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MICHAEL SCOTT ASATO CUTHBERT: Hello. We welcome today Michael Good, who is vice president of MusicXML technologies at MakeMusic Incorporated, creators of Finale, SmartMusic, and so many other great things and a dear friend of computational musicology and music theory at MIT. Welcome, Michael.

**MICHAEL GOOD:** Hi, thanks for the invitation. Great to be here.

MICHAEL SCOTT ASATO CUTHBERT: Great.

**MICHAEL GOOD:** Virtually.

MICHAEL SCOTT ASATO CUTHBERT: Yeah. Well, there are some great advantages to the way we're setting things up right now, and it allows you to-- the students to get to meet you in a way that we wouldn't be able to perhaps in the past.

**MICHAEL GOOD:** Mm hmm.

MICHAEL SCOTT ASATO CUTHBERT: I just want to jump in there and just ask you're the creator of MusicXML. This is incredible for me to be able to talk to the person who has done so much. Why did you create MusicXML in 2000, and what problems existed that you hope to solve with it?

**MICHAEL GOOD:** Yeah, in 2000, I was working at SAP, and I was the representative actually to the MIT Media Lab at that point, which will come in later. And it was just the beginning of digital sheet music happening. Sheet Music Direct was out there, which I didn't know at the time, but Sun Hawk released things where you could download digital sheet music and go, wow, this is really cool until I figured out, oh, you can only play it in the Sun Hawk player.

Well, that's really silly. I want-- and Finale and Sibelius were there for notation programs. You couldn't move them back and forth and get anything reasonable out of it, and it was like, well, the internet boom is happening and people want to make money on digital sheet-- this isn't going to work without a standard format to exchange sheet music between applications. People aren't going to want to be stuck in just one thing. We need something like midi for musical instruments or HTML for the web.

And a lot of people tried trying to do an interchange format and have succeeded, but I figured I could give it a good go. And I had some ideas for it, and when I visited the Media Lab, I went to my old thesis advisor, Barry Vercoe, Professor Barry Vercoe, who is at the experimental music studio and then the Media Lab and bounced this idea off him. You've worked in this area lot. Am I missing something obvious that makes it not going to work?

He said it sounds like it's going to work. Go over to Stanford and talk to Walter Hewlett and Eleanor Selfridge-Field with MUSE Data and talk with David Huron of Humdrum because they're doing the stuff closest to what you're doing. And David Humdrum was at Stanford that term, so that was great. I didn't have to go to Ohio to talk with him.

So I did that, and basically the first version of MusicXML was an XML version of MUSE Data. Used XML because at SAP, we were using XML to communicate between our R3 system and other systems. So it's like, oh gee, it seems like we have some standard technology that the whole computer industry is behind.

Why not use that to exchange music notation back and forth? And so it was just we've got to be able to exchange between applications. So the format is optimized very much for exchange between applications, not as a native format for any particular application.

MICHAEL SCOTT ASATO CUTHBERT: So how did you get the initial application users to buy in to this format?

**MICHAEL GOOD:**

Yeah, that was always going to be a tricky question. I knew that it had to work with either Finale or Sibelius or nobody would care. And so I gave myself, yeah, if I can't get it within two years or so to do two-way, not just writing, not just greeting, but two-way communication with either Finale or Sibelius. I don't care which one. Then nobody was going to care.

And it turned out that Finale had a better plug-in development kit than Sibelius for that, so I was able to build a plugin that did the two-way communication. And the way that things really got rolling is that there was a developer up in the north of Scotland, Graham Jones, who had the SharpEye music reader program, which was the best scanning program out there except the differences in the scanning, you could only transfer via midi. So you-- all the great recognition that you got in SharpEye got lost going into a notation program because midi couldn't handle it.

So I contacted Graham and said, hey, we got this MusicXML format. If you do that, we can-- and I got this importer that goes into Finale. So if you add this, you could really make things work better for Finale and increase your sales. And he said, well-- because he supported NIF at the time. NIF was an older attempt at a standard notation format that only worked well for scanners. So all the scanning programs implemented it, but nobody else did.

So they said, well, you could do a NIF to MusicXML converter and then I wouldn't have to do that. I'm going, yeah, I'm not going to do that. You can do a MusicXML, and he did. He wrote a MusicXML exporter out of SharpEye, and then the MakeMusic people saw, geez, this scanning thing, this is better than what we have built in with Finale. And it's better than what Sibelius has. So that's when they got interested in MusicXML and started to include the plugin as part of finale 2003 for Windows.

And so once Finale had it in there, you keep marketing it. You keep pushing it. I spent 11 years really pushing developers to marketing to developers to support the format. And now we have over 250 applications that support it. So it's great.

MICHAEL SCOTT ASATO CUTHBERT: So you started with a leader in one domain of music notation and a leader in a different domain that could communicate, and that ended up being part of the snowball instead of--

**MICHAEL GOOD:** Right.

MICHAEL SCOTT ASATO CUTHBERT: Because--

**MICHAEL GOOD:** That's two useful things. Yeah. And it solves-- people go, oh, this is useful.

MICHAEL SCOTT ASATO CUTHBERT: Because I could imagine that some of the industry leaders might have liked lock in that they had before.

**MICHAEL GOOD:** Sure. Everybody was very skeptical of a standard format, which is one of the reasons why it's not designed at all to be a native format. Because it had to be to a reference. It's modeling a musical score. It's not modeling how somebody would represent a musical score because then you would get, oh, you're favoring Finale or favorite Sibelius, and you would get into all that conflict.

But once we had, MakeMusic had the Finale plugin developer kit and we had the two way communication, that was already working when I made my first presentation to MakeMusic, and John Paulson, the CEO, said, yep, it's going to happen.

Nobody's going to stop you. So MakeMusic figured they might as well jump on board because there wasn't a way to stop it. Now that it was out, so let's use it for the benefit of the company, which turned out to be for the enormous benefit of the company over the years.

MICHAEL SCOTT ASATO CUTHBERT: So just to be clear for people who see your current position and things, you were not an employee at MakeMusic. This was not like Music Project.

**MICHAEL GOOD:** Yeah no, I started my-- in 2000-- at the beginning of 2000, I left SAP and started my own company called Recordare. Don't have me name your company. Can't-- nobody can spell it or pronounce it unless they're choral singers.

And I did a program called Dolet for the-- which everybody calls 'doo-lette' to go with Recordare. So, yeah, don't have me-- MusicXML is OK but don't have me do creative names for your products. I'm not very good at it, but I can write music notation software pretty well. So I had my own company called Recordare. That was through 2011, and then the assets of the company were purchased by MakeMusic in November 2011. And I've been a MakeMusic employee ever since.

MICHAEL SCOTT ASATO CUTHBERT: So you mentioned 250 applications, which from my look this might be an undercount, can read or write or do something interesting with MusicXML. I imagine you define that as success. Why-- beyond the initial startup, what aspects of MusicXML have-- or your advocacy of it have led to this to continued success?

**MICHAEL GOOD:** Well, the continued-- it's good technology. And we been continuing to market it and improve it. We're now working on MusicXML 4.0. And a nice thing now is that it's part of-- it's being maintained in the World Wide Web Consortium as a community group. We have a music notation community group, which is independent of MakeMusic or Recordare.

When I was at Recordare, we were independent. It was just a 1 and 1/8 person company. I had one very part-time person helping me. So we were like Switzerland, the neutral place everybody could go to, but once I joined MakeMusic, forget about it. And things did not improve with MusicXML.

So Joe Berkowitz was very persuasive and worked on me for many years to transfer MusicXML from MakeMusic ownership to being maintained in the World Wide Web Consortium as part of a community group. And my condition on that was that Steinberg also transfer the SMuFL standard music font layout at the same time, which they agreed to.

So we have both of those standards in the W3C music notation group, as well as a next generation project called MNX, which tries to deal with the issue of a native format and take the-- we're trying to disrupt MusicXML from inside rather than out because if you don't keep improving formats and improving technologies, if you think, yeah, we're done, it succeeded, we can kick back and relax, yeah, in a few years, you're toast.

And so whether-- we-- there have been these awkward transitions from midi 1 to midi 2 from Python 2 to Python 3, HTML4, and HTML5. So we're trying to manage that as best we can for what's the next step in the evolution of notation technologies and be ready for that while still just keeping on working on improving MusicXML for the use cases that it does really, really well.

MICHAEL SCOTT ASATO CUTHBERT: So you mentioned W3C's MNX format and also that MusicXML is soon to release version 4.0, and we see that there are other notation formats that are not part of W3C such as MEI and other more niche formats that are continuing to be developed. Why is music or music representation formats still being developed? What are the things that are that are not totally solved yet?

**MICHAEL GOOD:** Well, it's not so much that they're whether they're totally solved, it's having the right tool for the right job. MusicXML is optimized for the exchange between documents. It's not optimized for doing editing as in finale or musicology as in music21, or assessment as in SmartMusic. It's designed for exchange, and MNX is designed more for a native format.

But that's still going to be more simple applications, web-based applications. It's probably not something where if you wanted to build the next competitor to Finale, Sibelius, or Dorico, you would use MNX. Maybe you would, but it's not intended for that level.

As you get more and more sophisticated problems and more specialized problems, you want your own abilities to-- you want to optimize things for those problems. So MEI is optimized for they think for the issues of musicology. I have issues with how they have done that and whether it really serves the community or not, but it's a specialized format for a particular type of application.

But nearly anybody who's developing their own new application, it might be MusicXML influenced, and a lot of them are now. They, oh, OK, I can take-- if I cover all these concepts from MusicXML, I'm probably doing pretty good, but it's not going to look exactly like MusicXML. SmartMusic is that way. The format is very much influenced by MusicXML, but it's not MusicXML inside. It's a lot closer to MusicXML inside than finale is, but it's still not-- it's a different format.

MICHAEL SCOTT ASATO CUTHBERT: Now you mentioned your advisor, Barry Vercoe. You're an MIT grad. You're a--

**MICHAEL GOOD:** Brass Rat, Brass Rat! Yeah, there we go.

MICHAEL SCOTT ASATO CUTHBERT: You're an MIT grad, and you're a supporter of the MIT music theater arts section, the Lewis Music Library, and especially jazz programs. So I just want to ask you what advice would you give to MIT students or I suppose students anywhere who want to combine their love for computer and their love for music throughout their life like you have.

**MICHAEL GOOD:** Yeah, that's an interesting question because everybody has their own path. It's not just me. I met my wife in the MIT concert band, so-- and we're both lifelong performers. So one thing that we found out as an adult, it's a lot easier to have high-quality performance opportunities if you're a singer or a string player than if you're a brass or a wind player like we were because there are a lot of really good community orchestras and choruses but not so many good-- really good community bands.

So we switched to singing. I switched when I was 30, and my wife followed a few years later. And now we sing together in opera choruses. So being able to maintain high-quality performance opportunities is one thing. If you want to do it for your day job, that's harder because it's a small industry.

I spent the first 20 years of my work-- working-- well, when I graduated from MIT, there was-- this was before midi. There was no computer music industry. There was-- OK, there was New England Digital Doing Synclavier. But outside of that, there was, again, no one-- a few other synthesizer things, but there was no computer music industry at the time. So I did usability work for the first 20 years of my career and then moved into music software.

But when I worked, I worked at DEC, and then I worked at SAP with a virtual reality startup in between there. But DEC and SAP, those companies by themselves were way bigger than the entire music technology industry.

So it's hard, but you're from MIT. You do hard things so connect with people. Do projects. Make your projects visible. Contribute to open source projects. Network.

You can't go to an NAM show now because NAM isn't going to happen next year. But, yeah, when NAMs come back, you could the NAM show and visit all the different companies doing things that you want to do, show folks what you're doing. Most companies, you see the NAM thing. It says it's only open to members of the trade, and you go I'm not-- I'm a student. I'm not a member of the trade. Well, sometimes they have student programs for access, and most companies have a very large guest list that they can use to invite people.

So go to one of the companies that you're-- that you are a customer of something where you've bought something from them and see if they're if they're exhibiting that they have-- see if they can get you in or something to exhibit. But just it's like anything else in a-- when you have a niche market, you got to do a lot of networking and make your stuff-- self-promotion, make yourself visible. Look for the job openings that are there.

If you're specifically interested in music technology, I've got a list of the 250 programs that support MusicXML on the MusicXML.com websites with links to all of them, so you can say, oh, here are all the folks who are doing at least MusicXML-related stuff. So there's a handy list of-- most of those are like one- or two-person companies, but some of them are quite a bit bigger.

Everybody has their own path. My path was start my own company. That's another way to do it. But I could do start my own company because I married well, and I married an analog integrated circuit designer, of course, one who did very well at her company. And so we were able to take the financial hit of, yeah, let's start this totally speculative thing, which may not have any income for a couple of years. Most people are not in such a lucky position to be able to do that.

MICHAEL SCOTT ASATO CUTHBERT: Well, thank you, Michael. Your path has certainly been inspirational to so many including myself. So I really want to thank you for taking the time to speak to me and to speak to the students in 21M.383 Computational Music Theory and analysis.

**MICHAEL GOOD:** Well, thanks so much for the invitation and everything that you've done with music21, which has been a big contributor for MusicXML and for musicology and just the whole general area of computer music technology and everything that you do at MIT.

MICHAEL SCOTT ASATO CUTHBERT: Thank you, Michael.