



Science Modeling Talks

Episode 82 - Founding Member of AMTA

Guest: Colleen Megowan-Romanowicz

Mark (01:44):

Colleen. Hi. How are you doing?

Colleen (01:46):

I'm great, Mark. How are you? It's been a while.

Mark (01:49):

It has been a while, but I'm really looking forward to our conversation today. First off, I gotta say congratulations on the AMTA award that you've received, with the David Hestenes Leadership Award, so well deserved. That's the AMTA's highest honor, and I'm really glad you got it. It's really, you deserve it. Your contributions to the AMTA have been remarkable and to modeling instruction, and I'm really looking forward to talking to you today about your career and the contributions you've been making. It's very exciting and congratulations on that award.

Colleen (02:34):

Well, thank you very much. I am, I'm really honored. I'm especially honored to have my name in the same sentence as David Hestenes's name.

Mark (02:43):

Yeah <laugh>.

Colleen (02:43):

Yeah, it's quite the tribute. And, if I can do a 10th of what he has done for modeling instruction, then it will have been time well spent, but I'm not done yet. I'm not done.

Mark (03:03):

That's great. I'm glad to hear that because you have so much to contribute. I call him the father of modeling instruction, and he is the founder of the Ideas behind all the modeling. Tell me about how you met him. I know you met him 'cause you were there at the very beginning, how you met him and how you got introduced to modeling in the first place. I think this will be a fascinating story.

Colleen (03:33):

Well, I was teaching at a Catholic girls high school in Sacramento, and the information for this workshop came in by email from Jane Jackson, of course, who else is it gonna come from? Mm-hmm <affirmative>. And I read about this workshop and thought, wow, I am gonna learn how to use classroom technology really effectively. And part of the package with the workshop was some money to purchase some classroom technology. And I had been wanting

this for a really long time, and I thought, okay, here's my way into having a modern, technologically modern, lab for my students. So I signed up for it. I had no idea what modeling instruction was. Mm-hmm <affirmative>. I, or what a model is. I just knew that I was gonna learn to use classroom technology. So that was the Trojan Horse. I think that led me to apply for that workshop.

Colleen (04:38):

I was really lucky to be teaching at a time when there were lots of summer opportunities for science teachers. And, um, I went to NSF-funded workshops, I think probably every single year that I taught up till 2004. And then NSF changed their funding priorities, and now it's much harder for teachers to get workshops paid for. So, I was, I was really lucky. You know, it was the right time and the right place. And the place was UC Davis, which is kind of down the road from where I lived. So that made it convenient as well. And so I was really excited when I got in. It's like, okay, this is gonna be a great summer, but I had no idea that it would completely transform the way I think about thinking and learning. Yeah.

Colleen (05:32):

And, so that was a really big moment for me, attending that workshop. And the other big moment then was meeting David, who, at the time, he had the grant that funded all these workshops around the country, and he would go and visit each one. So he came to UC Davis, and he spent a day with us, and we had a barbecue in the evening. And I happened to sit next to him. And so I confided in him that I had been really wanting to go back to school and get a, at least a master's, maybe even a PhD in physics, because I had just had these burning questions for so many years, and with kids at home and whatnot, I was never able to go. But, UC Davis and Sac State, the two local universities, neither offered a program that would allow me to teach and go to school.

Mark (06:26):

Oh, yeah.

Colleen (06:27):

So he said, well, what would you do with a PhD? What would you do? And I said, well, I'd teach, I'd just be a better teacher. And he said, well, you should come to Arizona State University and be my student and do a PhD in physics education research. And I'm like, yeah. Right. In my dreams. And yet three years later, the opportunity presented itself and I jumped on it. I went.

Mark (06:58):

Yeah, that's awesome.

Colleen (06:59):

And I was his last PhD student. He had already retired, actually, just before I arrived, but they allowed him to continue to have one last student. And, so he stayed with me the whole time. And, boy, I learned a ton. I used to sit at his desk once a week for a couple of hours and talk, we would talk, but I would write like mad, because it was all so very wise and relevant to what I was thinking about and what I was working on. And I would go back and read my notes and, oh, maybe about half of it made sense to me, but I kept repeating week after week with that exercise with him. And I soaked up a lot of great stuff.

Mark (07:46):

What years were these?

Colleen (07:48):

I was there, I was his student from 2001 to 2007.

Mark (07:53):

Okay.

Colleen (07:53):

Yeah. I finished my PhD in 2007. I did the MNS program. I had the Master of Natural Science Program at ASU. Between 2001 and 2004. And then, I probably would've finished my PhD quicker if I had not chosen to study student discourse. And so I went into four different classrooms and videotaped for weeks and weeks. And then of course, I had to analyze all that data. So that part took a really long time. But you know.

Mark (08:28):

What an incredible opportunity you had at the very beginning of your, the start of your modeling tenure. You sat with the master. You sat with, with David Hestenes, who is the brain behind all of what has become modeling instruction today. And so NSF, he secured NSF funding for several years. 15. For 15 years. Yeah. And then, and then that ran out. And as I understand it, that's kind of when the origins of the AMTA began. And can you tell us a little bit about how it got started?

Colleen (09:14):

Sure. It was summer of 2005 that the final grant expired. And we had a huge number of people that came to the MNS program that year. They were being supported by that grant, so a lot of people were able to come from far away places. Including Brenda, I believe. Was there, because she and Larry were leading the, she and Larry Dukerich were leading the chemistry modeling workshop, which was right at the beginning of chemistry modeling. So

Mark (09:48):

For those who don't know, Brenda is my wife. <laugh>. Yes. Yes. So Brenda Royce is who she mentioned, Brenda and Larry Dukerich

Colleen (09:56):

And Larry Dukerich, and Brenda and I, in fact, go back even further because she and I were both at the UC Davis modeling workshops together. So there were a number of people there that summer that were UC Davis Modeling Workshop alumni, Patrick Daisley is another one. Mark Schober. There were a bunch of us. And so we were very invested in modeling. And we had really shared it widely with our colleagues. And so the thought that it was suddenly not going to be there anymore,

Mark (10:37):

The funding.

Colleen (10:37):

The funding and the workshops, the annual workshops. It really hit, I think it hit the old, if we can call ourselves old modelers, <laugh>, hard to think that younger teachers were not going to have, or newer teachers were not gonna have the opportunities that we had. And so, we went out to dinner and we talked about it and tried to figure out what we could do. And an organization, we need a national organization that can continue to do the work that this grant did, and we need to make it happen ourselves. So many NSF programs that are really fine programs just evaporate as soon as funding goes away. And we didn't really want that to happen. So the next day in leadership workshop, which many of these people were enrolled in, Patrick got up and announced, we formed the American Modeling Teachers Association last night, <laugh>, and you can be the first to join.

Colleen (11:50):

And I Hmm. Whipped out my checkbook and wrote my \$25 check. It was at the time, you could have a life membership if you joined in the first year. And paid the regular membership dues. You could have a life membership. So yeah, I wrote my check, and half a dozen other people did the same thing. And by the end of that summer session, we had, I wanna say, 25 or 30 members. So it started there, and it grew very slowly over the years, in part because there was no one to really mind the store, but there were officers, there was a president and a treasurer and so on. But when school started, all these people went back to work and they were busy doing work and other modelers were busy doing teaching.

Colleen (12:46):

I mean, we had this great teaching method that we could use that helped us and helped our students. And the thought about Yes, but helping the next generation of science teachers, it's not on your radar every day. Mm-hmm <affirmative>. Mm-hmm <affirmative>. But it emerged again every summer and new members joined. And in the first five years of AMTA, we had right around 200 members. We never asked people to renew their membership. They just, you know, they had paid their money whenever they paid it, and they were just still there. So no one was really trying to make this into something that was financially going to support itself. And at the five-year point, there were a lot of people that said, Hmm, can we really sustain this? Or has this lived its life and that's the way it's gonna be?

Mark (13:51):

Okay. I'm gonna project. I think that about that time you guys all realized that there needed to be some kind of managerial system put into place

Colleen (14:02):

Yes.

Mark (14:03):

Beyond just a president and a vice president and a treasurer. There needed to be somebody who was helping to keep it rolling during the year, during the school year. And otherwise and I happen to know, so I'm gonna ask, how did you become the first executive officer of the AMTA?

Colleen (14:28):

Well, I had at that point finished my PhD and gotten hired at ASU as an assistant professor. And, I got a grant right off the bat. I got a grant to develop middle school modeling. And a middle school master of natural science program that was basically patterned on the physics department's Master of Natural Science program. So things were going swimmingly until the economy collapsed <laugh>

Mark (15:01):

Yeah. And

Colleen (15:02):

Yeah. In 2008, you know it fell apart. And universities struggled financially as well. So while everyone else was sitting at home watching Barack Obama take his oath of office and give his first inaugural address, I was in a room with a bunch of teachers finding out that my college was being disestablished.

Mark (15:27):

Okay.

Colleen (15:28):

We had a little college that was just for science and math teacher preparation at ASU on the East campus. So that was being disestablished. We were being, the faculty there was being sent to a different college of education in ASU. And our dean at that college was not really interested in science and math education, and basically told us straight out, there are six of you, some of you will have to go, we'll figure out how that works.

Mark (15:58):

Wow.

Colleen (16:00):

So, because my grant was not in my college, it was in a STEM center on campus, which silly me, I never realized that means that the bulk of the revenue for the department was going to that STEM center instead of going to her College of Education. So she was unhappy about that, but I was collaborating with people across a bunch of departments and colleges in the university, and that was the appropriate place for it.

Mark (16:34):

Mm-hmm <affirmative>. <affirmative>. Yeah.

Colleen (16:38):

So my husband says to me, work, don't work. Do what makes you happy, <laugh>. And I talked to the engineering school and said, I would like to move myself, just as a research scientist into your department. I knew some people there. I was working with them on the grant. I'd like to move myself into your college and resign my tenure track position in the education college. Would you let me do that? So that I can continue to teach my grant supported classes and manage my grant? And they said, sure. So I resigned. And at the same time, knowing that AMTA needed somebody to be, you know, kind of minding the store, answering the emails, organizing workshops in the summer-time, making friends with people at universities who would host workshops and just kind of keeping things rolling. I went to the next board meeting of AMTA, I was on the board, as a member at large at the time. And I said, I'd like to make you an offer. I'll be your executive officer for free.

Mark (18:02):

Wow.

Colleen (18:02):

I'll do it for up to five years, and I won't pay myself a salary until you can afford to pay me a salary. And if I can't put AMTA on a solid financial footing in five years time, then I'm the wrong girl for the job.

Mark (18:21):

Hmm.

Colleen (18:23):

So, well, that was a great offer for them, services for free. You know, suddenly we're getting people to pay their dues. They're happily paying their dues, honestly. I mean, all we really had to do is ask. We have a website, we've got all the curriculum resources in one place where they're easy to download. And membership started growing.

Mark (18:51):

Sure.

Colleen (18:52):

So we went from 200 at that time and about \$5,000 in the bank to, by the time I handed off, 2,500 members and about \$300,000 in the bank. So yeah, we started paying, I mean, I got a grant pretty quickly, and started paying a salary first actually to Wendy Hehemann, who was our member services coordinator for many years. And then to me, and yeah.

Mark (19:25):

How long did you serve as executive officer?

Colleen (19:28):

I served as executive officer for five years. And then I have stepped in from time to time when XOs that have been hired, leave for various reasons, and they need someone to cover the job while they hire someone else.

Mark (19:48):

Yeah.

Colleen (19:49):

And, so I have done that for several times too.

Mark (19:53):

Okay.

Colleen (19:53):

But, yeah.

Mark (19:54):

So I've seen you referred to as a senior fellow with the AMTA. And so what does that mean? <laugh>,

Colleen (20:04):

You know, um,

Mark (20:05):

I'm not sure I understand that term. I'm sure there's a academic or business term that clarifies that, but tell me what it means, and especially for you.

Colleen (20:16):

Well, for me, it means to do what makes me happy, um, <laugh>.

Mark (20:23):

Okay.

Colleen (20:24):

Honestly, the title of Senior Fellow is very open-ended. It allows you access to people who are maybe potential funders or decision makers. It gives you a certain stature that allows you to speak for your organization. You know the inner workings, and you can talk about it with people that are potentially valuable partners. But it absolves you

of the day-to-day, sausage-making that goes into running a business.

Mark (21:08):

Right. Okay.

Colleen (21:09):

So it allows you creative space to do things that are of value or potential value to the organization. Most senior fellows in nonprofits do research and some also do development, grant writing, and fundraising. But, it's a vague enough title, which can make the job whatever you want.

Mark (21:37):

Yeah. Yeah. Gives you leeway.

Colleen (21:39):

Yep.

Mark (21:39):

That's awesome. Wow. That's very cool. Gosh, you've been involved with modeling since the beginning and AMTA over 20 years. What are your dreams for the future of modeling and specifically AMTA?

Colleen (22:04):

Oh, gosh, that's a really big question.

Mark (22:07):

Okay. <laugh>, I know you've thought about it.

Colleen (22:11):

I think about it all the time. And, the big limit, as with almost every organization, is funding. There are so many things that we want to do, that we want to be able to do, but with the really limited funding that we have, COVID hit us pretty hard.

Mark (22:35):

Yeah.

Colleen (22:36):

And with the changing climate for funding for teachers for professional development, if I could wave a magic wand, I would make 10 million bucks happen. I don't have 10 million bucks. I don't know anybody who does. So I chip away at that as I am able by writing grants and, a fraction of whatever you spend in a grant, gets to be taken by the organization as what is called overhead. So to keep the water running and the lights on basically. And so I do that. And, when you write a grant, you have to propose a project that the funder would really like to see happen.

Mark (23:31):

Right.

Colleen (23:32):

So, for example, right now, I just finished writing a proposal to incorporate AI into modeling instruction. And the

NSF has a very narrow group of things that they will fund right now for education, and that's one of them.

Mark (23:50):

Interesting.

Colleen (23:50):

So we could go off on a whole hours worth of conversation just about AI and whether or not

Mark (23:56):

Oh, yeah.

Colleen (23:56):

Using it. But, you know, Pandora's box is open, it's out there.

Mark (24:01):

Yeah.

Colleen (24:01):

And so, given that it's there and it's in the hands of our students, how are we going to use it well and use it responsibly and teach them to use it well and responsibly.

Mark (24:12):

Yeah. That's great. That's good.

Colleen (24:14):

So if we get that grant, we have to do the project, this is the thing about grants. They give you money to do a certain thing, then you have to do the thing, but you also get that overhead that will just go into the organization's general fund and help it.

Mark (24:33):

Right.

Colleen (24:33):

pay for the party.

Mark (24:36):

Yeah.

Colleen (24:37):

So, there's a certain amount of that that I do. And I've always got my eyes open and my ears open for foundations, private foundations, private individuals who want to do good, and then I see whether or not they wanna do good for science education, and then I let 'em know about AMTA.

Mark (24:56):

Yeah. Wonderful. That's really great. So, more about your thoughts on where the AMTA is headed besides AI.

Colleen (25:08):

That's just something that there's funding for, but I think there's also a demand, by teachers, for modeling instruction for math. Many science teachers are math teachers too. They would like workshops and resources that are optimized for teaching middle and high school math, and then math and science modeling for elementary teachers. We've had many requests over the years, for elementary teachers that could have a workshop that was customized for their needs. There are a lot of elementary teachers who attend middle school workshops. Just as before there was middle school modeling, there were a lot of middle school teachers who attended high school workshops.

Mark (25:58):

Sure. Yeah.

Colleen (26:00):

And I've started making inroads into third through fifth grade, just kind of developing a skeletal outline of what that might be. And I've been working for the last year with some elementary teachers on what that might look like. I never taught elementary. I taught middle school for a while. I taught high school for a long time. And I know what works in those learning environments, but for middle school, it has to be different. You know, we need people who know about elementary school to step up and... There are modelers who know about elementary school.

Mark (26:42):

I've not heard of any programs for elementary educators, for modeling specifically

Colleen (26:48):

There aren't really programs that are aimed at elementary school modeling instruction for science, but there is a demand. Put it baldly, there's a market for that. If we could develop it. If we build it, they will come.

Mark (27:07):

Right. Interesting.

Colleen (27:09):

And schools want substantive science education for their students in K-8. They know it's important. So that's one thing I would like to see us be able to develop. Another thing that actually I'm starting to work on now, is a journal, an AMTA journal, an electronic journal. We're not gonna print print magazines and mail 'em to people. That's just way past what we can afford. But there are many modelers who do classroom research.

Mark (27:45):

And so when you say journal, are you thinking of like a digital magazine?

Colleen (27:50):

Yep. A peer reviewed, digital magazine.

Mark (27:53):

Huh.

Colleen (27:53):

Yeah. There are plenty of modelers who do classroom research. They should have an outlet to publish that. Every year people graduate from Arizona State's Master Natural Science Program. And as a part of their graduation

requirement, they need to do action research and then they write a giant report, 70 pages or so, and give a big colloquium and, and then boom, it's over. And nobody reads that stuff. Nobody reads it. But there are committee members and they find out great stuff.

Colleen (28:28):

And I teach a class for them that's designing action research. I teach them quantitative qualitative methods for research, and I encourage them always to write that up for a journal. When you're done, just all you have to do is trim it down, you know, make your 70 pages into 20 pages that a teacher would like to read and then publish it. And most of them are just so tired. At the end of a program, it's like, yeah, I should do that. And it goes on the list of, you know, that list on your desk of the things you never get to?

Mark (29:01):

Yeah.

Colleen (29:04):

That list. And so why don't we give them an outlet? Why don't we lower the bar? Why don't we make it really explicit for them, about how they could make their research into something publishable and then get it out there for all modelers to benefit from.

Mark (29:23):

Yeah. Wow. That's really an ambitious, and I think a very intriguing idea.

Colleen (29:29):

We'll see how it goes. So this is something that might be, this is, you know, dreaming and scheming. You and I are dreaming and scheming right now. So another thing that I wanna develop is middle school astronomy modeling. And I think we've got a grant for that. I've got a grant into NASA, and I'm a little concerned because, you-know-who cut NASA's budget. But Congress still hasn't voted on that. So it's still alive. We're not dead yet.

Mark (29:59):

Yeah.

Colleen (30:00):

Yeah. What else? What else? I wanna develop several pipelines. I'm not gonna be here forever, and I need people to be able to do the kind of stuff that I can do in my spare time, because I'm quote retired.

Mark (30:16):

Yeah.

Colleen (30:16):

Like writing grants. I need some people to write grants. I need people to do the development stuff.

Mark (30:27):

If one of our listeners is like, you know, I've always thought that maybe that would be something I could do, would you be willing to help them in the process of learning how to do grant writing? 'Cause I know it's not something you just do. You know, it's something you gotta learn,

Colleen (30:47):

But you can't learn to do it unless you just do it. I mean, it's kind of like writing. You learn to write by writing.

Mark (30:55):

Yeah. I got you.

Colleen (30:55):

So you write something and then, I give you feedback and then you rewrite it and I give you some more feedback and you rewrite it. And pretty soon you've got something that's just as good as I could write.

Mark (31:08):

Awesome.

Colleen (31:09):

I've done this with a couple of people and they've become good grant writers, but they're grant writing for their initiatives, not necessarily AMTA's initiatives. And we need people who will write for initiatives that will help grow and sustain AMTA.

Mark (31:30):

Is it okay to share your email with on this podcast? It's colleen@modelingmodelinginstruction.org. C-O-L-L-E-E-N At modeling instruction.org. And if this is something that you'd be interested in contacting Colleen about, and maybe getting involved that would be great. Send her an email and say, Hey, let's get together, let's get to know each other.

Colleen (32:04):

Let's, do. I have a Zoom room. I can

Mark (32:06):

Awesome.

Colleen (32:07):

And I can talk, we can talk. Let's talk. Absolutely. And if there's anyone who wants to develop curricular resources, it's sort of like laundry. It's never done. You develop some, and then a few years later, they need to be redeveloped or extended or modified. We are constantly in need of folks who like to write student-facing materials.

Mark (32:33):

Mm-hmm <affirmative>.

Colleen (32:35):

If you've done any research in your classroom and you think you found out something cool that other modelers could benefit from, let's publish that in our new journal. You know, do you feel like helping out with elementary modeling curriculum? Let's do it. Do you love astronomy? And maybe you teach middle school and you would love to do a killer astronomy unit in your middle school classroom. Let's talk.

Mark (33:08):

Great.

Colleen (33:09):

We've got all these potential things. Yeah. And if you've got good ideas I haven't thought of, let's talk about that too. Yeah. Because most of what I do comes from conversations with modelers.

Mark (33:25):

And there's an army of these wonderful people. Every modeler I've talked with is just a fascinating and invested individual in good education. And, you know, there's a resource out there that you all who are listening carry with you. And we'd love to see you get more and more involved with what the efforts of AMTA are. And it's an exciting time. You know, we have a new executive officer. Caroline is, in my opinion, what I've seen, is doing a very good job and really taking the bull by the horns. They're involved in developing and improving the existing online presence with the website. And I know they're in process of reforming. And by the way, on the website are a lot of resources like Colleen's been talking about that have been developed. And that needs to be a continuing resource there, you know, a cache of resources. And so your contributions would be wonderful. Colleen, is there anything that we've not talked about that you desperately wanted to talk about?

Colleen (34:45):

If there's, if there's any one thing that I think we don't consider very often, it's that modeling has evolved tremendously since the time that Brenda and I took our first workshop in 1998. Modelers today, and modelers in 1998 have many, many things in common, but the way we do them has evolved. And I don't think that people know the history, where we've been and where we are now, and how it got that way.

Mark (35:21):

Well, I think this conversation today is a good one to have to help people understand a little bit more about the history and the evolution of modeling instruction over the last 30 years.

Colleen (35:35):

But even classroom practice has evolved.

Mark (35:38):

Yeah.

Colleen (35:38):

The way Brenda and I learned to do modeling instruction with our students, that's not how it's done anymore. I mean, various characteristics are the same. And if you walked into a classroom and you learned modeling in 1998, you would still recognize it today, but you would see teachers are doing it differently. The teachers have made it better.

Mark (35:59):

Yeah.

Colleen (36:00):

You know, it has improved with use. And David Hestenes will be the first person to tell you that he didn't invent modeling instruction as AMTA does modeling instruction. He invented modeling theory, but teachers invented and continued to refine modeling instruction.

Mark (36:18):

That's awesome.

Colleen (36:19):

And they're still doing it.

Mark (36:20):

Yeah. Which is how it should be. It's not just one person or a few people directing. It's the evolution of the methodologies being expressed in the classroom.

Colleen (36:34):

Yes.

Mark (36:34):

And all of us learning from that,

Colleen (36:37):

And students are changing, and the teaching environment and the learning environment are changing, not always for the best, but they're changing. So we need to change too. Teachers are very adaptable people and so is modeling. Modeling is a tool for them, and they are expert tool users, and they have modified that tool as needed to continue to do brilliant teaching.

Mark (37:06):

Colleen, I gotta tell you what a joy it's been to talk with you today. I am so glad you took the time to do this and spend this time and share from your really wonderful experiences. Really quickly before we leave, what's on your plate this week?

Colleen (37:26):

This week I have a lot of catching up to do because next week I'm gonna go and Melissa Girmscheide and I are going to co-lead the Leadership Academy for new modeling workshop leaders at ASU. So it's been a busy time.

Mark (37:42):

And you're just plugging away so wonderfully. We really appreciate your efforts and the contribution that you make. We really do. And I just wanna say thank you.

Colleen (37:55):

Oh, well, you're entirely welcome. You know, Mark, I'm just doing what makes me happy.

Mark (37:59):

That's awesome, <laugh>. That's great. I hope you have a great week.

Colleen (38:04):

Okay. You too. Thanks a lot.

Mark (38:06):

Take care.

Colleen (38:07):

Bye-Bye.