

NARRATOR: Printing, a storied industry, continues to see an evolution. In this edition of Intersections: The RIT Podcast, RIT alumnus Henry Freedman and Professors Robert Eller and Bruce Myers discuss the strength of the industry, the rise of inkjet printing and the role RIT plays in developing professionals who can take the printing industry to the next level.

ROBERT: This is a historic moment for us. But it's actually kind of a bookend. You like to talk about the history of printing, beginning back in Guttenberg's day, and the fact that change is accelerating here. Why don't you just set the scene for us as to how we got to this point in time?

HENRY: If you look at printing technologies from the 1450s until almost the start of 1900, there was no significant change in the technology. Then there was something that was created in printing that most people don't realize to give credit for. It was called a monotype machine. It actually was a mechanical computer, and as a result, computation began in printing. As a result, the digital world today actually had its original basis back in printing, most people don't realize, in an industrial way. Printing had a problem for public recognition but not internally. Printing was a trade and craft. In fact, the guilds in Europe were sworn to secrecy, so if a printer created a technology or something new, they could not tell society about it. Therefore, over time, printers are really not given credit for all the fantastic inventions that came from printing because of those earlier days and also trade and craft secrecy.

BRUCE: So, if we talk about the technological change, so going from Gutenberg to offset was several hundred years. And now, where does that leave us today?

HENRY: Well with the substitution. This has now come into society where everyone has the technology. It's really on your phone. Today on your phone you have fonts and image retouching and scanning and markup and enhancement, so it has gotten into the person's pocket all based on printing technologies.

BRUCE: So, that's really interesting, and we think about this in a context where everybody is doing their own work, but production printing is still a viable industry.

HENRY: Oh yes. In fact, printing is the second-largest industry in manufacturing next to the auto industry by number of locations and it's still here and it's not going away. I challenge anyone who wants to take a quart of milk and get rid of the printing and wrap their iPhone or iPad around milk and try to ship it to somebody. It's just not going to work. Packaging is growing at 26 percent a year. The fastest growing part of industry is in photography – it's at 22 percent a year. Its adaptability is amazing.

BRUCE: So, if we look at some of the changes again getting back to letter press to offset, and then now we hear a lot about inkjet technologies. And that kind of brings us to the current research that you're presenting to our community. Can we talk about this research?

HENRY: Absolutely. One quick thing to note is, inkjet to paper is real ink to paper. The intermediary from printing went to xerography. Chester Carlson's xerography resulted in a toner and electrostatic transfer of the marking materials, typically carbon black and toner. However, now that the printing technologies have gone to shooting ink by droplets to paper, now we're dealing with ink to paper, which printers really like. And what's occurred is, by being able to jet ink to paper at some amazing speeds, and these droplets can be varied in size from one, two, three or four picoliters. This corresponds in what used to be considered dot sizes in printing. But what you see on the paper when it comes out is ink on paper, and as a result what we would call in the traditional industry 'real printing.' And this allowed it to start emulating that of the offset process.

BRUCE: Okay, Henry. What does this mean for the industry? You've been doing a lot of research in these technologies – can you talk about what that means for the industry?

HENRY: We discovered this, actually. Image Test Labs, where I work with Dr. Peter Crean, Dr. Peter Dundas and Dr. Eric Zeise as my partners – who all come from Xerox and Kodak – and myself, we developed the ability to walk up to a device and print a target and then grade the target kind of like an SAT test for a student, but it evaluates the imagery. And what we have done for years now, we measured hundreds of machines from many of the manufacturers. And one day we went up to do a test for one of the inkjet press manufacturers. The grades that we got from their inkjet was as good as or exceeded the offset, and we realized that it was now possible on an inkjet press to print inkjet to be equivalent if not superior to offset. Now for years inkjet has been used in printing for doing proofing on wide format devices for offset presses. However, it couldn't be used to do the production run. What we did for the first time in history was take an inkjet press and run a 17,000-foot roll, or 3 miles of paper, across the paper run and then take that paper and sheet it, feed it to an offset press and print the exact same image next to it, and then demonstrate that the inkjet could match the offset or exceed the offset.

ROBERT: What you just said knocks me over. With offset, I've got a fixed plate. All I have to do to print another image is put ink on the plate, and then get it on the paper. With digital, I'm recreating the entire image every time I'm printing it. I mean, that could have been 17,000 feet of different images, as well as 17,000 feet of repeating the same. And yet you're telling me that in terms of color consistency, creating new images every

time for 17,000 feet actually beat a technology that had a fixed print form and only had to put ink on paper.

HENRY: Yes, and in this case Bob what we did was we kept the images the same just to prove that they could be matched across. Actually, we're demonstrating and have demonstrated that the product quality can exceed an offset press. We have shown that we can print photographs on this process. So, there's something better than offset quality – it's photographic quality. And these inkjet presses we're working with are photographic quality.

ROBERT: You know we often hear that print is a dead-end career path, and 30 years out into the future a lot of people say, "Ah, print's just going to be electronic, it's not going to be physical anymore." But your research is saying something very much different. As you said earlier in the podcast, it's impossible to wrap a package of any physical product in bits and bytes and get it to hold together, protect it, portion it, and promote it. So packaging is an area of print that's going to be with us for a long, long time. We're finding new ways to print the packaging, new ways to engage the consumers. What do you think the future of print holds for us?

HENRY: It's an enormous future. It's growing faster than ever before. People don't even realize the rate in which print is growing. Let's talk about advertising. When people go to their mail, they love junk mail no matter what they say. The reason is they get something in their mailbox. Secondly, when I meet you and give you a business card, I am physically handing you an object of communication. And not only am I giving you my printed information that stores and forwards it to you on paper, by physically handing it to you I've increased that communication beyond that of just sending someone an email. And therefore, that human bond of a physical transfer along with a physical object that remains with a person is a much more powerful communication, and after all digital or print, we're talking about communications.

BRUCE: Another thing too I'd like to add, you talked about direct marketing, so relationship marketing, and direct mail and segmented mailing and things like that. I go into some traditional print shops that are now really marketing communications providers, and they're handling mailing and fulfillment and things like that. If you look at, for example, the casino industry.

HENRY: Yes.

BRUCE: The casino industry, in order to gamble you need to have a card. They want to know who you are, right? And they're using that data to market to you. And you'll see

segmented pieces going out – okay, this is for the \$200- a-month gamblers, this is for the \$500-a-month gamblers – and they’re customizing those images because they’re not in the mailing business, they’re in the response business.

HENRY: Yes.

BRUCE: So, you think about that, that all needs to be managed by somebody. It has to be managed by somebody that understands databases. It has to be managed by somebody that understands the printing technology, understands what’s capable, understands mailing and fulfillment and things of this nature, understands the finishing processes. When I talk to high school students, high school juniors and seniors are one of the world's largest recipients of direct mail because the colleges and universities are sending them information and they want to catch their attention. And they know if it's personalized, they know if it's a catchy piece – when they get a catchy piece, and maybe it's lenticular printing, maybe it's a unique cut, maybe it has their name on it, maybe it has even their car or their pet on it, or something of that nature, that they're grabbing these people, and they're saving it and they're showing it to people and they're saying, “Hey, this was really cool. I got this in the mail.” Well, you think about who has to make that. And that's really what we're trying to prepare our graduates for is the breadth of the industry and the skill sets of the industry. That's why we like to emphasize critical thinking in our curriculum, so that students learn not just a technology. It's not just click here, click there. It's what's behind that technology, so that, lifelong, you can apply your skills to maintain viability as the markets change. But all these things that you're talking about really just mean different types of career opportunities in a very dynamic and viable industry. That's what it means to me. The College of Engineering Technology also houses the program in packaging science, and I think there are unique synergies between our program and the packaging science industry. And you mentioned, you touched on the viability and the growth, and the packaging center and how packaging cannot be replaced by, as professor Eller said, bits and bytes.

HENRY: Yeah, packaging is going to be a hybrid technology in to the future. Because printing, as I may have mentioned it, electronic displays are printed, for example the OLED printing. You're going to be able to go down the aisle and have a potato chip package say, “Henry, come over here. I taste really good!” Because what's going to happen is it's going to recognize who you are. It's then going to be able to have electronic – printed electronics is the next thing. And I'll be able to have packaging that actually has printed electronics on it. Maybe you're looking to buy something, and it has a little video running on the package on how it works to motivate you to buy it. So, as a result you're going to see a hybrid – the print will remain and they'll add the electronics to it.

BRUCE: Sure. And there's a lot of exciting things going on that really mesh with that that are viable technologies today. A lot of people are familiar with the '19 Crimes' wine that has augmented reality. So, what they did was they took pictures of – they had these old pictures of individuals who were incarcerated on the continent of Australia by the British Empire. And they have with your phone – so it kind of wraps up where people are going – you have this augmented reality where you have the wrap, you point it at the picture and the criminal comes to life and talks to you, tells you his or her story. So, you have this level of augmented reality. Well, somebody has to do that. So, these are very clever applications, and this is really in its infancy.

HENRY: What you just said is, you've taken print from being a reactive to an interactive. When you make people interact with something, it will go better.

BRUCE: As we know, craft breweries are a big thing now. There's a lot of towns that have brew pubs.

HENRY: But what sells the beer, Bruce? The label.

BRUCE: The label, exactly. So I've heard of this company –

HENRY: The printed label is key.

BRUCE: Right, so the people printing Budweiser cans, they're doing business in the millions, right? So, if you want to have 10 cases of cans of your beer, how do you do it? Well, what they do is, I know someone who has a truck that has the canning equipment in a truck, he will drive up into the parking lot, he buys white cans, he has digitally printed shrink sleeves. And for these brands the wilder the label the better. Right? So, he has shrink sleeves on white cans and he will can ten cases of your beer for you in your parking lot.

HENRY: That's funny.

BRUCE: Right?

HENRY: You're dead on. The label printing is a big business.

BRUCE: And look at what it did with Coca-Cola with the names on the labels. Right? That they got a huge marketing splash out of that.

HENRY: Heinz personalizing the ketchup.

BRUCE: Exactly, huge marketing splash out of that. And how do they freshen up these brands and get people to think about it? Well, it all comes down to how they're printing their packaging. So, it's tremendous opportunities across really almost any industry that you can touch.

NARRATOR: Thank you for listening to Intersections: The RIT Podcast, a production of RIT Marketing and Communications. To learn more about our university, go to www.rit.edu and to hear more podcasts, subscribe to Intersections on iTunes, Spotify, TuneIn, or Soundcloud or by visiting www.rit.edu/news/podcasts