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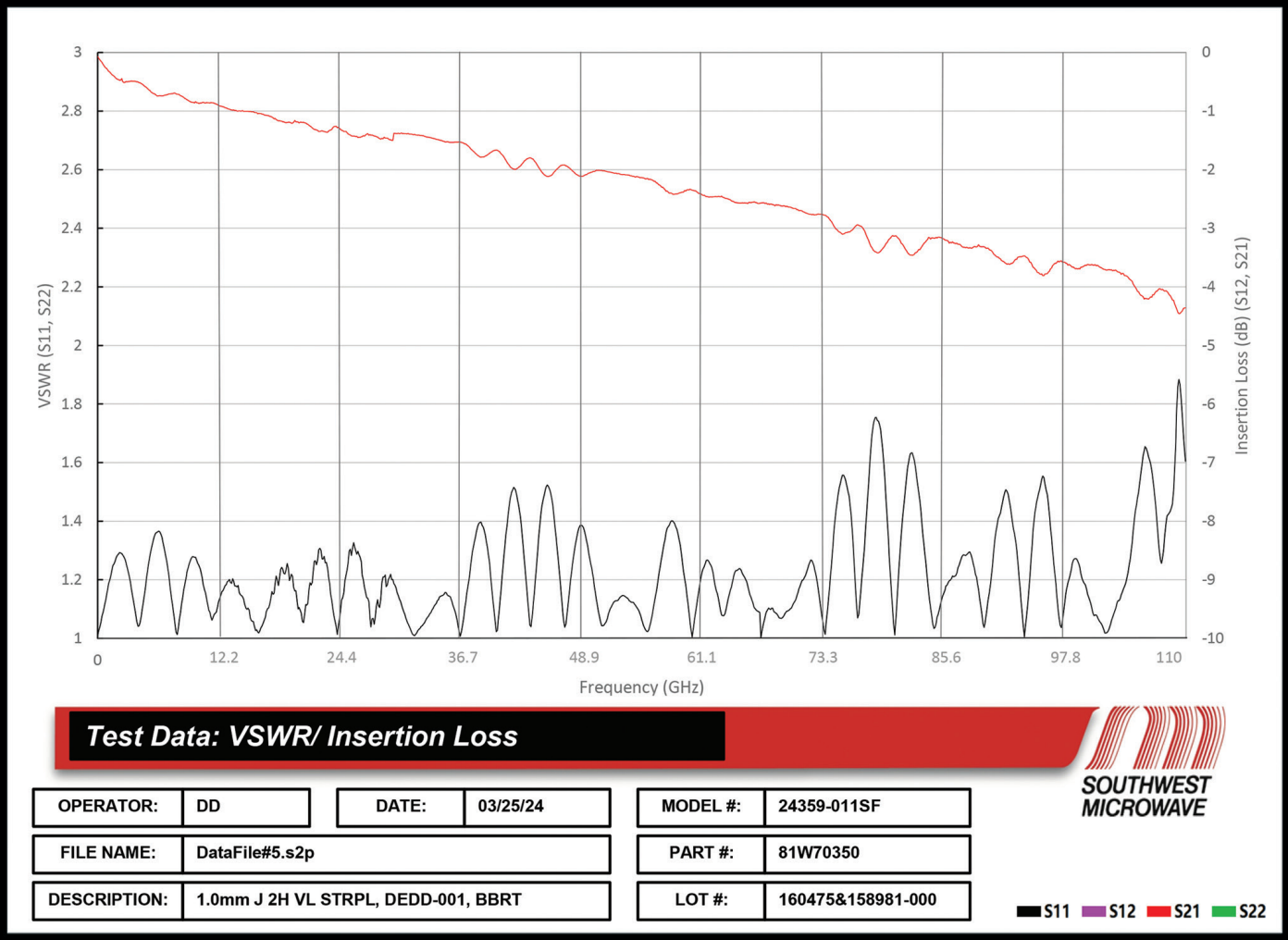

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VOLUME 3
NUMBER 1

FEATURED CONTENT

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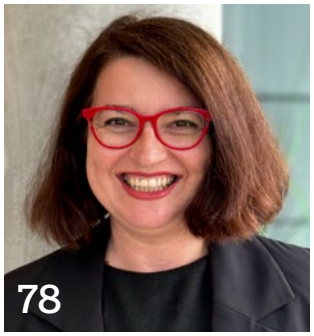
Stories



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On the Cusp of Change

Laying out our priorities for 2025

By Dr. John W. Mitchell, IPC President and CEO

Last fall, I attended electronica in Munich and thoroughly enjoyed being surrounded by industry professionals worldwide. We exchanged insights on the challenges facing our vast global industry. During our discussions, several key trends emerged: market dynamics, sustainability, geopolitics, and the increasing role of artificial intelligence (AI) in manufacturing. It became clear that the production and utilization of electronics are undergoing a fundamental transformation, leading us toward an exciting journey ahead.

What does this mean for us in 2025? For IPC, it's essential to be present wherever the industry is, which means taking a global approach to solving regional problems. You'll see more of us in local events and your facilities throughout Europe, Asia, India, Mexico, and the United States because we recognize the value of meeting people on their home turf.

Sustainability will take center stage this year as the need to protect our environment changes how we design, manufacture, and use products. This is reflected in IPC's Sustainability Initiative, which focuses on solutions using global standards, workforce training, certification and validation programs, industry intelligence, and advocacy to help solve these challenges.

We will continue to address workforce issues, expanding on our commitment to offering registered apprenticeship programs throughout the U.S. and looking to extend similar programs to other countries. Our training, education, and certification efforts will continue to seek long-term growth by fostering a skilled, adaptable, and motivated workforce.

AI, already a significant player, will continue to enhance our workforce, help us gain efficiencies, improve our workflows, and assist in necessary data collection for running our businesses.

Working closely with member companies, we will actively engage in government policy advocacy, focusing on key topics such as advanced packaging, innovation, sustainability, and a skilled workforce.

We will continue to seek solutions to the toughest challenges facing our industry while also focusing on the local concerns that face our global membership. We will be the common element that connects us all, building a larger community that focuses on the most critical challenges and opportunities facing your part of the world today and tomorrow.

While this overview only touches on some of the issues, challenges, and topics we will face in 2025, the electronics industry is vast. It impacts every aspect of our lives, and that can feel overwhelming. However, there is a through-line holding all these disparate parts together: IPC, your global electronics association. You can expect to see more of us in 2025 in regional locations worldwide. I look forward to seeing you and saying hello.

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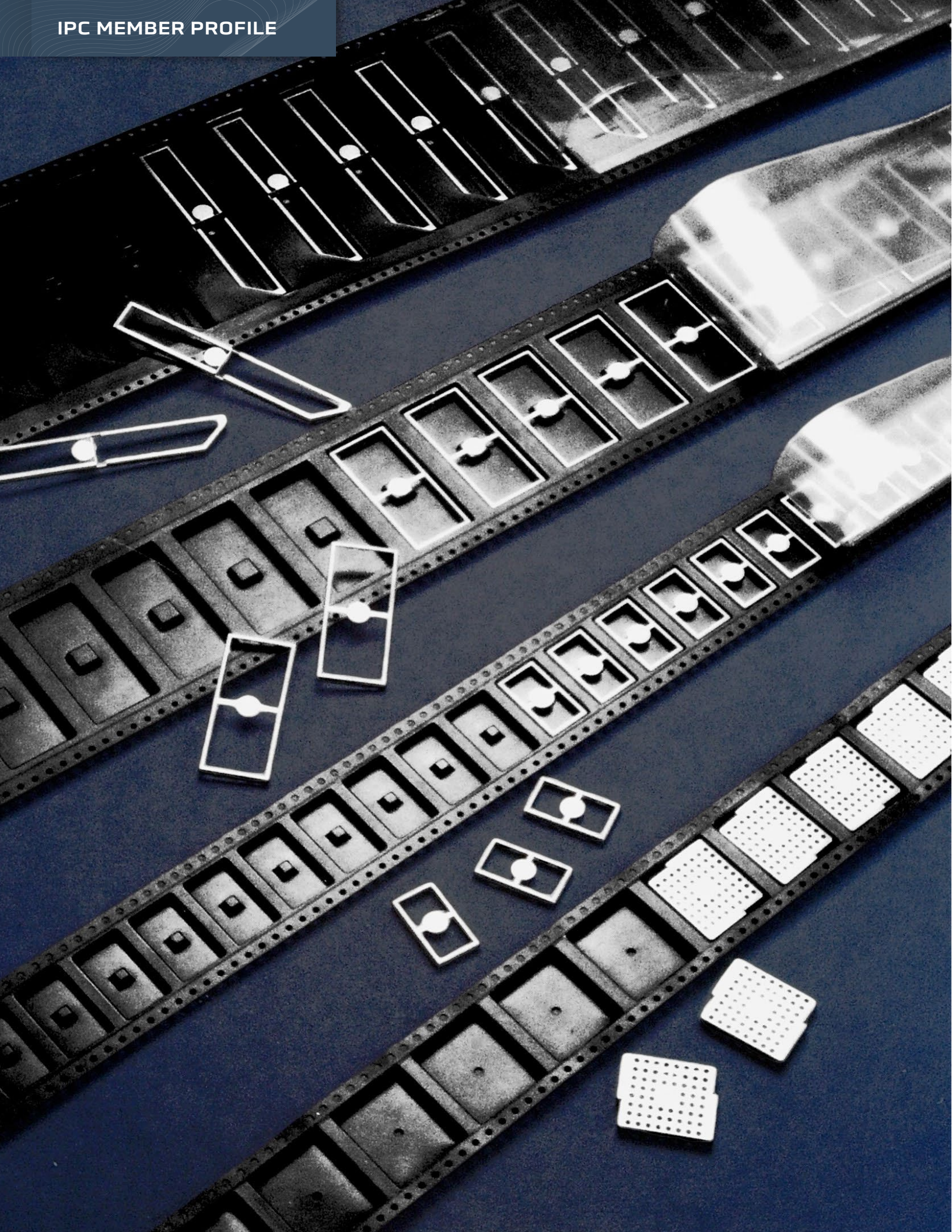


Delivering on a Promise

Mid-America Taping and Reeling meets customer needs while outpacing the competition

By Linda Stepanich, Contributing Editor

A motto on the conference wall at Mid-America Taping and Reeling, "Promise only what you can deliver and then deliver more than you promised," has led to Barbara Paul's success, from starting her business in her parent's basement to a thriving company with locations in Illinois and Florida and 75 employees.

IPC member Mid-America is a leader in supplying tape and reel services to the electronics industry. It specializes in surface mount, axial and radial taping, baking, dry packing, lead forming, and memory device programming.


Barbara Pauls

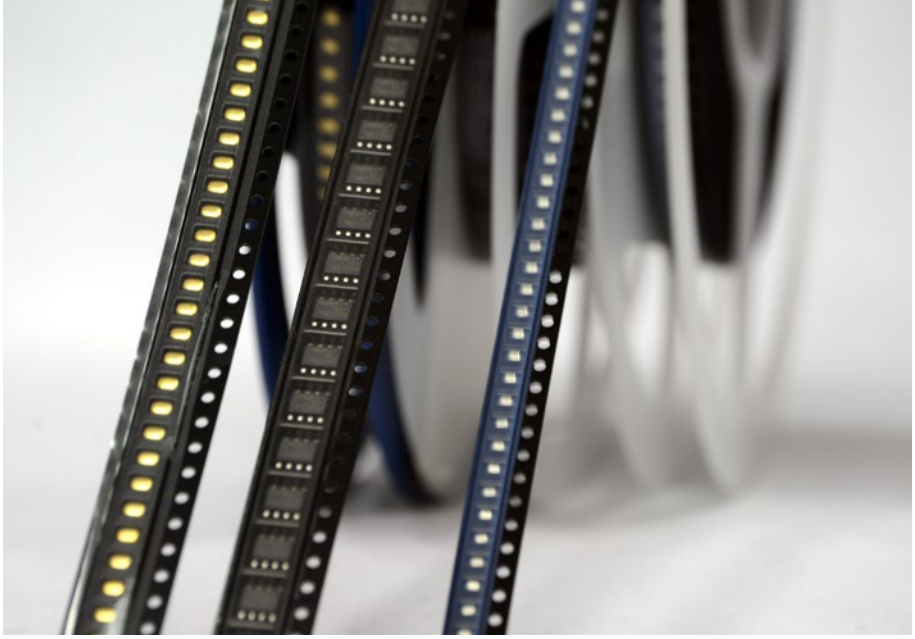
Barbara was a college student in the mid-1980s, working for a printing broker who had set up his own business. As she watched him, she realized, "I could do this. I want to start my own business. I don't want to depend on someone else for a living, and I want to forge my path."

With that determination and an innate curiosity, she sought opportunities to realize her dream. Her first outreach was to her own family. "I went to my uncle, who had made himself a multimillionaire in eyeglass frames," she says. "I told him I wanted to start my own business and asked him for ideas. He said he'd met someone who was selling an axial lead taping machine. I had no idea what that meant, but I learned that this was a growing industry."

She shared that information with her father, an engineer at Navistar, "who told me that it was a way to sequence electronic components for automation and that I should investigate it," Barbara says. "There was no internet back then, so I researched the Thomas Register of North American Manufacturers at the local college library to find out who was putting circuit boards together and who I could approach for a sale."

Barbara and her father set up her first axial taping machine in her parents' basement, and she started cold-calling local businesses to build a client base. Her first client, Bally, agreed to give her their business only after an audit. "I was mortified when he said he would come to the basement of my parents' house since I didn't have an office," she says. "But I passed the audit with flying colors," and her business was born.

Barbara continued reaching out for sales, and with help from her mother this time, they did all the taping and reeling until the business became solvent. "Sometimes I'd stay up all night to tape a big job, drop it off, and collapse when I got home. I was in that basement for over a year until I could rent a 1,200-square-foot unit. It was tiny, but above the ground, and I got to put my name on the door. I kept building the business and eventually started making carrier tape pockets."



Barbara describes how she met the needs of a changing industry while outpacing her competitors. "I went in a direction that my competitors didn't," she says. "Most people were chasing the IC market, and I entered the metal stamping market. They were all fighting for that same piece of pie, so I went toward the metal stampings and got away from the competitive IC stuff. I did very well in that market during the '90s. Even today, we still do a lot of metal parts, but we do a lot of ICs as well."

As any business owner knows, unforeseen events require companies to pivot and adjust to various challenges. The most formidable challenge for Mid-America Taping and Reeling was losing a significant client, Motorola.

"We were doing a lot of metal stamping for Motorola's cellphones," Barbara says. "We had locations in Florida and Illinois, where Motorola was headquartered. We did a lot of business for them until they packed their bags and moved to China. It was devastating. There was a vast network of companies in the Chicagoland area living off the Motorola build, and when that went away, we had to reinvent ourselves quickly."

Her company adjusted to the loss of such a large client by making "a quick turn and going automotive instead of focusing on cellphones because that

"Most people were chasing the IC market … so I went toward the metal stampings. I did very well in that market …"

—Barbara Pauls

business was going overseas," she says. "The writing was on the wall."

Barbara credits her staff for the success of the company. "I've had people here for 20 to 30 years with me," she says. "Without them, nothing would be possible. Most of my employees are women; the company has Women Business Enterprise Certification (WBENC). We are very proud of that."

Mid-America Taping and Reeling exhibits at many trade shows, including annually at IPC APEX EXPO. "IPC APEX EXPO is so well done, and they support women in business," Barbara says. "It is by far our best show. So many of our customers attend, and we get to see each other. The networking is incredible."

Barbara's Abundant Life

What does Barbara Pauls do when she is not running her business? In addition to spending time with her family—she is the mother of five and grandmother of four—Barbara loves to paint. "It is very relaxing to me, and I can get lost in it," she says. "I also love to read."

Raising her children while running a business made for a very busy juggling act, and Barbara kept each child with her in the office for their first year, creating a nursery in a small office next to her own. "Between me and my husband, we were juggling kids like crazy, and when I look back, I wonder how we did it," she says. Four of her children currently work for the company.

Barbara's experience balancing work and family led her to create a flexible and family-friendly workspace for her employees. "We are like a family," she says. We just try to take care of each other."

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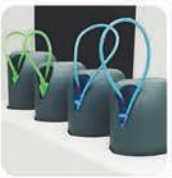
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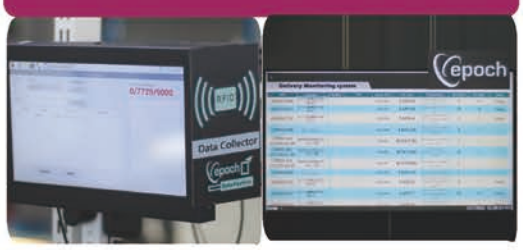

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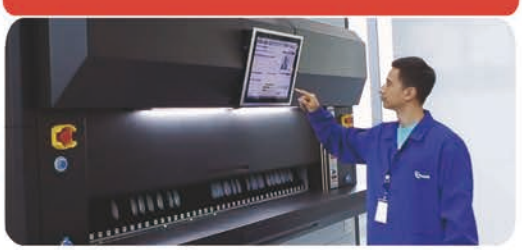

Global Sales & Support

Trade Tensions and Tariffs

Who bears the cost in these shifting trade patterns?

By Shawn DuBravac, Ph.D., IPC Chief Economist

During his 2024 presidential campaign, President Donald Trump suggested imposing a universal tariff of at least 10% on all imports, as well as a 60% tariff on goods originating from China. More recently, he proposed implementing blanket tariffs of 25% on all products imported from Canada and Mexico and adding a further 10% tariff to all existing duties on Chinese imports.

These potential measures emerge against a backdrop of shifting trade patterns. In 2023, Mexico surpassed China as the United States' top source of imported goods for the first time since the early 1990s, helping make Mexico the leading U.S. trading partner, followed by Canada and then China.

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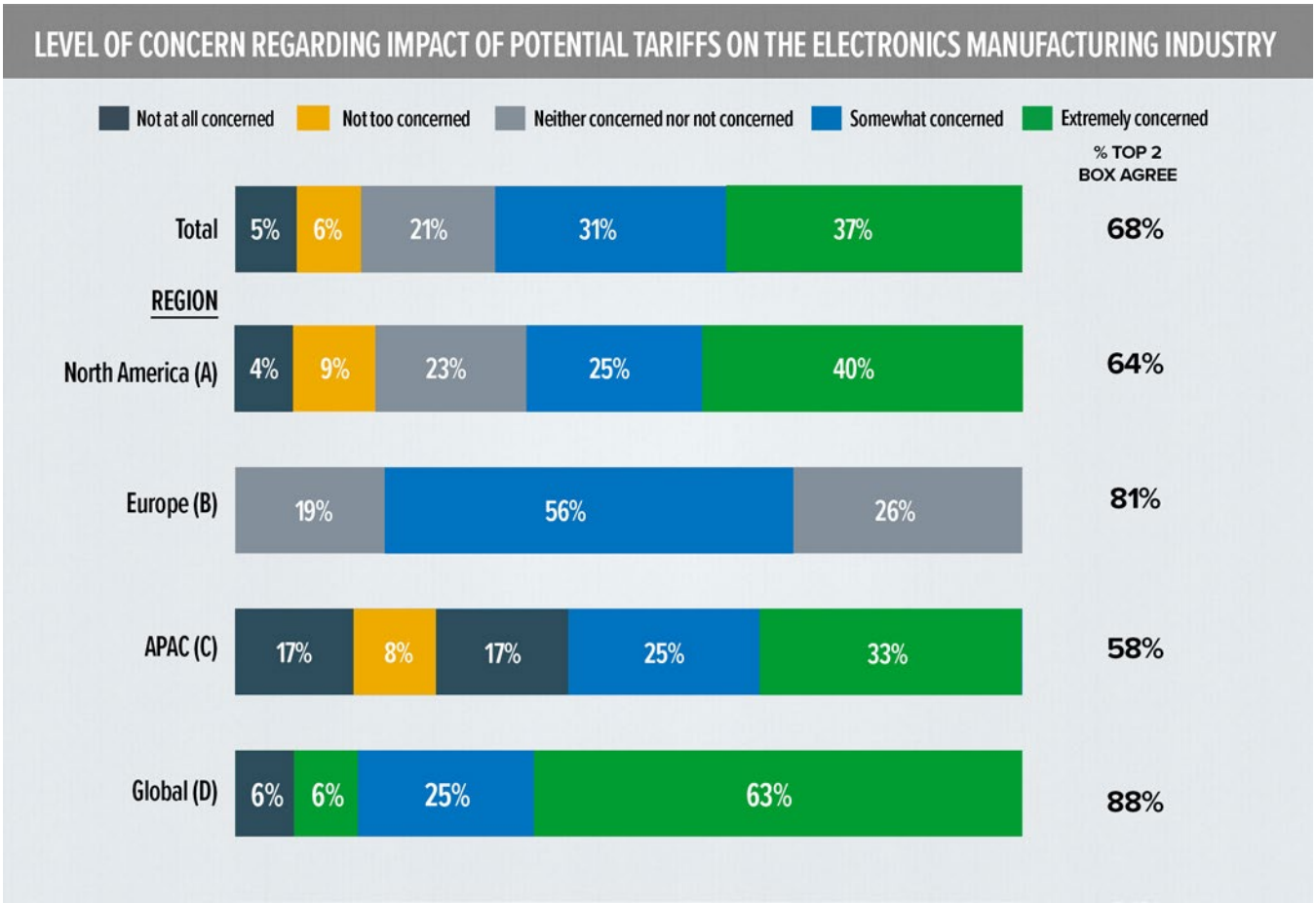

These key U.S. trading partners have signaled the possibility of retaliatory measures in response to higher U.S. tariffs. Such signals underscore escalating trade tensions and reflect how economic tools are being used to address broader issues, including geopolitical rivalry, supply chain disruptions, and market competitiveness.

The specifics of any additional tariffs—when they would be implemented and which goods they would cover—remain uncertain. Their potential impact is also unclear. However, research on previous tariff increases suggests negative consequences not only for trade volumes but also for businesses.

Work by U.S. economists examining the effects of the 2018 U.S. import tariffs and subsequent retaliatory tariffs, found significant declines in both imports and exports[1]. Moreover, the prices of tariff-targeted imports did not decrease, indicating tariffs were fully passed on to consumers and firms. Foreign exporters did not substantially lower their prices to offset the tariffs, meaning Americans effectively bore the cost of the tariff increases. They estimate losses to U.S. consumers and import-reliant firms amounting to $51 billion, or 0.27% of GDP. Similarly, a study by economics professors for CESifo Working Papers[2] found U.S. importers paid 93% of U.S. tariffs while Chinese importers absorbed about two-thirds of the retaliatory tariffs China imposed.

In a subsequent U.S. study[1], economists found that the U.S.-China trade war created net export opportunities for some countries, rather than merely diverting trade. Many "bystander" countries increased their exports of taxed products to other global markets, excluding both the U.S. and China. The results highlight that countries capable of substituting U.S. or Chinese exports—operating along downward-sloping supply curves—benefited significantly from the trade war.

In recent weeks, IPC surveyed electronics manufacturers and suppliers to understand how they plan to navigate these potential tariffs. A majority (68%) expressed at least a moderate level of concern about the impact on the electronics manufacturing sector. This widespread apprehension—spanning across regions—reflects the high stakes involved. The electronics sector anticipates that potential tariffs could threaten cost structures,

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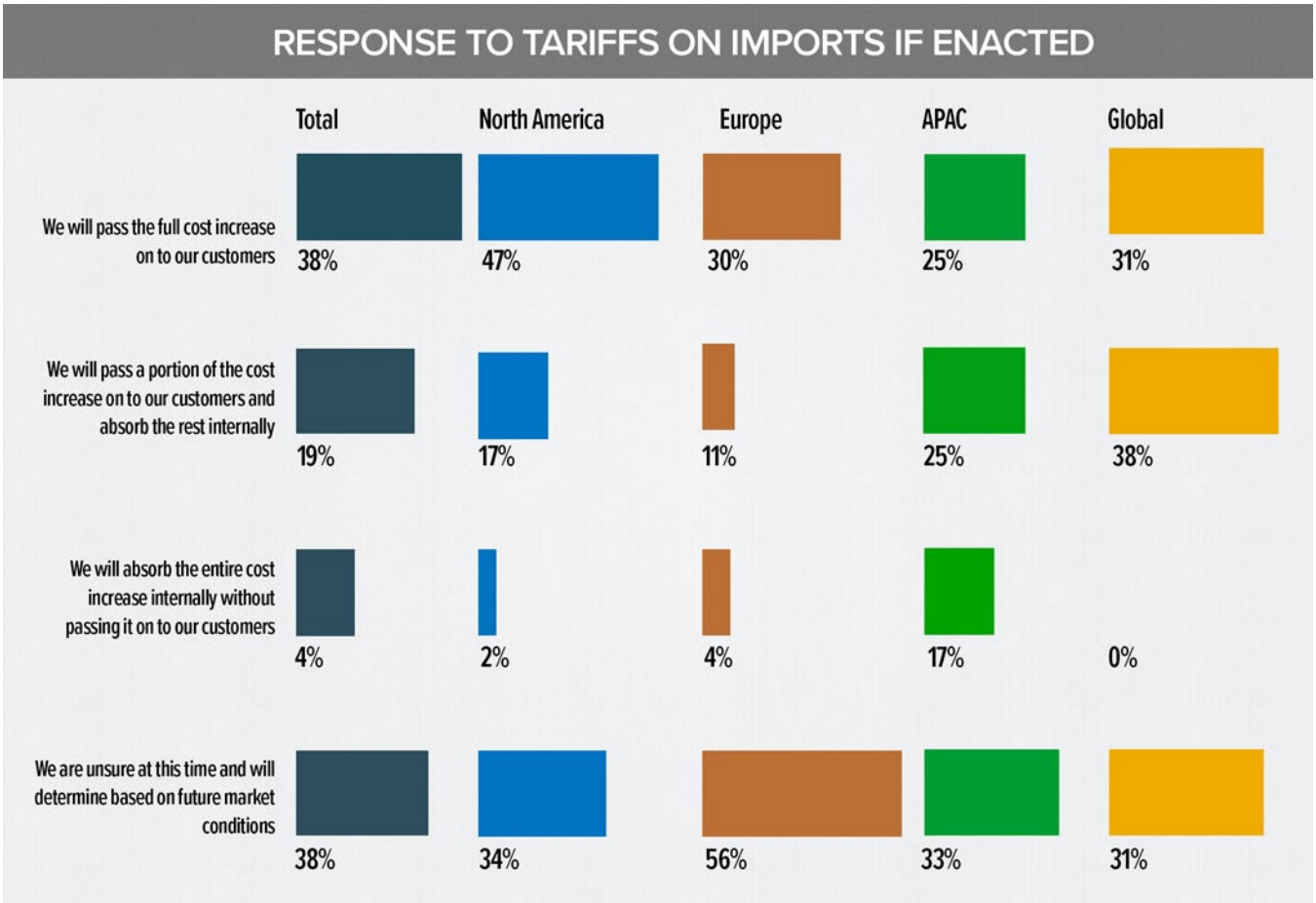

competitive positions, and overall industry stability.

A substantial proportion of electronics manufacturers (38%) intend to pass the full cost increase on to their customers, while another 19% plan to share some of the added expense, passing part of it along and absorbing some internally. Only a small minority (4%) expect to absorb the entire cost without raising prices. This distribution of strategies suggests that most firms believe at least some of the tariff-induced costs will need to be transferred to end-users.

Looking ahead, the global trade environment appears increasingly uncertain. President Trump's proposed tariffs—ranging from broad-based levies on all imports to targeted increases on goods from key partners—signal a departure from the status quo. As shifting trade dynamics place Mexico and Canada more prominently on the U.S. import roster, the potential for retaliatory measures looms large. The resulting tensions threaten not just raw trade volumes, but also consumer wallets, corporate bottom lines, and delicate geopolitical equilibria. Amid this uncertainty, smaller "bystander" nations stand poised to gain, capitalizing on trade diversion as world powers vie for leverage and control.

In the electronics manufacturing sector, concern and apprehension are palpable. While some firms intend to pass the costs on to customers, others may absorb part of the burden themselves. As policymaking unfolds and retaliatory postures evolve, both industry players and consumers will be forced to adapt. Ultimately, the path forward will depend on how swiftly and wisely the U.S. and its trading partners navigate this delicate era. Research to date offers crucial lessons: Tariffs often produce unintended consequences and understanding who truly bears these costs will be essential for informed decision-making in a complex, interconnected global economy.

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2. "Who Pays for the Tariffs and Why? A Tale of Two Countries," by Chaonan Feng, Liyan Han, and Lei Li, CESifo Working Papers, June 2023.

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Mind Meld

Brian Chislea and AJ Arriaga embark on a journey of discovery and growth in IPC's mentorship program

IPC's Emerging Engineer program provides professionals an opportunity early in their careers to learn from dedicated industry volunteers participating in standards development. Two participants in the program—Brian Chislea, Dow Chemical, mentor to AJ Arriaga, Summit Interconnect—share their experiences in the program in a series of articles. We will follow them through their three years in the mentor program. This is the first in the series.

Brian J. Chislea

Occupation: Scientist and Application Engineer, Dow Chemical

Achievements: 27 years of industrial experience:

- Specifying and purchasing industrial equipment for the manufacture of new vehicle components
- Early-stage Compound Semiconductor program for the development and scale-up of SiC wafer production
- Crucial role in development of materials that enable novel, next-generation solar architectures
- Multiple patents and external publications regarding development of several electrically conductive adhesives

IPC Involvement:

- Chair, Conformal Coatings Task Group
- Co-chair, Encapsulation Committee
- Member, EV Quality and Reliability Task Group

Passions: 3D printers (we have eight at our house), gardening (I love to make salsa), recycling (I make art glass in a rock tumbler), sustainability (focus on reliability), and family (married for 22 years with two children who share my passions).

Jorge A. (AJ) Arriaga

Occupation: Chemical Process Engineer, Summit Interconnect

Education: Bachelor of Engineering, BE Chemical and Biological Engineering, Biomedical Engineering, Colorado State University

IPC Involvement:

- Second year, Emerging Engineer Program
- 5-32G, Residue Assessment Task Group

Passions: My biggest passion is learning and trying new things. I like to read and acquire new skills. I also like being outside, especially skiing and playing soccer.

Brian's story: When I joined IPC, my mentor introduced me to leaders within my area of focus and immediately connected me to the next generations of specifications. He helped me form friendships that have lasted throughout the years. I have enjoyed the cross-industry collaboration and lively debate on topics.

I recall planning to attend my first IPC APEX EXPO, and my mentor had planned to meet me in San Diego. We would be arriving from different regions of the Northeast, and as luck would have it, there was a significant snowstorm.

With minimal delays, I made it to the warm weather of California; unfortunately, my mentor's flights were canceled, and he had no chance of traveling for several days, leaving me at the conference and show without knowing anyone. Initially, I felt somewhat like a fish out of water, but my mentor put me in direct contact with key committee leaders. Everyone within the IPC community was so welcoming. One key leader spent considerable time connecting me with all the committees most important to electronics protective materials and engaged me in several networking events.

We still work together, and their mentorship was quite similar to what is now the Emerging Engineer Program.

This was just one of many experiences I've had with mentorship programs—both on the giving and receiving ends. In my personal life, I have logged more than 1,200 hours working with more than 110 students in my local Michigan STEM community, and I very much anticipated opportunities to be a mentor for IPC.

In early 2024, I became a mentor for AJ Arriaga, a process engineer for a printed circuit board fabrication manufacturer. We got to know one another at IPC APEX EXPO 2024. We were able to share our networks and expand each other's experience of the show.

Being from different regions in the electronics value chain allows us to cross-collaborate and discuss each other's paradigms in the industry. AJ's contributions are on the functional circuit device and more upstream from my materials. My materials are generally applied after circuits are assembled to protect them from the negatives of environmental impact. The interaction between what each of us designs is, however, critical to the overall reliability of the assembly. Having the opportunity to create a mindshare on these interactions can only further benefit the knowledge of IPC.

My expectation for being a mentor: Unlike teaching or presenting, being a mentor is a two-way interaction. As a mentor, you can be both a student and a teacher while networking with peers of similar interests. I find more value in this type of interaction than just presenting a body of work because you can broaden your industry knowledge beyond your area of focus.

The IPC Emerging Engineer Program encourages attendance at several networking events and provides dedicated resources for the success of the program. AJ and I will engage in the mentorship program for three years. I feel that's enough time to see the broad range of activities, build a solid network, and ultimately help AJ start contributing within the IPC community for early career professionals.

AJ's story: As a new member of the electronics manufacturing industry, I have an opportunity to always be learning from some of the most experienced leaders in the industry. I work as a chemical process engineer at Summit Interconnect in Hollister, California, where we build prototype printed circuit boards for well-known companies in Silicon Valley and across the United States. Building a circuit board is an intense and complicated process, with each step affecting later steps. These interactions are understood only after many years of training and experience, so I feel lucky to work with and learn from colleagues who have decades of experience.

My line of work fits well with my curious personality. I'm always looking to learn and try new things. I love to innovate along the way. This is one reason I joined the IPC Emerging Engineer program. I wanted to work with industry experts to develop my professional knowledge and skills. In my two years in the program, I've done my best to take full advantage.

Being part of the EE program means attending IPC APEX EXPO, where I've met other industry experts, attended professional development courses, and participated in standards meetings, where we get to amend and vote on IPC standards.

My mentor in the EE program is Brian Chislea, an electronics application engineer at Dow. I met Brian in person at the trade show this year, and he introduced me to many of his colleagues in the IPC community, all of whom happily shared their experiences and offered their advice to a young engineer like myself.

Brian is chair of the Conformal Coatings Task Group and invited me to attend. There, I learned the ins and outs of joining a task group and, ultimately, how to lead one. It was a pleasure working with and learning from Brian during APEX EXPO, and I look forward to continuing our interactions during my final year in the EE program and beyond.

I also enjoyed attending the standards development meetings, where I saw how manufacturers

and end-users work together to find common ground in the IPC specs as they build reliable products that suit the users' needs.

Another advantage of the EE program is the access to PD courses, which allow me to dive deep into specific topics of interest. Some courses I've taken include PCB Fabrication Basics, Process Flow and Associated Defects, and Design for High Reliability. I've used information from all these courses in my work at Summit.

In fact, two weeks after attending my first show, there was a sudden and random increase of voids inside plated through-holes which led to us scrapping a lot of product. I used information I had gained from the courses to identify that the problem was due to photoresist lock-in. The

engineers attacked the problem and found that a thermocouple on the hot-roll laminator wasn't working correctly, which heated the dry film far beyond the optimal temperature. This caused the dry-film lock-in. It has been a great example of applying the information I gained from IPC to solve real-world problems in our shop and provide value to the company and our customers.

These opportunities, combined with my mentor, have been invaluable to my early career. It is a privilege to learn from industry leaders in many different fields. I feel fortunate to work at Summit Interconnect, a company that values the training and education of its employees and invests in us with programs like IPC's Emerging Engineers. I often hear this is an aging industry, and that there is a massive need for young people to contribute as experienced professionals. My goal is to someday contribute my knowledge to the IPC community and young professionals like myself.

My expectations: I hoped to attend IPC meetings with my mentor and get an inside view of their work and why they're important. Brian leads a committee, so I thought it would be interesting to see what goes into IPC committees. I also expected to attend some interesting professional development courses and learn together. What I didn't expect, however, was Brian's popularity, as he introduced me to many people involved in IPC. It was a great networking experience for me.

Want to become an Emerging Engineer or Mentor?

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ROADMAPPING SUSTAINABILITY

Paving the way for eco-friendly electronics

By Tom Okrasinski, Nokia Bell Labs; Fu Zhao, Purdue University; Francis Mullany, iNEMI

Embedding Sustainability Into Electronics Manufacturing

In light of ongoing climate challenges, the electronics industry is poised for a transformative shift driven by heightened consumer and corporate awareness of sustainable practices and circularity. iNEMI (International Electronics Manufacturing Initiative) enlisted the help of the electronics industry to roadmap that transformation in electronics manufacturing. This article provides an overview of the resulting sustainable electronics roadmap and how to get involved.

The coming transition to sustainable electronics is in both technology and market structure and must address the three Ps of sustainability:

- **Planet:** Environmental sustainability for minimizing emissions, including greenhouse gas emissions, optimizing resource usage, and protecting biodiversity.
- **People:** Social sustainability addressing human rights, social justice and equality.
- **Prosperity:** Economic sustainability, managing resources and systems in a way that supports long-term economic growth.

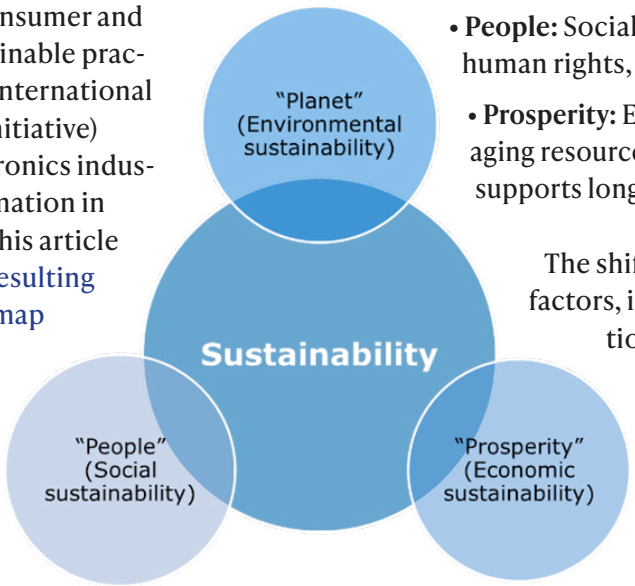


Figure 1: The three Ps of sustainability.

The shift is catalyzed by various factors, including stringent regulations, consumer demand for eco-friendly products, and the realization that the traditional linear model of electronics production and disposal is no longer tenable.

Government policy and regulation is just one element informing corporate approaches to sustainability. Instead, there is a broader range of key stakeholders:

- **Consumers/service suppliers:** Increasingly aligning their purchasing decisions with their values for a greener future.
- **Shareholders:** Increasingly motivated by a combination of ethical, financial, and strategic drivers. Regulatory compliance and near-term profitability are just starting points:
  - From an ethical standpoint, shareholders recognize the need to align their investments with principles of responsible consumption and production.
  - For long-term financial profitability, embracing sustainable electronics enables suppliers to tap into new market segments and cater to the burgeoning demand from environmentally conscious consumers.
  - Strategically, shareholders also recognize that visibly supporting sustainability enhances brand reputation and fosters innovation in product design and manufacturing.
- **Government/regulatory agencies:** Driven by a pressing need to address the environmental and societal challenges posed by scarce resource access, e-waste, and the broader impact of electronics on the environment.

From Linear to Circular Business Models and Technologies

Circularity refers to an economic and production model that aims to minimize waste, optimize the use of resources, and promote the continual reuse, recycling, and regeneration of materials and products. This concept contrasts the traditional linear economy, which follows a "take-make-dispose" pattern, leading to significant resource depletion, environmental degradation, and waste generation.

Circularity involves the key principles of repair,

reuse, remanufacture, recycling, and waste reduction, as highlighted in the Ellen MacArthur Foundation butterfly diagram (Figure 2).

The iNEMI Roadmap analyzes circularity in detail, mapping out needs, gaps, and solutions. It highlights the following key trends:

- **Leadership for change:** Some companies will act as the leading change agents to demonstrate a new value proposition with financial success and thus help followers navigate the new space.
- **Business model:** Circularity requires significant changes to the manufacturing business model, e.g., from product-oriented to service-oriented (i.e., toward electronics-as-a-service). New business models may also be needed to extend to current collection and recycling networks.

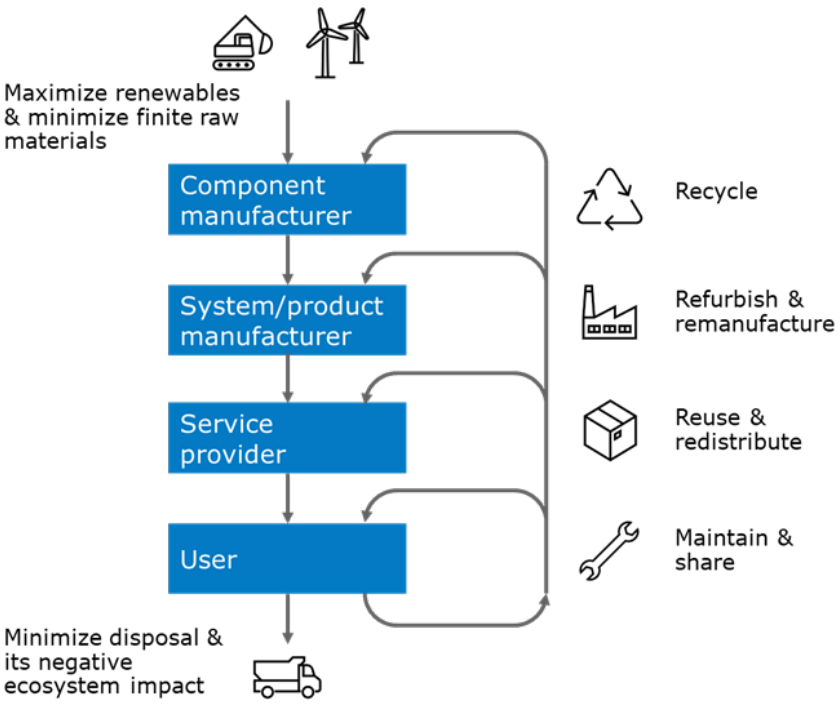


Figure 2: One half of the Ellen MacArthur Foundation butterfly diagram for circularity: The technical cycle.

- **Metrics and methodology:** Although there are many metrics and methodologies that have been developed for circularity, one suitable for electronics remains to be established and standardized.
- **Technologies to support cost-effective reuse, remanufacturing, and recycling:** In business-to-business market segments, reuse, remanufacturing, and recycling have made significant

MATERIAL	USE IN ELECTRONICS	AMOUNT USED	POTENTIAL RECOVERY VALUE (HIGH/LOW)
Epoxy resins	Laminate dielectric material	High	Low
Sulphuric acid	Cu plating and micro-etchants (Cu)	High	Low
Hydrochloric acid	Used in etchants (Cu)	High	Low
Hydrogen peroxide	Used in micro-etchants or etchants (Cu)	Medium	Low

SOLUTION/TECHNOLOGY DESCRIPTION TO ACHIEVE 4Rs	4 Rs TRL: TODAY -2023	4 Rs TRL: 3 YEARS -2026	4 Rs TRL: 5 YEARS -2028	4 Rs TRL: 10 YEARS -2033
Reduce waste through additive processes	7	8	8	9
Grind & recover metal, burn or repurpose resin	8	8	8	8
Replace with bio-degradable resin	1	3	5	6
Solutions to extract and reuse the epoxies	1	3	5	6
Improved consumption control (e.g. with lower concentrations)	9	9	9	9
Repurposed for other industrial applications	9	9	9	9
Waste treatment + disposal	9	9	9	9
More efficient use (including reuse in-process)	9	9	9	9
Repurposed for other industrial applications	8	8	9	9
Waste treatment + disposal	9	9	9	9
Reused & recycled in-process	9	9	9	9
Waste treatment + disposal	9	9	9	9

Figure 3: Compound materials used in PCBs and their manufacture, the associated sustainability issues, and technology readiness of the appropriate recycling and reuse technologies.

progress. However, consumer electronics face challenges, and their efforts need to be scaled up. Standardization and adoption of digital product passport technologies and practices to monitor, track, and manage the movement of goods throughout the supply chain could act as a catalyst for the development of these technologies.

- **Product design for circularity:** A proactive design approach with circularity in mind and the development of supporting tool capabilities, can greatly optimize effective end-of-life management efforts, while not compromising on product performance and reliability.
- **Education:** Workforce development and training of engineers in practice are needed to promote circularity.

From Reactive to Proactive Industry Approaches to Materials Selection

From a materials perspective, sustainable electronics means higher material efficiency and improved functionality, while utilizing materials with lower environmental impacts and human health risks. That combination calls for an industry approach that moves from reactively responding to regulation to proactively addressing sustainability issues:

- Selecting materials that minimize greenhouse gas emissions
- Proactively identifying and addressing health and ecotoxicity concerns
- Building secure and socially responsible supply chains
- Researching material reuse and recycling to support a circular economy

The iNEMI Roadmap also identifies and characterizes critical raw materials and compounds by various dimensions of sustainability. The expected technical maturity of various approaches to recycling and reuse of different materials is mapped over time; an example is shown in Figure 3.

Roadmapping Ecological Footprint Reduction

The electronics manufacturing industry is heavily focused on optimizing resource-intensive manufacturing processes. Key targets are energy-efficient production and responsible water management. Furthermore, biodiversity impact from land footprint is an increasing concern, particularly for new builds.

While IEEE's International Roadmap for Devices and Systems (IRDS) has addressed the energy and water footprint for semiconductor fabrication, there is a gap in technology roadmaps for PCB fabrication and board assembly processes. iNEMI will address this gap by roadmapping the ecological footprint of these important parts of the electronics supply chain.

Electronics Manufacturing—An Industry in Transition

The challenge of sustainability is driving electronics manufacturing to revisit its materials, processes, and design methods. In some cases, sales and aftercare models will also change, again requiring technology advancements to support repair, recycling, and reuse. It is a challenge that is posed by all stakeholders, from customers, governments, shareholders, and from within the industry itself. However, it is a challenge that can and will be met through technology and business innovation.

This transformation not only promises to reduce environmental impact but also opens new opportunities for growth. By embracing sustainability, the electronics industry has the potential to set a benchmark for responsible innovation across sectors.

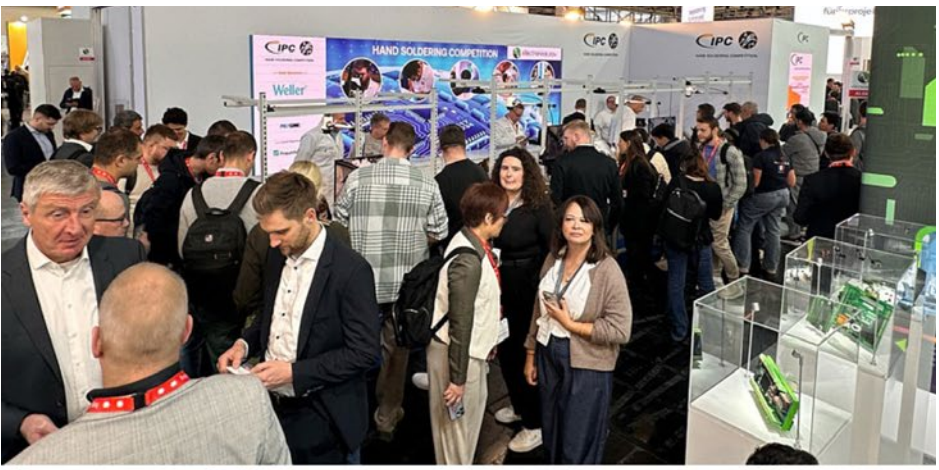
About the authors

Thomas Okrasinski is director of Product Environmental Engineering for Nokia Bell Labs; and Fu Zhao is professor of Mechanical Engineering and Environmental and Ecological Engineering at Purdue University. They are co-chairs of the iNEMI Sustainable Electronics Roadmap. Francis Mullany is iNEMI's director or Roadmapping.

HOW TO ENGAGE WITH THE INEMI ROADMAP

iNEMI will host an online webinar on Feb. 13, 2025, to kickoff roadmap work on ecological footprint reduction. Click here for details and to register. Industry experts are needed to join existing roadmapping teams across a range of topics. If you're interested, send an email to roadmap@inemi.org for more details.

LEADING AT electronica 2024



IPC celebrates successes in innovation, networking, and global participation

By Philippe Léonard
IPC Europe Senior Director

IPC is thrilled to report on the incredible success of our participation at electronica 2024, Nov. 12–15, in Munich. The 60th biennial event hit a record-breaking 80,000 visitors and exhibitors. IPC showcased its innovation, collaboration, and leadership in the electronics manufacturing industry where this year's global trends were electrification, digitalisation, automation, and innovation, with a vision of an all-electric society.

The trade show brought together 3,480 exhibitors from 59 countries; 76% were international professionals, underscoring the global reach and significance of the event. Three hundred sixty-four press representatives from 27 countries highlighted the global interest in innovation and global trends. IPC's presence at electronica was marked by a range of engaging activities and highlights. The IPC Forum presentations featured key industry players, including representatives of Zollner Elektronik AG, ILFA Feinstleiter Technologie, GPV Group, and Lacroix Electronics, who spoke on sustainability, advocacy, Factory of the Future, and PCB design. These thought leaders raised awareness and magnified calls to action within the electronics manufacturing landscape.

Philip Stoten of SCOOP, a leading industry journalist, conducted 47 one-on-one interviews with industry leaders at the IPC booth, shedding light on global manufacturing trends, insights, challenges, and market strategies for 2025. Of the 47 interviews, four IPC staff members spoke with Phil: Dr. John W. Mitchell, IPC president and CEO; Chris Mitchell, IPC vice president, global government relations; Alison James, senior director, European government relations; and Sanjay Huprikar, IPC president, Europe and South Asia operations.

Our hand soldering competition area hosted the German Regional Qualification and the World Championship, which created significant booth traffic. Not only were we able to host the world champions in one place, but we fostered more in-depth knowledge about aspects of the electronics manufacturing industry that would typically go unnoticed by the general public. IPC congratulates Stéphanie Devy (France), winner of the German Regional Qualification, and Zhiheng Zhou (China), winner of the World Championship. Their talents in highlighting the importance of craftsmanship and diligence in electronics manufacturing have not gone unnoticed.

All in all, visitors from all over the world were welcomed to the IPC booth which featured a stunning LED wall displaying key information on IPC initiatives and activities, a lounge area dedicated to networking and one-on-one discussions, and ample space for showcasing IPC Hand Soldering Competition sponsors.

We are already looking forward to next year's event at productronica in Munich, where we plan to build on this year's success, create even more impactful experiences, and continue to lead conversations on the future of electronics manufacturing.

For further details and additional photos from the event, contact Philippe Léonard, IPC Europe director, at PhilippeLeonard@ipc.org.

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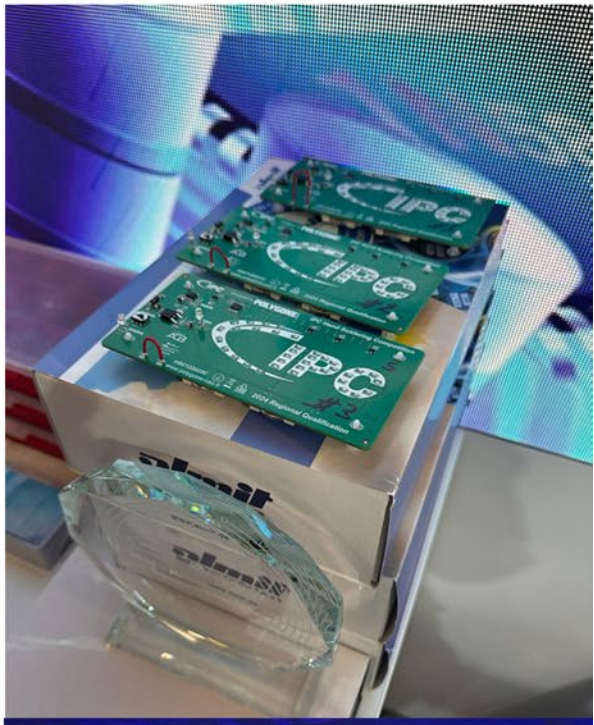
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Siti's Recipe for Success

Siti Wahab keeps her thriving EMS company on the cutting edge in Malaysia

By Michelle Te,
Managing Editor, IPC Community

Siti Padillah Binti Abdul Wahab has a simple recipe for success: Believe in yourself, pursue knowledge and experience, embrace challenges, and build a support network as you aim for leadership roles. As one of just a handful of women in leadership roles in the EMS provider industry in Malaysia, she also advocates for inclusivity and takes time to celebrate her achievements.

Siti is managing director at CG Global Profastex Manufacturing Sdn. Bh., in Malaysia, a role that came as a result of shifting her career from business to manufacturing.

Establishing Herself in the Industry

Siti was just 20 years old when she took on part-time work at various electronics factories in Penang while a college student at Universiti Sains Malaysia (USM), where she majored in organization with a minor in communications.

"Through perseverance and hard work, I gradually established myself in the industry," Siti says. She started in entry-level positions at an LED component manufacturing plant in her hometown of Taiping, Perak, learning

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as much as possible about the production process, technical parts, and market dynamics. Over time, this led to greater responsibilities, where she could lead projects and teams. "Networking within the industry opened doors for collaborations and partnerships," she says, "allowing me to expand my influence and reach."

Her college training equipped her with essential skills in interpersonal communication, negotiation, and presentation. She has used these to help build relationships with clients and stakeholders, and with her team members to foster a positive work environment.

"This educational foundation has empowered me to navigate the complexities of the EMS provider industry and drive my business toward sustained growth and innovation," she says.

Siti acknowledges that the EMS industry has traditionally been male-dominated, "which can present challenges for women seeking to establish themselves in leadership roles. Breaking through gender biases and gaining equal recognition in a competitive landscape has required resilience and determination."

She also had to break through some barriers within her own family. Siti grew up as the sixth of 10 children, where her father worked as a boilerman, and her mother was a homemaker. "My unique path in business set me apart as I became the only member of my family to pursue business," Siti says. "(My parents') support has been a constant source of motivation, driving me to succeed and make them proud."

As the leader of an EMS provider, Siti readily recognizes the challenges they face in the industry. "Entering the EMS sector often necessitates significant capital investment for equipment, technology, and facilities," she says. "Securing funding and managing financial risks are critical challenges that require careful planning and strategic decision-making."

She also faces the challenge of rapid and "relentless" technological change, and that staying ahead of these changes demands continuous learning and adaptation. "Companies must invest in research and development to remain competitive, which can strain resources and require a proactive approach to innovation," she says.

Siti has been recognized for her ability to meet these challenges. CG Global has successfully transitioned from a local player to a formidable presence in the global market, penetrating key markets in the U.S., UK, France, Australia, and China. CG is also developing its own innovative products, such as LED street lanterns and EV chargers.

She has been awarded the Women Inspirational Entrepreneurs Award and Women Exporter Award from government sectors that recognize her contributions and impact on the industry. She is frequently invited to speak at motivational events, "where I share my experience and insights with fellow entrepreneurs and college students, inspiring the next generation of entrepreneurs."

Working With IPC

CG Global is an IPC member and has benefited from this partnership in several ways, from quality assurance to standards and workforce training.

"IPC is known for its rigorous standards in electronics manufacturing," Siti says. "By aligning with IPC, we can adopt best practices that ensure our products meet the highest quality standards. This not only enhances our reputation but also builds trust with our customers, who increasingly demand reliable and high-quality electronic components."

CG Global uses IPC standards in its operations, which improve efficiency, reduce errors, and ensure consistency in product quality. "This is crucial in a competitive market where even minor defects can lead to significant losses," Siti says.

Because IPC provides valuable training and certification programs for employees, Siti has accessed these programs to ensure her workforce stays updated on the latest technologies, techniques, and industry standards. Regular upskilling "enhances the skills of our technicians, leading to improved productivity and innovation," she says.

IPC also opens doors to a vast network of industry professionals and organizations and is at the forefront of industry R&D.

"By collaborating with IPC, we can stay informed about emerging trends and technologies, allowing us to adapt quickly and remain competitive," Siti says.

Finally, Siti appreciates IPC's emphasis on sustainability in electronics manufacturing. "Partnering with IPC can help us incorporate eco-friendly practices into our operations, aligning with global sustainability goals and appealing to environmentally conscious consumers," she says.

Leading GC Global Into the Future

Staying competitive in a crowded EMS provider market means creating some of your own technology. CG Global has created an LED street lantern that represents "a significant advancement in urban lighting, combining energy efficiency with innovative technology," Siti says. "As cities strive for sustainability and improved public safety, this offers compelling solutions."

The company has also developed an EV charger that is more efficient, accessible, and sustainable.

Siti believes it is important to market her company's services through global trade shows (including IPC India's IEMI) and has made customer service a top priority. She does this by having dedicated account managers for customer support and sending out regular feedback surveys to customers.

In addition to adopting best practices in operations, Siti has ongoing training programs that upskill her employees, and she encourages diverse perspectives and innovative thinking. She collaborates closely with several local universities and colleges to offer internship programs and job opportunities and invites local students to participate in industrial tours.

Siti has ambitious plans for her company in both domestic and international markets. Her key strategies are to strengthen local operations and diversify their product offerings.

Support From the Malaysian Government

"Malaysia has made great strides in promoting skill development and entrepreneurship, especially for women," Siti says. "The government plays a vital role in creating a environment for women entrepreneurs like me through several key initiatives."

These include supportive policies that offer financial support, training programs specifically for women entrepreneurs, recognition of advancements, a focus on inclusivity, and encouraging innovation.

"As a successful entrepreneur, I appreciate these efforts and believe they are vital for inspiring future generations of women leaders in Malaysia," Siti says. "Reflecting on my journey, I'm grateful for the support of my mentor and the experiences that shaped me. The electronics industry has been a challenging yet rewarding arena, and I look forward to continuing my contributions and inspiring others from similar backgrounds to pursue their dreams."

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Gathering Around the Table

IPC Regional Roundtables provide opportunities to address common challenges

By Mark Wolfe, Executive EMS Advisor, IPC

When I entered the EMS provider industry 30 years ago, I attended some early IPC EMS management meetings. While I enjoyed the planned presentations, I especially valued the roundtable discussions with other industry peers. They not only provided an excellent opportunity to foster new relationships but also allowed me to listen to others facing similar challenges, who often addressed them in innovative ways that I could benefit from.

More recently, I have reflected on those past roundtable experiences and how we could expand these benefits to a larger audience without extensive planning or travel. During this time, I attended an annual face-to-face meeting of EMS executives hosted by Cirtronics in Milford, New Hampshire, USA, where I observed a similar collaboration. Bolstered by what I had seen and with great support from IPC staff, we launched the first IPC Regional EMS Leadership Roundtable at our IPC headquarters in Bannockburn, Illinois, USA, in July 2023.

Since then, we have hosted Regional EMS Leadership Roundtables in 10 regions. Based on positive feedback, we are expanding our locations and returning to most of the same locales. We have now hosted more than

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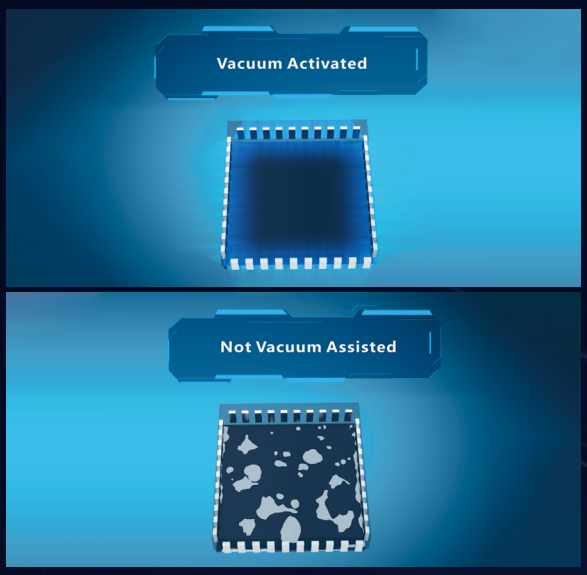

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Mark Wolfe

100 attendees from more than 70 EMS companies at Regional Roundtables. We have not allowed "outsiders"—participants need to be directly involved in operating EMS organizations—and most who attend are at a senior level of their organization.

The Roundtables typically run from 4–8 p.m. We have dinner and introductions, and then I share EMS industry demographics and some other unique supply chain and financial EMS industry data. Conversations often go later than 8 p.m. because our groups are deep in conversation around important topics.

The Roundtables share thoughts around a predetermined theme, such as leveling up, industry KPIs, and benchmarking. However, the group may not actually follow the given theme. I certainly look for opportunities to share my own industry experience but also work to facilitate the group so that everyone is engaged. Overall, I want the Roundtables to be participant-driven and it's okay if the group gravitates toward a totally different topic than what I had planned.

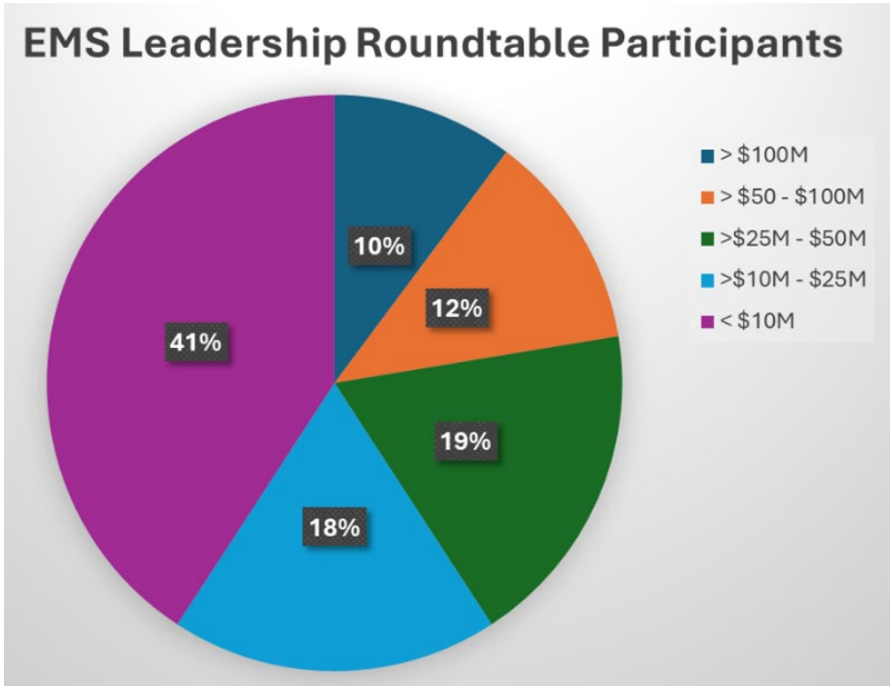
From my perspective, no two Roundtables have ever followed the same path, even if the initial topics are intended to be the same. There are always enough common EMS provider industry challenges—most often about talent, software tools, technology development, supply chain, or customer acquisition—that the group can share valuable insights without getting into specifics that may create discomfort. Participants really seem to share what is on their minds, and there is a spirit of "coopetition," which always seems to enable appropriate conversations regardless of the topic being discussed.

Companies of all sizes attend the Rountables, and I like that because it brings different perspectives on any topic. While most attendees are from relatively small companies, we've also seen participation from a higher proportion of $100 million and above, compared to the overall EMS industry.

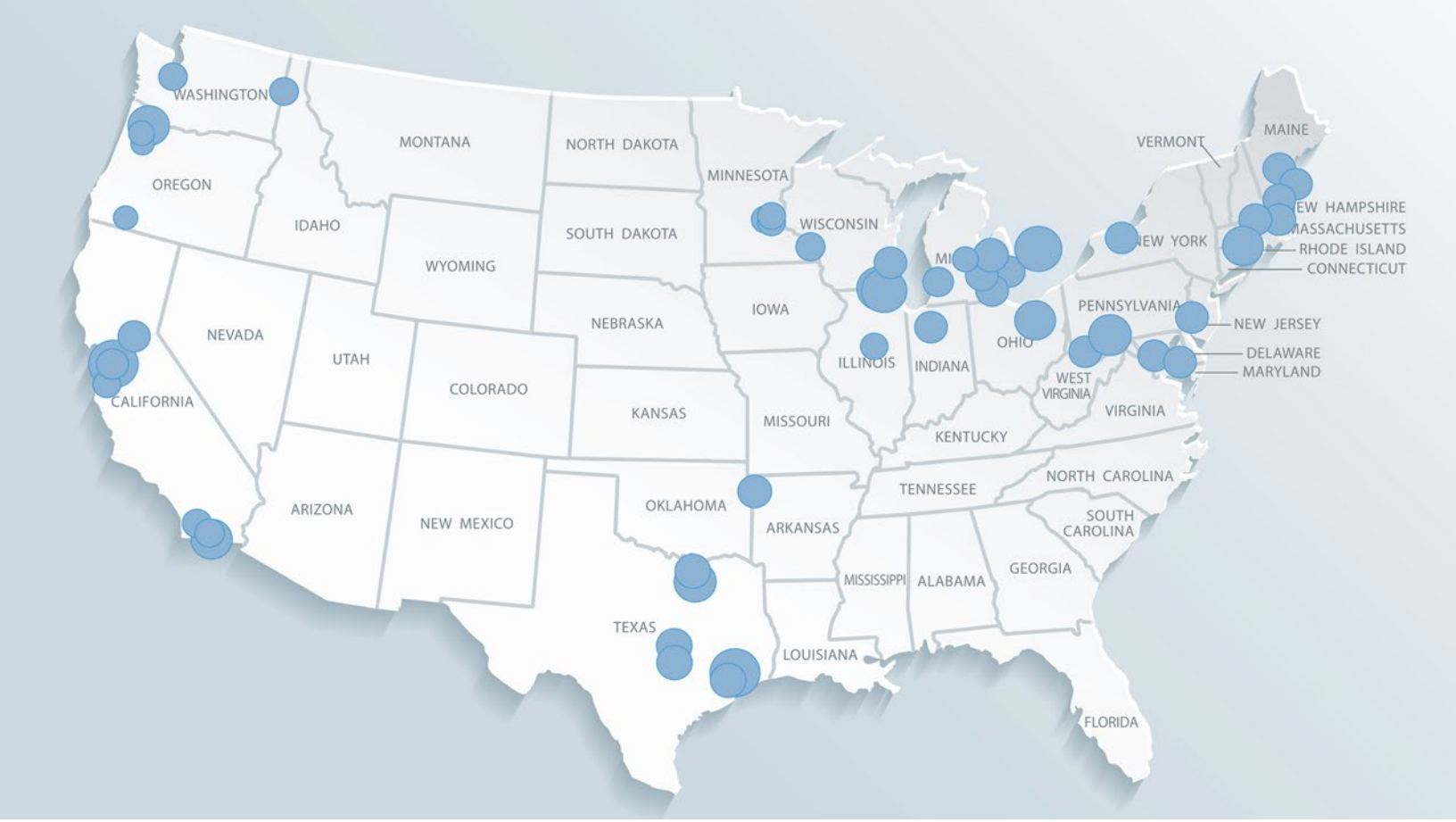
As we conclude each Roundtable, I ask participants about the value of the event. Consistently, they say that it is time well spent. In most cases, attendees leave with at least one item they want to explore to help their own businesses when they return to their operation. In regions where we have held a second Roundtable, more than 80% of the original attendees chose to participate again.

The Roundtables benefit IPC as well. We are not there to "sell" IPC services, but we seize the opportunity to expose participants—IPC members or not—to the types of services and support that IPC provides. As a result, IPC has gained many memberships, training subscriptions, standards purchases, and certification requests from participants as a direct result of the Roundtables. It has also been a great opportunity to hear from the "voices of the EMS industry," which I share with IPC leadership to help form future programs and support.

We have also found that the Regional Roundtables have been a great introduction to the annual EMS Leadership Summit at IPC APEX EXPO. Approximately half of the participants at the six regional



Breakdown of roundtable participants by size of company.



Regional EMS Leadership Roundtable participant factories.

roundtables prior to last April also decided to attend the EMS Leadership Summit.

We are finalizing our plans for Regional Roundtables in 2025 and expect to soon publish a long-range calendar. My goal is to increase participation within each region and seek opportunities to initiate roundtables in other regions of North America. We are also exploring some topic-specific "regional" roundtables that may bring in more focused experts and have broader appeal. I certainly expect to see our regional efforts reflected in continued growth at the annual EMS Leadership Summit.

Roundtables have been an important part of my journey within the EMS supplier industry, and I believe they have helped shape me into a more impactful and thoughtful industry leader. It is my hope that our IPC EMS Regional Roundtables will afford the same opportunities to new EMS industry leaders in the future.

Future Roundtable: Washington DC EMS Leadership Roundtable on public policy and your business.

Standards Update

Newly Published Standards and Revisions

IPC-7095E

Design and Assembly Process Guidance for Ball Grid Arrays (BGAs)

IPC-7095E describes design and assembly implementation for ball grid array (BGA) and fine-pitch BGA (FBGA) technology, focusing on inspection, repair, and reliability issues associated with design and assembly of printed boards using these packages. The standard provides valuable and practical information to those who use or are considering using BGAs, descriptions of how to successfully implement robust design and assembly processes for printed board assemblies using BGAs, as well as ways to troubleshoot some common anomalies that can occur during BGA assembly.

IPC-8401

Guidelines for In-Mold Electronics

IPC-8401 provides guidelines for in-mold electronics (IME) manufacturing processes, part structures, candidate materials, and production test methods. In-mold electronics integrates printed electronics and electrical components into injection-molded plastics, creating a three-dimensional smart-molded structure. IME technology uses mass production processes, materials, and components. IME parts are structural electronics characterized by their light weight, thinness, robustness, and seamless integration.

IPC-2294

Design Standard for Printed Electronics on Rigid Substrates

IPC-2294 establishes specific requirements for the design of printed electronics applications and their forms of component mounting and interconnecting structures on rigid substrates. Rigid substrates, as applies to IPC-2294, are those that are not required to be flexed into a new shape for the purposes of assembly or operation. The rigid substrate can be conductive (e.g., rigid printed board or assembly), semiconductive, or nonconductive.

IPC-6904

Qualification and Performance Specification for Printed Electronics on Rigid Substrates

IPC-6904 establishes and defines the qualification and performance requirements for printed electronics and their forms of component mounting and interconnecting structures on rigid substrates. The substrate can be conductive, semiconductive, or nonconductive.

IPC-HERMES-9852-v1.6

The Global Standard for Machine-to-Machine Communication in SMT Assembly

IPC-HERMES-9852 provides a state-of-the-art communication protocol for machine-to-machine communication for surface-mount technology. Used with IPC-2591, *Connected Factory Exchange*, IPC-HERMES-9852 can assist any electronics manufacturer, large or small, to align their companies with smart manufacturing and Industry 4.0. Version 1.6 includes updates to SendBoardInfo and capabilities for Hermes-enabled equipment to be queried on its Hermes capabilities.

IPC-4562B

Specification for Metal Base Copper Clad Laminates for Printed Boards

IPC-4562A covers metal-unsupported foils and foils supported by carrier films suitable for subsequent use in printed boards. IPC-4562B addresses the requirements of metal foils used in printed wiring applications.

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

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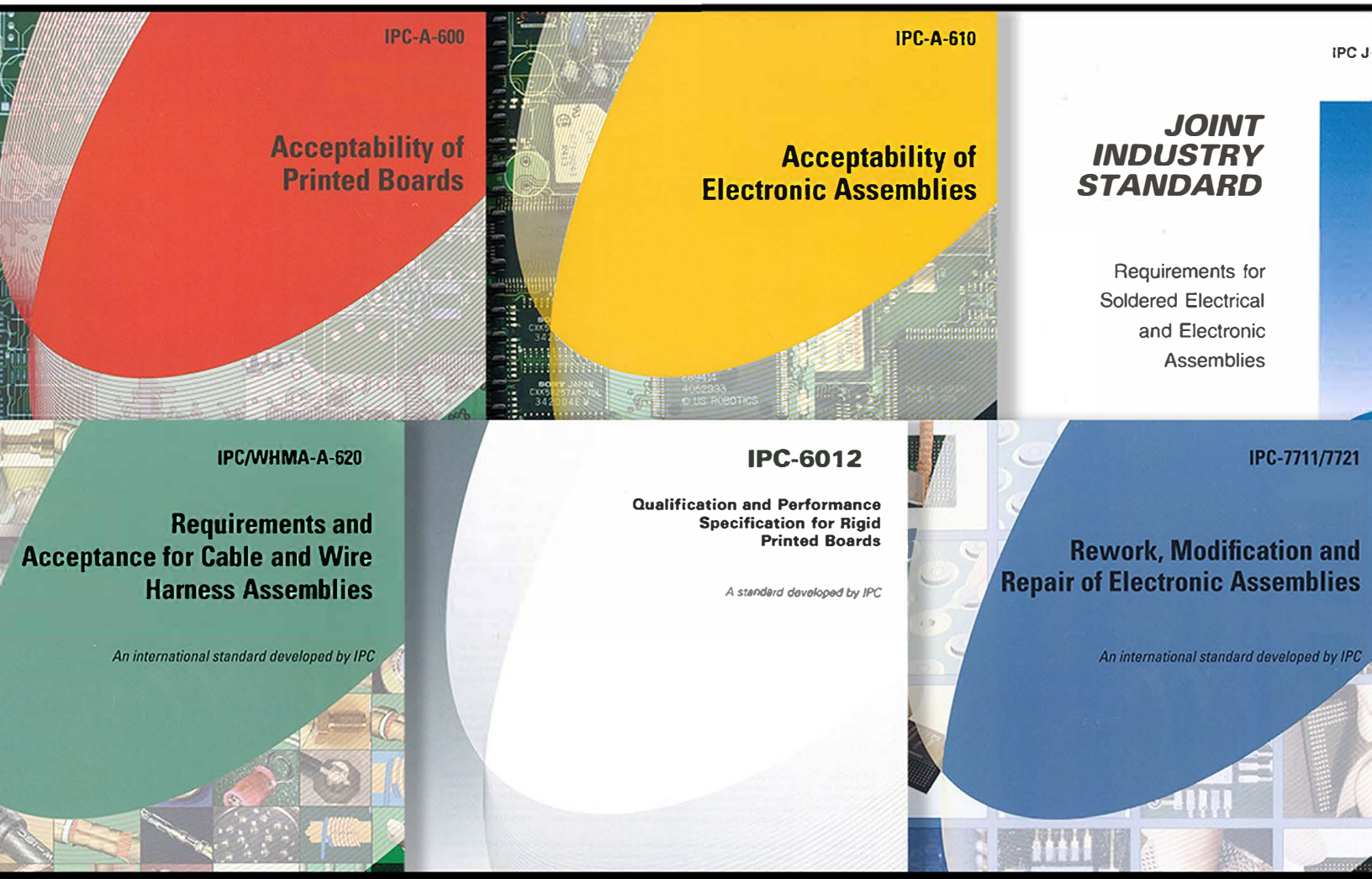

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“I have no intention of retiring. There’s so much good stuff happening in our industry, and it’s exciting to be a part of it.”

—John Watson

Pieces of a Puzzle

PCB designer John Watson sees the big picture of life and work

By Michelle Te, Managing Editor, IPC Community

John Watson started his career in military intelligence and as an electronics repair technician but moved over to printed circuit board (PCB) design at a time when the whole electronics industry was experiencing a paradigm shift.

"I wanted to be involved in electronics," he says of those younger days. "As a technician, you used to go down to a component level on fixing things. But in the late 1990s, they began just swapping boards out. They didn't care if you went down to the component level. So, the whole area of electronics technician work changed. That's when I changed my career and went into PCB design."

There's a common belief, he says, "that you need a set path to get into PCB design or that maybe you have to be an engineer, but I've been doing this career for about 24 years now, and it's really exciting."

Since shifting to PCB design, John has supported the industry through his roles as a PCB designer, an instructor at Palomar College in southern California for the past three years, and as a member of a design leadership initiative through IPC.

John was introduced to IPC standards in 2000 as a student of PCB design by instructor Bill Brooks. "As we walked through the door of the classroom, he handed us IPC-2221 and 2222, and said, 'These are your textbooks.' That was my introduction to IPC," John says. "I really held true to IPC as the standard of how it should be done."

In the summer of 2023, John was invited to serve as a representative on the Design Leadership Council, led by Peter Tranitz, senior director of technology solutions, IPC Electronics Europe GmbH. "It's a fantastic group, and I'm really glad to see this happening with IPC," John says. "This is a very active and talented group of individuals and includes some of the greatest leaders in our industry. It's very exciting to see."

All members of the council are board designers, but John says they represent both MCAD and ECAD programs. "It definitely gives a different viewpoint of a particular point or standard when we're looking at it from the various industries involved," he says.

The council's purpose is to service the design side of the industry. "We are here to provide resources and to develop this relationship between IPC and the designer," John says. "We started this group because IPC began to see that this whole PCB process is so interconnected, what IPC calls 'silicon to systems.' It's a broader, multi-faceted view of the work we're doing in the industry."

It's also a very international group, with representatives from Europe, North America, and Asia addressing topics of interest to a worldwide audience.

At IPC APEX EXPO 2024, the Design Leadership Council members presented a white paper and hosted a roundtable presentation. That paper has now been published and is available at ipc.org.

"My part of the white paper examined DRCs and 'single-source of truth,' which was a very interesting topic to review in the PCB process," John says. "Our council meetings also discuss different standards, and we are each involved in a committee or subcommittee surrounding those standards. We have many projects in the works."

John says it's satisfying to be at the forefront of PCB designers' efforts, particularly at a time when so many are retiring and leaving a significant gap in the workforce. His professional role and the courses he teaches are helping to meet those needs.

"We're continuing to develop and train the next generation," he says. "I am working with several other universities to help them set up their curriculum and begin training more students. This whole area of PCB design was an afterthought for the longest time, and now it's catching on, so we need to train the next generation. We can't just leave it and hope they'll pick it up somewhere down the road."

While others are looking to retire and move on from their careers, John says he's just warming up. "I'm 63, and people ask me, 'Oh, so when are you retiring?' Hey, I have no intention of retiring. There's just so much good stuff that's happening in our industry, and it's exciting to be a part of it."

What John does for fun

As much as John values his roles at Palomar College and IPC, he also seeks opportunities to unplug from the world. He enjoys hiking, camping, and traveling with his wife. In addition, he is a musician.

One of his favorite trips was a 10-day, 150-mile hike across northern Spain on the Camino del Santiago. "It was just a fantastic trip," he says. "It was a pilgrimage for my wife and me, and we're actually talking about doing it again. I'm usually doing stuff that unplugs me from my phone, email, etc. Another favorite spot is Sedona, Arizona. We love to hike around there.

"I'm trying to keep a balance in my life," he says. "It seems to help me a lot with clarity of the mission, and things I'm involved in. It's important to take care of yourself and be good to yourself. I find that a lot of people are their own worst enemies."

What are the top characteristics of a good designer?

"Be a good problem solver and have a creative mindset," John says. "I find that this is why many PCB designers are artists. PCB design really is art, so when you have someone who can look at something and solve it mentally—not just if it's correct, but does it solve a problem? You give one schematic to 10 people, and guess what happens? You will probably get 10 different PCB designs. This is something I really try to imbue with my students: Always keep in touch with your creative side.

Another trait is the ability to be a thinker, someone who will think outside the box, and not constrain yourself with only doing things one way. For example, I enjoy doing puzzles, and PCB design is just one giant puzzle."

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Paras Wires: *A Family Legacy*

This Indian company is shaping the future of wire harness solutions

By Brittany Martin, Contributing Writer, IPC Community

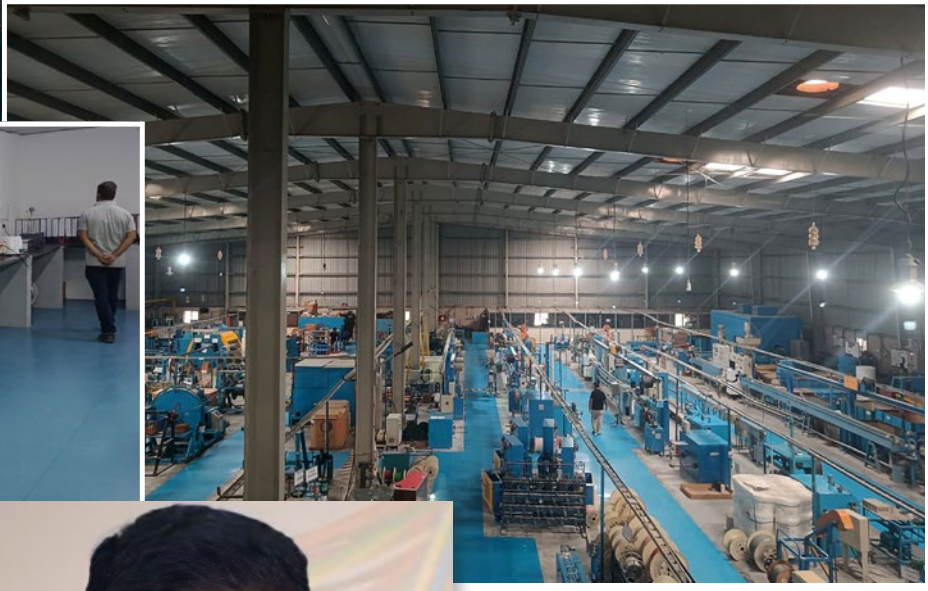
India's electronics manufacturing capabilities, competitive labor costs, and dedication to quality now attract a larger global audience due to a shift from traditional markets. The rise of electric vehicles and smart technologies also presents fresh markets for wiring solutions. The Surana family, which owns Paras Wires PVT LTD, has been riding that wave for nearly 40 years and is ready to seize greater opportunity in India's wire harness industry.

For the Suranas, the future isn't just about growth; it's about staying true to their values as they lead India's wire harness industry into a new era.

Paras Wires PVT LTD is a family story as much as it is a business. The company was founded in 1986 by three members of the Surana family: R.M., Anil, and Usha, starting with only four employees, a rented space, and an unwavering drive to create something exceptional in the wire harness industry. Their goal was simple: "To craft high-quality cables and wiring solutions that clients could rely on," says Rupin Surana, operations director.

What was once the aspiration of a small team has flourished into a recognized name in specialized cable manufacturing. After nearly 40 years in business, Paras Wires now has three self-owned facilities with over 100 dedicated employees and a thriving R&D team.

Over the years, Paras Wires has gained the trust of its clients by



Rupin Surana

creating products that balance precision and reliability. Its continued focus on molding, crimping, and assembling coil cords has set it apart from other similar companies. "Every aspect of production, from injection molding housings and connectors to manufacturing flexible coil cords, is managed with careful attention to quality," Rupin says.

This dedication reflects a commitment to delivering durable and efficient products crafted with care to meet each customer's unique specifications. It's a philosophy that comes back to family values. "It is putting customers first and staying true to one's word," Rupin says.

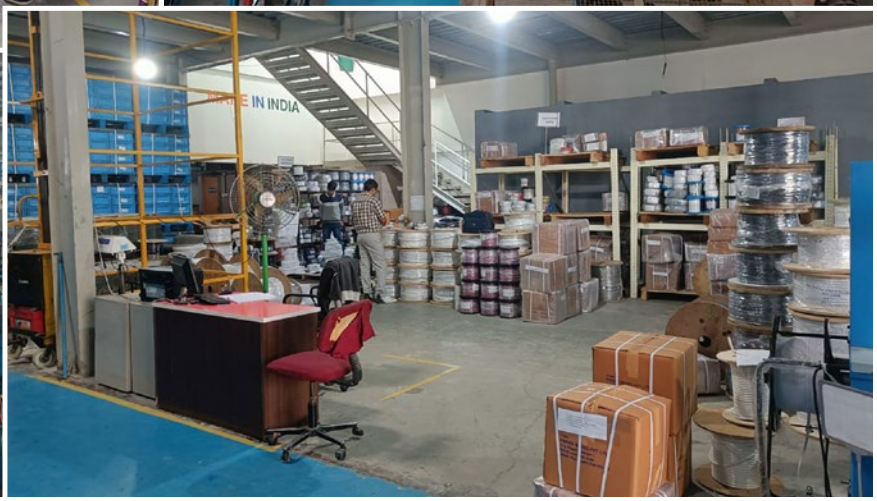
Joining the Wiring Harness Manufacturer's Association (WHMA) has provided Paras Wires with an extended network of industry professionals and suppliers who share insights on trends, standards, and best practices. This affiliation has been more than a business move; it has given Paras Wires a sense of belonging within a community dedicated to excellence.

"WHMA's training programs have also empowered Paras Wires to continually raise our quality standards, building a strong foundation for sustainable growth and solidifying its reputation as a reliable manufacturer in the industry," Rupin says.

The world has changed dramatically since the mid-1980s when Paras Wires opened its doors, especially with shifts like the China Plus One trade policy, which has encouraged companies to source materials from diverse countries beyond China. For Paras Wires, this move has added a layer of resilience to their business that helps protect against the unexpected: tariffs, global disruptions, and the inevitable supply chain challenges.

"By building flexibility into our sourcing strategy, we've provided



uninterrupted customer service, even amid uncertainties, and even opened new markets for our products," Rupin says.

In fact, they've seen that an interest in Indian manufacturing, particularly for specialized wiring solutions, has only grown in recent years. The demand for products from Paras Wires has surged as more companies seek dependable, diversified supply chains.

"As more clients look for reliable alternatives to traditional sourcing, we have become a trusted partner for international clients who are drawn to India's growing reputation for quality and reliability," Rupin says. "It's a remarkable shift that speaks to our company's core values of always being willing to adapt to meet the needs of our clients."

Expanding into North America is another exciting yet challenging journey. "With the support of WHMA and IPC, we are gaining a solid understanding of market standards in North America, building relationships, and preparing for the road ahead," Rupin says. "The guidance we receive on certifications and compliance ensures that we are well-prepared to meet new clients' expectations."

But entering the North American market comes with its own hurdles, including navigating regulatory requirements, establishing a new distribution network, and competing with established companies in the region. Yet these challenges only reinforce their commitment to adapting and learning as they invest time and resources into understanding what North American clients truly value.

"New technologies and automation are central to our vision for the future, enhancing production efficiency and opening doors for innovative products," Rupin says. "To stay competitive and continue offering clients the best solutions in the industry, we are embracing advanced materials and exploring new manufacturing methods."

Looking ahead, the Surana family plans to expand their global presence and optimize efficiency in the company's systems by integrating smart manufacturing, data analytics, and automation. As they do so, it's important for them to stay grounded in their values of innovation, integrity, and dedication to customer satisfaction. This will bring both personal satisfaction and business success in a way that feels true to the family's legacy.

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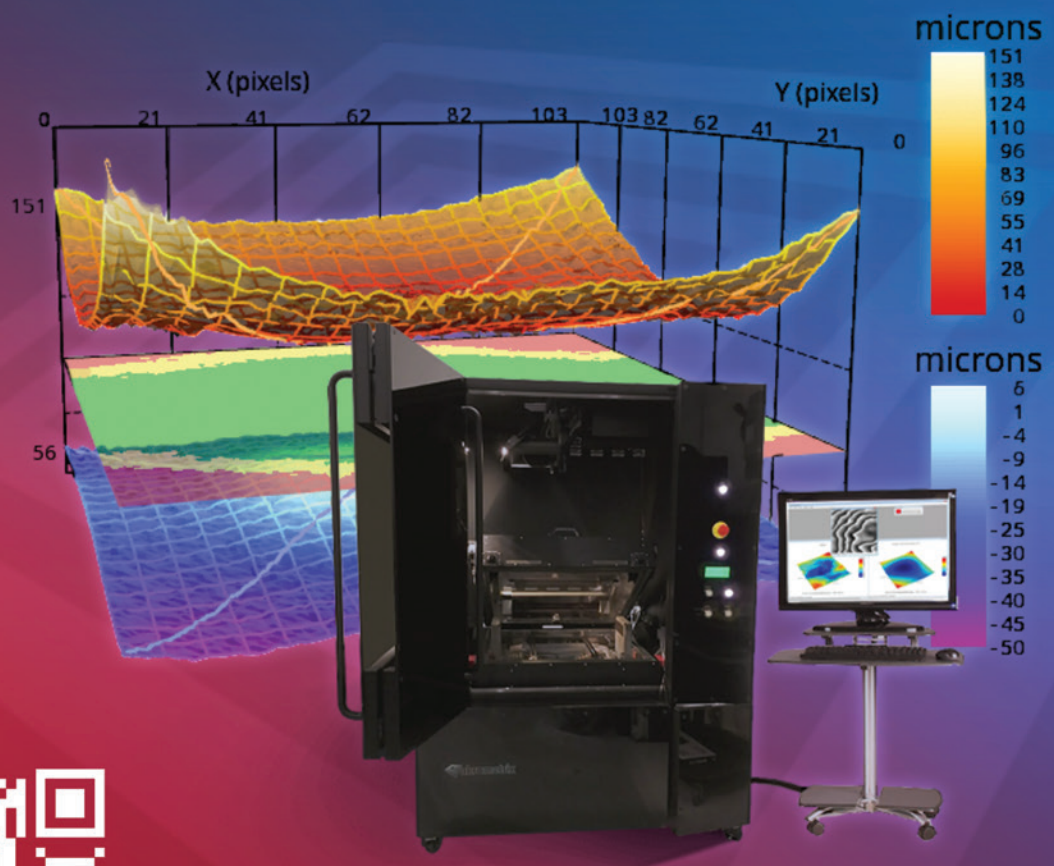

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THE 2024 GOLDEN GNOMES

Take a peek inside...

a one-of-a-kind standards awards night at IPC

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

Since 2020, the IPC technical and training staff liaisons have celebrated the achievements of the A-Team members who provide input for IPC standards and t raining programs at the annual Golden Gnomes event. The event, named in honor of Clumpy and Kloumpios, the gnome mascots for the A-Teams, started as a luncheon with missing award statues. It has become a much-anticipated formal dinner complete with a carefully selected theme, one-of-a-kind statues with a nod to the theme, and a red carpet.

Last year's Golden Gnomes occurred during IPC Builds 2024, Oct. 5–10, in Raleigh, North Carolina. The "Oktoberfest" theme was kept a secret until the event started when attendees were treated to a rousing rendition of "Ein Prosit," led by A-Team member Udo Welzel. We didn't tell Udo he would be leading the song until the music started playing and the staff looked to Udo for the lead. "Ein Prosit" is a song made famous by The Polka Brothers and is a well-known cheerful chant at Oktoberfest-style events. Udo later said he was suspicious because in the days leading up to the dinner, each member of the technical staff would ask him a question that ultimately led to the answer, "Ein Prosit," (meaning "to cheer and good times") although he didn't completely connect the dots. We couldn't have asked for a better outcome than when he stepped up on stage and took his place behind the microphone.

How It All Comes Together

The Golden Gnomes are written, directed, and produced by the IPC technical staff. Each year, an internal A-Team called The Golden Gnomies selects a theme, which is heavily debated. Once the topic has been determined, the team selects a gnome statue design—another conversation with much input. Just like production of the most sophisticated electronics hardware, we see some prototypes, send them back for design revisions, and practice rigorous quality assurance checks. Then, the statues head to production.

Now, it's time to work on the formal dinner. The group members discuss the dinner menu and select the linens, decorations, and swag. As we get closer to the event, our scriptwriters swoop into action. This year, John Perry deftly handled his new responsibilities. In the days before the event, we discuss final logistics and create the seating charts.

The best part is when the technical staff and A-Team members see it all come together. We see the smiles on the faces of those attending and hear our volunteers being thanked for creating this special night. It makes all the hard work worth it.

THE 2024 GOLDEN GNOMES

Technical Staff Know Their Roles

The IPC technical staff members share some of their responsibilities in putting together this year's Golden Gnomes

Patrick Crawford

(Manager, Design Standards)

My role is to coordinate the design and production of the Golden Gnome trophies. I take input from the Gnomies A-Team and work with freelance designer(s) to generate the trophy model. Then, I use LCD resin 3D printers (IPC's Kraken and Nostromo and my personal beast Rocinante) to produce them. I prepare, paint, and package the gnomes and ship (or carry) them to the awards dinner.

It's important that our volunteers understand and feel our appreciation for their efforts. While it's a small token compared to the amount of work they do, the gnome trophies are a physical embodiment of our appreciation.

John Perry

(Director, Printed Board Standards and Technology)

I was tasked with writing the script for the Golden Gnomes, and was challenged to make the event leaner while also maintaining a good mix of humor and sincere recognition of people's accomplishments. Together with a great host, narrator, and staff supporting both award presenters and recipients, we did just that. To learn more about the professional and personal accomplishments of the A-Team members, we introduced a "Pass the Prize" contest during the event. I thought it was very well received. I was also the "musical director" and enjoyed our Oktoberfest vibe throughout the night. I can still hear the polka music in my head.

We received very positive feedback about the event, and I was glad to be part of something that uses a fun and entertaining evening to acknowledge the hard work and dedication of our A-Team members and leaders.

L–R: Patrick Crawford, Orsi Alis, Zenaida Valianu, Chris Jorgensen, Teresa Rowe, Francisco Fourcade, Deb Obitz, John Perry, Kieron Roberson, Doug Sober, Andres Ojalill.

THE 2024 GOLDEN GNOMES

Orsi Alis

(Project Coordinator, Standards and Translations)

This was my debut at IPC Builds and my primary mission was to seal the awards envelopes using a gnome-shaped wax seal. I'm proud to say it became an instant hit among the presenters. Each envelope was entrusted to my steady hands, ready for its moment of glory on stage. Thankfully, every announcement went off without a hitch.

As a rookie, I learned that IPC Builds was a community endeavor, which meant I was also helping with the swag bags, decorations, and—naturally—crafting a small army of gnomes for the dinner tables. How many tiny gnome hats did I glue on? I'm not sure, but that miniature village of gnomes on display was oddly fulfilling.

Who knew a crash course in envelope-sealing and gnome construction would kickstart my IPC career?

Kieron Roberson

(IPC Standards Coordinator)

I've had a hand in just about every step of the Golden Gnomes planning, from working with IPC's wonderful graphic designer to creating teasers and announcements related to the awards to hand-stamping a couple hundred paper bags and running to the nearest craft store for glue guns and scissors after a long day of committee meetings.

I've ordered so many random gnome-themed items. At home, I'll say something off-the-wall, such as "Oh, my fake beards and custom gnome hat wax seal is here," and my family simply responds with, "Golden Gnomes again?"

My biggest role, however, is "the Voice of the Golden Gnomes." Not only is it a lot of fun, but I have the honor to share the accomplishments of our award recipients with their friends and colleagues as they are recognized for going above and beyond for our IPC standards development community. I truly enjoy cheering for our wonderful A-Team volunteers and look forward to Golden Gnomes 2025.

THE 2024 GOLDEN GNOMES

Fran Fourcade
(Manager, Electronics Technology Standards)

I assembled the step-and-repeat backdrops for both the red carpet and award picture corner, helped escort some of the award presenters to the stage, and was then honored to present the Gnome Spirit Award.

Doug Sober
(Director, Materials and ICE Engagement, Standards)

I was honored to conduct video interviews on the red carpet with my cohort, the lovely Deb Obitz.

Andres Ojalill
(IPC Europe Representative)

My role was to collect and count votes for Gnome's Choice Award, then get the winner's name into a secret envelope. It can't be leaked out before the public announcement on the stage.

Deb Obitz
(Technical Program Manager, Standards)

I have several responsibilities for the event. I'm on the team that decides the statue design. Together with Teresa Rowe, we purchase the materials to make the decorations. We set up the seating chart and worked with Kieron Roberson, Zenny Valianu, and Orsi Alis to fill the swag bags. We number and decorate the tables and put the statues and swag bags in place. During the reception, I work the red carpet with my fun sidekick Doug Sober to interview attendees as they enter the event.

Chris Jorgensen
(Director, Technology Transfer)

I ordered swag bag items, created the awards envelopes and inserts, and escorted award presenters from their seats to the stage.

THE 2024 GOLDEN GNOMES

Zenaida Valianu

(Training Manager)

Being part of the Golden Gnomes event planning team has been an incredibly rewarding experience. The event was filled with excitement as I welcomed attendees at the door, setting the tone for a memorable dinner.

The highlight was undoubtedly presenting the coveted gnomes to the awardees at the Golden Gnomes Award Ceremony. It was exhilarating and humbling, adding a memorable chapter to my journey with the Golden Gnomes.

One of the night's funniest moments occurred when I accidentally handed out the wrong trophy. The stage lighting, viewing angle, and font made reading the winner's name challenging, leading to the mix-up. Thankfully, I swapped out the gnomes, ensuring everyone received their rightful recognition. This lighthearted moment added a bit of humor to the ceremony and reminded us that even the best-laid plans can have their hiccups.

Teresa Rowe

As a member of The Golden Gnomies, I am the creative director of the program. We select the theme, statue, decorations, menu, and cadence of the program. We are always thinking outside the box to keep the event focused on honoring our A-Team members while also entertaining the attendees. I enjoy the challenge, and that includes teaching some of the other staff liaisons how to use a hot glue gun—think of it as a soldering iron only with glue instead of solder.

This year, I was the emcee. I had a great script, and only had to do a little quick thinking when some presenters and winners had last-minute cancellations. One special note: When Christina Rutherford of Honeywell Aerospace (who cancelled last minute) was announced as Outstanding A-Team Member of the Year, I made a last-minute decision to call her. She was able to give her acceptance speech from her evacuation site north of Hurricane Milton's destructive path.

We are now in full planning mode for 2025, and look forward to welcoming everyone to IPC Builds 2025 in Denton, Texas. Does anyone want to attempt to guess the theme?

THE 2024 GOLDEN GNOMES

Noting the Passing of Cathy Hanlin


SummerCom 2023, Milwaukee, Wisconson

We sadly report the recent death of Cathy Hanlin, Precision Manufacturing Co., Inc. a valued member of the IPC/WHMA community and a leader in the electronics industry. A member of numerous standards development committees, Cathy held leadership roles on 7-31F: IPC WHMA-A-620 Task Group, 7-31FT: IPC WHMA-A-620 Training Committee, 7-31FT-AT: Training Wheelz, and 5-22A-BLUEHEDGE: Blue Hedgehog.

Cathy won multiple IPC awards for her dedicated work editing, developing, and implementing the standards the global electronics industry relies on. Her kindness, humor, expertise, and professionalism will be greatly missed.

We offer our deepest condolences to Cathy's family, friends, and colleagues.

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GOOD FOR THE INDUSTRY

Anastasia Shepro operates the Ersa Versa-Flow Selective solder machine.

A DAY IN THE LIFE OF AN *Apprentice*

Three apprentices at Arc-Tronics share what it's like to work for an EMS provider

By Cory Blaylock, IPC Director, Workforce Partnerships

Arc-Tronics launched its first-ever apprenticeship program in 2024 to emphasize the importance of workforce development and reflect its deep commitment to nurturing future talent. This program not only provides hands-on experience to apprentices but also ensures the company's continued leadership in the industry.

Meet the First Cohort

We're taking a closer look at the daily experiences of three apprentices from Arc-Tronics' first cohort. Each brings unique backgrounds and aspirations, reflecting the diversity and potential within the program.

"I really appreciate the versatility of the online course work. Being able to rewatch videos, as well as read along with the notes feature, allows me to get a better understanding of the materials."

—Anastasia Shepro

John St. Louis inspecting custom materials for conformance.

Anastasia Shepro is a detail-oriented machine operator with a passion for perfection. She's eager to learn and apply her knowledge in a hands-on environment.

John St. Louis has a background in quality control, mainly in the electronics industry. He is expanding his knowledge of the electronics industry to broaden his skill set and open future career opportunities.

Derek Hanzlovic is an Army veteran gaining knowledge of the electronics industry through the apprenticeship program, on-the-job training, and by completing his degree at DeVry University.

A Day in the Life

Morning routine: Anastasia, John, and Derek start their day early, arriving at Arc-Tronics by 7 a.m. After a brief morning meeting with their supervisors, they review their tasks for the day. This might include setting up their workstations, preparing the necessary tools, inspecting parts, creating documentation, and ensuring that all safety protocols are in place.

Hands-on work: As the day progresses, the apprentices dive into their projects. Anastasia is currently working on setting up programs for orders being produced on the wave solder machine. John is inspecting all incoming parts and following quality process to ensure all parts are verified before moving to the production line. This is a critical part of Arc-Tronic's process of superior quality on all products produced. John's newly acquired electronics assembly knowledge is an asset in his position. With a year of experience

"I know what physical characteristics to look for on components. With the training I am receiving from the apprenticeship program, I am learning what is required for the components to function properly. This ensures the satisfaction and safety of the customer and end user and maintains our company reputation and profitability."

—John St. Louis

Derek Hanzlovic programming the AOI machine.

under his belt, Derek is learning all aspects of production equipment, including programming automated machinery, while continuing to build work instructions that require detailed, accurate information for all production jobs.

Mentorship and collaboration: Throughout the day, the apprentices frequently interact with their mentors and fellow team members. Anastasia, for example, consults her mentor, Jory Feustel, when encountering a particularly challenging issue with the machinery. Jory guides her through the problem, offering insights from his years of experience. Derek attends a daily engineering meeting where he shares his progress on engineering projects, receiving valuable feedback and suggestions.

Overcoming challenges: Challenges are a natural part of any apprenticeship, and the apprentices at Arc-Tronics are no exception. Whether it's a technical issue or a learning curve in understanding new concepts, the support system ensures that apprentices are never left to tackle these hurdles alone. Derek is a newer member of the team who continues to learn the intricate details of circuit board assembly. He now approaches each task with confidence, thanks to the guidance of Jory, Joel Bloom, and the collaborative environment.

Spotlight on Skills Development

This apprenticeship program is designed to develop a wide range of skills. For Derek, it's about mastering the technical aspects of electronics manufacturing. Anastasia is honing her problem-solving abilities, while John is enhancing his leadership and teamwork skills. These skills are not just theoretical; they are applied daily in

"Taking the IPC apprenticeship has been incredibly beneficial, offering hands-on experience and valuable industry skills. The journey has also been very enjoyable, with engaging learning experiences and a supportive environment that makes mastering new challenges rewarding."

—Derek Hanzlovic

Apprentices (left to right): Wesley Shaw, Justin Thompson, Derek Hanzlovic, John St. Louis, Tim Hensley, Sandor Kunyik, Jorge Hernandez, Laura Flores Rodriguez, Minerva Garate, and Anastasia Shepro.

Mentors (left to right): Sarah Sester, Jory Feustel, Joel Bloom, George Kitsis, Javier Ortega, and Matthew Goeringer.

real-world scenarios that impact the company's operations and client satisfaction.

Personal Growth and Career Progression

Beyond the technical skills, the apprenticeship program has a profound impact on the personal growth of the apprentices. Derek now sees a clear career path in electronics, with aspirations to become a manufacturing engineer. Anastasia, who initially joined the program to broaden her skill set, is considering a long-term career in electronics manufacturing. John is already thinking about how he can advance within the company, possibly moving into a supervisory role in the future.

The apprenticeship program is more than just a training ground; it's a launching pad for promising careers. The experiences of Anastasia, Derek, and John demonstrate the value of hands-on learning, mentorship, and the support that the company provides. For the apprentices, the program is a transformative journey. For Arc-Tronics, it's an investment in a skilled, committed workforce that drives the company's success.

Interested in learning more about this apprenticeship program?

Whether you're a job seeker looking to start a rewarding career or an organization exploring ways to develop your workforce, companies like Arc-Tronics offer a pathway to growth and success. Contact Cory Blaylock, IPC workforce director, for more information.

Make Your Imagination *Reality*

IPC CEMAC 2024 packs in 48 presentations over two days

By Glenn Gong, Marketing Director, IPC Asia

IPC and Pudong New Area Association for Quality and Technology Shanghai jointly hosted the China Electronics Manufacturing Annual Conference (IPC CEMAC), Oct. 24-25, 2024, attracting 400 companies and 600 representatives from automotive electronics, rail transportation, aerospace, consumer electronics, medical, and energy.

With the theme "Make Your Imagination Reality," the conference promoted international exchange and cooperation in the electronics manufacturing sector while driving technological innovation and industry upgrades.

A Packed Agenda

Over the two-day conference, IPC organized 48 presentations across six forums, delving into the technologies and challenges shaping the future of the electronics industry. During multiple forums, members of the IPC Solutions Team shared progress on IPC initiatives, which received significant attention from the audience.

Concurrently, IPC held steering committee meetings and standards task group A-team meetings, exploring pathways for high-quality development in the electronics industry. The IPC Asia

CEMAC Opening Ceremony.

Dr. Udo Welzel was the keynote speaker.

Member Appreciation and Awards Dinner provided opportunities to network and recognize excellence in the industry.

Forums Address Industry Hotspots

The CEMAC forums focused on pressing industry topics, including ESG, high-power semiconductor advanced packaging, and Factory of the Future. These sessions explored how to translate innovation, digital transformation, and sustainability concepts into actionable solutions to accelerate high-quality development in the electronics manufacturing industry.

- **ESG:** The forum on environmental, social, and governance highlighted the value and impact of ESG in advancing high-quality growth in the electronics industry, addressing the challenges and opportunities ESG poses for Chinese companies in the global market. Speakers centered their discussions on the IPC-1401 ESG Management System Standard, as they addressed key trends of the ESG industry in 2024. They shared profound insights on lessons learned and best practices in corporate ESG, highlighting strategic approaches and practical implementation.
- **High-power semiconductor and advanced packaging:** With AI driving increased prominence for semiconductors, the High-power Semiconductor and Advanced Packaging Forum detailed core production processes, shared success stories, and explored new opportunities within the industry.
- **Factory of the Future:** Digital transformation and AI-powered solutions are reshaping the vision of the factory of the future. The conference explored CFX-driven digital capabilities, Industry 4.0 integration with quality management, and other innovative solutions that foster collaborative progress.

The other forums on e-Mobility, design, IC substrates, and PCBs addressed specific challenges within their subfields.

Standardization Empowering the Industry

As a global association, IPC is committed to helping OEMs, EMS providers, and PCB manufacturers produce high-quality products. Through standards, certifications, and educational programs, IPC inspires innovative solutions to

Chris Jorgensen delivers a keynote speech in Shanghai.

The audience listening to a keynote speech at CEMAC.

Mr. Rongcong Hong from Foxconn spoke at the ESG Forum.

Audience members at the High-Power Semiconductor and Advanced Packaging Forum at IPC CEMAC 2024.

A panel discussion at the E-Mobility Forum.

The IPC-9111 Task Group.

improve manufacturing efficiency and share the latest industry trends.

Eight task group A-team meetings demonstrated the practical application of electronics manufacturing standards in SiP system-level packaging, CFX factory connectivity, IGBT high-power semiconductors, and ESG management systems. These sessions provided in-depth insights into the latest standards and opportunities to participate in shaping global standards.

The committee meetings leveraged expert resources to address industry challenges, ensuring IPC initiatives aligned with the sector's rapidly evolving needs. The committees are:

- IPC Asia Standards Steering Committee (ASSC)
- IPC Asia Education Steering Committee (AESC)
- IPC China Automotive Electronics Committee (CAEC)
- IPC China Intelligent Manufacturing Steering Committee (CIMSC)

Awarding Outstanding Contributions

During the event, IPC unveiled its 2023-2024 Asia Awards to show appreciation to individuals and companies for their exceptional contributions to the electronics manufacturing sector.

Award categories included standards development, education promotion, industry leadership, and ESG sustainability.

IPC presented the QML certificate to Magna Electronics (Zhangjiagang) Co., Ltd., the first company in the world to qualify for the IPC J-STD-001/IPC-A-610 Automotive Addendum QML.

"We are honored to be the first automotive electronics manufacturer to qualify for the IPC J-STD-001/IPC-A-610 Automotive Addendum QML," said Mingye Zhou, general manager of Magna Electronics (Zhangjiagang) Co., Ltd. "This project validates our existing quality management system and motivates us to continuously improve and strive for excellence. We thank IPC's expert team for their professional guidance and practical insights, which have strengthened our confidence in achieving better product quality and industry best practices."

Additionally, IPC recognized Delta Electronics as the Asia-Pacific Demonstration Factory for the IPC CFX Line Standard for Connected Factory Data Exchange.

Foxconn Technology Group received IPC Asia's most prestigious award, the IPC Asia Electronics Industry Outstanding Contribution Award, for its exceptional impact on advancing the electronics industry.

IPC China Automotive Electronics Committee.

IPC China Intelligent Manufacturing Steering Committee.

IPC Asia Standards Steering Committee.

IPC Asia Education Steering Committee.

"We are deeply honored to receive this award," said Rockey Luo, assistant vice president of smart manufacturing platform at Foxconn. "As a longstanding partner of IPC, Foxconn will continue its close collaboration with IPC in the world. Events like CEMAC provide a platform for reconnecting with old friends and forming new partnerships to advance technology and innovation."

Forging a New Chapter for Intelligent and Sustainable Development

Sydney Xiao, president of IPC Asia, emphasized the importance of the electronics manufacturing industry as a cornerstone of the global economy. "In a time when new technologies are transforming the global electronics sector, IPC aims to highlight the latest trends and innovations through CEMAC," she said. "Together with industry leaders, we will address opportunities and challenges, contribute high-quality standards, and empower enterprises to drive intelligent and sustainable development in the electronics manufacturing industry."

Sydney Xiao, president of IPC Asia, gave opening remarks at IPC CEMAC on Oct. 24, 2024.


IPC Asia CFX Awards Ceremony.


IPC J-STD-001/ IPC-A-610 Automotive Addendum QML Awards Ceremony.


IPC Asia Member Appreciation and Awards Dinner.

IPC Schedules Courses for Times in Europe and Southeast Asia

By Corey Lynn, Marketing Director, IPC Education

To meet the growing demand for flexible, global access to IPC's premier training programs, IPC is now scheduling several of its popular courses at times tailored for participants in Europe and Southeast Asia. These courses accommodate professionals seeking to enhance their skills and expertise in PCB design, electronics program management, and cutting-edge technologies. Here is a snapshot of the classes being offered through March 2025.

PCB Design for Military & Aerospace Applications

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PCB Design for Radio Frequency (RF) Boards

Specialize in the intricacies of designing PCBs for RF applications. Learn how to manage signal integrity, high-frequency components, and layout considerations for optimal performance.

Introduction to PCB Design I (Available in European and Southeast Asian times)

This foundational course provides beginners with essential knowledge about PCB design principles, tools, and industry standards to start their journey in PCB design.

Introduction to PCB Design II (Available in European and Southeast Asian times)

Build on your foundational knowledge with this advanced course. Topics include multilayer PCB design, thermal management, and design for manufacturing.

Introduction to Wire Harness Design I

Get started in wire harness design by learning key concepts, tools, and best practices to create efficient and reliable harnesses for electronic assemblies.

Certified Electronics Program Manager (CEPM) Program

Develop the leadership and project management skills necessary to successfully oversee electronics manufacturing projects from start to finish.

PCB Design for Manufacturability

Master the art of designing PCBs that are optimized for efficient manufacturing processes, reducing production costs and ensuring high-quality outputs.

AI Applications and Machine Data in the EMS Industry

Explore the transformative impact of AI and machine learning in electronics manufacturing. Gain insights into how data-driven technologies can enhance operational efficiency.

Join IPC's Global Learning Community

These courses are expertly tailored to meet industry demands and provide participants with actionable skills they can apply immediately. By scheduling sessions at times convenient for European and Southeast Asian participants, IPC ensures its training programs are more accessible than ever before. Contact Kelly Allen for custom schedules for companies that want to train a cohort of employees.

Ready to enhance your skills and stay ahead in the competitive electronics manufacturing industry? Visit our 2025 schedule and register today.

Course Title	DATES	DAYS
PCB Design I (Europe)	Jan. 1 – Feb. 21	M/F
PCB Design for Military, Aerospace & Other Extreme Applications	Jan. 27 – March 5	M/W
PCB Design for Radio Frequency Boards	Jan. 27 – March 5	M/W
PCB Design I	Jan. 28 – March 6	T/TH
Introduction to PCB Design II	Jan. 28 – March 27	T/TH
Introduction to Wire Harness Design I	February 3 – 12	M/W
Certified Electronics Program Manager	Feb. 4 – March 13	T/TH
PCB Design for Manufacturability	February 11 – 27	T/TH
PCB Design I (Southeast Asia)	Feb. 11 – March 20	T/TH
AI Applications of Machine Data in the EMS Industry	March 25 – 27	T/TH

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Inspiring Innovation

A Vision for Future-ready Engineers

IPC's collaboration with Stephen F. Austin State University integrates IPC standards into the curriculum

By Victoria Hawkins, IPC Director of Grants and Proposals

Bridging the gap between academic rigor and industry demands is crucial in engineering education. One stellar example is the successful partnership between IPC and Stephen F. Austin State University's Center for Applied Research and Rural Innovation (CARRI). This collaboration has culminated in a transformative initiative funded by a $15,835.15 grant from CARRI aimed at equipping SFASU faculty and students with critical skills required in the electronics manufacturing industry.

Certification and Curriculum Enhancement

At the heart of this project has been the training and certification of four faculty members and one student in the globally recognized IPC-J-STD-001 and IPC-A-610 standards, critical for soldering and electronics assembly. This initiative, which took place in August 2024, not only enhanced the technical capabilities of participants but also integrated these standards into the university's engineering curriculum. This strategic curriculum enhancement is set to provide SFASU students with

a competitive edge, making them workforce-ready upon graduation.

Strategic Industry Integration

By embedding IPC certification standards into its coursework, SFASU has made significant strides in aligning educational outcomes with real-world industry requirements. The certified faculty members have begun revising and improving the curriculum, ensuring students receive up-to-date training that reflects current industry practices.

Hands-on Training and Workforce Readiness

The project has included practical, hands-on training sessions facilitated by state-of-the-art equipment donated by Weller Equipment. This aspect of the program was particularly beneficial in reinforcing theoretical knowledge through practical application, and both students and faculty greatly appreciated it.

"This is precisely what a regional comprehensive university should be doing," says Dr. Lorenzo Smith, SFASU provost and executive vice president of academic affairs. "It is connecting with industry to ensure that our students are well prepared not just to have the knowledge they get from the textbooks but also to couple that knowledge with practical skills needed in their chosen industry."

Building Sustainable Futures

Looking ahead, there are plans to extend these educational advancements by establishing a student chapter at SFASU under IPC's Education Foundation. This chapter will provide further scholarships, mentorship, and networking opportunities within the industry, setting a solid foundation for regional innovation and growth.

"At Lockheed Martin, we understand that the foundation of our industry success is a highly skilled and well-prepared workforce," says Todd Laird, production operations manager, Lockheed Martin–MFC, Lufkin Operations, which is directly benefitting from the partnership. "The partnership between SFASU's engineering department, IPC, the IPC Education Foundation, and CARRI is not just an academic collaboration. It's a strategic investment in the future of our industry that fosters a strong relationship between industry and academia and creates a talent pipeline that's critically important to our operations in Lufkin, east Texas, and beyond."

A Model for Future Collaboration

The SFASU-IPC initiative serves as a compelling model of how academic institutions can effectively collaborate with industry leaders to enhance educational programs and meet workforce needs. This partnership promises continued advancements in educational offerings and industry alignment and prepares a skilled workforce ready to tackle the challenges of the modern world.

For further information on this groundbreaking initiative, please contact Victoria Hawkins, director of workforce grants and proposals at IPC.

A Champion of Sustainability

Dr. Diana Radovan is IPC's new global sustainability policy and advocacy lead for electronics

By Marcy LaRont, Contributing Writer, IPC Community

Dr. Diana Radovan joined IPC in August 2024 as the advocacy lead for sustainability policy, a role that requires awareness of global policy activities. From the IPC Munich office, Diana has been busy working as a policy analyst with Dr. Kelly Scanlon, IPC lead sustainability strategist. In this interview, she shares her background, her role at IPC, and what she wants to accomplish for the benefit of our industry.

Diana, tell me about your new role at IPC.

Diana Radovan: I am the director of sustainability policy, part of the IPC Global Government Relations team. Although I am based in Germany, my advocacy role is a global one. I am the industry's point of contact as a policy analyst and advocate, a connector of technical and policy leaders, an active contributor to various industry working groups, and the

coordinator of the Environment and Health Strategic Management Team (ENV SMT). I am also a blog writer, webinar host, and newsletter contributor. My goal is to always be one step ahead of emerging policies and to work with the industry to propose pragmatic solutions for their implementation, or for the need for us to engage directly with government and policymakers.

IPC has always distinguished itself as a key voice for the electronics industry on environmental issues. Dr. Kelly Scanlon held this role before me and recently stepped into a new role at IPC as the lead sustainability strategist. As sustainability policies are important to and even drive decisions about sustainability for electronics, Kelly and I work together closely. I also liaise with IPC's EU and U.S. government relations senior directors Alison James in Brussels and Richard Cappetto in Washington, D.C.


Diana Radovan

Tell me more about your background before coming into this role.

More than anything else, I am an explorer. I've always been passionate about science, technology, and communication. I have a doctorate in physical chemistry from the Technical University (TU) Dortmund through the International Max-Planck Research School Dortmund in Germany and did post-doctoral work at the University of Calgary in Alberta, Canada. I am multilingual and a dual citizen of Germany and Romania. I've always enjoyed writing and discovering other cultures through learning different languages. I also feel lucky to live in such a beautiful area. I love nature and spend much time hiking in the Alps close to the German-Austrian border. Before joining IPC, I worked in the healthcare industry, most recently in a leadership role in regulatory affairs.

I am a passionate volunteer who has worked on human rights, climate change awareness, and science communication campaigns. While volunteering toward the end of my post-doctoral training, I had the chance to interact with the Governor of Alberta for Advanced Education and Technology who suggested that I would be great in science policy. That idea stayed with me. Simultaneously, I realized that one of the most valuable skills gained from a scientific education is critical thinking, and that can and should be applied in many areas.

It's been 13 years, and I can say that the regulatory field has given me many rewarding experiences. I am proud to have contributed to shaping policies. There is an interdependence between policy and progress. The policy landscape is constantly evolving, often driven by, or in response to, emerging technologies. I find purpose in navigating the space in between. I always keep three things in mind: overall strategy, core messaging, and timelines. Given that I am a trained scientist with a passion for communication and, sometimes, for challenging the status quo, as well as a human being with a genuine love for the natural world and a strong desire to protect it, I feel right at home in sustainability policy.

IPC has been focused on sustainability and advocacy, and it sounds like you entered straight into the action.

You are correct. IPC has been supporting the industry on environmental issues for decades. We are a valuable partner for sustainability topics in Europe and globally. It makes sense for me to be located at our Munich HQ because many of the sustainability policy priorities we work on are being driven by the EU. While they originate in Europe, they will have a global impact, and sooner rather than later they will affect the entire value chain.

What areas are you focusing on in this new role?

Currently, I am concentrating on emerging policies in different focus areas: chemicals and products, environmental, and social sustainability. Some are specific to the electronics industry, while others have a much broader focus. There is a lot of information to go through and turn into pragmatic action that is both timely and meaningful. As a result of my ongoing dialogue with the ENV SMT and with other

industry working groups, I am focusing on the following:

Chemical and product policies

- Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation: Authorization activity on lead (Pb), restriction activity on the everlasting chemicals known as per- and polyfluoroalkyl substances (PFAS) as well as organohalogen flame retardants
- Toxic Substances Control Act (TSCA): Record-keeping and reporting rules for PFAS, risk evaluations, and risk management of existing chemicals, such as formaldehyde and PIP (3:1)
- EU Restriction of Hazardous Substances (RoHS) Directive: exemption renewals, evaluation of potential substances for restriction, and progress in other jurisdictions on their own RoHS rules (e.g., in the UK)

Environmental and social sustainability policies

- EU Ecodesign for Sustainable Products Regulation (ESPR)
- EU Corporate Sustainability Reporting Directive (CSRD) and the European Sustainability Reporting Standards (ESRS)
- EU Corporate Sustainability Due Diligence Directive (CSDDD)

Those priorities cover a broad scope. How do you prioritize?

These are the priorities identified by our industry stakeholders, including those in the ENV SMT. While all are important for the electronics industry, we must think about which policies to prioritize in 2025. Prioritization must be driven by input from the community. IPC will continue to actively engage with the industry on sustainability policy priorities, advising and supporting our members in activities around these complex, challenging topics.

Is it difficult to get this engagement and feedback from electronics industry representatives, including manufacturers?

Here at IPC, I coordinate the ENV SMT and engage in many industry working groups, where community members are actively involved. Our working groups are very important in terms of engagement and feedback, and I want to ensure that we have the right industry members involved as policy priorities shift and evolve. To this end, I am already working on growing representation from Europe- and Asia-based companies, while continuing to engage in active and constructive dialogue with our community members worldwide.

Besides IPC working groups, what helps raise awareness of sustainability policy priorities for the industry?

We partner with organizations like Information Technology Industry Council (ITI) on educational activities, such as hosting policy webinars. We hosted a webinar last October on the topics of Ecodesign for Sustainable Product Regulation (ESPR) and the Digital Product Passports (DPP).

Diana, is there anything else you would like to share regarding your role and what you hope to accomplish?

IPC is an indispensable voice for the electronics industry. In the years ahead, the organization will grow its partnership with the industry worldwide on matters related to sustainability. I look forward to contributing to the larger IPC goals and our engagement with industry. I want our members and industry partners to know that I am here to support and advocate for them. I am just one email or call away, regardless of where you are in the world and within the electronics value chain. Together, we can continue to shape sustainability policy and the global electronics ecosystem to best support our businesses into the future.

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IPC K-FEST 2024 introduces leading manufacturers to IPC standards

By Tina Choi, IPC Korea Representative

The second annual IPC Korea Festival of Electronics Standards and Technology, IPC K-FEST 2024, took place Oct. 29, 2024, in Seoul and focused on integrating Korea's technological leadership with international standards development.

The one-day conference attracted 160 industry professionals from approximately 80 companies and featured technical seminars, an IPC-A-610 regional task group meeting, and the IPC Korea Annual Awards.

IPC Asia President Sydney Xiao and IPC Board member, Jae-sang Min, LG Electronics, gave welcome speeches to open the event.

Technical seminars focused on addressing challenges in the electronics manufacturing industry, demonstrating how IPC standards enhance manufacturing performance and quality. Participants engaged in active discussions across seven topics:

- Digitalization of Electronics Manufacturing—Toward Smart Factory Enabling Industry 4.0
- Mastering Challenges in Electronics for Electric Vehicles
- Evaluation and Prediction of MLCC Ionic Migration in Electronics
- Material Selection and Technical Solution of Conformal Coating
- Improving Performance and Reliability at the PCB Design Phase
- Requirements and Acceptance Specifications for Organic Packaging Substrates
- Relationship of Sn Plating and IMC at PCBA

IPC Korea staff recognized individual volunteers during the awards luncheon. Rounding out the day, the IPC-A-610 regional task group met and discussed efforts to involve more Korean engineers in IPC's global standardization activities.

Jae-sang Min had high praise for the achievements made by the IPC Korea team in the past three years. "Although there are not many Korean people participating in IPC standardization compared with Korea's leading position in the electronics industry and the importance of IPC in the electronics industry," he said, "I believe that in the near future, the IPC Korea team, through platforms such as IPC K-FEST, will surely lead more Korean electronics manufacturing companies and experts to the world standardization stage."

The Korean Government project, "De-facto Standard Forum," sponsored this event. "IPC K-FEST is exactly the kind of event that we are expecting to see," said Jong-won Kwon, general project director. "The Korean De-facto Standard Forum would like to support IPC as much as we can."

MacDermid Alpha Electronics Solutions and K&P Co., Ltd. sponsored supplies for this event.

"My special thanks go to the IPC Korea team and IPC Korea Advisory Committee for their dedication in making this event possible," said Sydney Xiao. "We are confident that it will continue to attract greater interest from Korea's industry, potentially evolving into a global event, and thus promoting more industry experts to participate in the development of IPC standards."

IPC K-FEST 2024

The IPC Technology Solutions Team

By Matt Kelly, IPC CTO and Vice President Technology Solutions

With the ever-increasing rate and pace of technology adoption in the marketplace, the electronics industry is experiencing significant disruption. Many new technologies have heightened geopolitical pressures and new business models, and, simultaneously, regional/global supply chain shifts are changing dramatically. Now more than ever, it is essential that companies stay on top of the latest advancements in technology and supply chain shifts by understanding the impacts these changes have on their businesses both in the near and long term.

In response, the mission of the IPC Technology Solutions Team is to drive next-generation technology advancements and supply chain transformation across the electronics industry. The team identifies critical industry needs and challenges and works to develop new solutions by collaborating with governments, academia, companies, other associations, and IPC members worldwide.

IPC Technology Solutions considers that:

- Investments must be made to strengthen internal IPC technical expertise and capabilities to better serve the global electronics industry.
- It must identify and develop solutions with a mid-term and long-term outlook.
- It operates internationally to solve challenges within regional and global supply chains spanning North America, Europe, and Asia.
- Collaboration with other associations, partners, and work groups is essential for the successful deployment of new industry solutions.
- It must work across all IPC functions, including Advocacy, Standards, Education, and Events.

The team's top priority is ownership and delivery of new solutions across four key IPC initiatives:

- Design, led by Dr. Peter Tranitz
- Advanced packaging, led by Dr. Devan Iyer and Matt Kelly
- Factory of the Future, led by Chris Jorgensen
- eMobility, led by Tracy Riggan

They strategically manage various core technology areas, including design, system- and component-level packaging, PCB/HDI/UHDI, EMS/PCBA, wire harness, and final system assembly domains. In addition, the team oversees IPC's emerging technology pipeline that includes e-textiles, additive manufacturing, and plastronics by evaluating and assessing when new solutions need to be developed.

This is underpinned by the need for sustainable electronics practices. The Solutions Team works closely with Dr. Kelly Scanlon, IPC lead sustainability strategist, to ensure that deliverables being worked on by the team meet sustainability initiative goals for IPC and the industry and support the development of new solutions for sustainability.

The Solutions Team has created and implemented a "silicon to systems" approach, which expands upon PCB/PCBA legacy capabilities. Focused expansion into electronic components and component packaging, as well as final system-level assembly, allows the team to explore and deliver new solutions to OEMs, IDMs, OSATs, and IC-substrate fabricators, extending beyond traditional PCB and EMS markets.

Technology solutions efforts are driven by the input of leadership councils, including the Chief Technologist Council (CTC), the Design Leadership Council (DLC), and industrial and academic partnerships. These groups provide industry-influencing thought leadership and research, networking events, and technical guidelines in digitalization, design tools, and the development of new workforce development programs.

Meet the Team

Matt Kelly

CTO and Vice President

Matt leads the IPC Technology Solutions Team and is instrumental in directing members to engage in the electronics industry's latest technology trends and supply chain transformation. He defines the scope of future products and services IPC develops in advocacy, standards, education, and events.

He provides industry-leading thought leadership by authoring numerous white papers, reports, and trade publications, participating in expert panels, and delivering keynotes at industry conferences worldwide. He established the silicon-to-systems framework in 2021, aimed at ensuring the entire electronics ecosystem is addressed as disruptive technologies integrate into electronics products spanning the full ecosystem: semiconductors, component- and system-level packaging, OEMs, PCB suppliers, EMS/ODM manufacturers, and equipment and material suppliers.

He works closely with industry associations, including NIST, SRC, ASIC, MITRE, PSMA, IMAPS, INEMI, HDP, and most recently, IEEE-EPS, developing technology roadmaps that identify next-generation technology needs and timelines.

Matt is a trusted advisor to global governments advocating for critical technology and supply chain needs impacting the global electronics industry. Examples include the need for substrate provisions within the U.S. CHIPS Act/Department of Commerce and recommendations to the Department of Defense including PCB presidential determination inputs, and domestic HDI/UHDI and substrate needs. In addition, Matt works closely with the IPC Government Relations team, supporting a wide variety of advocacy support areas within the European Commission and Parliament and, most recently, governments in Japan and Mexico.

In 2020, he created the IPC CTC to identify key technology needs, provide industry-influencing thought leadership, and offer an outlook for future challenges.

Matt serves as the technical conference director for IPC APEX EXPO, ensuring that the conference tracks and professional development courses are of the highest quality and technical content from international subject matter experts.

Contact: MattKelly@ipc.org

Meet the Team

Devan Iyer, Ph.D.

Chief Strategist, Advanced Packaging

Devan joined IPC in March 2024. He has more than 35 years of global executive leadership experience in the electronic component and system industry, focusing on technology, manufacturing, and business development. He has led global cross-functional teams and supply chains to deliver electronic components and advanced semiconductor packaging processes for customers in the computing, communication, industrial, automotive, and defense sectors.

Devan drives the advanced packaging initiative in IPC in the following ways:

- He works with companies and governments to identify and deliver new solutions to IPC members and the industry. He has been instrumental in bringing new strategies and partnerships for the Solutions Team, in general, and advanced packaging initiatives, in particular.
- He is leading IPC to connect component-level packaging to PCB and EMS providers, and released a white paper in September 2024, coauthored with Matt Kelly.
- The partnership he is establishing with the IEEE Electronics Packaging Society for chapters in the Heterogeneous Integration Roadmap will help to connect component-level and system-level packaging and develop new roadmap chapters; his partnership with Purdue University's Atalla Institute for Advanced System Integration and Packaging (ASIP) will strengthen IPC's ability to contribute to advanced electronic packaging.
- On the thought leadership front, Devan was instrumental in positioning IPC amongst industry leaders:
  - He participated in an expert panel, "Chiplet for Automotive," at the 2024 IEEE 10th Electronics System-Integration Technology Conference (ESTC) in Berlin in September 2024, along with experts from NVIDIA, Renault, TSMC, Infineon, and IMEC.
  - He delivered a keynote speech on advanced packaging customization trends and standardization opportunities at the 2024 IEEE 26th Electronics Packaging Technology Conference (EPTC) in Singapore in December 2024. It was attended by more than 650 experts from industry and academia.
- As a trusted advisor to global governments on topics related to electronic components, semiconductors, and advanced packaging. Devan provides advocacy support to the IPC Government Relations Team:
  - He is developing technology project partnerships with companies and academic institutions and submitting funding proposals to DOC/NIST organizations. This includes several meetings with the U.S. Departments of Defense and Commerce as part of the team's trusted advisory role and technical discussions with academic institutions.
- By establishing IPC's involvement in advanced packaging in Southeast Asia.

Contact: Devanlyer@ipc.org, or visit Advanced Packaging Semiconductors | IPC Industry Initiatives

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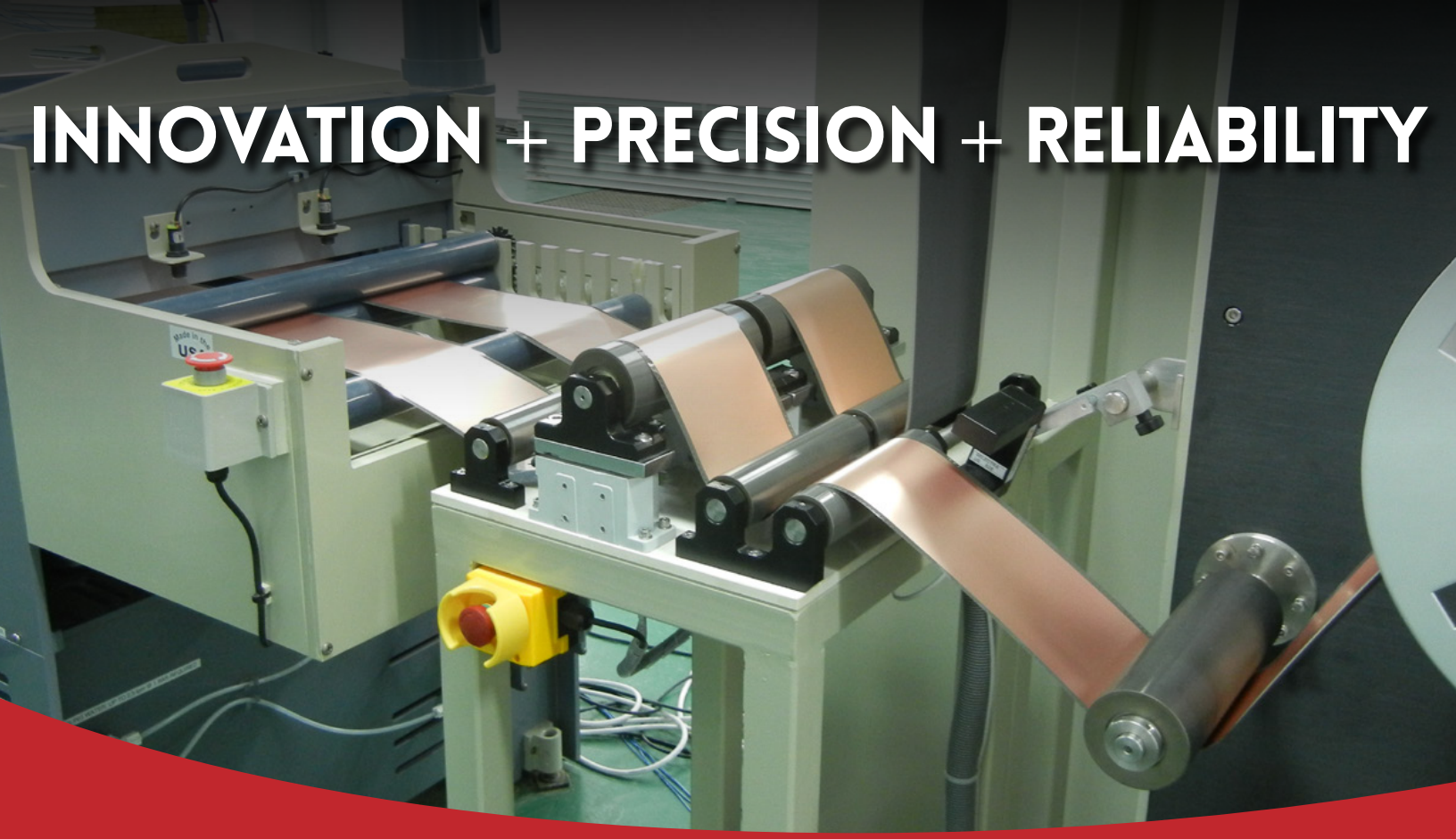

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Meet the Team

Peter Tranitz, Ph.D.

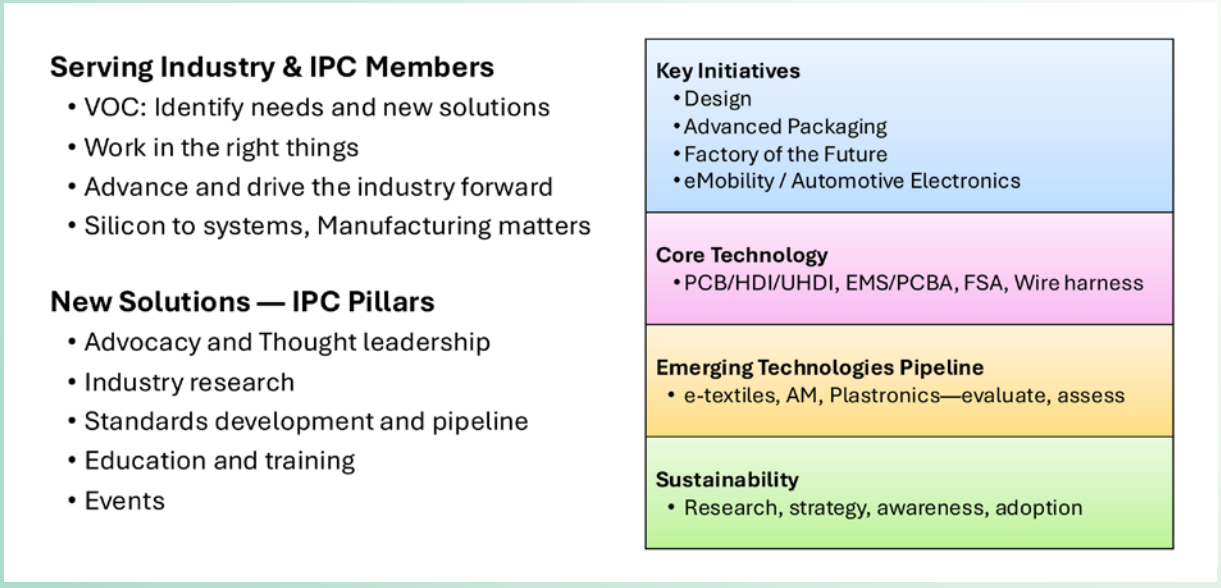
Senior Director, Technology Solutions–Design

Based in Munich at IPC Electronics Europe GmbH, Peter is the technical resource for regional activities in Europe, and serves as the lead for IPC's Design Initiative. His expertise spans academic semiconductor manufacturing and characterization and design, development, standardization, and manufacturing of numerous industrial system assembly technologies. Besides leading IPC's Design Initiative, he supports the IPC Europe team, especially on advocacy activities, with technical expertise in industry coalitions and representing industry with the European Commission.

Peter works to increase the visibility and relevance of IPC's design offerings with a focus on integrating IPC design standards content into CAD and CAM software throughout the product development cycle by:

- Building up the design community through the DLC and the IPC-internal design team (GIDT) and providing thought leadership with white papers on next-gen design needs as well as design process flow and the link to IPC design standards. IPC design offerings were presented at 12 conferences, trade shows, workshops, and webinars worldwide in 2024.
- Ensuring IPC design standards are current and relevant for the global industry by revisioning existing and developing new standards with our industry in line with IPC's silicon-to-systems strategy and advancing DFX in collaboration with IPC's global units and initiatives, including advanced packaging, workforce, sustainability, Factory of the Future, and eMobility.
- Building IPC DFM profiles from IPC design standards applicable to CAD and CAM software and tools. This was first achieved with PCBflow, an online platform where all major ECAD output formats can be uploaded and designs validated against IPC reliability classes and manufacturability levels. DFM profiles are accessible in the Siemens ECAD and DFM software landscape, and we are working with the industry to establish review options along the product development and NPI process.

Contact: PeterTranitz@ipc.org, or visit IPC Design



Highlights of how the Technology Solutions Team serves the industry and IPC members and how new solutions can be integrated into various IPC offerings.

Meet the Team

Chris Jorgensen

Director, Technology Transfer–Factory of the Future

In addition to his role as a staff liaison for the IPC Tech Team, Chris leads the Technology Solutions Team in Factory of the Future efforts, including:

- Connected Factory Exchange (IPC-CFX)
- Data analytics
- Digital twin
- Model-based definitions
- Artificial intelligence

His work involves supporting the industry's adoption of modernization techniques and technologies, including shoring up existing standards to set baselines for shop floor and IT/OT communications, developing new standards, and providing education to industry. Specifically in 2024, teams involving participation from around the world have:

- Added new capabilities to IPC-CFX to support hand soldering stations, wave soldering equipment, and AGV/AMR on factory floors as part of IPC-2591, Version 2.0, which will be released in the months ahead. In addition, the standard will now provide a path forward for companies developing solutions for legacy equipment to demonstrate their CFX capabilities.
- Increased by 60 new pieces of equipment through industry engagement and global adoption of IPC-CFX-2591 Qualified Product List (QPL) . There are now more than 150 devices on the QPL.
- Published a white paper on data analytics and provided instructor-led, hands-on courses on data analytics.
- Oversaw development of a new IPC standard on process control for AOI systems for board assemblies, which will be augmented by a white paper/webinar on AI for inspection systems such as AOI.
- Began work on a new white paper/webinar to provide practical approaches to the adoption of digital twins within an operation, with a planned release to industry by early 2025.
- Began a project to map requirements from standards for traceability (IPC-1782), digital twin (IPC-2551), cybersecurity incident reporting (IPC-1792), and sustainability reporting to existing JSON schemas in IPC declaration standards to ensure interoperability among IPC's factory of the future standards library.
- Formed new task groups to develop standards for sustainability data collection, with the initial focus on CO2e.
- Launched IPC Digital Credential Exchange (DCX), a new standard for secure data and facts exchange both within an operation and across a supply chain.

Contact: ChrisJorgensen@ipc.org or visit Factory of the Future Program | IPC Industry Initiatives

How to Engage and Collaborate

- **Get involved, proactive engagement, and encourage next-gen colleagues**
- **Provide feedback on Technology Solutions initiatives**
- **Send requests for new research, thought leadership, and advocacy**
- **Identify new standards, education, and training needs**
- **Define and shape IPC-led initiatives with your input and expertise**

Meet the Team

Tracy Riggan

Senior Director, Business Development, eMobility

Tracy, with the support of industry expert Dr. Stanton Rak, is responsible for advancing innovation in eMobility reliability with a focus on:

- High-voltage power electronics
- New interconnection technologies
- Harsh-environment protection
- Design, materials, and manufacturing

Work being done to address reliability and new technologies for eMobility and charging applications includes updating existing standards and developing new guidelines and test methods to address high voltage/power and harsh environment requirements. To understand challenges, provide guidance, and develop new solutions, IPC has established and works with advisory groups, including the eMobility Quality & Reliability (EVQR), China Automotive Executive Council (CAEC), and Automotive Solutions Committee (in India). Current work includes:

- Conducting global OEM/T1 surveys to prioritize challenges.
- Launching IPC-J-STD-001/IPC-A-610 Automotive Addendum QML and conducting the first certification.
- Establishing partnerships with key organizations such as ChargeHelp and ChargeX to identify and address EVSE reliability issues.
- Writing whitepapers in system-level areas starting with EVSE (charging), inverter, and BMS technology areas such as wire bonding, and related issues such as sustainability.
- Hosting an annual Road to Reliability webinar series and in-person sessions addressing topics like high voltage (300V+), hardware for the software-defined vehicle, power electronics substrate technology, and sustainability.
- Developing high voltage addenda for IPC-6012 and IPC/WHMA-A620 and releasing IPC-TM-650, Method 2.5.7.4 High Voltage Moisture and Insulation Resistance Test of Fabricated Printed Board Test Patterns.

Contact: TracyRiggan@ipc.org or visit e-Automotive and e-Mobility Solutions | IPC International, Inc.

How to Get Involved

Electronics engineers at all levels have many challenges on their minds, from next-generation electronics and highly integrated electronics to modernization and changing supply chain models. To help the industry build electronics better, we are constantly working to stay on top of leading-edge technologies and offer new solutions to members and the global electronics industry.

Click to learn more!

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?
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Technological Innovations

IPC's new semiconductor course provides a thorough layman's view

By Nyron Rouse, Director of Government Grants and Strategic Funding, IPC

Taking the course, *A Technical Overview of the Semiconductor CHIP Industry*, taught by Cheah Soo Lan, wasn't just a professional box to check for me; it was an opportunity to understand the technical backbone of a field that directly influences the work I do at IPC. While I'm not immersed in the technical aspects of semiconductors day to day, learning about this landscape allows me to better align our funding pursuits with the strategic needs of the industry.

Before this course, I had a general sense of the semiconductor industry, especially its reliance on global supply chains and the role of countries like Taiwan and Korea in advanced chip manufacturing. But the course provided far more depth, particularly in showing how intricate and vast the ecosystem has become, and how reliant modern economies and industries are on these small yet essential components. This is information I was aware of but gained a deeper understanding of, especially in terms of how this complexity ties into government relations and economic strategy.

One of the highlights for me was learning about the technological innovations pushing the industry forward. For example, memory chips are no longer just flat but are being made denser by stacking them over 100 layers high. Additionally, electronic design automation (EDA) companies are incorporating artificial intelligence to automate certain parts of the chip design process, which speeds up time to market for increasingly complex chips. These were fascinating developments that I hadn't fully appreciated before, and they underline how innovation is happening at every step of the semiconductor manufacturing process, from design to production.

A particular takeaway for me was the importance of foundries, which are now critical players in the ecosystem. Historically, companies that designed chips also manufactured them in-house, a vertically integrated model known as integrated device manufacturing (IDM). Today, however, foundries that specialize purely in manufacturing, like TSMC and Samsung, have the advantage of economies of scale. The shift from the IDM model to relying on foundries, exemplified by companies like AMD and, more recently, Intel, highlights the ongoing evolution of the business side of semiconductors.

New course:

Fundamentals of Wire Harness Design

Mondays and Wednesdays
Feb. 3–12
8 a.m. PT, 11 a.m. ET
7 p.m. EET

One can't discuss the semiconductor industry without touching on geopolitics. I already understood that Taiwan's dominance in advanced chip manufacturing is a potential risk, given China's view of Taiwan as a province. The course, however, made me reflect more on the implications of this from a broader perspective. The strategic importance of semiconductors has reached a point where controlling chip manufacturing could become as pivotal in the 21st century as controlling oil was in the 20th. The United States and China are now working to decouple their semiconductor ecosystems, with each side pouring billions into incentives and infrastructure to build more local fabs and ensure self-reliance. This shift has vast implications, not just for global supply chains but also for national security and economic competition.

I believe this course would be valuable for anyone involved in industries that intersect with semiconductors, whether directly or indirectly. It offers an essential overview of the technological and geopolitical landscape and helps non-technical professionals like myself grasp why this industry matters so much. For me, it wasn't just about understanding the chips themselves but gaining a holistic view of why semiconductors are central to everything from national security to economic stability.

The *A Technical Overview of the Semiconductor CHIP Industry* course gave me an enriched perspective on the landscape I help navigate as we seek funding for initiatives that support technological growth. I now have a stronger foundation to connect the dots between our funding priorities and the broader semiconductor ecosystem, which will be essential as the industry continues to evolve at breakneck speed.

Ready to take the course? Click here for more information.

Guangdong Province, China: The IPC China team provided IPC standards training to students from Zhongshan Technician Institute.

TACKLING TALENT SHORTAGES

IPC Asia's Talent Development Program opens pathways to a more qualified workforce

By Evelyn Cui, Education Program Director, IPC Asia

As global technological innovation and industrial transformation in the electronics sector accelerate, talent shortages become increasingly apparent, creating a bottleneck that hampers the growth of enterprises and affects the overall competitiveness of the industry.

In Asia, the contradiction between the rapid development of the electronics manufacturing industry and the shortage of talent is particularly evident. The existing talent pool cannot fully meet the market's demand for highly skilled professionals. According to feedback from

industry companies, there is an urgent need for professionals with knowledge of IPC standards and practical skills in electronics. However, the reality is that most academic courses are disconnected from the actual needs of the industry, leading to disappointing results when companies recruit from universities and schools.

So, how can the talent development systems in universities and schools seamlessly align with enterprise needs to quickly unblock these bottlenecks?

In response to these needs, IPC Asia launched the IPC Asia Talent Development Program in 2020 with three core projects: the Internship Program, the Student Training Program, and the Academic Partner Program. This overall initiative has aimed to bridge the gap between education and industry by providing systematic training and practical opportunities that help students and young professionals master the core knowledge and skills of IPC standards. Through close collaboration with major enterprises and academic institutions, IPC Asia has successfully cultivated a number of highly skilled professionals who are meeting the industry's development needs and laying a solid and sustainable foundation.

A workshop on IPC standards took place at Saigon University in Ho Chi Minh City, Vietnam.

Exploring Through Collaboration

The IPC Asia Talent Development Program has collaborated with more 20 educational institutions in mainland China, Hong Kong, Taiwan, Thailand, and Vietnam, with over 1,000 participants.

Student Training Program

The Student Training Program has attracted more than 400 students from nearly 20 universities. To ensure that the training content is both cutting-edge and practical, IPC Asia invited several university professors and industry experts to give lectures that present typical industry case studies. Through seminars

The IPC Taiwan team conducted IPC-A-610 guided instruction at Ming Chi University of Technology.

Guangdong Province, China: IPC China team and a delegation from Zhongshan Technician Institute visited the Wistron South China factory.

and workshops, students engage deeply with these professors and experts to enhance their understanding of the industry.

IPC Asia develops training courses tailored to the specific characteristics of the electronics industry in different regions. In Taiwan, for example, there is a dynamic structure between the technology industry and the evolving field of "electronics engineering" education. In cooperation with Ming Chi University of Technology, IPC Asia has focused on constructing course offerings with the future needs of both industry and academia. IPC Asia also works with schools and local companies to jointly develop courses, curricula, and teaching processes, and incorporates language skills and communication abilities into professional courses to provide students with a competitive edge.

Academic Partner Program

The IPC Asia Academic Partner Program also has made significant progress. To date, five universities have joined the program. Students can learn and master IPC standards while still in school and can obtain IPC international certification. IPC ollaborates with local companies to help students improve their personal skills in practice and become aware of the gaps between their abilities and enterprise requirements.

This win-win model not only helps students thoroughly prepare for entering the workforce but also strengthens the connections between IPC and academic institutions and companies. Xie Tonghui, a faculty member at Zhongshan Technician Institute, an IPC Asia education partner, deeply appreciates this approach. "By jointly conducting IPC certification training for both teachers and students, we have not only enhanced the teaching quality and employability of our students but also opened new avenues for our institution to serve emerging productive workforces," Xie says. "The professional skills competitions, based on the principle of 'learning by doing, have further promoted the seamless integration of IPC standards, paving new paths for a win-win scenario between our institution and enterprises."

Internship Program

The Internship Program, a collaboration between IPC and TTM Technologies, has been highly successful. Since its launch in October 2020, the program has entered its seventh phase, attracting over 120 students from more than 20 disciplines in Hong Kong, Guangzhou, Shanghai, and other areas. Through internships, students have been able to combine theory with practice, gain frontline industry experience, and lay a solid foundation for their careers.

Leading the Industry's Development Direction

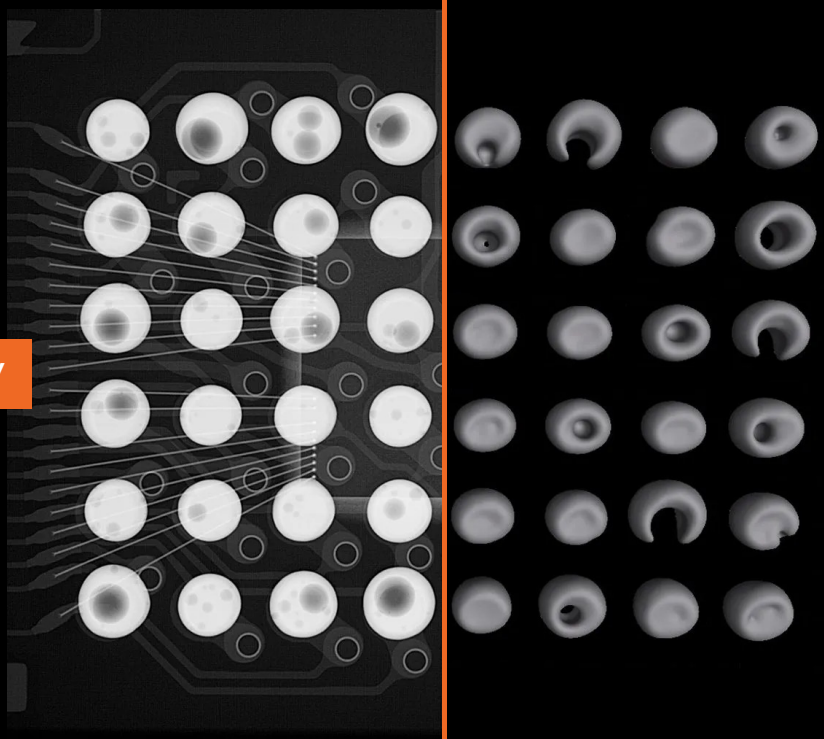
Technological innovation and industrial transformation present new challenges for talent development and team building. Rapid changes in the industry

Hunan Province, China: An IPC standards course was held at Changsha Aeronautical Vocational and Technical College.

Creative Electron

Get the whole picture with Smart CT

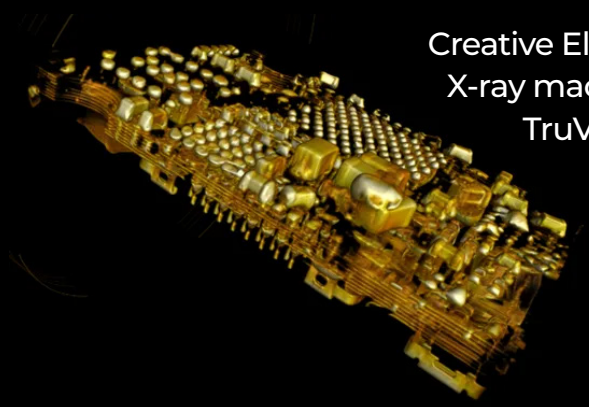
2D X-ray



SmartCT

A 2D X-ray image quickly and easily reveals defects like voids in this BGA, but the information is incomplete.

Smart CT creates a 3D representation that shows the exact location of voids to assess potential impact.



Creative Electron's Smart CT module turns any TruView™ X-ray machine into a CT System too. You can use your TruView™ X-ray for 2D imaging, and insert the Smart CT module when you need 3D imaging.

SEE SMART CT IN ACTION

Smart CT is just one reason why our systems are the most powerful x-ray imaging products in the market.

Ho Chi Minh City, Vietnam:
Workshop of IPC Standards at Posts and Telecommunications Institute of Technology.

require us to stay up to date, maintain flexibility, and adopt a forward-looking attitude. We must closely follow industry trends if we want to cultivate a group of leaders who can and will contribute to a prosperous future.

In response to new industry characteristics, IPC Asia has optimized and launched new courses this year, including the Electronic Assembly Engineer (EAE), and adjusted program content accordingly to align with the educational systems of academic institutions.

"Currently, the electronics industry continues to develop globally, and behind all this progress is the need for high-quality talent," says Sydney Xiao, president of IPC Asia. "The IPC Asia Talent Development Program not only addresses the current talent shortage but also carries the mission of leading the future direction of the industry. To this end, IPC Asia will continue to uphold the principles of foresight and practicality, expanding the program's coverage to attract more academic institutions and industry partners."

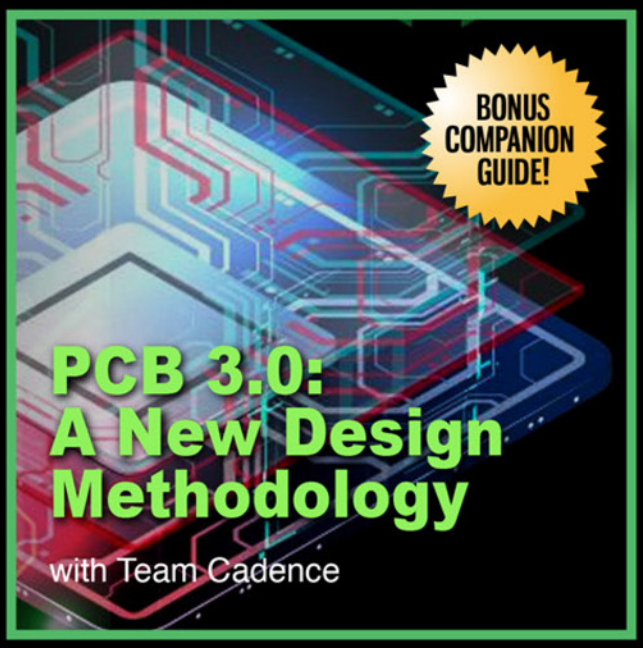
Xie Tonghui, a faculty member at Zhongshan Technician Institute, an IPC Asia education partner

Evelyn Cui, Education Program Director, IPC Asia

Sydney Xiao, President of IPC Asia

Guangdong Province, China: The Seventh IPC Asia Scholars Program with TTM.

Now Playing



ON THE LINE
WITH... I Connect007

PODCAST SERIES

Insights on a New Innovation Advisory Team

Providing leadership opportunities amongst rapid technological change in wire harness

By Sarah Blair, WHMA/IPC Marketing Coordinator

Doug Chowning, president of American Syscomptel and vice chair of the WHMA Board, shares insights into the formation, goals, and potential impact of the Innovation Advisory Team (IAT), a key part of the strategic initiative developed by the WHMA Board. The IAT represents a pivotal move to position the wire harness industry at the forefront of technological and innovative advancements.

What is the Innovation Advisory Team?

Doug Chowning: At its core, the IAT is a cross-functional group of experts dedicated to understanding and shaping the impact of technology within the wiring harness industry. Technology is fundamental to the entire strategic plan. It's not just about keeping up; it's about driving industry advancements and what's next. The team works directly with the board to analyze the current state of technology, identify gaps, and propose actionable strategies.

How does it benefit the members of the team?

The IAT offers individuals the chance to influence the direction of the wiring harness industry.

Doug Chowning receives the 2024 WHMA Volunteer Excellence Award at the annual Global Leadership Summit from Parker Garrett, WHMA board chair.

By participating, members contribute directly to strategic decisions and gain a unique opportunity to make a broader impact. Being part of the IAT means having a voice in the future of our industry, ensuring we're not just reactive but proactive.

What is the significance of forming the team now?

The motivation to create the IAT stems from the rapid pace of technological industry change, particularly with the rise of AI and other advanced solutions. Our customers are driving innovation, and it's critical we align our efforts to support this transformation effectively. The IAT aims to address these changes by collaborating among industry leaders, preparing members for upcoming challenges, and ensuring that education programs evolve alongside technological advancements.

What are the goals of the IAT?

Though the IAT's specific initiatives are still under development, its potential impact can be significant. By analyzing industry trends and identifying areas for growth, the team is expected to shape programs that will drive the industry forward. We don't have all the answers yet, but by bringing the right people together, we're confident that the team will identify exciting proposals that the Board can act on.

How does the IAT align with WHMA's strategic plan?

The IAT is a key component of WHMA's broader strategic plan, which emphasizes innovation, education, and connection. With technology influencing daily operations at an accelerating pace, the board recognized the need for immediate action. We couldn't sit back and let these changes happen. This is our opportunity to guide the industry and stay ahead.

Looking ahead, we envision the IAT presenting annual findings at future WHMA Global Leadership Summits, providing valuable insights for members. The Board is ready and eager to embrace the changes coming to the industry. We're committed to leading, not following.

The Innovation Advisory Team is more than just a response to technological shifts; it's a testament to WHMA's dedication to empowering its members and ensuring the industry's continued growth and success.

Member Milestones

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

IPC Anniversaries in Q4 2024

40 YEARS

Apple Inc.
Cupertino, California, USA

35 YEARS

Adran Inc.
Huntsville, Alabama, USA

Intel Corporation
Hillsboro, Oregon, USA

30 YEARS

National Instruments
Austin, Texas, USA

Shure
Niles, Illinois, USA

25 YEARS

Bechtel Plant Machinery Inc.
Monroeville, Pennsylvania, USA

Calian Advanced Technologies
Saskatoon, Saskatchewan, Canada

Cirtronics Corporation
Milford, New Hampshire, USA

Frequency Electronics Inc.
Mitchel Field, New York, USA

A Fresh Perspective

Waad Tarman's journey defined by a determined pursuit of leadership

By Charlene Gunter du Plessis, Senior Director, IPC Education Foundation

Waad Tarman is the current IPC Student Board Member and incoming president of the IPC Student Chapter at Auburn University. She has an impressive background as a second-year Ph.D. student and dedicated research assistant at Auburn University's Electronics Manufacturing and Reliability Laboratory within the Industrial and Systems Engineering Department.

As a Student Board Member, Waad has full voting rights and attends all Board meetings. Her role is focused on bringing a fresh perspective to the table, based on students' needs and aspirations, as a representative of her fellow IPC student members. Her journey has been defined by a determined pursuit of leadership and a passion for making a positive impact. She possesses strong knowledge of various microelectronics manufacturing, including PCB fabrication and assembly (PCBA), package mounting and assembling (SMT and THMT) technologies, inspection and quality control, and design for manufacturing (DFM).

I visited with Waad last fall after she returned from attending an IPC Board meeting in Munich.

What does it mean to you to serve on the IPC Board of Directors?

Waad Tarman: It is an incredible honor and responsibility to serve on the IPC Board of Directors as the student member. Being the voice of students means ensuring that, in a field that is always changing, our needs and goals are considered. It's also a unique opportunity to witness how decisions are made at the highest levels of leadership in electronics manufacturing. I have developed a deep understanding for the breadth of knowledge and teamwork needed to overcome industry concerns, and I feel privileged to contribute to these discussions from a student perspective.

How important has it been to serve in leadership positions as a student?

It's really important because it helps you grow in ways you can't get from just studying. You learn how to work with different people, solve problems, and take responsibility. Leadership gives you the chance to make a real difference, and it prepares you for the challenges you'll face after graduation. They allow you to inspire and support others in their journey, which is incredibly fulfilling.

What are some of the things you have learned this past year as a board member?

This year has been an absolute eye-opener. I've learned how important it is to have diverse perspectives in the room, especially when facing challenges in a global industry like ours. As the student board member, I've witnessed how small ideas can spark big changes when the right voices are heard. I've seen the power of collaboration at the highest level, and how our collective experiences shape the direction of IPC's initiatives. Most importantly, I've learned that no matter your position, your voice matters—and it can make a difference.

Has this opportunity influenced your initial thoughts about the industry from a career perspective?

Without a doubt! This opportunity has taught me the limitless potential within the electronics manufacturing industry. The more I engage with industry leaders, the more I see how dynamic, innovative, and future-oriented this field is. I came into this with an idea of what my career might look like, but now, I'm thinking bigger. The possibilities are endless, and I'm more excited than ever to play a role in advancing this industry whether it's through research, leadership, or driving change at the global level. This experience has solidified my commitment and drive to this field and to be part of its next chapter.

What advice do you have for your successor?

My advice to my successor is simple: Make the most of this incredible opportunity. Don't be afraid to take risks and walk the extra mile. This is your time to leave a lasting impact on the industry and your colleagues. Always speak out loud, be bold, and remember you are not only representing yourself, but you are also representing thousands of students who are eager for change and growth. The IPC Board is your

More About Waad

- Originally from Jordan, where she earned an industrial and systems engineering degree
- From 2011–2018, she formed part of the Jordan National Taekwondo Team as a professional athlete and competed in Korea, Taiwan, Lebanon, Indonesia, Turkey, Qatar, Egypt, Vietnam, Kazakhstan, UAE, Azerbaijan, and Turkmenistan
- Selected from 750 applicants to lead the Community Engagement Exchange (CEE) program under the Department of State's MEPI Student Leaders Program through Georgetown University in 2019
- Has received various IPC scholarships, including two member scholarships in 2022 and 2023, and a leadership scholarship in 2023
- President of the SMTA Chapter at Auburn University
- Graduated from Auburn with a master's degree in industrial and systems engineering
- Holds a Lean Manufacturing (186 hours) certificate and completed Lean Six Sigma Green Belt

platform—use it to advocate for innovation, diversity, and the future of our industry.

To all students: Try your best to be on the board because serving on it has been one of the most rewarding experiences of my life. It's more than just a title; being part of something big can shape the future of electronics manufacturing. You can take on active, meaningful involvement by making an impact in this world. I am very proud, and I look forward to the future with respect to that industry and students to follow. I can't recommend enough to get involved, be a part of the IPC community, and start shaping your future today.

A note from the director of the IPC Education Foundation

It is truly an honor to recognize and reward the future talent that our industry so desperately needs. With a growing network of engaged students, the IPC Education Foundation continues to inspire, educate, and prepare the next generation of skilled professionals in electronics manufacturing and engineering.

We extend our heartfelt thanks to student leaders like Waad and the others who have served before her.

Charlene Gunter du Plessis

Their dedication to excellence, their commitment to being the voice of their peers, and their role as outstanding ambassadors for both IPC and the Foundation are invaluable. These student leaders not only represent the future of our industry but also inspire their fellow students to strive for greatness.

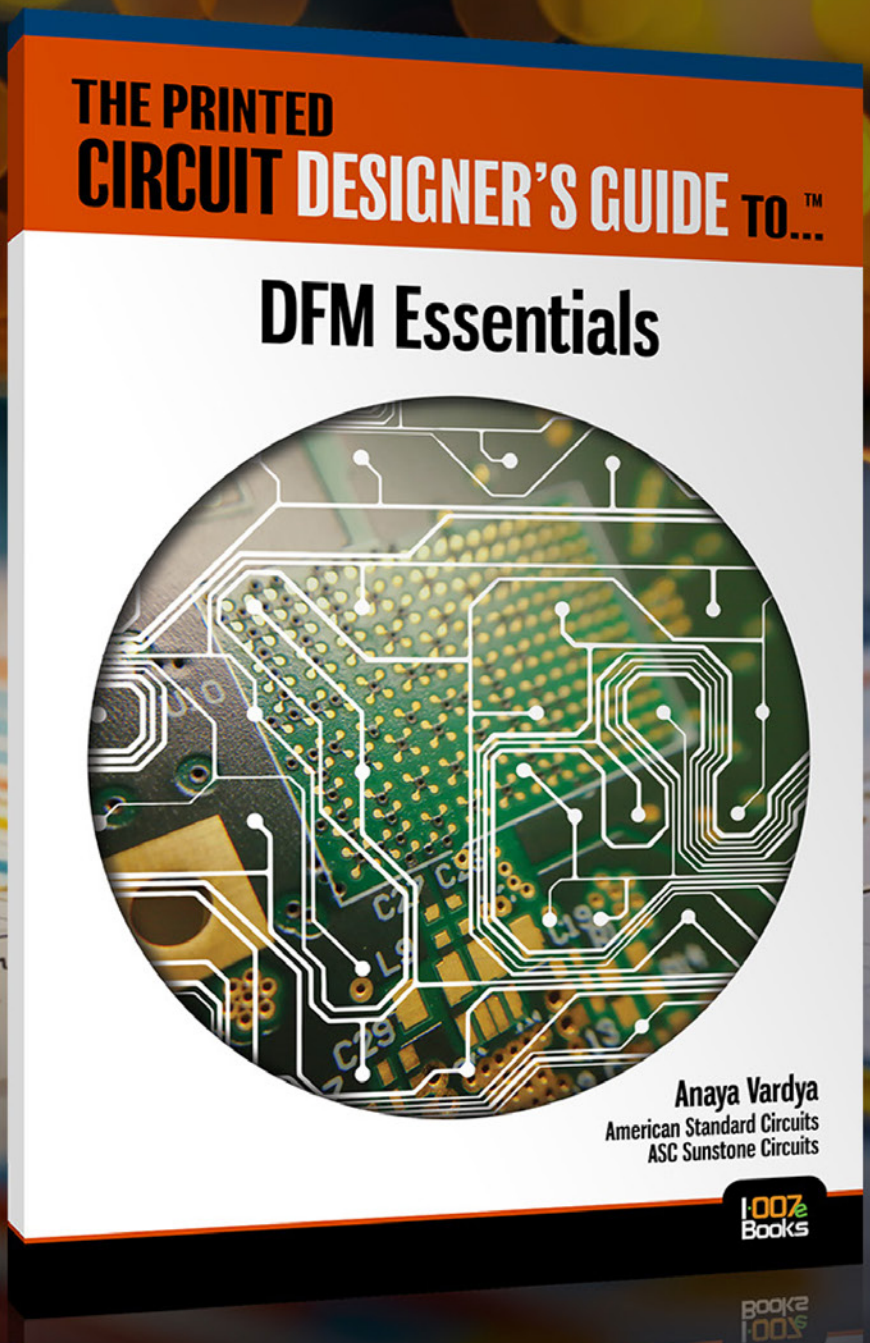
Thank you for your ongoing contributions to our mission of developing the next generation of professionals who will drive the future of electronics manufacturing.

Young Engineers

When beginning your career as an electrical engineer, you want to learn as much as possible as quickly as possible. How do you make that happen? We spoke with Antoine Mwamba and Krystal Li, two of IPC's Emerging Engineers, to discuss their education, current jobs, the benefits of professional development courses and technical training, the significance of their mentors, and the valuable connections they have built through IPC.

Kris Moyer
Instructor, IPC

"Whether you are new to PCB design or a seasoned designer, this book can help you achieve a successful, high-quality, high-yield PCB design the first time and every time."



I-007e Books

Look inside

IPC Around the World

North America

By Brian Knier, Vice President, Marketing, Member Success

North America celebrated National Apprenticeship Week November 17-23 with a new Apprenticeships Playbook for IPC members and new data on how apprenticeships create opportunities for women, veterans, and others facing barriers to entering the electronics industry. IPC's Registered Apprenticeship Program, approved by the U.S. Department of Labor, has supported nearly 90 new apprenticeships across nine companies and seven states, with over $125,000 in grant funding secured to offset employer costs. Learn about IPC apprenticeships here.

IPC's Department of Education released a new video, "Workforce Challenges Facing the Electronics Industry," a short explainer detailing IPC's comprehensive strategy to tackle workforce issues. Providing insight from the white paper "Building Electronics Better: A Plan to Address the Workforce Challenges Facing the Electronics Manufacturing Industry," the video covers IPC's multifaceted approach to establish partnerships among educational institutions, businesses, government agencies, and non-profits to ensure a steady flow of skilled workers with defined career pathways.

The video can be found here

Click to download the white paper

Thiago Guimarães

Our Industry Intelligence team is growing, and our newest member is Thiago Guimarães, director of Industry Intelligence, responsible for leading IPC's research program in North America. Originally from Brazil, Thiago has more than a decade of experience in B2B market research and a focus on industrial manufacturing. He will work with colleagues across the organization and the industry on expanding IPC's Industry Intelligence program.

IPC Europe

By Sanjay Huprikar, President, IPC Europe and South Asia Operations

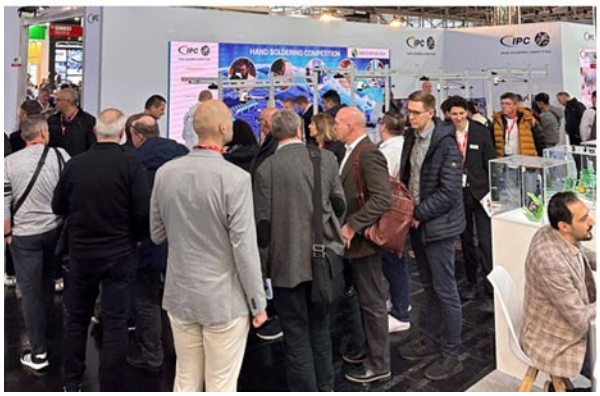
The IPC Europe Team wrapped up a busy events season in 2024 at electronica in Munich in mid-November. We were thrilled to be one of 3,600 exhibitors at the world's largest electronics fair, which drew 80,000 attendees from 100 countries around the globe. The show organizer's vision of the "All Electric Society" was a great fit with IPC's expanding vision of electronics being the resource of the global economy. Our stand featured:

- The worldwide hand-soldering championship won by contestants from China, India, and France.
- A thought leadership forum with 12 industry subject matter experts talking about design, Factory of the Future, sustainability, industry intelligence, and advocacy. The latter featured a visit from the European Commission.
- Live interviews with 50 key industry executives and technologists by Phil Stoten of SCOOP Communications.
- Partners lounge area with hundreds of visitors and 70 informal meetings.

Our team looks forward to engaging our European members during the first quarter of 2025 at several significant industry events:

- Pan-European Electronics Design Conference, Jan. 29-30, Vienna, Austria
- Southern Manufacturing & Electronics Show, Feb. 4-6, Farnborough, UK
- Global Industrie, March 11-14, Lyon, France
- IPC APEX EXPO, March 18-20, Anaheim, California

Please contact PhilippeLeonard@ipc.org for more information.



IPC Asia

By Sydney Xiao, President, IPC Asia

Q4 is traditionally the busiest time for the IPC Asia team, and the last quarter of 2024 was no different. There were remarkable advancements across standards, certification, validation, education, and events.

Standards

- The new Requirements for Design and Testing of Insulated Gate Bipolar Translator (IGBT) has been submitted for PIN approval.
- IPC Asia has released several new standards, including IPC-2221C-JP, *Generic Standard on Printed Board Design;* IPC-2552-CN, *General Electronic Components Model-based Definition (MBD) Standard;* and IPC-1402-CN, *Standard for Greener Cleaners Used in Electronics Manufacturing.*
- A new task group, D-33AA-JP, has been established in Japan to focus on the Automotive Applications Addendum to IPC-6012E, *Qualification and Performance Specification for Rigid Printed Boards.*
- IPC collaborated with Delta Electronics to establish an IPC Asia CFX Demo Line and presented a certificate to Delta Electronics during IPC CEMAC.

Certification and Validation

- The Chinese version of the IPC-7711/7721D training course was released.
- On Nov. 5, 2024, 25 representatives from 14 companies participated in the Zhongshan CIT Club event.
- IPC awarded the IPC J-STD-001/610 QML validation certificate to Access Device Integrated Communications Corp., Beijing Railway, Pateo, and Cincon Electronics.

Education

- IPC Asia released the new workforce training courses, including IPC-7530, *Guidelines for Temperature Profiling for Mass Soldering Processes (Wave and Reflow);* IPC-1402, *Green Cleaners Used in Electronics Manufacturing;* and IPC-7095E, *Design and Assembly Process Implementation for BGAs.*
- IPC standards were recognized in China's national curriculum standard for vocational education. IPC-A-600, IPC-A-610, IPC-A-620, and IPC-7711/21 standards were included in electronics technical talent development requirements.

Events

- IPC Japan Hand Soldering and Rework Competition was successfully held in Nagoya, Oct. 23-25, 2024, with 140 participants competing

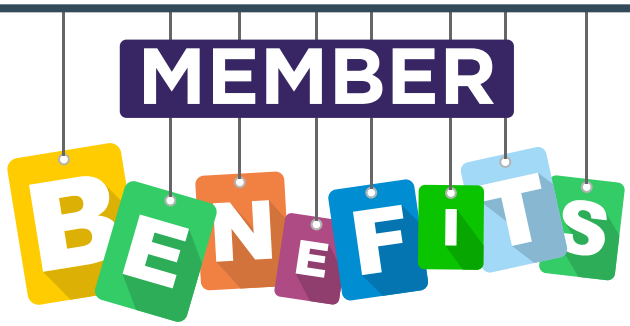
Strategic Partnerships: Strengthening collaborations with Japanese companies, including LDP, METI, Keidanren, NEC, and Panasonic. John Mitchell delivered a keynote at the Keidanren Executive Summit, addressing over 100 executives on international standardization.

in the preliminary rounds, and 32 finalists advancing to the onsite finals after fierce competition. The top prizes went to Yuki Miyashita, Fujifilm Healthcare Manufacturing (1st place); Tomohiro Iwata, Sowa-Electronics.pl (2nd place); Tomoki Hara, Mitsubishi Electronics (3rd place).

- In collaboration with Pudong New Area Association for Quality And Technology Shanghai, IPC successfully hosted IPC China Electronics Manufacturing Annual Conference (CEMAC), Oct. 24-25, 2024, in Shanghai under the theme "Make Your Imagination Reality." The event featured keynote speeches, forums, committee meetings, task group meetings, CIT Club, committee reception, partner reception, and IPC Asia Annual Member Appreciation and Awards Dinner. The event attracted over 600 industry experts from more than 400 companies.
- The second annual IPC Korea Festival of Electronics Standards and Technology (IPC K-FEST 2024), was held Oct. 29, 2024, in Seoul, South Korea. IPC K-FEST 2024 has attracted 160 industry professionals from almost 80 companies. This one-day event featured technical seminars, the IPC-A-610 Regional Task Group meeting, and the IPC Korea Annual Awards.
- IPC Japan hosted the IPC WorksAsia 2024 Automotive Electronics Seminar in Nagoya, Oct. 31, 2024, attended by over 200 automotive industry experts, both online and in-person.
- IPC hosted its Hand Soldering World Championship at electronica in Munich, Germany, Nov. 14-15, 2024, welcoming 14 competitors from 13 companies and 12 countries worldwide. The prestigious title of 2024 World Champion was awarded to Zhiheng Zhou, Jiangsu Jinling Mechanism Manufacture Company, China.

Upcoming Events

- IPC Masters Competition China will be held in Shanghai during productronica, March 26-28, 2025, bringing together top technical talents from China's electronics manufacturing industry.



IPC Members: Discover Technical Research in Conference Paper Database and Resource Library

IPC Searchable Conference Paper Database: This is a valuable resource for engineering leadership and staff who want to stay up to date on the latest developments in the electronics manufacturing industry. You can search by author, title and keyword. You can also search for keywords and topics in the filter by tag field. Offerings dating back to 2002 include IPC's workforce white paper and IPC APEX EXPO conference papers, featuring such topics as digital transformation, supply chain cybersecurity, conformal coating, PCB fabrication, design for manufacturing, and more.

Visit Conference Paper Database.

More Valuable Resources: Explore the IPC Library, a central portal providing access to additional technical content, webinar recordings, white papers, reports, economic analysis and industry publications.

Visit IPC Library.

Year in Review: In 2024, IPC exemplified its unique role as the global electronics association. While maintaining a robust schedule for new and revised standards, IPC expanded the breadth and depth of its industry programs to promote innovation, sustainability, workforce development, and supply chain resiliency. IPC kept its focus, as we have for close to 70 years, on working with and for our members and the greater electronics industry globally. The hallmark of IPC's success remains the value we deliver to our members and industry. In this report, we highlight the incredible work that IPC and our members accomplished together in 2024.

Read 2024 Year in Review.

IPC India

By Arpita Das, Deputy Manager, Events and Communication, IPC India

The last quarter of 2024 was an eventful period for IPC India, marked by impactful regional activities and remarkable achievements on the global stage.

Regional Activities in India

IPC successfully organized an Industry Networking Event and a Hand Soldering Technical Workshop in Thiruvananthapuram and Cochin, Kerala, Oct. 17-18, 2024. These sessions highlighted Kerala's position as a hub for the electronics industry, with its world-class R&D and testing facilities and the strong presence of EMS suppliers catering to the Strategic Electronics sector.

IPC hosted an Industry Networking and Technical Session on Hand Soldering in Vizag, supported by AMTZ, on Oct. 25. These activities continue to drive IPC's mission of promoting technical excellence and community development within the electronics industry to build electronics better.

Global Outreach and Collaboration

Beyond India, IPC expanded its footprint by organizing the first Workforce Development Program in Durban, South Africa, on Oct. 21. This inaugural event attracted 20 professionals from OEM and EMS companies who participated in an intensive Hand Soldering Technical Course.

Furthermore, technical sessions on hand soldering in South Africa were conducted in Cape Town on Oct. 23 and Johannesburg on Oct. 25, supported by Priben Distributions Cc.

India's Achievement on the Global Stage

We had a proud moment for India at the IPC Hand Soldering World Championships 2024 at electronica in Munich, on Nov. 15, when Roshan Dhyani from Barco India secured a second-place finish. Roshan showcased exceptional skill and speed by scoring 795 out of 816 points and completing the task in 59 minutes and 31 seconds. Congratulations to Roshan for this remarkable achievement.

As we begin 2025, IPC remains committed to supporting the electronics industry with initiatives that enhance technical skills, promote global collaboration, and celebrate excellence.

Embracing Innovation: Highlights of Upcoming Q1 2025 Activities

IPC India is set to host a series of dynamic industry networking and technical sessions across multiple cities, addressing key topics for OEMs, EMS providers, and PCB manufacturers in the electronics industry. These activities are key milestones on the journey to IEMI 2026, the annual flagship event.

The first Technical Session for 2025 will be held in Mysore, where participants will delve into the "Best Practices in Electrostatic Discharge (ESD)," while Gandhinagar will offer insights into "ESD and the Acceptability of Printed Boards." Under the topic "Building Electronics Better," New Delhi will highlight developments in mobile manufacturing and Hyderabad will explore innovative approaches for enhancing aerospace and defense electronics. These sessions promote knowledge-sharing, address industry challenges, and empower professionals with the latest technological skills.

Roshan Dhyani receiving his hand-soldering award at electronica 2024.

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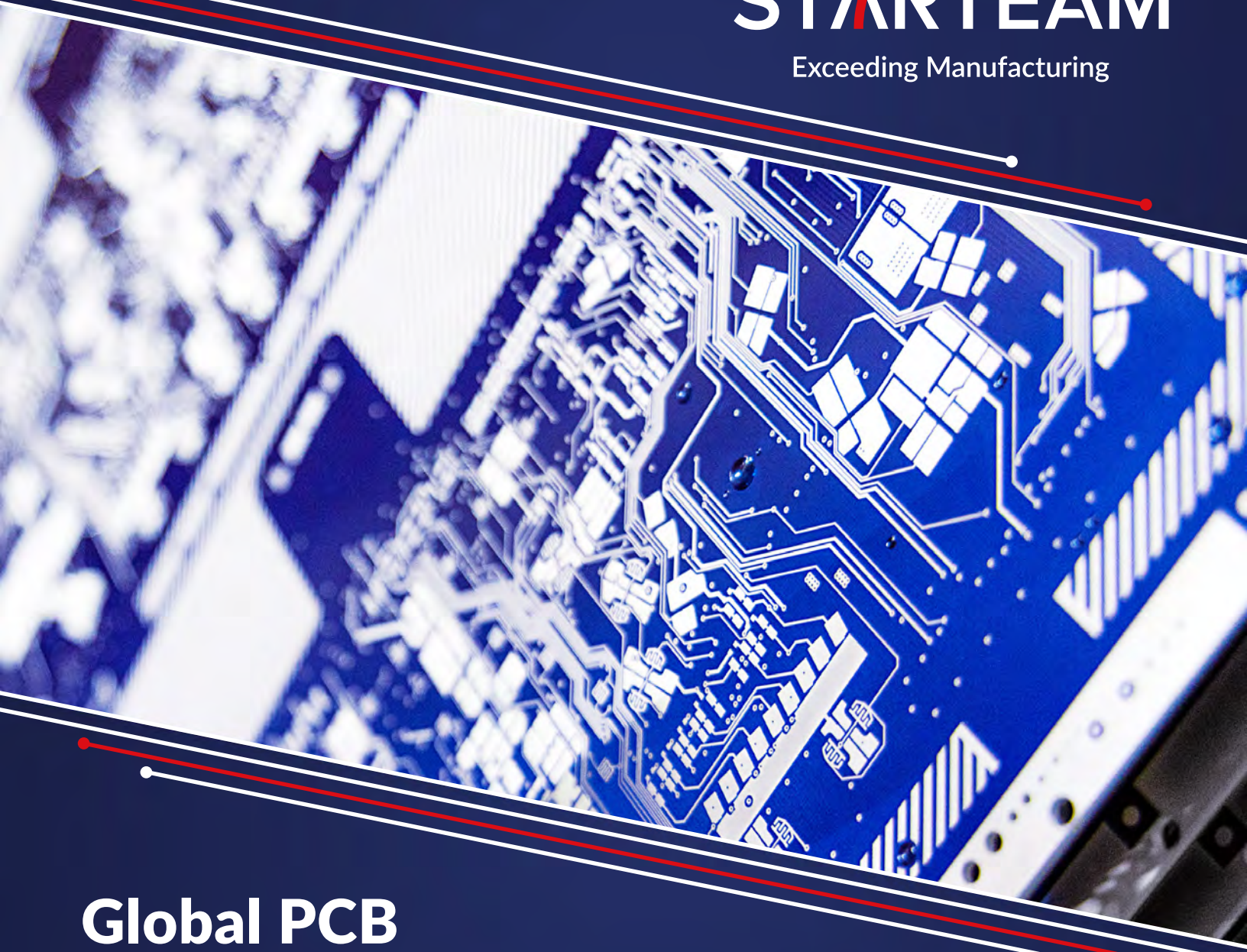

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2025 Programs Q1

Stay connected with IPC through some of these regional events in January, February, and March. Visit our online calendar of events for more information.

JANUARY

January 22
Designing for Success: How DFM, DFT, and DFA Impact PCB Production
Webinar

January 28–30
WHMA's Annual Global Leadership Summit 2025
Fort Meyers, Florida, USA

January 29–30
Pan-European Electronics Design Conference
Vienna, Austria

January 31
Electrostatic Discharge (ESD) Technical Session
Mysore, Karnataka, India

FEBRUARY

February 4
IPC Hand Soldering Competition 2025 Regional Qualification, United Kingdom
Farnborough, Hampshire, England

February 21
ESD and Acceptability of Printed Boards Technical Session
Gandhinagar, Gujarat, India

MARCH

March 5
Building Electronics Better Inside Mobile Manufacturing
New Delhi, Delhi, India

March 7
Building Electronics Better in Aerospace & Defence
Hyderabad, Telangana, India

March 11–13
IPC Hand Soldering Competition 2025 Regional Qualification, France
Lyon, France

March 15–20
IPC APEX EXPO 2025
Anaheim, California, USA

March 26–28
IPC Masters Competition
Shanghai, China

Wanted: Workforce Champions

IPC is building greater awareness of workforce opportunities within the electronics manufacturing sector by creating a network of individuals willing to share their workforce stories across various outlets. If you volunteer, your name will be added to a database, and you may have the opportunity to participate in multiple video and print platforms, including speaking engagements, media interviews, blog posts, social media posts, and magazine articles.

We are looking for individuals who have overcome challenges, acquired new skills, or earned certifications to excel in their field. Your story can empower others on their path to success.

Your story will not only help others navigate their own career paths, but it will also provide a platform to showcase your expertise and connect with fellow professionals in the industry. Together, let's inspire and uplift the next generation of electronics manufacturing professionals.

Complete this form or email Michelle Leff Mermelstein for more information.

IPC Community MAGAZINE

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Cover image: **Adobe Stock © Sumet**

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

Winter 2025, Volume 3, Number 1
IPC Community is published quarterly.

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APEX EXPO IPC 2025

25TH ANNIVERSARY

REIMAGINE THE POSSIBILITIES

MARCH 15-20
MEETINGS + COURSES

MARCH 18-20
CONFERENCE + EXHIBITION

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> **- KEVIN GERMAINE, SRCTEC**

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