to put together a sales plan and team in place to having him facilitate strategic sales meetings. He has grown with us and provided the solutions we've needed."

If you are ready to make your company better, contact Dan today, 24/7



 **207-649-0879**

 **danbbeaulieu@aol.com**

 **dbmanagementgroup.com**



times as the main originating task groups will be meeting in Europe for the first time.

WinterCom involves committees developing and maintaining top industry standards, such as:

- Assembly: IPC A-610 and IPC J-STD-001 with the Space/Military and Automotive Addendums, IPC/WHMA-A-620, and IPC-7711/21
- PCB fabrication: IPC-6012 and its Automotive Addendum
- Many more committees developing standards for design, materials, cleaning, printed electronics, e-textiles, plastronics, Connected Factory Exchange, digital twin, and sustainability

Industry representatives across all continents will join us during these four days. Each day kicks off with a keynote, followed by a variety of committee meetings, networking events, and tabletop exhibits that represent European industry offerings.

To stay on the front lines of innovation, IPC will sponsor the Smart Plastics Congress, co-organized by Polymeris and Eurecat. This event includes a visit to Eurecat's Plastronics



Pilot Plant. All participants are encouraged to learn more about emerging technologies that continue to break through design limitations and the manufacturability of structural electronics.

WinterCom is recommended for all industry participants, newcomers and industry veterans alike. Join us in Barcelona to network, collaborate, learn, and continue to support the industry by building electronics better. 🇪🇸





Hmm... If I have a **conductor width and isolation distance of 40 μm (1.5 mils)**, does that mean my **PCB is considered Ultra HDI?**

PCBs are complex products which demand a significant amount of time, knowledge and effort to become reliable. As it should be, because they are used in products that we all rely on in our daily life. And we expect them to work. But how do they become reliable? And what determines reliability? Is it the copper thickness, or the IPC Class that decides?

Every day we get questions like those. And we love it. We have more than 550 PCB experts on 3 continents speaking 19 languages at your service. **Regardless where you are or whenever you have a question, contact us!**

What's your PCB question?
www.ncabgroup.com/faq-about-printed-circuit-boards/

Reliable answers. Reliable PCBs.



A Rousing Success

IPC India Hosts Integrated Electronics Manufacturing & Interconnections 2023

By Manvi Kapoor, Deputy Manager, Events & Communication, IPC India

The second annual Electronics Manufacturing & Interconnection (IEMI) trade show, held in Chennai and Pune, India, welcomed more than 1,000 participants, including 30 international delegates from more than 10 countries, for two days of skills challenges, business-to-business meetings, panel discussions, special addresses from subject matter experts, and a keynote speech from IPC President and CEO John W. Mitchell. Awards ceremonies were held, and two Memorandums of Understanding (MOUs) were signed.

Supported by the Ministry of Electronics & Information Technology, the government of

India, state governments of Tamil Nadu and Maharashtra, and Indian and International Industry Associations, IEMI hosted electronics manufacturers, designers, traders, suppliers, service providers, and technical experts to explore new business partnerships, gain technical knowledge, and to source products and services.

New to IEMI this year were standards committee meetings, with an EMS committee meeting in Chennai, and wire harness and design committee meetings in Pune. In addition, a vendor development program was held in Pune, with representatives from Siemens







meeting with wire harness manufacturers in efforts to expand their supply chain.

In Chennai, Ar Rm Arun, president, Southern India Chamber of Commerce and Industry (SICCI), welcomed the delegates, while Ramachandran Natarajan, managing director, Mel Systems and Services, delivered the vote of thanks. Both speakers highlighted the growth of electronics manufacturing in the state of Tamil Nadu and the need for cooperation between associations to develop strong industry partnerships to encourage further development in the state.

In Pune, delegates were welcomed by Prashant Girbane, director general, Maharashtra Chamber of Commerce Industries and Agriculture (MCCIA), who emphasized the importance of Pune's contributions to the Indian econ-

omy. He was joined by Aditya Paranjpe, chairperson, MCCIA's Electronics Committee, who discussed MCCIA's role in developing the electronics manufacturing sector of the region.

Rajinder Bhatia, president and CEO, Bharat Forge Defense & Aerospace, was the chief guest in Pune, and presented "The Role of Integrated Electronics Manufacturing and Interconnections," illustrating how integrated electronics contribute to defense innovation and the importance of reliable electronics in both aerospace and defense applications.

John W. Mitchell, IPC president and CEO, delivered the keynote address in both Chennai and Pune, presenting "What's New in Technology: Micro Trends Determining Electronics' Future." Mitchell explained IPC's commitment to creating an environment for IPC members to embrace new trends such as AI, digital twin, 3D printing, nanotechnology, and new energy solutions, enabling members to stay ahead of the competition while continuing to innovate and grow in the industry.

Two special addresses were held in Chennai and Pune, led by Bhanu Sood, Ph.D., and Chris Peters.

Bhanu Sood, Ph.D., deputy chief technologist, Goddard Space Flight Center, NASA,





presented “The Evolving Landscape of Advanced Technology—the Role of Risk, Reliability, Quality, and Policy.” Sood stressed the role of robotics and quantum sciences in revolutionizing space research and provided an overview of the evolving landscape of advanced technology, including risk, reliability, quality, and policy issues.

Chris Peters, founding executive director, U.S. Partnership for Assured Electronics (USPAE), presented “Industry-Government Collaboration in Defense to Solve Challenges,” where he highlighted the models and best practices adopted by the U.S. government to access trusted electronics supply chains as a means of solving defense challenges.

Panel discussions in both Chennai and Pune were well attended, showcasing the role of emerging tech in electronics manufacturing as well as the importance of electronics and cable and wire harness assembly in the efficient functioning of electric vehicles.

At the two Memorandum of Understanding (MoU) signing ceremonies, IPC signed with India Cellular and Electronics Association (ICEA), and Panimalar Engineering College. The IPC-ICEA MoU aims for faster adoption of standards by the Indian ESDM sector, and for both organizations to work together to skill the ESDM workforce in IPC standards used in the PCB and PCBA domains.

The IPC-Panimalar Engineering College MoU supports the training of engineering students in the IPC Electronics Assembly for

Engineers course to help new engineers learn key concepts critical to the electronics manufacturing industry.

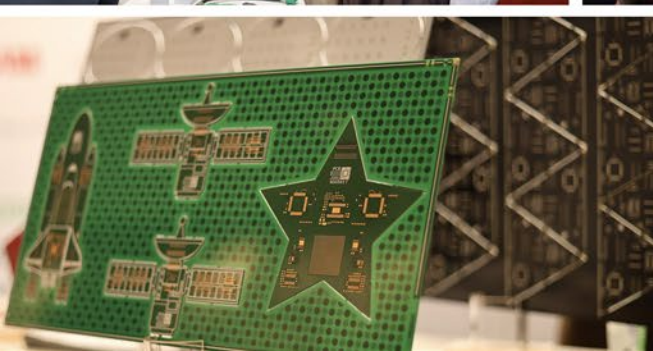
At the hand soldering and wire harness competitions, more than 100 companies and 1,000 technicians participated. Top prizes in hand soldering went to Tejas Sutar, Philips Electronics India Limited, Pune; and runner-up Sharan Yabesh, Avalon Technologies Limited, Chennai. In the wire harness competition, top honors went to Siddaraju Av, Cyient DLM Limited, Mysuru; and runner-up Amit Sharma, Vista Consoles Electronics Private Limited, Delhi.

To recognize the companies and volunteers engaged in IPC standards development and certification programs, Mitchell led an awards ceremony. Volunteer of the Year awards were presented to:

- Chandana Dissanayake
- Thevin Arumugam
- Anand Selvaraj
- Abhay Gupta
- Rama Murthy PBV
- Sudhakar Babu
- Manish Agarwal
- Prakash Rukmaiah
- Eileen Ang
- Rajoo Goel
- Amulya Mohapatra

IEMI 2024 will be held on July 23 in Bengaluru, India, and on July 25 in Penang, Malaysia. 🇮🇳🇲🇾





Erika Crandall finds her niche in the Cold Joining Press-fit Task Group

By Dr. Erika Crandall, Senior R&D Product Development Engineer, TE Connectivity

Press-fit technology as an interconnection to printed boards (PBs) started in the telecommunication industry in the 1970s. With press-fit technology, the electro-mechanical connection between compliant pin and printed boards is achieved through a single insertion process, eliminating the use of auxiliary materials (e.g., flux, solder alloy, cleaning agents) and heat treatment, which makes it no surprise that not only is this technology widely used in automotive, industrial, aerospace, and many other applications, but it continues to grow.

Until May 2020, the only available press-fit standard on the market was the IEC 60352-5,

which was initially developed within the context of telecommunication equipment or similar applications.

As a physicist who has spent much time for my Ph.D. utilizing various surface analysis techniques, plating conditions, and environmental exposures to investigate the underlying mechanisms behind metal whisker growth, many of my main projects for the automotive industry were focused on the development and testing of new surface finishes for whisker mitigation of compliant press-fit pins.

However, the IEC standard at that point didn't call out any kind of whisker testing, not to mention environmental conditions

harsh enough for automotive applications. So, imagine my excitement when I saw the Cold Joining Press-Fit Task Group listed in the standards development committee meetings at IPC APEX EXPO 2019, my first-ever IPC event. Immediately, I signed up.

When I walked into that committee meeting, I saw familiar faces—acquaintances from other companies in the field whom I greatly regarded as renowned experts. As the meeting started, I couldn't help but smile, relishing the detailed conversations. Even when members would disagree, there was always steadfast respect. Everyone really listened, contemplated, and sought to understand one another's viewpoints. Often, it was something they hadn't initially considered, yet realized it was important to the topic at hand.

By the end of the meeting, the final action items were concluded. Later, the first working draft was distributed for committee comments. It was a very exciting phase in the creation process of a new standard, and I wholeheartedly wanted to become an active member of the committee.

For the next meeting later in the year, I prepared and submitted 20 pages of comments, which took the committee almost an entire day to review. I was quite embarrassed! It was my first comment/voting experience in a standards committee, and I had no idea what to expect. However, the process was beautiful. The discussions were extensive, intricate, and awe-inspiring. I learned so much from the other members. These beneficial aspects remain part of our meetings to this day.

In May 2020, IPC-9797 was published, finally providing

It was my first comment/voting experience in a standards committee, and I had no idea what to expect. However, the process was beautiful."

an international standard on compliant press-fit testing and requirements for high-reliability applications, such as automotive, which must endure a wide variety of harsh environments while still ensuring safety and function—a person's life may depend on it. It was personally and professionally satisfying to have had such an intimate role in the process. Since then, we have created the Cold Joining Press-Fit Handbook task group and published IPC-HDBK-9798 as further detailed support and advisement for the standard.



In 2022, I was unexpectedly invited to meet with our press-fit committee co-chairs and IPC liaison. They told me that one of our co-chairs was moving from their current job to one at IPC, leaving an open seat on the committee. I was astonished when they told me I would be the right person to take over this position. Would I be interested? Yes, of course, but I was filled with mixed emotions; I felt honored, concerned, and even a little scared. Over the years, I had watched the chairs realign the committee when discussions were spiraling in unproductive directions, resolve complicated disputes by providing reasonable solutions, and lead global experts in highly technical subject matters. I'm a bit of an introvert and I don't have years of experience in the industry, so I couldn't help but wonder whether I was the best candidate.

I accepted the position, and immediately expressed my appreciation for their trust and confidence in me, while secretly reminding myself that it's good to step outside my comfort zone and push myself. At the beginning of the following year, we published the next revision of IPC-9797A.

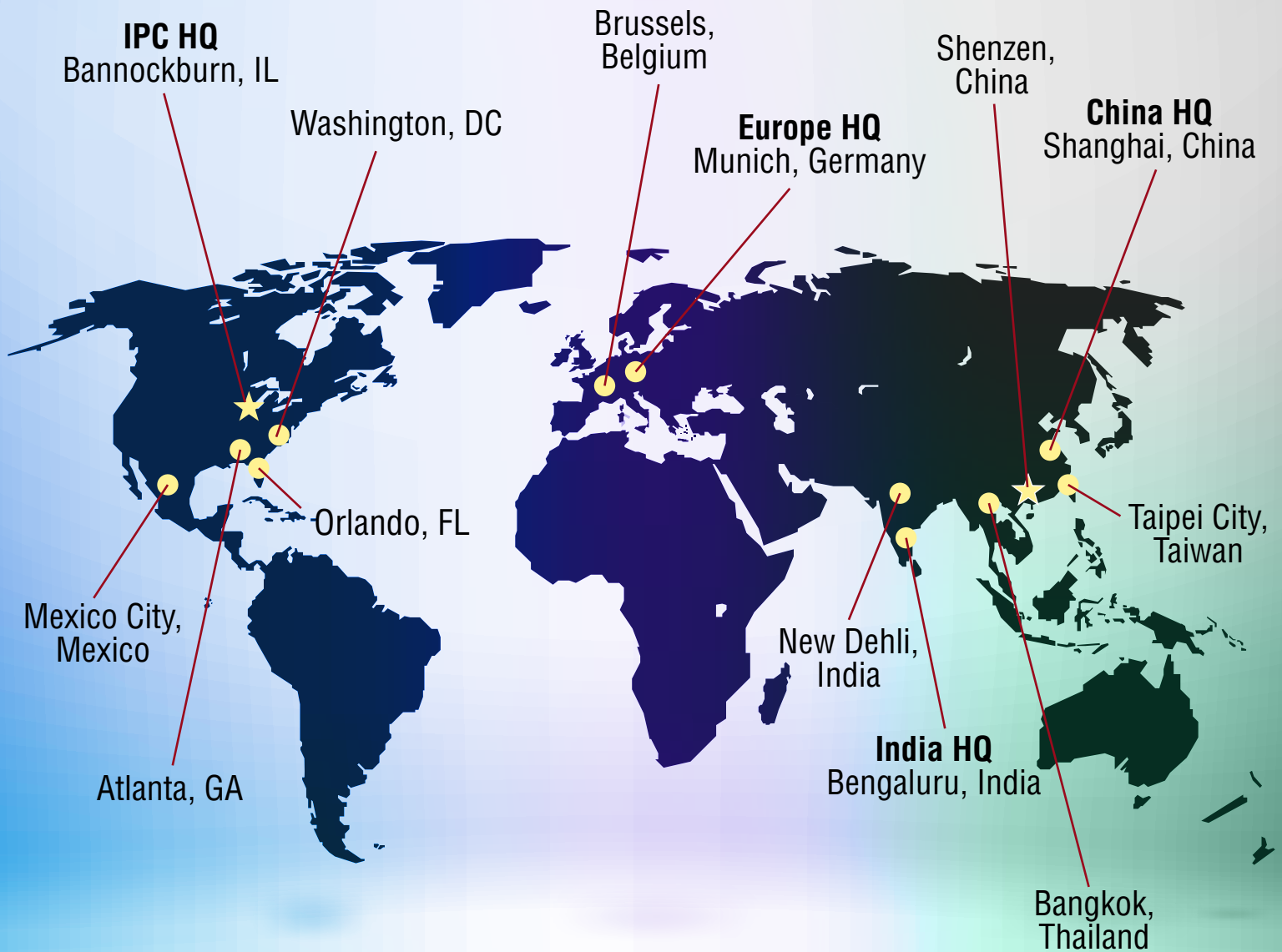


Erika Crandall is senior R&D product development engineer at TE Connectivity. She earned her doctorate at Auburn University. She is co-chair, 5-21M and 5-21N: Cold Joining Press-fit Task Group and Handbook Task Group.

I have witnessed amazing teamwork, and I look forward to the years ahead as I grow further into this role and help make our IPC committees as strong as possible. 🌈



AROUND THE WORLD WITH IPC



11 OFFICES

7 COUNTRIES



Standards Update

Newly Published Standards and Revisions

IPC-7352

Generic Guideline for Land Pattern Design

IPC-7352 provides generic guidelines on land pattern geometries used for the attachment of electronic components to a printed board, as well as design recommendations for achieving the best possible solder joints to the devices assembled. IPC-7352 is an essential tool for helping printed board designers to achieve these optimal results.

IPC-9797A

Press-fit Standard for Automotive Requirements and Other High-Reliability Applications

IPC-9797A is the only industry-consensus standard for requirements and acceptance of press-fit pins. The standard describes materials, methods, tests, and acceptance criteria for solderless press-fit pin connections.





***Now you can get the essential facts
about testing your high-reliability boards!!***

Ensuring electrochemical reliability in circuit boards, where devices face potentially corrosive environmental conditions, is of paramount importance.

These **FREE** books provide essential insights into optimising PCB assembly process control and the vital practice of process validation, so that your manufacturing processes consistently yield products meeting the desired specifications and quality standards.

Elevate your manufacturing process to achieve unrivaled quality and reliability in the market.

Download your free copies now!

#THEPEOPLEWHOPROTECT

GEN3
PRECISION AS STANDARD

sales@gen3systems.com
+44 (0)12 5252 1500
www.gen3systems.com
www.objectiveevidence.org

IPC/WHMA-A-620E

Requirements and Acceptance for Cable and Wire Harness Assemblies

IPC/WHMA-A-620E is the only industry-consensus standard for requirements and acceptance of cable and wire harness assemblies. The standard describes materials, methods, tests, and acceptance criteria for producing crimped, mechanically secured, and soldered interconnections and the related assembly activities associated with cable and harness assemblies.

IPC-1791C

Trusted Electronics Designer, Fabricator and Assembler Requirements

IPC-1791C provides minimum requirements, policies, and procedures for printed board design, fabrication, assembly, and cable and wire harness assembly organizations and/or companies to become trusted sources for markets requiring high levels of confidence in the integrity of delivered products.

IPC-2591-V1.6

Connected Factory Exchange (CFX)

IPC-2591, Version 1.6 establishes the requirements for the omnidirectional exchange of information between manufacturing processes and associated host systems for assembly manufacturing. Version 1.6 applies to communication between all executable processes in the manufacture of printed board assemblies, automated, semi-automated, and manual, and is applicable to related mechanical assembly and transactional processes.

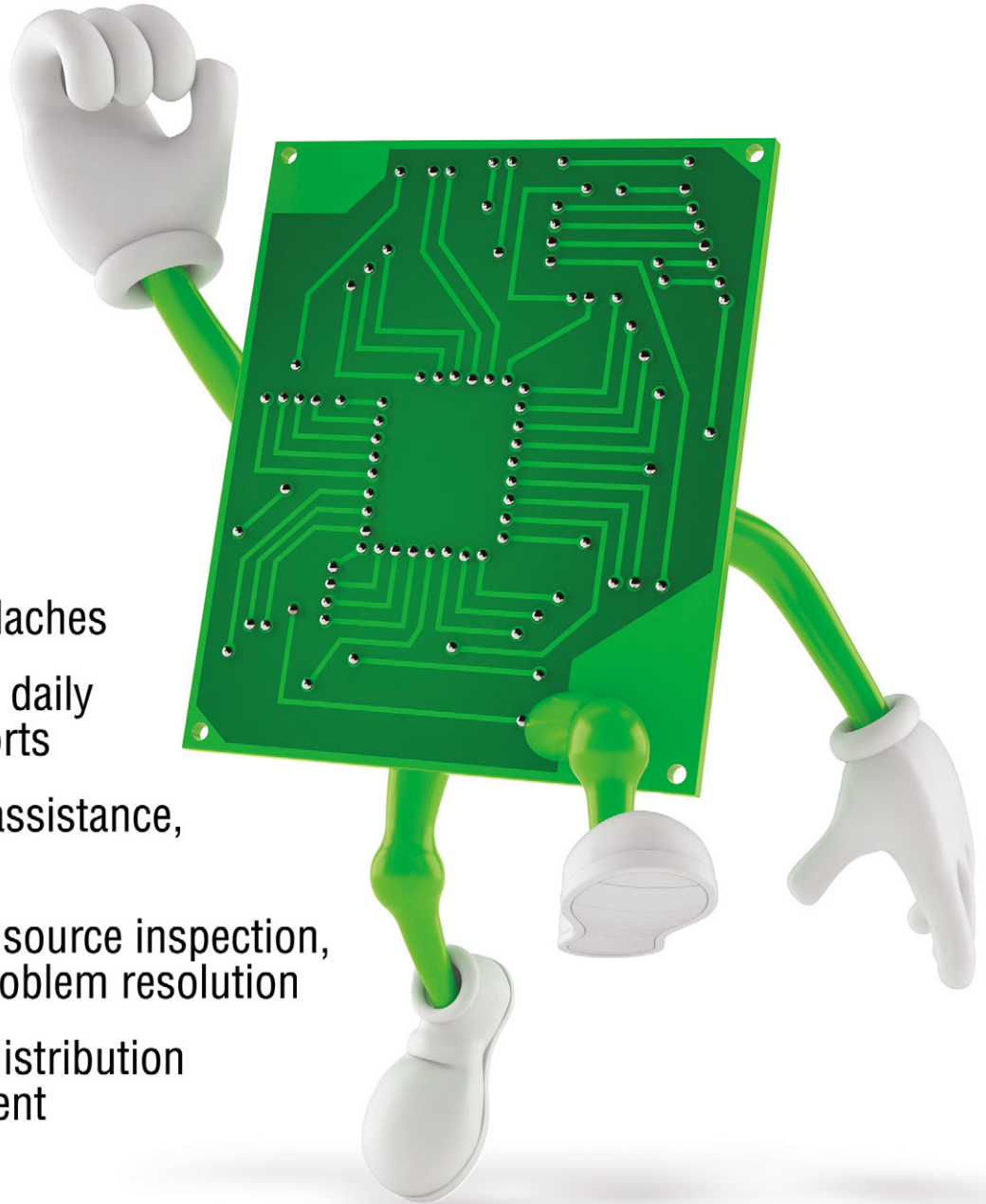
IPC-9203

Users Guide to IPC-9202 and the IPC-B-52 Standard Test Vehicle

While there are a variety of industry test vehicles for the examination of material compatibility, the IPC-B-52 test board was created to meet the needs for testing both ion chromatograph and surface insulation resistance (SIR), which would be more representative of the manufacturing materials and processes. IPC-9203A standard addresses the IPC-B-52 test vehicle, which can be used to evaluate a manufacturing process, or to provide objective evidence that a chosen manufacturing material set and process are compatible from a cleanliness standpoint.

**To view a complete list
of newly published
standards and standards
revisions, translations,
proposed standards
for ballot, final drafts
for industry review,
working drafts, and
project approvals,
visit [ipc.org/status](https://www.ipc.org/status)**

SAVE UP TO 28% ON PCB PURCHASES



- Reduced tariff headaches
- Order tracking with daily WIP and SHIP reports
- CAM, engineering assistance, and EQ resolution
- On-site expediting, source inspection, and swift quality problem resolution
- Warehousing and distribution services management

GET STARTED →



DirectPCB®



IPC DAY MEXICO

This first-time event specifically highlighted the aeronautics industry

By Robert Erickson, IPC Director, Product Management
and Lorena Villanueva, IPC Director, Mexico

About 200 kilometers (125 miles) north of Mexico City lies Queretaro, an area rich in history, with stone streets and public squares, and which twice has been the country's capital. But it's also quickly becoming a global capital of electronics manufacturing, especially aeronautics, and was the location for the first IPC Day Mexico this past June.

IPC Day is a one-day event where IPC works with local partners to bring together members of the electronics industry from key centers in the countries where IPC operates, to discuss topics of interest around electronics manufacturing and assembly. Events of this nature are a unique opportunity to learn first-hand

about IPC's global initiatives for the benefit of the electronics industry, as well as the achievements and progress that IPC members are making to promote the region.

The first IPC Day Mexico was co-hosted by IPC and the Queretaro Aerocluster, and was attended by representatives from more than 15 different companies and organizations in the local aeronautics industry.

During the event at Queretaro Aerocluster's facility, adjacent to the Queretaro International Airport, attendees learned about IPC globally and in the Mexico region, more about IPC's workforce training programs, and were able to network and share their experiences in the industry. The three keynote speakers

discussed workforce training for electronics assembly and wire harness production, the Queretaro Aerocluster program to train students at the Aeronautical University of Queretaro (UNAQ), and trends in electronics manufacturing's "near-shoring," from Asia to Mexico.

One of the speakers, Alexandre Borsoi, director of business development for Axon Cable, discussed his company's need for skilled production employees and the support he's received through IPC's training programs. Alexandre mentioned that Queretaro has unique qualifications as a leader in aviation maintenance and repair around the world. He shared how Axon Cable supports this industry that becomes more important every day. "IPC is a guarantee of quality when we talk to a customer who doesn't know Axon Cable," he said. "Talking about IPC in our manufacturing standards is a guarantee of trust and quality."

Carlos Plaza, IPC senior director of education, spoke to the group about workforce training and the inherent value in skills training for both new and experienced employees. Because of a new agreement between IPC and the Queretaro Aerocluster, two of IPC's flagship workforce training programs have been included in a pilot program now available to the industry in that focal aerospace hub. The training courses are "Electronics Assembly for Operators" and "Wire Harness Assembly for Operators." We have high expectations for a very successful outcome from this partnership.

Antonio Velazquez, general manager of the Queretaro Aerocluster, spoke positively about this collaboration between the industrial cluster and IPC to facilitate access to IPC's workforce training programs for students at the region's universities and for employees who support the location's aerospace and aeronautics companies. Antonio noted that for the continued growth of the region's already world-class aerospace industry, highly trained labor is key. IPC's programs, especially Span-



Alexandre Borsoi



Carlos Plaza



Antonio Velazquez



This Boeing 737-200 is one of 12 aircraft used as a laboratory for the training of higher-level professionals at UNAQ.

ish-language options, provide the exact training needed. Antonio shared IPC's dream of becoming an education partner for the entire industry, not only in Queretaro but across Mexico as well.

Born and raised in Mexico City, Lorena Villanueva, IPC director of Mexico, spoke of the unique opportunities available to Mexico as a key player in the global supply chain. The combination of established industry, proximity to key markets, and the continued trend of near-shoring of electronics manufacturing, well-positions Mexico to compete and win against manufacturing regions around the globe.

Lorena spoke passionately about how to make that opportunity a reality with a labor force highly trained in industry best practices. Mexico has long been an unskilled labor market, but now with more than 100,000 engineering graduates

each year, the country is positioned to take on design, engineering, and manufacturing responsibilities in a significant way. "The only way for Mexico to solidify itself as the partner of choice for the U.S. value chain is through a trained and qualified labor force," she said during her presentation. "IPC Mexico is ready to help the industry in this endeavor."

With very positive feedback from the nearly 50 participants, IPC Day Mexico was a great success. It provided valuable insights and networking opportunities for all attendees.

We look forward to organizing similar events in other regions of Mexico. Together, we will continue our path of growth, learning, and development in the electronics industry. IPC reaffirms its commitment to continue

supporting the electronics industry in Mexico and the world, helping companies build electronics better. 🇲🇪





REVOLUTIONIZING PROCESS IMPROVEMENT

Harnessing the Power of AI Tools



Simplify programming and expedite production with Koh Young Auto Programming (KAP)



Minimize false calls and escapes while reducing operator subjectivity with Smart Review 3.0



Apply real-time process control and adjustment with Koh Young Process Optimizer (KPO)

kohyoungamerica.com



america@kohyoung.com



TESTING THEIR SKILLS

Winners from the IPC Masters Competition China 2023

By Glenn Gong, Marketing Director, IPC Asia

Over the past decade, the IPC China Skills Competition has received positive responses from the industry, attracting over a thousand participants from hundreds of companies in defense, aerospace/aviation, transportation, automotive electronics, and consumer electronics. In fact, the competition garnered enough attention that it was featured on Pudong TV in Shanghai.

The IPC China Skills Competition originated in 2010, with the aim of providing a platform for competition and exchange among professionals in the electronics industry. Beginning with the Hand Soldering and Rework Competition (HSRC), the competition has expanded its scope as the industry evolves and the popularity of the event grows in China.

In 2019, we held the Cable and Wire Harness Assembly Competition (CWAC) for the first time, and in 2022, we added the IPC Standards Knowledge Competition. In 2023, we introduced the BGA (ball grid array)/BTC (bottom terminated component) rework competition, and finally merged these four events into the IPC Masters Competition.

This year's competition, July 11-13, was co-organized by IPC and the Pudong New Area Association for Quality and Technical in Shanghai, China. Skilled contestants competed against each other to finish a functional electronics assembly within the required time limit. Judges evaluated competitors based on IPC-A-610, IPC-J-STD-001, IPC-7711/21, IPC/WHMA-A-620, IPC-7075, and IPC-7093 standards.

The IPC Masters Competition—the first competition taking place after the pandemic—wel-

comed 297 participants from 42 companies across 17 provinces and three municipalities in China, and received onsite media coverage from Pudong TV.

“The IPC Masters Competition serves as an excellent platform for communication and exchange among peers,” said Lingling Xu, Shanghai Railway Communication Co., Ltd, champion of the Hand Soldering and Rework Competition. “Participating in such events allows for extensive interaction with colleagues, and broadens one’s horizons. Additionally, it offers a platform for operators to showcase their skills and it provides guidance for future skill enhancement. Winning the national championship, to me, is not the end-point but rather the starting point for aiming at the world championship.”

Wujun Li, AVIC Computing Technique Research Institute, champion of the BGA/BTC Rework Competition, has been engaged for quite some time in various re-soldering and repair work for encapsulated components. Not only is he familiar with various plug-in components, but he utilized his spare time to study IPC standards, which laid a strong foundation for his hand-soldering work. Over the course





of 18 years, he has rigorously demanded high standards of himself, continuously honed his skills, and committed to soldering every joint well.

To excel in repairing BGA/BTC components, Li meticulously studied the operation manuals and standard operating procedures for the repair station, trained using test boards, and mastered the disassembly and soldering skills of BGA/BTC components. He firmly believes that practice is the path to excellence. “Becoming a champion in this competition is merely the starting point,” he says. “It will inspire me to elevate my skills. I will continue to delve deeper into the field of hand solder-

ing for electronic products that I am passionate about, embodying the spirit of a craftsman and perseverance.”

The IPC Masters Competition China is dedicated to providing the electronics industry with a valuable platform for mutual communication, learning, skill enhancement, and showcasing individual excellence. It allows more outstanding participants to embrace their craftsmanship, characterized by dedication, precision, meticulousness, and the pursuit of excellence.

Through the competition format, it further promotes the dissemination of standards in the electronics industry, fosters the cultivation and development of highly-skilled talents, and contributes to the high-quality development of the electronics industry.



Winners of Hand Soldering and Rework Competition

- *First Place:* Lingling Xu, Shanghai Railway Communication Co., Ltd.
- *Second Place:* Jingjing Xu, Shanghai Railway Communication Co., Ltd.
- *Third Place:* Yao Tang, Shenyang Railway Signal Co., Ltd.



Winners of Cable and Wire Harness Assembly Competition

- *First Place:* Jieyuan Cui, Shanghai Railway Communication Co., Ltd.
- *Second Place:* Xiaoqin Shi, Wuhu State Machinery Factory
- *Third Place:* Dongying Xu, Wuhu State Machinery Factory

Winners of BGA/BTC Rework Competition

- *First Place:* Wujun Li, AVIC Computing Technique Research Institute.
- *Second Place:* Si Chen, Beijing Railway Signal Co., Ltd.
- *Third Place:* Guojun Yu, Wistron InfoComm (Kunshan) Co. Ltd.

Winners of IPC Standards Knowledge Competition-PCBA Division

- *First Place:* Buyao Wang, Shanghai Haiying Machinery Factory; Feng Zhou,



- Zhuzhou CRRC Times Electric Co., Ltd.; Ruifeng Cao, Avic Lanzhou Wanli Aviation Electromechanical Co., Ltd.
- *Second Place:* Yusheng Gong, Shanghai Haiying Machinery Factory; Xueqin Zhang, Avic Lanzhou Wanli Aviation Electromechanical Co., Ltd.; Meng Ji, Shanghai Haiying Machinery Factory
- *Third Place:* Xingna Du, Avic Lanzhou Wanli Aviation Electromechanical Co., Ltd.; Hongying Guo, Zhuzhou CRRC Times Electric Co., Ltd.; Jiance Wang, Beijing Railway Signal Co., Ltd.

Winners of IPC Standards Knowledge Competition-CWAC Division

- *First Place:* Jiance Wang, Beijing Railway Signal Co., Ltd.
- *Second Place:* Feng Zhou, Zhuzhou CRRC Times Electric Co., Ltd.
- *Third Place:* Yuxin Jiang, Beijing Railway Signal Co., Ltd. 🏆





A New Venue

See what's new for IPC's annual trade show

By Alicia Balonek, Senior Director, IPC Trade Shows and Events

IPC APEX EXPO will convene April 6–11, 2024 at the Anaheim Convention Center—a new date and location for the annual trade show. The six-day event includes the industry's premier technical conference, standards committee meetings, professional development courses, keynote speakers, awards ceremonies, the largest exhibition floor in North America, a multitude of networking opportunities, and more.

The technical conference showcases the highest level of quality and technical merit through peer-reviewed technical paper presentations, and includes special sessions on

advanced packaging, e-mobility, and sustainability.

The show floor will once again attract the largest gathering of leading equipment manufacturers, suppliers, and product innovators in North America, featuring exhibitors from every step in the electronics manufacturing supply chain—all under one roof.

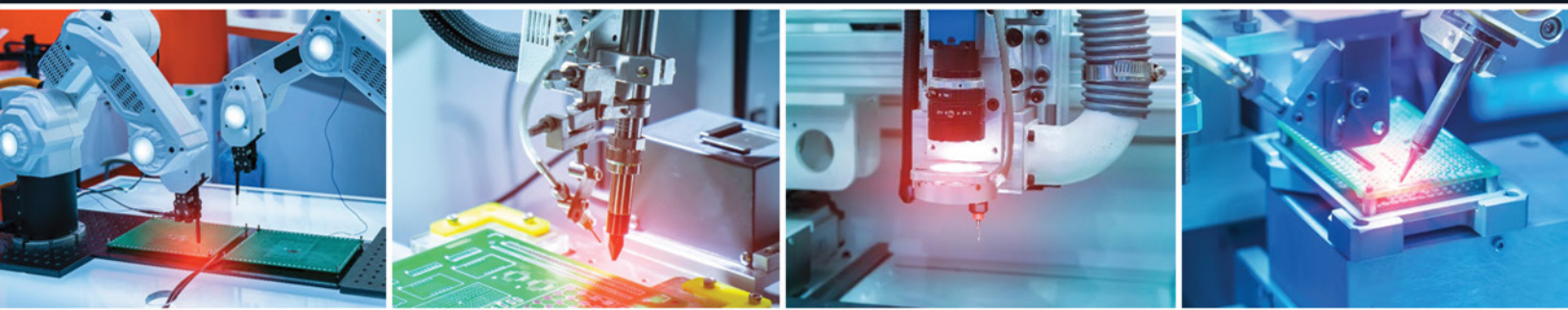
Attendees will have an opportunity to network and collaborate with their peers and industry leaders from around the world at numerous networking events including the International Reception on Monday evening. This reception is free, but you must register in advance.



AMITRON

CHECK OUT
OUR COLUMN
FACING THE
FUTURE

FACTORY 5.0



Welcome to Amitron.

Come meet the future. A whole new way of manufacturing PCBs...a whole new way of partnering with our customers, vendors, and associates.

Welcome to Factory 5.0

[CLICK TO LEARN MORE](#)



amitron.com | (847) 290-9800 | support@amitron.com



ecwc16

ELECTRONIC CIRCUITS WORLD CONVENTION

IPC is proud to host the Electronic Circuits World Convention 16 (ECWC16), April 9–11, as part of IPC APEX EXPO 2024. Over the past 40 years, members of the World Electronics Circuit Council (WECC) host this conference every three years in different cities throughout the world. ECWC16 is an opportunity for electronics industry leaders, manufacturing innovators, and subject matter experts from across the globe to convene and collaborate, to encourage knowledge sharing about the latest information on global PCB demand and PCB manufacturing processes, and to promote the domestic PCB industry in every country and region.

The WECC is a strategic partnership formed in 1998 by the major industry associations serving member companies in the global electronic circuits industry to increase the global

influence and effectiveness of its member organizations for the benefit and improvement of the industry. It is comprised of the following associations:

- China Printed Circuit Association (CPCA)
- Electronic Industries Association of India (ELCINA)
- European Institute of Printed Circuits (EIPC)
- Hong Kong Printed Circuit Association (HKPCA)
- Indian Printed Circuit Association (IPCA)
- IPC International
- Japan Electronics Packaging and Circuits Association (JPCA)
- Korea Printed Circuit Association (KPCA)
- Taiwan Printed Circuit Association (TPCA)
- Thailand Printed Circuit Association (THPCA)

Registration for IPC APEX EXPO 2024 will open in early November. Register by March 1, 2024 to save 20%. Keep up to date on event details at [IPCAPEXEXPO.org](https://www.ipcaapexexpo.org).

IPC APEX EXPO will conclude on Thursday afternoon with a special keynote address and ECWC16 closing ceremony. Both are free and open to all attendees.



Problems solved!



SUBSCRIBE NOW

IPC Around the World



North America

By Brian Knier

Vice President, Marketing, Member Success, and Sales

North American EMS and PCB Industry Shipments Up in August

Did you know that IPC conducts statistical programs for the EMS and PCB segments of the electronics manufacturing industry? Each month, IPC issues EMS and PCB book-to-bill ratios, and July was a great month for the PCB sector while the EMS sector experienced weaker orders, but stronger shipments.

- Total North American PCB shipments in August 2023 were up 26.4 percent com-

pared to the same month last year. Compared to the preceding month, August shipments were down 35.7 percent. PCB bookings in August were down 29 percent compared to the same month last year. August bookings were down 36.8 percent compared to the preceding month.

- Total North American EMS shipments in August 2023 were up 2.49 percent compared to the same month last year. Compared to the preceding month, August shipments increased 8.9 percent. EMS bookings in August increased 13.7 percent year-over-year and increased 8.2 percent from the previous month.

IPC's monthly EMS and PCB industry statistics are based on data provided by a repre-

sentative sample of assembly equipment and rigid PCB and flexible circuit manufacturers selling in the United States and Canada. To learn more about IPC's statistical programs, [click here](#).

Midwest EMS Inaugural Roundtable Event

In July, several local Midwest-based EMS leaders attended the first regional EMS Leader Roundtable at IPC headquarters in Bannockburn, Illinois. Mark Wolfe, executive EMS advisor, shared statistics on the size and makeup, and exclusive industry benchmark data of interest to the Midwest EMS market. The leaders discussed various benchmarking data opportunities, including wage, component costs, and lead times. Attendees represented companies of all sizes, primary verticals, and structures.

Much of the conversation centered around workforce development issues. Participants shared approaches to mitigating the lack of workforce, discussed solutions for attracting talent locally and generally to electronics manufacturing, and brainstormed strategies for maintaining and training line workers.

Other topics discussed were the value of facility certifications and EMS revenue growth challenges. Participants left with action items, ideas, and contacts. The group will meet again in Q4 2023.

For more information on local EMS leader roundtable events in your area or to sign up for monthly EMS statistical content, contact MarkWolfe@ipc.org.

Engineering Webinar Series

The IPC Engineering Webinar Series offers monthly educational experiences via webinars that address topics of pressing concern to members of the electronics manufacturing industry. They feature subject matter experts discussing key design issues, such as aspects of quality, defect detection and remediation, and design finalization and fabrication. Speakers include seasoned industry experts, emerg-

The graphic features the IPC logo at the top left. To its right is a circular portrait of Stanton Rack. Below that is a larger circular portrait of William Graver. The text "2023 Engineering Webinar Series" is positioned on the right side of the graphic.

IPC

Stanton Rack

William Graver

2023
Engineering
Webinar Series

ing professionals with new research, and talented thought leaders. July's webinar featured Willam Graver, program manager and master IPC trainer, speaking on "Inspection of Failure Analysis of Bottom Termination Components (BTCs)." September's webinar featured Dr. Stanton Rak, SF Rak Company, who provided an overview of best practices for preparing technical data to write a high-quality manuscript suitable for conference presentation and publication. View upcoming webinars in the engineering series, [here](#).

Europe

By Sanjay Huprikar

President, IPC Europe and South Asia Operations

After hosting a record-breaking eight events in the second quarter of 2023, the IPC Electronics Europe GmbH team took advantage of the typical industry event lull during the months of July and August to actively 1) prepare for a busy fourth quarter of events; 2) plan the 2024 event calendar; and 3) submit the highly anticipated "Silicon to Systems Industry Strategy" report to the European Commission.



In June, IPC was selected by the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) to lead a collaborative electronics manufacturing industry effort to author a high level paper that would convey the current state of the European PCB and EMS industries (with a comprehensive SWOT analysis) and provide a list of initial recommendations on how our industry could achieve supply chain resiliency by 2030 in line with the EU's priorities for digital and green transitions. The IPC team, led by Alison James, senior director of government relations, and Peter Trantz, senior director of solutions, convened a group of national electronics trade associations and key industry leaders representing important PCB, EMS, and OEM companies to deliver the report to the Commission at the end of July. The six main recommendations were:

- EU and member states declaring the industry's strategic importance for Europe
- Strategically aligning the entire electronics manufacturing ecosystem with the Chips Act
- Supporting factory modernization
- Developing a skilled workforce

- Creating a level playing field in global trade
- Investing in research, development, and innovation

The EU was impressed with the initial report (and our ability to submit it within a month) and has asked us for more detailed data and specific policy recommendations. As such, the working group has assembled this fall with a goal of delivering the next paper by the end of November.

The 2024 event calendar will feature several new opportunities for IPC to serve the needs of the Pan-European industry. In January, we will host WinterCom in Barcelona. This will represent the first time in IPC's history that our in-person, full committee, standards development meetings will take place outside the U.S. Regarding this news, IPC Senior Director of Standards Teresa Rowe and IPC Europe Manager of Standards Francisco Fourcade both commented that the process to help bring the most trusted standards to the industry is based on collaborating with all the dedicated volunteers across all regions. They said they are excited to bring these important meetings to Europe as our community helps the world build electronics better.

The popular Hand Soldering Competitions will continue to expand eastward; both Türkiye and Israel will host these for the first time in Spring 2024. While discussing these exciting developments, IPC Senior Director of Operations Philippe Leonard shared, "Continuing to put the workforce development spotlight on a core skill like soldering is fundamental for these newer markets to expand their electronics manufacturing footprint. The lack of capable workers who can solder is still cited as a key challenge in the industry, so IPC is doing its part to help alleviate that pain point."

As part of our community building activities around other key initiatives such as advanced packaging and design, IPC is planning to host

or co-host technical meetings and workshops in Germany and France in Q4 of 2024.

The European electronics industry's signature event will be productronica, Nov. 14–17, in Munich. IPC will support the industry by hosting the Hand Soldering Competition World Final there with 20 competitors from Europe, the Middle East, and Asia. In addition, the IPC booth will spotlight the vital CFX standard and the growth of wire harness technologies through a series of interactive presentations from subject matter experts around the globe.

We hosted three “IPC Day” events in Q4 to engage our European members:

- IPC Day in Romania: Build Electronics Better with Standards and Solutions, co-hosted with Flex
- IPC Day in the Netherlands, co-hosted with the European Space Agency and E-Tech
- IPC Day in Tallinn, Estonia, co-hosted with the Estonian Electronics Association and in4ma

As the industry works together to “Build electronics better,” it serves as a reminder that the “C” in IPC continues to stand for collaboration and community.

Asia

By Sydney Xiao

President, IPC Asia Operations

Nurturing technical talents has always been one of IPC Asia's efforts in the sustainable development of the industry. In July, IPC China held the IPC Masters Skills Competition, which included individual competitions for hand soldering, cable and harness assembly, BGA/BTC component rework, and IPC standards knowledge. The event received enthusiastic participation from 42 enterprises from 20 provinces, and 297 excellent competitors. Pudong TV and newspaper reported on this event. In addition, HSC events take place in Q4 in Vietnam, Japan, and Taiwan.

IPC Asia's validation program continues to grow. VALUETRONICS VIETNAM CO., LTD passed the requirements of IPC J-STD-001/IPC-A-610 (Class 1, 2, and 3) in July, making it the first factory in Vietnam to obtain IPC QML qualification. Advantech Japan Co., Ltd., also conducted QML audits in September, marking the first factory in Japan to take the IPC QML project.

IPC-Continental HERMES Day was successfully held in the Continental Jingyue factory



on Aug. 16, attended by 35 participants from Continental Changsha, Wuhu, Shanghai site, and supplier partners Pemtron, ASMPT, REHM, Viscom, ASYS, YJLINK, FUJI, and Omron. HERMES training and onsite simulation tests were included on the agenda. CFX introduction was also shared during the seminar. After the meeting, IPC subject matter experts viewed the production line, discussed the issues in the HERMES implementation, and suggested improvements.

In October, the China team hosts the highly anticipated IPC China Electronics Manufacturing Annual Conference (CEMAC) in Shanghai. There will be keynote speeches and seven forums on different themes to help the industry stay abreast of the latest trends and technologies.

India

By Gaurab Majumdar
Executive Director, IPC India

IPC Hand Soldering Competitions and IEMI 2023

The IPC Hand Soldering Competition is an annual event that tests the skills of soldering professionals across the region. Teams compete in a series of challenges to demonstrate their soldering expertise. Meanwhile, IEMI 2023 is an

international event that brings together industry professionals from all over the world.

In Q3, we had a series of notable events across different regions. These activities, ranging from skill-based competitions to industry expos and conferences, highlighted the advancements and innovations in electronics manufacturing and assembly.

IPC Hand Soldering Competition in Penang, Malaysia

In July, professionals and enthusiasts gathered in Malaysia to exchange insights and techniques on soldering, as the electronics industry is a significant contributor to Penang's economy. Ultimately, these competitions enhance the level of soldering standards across the industry by encouraging healthy competition and cultivating an environment of learning. We witnessed an overwhelming response from members and industry, and we felt the event was a huge success.

IPC Hand Soldering Competition in Dubai, UAE

IPC organized a hand soldering competition at Neuro Technology, Middle East FZE, Dubai, in July. We had a great deal of participation from the UAE electronics industry. The participants showcased their expertise and dexterity in soldering by assembling an elec-





WHMA Excess Inventory Listserv

The Wiring Harness Manufacturer's Association aims to provide members with access to the technology they need to succeed. To help accomplish this, WHMA/IPC has developed the WHMA Excess Inventory Listserv to address the industry's challenge to find inventory. Listserv is a system available exclusively to WHMA and IPC members through WHMA.org. There you'll find over 800 pieces of inventory posted for sale by other members.

Looking to sell your own excess inventory? As a WHMA member, you can post your own inventory for sale.

WHMA members who sign up for the Listserv will be able to send email updates of materials they are selling, as well as receive emails listing materials that other members have available.

This service is free and exclusive for WHMA members.

To register for the Excess Inventory Listserv, WHMA members will need to log in and access the Member's Area, then click on the WHMA Excess Inventory Listserv link for instructions.

To explore more WHMA member benefits, visit the [WHMA website](#).

tronic circuit with a miniaturized PCB board. The competition provided a platform for the electronics industry to highlight the importance of hand soldering. First prize went to a competitor from Industrial Control Care ICC FZCO, with the runners-up from Airbus Middle East Africa and Axiom Telecom LLC.

Our biggest event was IEMI 2023, where IPC India hosted more than 1,000 delegates, more than 200 meetings, and saw participation from more than 10 countries. [Learn more here](#).

In September, IPC India was a supporting partner in Electronica India, a great opportunity to network with industry professionals

and learn about the latest developments in electronics manufacturing.

Also in September, IPC India organized a technical workshop on ESD Control for Electronics Manufacturing that introduced participants to the causes of ESD and the steps taken to mitigate its effects when handling, storing, or transporting ESD-sensitive components in a manufacturing facility.

We are looking forward to hosting a series of standards committee meetings in November, as well as hand soldering foundation courses, vendor development meetings, member networking meetings, ESD workshops, and standards awareness events in Q1 2024. 

2023 Programs Q4

Stay connected with IPC through some of these regional events in October, November, and December. Visit our online calendar of events for more information.

OCTOBER

October 17-19

IPC High Reliability Forum

Linthicum Heights, Maryland

October 25-27

IPC Hand Soldering and Rework

Competition at NEPCON Japan 2023

Nagoya, Japan

October 27

IPC China Electronics Manufacturing Annual Conference (CEMAC)

Shanghai, China

October 27

IPC WorksAsia Taiwan, EV/AV Technologies Seminar

Taipei, Taiwan

October 27

Taiwan Member Appreciation Event

Taipei, Taiwan

NOVEMBER

November 9

IPC Korea Festival of Electronics

Standard and Technology (K-FEST)

Suwon, Korea

November 14-15

IPC Hand Soldering Competition:

Regional Qualification at productronica

Munich, Germany

November 16-17

IPC Hand Soldering Competition

World Championship

Munich, Germany

DECEMBER

December 1

IPC Day, EMS Europe (in conjunction

with Estonian Electronics Industries

Association)

Tallin, Estonia



We value your opinion!

Do you use IPC/WHMA-A-620? Have you had a great experience with WHMA? We want to hear about it! Scan the QR code to fill out a [quick survey](#) about the impact WHMA has had on your business.



How Do We Celebrate Member Success?

By telling stories of the electronics manufacturing industry and how we are all connected. This publication celebrates member success while sharing the important work being done within the association to better serve its members and the global electronics manufacturing community. Stay up to date on all *IPC Community* content.



Visit: ipccommunity.org/subscribe.

For inquiries regarding advertising opportunities within the magazine, contact Barb Hockaday, ad sales manager, at barbhockaday@ipc.org.

To suggest a member success story, contact Michelle Te, magazine managing editor, at michellete@ipc.org.

This magazine is for you!

Community MAGAZINE

Publisher: **Barry Matties**

Managing Editor: **Michelle Te**
971-409-9792; michellete@ipc.org

IPC Contributing Editor: **Sandy Gentry**; sandygentry@ipc.org

IPC Contributing Editor: **Linda Stepanich**; lindastepanich@ipc.org

Sales Manager: **Barb Hockaday**
916-365-1727; barbhockaday@ipc.org

Marketing Programs: **Tamara Sites**; tamarasites@ipc.org

Marketing Services: **Tobey Marsicovetere**
916-266-9160; tobeymarsicovetere@ipc.org

Art Director/Production Mgr: **Shelly Stein**; shellystein@ipc.org

Magazine Layout: **Ron Meogrossi**

Ad Design: **Mike Radogna**

Sr. Director of Technology, I-Connect007: **Bryson Matties**

IPC CMO: **Brian Knier**; brianknier@ipc.org

Cover: **Shelly Stein**

IPC Publishing Group Inc., 3000 Lakeside Drive,
Suite 105N, Bannockburn, IL 60015

IPC COMMUNITY © 2023 IPC International Inc. does not assume and hereby disclaims any liability to any person for loss or damage caused by errors or omissions in the material contained within this publication, regardless of whether such errors or omissions are caused accidentally, from negligence or any other cause.

Fall 2023, Volume 1, Number 4
IPC Community is published quarterly.

ADVERTISER INDEX

American Standard Circuits.....	2
Amitron.....	95
APCT.....	37
Arch Systems.....	21
Calumet.....	33
Chemcut.....	9
DB Mgmt Group.....	69
DirectPCB.....	85
EPOCH.....	49
EPTAC.....	5
GEN 3 Systems.....	83
HDPUG.....	51
Heller Industries.....	59
I-007eBooks.....	27, 35
I-Connect007.....	97
IPC.....	63, 106
Koh Young.....	89
NCAB.....	71
Prototron Circuits.....	19
Summit Interconnect.....	7
Technica USA.....	15
TTM Technologies.....	11
Ventec International Group.....	25
Viscom USA.....	55



MEETINGS
& COURSES

APRIL 6-11

CONFERENCE
& EXHIBITION

APRIL 9-11

Anaheim Convention Center | CA

WHAT'S NEXT BECOMES NOW

Discover the newest innovations and hear from the best minds in the electronics manufacturing industry. **IPC APEX EXPO 2024** is our industry's largest event in North America, and this year's event will feature the largest gathering of leading manufacturers, suppliers, and product innovators, a technical conference with highest level of quality and technical merit through peer-reviewed technical paper presentations, professional development courses featuring knowledge you can leverage right away, non-stop networking opportunities and much, much more! Join us in Anaheim, California, April 6-11, 2024, as **IPC APEX EXPO** host the **Electronic Circuits World Convention 16** (ECWC16).

[IPCAPEXEXPO.ORG](https://ipcapelexpo.org) | [#IPCAPEXEXPO](https://twitter.com/IPCAPEXEXPO)

