

# I-Connect007

EXCLUSIVE IPC APEX EXPO 2018  
PRE-SHOW COVERAGE





# A Sneak-Peek at IPC APEX EXPO 2018

IPC President and CEO John Mitchell gave I-Connect007 a sneak-peek at the upcoming IPC APEX EXPO, happening in February in San Diego. Mitchell provides a description of this year's keynote, as well as a few new additions and areas of emphasis. It looks like it will be another packed house, with plenty to see, do, and learn about.



John Mitchell

insights into the complex world of technology. In addition to this opening keynote on February 27, I will give a keynote on 'Educating a 21<sup>st</sup> Century Workforce,' and cover how understanding the challenges and solutions in educating a 21st century workforce, is critical to businesses and leaders around the globe.

**Patty Goldman:** John, what can you tell us about the upcoming show, and keynote speaker, which I understand is expected to be quite a draw?

**John Mitchell:** Jared Cohen is our Tuesday keynote. He is now the CEO of Jigsaw, which is a part of Google. He's the former advisor to two U.S. Secretaries of State and the author and member of the Council on Foreign Relations. The title of his speech is, "Game changers, Technology, and the Next Big Disruptions." He travels a lot, so he'll be drawing on his travel and first-hand accounts of some of the various important and emerging trends in technology, and then reveal how some of those will matter to the electronics industry.

**Goldman:** That should be very interesting and appropriate.

**Mitchell:** Yes, we're looking forward to Mr. Cohen's

**Goldman:** Sounds good. What else will be going on at APEX?

**Mitchell:** Our theme this year is "Succeed at the Velocity of Technology." We are more than 95% sold out for the show floor, which is great, and we're anticipating more than 450 suppliers to showcase their products and services. In addition to the exhibition, we of course have our educational offerings, the professional development courses, which include subjects like PCB fabrication troubleshooting, printing, dispensing, jetting, manufacturing yield, reliability, and DFX. We really try to provide things that are driven by real-world application of what's happening right now, so the attendees can apply it later. We're trying to help them access new research on materials and processes and learn about trending materials or applications and processes, such as Industry 4.0 and wearables. We'll address real-world problems and teach the practical way that people can be

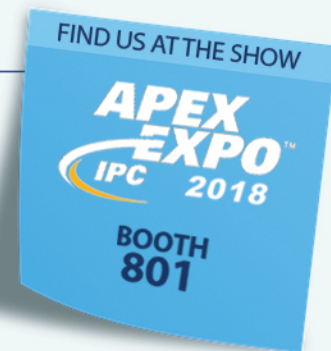






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successful at their jobs. So, flex circuit design, signal integrity issues, wearables, printed electronics, impedance and tools that merge electrical and physical design are just a few of the areas that the programming will cover.

Then, we have the technical conference, which offers the industry's most stringently-vetted program available. We have more than 80 papers this year, and they're measured against strict requirements by a panel of industry experts. We want to make sure we have the latest research and innovation available from the subject matter experts in the areas of board fabrication, design and electronics assembly.

The content that the attendees will be experiencing at this show is completely unique to IPC APEX EXPO. We've been careful to craft the conference so that similar topics don't overlap to help attendees maximize their time and effort. A few of the highlights include PCB fabrication reliability, assembly reliability, and then voiding and developments in the assembly of bottom termination components.

The Design Forum will be going on concurrently and will feature distinguished experts from the design community. They'll be delivering design-focused education on some topics, as well as sharing priceless and timeless lessons learned. They'll be presenting practices in Industry 4.0, including IPC-2581, emerging ECAD and MCAD, designing for flexible circuits, as well as circuit board design and mistakes you can avoid. Those are some of the topics that will be presented there. We will have

buzz sessions again, with a market outlook buzz session, as well as IPC standards updates and environmental legislation updates.

We're trying to make sure that people in every stage of their career can be successful by coming to IPC APEX EXPO. There will be sessions for early career that we would recommend, things like PCB fabrication, voiding, bottom termination components, PCB surface finish reliability, things like that. Then, for those in mid or later career, some of the sessions they might benefit from would be the wearables, printed electronics, emerging technology, SIR corrosion, and some of the reliability issues with dispensing jetting, etc.

The whole show continues to grow every year, which I'm very pleased with. Frankly, the industry's been doing very well this past year. We're excited about that because typically the show follows the viability of the industry. We expect the show to grow right along with it this year. One of the two annual IPC board of directors' meetings will be held right before APEX EXPO, so you should see the majority of the IPC board members in attendance.

**Goldman:** Will there also be award ceremonies?

**Mitchell:** Yes. At the Tuesday luncheon we will have the official IPC annual meeting, and then for the Monday and Wednesday luncheons we will have the industry awards ceremonies. We just can't get them all done in one lunch. When you have thousands of volunteers, it's a good problem to have, right?

**Goldman:** Exactly. At the Tuesday annual meeting, will we be electing any board members?

**Mitchell:** A new member of the executive committee—a new secretary/treasurer—will be put forward at that time. Actually, all of the executive positions will be renewed because Joe O'Neill will just have finished his two-year term as chairman. He would move to immediate past chair and there would be subsequent shifts in the other positions, if tradition follows.







Those positions are being vetted by the board and we'll have that approved for general voting, as well, once the board approves. Also, there will be at least one board member renewal, and there may be one slot available, or not. We'll see. Right now, we're completely full at the maximum number of board members. If one of those people moves onto the executive committee, then there's a possibility that there may be another slot available, but it won't be a necessity to fill it. We have five on the executive committee, and then the elected board members range anywhere from seven to 14 members at any time. Right now, we're at 19, which is the max.

**Goldman:** Okay, what else? Anything more to add on the keynote speaker?

**Mitchell:** I think people will be very excited to hear from him. We've had really good fortune most of the years I've been here in having keynotes that people are pretty gung-ho about, so I expect this will be no exception.

And one other thing. In an effort to engage people earlier on understanding the industry and what IPC does for it, we're bringing in some high school groups that will be touring and will be privileged to hear some panels. I understand one of the schools, a San Diego school, has already accepted, and we've put the invitation out to a couple others.

**Goldman:** Any news on the standards front?

**Mitchell:** In addition to our standards, education, advocacy, and solutions areas, there are a few initiatives that we're going to focus on for the next two or three years. You'll see some of this coming out at the show. One of those initiatives is what we're calling the transportation initiative. As you've noticed, we've recently had a lot of standards in the automotive arena. We're going to be looking at the heavy trucking, rail, and shipping, etc. as well. Since electronics is proliferating into the transportation space, we want to make sure that we can lever-

age the industry's expertise to those verticals, as well. You'll see a lot of effort on the transportation initiative.

On the education initiative, we're looking to do a lot more and that will be discussed at APEX EXPO as well as workforce development. There are still a lot of jobs that aren't being filled and we're trying to work with the industry to understand exactly what the skill sets are that we could help develop in individuals so there can be more people available to be hired, as well as reaching out to schools and doing some academic work there.



We'll continue to improve our systems to be better and more consistent with our offerings to the industry, on a global basis.

**Andy Shaughnessy:** You mentioned the design forum. My focus is design, so I'll be covering that. Sounds like you have a pretty good program.

**Mitchell:** There's the standard information that everybody's used to, that will of course, always be there, but the team just continues to reach out to the industry to understand the latest, newest, hottest issues that we need to be covering. They're striving to make sure that it's out there so people can get that information.

**Goldman:** John, how much interchange is there between the people out on the show floor and the people in the conferences and committee



meetings? Sometimes I feel like for the people on the show floor, all they know is the show, and they never see that other half, which is the conference and the committee meetings. Do you get that feeling?

**Mitchell:** I'm sure that happens for some people, but I know there are other people that are experiencing all the show has to offer. It just depends. For instance, if you're a sales person and you're there, guess what? You're not going to leave the show floor, and that's where you ought to be because I know people there last year who said, "Hey, in the first day I met my entire annual quota." That person really ought to be on the show floor, doing the selling. That's what their role is. That's where they're going to be the most effective they can be.

For other people, they're going to spend time at committee meetings, standards meetings, and learning events, etc., and the show floor. That will be the guy that gets caught Wednesday afternoon and buys something on the show floor from somebody else because they were

tied up all day Tuesday, and that's why people have three days to check out the exhibits.

Some instructors are going to be teaching the entire time and they may not even make it to the show floor. That's why we try to have the big food event one evening so people have a good motivation to go down to the show where we do the burgers, the dogs, and the brats and stuff. We pull everybody out on the show floor at 5 pm on Tuesday for the reception, then on Wednesday we're having the ice cream social from 2-4 pm on the show floor.

**Goldman:** One of the good parts about San Diego is the fact that the meeting rooms and the show floor are so close together, right?

**Mitchell:** Yes. Just down the escalator and you're right there. It's all a good thing.

**Goldman:** Yes, it is. Thank you so much, John. We'll see you soon.

**Mitchell:** Thank you, Patty. ■

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## Philip Carmichael, IPC President, Asia on the Changes in PCB Value Chain



During the 2017 International Printed Circuit & APEX South China Fair (HKPCA & IPC Show 2017) in Shenzhen, China, IPC Asia President Philip S. Carmichael speaks with I-Connect007 Managing Editor Stephen Las Marias about the move in the value chain that's driving the electronics manufacturing industry forward. He discusses the new market trends that will further the growth of the PCB industry, and how new manufacturing technologies will help bring the industry toward the vision of a lights-out factory. Carmichael also explains the need for knowledge transfer, education, and standards, in the industry.

[Watch the interview here](#) ►



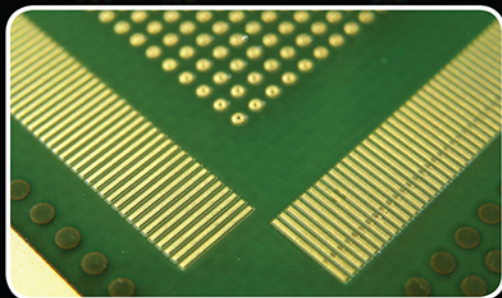
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# Keeping it New, Current and Relevant: IPC Conference Director Jasbir Bath

Jasbir Bath, technical conference director for IPC APEX EXPO, has been coordinating IPC's technical program for several years now, but his interest and excitement for the event continues to expand. It's clear that Jasbir and his team take great pains to create a fresh, exciting menu of sessions, development courses and more, full of potential learning experiences, year after year. It looks like 2018 will be no exception.



Jasbir Bath

**Patty Goldman:** Hi Jasbir, please begin by telling me what your position at IPC entails.

**Jasbir Bath:** I'm the conference director for the IPC APEX EXPO conference. I've been doing it for the last four or five years. My responsibility is to help organize the conference, solicit papers, and then put together a technical program committee to solicit papers and review the abstracts coming in, and then select papers for the conference. We're at the stage now where we're putting papers into sessions. We're writing session descriptions and we're receiving papers and presentations for each of the sessions to review for the conference. That's the job that I'm responsible for. We may have some drops, we may have some additions, but we're in the middle of the review process for papers and presentations now.

**Goldman:** How many tracks should there be?

**Bath:** There should be 32 sessions. We're doing about five tracks in parallel from Tuesday afternoon, Wednesday all day, and then Thursday morning. We're trying to make sure that the

tracks have assembly, PCB fabrication, and reliability tracks, as well as some others. We're trying to keep the fabrication and the reliability in one track, the assembly in one track, etc., so that two fabrication sessions aren't going at the same time. It's always tricky. We try not to clash with the standards committee meetings.

That gets interesting, because some of the people who chair the paper sessions may also be involved in standards meetings. We want to make sure, for example, if there's a PCB assembly track that it doesn't overlap with a PCB assembly standards committee meeting. There has been feedback on that, so we're putting in a renewed effort to make sure we don't have any overlaps. At the same time, if there's a potential clash on Thursday morning with the professional development (PD) courses that are going on, we're also trying to make sure we don't have a PD course on one subject coinciding with a technical session in the same area.

**Goldman:** Do the professional development courses run on the weekend and during the week too?

**Bath:** They run on Sunday all day, Monday all day, and then Thursday morning. It's not a big overlap. There maybe last-minute changes that we can't account for, but generally we're in good shape.

**Goldman:** It's hard to make everyone happy.

**Bath:** Exactly. The chair of a standards committee session may also be chairing a technical





conference session we have, so we give priority in some ways to someone who's chairing a standards meeting and chairing a session. We'll give them the power to move things around.

**Goldman:** Continuing with the conference, are there any new tracks or hot topics this time around?

**Bath:** We have some that are generally considered hot topic sessions. There will be sessions on bottom termination components, which is a growing technology. We have the emerging technology session where we cover wearables, printed electronics, and emerging technologies like stretchable applications, wash-ability of materials for e-textiles, and an overview of XR virtual reality or augmented reality. That's a nice session. We have the traditional PCB fabrication and assembly sessions and component reliability. We have voiding sessions, which is a hot topic in terms of voiding areas for BGAs and components and how to minimize voids. We have a session on jetting, which is a newer technology where people are looking at non-contact dispensing for solder paste.

Then we have the traditional sessions, but some of those like surface insulation resistance (SIR) are still continuing issues. There are still challenges in terms of not just existing materials, but developing materials, masking materials, flux residue issues, etc. We'll have session(s) on reliability of plated through-hole materials, issues with reliability in terms of degradation and glass epoxy degradation. We're trying to cover things that are challenging, or issues that are coming up in the industry.

**Goldman:** Of course, all the papers are fresh and dealing with the latest technology.

**Bath:** Exactly. We also have a session on creep corrosion, where we have experts from IBM talking about the new developments in corrosion testing. Typically, you've got your alloy sessions, your high-speed/ high-frequency sessions, and where we're going on that. Then

surface finish reliability, where we'll talk about recommendations for increasing shelf life with PCB finishes. A paper we have for the cleaning session is looking at cleaning challenges when we get to very fine powder sizes for solder paste.

**Goldman:** How clean is clean, right?

**Bath:** How clean is clean, and how clean can you get it? What are the challenges of removing flux residue? We have solder paste testing development on where we are in terms of the test technologies and J-standard 005, what test vehicles you can use for solder paste evaluations, and paste development for laser soldering applications. It's the kind of things that discuss new applications coming up, like miniaturization. We're getting smaller and smaller paste deposits. Some of the components to assemble are temperature-sensitive so reflow ovens can't be used so you may have to use laser or other non-contact applications to reflow those locations.

We've got rework application sessions. Rework is still interesting and still coming up. Session speakers will talk about the challenges for big board rework and optimizing bottom heat for manual rework applications. Then there are the typical copper foil issues, alloy reliability, and test/X-ray inspection issues. For instance, the impact of X-ray on preprogrammed managed NAND devices and understanding if the X-ray is causing any radiation damage to the devices with best practices.





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We have a design session looking at different redesigns and how to do it the right way, ECAD/MCAD tools, etc. We have a session on flex with areas covered including minimizing signal degradation for flex PCBs. We have sessions on conformal coatings covering issues on high temperature protective coatings, and nano coatings, etc. We are also looking at reliability modeling and reliability of adhesives. That pretty much covers the conference. We have some new sessions, some sessions on existing material developments, where we're going, and then test and papers to cover some of the challenges and development that we need for new technologies.

**Goldman:** How many papers total for the 32 sessions?

**Bath:** Approximately 75. The sessions are either two-or three-paper sessions running from Tuesday afternoon, Wednesday all day, and then Thursday morning.

**Stephen Las Marias:** Compared to last year, do you have more papers for 2018?

**Bath:** It's about the same. If the paper is being presented in another conference we don't accept it. Basically, we want what is new. We set a higher bar for our criteria for acceptance. Our philosophy is not quantity, but quality. If it doesn't add value we won't include it within the technical conference. Our review process is such that, when we're reviewing papers and presentations, we're reviewing for technical content, as well as grammatical issues, and making sure that the paper is a good read for the audience. We're reviewing papers to make sure they read well. That's something that I don't think other conferences do as well. Our process for review can take 2-6 weeks because of the back and forth with the authors. When we do reviews on the papers or presentations, we generally get good feedback. Some peo-

ple don't like some aspects when we ask them to update them. But, in general, we get a lot of feedback that says, "Thank you for helping me to provide a better paper and presentation." Because, at the end of the day, we're trying to enhance the information value to the audience. That's the idea.

**Goldman:** Do you also put together the buzz sessions?

**Bath:** The buzz sessions come in with industry challenges. Typically, we ask within IPC, "What sessions do you think would be of use to the industry?" The sessions typically are presented by IPC staff, but buzz sessions could be from somebody who comes to IPC and says, "We would like a session in this area." These are free sessions which are giving the status of some area of interest. For example, the first buzz session this year is a politics and policy roundtable. What's going on in government relations? What are the issues? Your typical technical conference session may not have this kind of discussion. These usually have two or three speakers, a panel, a short presentation, and then question and answer with the audience, and more interaction. The second buzz session will be a standards update. Three is on printed electronics. Where are we going? Where do we need to go to get to the next level? These are things that someone who is a chair of a standard committee, or an IPC staff standard committee liaison, has been talking within their committees, and is saying, "Couldn't we have a buzz session on this area?" Maybe it's not fully developed, but it's developing, and they can give a status of where they are at and say, "Here's where we need to go to." It should be of interest to the audience.

**Goldman:** I see there's also one called "Student Presentations," although there's nothing listed yet.

**Bath:** Yes. The suggestion came during the Technical Program







Committee discussions, “Should we just open up a buzz session to universities or students who have an area of interest?” Maybe they’re doing a six-month project or MS project and could come to the buzz session and present on this area. We’re asking around for students who do work in electronics manufacturing if they might be willing to come and present. We would look to get an IPC emerging engineer to chair that session because we’re trying to encourage students to participate in these kinds of events. That’s the idea. We haven’t got it dialed in, in terms of speakers yet, but we’re looking. And because it’s a presentation, it doesn’t need to have a paper with it. In terms of getting this session done, it wouldn’t be that hard. We’ve asked around a little bit and we’re just waiting. As of now, it’s just a place holder we have for student presentations.

**Goldman:** I hope that works out, because that could be very interesting.

**Bath:** It would be nice to have but if doesn’t happen in 2018, we’ll revisit that session for 2019. We’re trying to encourage the students who wouldn’t get the opportunity to present in a technical session to use this session, and get them involved a little bit more. That would be good for them and for the industry.

For other buzz sessions, you’ve got the typical ones: the pulse of the industry, China/environmental issues, and new areas such as e-textiles. This is a developing standards group; this is what we’re doing and some of the questions/areas around that. Where are we in terms of standards development? Buzz sessions can be kickoffs to discussions on where the industry should go.

Buzz session seven is on the the PCQR squared database. What are the updates? Then, the pulse of the electronics and the business outlook with roadmaps and things, and where we’re going. Buzz session 11 is something that we got from Brooke Sandy-Smith at Indium Corp. on IPC J-STD 001 standard and the ROSE testing requirements in the stan-

dard being discontinued. What are we going to do? Let’s have a panel discussion on this. This was from a user. Someone out there saying, “We would like to have this.” Then we checked within IPC and there were people in the industry who were willing to be on the panel for this. We don’t have to go out and pull people. They want to be involved. We just ask them and they say, “Yes, sign me up.” This is an ongoing issue. This is something they’ve got to deal with, so you’ll get feedback in the



industry on where we are and the status of the emerging methods to reach the level of industry standardization. What should we be doing? We’re trying to get these types of discussions moving in the industry.

**Goldman:** Let’s talk about the professional development courses, the PDs, of which I see there are 30 being offered. They’re usually about half a day, right?

**Bath:** Yes, there are 30 half-day sessions, with classes on things like non-contact/jet dispensing and other focused technologies. They can encompass what we currently know about a subject, and things on the horizon. As we get into more and more miniaturization, we learn about new technologies and people need to know where the state-of-the-art is. This is going to cater to that, which we hope will be of use. We believe it will be.

There are the regular courses too, like the design analysis courses. I think quite a lot of them have been around before, but there are updates from each of the authors on those. We’re trying to make sure we cover all the



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bases. We cover the ESD program. It's not something that maybe has a massive audience, but it's something that we think could be of use. We've got design for testability and boundary scan.

There's something for everybody here. We've got the cleaning and coating. We have a couple of sessions on reliability from Dock Brown of DfR, discussing physics of failure. Let's give the audience something that they don't normally get when they come to the technical sessions with a more in-depth discussion on certain areas. We have Jean-Paul Clech at EPSI who is will be presenting on reliability as well. We also have new developments in selective soldering.

The rest of them cover areas including PCB fabrication, PCB assembly, and the issues in those areas. How do you troubleshoot? What are the defects? How do you do failure analysis? For engineers coming in, it covers people who maybe are developing engineers, trying to learn the ropes, and then some of the courses are more advanced for those who have been around in the industry and want to learn about developments in those areas. We're covering it in both ways as best we can. We're covering a wide range of topics from intermediate to advanced levels. We're saying, "Here's the booklet, pick and choose, however you want it." We think that these are the courses that would be of most interest to the audience.



**Goldman:** In the past, how well attended are the PD courses?

**Bath:** In recent years, we haven't had to cancel any PD course for lack of interest. I don't have the figures in front of me, but at minimum maybe 10-15 people, and at maximum maybe 100 attend a PD course. Typically, we're in the 20-40 range, but for some of these courses we're getting 60, 70, and more, which is a lot. We're not upset about the attendance whatsoever. These are the areas where there's a grow-

ing need, and we're happy to oblige.

**Goldman:** Any last thoughts from you, Jasbir?

**Bath:** If you look at the entire technical program, you'll see different pieces that cover different areas. I look at it in terms of new developments, but also new defects or failures that people are working on. It's a nice overlap between the technical conference sessions, which give you the details of where we're going, and the PD courses, which may give you more training, and cover those aspects in more detail. The technical conference session could be on printing, but the PD printing course will cover three hours where the conference would be a half an hour, or an hour and a half. It's more in-depth. The buzz sessions are where the pulse is, the biggest issues and the emerging trends. We've got a nice balance in terms of how we do this. We've got the PD courses on the front end and on the back end, with the conference and the buzz sessions in the middle. With the exhibits on top of this and the standard committee meetings, I think it's a nice balance. It gives everybody a chance to pick and choose.

**Goldman:** If somebody really wants to get immersed in it, they certainly can and come home with a boatload of knowledge.

**Bath:** Exactly. You come in, pick and choose what you want, and you come out and hopefully apply what you learned to your work. That's how we want people to come in on Saturday and Sunday all the way through to the end of week. You have every opportunity to learn something everywhere you turn.

**Goldman:** Thanks so much for your time, Jasbir. We appreciate it. See you in February.

**Bath:** No problem. Thank you. ■



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# CFX: Updates and Developments

Nancy Jaster is the manager of design process at IPC—and she has every right to be. As part of the technical staff team, she works directly with many IPC standards committees to support the industry, particularly those related to DFM and DFX guidelines, as well as those involved in data transfer. With 28 years' experience in the industry—10 years in manufacturing and 18 years in design—she understands clearly what people need on the factory floor.



In an interview with I-Connect007, she discusses the latest developments in the Connected Factory Initiative (CFX), the machine data interface standard that would enable manufacturers, equipment, device and software suppliers to achieve Industry 4.0 benefits, and CFX demos at IPC APEX EXPO 2018.

**Stephen Las Marias:** Nancy, what's the rationale behind the Connected Factory Initiative?

**Nancy Jaster:** I'm one of the fortunate ones in that I've got the experience in both design and manufacture. I already have the IPC-2581, which is the standard to get design data to manufacturers. The wonderful thing about 2581 is that it is intelligent data. It's no longer just a flat file. It's a model-based dataset where we can share much more information with the manufacturing floor than we ever have before because it's all bundled up in this one package.

IPC used to have CAMX, a standard for transmitting data on the shop floor. But it was tied to a message broker, which limited

its usability. After talking to some of the machine vendors, my original thought was how we could take CAMX to the next level, and how do we get CAMX working with 2581? I realized that we had an issue there, and that we really needed to look at the shop floor like we looked at getting design data into manufacturing as an intelligent data model.

Data is key not only to the design process but the manufacturing process. We really need this overall data backbone to support the industry, and we want this data backbone to be smart, intelligent data. We want it to be on a standards base, so that if we're calling, say a fiducial the same thing in every standard that we have, then we can easily pass that information back and forth. We standardize how we describe it, and what it makes up from a data perspective, and then you can reuse that piece of information anywhere within the product realization process. It's critical for us to get to the standard understanding, the standard way of using data. It's critical for the industry to be looking forward, thinking about it from an intelligent data perspective. When I started in this industry, we got flat files and we got drawings, and then we would have to take those and parse those out. I actually did some machine programming on the shop floor for a while. You'd have to take that unintelligent data and put all that intelligence in there. Now, we have the ability to do that within the data.

CFX is taking that shop floor data and taking it to the next level, coming up with standard terms and definitions, and has a standard transport definition so the information





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can flow from machine to machine, no matter whose machine it is. When they get that data, they can then apply their internal algorithms, their secret sauce, shall we call it, so we're not infringing upon what the manufacturers are doing or what may make their piece of equipment special. It's just using that common



framework so we can transmit the data from machine to machine. As we gather information, like if you have a part and you must alter the placement slightly, we can seed that back upstream. You want this to be bidirectional data going back and forth, so we can learn from the shop floor and continually improve the manufacturing process.

**Las Marias:** Is CFX a replacement for the IPC-2541, or the CAMX, as you were mentioning earlier?

**Jaster:** It's kind of a replacement, but it's two-fold. One, the industry has moved ahead. When you think about how this industry started and how we used to do drawings on big drafting tables, and then photographing it down to the size we really wanted, to where we are today with data. The whole technology has changed and we're taking advantage of those advances. With the whole Internet of Things and Industry 4.0, people really want to start communicating more about the data. In the past, it's really been one way. You just keep it flowing through the factory. But we know there are so many things we can learn from the process, and we want to take that information and flow it back, not only in the manufacturing process but to design.

When I was in the development area, that was always a problem because we'd send it over to manufacturing and they may do something or tweak that data partially, not change the design, but they might adapt the data a little bit for their shop floor. Then that meant that information didn't necessarily get back into the design community. So, being able to have bi-directional data is going to move us forward. Not only can the shop floor understand what's going on in their machines and maybe tweak things a little here or there, or if they know this design in the past has had a problem, to change something to adapt to it. They can also feed information back to the design community as well because we've got this common set of terminology that we're using, so it'll be easy to transmit information back and forth.

**Las Marias:** How is CFX going to address all that?

**Jaster:** CFX is not related to any one tool. It is tool agnostic, so it is being done by the equipment manufacturers, the software vendors, and OEMs, all on the committee. We have a chair from each one of those areas to make sure that it's being looked at across the board, and that it's not one industry or one player trying to push their version of things. It is definitely a balanced committee with balanced leadership who are looking at this for the entire electronics industry.

We have already agreed to a transport mechanism, and it's the AMQP 1.0 message queuing protocol. The team looked at a number of transport mechanisms, and the team decided that was the one that really had the most versatility and would serve us in the long run for this committee. Now, the next thing we're working on is standardizing the bits of information we need to share back and forth.

But instead of doing it machine by machine, like if you're a surface mount machine or an oven, we're instead doing it by function. We know that with pretty much every machine,





they've got an eye on that machine to make sure that they're looking at the fiducial. So, this is from 00, and everything is determined from this point. We know everybody has a camera that's looking for that, right? So, why reinvent that multiple times for each piece of equipment? That's going to be a building block.

We're creating all these building blocks that we can say, 'Oh, this piece of equipment needs a barcode reader. It reads barcodes, and it's looking for 00.' It's pulling those together, and now we can create the standard so that this is how we pull that information across from machine to machine. It's consistent across the board. If what we're calling a fiducial, then every piece of equipment's got to use that same terminology and the same criteria to describe that block. It's that commonality at a low level, at the right level, so we're not forcing people to tell them how necessarily to do things. So, what information needs to be portrayed? When I worked at Lucent, we used to talk about the 'whats' and the 'hows', and the whats are what you need to have at a lower level, so that you can standardize.

Everybody can agree to that, everybody knows that a product has an ID. We want to standardize on that ID and say, 'this is the ID.' Every board has the point zero, the starting place where we zero out from, so all my dimensions are from this point forward. Everybody agrees to that, so we're going to make sure that definition is the same across the board. By doing that, you can then build upon it, but you're still not inhibiting innovation on the software provider or the machine vendor to do things differently, or even the OEM. There's still an opportunity for them to make improvements or adjustments, or they can decide what information they want to maybe feed upstream to keep track of quality, production, or for whatever reason. It still allows everybody to do things differently when you get down to the 'hows.' How they do it, it may all vary, but if we're communicating the

same language across the board, it's going to make life so much easier for everybody.

**Las Marias:** CFX aims to provide or enable true plug and play interoperability of the equipment, device, and the software.

**Jaster:** That is our goal.

**Las Marias:** So far, what have been the challenges in that aspect? We're dealing with a lot of vendors here.

**Jaster:** Yes, and somehow, I got lucky. I don't know what I did, but my vendor support has been great from day one. I think part of it was that I went into the very first meeting and said, 'This is for you. We want to do what is right for the industry. We've got no preconceived ideas. We want it to be not non-tool specific. It's not like you're going to have to go off and buy vendor A's product, or use a particular product.'

I think it helped because I do have manufacturing and design experience, and that helped me a bit in communicating to folks. Because I've been there, and I've actually had to run Mylar tapes to run sequencings machines for through-hole components and figure out what's the best way to layout and insert those parts on the board. Been there, done that, and I understand the complexities of the shop floor.

It's only gotten more and more so as the industry has evolved. Part of it was being in the right place at the right time. I had help from my chairs in pulling the right people into that room, and I cannot say enough about my three chairs: Jason Spera from Aegis Software, Mark Peo from Heller Industries Inc., and Mahi Duggirala from flex. The three of them are wonderful. They're open and they're willing to listen to all ideas. They're not there pushing an agenda.

Sometimes, we've had a meeting or two where people were kind of pushing an agenda,





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and we basically said, 'No, stop it. IPC doesn't allow commercialization.' We don't want people pushing their own agendas when it's product specific or vendor specific. Some of that came up, and the wonderful thing is that a good, strong, solid team of people pushed back at the right points in time. I'm not saying it happened a lot. It really has been a very good group to work with. They're very interested. At first, there may have been a little skepticism. Could we really keep it generic enough that everybody could use this? But when we came up with the building block approach, people thought that was unique and a great idea, so let's go for it. Probably the biggest problem we have in all of standards committees is that they're made up of volunteers. Our volunteers have been great, a lot of them have given it plenty of time, but there just never seems to be enough time. You always wish you had a little more time with folks where you could maybe get a little bit farther, a little bit faster. So, you're always limited by people's time that they can commit to a project. But let me reiterate, IPC has great volunteers.

We are making great strides. We had our first meeting over in Germany at productronica. We've never done that before, but my colleague over there who runs some of the standards meetings, Andreas Ojalil, ran that meeting for me. We have a lot of our committee members over there, so they're continuing to work it. People are excited because they see where this is going, and they see that this is going to be machine to machine, it's generic,

and you don't have to use a particular message broker. You're not tied to any one competitor's tools. It's going to give you what we need without forcing you to do something you don't want to do. You're not giving away the secret sauce, which is critical.

**Las Marias:** I think one big factor is the increasing trend towards Industry 4.0. This is a version of that when it comes to the factory floor in the electronics in the industry.

**Jaster:** And that was part of it, too. When we started, we said we wanted it to address Industry 4.0, and everybody in that room said, 'Well, what's the definition of Industry 4.0? Because everybody's got a different definition.' That's one of the things that this team said, 'For this team's perspective, this is what we mean by Industry 4.0, this is our interpretation, and this how we're going to address it.' People agreed, so it may not fit some other models, but it's going to work for the folks who the standard is intended for.

**Las Marias:** What about the legacy systems that are being used by manufacturers or electronic assemblers? Do they have to install new systems or equipment?

**Jaster:** They won't have to install new equipment. This is intended to work with all existing equipment, and it will, because it's at a high enough level that it will work. When it really is going to come into play is for the equipment manufacturers and the OEMs, and even the software providers. They now know if they work to this standard that it's going to be easier on implementation. With any standard, you don't have people going, 'Okay, we're going to cut it in tomorrow.' It doesn't happen that way.

It's like with a software update in the CAD world. A CAD vendor comes along with an update for their program. A company will decide when they want to implement that. They may implement it on new designs, where you still have to have things around for old



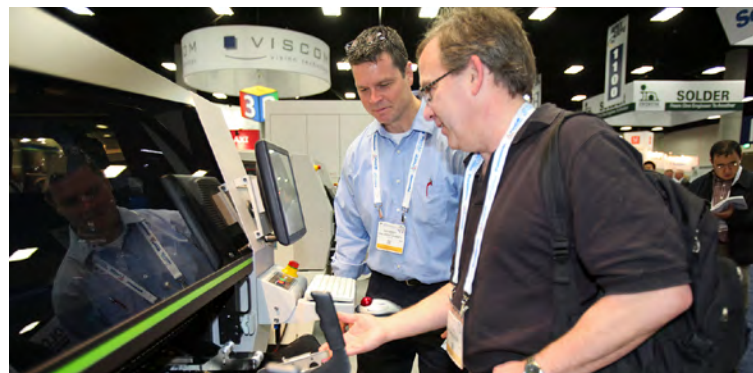


designs. With factories and producing products, even in the design community, most of our customers or our members are not consumer products. Consumer products you can do a lot of things and change over in a year, because you can change a whole product.

In the defense industry, the automotive electronics industry, we have a long-term approach to products because we must have long-term support. In telecommunications, my background, we always had to support the old as you move to the new. I believe going to the CFX standard will be a phased approach. At some point in time people on the factory floor may want to start implementing CFX even with some of their older equipment, or older programs, etc. But because it's a standard, it should be easy and adaptable to do. Once we get the tool kit available, which Aegis has just graciously signed over to IPC, we're going to put it on a public website so that people can go in and start working with it. I haven't seen it yet, but I am told it's very easy to program in this new environment using the AMQP 1.0, and it's going to be very simple for folks to make modifications and update things. Obviously, every factory and every machine vendor will have to determine when they want to start implementing this. But again, that's the wonderful thing about it being at the 'what' level, and not at the 'how' level. It allows that flexibility.

Now, what happens to the old standards? They're still going to be around. It'll take us a while before we say that we're not going to support them. We won't necessarily do any updates to them, but we don't necessarily say that you can't get the standard, because if somebody's currently using a particular standard and they want to buy a copy of it again, we can do so. You can't necessarily just throw it out just because you got something new. You always have to look back and make sure you can deal with legacy products.

**Las Marias:** That's true, because a lot of manufacturers have already invested millions in them.



**Jaster:** Right. You always have repairs, you always have legacy issues, and you have old machines on the factory floor. My guess is, as people bring in new equipment, they'll start using the standard. They'll see how easy it is to develop and use, as well as transmit data back and forth. The bi-directional ability is going to be great. Then they may take on projects to update other programs on their floor, even for older equipment. It'll be easy enough to do moving forward, once they get used to using the new standard.

**Las Marias:** Right now, you have the software toolkit from Aegis, which is the CFX messaging library, and then the transport mechanism AMQP 1.0. Are there any other new developments with CFX?

**Jaster:** Right now, we're working on those building blocks and defining what those building blocks should be. The next step is getting those building blocks in place and getting the standard definitions there. Come APEX, we actually hope to be able to demonstrate on the show floor how simple and easy it is to use these building blocks to run the machines. I'm hoping we will have demonstrations there, but the key now is getting all those building blocks together and determining at what point we want to go ahead and actually publish the standard. It's just more work right now and getting those blocks built.

**Las Marias:** Apart from the demo, what should the industry expect at APEX regarding CFX?





**Jaster:** Well, hopefully the standard will be released next year. The standard will be released for the building blocks that we know of today, but as industry changes, we need to keep making sure that we are in tune with industry and continually look to make sure the standard stays up to date with where the industry is going.

I would love to see if we can integrate it into making sure that it's communicating well with the 2581 data. I really want to get this continuous backbone of data and expand it out. Right now, we're really focused on circuit assemblies. Can we expand this into printed wiring board assembly? I think we can, so is that the next phase we tackle? I don't know. We have a standard component traceability. We need to make sure that component traceability works well with the CFX standards so that we can make sure we're providing that information back. I'm also responsible for a number of standards related to material declarations for RoHS and REACH. I would like to get those standards connected in as well, so that they're all talking to one another. I want a set of standards to support a data backbone for the electronics industry.

As you know, when you're putting in data it is basic quality 101. Do it right the first time. If design inputs the data and it is correct, which it has to be, then it transfers automatically over to production. If they don't have to touch anything, not only do you speed up your process, you improve your quality, you have fewer

errors, and you have less manual intervention. Now we don't have to worry about transmitting data from machine to machine because they can all talk to one another with CFX.

Then you worry about, how do you take this data, and move it even farther outward in through the thread? We really need this backbone of data to support manufacturing. Data has always been key, and we've gone from paper, to flat files, to somewhat intelligent files, to now extremely intelligent data, and we just need to take that and keep using the technology as it becomes available to us. The other part is making sure it's secure. You always have to make sure your data is secure.

**Las Marias:** The traceability, the standards, and then RoHS and REACH. They will be connected, but not really integrated into the CFX, right?

**Jaster:** Not yet. That's another phase. When the directives came out for RoHS, we needed things, and so standards were written. Now we're working on connecting the factory. My goal is someday to get them all talking to one another.

**Las Marias:** Do you think this will be able to somehow pave the way for something like the lights-out assembly factory?

**Jaster:** Not yet. Do I think robots are going to completely take over the factory? No, because people still add value. Will it get us to a point where you can engage your people to instead of doing busy work they are doing something of more value? Definitely. Instead of people having to manually do something over and over, or correct problems over and over, it's going to help improve the quality, improve the data, and then allow employees to spend time working on other activities and things that can help the overall manufacturing process. How can they improve the secret sauce, or what can they do differently within their factory, versus



other factories, to make their product better than somebody else's? It's going to take people away from doing that drudgery, like double checking and triple checking data all the time, into allowing for more innovation.

**Las Marias:** Moving forward, as new technology developments happen in the industry, how can others in the electronics assembly industry join in or contribute to the CFX?

**Jaster:** All they've got to do is call me, email me, talk to one of my chairs, or talk to another committee member. To participate on an IPC committee, you do not have to be an IPC member. Obviously, we would love everybody to be an IPC member, but you don't have to be. We take any and all volunteers. We are welcome to include people in the process. When this goes out for industry review, we want folks that maybe haven't been involved looking at the document and making sure that we haven't missed something. When I teach hardware methodology, I always have a section on why we need design reviews, or why you need to do a test plan review. People get so focused on what they're doing and think they've got everything covered, but you always want that fresh set of eyes to look at it to make sure that you didn't forget something.

Going out for industry review is going to be very critical on this document. I have nothing but the highest regard for this team. This team is doing an outstanding job. The comments we're going to get back are going to be for the little things we forgot, not the big things. I think the logic is strong. The way everybody on the team is approaching and looking at and agreeing to it, I know we're headed in the right direction. But you want to make sure that the little things aren't forgotten.

That's going to be where we're going to get some help, with the little tiny details. One screw

used to screw up assemblies on the shop floor. Somebody forgot to add a screw to the drawing to put the faceplate on, and guess what? You can't ship product. It's the little things that can always trip you up. Again, I feel very strongly that we are totally in the right direction. This is going to be an outstanding standard that everybody's going to be able to use, but it's good to have reviews to make sure we're looking at all aspects of it.

**Las Marias:** Nancy, do you have anything that we haven't talked about that you would like to share?

**Jaster:** The one thing I just really want to stress is that it has been a pleasure working with this team. I think we will have a major impact on the industry when we finally get the work completed. The level of cooperation within the industry is just outstanding. I am extremely proud of this team and its leadership. It is a delight to go to the meetings, and they're just a great group of people that really want to do what's right for the industry.

I'm not saying that my other teams aren't great, because I love my teams, but to see the manufacturers, the equipment manufacturers, and the software guys all in the same room, and nobody's trying to protect turf, is just amazing. You have competitors in this room and yet they're all working together to do what is right for the industry. They're doing what they believe is right for the industry. When we get the standard completed it will make a significant impact on the industry, in a positive way.

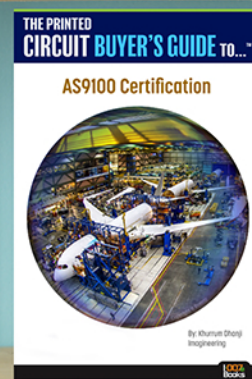
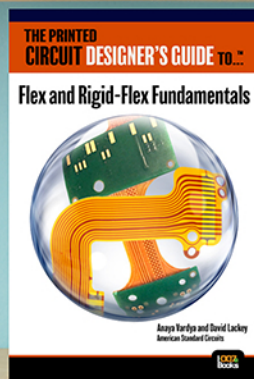
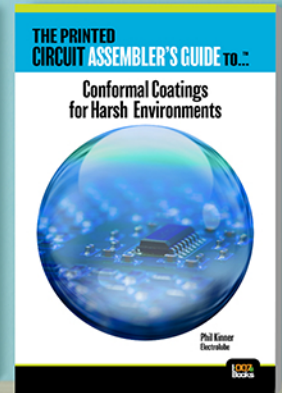
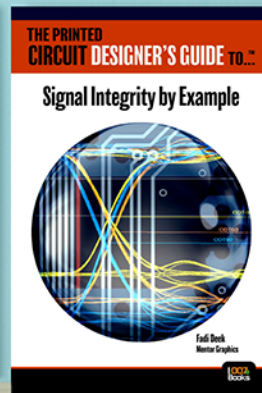
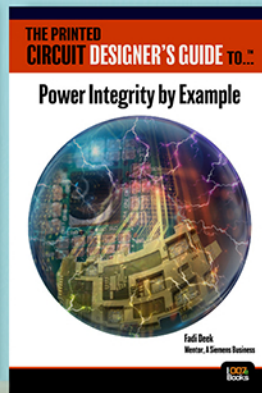
**Las Marias:** That's true. That's also what we at I-Connect007 strive towards—to be good for the industry. Nancy, thank you very much for your time.

**Jaster:** Thank you. ■





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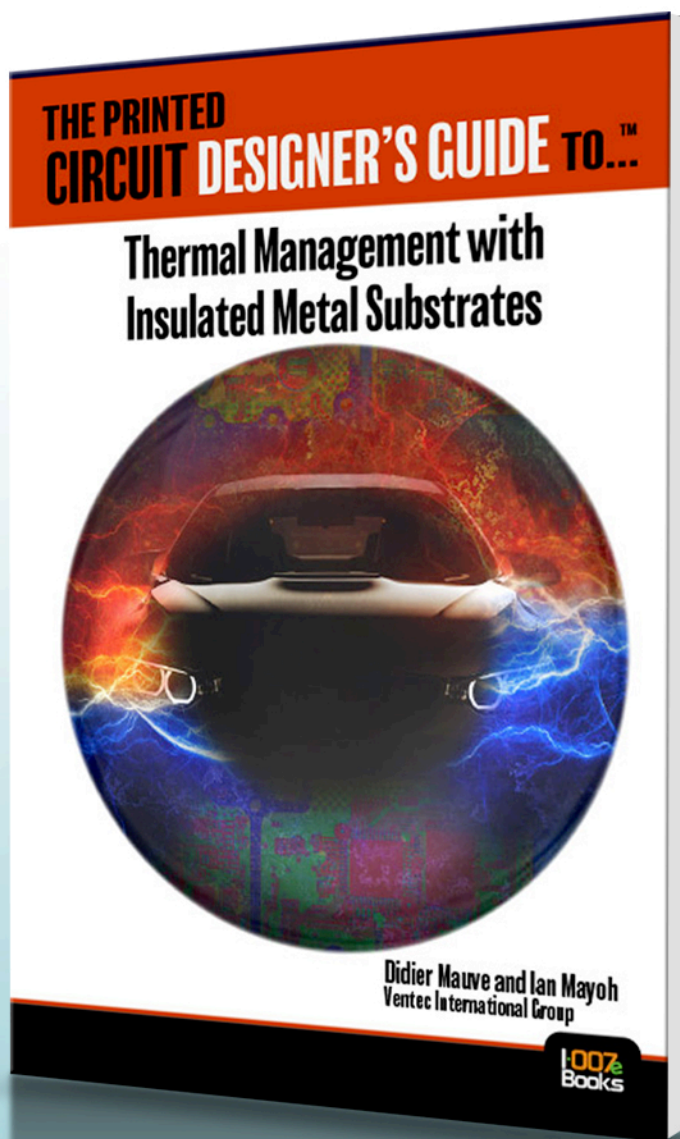
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# All the Details on IPC's Emerging Engineer Program

Teresa Rowe and Nancy Jaster, in charge of IPC's Emerging Engineer Program, explain to I-Connect007's Patty Goldman and Jonathan Zinski how this novel approach to attracting and supporting young people works.

**Patty Goldman:** Teresa and Nancy, let's start by having you tell us a little about what each of you does at IPC.

**Teresa Rowe:** I am a senior director of assembly and standards technology. I work with a technical team, as a staff liaison to the industry preparing IPC standards. My focus is in the assembly area. I'm also one of the leads for the emerging engineer program that we're going to be discussing today.

**Nancy Jaster:** I am also in the technical department as a staff liaison. My focus is more on IPC's design standards, and I assist Teresa with the emerging engineers program.

**Goldman:** Teresa, can you please describe the emerging engineers program and fill us in on this IPC program?

**Rowe:** The emerging engineer program started about three years ago. At IPC APEX EXPO 2018, it will have reached its third year. It was developed out of a conversation we had about attracting the younger generation to join our standards activities and to be more interested in our efforts as a global association for the electronics industry. We are attempting to pair emerging engineers, or individuals, who are in



the early part of their career in electronics with someone who has been part of a task group or subcommittee, and part of our standards development processes, for a longer period of time. We like to think of it as a way to bring the two generations together to introduce our older generation to the newer technologies and newer thoughts, but also for our emerging engineers to gain the knowledge and exposure that they need to develop their careers.

We started very small and we have grown the program; we have tried to tailor it each year to not only have our engineers grow in the program, but also to introduce them to more detailed projects as the years develop. Nancy came on board at the tail end of the first year.

**Jaster:** The program is to help these young people develop leadership skills as well, because it gives them an opportunity to explore other areas, and to understand everything about the association. We've had real success in having some of our mentors take our emerging engineers and make them co-chairs of teams, so they can start learning the leadership skills that they need. It's an excellent program for people who are new in the industry or who haven't been there very long to get some leadership ability, as well as learn more about IPC and the standards development process. It really helps IPC out because it gives us some fresher views...not that we don't love our members who have been with us for a long time, but it gets us some newer people involved and starts expanding things, so we can be ready for the future as well.





**Goldman:** How many engineers, or how many sets of mentors and engineers are there right now?

**Rowe:** We have two that will be in their third year with us, and we have three in their second year. We are now looking at our applicants for our first-year group starting in 2018. The interesting part of this is that for our second-year group we actually have a university student who is one of our emerging engineers. We were excited in our second year to bring an individual on board who is a student, as opposed to actually working in the industry at the current time. He has developed a real interest in IPC and he's taking on a larger role, too, with some activities that Nancy has been working on.

**Goldman:** You said you have applicants. How does that part work? Who applies and how do you determine who you accept?

**Rowe:** There is an application process. We ask applicants to complete a benefits and commitments paper or page, which is on our website for the emerging engineer program<sup>[1]</sup>. That explains the commitment for three years; as we both said, it is a three-year commitment for this program. We ask the individual to acknowledge that and for their supervisor, or the person they report to, to acknowledge that this is a three-year commitment on their part. We have had requests for additional information such as 'What do I do beyond the events?' for example. We've been able to work with each individual to understand their concerns as they're worried about that three-year time commitment. It does take that paper and it also takes a copy of their resumé. When that information comes to Nancy and me, we sit down together and review it to determine if that person meets the qualifications and requirements, and then we fill our slots accordingly.

We do have situations where organizations have asked for the person's mentor to be from their company, as well. We've been able to match those individuals up, where the mentor

is someone who may be mentoring that individual at their company now. In other cases, it's someone from their organization, but maybe from a different site or a different location around the world. We've also had companies come to us and say, 'I have an emerging engineer candidate, and I would truly like to have someone mentor them who is not part of our organization to give them a broader knowledge base of other organizations and the way to rest of the world works.'

**Jonathan Zinski:** When you go through the application process, how many slots do you have to fill?

**Rowe:** We have been talking about five for our current year, plus a university student.



**Goldman:** I guess you need to have mentors, which I presume are mostly committee chairmen? Would that be accurate?

**Jaster:** We do have chairs that have been mentors, but the key is really that they're an active member on a committee. We want somebody who can work with the emerging engineer and direct them to the right standards committees that they may be interested and want to participate in. They don't necessarily have to be a chair, but it does have to be somebody who has been involved in the standards activities.



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**Rowe:** Patty, we've seen TAEC lifetime members come forward and ask to be mentors.

**Goldman:** The mentors must have to make a three-year commitment too. What all is involved in that commitment?

**Rowe:** We certainly expect before the first meeting for our mentor and our emerging engineer to discuss the emerging engineer's interests. We encourage them to do that by teleconference, although email is fine. The emerging engineers discuss what their interests are, as far as professional development. In the first year, as they attend APEX EXPO, we require them to attend professional development courses and they have to attend standards committee meetings. They have to attend a series of other receptions and events. They have to acknowledge that they've attended all of these things. We ask them to keep notes. They do a report at the end of the event that shows us what they've done. The fun part is we ask them to take selfies when they meet individuals. We may send them off to meet someone, or a person that meets a certain set of criteria. We ask them to take a selfie and show us they've met the person and started to network and have a conversation. Then it's up to the mentor to follow up on activities for the remainder of that year.

**Jaster:** One of the things we have them do is go to the show floor. They have to meet with a number of exhibitors, because we want them

to get down on the show floor and see all that equipment and talk to some of the vendors on the show floor. It's really an opportunity for them to start networking and understanding the benefit of being at IPC APEX EXPO and getting the most out of it, because we really encourage them to do all the activities that are available to them. They basically get a one-of-a-kind opportunity for three years and we encourage them to take as many of the classes as they can, and to go to as many of the activities as possible, so that they can not only learn, but network and really get a full feeling of what the show and conference is all about.

**Goldman:** The commitment on the part of their company, presuming they're from a company, or university, is they have to get themselves to the meetings, to the show, and then IPC sponsors them for meetings and workshops. Is that correct?

**Rowe:** This is true for companies, yes. The commitment from the company is they have to get the emerging engineer to the show and sponsor their travel.

**Goldman:** I know there are a lot of workshops offered. Is there a requirement as to how many they should take each time, or is that open?

**Jaster:** The first year we said they have to take two classes.

**Rowe:** Then the second year we required one. We're now preparing our third-year activities. We'll be working on that. This will be our first group to reach three years.

**Goldman:** After this you'll see how well the first two participants, or emerging engineers, pick up on their own for next year.

**Rowe:** This is true. What we have noticed, to Nancy's point, is that one of our two emerging engineers has taken on a general vice chair position.

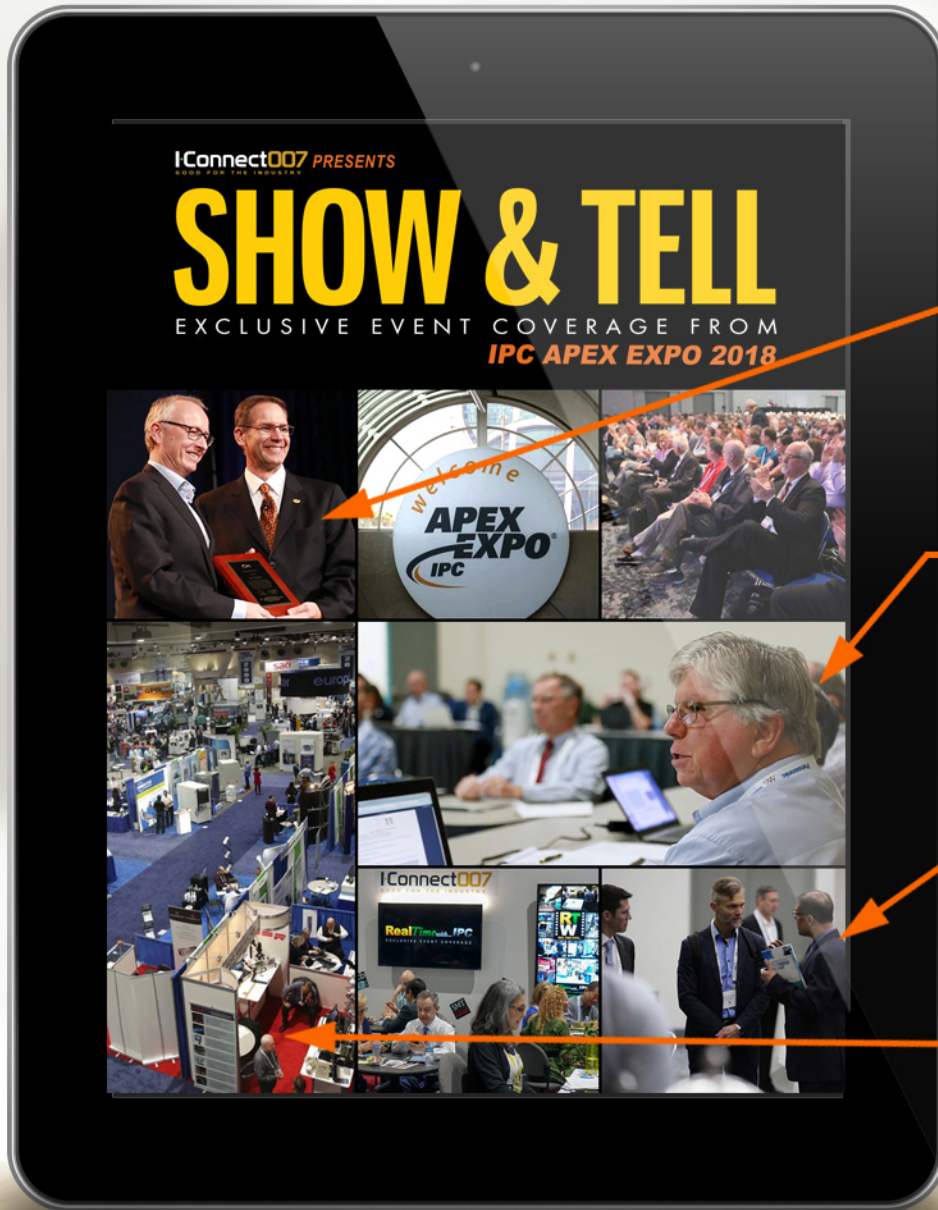


IPC's emerging engineers and their mentors.



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**Jaster:** Actually, two emerging engineers have become vice chairs.

**Goldman:** Fantastic. So they are delving into it. We all know how you can get really interested in this industry. Many of us kind of fell into it by chance, so it's nice that now we're making a concerted effort to bring people into the industry and not letting it happen just by chance.

**Jaster:** The nice thing is, because they do have the mentors, it's not like we're just saying, 'Here you go,' and they get overwhelmed by the size of APEX EXPO. They are getting some encouragement; they're getting direction from their mentors. I recall the first time I went to APEX EXPO—and I already had several years under my belt—it was almost overwhelming with the amount of choices of classes, technical sessions, and the show floor. Having somebody to help mentor them and help get them through that process and find the most benefit for them is very helpful. We owe a big thanks to our mentors for stepping up and doing that, as well.

**Rowe:** I second that. We have seen our mentors and our emerging engineers interacting off in a corner, or looking at the directory trying to

determine where they were going. It is real-time event. It's not a mentor saying, 'I'm here to help you and you come find me.' The mentors are reaching out to the emerging engineers and really guiding them through those activities.

**Goldman:** They volunteered to be a mentor and so they've got a real interest, and that's good to hear.

**Rowe:** They've taken it to heart.

**Jaster:** What was really interesting last year, our second year, was watching the emerging engineers bond as well. The second-year ones kind of took the first-year engineers under their wings and tried to help them along. To me it's just been an overwhelming success at how well the folks that are involved in the program are enjoying it and taking advantage of all the opportunities that they have.

**Goldman:** I take it you expect to continue to expand the program?

**Jaster:** We do.

**Rowe:** As we mentioned, we have slots open for this year and we have a number of applicants. The deadline was December 15, for the 2018 class. I know that we have some individuals who've expressed interest and we're just waiting at this point in time for their paperwork to come in. We do have four that have already sent their applications in.

If someone applies, we don't automatically accept them into the program. We review the applications. We also have had individuals apply and asked to be waitlisted, just like you have a university situation with delayed admission. We've had a situation already where we were able to accommodate the individual because he couldn't attend the first year. He said, 'I'm interested in this program, I just can't come to APEX EXPO,' so we delayed his start until the following year. We do try to accom-





modate when we can, because we understand that this is a volunteer effort that their companies are allowing them to do.

**Goldman:** What feeling do the companies have regarding this?

**Rowe:** From my perspective, I don't think we'd have companies coming back and offering the second individual for the three-year program. We do have a company who has said, 'We have someone in their third year, and we'd like to have another person start this year.' We've had interest from companies that have taken the program to heart. Nancy and I talked about this just recently. They have embraced the idea of introducing these individuals to this activity. I've had feedback in another conversation from one of our mentors saying that the program has really helped the emerging engineer in that company to take on a bigger role. It's recognizing within the company that this is something that they've been selected to do and it was a choice, not only by their company, but by IPC. This is an opportunity to embrace for their career. This is my perspective from an assembly point of view. Nancy, I know you've had similar conversations with your design groups, correct?

**Jaster:** Yes. Again, the companies are really enthused to have people in this program. Our current emerging engineer, I don't think he's going to have any trouble whatsoever getting a job, because some of our mentor companies have already expressed an interest in him. It's giving him an opportunity to do things that he wouldn't have had the opportunity to do had this program not been there. He's already getting involved in industry and working on projects because he is an emerging engineer.

**Goldman:** Now, you've almost got a full slate for next year. How do people find out about this?

**Rowe:** Our marketing group has put out fly-

ers on the program at various IPC events. We have posters that we post at our major events. We've also used tabletop tents in our standards committee meetings. We've done some visual information for them. We also have a webpage<sup>[1]</sup> on the IPC website.

**Jaster:** There's also usually a full page in our show directory as well.

**Goldman:** So if somebody doesn't go to the show or a standards committee meeting they might not find out about it? How does that work for university students? Just curious.

**Rowe:** We have spoken about the emerging engineer program at IPC Day and at some of the events on university campuses that we have attended in the past couple years.

**Jaster:** If you see me at any trade show, you know that I'm pretty blunt and ask young-looking people how long they have been in the industry. Then, I explain what the emerging engineer program is. I think some people wish I'd go away, but I'm out there talking all the time. I was at an event at PCB Carolina, at





## IPC APEX EXPO 2018 PRE-SHOW SPECIAL COVERAGE



Hall of Famers have pins, President's Award winners get pins, and they're a certain size. The emerging engineer pin is much larger and the mentor pin is unique as well. They are a pewter color, rather than gold. Each person is presented with one when they join the program, which they wear when participating in their events so that they can be identified.

**Zinski:** Are there any more specific requirements for people who are considering applying, other than being in the industry?

North Carolina State, and there were a lot of students there. I definitely brought it up to all the students there. We're trying our best to get to the student community as well.

**Goldman:** Is there some place where you list the emerging engineers and their mentors, so that when people see them at the meetings and so forth the rest of us can speak to them?

**Jaster:** We do make them show up at the breakfast for the keynote speaker. Certain lunches we make sure we have them stand up and they get introduced along with their mentors. Wednesday evening, we have a meet-and-greet with the emerging engineers at APEX. That is one of the activities they are going to be highly encouraged to attend, so they can meet other committee members, or other IPC members. Again, they really bonded as a group, so there's no problem getting them together for opportunities like that. They like each other, which is a good thing.

**Rowe:** We've also put their photos on our Emerging Engineer program web page<sup>[1]</sup>. We don't have their names, but we do have their pictures that were taken at APEX EXPO 2017. We have special badge ribbons for them when they attend a meeting. Each emerging engineer gets a very unique, large pin. Patty, as you're aware, the TAEC members have pins, the

**Rowe:** We'd like for them to be interested in standards development, although we understand and we accept that at this stage in their career they may not understand what that means. This is a program for them to learn what IPC offers and an opportunity for them to be paired with someone who has been in the industry. Beyond being early in their career and having an interest in the electronics association or electronics in general, there aren't a whole lot of criteria that say they have to study this or that or whatever. Nothing like that.

**Jaster:** What's really been nice is we have folks that are more on the design side. We have other folks more on the manufacturing side and those who are interested more in the process-related type of standards rather than assembly standards. We've been lucky that we've gotten a nice array of people interested, not just all from one area.

**Goldman:** That's another good thing. Okay, I think we have covered just about everything here. Thanks so much for your time.

**Rowe:** Thank you very much. ■

### Reference

1. IPC Emerging Engineer Program.

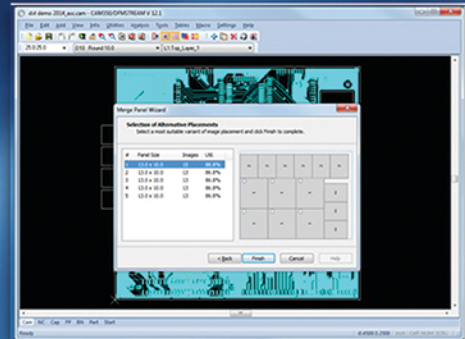


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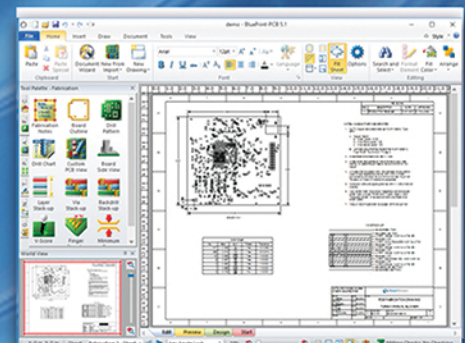
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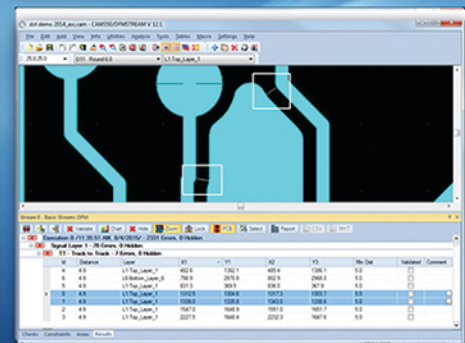
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# What to Expect at IPC APEX EXPO 2018: EXPO Veteran Alicia Balonek Shares

Alicia Balonek has seen it all. IPC's senior director of trade shows and events joined IPC during the dot-com bubble, and helped launch the first IPC APEX EXPO. Editors Andy Shaughnessy and Patty Goldman spoke with Alicia about IPC APEX EXPO 2018, what attendees can expect, and the organization's continuing efforts to attract talented young people to this industry.

**Andy Shaughnessy:** Alicia, I didn't realize you've been doing this with IPC for 18 years. I'm sure you've seen a lot through the years—including substantial changes.

**Alicia Balonek:** Well, that's true. I started with IPC in 1999 and I was part of the launch of APEX in 2000, so this show is very dear to me and it was a great opportunity to be involved with a launch show. There's such a connection to the show, we've certainly experienced our fair share of ups and downs but for the most part it's been an extremely enjoyable experience through the years. There have been a lot of changes in the industry, especially on the board side, particularly in 2004 when IPC Printed Circuits Expo, a show produced by IPC since 1994, was co-located with APEX and IPC APEX EXPO was formed.

Every show is a new experience and we just seem to keep learning from that, and we do it for the industry. This is the largest event in North America for electronics manufacturing and it has been since its inception. Everything is under one roof, from one end of the manufacturing process to the very end of the process, and we're proud to be able to bring the industry together for this important event.



Alicia Balonek

**Shaughnessy:** We're glad it's not in Anaheim anymore (laughing).

**Balonek:** Well, for a show this size, especially with the extensive electrical and plumbing requirements, there aren't many facilities throughout the country that can handle this event, especially with the long move-in time. We have almost two million pounds of freight on the show floor. It's a heavy equipment show, so not only does it take time to get that freight onto the show floor, we also must make sure that we're giving the exhibitors ample time to calibrate the machinery and their assembly lines so they're ready before the show begins.

**Shaughnessy:** I think everyone really likes San Diego. It's hard to have a bad time here.

**Balonek:** Especially when you're coming from the Midwest or the East Coast in February. Everybody enjoys that warm weather and it is a great facility. I've been in this industry for a long time and I've worked in many different convention centers, and we have great staff from the San Diego Convention Center working with us. I couldn't ask for a better team. They look forward to our show every year.

**Patty Goldman:** So what will be happening this year?

**Balonek:** Well, it's not necessarily new, but a favorite of the event, is the show floor reception on Tuesday evening which is a great gathering place for attendees to network with the exhibitors. We're introducing "Passport to Prizes" this year and we'll be giving away an iPad mini, Beats





headphones, Google Home, and lots of other useful and high-tech prizes. When attendees register they'll be given a little passport card which will have the exhibitor sponsor's booth number and name on it. They have to go to those specific booths throughout the show to get stickers from them; on Thursday, they must drop off the card at the IPC booth, where we'll announce the winners that afternoon.

**Goldman:** That's something new that should be fun.

**Balonek:** Especially with the younger audience that we're trying to attract to APEX EPXO. Of course, they come for the education, but there should be a fun aspect of it too. They've asked for more networking opportunities and just fun things to do on the show floor.

**Shaughnessy:** People like it when they can get a beer together at the show.

**Balonek:** Exactly. Our keynote speaker this year is Jared Cohen, the founder of Google Ideas and now he's with Jigsaw, the Alphabet arm. We're excited to bring him to the show, and he's equally excited to speak to this audience. I think his quote was, "Wow. This is perfect for me," when the invitation came across his desk.

**Goldman:** A nice technical audience.

**Balonek:** Yeah, and that's the one thing with the keynote speakers that we do try to recruit for this event—they love speaking to this audience because they can speak at the same level as them. For lack of a better term, they don't have to "dumb it down" for us. We get it. Mr. Cohen will present, "Game Changers: Technology and the Next Big Disruptions."

**Shaughnessy:** Yeah, it was great having Mayim Bialik last year. She was great discussing engineers versus scientists. That was funny.

**Balonek:** It was interesting the questions they

were asking her. I always find that fascinating to see what kind of questions there are. I think my absolute favorite keynote speaker, though, was William Shatner.

**Shaughnessy:** Hard to beat that.

**Balonek:** I'm still trying.

**Goldman:** You've had some pretty good ones.

**Balonek:** Thank you. It's a hard industry to tap into. It's a very niche industry, so it's a long process of trying to figure out who would be the best fit. So, if you have any ideas, I'm always open to them.

**Shaughnessy:** I think it's good how you rotate. Instead of having all futurists or something, you kind of rotate and you even had a super famous guy like Shatner, but then the next year was Michio Kaku.



**Balonek:** That's an important thing when planning an event. You've got to keep it fresh every year so people keep coming back. One new initiative that we are doing this year is a STEM program for high school students, and that will take place on Thursday. We invited two high schools from Southern California that are involved in STEM programs. There's been a lot of talk in this industry about how to attract the younger employees for the industry. It's great to recruit at the college level, but



## IPC APEX EXPO 2018 PRE-SHOW SPECIAL COVERAGE

there's such an initiative for STEM now that we really need to start reaching out to people at the high school level before they even enter college so they can consider this industry as a career choice.

David Bergman, our vice president of standards and training is doing a cool presentation, "How to Make a Circuit Board out of Peanut Butter," for the students and then we'll take them on the show floor. Hopefully, after they see the peanut butter presentation, they'll see the equipment and the technology that makes the circuit boards and it will all come together for a better understanding of the industry. Then we have a lunch scheduled with a panel discussion with some industry leaders so they can ask questions about our industry. We hope that it will be well-received by the students and that we'll be able to recruit the next generation for this industry.

**Shaughnessy:** That's one of the things we constantly see: People are retiring. For some reason, especially in PCB design, there was a big flood of designers joining the industry in the '70s and '80s. We're seeing a few young people coming in, though.

**Balonek:** And that's good but we need to do more and that's where STEM comes in. STEM education is so important and it's nice to see schools offering these types of programs. My daughter is in middle school now and they refer to her program as STEAM in her school, she's involved in the program and goes to classes three times a

week. They have afterschool workshops too, so it's a really good to start at even a younger level to start tapping into where our future engineers are coming from.

**Goldman:** Is your daughter finding the program interesting and intriguing?

**Balonek:** Oh, she absolutely loves it, and especially the part that includes making slime. I don't know if you guys have young kids, but they're making it all the time. I cannot tell you how many gallons of Elmer's Glue I have in my house right now. But even with these small experiments, they're exposing themselves to science which is beneficial for kids. But back to the STEM program at APEX EXPO, we're able to provide this program through sponsorships and I'd like to take a minute to recognize, ASM Assembly Systems, Mycronic Inc., Nordson and Panasonic Factory Solutions Company of America for sponsorships. In exchange, they'll be invited to the panel discussion and the students will be visiting their booths during a special tour of the show floor. We'll also be making a donation in their names to the STEM program for the participating schools.

**Goldman:** That sounds like a fantastic program. I guess the important thing is to make sure it's not a one-time thing, right?

**Balonek:** Right. It's a pilot program this year and we hope to be able to offer it again next year and maybe even doing things in different cities. I know a lot of our members have production plants within their facilities so we could do something in their cities if they don't have the time to coordinate a program themselves.

**Goldman:** We recently had our newest team members visit a PCB facility—they are editors, not really PCB people. They were absolutely astounded at what was involved in making the circuit boards, and of course they related it to







their cellphones: “Oh my gosh. Who knew all this stuff had to happen to make one?”

**Balonek:** Exactly. I had no idea before I joined IPC.

**Shaughnessy:** Where were you before you came to IPC, Alicia?

**Balonek:** I worked at a financial association in the banking industry, which was cool, though, because that was in the ‘90s, so you saw a lot of changes in banking with the ATM machines coming out, retail banking, gas stations and grocery stores. It was an exciting time there. It was right around the dotcom era too.

**Shaughnessy:** That was the good time.

**Goldman:** Not as exciting as circuit boards, though, right?

**Balonek:** You know what? The longer I’m at IPC, the more exciting it gets. I finally get it. It took me a long time to grasp this industry. It’s exciting to see how engaged our members are too. That’s what I like most about working at IPC.

**Shaughnessy:** Everybody you talk to in the industry will tell you about their job. They’ll tell you how they love it, how they got into it. Everybody has some crazy path that led them to this industry.

**Balonek:** It’s funny. Engineers are typically introverts until you start asking them about their work in this industry.

**Goldman:** Alicia, what else should our readers know about this year’s show?

**Balonek:** I’d like to just share a few facts with you. Just the sheer buying power of our attendees that come to the show—many of them wait until they visit IPC APEX EXPO before they make their purchasing decisions for the year. In fact, through our attendee surveys, we know that 37% of our attendees indicate that they will be making a purchase within six months of the show. Then about 28% of our attendees actually make the final buying decisions for their companies, and 55% recommend or influence those buying decisions. We have the key decision-makers coming to this event.



## IPC APEX EXPO 2018 PRE-SHOW SPECIAL COVERAGE

**Goldman:** That's good. How about the size this year? How's that shaping up comparatively?

**Balonek:** We're expecting about 450 exhibitors in about 150,000 net square feet of space, and right now, the needle is pointing into the direction of selling out the show. We still have a lot to do, but that is our goal. As far as attendance-wise, we'll have total visitors of about 9,000, which encompasses about 4,600 attendees and about 4,400 booth personnel.

**Shaughnessy:** That's a lot of people. You do a good job just herding the cats and putting it all together.

**Balonek:** It's fun. We work so hard planning all year long, and, when I see it come together, I cry at every ribbon-cutting. I'm just so happy that all our plans went off without a hitch, although there are sometimes little bumps in the road. It's very fulfilling to me.

**Goldman:** I bet. Your baby gets born.

**Balonek:** Exactly.

**Shaughnessy:** I liked having the guitar players during the ribbon-cutting in Vegas. That was nice.

**Balonek:** Yeah, they were fun. My husband and I were on a trip in Vegas and we were at the Irish bar in Mandalay Bay, and that's how I found them. They were a lot of fun.

**Goldman:** Is that how you come up with your ideas, hmm?

**Balonek:** It's just amazing where you come up with ideas and what you're doing when you come up with those ideas. I also want to mention the First-Timers' Welcome Reception. We normally have a breakfast on Tuesday morning for them, but this year we're having a reception on Monday evening for the first-timers.

**Goldman:** You expect that to be a better time slot?

**Balonek:** I think it's a better time. Nobody really wants to get up for a 7:00 am breakfast meeting. And we will be holding the Women in Electronics reception on Wednesday evening.

**Goldman:** You have something every evening. Are those considered part of the show? Or are those separate?

**Balonek:** Yes. Those are free networking events and included in the exhibit hall only registration option.

**Goldman:** Well, we are looking forward to it. Especially after winter, we're always looking forward to San Diego. Thanks for talking with us today, Alicia.

**Balonek:** Thank you. ■







# IPC APEX EXPO

## App is Where It's At

In an interview with I-Connect007, IPC Exhibits Manager Kim DiCianni discusses the IPC APEX EXPO 2018 app and how this powerful tool will keep attendees on track. She also highlights its usefulness for exhibitors.

**Stephen Las Marias:** Kim, can you please tell us more about yourself and your role at IPC?



Kim DiCianni

**Kim DiCianni:** I am the exhibits manager at IPC. I handle all logistics, sales, operations, overall exhibitor tasks for the event as well as managing registration, the agenda planner, the app, and most things that have to do with exhibitors and attendees for IPC APEX EXPO. I've been with IPC for 12 years, and I've always worked on the show, so I've been growing with the event as IPC APEX EXPO evolves.

**Las Marias:** Please tell us about the app. When was it first created for the APEX show?

**DiCianni:** I started managing the APEX EXPO app in 2015. We created the app two years prior to that, but I don't know that it was as extensive or had the capabilities that it does now. It has come a long way from that first year.

**Las Marias:** How is the app helping the attendees?

**DiCianni:** The app provides everything that attendees could possibly want or need for the event, including being able to look up exhibitors by specific categories. If they're looking to focus on a specific category, not only can

they see what exhibitors are tied to that, they can see related tech conference and PD sessions, and any event related to something they're interested in. App users could filter for "adhesives," and it will tell them what exhibitors are related to it, and what sessions might be of interest to them.

Basically, what happens is when an attendee registers, they select their demographics. Their demographics then go into our online agenda planner, which feeds the app. It gives them suggestions of any exhibitor that would be of interest to them, any session we have, and attendees can add those things to their planner. If they add it to their schedule, they're able to see what time something takes place or what exhibitor they might want to see. They can browse exhibitors by name and product categories that the exhibitor selected.

We have "What's on Now?" which shows anything that's going on at that moment or coming up soon. They can look at any speaker's profile. They can see a list of attendees, or someone that might be of interest for them to connect with, and they can request a connection to that person. We have the maps of the show floor and the meeting rooms area. Users can see virtually anything that we offer at the event right in the palm of their hand, and it's always the most up-to-date information.

We have the show directory on site as well, but, as you know, once something goes to print, if something changes, it's no longer up to date. The app is always up to date. If something gets canceled at the last minute, we can do push notifications letting people know, or if



## IPC APEX EXPO 2018 PRE-SHOW SPECIAL COVERAGE

it was replaced by something or if the speaker changes. For the Tuesday morning keynote at 9:00 a.m., we can send a push notification at 8:00 a.m. as a reminder.

**Jonathan Zinski:** I was looking at your app from last year, and it was very extensive. I liked how you had links to check out the local area and find restaurants.

**DiCianni:** Many people aren't familiar with San Diego, so it helps. The app has social media links so they can look at Facebook, LinkedIn, or anything IPC is putting out during and after the show. The app we have now is called the multi-year. We use Core-apps and have since 2015, so if you already have the app on your phone from a previous year, it'll automatically add the new show, but it keeps the apps from the previous show also. So, if you made notes last year on something, you can go back, look at your notes from last year, and see if it is going on again. You're able to go back and compare the app. It never goes away.

**Las Marias:** How popular was the app last year and the years before, in terms of downloads, and did the attendees find it useful? Do you have some sort of feedback mechanism that will gauge that?

**DiCianni:** Last year, about 20% of our attendees downloaded the app. It has increased each year since 2015, in terms of downloads and usage. Comparing 2016 to 2017, the number of people using speaker profiles, sessions, and exhibitors is growing as well as the overall use. I think every year we're seeing an increase in usage.

**Zinski:** Do you use analytics to see what features are being used the most and which aren't being explored as much?

**DiCianni:** I would say probably our largest hits are on the session views, exhibitor views and speaker views—they're all very high.

**Zinski:** What means are you using to advertise it? If I had seen it last year, I would have used it.

**DiCianni:** On the printed show directory that's given to all registrants the QR code is right on the front page of the directory. We had 8-1/2 x 11 signs across the registration counter with the QR code. It had a picture of a tablet, a phone with the logo and then the QR code to download it right there. On most of our directional signage throughout the hall upstairs in the meeting area we also had the QR code. I know we promoted it to exhibitors in newsletters, and it was promoted within the conference brochure last year that was sent to attendees in December.

**Zinski:** Is there a way in the app for users to leave feedback about features they'd like to see improved or that they'd like to see added?

**DiCianni:** Currently not in the app itself, we do not. We do send exhibitor and attendee surveys at the end of each show. I know on both the exhibitor and attendee surveys we do touch on usefulness of not only the app itself but the agenda planner and ask survey respondents to provide their ideas for suggested improvements.

**Las Marias:** Does the data on usage or functions and features being used by attendees help you decide what other features to include in the show next year?

**DiCianni:** Absolutely. For example, the app is confirming that people like to look at new products. We know speakers at a session might be important or the session itself or







certain products or new products. It helps when we see trends, what's important to attendees, what they're looking for, etc.

**Zinski:** You said the app is continually updating for each year, so if someone has last year's, and is interested, they could download it right now and it would update for the show?

**DiCianni:** The 2018 app is still being created and it has to go through the approval process from Apple, so that's where we're at right now is putting in the new graphics and getting it prepared for 2018. Before we can actually push it live, it has to go through an approval process. If you were to download it right now, you would be able to see '17, '16 and '15, and then as soon as '18 becomes available, it would come into the app as an update. It would tell you that you have an update for the app, and then '18 would become available.

Once a person registers, their information comes from our registration company, and it populates into the agenda planner. Then when the app goes live, basically everything in that agenda planner, all our sessions, everything comes into the app. We're in the process right now of actually finalizing the agenda planner itself. It should be done in the next week.

**Zinski:** I'm on Android, and I was looking on Google app store, and I saw two of your apps. One of them looked pretty old, and the other one was the recent one.

**DiCianni:** Yeah, prior to 2015, we used another company for the app, so that's probably the other one you're seeing, because I don't think they ever go away. We have requested for it to be removed, so I'll have to check that out. Another thing I wanted to mention is the operating platforms, because I know people worry about Apple having so many operating, the app is always up to date and will work with the operating systems as they update. So, there's never going to be an issue with that.



**Zinski:** That's good to know. It's frustrating when a phone pushes an update. Android was pushing out their latest operating system, and half my apps are just crashing because they're not ready.

**DiCianni:** Exactly, and that's something that is very important to us, and I have confirmed repeatedly that, no matter what updates these carriers are doing or what platform they're using, it will work with it.

**Las Marias:** Kim, is there a benefit to the exhibitors for using the app?

**DiCianni:** Yes, we offer a sponsorship opportunity for them. On last year's, we just had an IPC banner, but this year, we are offering that to exhibitors, and it would lead to their page. It could be a great promotional tool to get themselves out there.

**Las Marias:** Right, good exposure. Hopefully doing this preview will inform a lot of people way before the event, and come the actual event, they will know that they can download the app. Thank you very much for your time.

**DiCianni:** Thank you so much. ■



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