KENNESAW STATE UNIVERSITY ORAL HISTORY PROJECT

INTERVIEW WITH ANA-MARIA CROICU

CONDUCTED, EDITED, AND INDEXED BY THOMAS A. SCOTT

For the

KSU ORAL HISTORY SERIES, NO. 133

FRIDAY, 2 OCTOBER 2015

Kennesaw State University Oral History Project
KSU Oral History Series, No. 133
Interview with Ana-Maria Croicu
Conducted, edited, and indexed by Thomas A. Scott
Friday, 2 October 2015
Location: Science Building, Kennesaw State University

TS: Ana-Maria Croicu was the 2015 recipient of the KSU Foundation Distinguished Teaching Award. Ana-Maria, why don't we begin with your background? I know you grew up in Romania and went to college there. But maybe you could talk about your educational background and how you got interested in mathematics and engineering and those good things.

AC: Hi, Tom! I am delighted to be here today to interview for the KSU Oral History Series! Thank you for your kind invitation! I was born, raised and educated in Transylvania, Romania, a land rich in beauty and well known for its medieval towns, mountainous borders and castles. Education-wise, I hold a B.S. and M.S. degree in electrical engineering, a PhD in Pure Mathematics and a PhD in Applied and Computational Mathematics. I developed a strong passion for mathematics in middle school. In fact, I could say that I owe my career in mathematics to my middle school math teacher, who 'discovered' my talent for this subject matter.

TS: Did your parents have any kind of scientific background?

AC: I am proud to affirm that there exists a strong scientific background in my family. My dad is an outstanding automobile engineer, who published 2 books in the field. I am convinced that I inherited the affection for engineering from his side. On the other hand, my mom was quite devoted to mathematics until high school, when she decided to become an English teacher. I was always encouraged by my parents to pursue a career in the STEM disciplines.

TS: So an English teacher obviously teaches a foreign language in Romania. Did she study English in college or how did that work out?

AC: If I am not mistaken, my mom studied English language since she was a second grader.

TS: Oh, I see. Is English the universal language then?

AC: English is a universal language, but so is Math!   Mathematics is the only language shared by all human beings regardless of culture, religion, or gender.

TS: So did your Mom focus on American studies or English studies?

AC: She focused on English studies, Shakespeare and his era.

TS: That's fantastic. And your father made a career of engineering then. Did he get his degrees in Romania also?

AC: He got his engineering degree in the historical and beautiful city of Brasov, Romania.

TS: So you had a strong intellectual background growing up it sounds like.

AC: I am fortunate to come from an intellectually rich family.

TS: Great. So you start out at . . .

AC: I started out at the Technical University of Cluj-Napoca and one year later at the Babes-Bolyai University of Cluj-Napoca.

TS: And so this is like one big university on the same campus but different colleges or areas within the university or how does that work?

AC: The Technical University and the Babes-Bolyai University are two separate universities with separate campuses.

TS: Okay. So you started out in engineering when you started to college and you got your engineering degree in 1994, I believe?

AC: I was awarded a BS degree in Electrical Engineering in 1994 and a BS degree in Mathematics in 1995.

TS: So was this like a double major that you're getting?

AC: These are 2 different B.S. degrees. To fulfill the requirements for each degree, I had to take 30 credit hours each semester, 15 credit hours for the engineering degree and 15 credit hours for the mathematics degree.

TS: Had you decided at that time that you didn't want to practice electrical engineering and that you wanted an academic career? Why the switch? Obviously, you had a lot of mathematics in electrical engineering.

AC: I elected to pursue an electrical engineering degree in 1989 for a simple reason. In communist Romania, there were better career opportunities for engineers compared to other professionals, such as teachers. However, teaching was still my number one passion. After December 1989 [when 42 years of communist rule ended], college students have been allowed to pursue more degrees if they want to. I immediately took advantage of this opportunity. I decided to pursue a mathematics degree, which would give me the training needed to teach, too.

TS: So you're saying while the communists were in control you couldn't pursue a second degree?

AC: No.

TS: What was the rationale behind that?

AC: I believe financial reasons were the rationale, as education was free under communism.

TS: Oh, free education. So they didn't want to pay for a second degree.

AC: I believe so. After December 1989, a door has opened for college students who wanted to pursue more degrees.

TS: Did it remain free?

AC: It remained free for a while.

TS: A while. But not anymore?

AC: I don't think it's valid anymore. State colleges in Romania charge tuition for a few good years now.

TS: Okay, so you got your bachelor's degree, but at the very same time you were working on a master's degree in electrical engineering?

AC: That's correct.

TS: So it sounds like you're already thinking about college teaching.

AC: Of course!

TS: Okay. So, let's see, you got your first doctorate in Romania also. So you just kept going straight through school then. And so about 2001 you get a PhD in pure mathematics.

AC: I was awarded a PhD in pure mathematics from the Babes-Bolyai University with a dissertation in the area of non-linear analysis.

TS: And non-linear analysis means what?

AC: Non-linear analysis is a theoretical sub-field of mathematical analysis, an area that is concerned with connections between mathematical tools that do not exhibit the nice properties of lines. I think everybody can imagine a line, a straight line and all its nice properties. Non-linear is the opposite, i.e. with non-intuitive properties.

TS: Okay, no straight lines.

AC: No straight lines.

TS: No crooked lines either.

AC: Everything becomes more difficult to visualize, explain, and justify in non-linear analysis.

TS: Okay. You're getting into rare atmosphere. So you did your doctorate, and you're not worried about whether there's any practical application to all of this, I guess, or are you?

AC: While working on my non-linear analysis dissertation in Romania I was always wondering on "how can we apply this theory in practice?" Due to the nature of the PhD program, I was concentrated and concerned to 'discover' new results in mathematics, but thinking about its practical impact.

TS: So you're already thinking in terms of applied mathematics.

AC: Mathematics in Romania at that time was under the Russian influence. Mathematics was very rigorous, and it's still very rigorous these days, too. I mean, when you did mathematics, especially for a PhD, you needed to concentrate on advancing mathematics. But I always wanted to employ mathematics to solve real life problems.

TS: And you've also got all that background in engineering.

AC: I wanted to use all of my potential and contribute in a meaningful way to the community. That's why I considered a second PhD in applied mathematics.

TS: Right. So that brings you to America, right to Florida State, isn't it?

AC: Florida State University, in 2000.

TS: Okay, so you applied and had no trouble getting to America in 2000?

AC: Luckily, I had no trouble getting to America. In fact, I've been very fortunate to have very special people and mentors at Florida State.

TS: I was going to ask you about that with regard to Romania, but if you want, we can just talk about it with regard to Florida State. Who were some of the mentors that you had?

AC: The first person I met at Florida State was Dr. [I.] Michael Navon. He was born in Romania, too. However, he left Romania when he was seven years old; he lived in Israel, France, South Africa, and finally in America. He was the one who received my application at Florida State. Because he was working in the optimization area, and I had already an interest in optimization, he immediately . . . .

TS: That's another term you're going to have to explain in a few minutes.

AC: [Laughter]. He immediately called me in Romania.

TS: Oh, he did.

AC: Yes. He called me at home and asked me if I would consider joining FSU. Working with a professor who is well known in an area which overlapped with my own research interests was not something I could refuse.

TS: And he's read your papers.

AC: That was quite impressive, to be honest. Therefore, I came to the US especially to work with Professor Navon. However, when I arrived at FSU, Professor Navon introduced me to a colleague of his and indicated that they both would like to co-advise me.   Professor [M. Yousuff] Hussaini was, at that time, the director of the Computational Center of Florida State. Two impressive professionals to mentor and guide me! What else could I ask for?! No doubt about it, Dr. Navon and Dr. Hussaini both had a very big positive impact on my future career.

TS: So you had a strong international faculty it sounds like at Florida State.

AC: Yes, and I was fortunate.

TS: How did your research change once you get to Florida State and were in an applied mathematics program?

AC: It was a shock to me at first.

TS: Was it?

AC: Yes, I couldn't imagine that solving real-life problems is so different from doing mathematics. In mathematics one must prove everything. Proofs are not always needed when one solves real life problems. It's acceptable to have computations and simulations to validate results, and it is not necessarily needed to prove everything theoretically. In fact, there may be solutions found in practical life that cannot be proved to be valid.

TS: That you can't prove it?

AC: Yes. In theoretical Mathematics, it is the end of the road if things cannot be proved valid. But in Applied Mathematics, if you're able to validate your computations, then you can really move forward.

TS: Even though theoretically you can't explain why it works?

AC: Exactly.

TS: But you know it works.

AC: You know it works, so you can use it to move forward and build on it.

TS: And maybe you can figure out why it works later on?

AC: It would be wonderful to be able to figure it out rigorously at some point.

TS: I'll have to confess that my last mathematics course was in 1961. I took the first two calculus courses in college.

AC: Oh, a lot!

TS: Well, I got through those two courses in good shape, I guess, but I think I was in that place that you're talking about. I knew how to work the problems, but it didn't make sense to me why it worked. It was at that point I decided I think I'm going to go a different direction.

AC: I see.

TS: But probably I should have stuck with it. Although I'm happy I ended up in history. Okay, so you got over your shock at not necessarily being able to prove why things worked or maybe even caring at that point when you're trying to apply it to real world problems.

AC: In applied mathematics the goal is to solve the problem you have in practice somehow.

TS: Yes. Okay, what is optimization?

AC: Optimization is a process usually applied to make things work better, cheaper, safer, nicer, etc.

TS: So optimization really means the optimal way to do something at the least cost and greatest efficiency.

AC: Very nicely said! Only looking at cars, for instance, the engineers and mathematicians try to design them, so their gas consumption is lower and lower.

TS: Yes, right.

AC: This is just a very simple example.

TS: Okay, so you do that. So tell me about your doctoral dissertation at Florida State ["Single- and Multiple-objective Stochastic Programming Models with Applications to Aerodynamics," 2005].

AC: At Florida State University, I focused my efforts in optimization and control. Control is an optimization problem where basically one drives the solution to a desired value. I employed optimization and control tools and applied them to aerodynamics. I was concerned with the airfoil optimization, airfoil being a cross-section of the wing.

TS: Oh, yes. I know that Lockheed had some major problems over the years over the shape of their wings and the problems with the Pentagon and trying to reduce the weight of the wings, particularly for the C-5.

AC: Shape optimization is still an ongoing problem in aerodynamics. Engineers never end their searches for better solutions.

TS: I guess not.

AC: Engineers and mathematicians work on optimization/control issues every day, and they then discover new or improved solutions.

TS: Yes. I guess their problem at Lockheed in the 1960s was they could reduce the weight, but the life of the wing was greatly reduced when they did so. So that's what you're doing then. You're working on these technical type problems.

AC: Yes, and what you just mentioned is a perfect multi-objective optimization problem, an optimization problem with conflicting objectives. On one hand, one seeks the smallest weight, while on the other hand one seeks the strongest wing. These are conflicting objectives. One either can have one or the other, not both in the same time. So you need to figure out the best tradeoff. Luckily, there are many, so-called, Pareto-optimal solutions available.

TS: I've heard some horror stories from Lockheed engineers about dealing with the Pentagon on these things. I think at one point they came up with a more efficient engine, and the Pentagon said, "Well, that's fine, but you've still got to reduce the weight." So at any rate, that sounds very practical and much applied that you're doing at this point. I guess the next question is, why didn't you go to work for Boeing or someone like that when

you got through your program? What is it about teaching and research and an academic career that appealed to you more than, say, going out and making a lot of money for Boeing?

AC: I think it goes back to my mother because I definitely inherited her passion for teaching. She was an excellent teacher. Now she is retired, but she adored teaching and everything that was student-centered.

TS: At what level did she teach?

AC: She taught all levels from primary to middle school to high school, but finally, she ended up teaching high school students. So many things in her life inspired me! She was an outstanding teacher, principal, and superintendent! She inspired me at all levels, horizontally and vertically!

TS: So she's definitely one of your mentors.

AC: Yes. Just watching her, I knew I wanted to follow in her footsteps.

TS: I'd like to put her name in the interview if you don't mind.

AC: It would be so nice; I would love to. Her name is Margaret, and the last name is a little bit uncommon for Romanians. I'm going to spell it for you, Ghiurutan.

TS: That's not a Romanian name?

AC: It is a Romanian name, however, it's not a very common one.

TS: What's your father's name?

AC: His name is Traian, like the Roman emperor.

TS: Is that who he is named for?

AC: Yes. [Laughter]

TS: So you were inspired by your mother, and you wanted to be in the academic world.

AC: This was my passion.

TS: You get your second doctorate, which is very unusual.

AC: It's very unusual, indeed.

TS: And then I guess you started looking for a job. What is it that attracted you to Kennesaw?

AC: I only needed a second to fall in love with Kennesaw State University. It's unbelievable. I still remember those moments. It was at the end of August or maybe the beginning of September when KSU posted their announcement for an assistant professor in the applied mathematics.

TS: This would have been 2005?

AC: It was August-September 2005.

TS: Then you came here in 2006.

AC: Yes, you are right. KSU's job posting was among the first announcements that came up on the MathJob's webpage.

TS: MathJobs.org?

AC: Yes. It was among the first postings, because usually mid-October is when [they first appear].

TS: Oh, we got the announcement out quicker than other folks.

AC: Very quick! KSU was looking for someone with a passion for teaching who was also doing research in the applied math area. I thought, "That's me. Sure, that's me!" In addition, I loved the idea of being so close to downtown Atlanta and living in a small family oriented community. I said to myself, "This is the perfect place for me." So I fell in love with KSU immediately. I even confessed to my husband, who asked, "Don't you think it's too early to draw a conclusion yet?"

TS: Too early?

AC: Too early to claim that Kennesaw is the perfect fit for me.

TS: Oh, I see. See what other jobs are out there.

AC: Maybe something even better will come up.   October and November 2005 came, and I submitted my applications to places where I thought I would fit in nicely.   I received a few phone calls in December, one of them being from KSU. Then I was invited for an on-campus interview. In fact, I had six on-campus interviews in two weeks.

TS: Six interviews in two weeks?

AC: Yes.

TS: Usually interviews last a couple of days at least.

AC: It was interview after interview after interview. I was in my sixth interview, and I got phone calls /job offers from three universities in a day.

TS: Three?

AC: They were all offering me a job.

TS: I assume that some of the interviews were with Research I universities, maybe?

AC: Some of them, yes.

TS: Of course, Kennesaw is now designated a comprehensive university, but it wasn't in 2005. So you had to make a choice between a place that was more teaching-oriented and ones that were more research-oriented.

AC: Yes, that's right.

TS: So why Kennesaw?

AC: Just because of my love for teaching.

TS: That's what you wanted, isn't it?

AC: I wanted to dedicate a good part of my time to teaching, as I simply adore teaching. And, there was a second reason, as well. I wanted to have a happy family, and I felt that Kennesaw was exactly the nicest and safest place to raise a family.

TS: Where did you meet your husband? Was that at Florida State or did he come with you from Romania?

AC: Yes, we have been together, first as girlfriend-boyfriend, since 1989.

TS: In 1989, when you started college?

AC: Since we started college, you are completely right. We were both students and colleagues at the Technical University [of Cluj-Napoca]. That's the place where we met, and we fell in love. Five years later we decided that is time to start a family together.

TS: Great. How many children do you have?

AC: We have two wonderful children. We have a girl and a boy and we're so happy.

TS: Great. So you thought [that Kennesaw] would be a good place for them to grow up?

AC: Yes, quiet, nice, safe and charming.

TS: They're probably just about grown up now, aren't they?

AC: Oh, yes. Middle school and elementary school now.

TS: What's your husband's name; can we put that in?

AC: It's Sorin Cristian, I call him Cristi (Romanian nickname), but others call him Chris.

TS: So he said, "Wherever you want to go, I'm going to go too?"

AC: As a matter of fact, yes, he was very supportive all the time. He just said, "Atlanta is a nice place, and if I need to be looking for a job, there are many opportunities for me as well. So I'm not worried about our move."

TS: Did he keep on going for his master's and doctorate as well?

AC: Not really. We were under communism when we started college, and we graduated under the same curriculum that was in place before December 1989.

TS: Oh, no change then.

AC: There was no change when we graduated. We both had five years of engineering school. This is equivalent to a master's degree in engineering. He just wanted to start working and design interesting electronic devices as soon as possible.

ST;   I guess in engineering he can go where he wants to, pretty much.

AC: Yes, he's a very skilled engineer. He designs everything from scratch and builds it up to the final product all by himself. He is pleased with his job as it challenges him every day.

TS: Is he in business for himself?

AC: He works for a company in California.

TS: But he can do it from wherever he wants to be.

AC: Yes, he can work from home.

TS: Fantastic. That sounds like a great life.

AC: I guess so!

TS: Okay, you arrive here in 2006, so you've been here nine years now. You've been remarkably productive while you've been here. It sounds like when you started out you were teaching pre-calculus and calculus almost exclusively. Is that what they hired you to do?

AC: This was the policy, and I think it's still the policy in place now in our department; when you join the department, you teach lower level courses first. As you build your experience, you move to upper level courses, as well.

TS: Right, the last one hired teaches all the basic courses. Now you're teaching more of the upper level classes?

AC: To be honest, I still teach pre-calculus and upper level courses.

TS: Do you?

AC: Yes.

TS: So you like teaching.

AC: I like teaching, and pre-calculus is just an elementary course that everybody needs to take.

TS: Everybody who's a science or math major, you're talking about?

AC: I think it is part of the General Education [curriculum], if I'm not mistaken. [Editor's note: the section on General Education Core Requirements in the current undergraduate catalog stipulates that students in most majors have an option of taking Introduction to Mathematical Modeling or Algebra or Trigonometry or Pre-Calculus or Calculus I to complete Area A2 (Math Skills). However, STEM majors fulfill their Area A2 requirement by taking one of the last three (Trigonometry or Pre-Calculus or Calculus I)].

TS: We wouldn't have any history majors if they had to start with pre-calculus!

AC: I teach majors from business and other social sciences areas as well.

TS: So you teach a variety of students then.

AC: Yes. But recently I teach pre-calculus only online.

TS: That's something we can talk about too because you pretty much developed that online course, didn't you?

AC: Yes, I did.

TS: And you mentored other people teaching online courses. Do you want to talk about that a little bit?

AC: I've been involved in online teaching since 2007—early on after I joined KSU. At that point we did not know what we were doing—if online learning was going to have any success or not. I know it was just in the infancy stages. I was involved in all kinds of training, how to develop an online course, how to review an online course, and what's needed for online learning. So I started to develop my own pre-calculus course, let's say, having a feeling that online learning is going to be the future. It's so convenient for students. Students have jobs and family obligations. Just having the flexibility to work when you have the time, it's going to be very appealing to our student body.

TS: You don't have to battle for a parking space.

AC: Yes, it's true. And if you need to study at 6:00 a.m., you can do that. If you need to study at night, you can do that, too.

TS: What have you found? Are we attracting students from all over the world with online courses or are they all local?

AC: I've seen more and more non-local students. I have seen students from Texas and Michigan, just to give you some more insight. I don't think I have taught any international students yet

TS: What have you found about online students as compared to those that you see in the classroom? Are they the same or are they different?

AC: Students remain students no matter what. Some students master the skills in no time, and unfortunately, others fail repeatedly. Some students take the class with the intent of actually learning; others take the class just because it is required for their major. In

addition, online learning is not for everyone. It all depends on how motivated a student is to do well.

TS: I would think that it would be harder for people taking an online course to do the work day after day after day when they don't have to be in class.

AC: Yes, there is a certain discipline involved.

TS: Yes, self-discipline.

AC: Self-discipline.

TS: So they either have it or they don't, and if they don't, they're probably not going to pass the course.

AC: It's not easy to succeed in the online environment.

TS: We used to run into the same thing when I was teaching the methodology class in history. As long as they had a reading assignment for tomorrow, they were going to do the reading assignment and do well on the quizzes and all those things. But when you got to the point where they had to go out on their own and do a research project, some people never did finish it. Once they were on their own they started thinking, "I've got a quiz in math tomorrow. I need to study for that." Then they keep putting things off and off instead of doing them. Most people figured out eventually that they had to get the job done, but some people would never get it done unless somebody was over them telling them what to do every minute.

AC: Yes, of course.

TS: I think that would be the same thing with the online courses. If you're not self-motivated and self-disciplined, you probably ought to be in the classroom.

AC: Yes, that is a big problem because students think they have the entire semester to work on the course, but in fact if you don't spend time today, you may not be able to do something else that is needed tomorrow.

TS: Yes. So you went through all the training and, basically, were the first one to go through all that in the Math department?

AC: I think I was among the first ones.

TS: Yes, so now you've got a role of mentoring others as well.

AC: I've been invited to be part of a KSU leadership team to review online courses and make sure they meet certain standards for online learning. I have reviewed a good number of online courses up to this moment, probably more than fifty.

TS: More than fifty?

AC: Yes.

TS: Wow. Well, let's talk about your teaching philosophy and what you've been doing in the classroom that made the case this year for you to get the Distinguished Teaching Award. I love the quotation that you put in your application of "Teach me, I forget. Show me, I remember. Involve me, I understand." You say that's an ancient Chinese saying?

AC: Yes.

TS: Does that become the focus for your teaching, do you think?

AC: I think that's the focus of my teaching.   I motivate the students to realize that learning is an active process rather than a passive one. I have learned that my mission is not only about teaching the students various concepts, but helping them develop logical reasoning skills and think independently. I view my role as a facilitator who exposes the students to the wonderful world of math, inspires the students to gain appreciation for math and its wide areas of applicability, and ensures that each student maximizes his/her learning and develops life-lasting reasoning and ethics skills.

TS: You talked in your application for the award about motivation, and you tied it in, I think, with making students know that you care about them. Do you want to talk about that?

AC: Effective teachers facilitate learning by truly caring about their students' engagement and motivation. I believe a good personal relationship between the professor and each student has a positive influence on students' success. That's why I always make myself available to the students physically and virtually. I make an effort to learn students' names as soon as possible. To provide a more comfortable environment, I always show my students confidence and enthusiasm. This way the students know that I care a lot about their individual needs. I learned that when a teacher makes time for the students, then the students make time for the subject matter and are likely to be strongly motivated to learn. A positive classroom climate can definitely energize a student's learning.

TS: It's common sense, isn't it?

AC: Yes, I think so.

TS: I was also impressed that it looks like you've done a lot of reading about how to teach and the philosophy of teaching and all those kinds of things. How far back does that go?

AC: The most important strength of my pedagogy is that it is based directly on research and is continuously adapting as new developments in learning sciences emerge.

TS: I think that's very admirable that you're looking at the literature.

AC: Self-reflection is crucial to both teaching and learning. Over the course of my career, I have developed activities and assessments that help me refine and improve/enhance my classroom performance/teaching skills. Each semester is different compared to the previous one. I'm always experimenting with new strategies and hopefully discovering new paths.

TS: Right—new ways of doing things.

AC: Yes, new ways of doing things. Even if it's a small positive change, it's an improvement and a better learning experience for my students.

TS: How do you handle it when students come in with different levels of knowledge in mathematics? Do you run into that—some people know a lot, while other people know next to nothing about calculus?

AC: Yes. That's normal. Sometimes you have students with different backgrounds.

TS: How do you handle those different backgrounds, particularly in an area like mathematics, where if you don't get the concepts the first couple weeks of the semester, you might as well give up this semester and try again later? Do you teach to the middle or do you give a lot of individual help to people that are behind or how do you do that?

AC: I'm just trying to teach to the middle, as you said, to be where the average should be and, of course, address concerns/needs on both sides. What I like to do the first month of each semester is to relate the new course to its pre-requisites. I strongly encourage students to go back and review the key concepts from the previous classes. In my teachings that's fundamental.   As I introduce a new concept, I immediately connect it to other concepts that students have learned. I use prior knowledge a lot in order to facilitate student leaning. When I refer to prior knowledge, I explain the conditions of applicability; provide real life examples; and point out differences, as well as, similarities.

TS: Aren't pre-calculus and calculus classes taught mainly by full-time faculty members or are we using a lot of adjuncts in these courses?

AC: These courses are taught by full-time and part-time instructors, as well.

TS: So probably in pre-calculus you have more adjuncts and in calculus more full time?

AC: Yes.

TS: So you have at least an expectation that if they've taken pre-calculus they know this and that.

AC: We do have this expectation. However, forgetting is normal. That's part of the learning process. You learn new things, and you forget old things.

TS: So that's where you say, "Go back to the basics."

AC: Just go back and revisit because it's something you need to know to move forward. And if you learned it once, it may take just a few minutes to revisit.

TS: You already know it.

AC: Yes.

TS: It sounds like you've spent a lot of time too on trying to make it as clear as possible what you've got to do to make an A and so on in the class. Could you talk about that?

AC: The first day of any semester is dedicated to setting my expectations for the class and clearly articulating my objectives. The learning objectives, which are always included on my syllabi, are student-centered, broken down to the tasks, described using action verbs, and measurable. They clearly communicate my intentions to students and give students the information that helps them monitor their own progress. Another way that I make my expectations clear is to use rubrics or samples. I usually like to provide samples rather than rubrics, as mathematics cannot always be evaluated by describing the levels of quality. However, samples of work are more descriptive. Using the rubrics/samples provide several advantages to both students and myself. They help ensure that my grading standards remain consistent across a given assignment, help students monitor and assess their progress as they work toward clearly explained goals, and reduce student uncertainty and anxiety.

TS: It sounds like you are available a lot for students too. I guess it is different today. I know it's a different world nowadays where they can contact you by e-mail or send you a text message or something of that sort. In the old days we had to be at the office a large number of hours to give students a chance to drop in. But that's not so important nowadays, I guess.

AC: No, it's convenient if students e-mail you. As soon as I'm available I can answer e-mails, and usually I do it quickly, and students appreciate it.

TS: Yes. It's a different world in that way, and I think for the better.

AC: However, answering emails can be quite time-consuming, especially when replying to mathematics related emails. Mathematical writing requires the use of symbols that are not readily accessible in the email environment. But if this is what it takes for my students' success, I'm very happy to do it.

TS: Well, I guess we have 168 hours in a week. How much time do you spend just helping students?

AC: Believe it or not, it is a lot. Even though I leave campus at 5:00 PM, after I have dinner with my family, I always check my e-mails a few more times, to make sure that I respond to my students' needs quickly. However, from 10:00 p.m.to 8:00 a.m., I take a break.

TS: Good for you. I used to be amazed when I would check the time that the e-mails were sent to me how many people were working at 2:00 in the morning and all kinds of weird times.

AC: Yes. And you see that happening more and more often. Some students have a different/hectic schedule, so they might need to study at or during the night. At 8:00 a.m., my first priority always is answering the e-mails that come in after 10:00 p.m.

TS: Right, right. And I think that's the neat thing about it. They can send an e-mail anytime they want, and it's not disturbing you. You can answer when you get up in the morning. Well, let me just ask it this way. If you were to write down how much of your time you spend on teaching, how much you spend on scholarship, and how much you spend on service, what would the teaching be? A third of the time, a half of the time, two-thirds?

AC: I think teaching takes probably 80 percent of my time.

TS: Eighty percent?

AC: Approximately.

TS: Sounds like you also brought other people in to observe your classes just to try to improve. Could you talk a little bit about that? I know, Mary [L.] Garner [professor emeritus of mathematics] has a letter in your file, and she's won these awards in the past [KSU Distinguished Teaching Award, 2006; Board of Regents Excellence in Teaching Award, 2007; KSU Distinguished Professor Award, 2009].

AC: Yes, I have had a few colleagues observing me while teaching. Dr. Mary Garner won the faculty outstanding teaching award. I wanted her to give me some feedback, and she "invested" quite a bit of time observing my classes. Based on Dr. Garner's feedback, I revisited my teaching strategy. I adjusted my teaching style and hopefully improved.

TS: That's great. Some people are intimidated to have anybody else come into their classroom.

AC: It's not easy, indeed. It feels like an interview or an exam, however, it is for your own, and students', benefit.

TS: Great. Well, you talked in your application about trying to turn students into self-directed learners. Can you talk about that? I think you've talked about it a little bit in the interview already, but what were the kinds of things you do to make them self-directed learners? Maybe just define what you mean by that.

AC: In my efforts to teach students to become self-directed learners, after each test, I ask students to fill out a "post-exam reflection". These surveys help students reflect on their own, and even my own, performance. They are a perfect assessment activity to review and analyze student/instructor performance, with an eye toward future learning/teaching. Once students complete the post-exam reflections, I collect them to see whether there are any patterns/strengths/weaknesses either in student studying behavior or instructor teaching style. These findings give me some insights into student/instructor performance and help me formulate advice that might help students/instructor do better. About two weeks before the next exam, I return the post-exam reflections to the students and ask them to re-read them. Also, at that time, I provide students with my advice for a better approach to studying for the upcoming exams. If the post-exam reflections indicate a need to change the course format or teaching style, that it is also communicated to the students. Moreover, during these discussions, I engage students in sharing effective study strategies.

TS: It may be getting into service as well as teaching, but those NSF (National Science Foundation) grants, that you've received sound fabulous to me. Let's see, the first was 2007. Was that the first grant that you applied for when you got to Kennesaw? Was that the NSF grant?

AC: I applied for my first NSF grant in 2006 immediately after I joined KSU. In fact, I was working on that first proposal while at Florida State. Unfortunately, I was not funded on my first attempt. Nevertheless, when you aim for an NSF grant, you search their website, and you look for opportunities—what's there. I was just surfing the NSF's webpage, when I noticed the NSF scholarships for students in STEM disciplines. That got me thinking, and I went to my chair and said, "Look what I found. There is a neat opportunity for our students. What do you think about that?"

TS: Who was the chair at the time?

AC: It was Dr. Vick [Victor E.] Kane. He said, "Would you like to apply for it? If so, now is the perfect time. You're pregnant. If you want to work on a grant proposal of this magnitude, how about we give you some release time from teaching and you concentrate on your research and submitting this grant proposal next semester?"

TS: You were pregnant your first semester at Kennesaw?

AC: Yes.

TS: Building a family.

AC: Yes. And so in my first spring semester I didn't have any teaching obligations, and spent my time on research and submitting this NSF S-STEM grant proposal. I submitted the proposal to NSF at the end of February and my son was born on March 2.

TS: That's fabulous to hear stories about how many times people apply before they actually get the grants, and you got it in the first try on that one.

AC: Yes. I did my very best to succeed with this proposal.

TS: Okay, the grant comes in 2007 and it's for seven years.

AC: It was for five years plus one year of planning. The funds were allocated for 5 years.

TS: Okay, the first year you're going to be planning, and then the next five years you get the money for the students and scholarships.

AC: Yes.

TS: Talk about what the grant actually was and what you have to plan. You're basically administering a program now that students apply to you for scholarships, so they can study in the STEM fields—science, technology, engineering, and mathematics.

AC: Yes. It's a program hosted in our college, the College of Science and Mathematics, and it is for all of our majors.

TS: Oh, all the mathematics majors?

AC: Not only mathematics majors.

TS: Oh, the sciences.

AC: Any of the sciences.

TS: I guess presumably since consolidation the engineering majors on the Marietta campus could apply too.

AC: The problem is that we have been required to specify what majors will benefit from the NSF funding in our proposal. The proposal submission was done before consolidation, so we listed only the majors in the College of Science and Mathematics at that time. We need to keep doing what we planned on doing in our original proposal.

TS: So students find out about the money, they apply to you, and need is a factor, isn't it?

AC: Financial need is an important factor. If there is financial need, then the students are eligible for the NSF scholarship.

TS: Okay, so they apply and make their case that they're a good student in mathematics or biochemistry or whatever. What's the success rate? Do you get ten times more applications than you've got money to give out?

AC: Indeed, we receive more applications than the spots available.

TS: So about half the students get it?

AC: Let me give you the last statistics for academic year 2015-2016. We have received ninety-two applications, and we were able to award thirteen students.

TS: Wow, that's very exclusive then.

AC: I would say so. However, once a student is awarded the NSF scholarship, as long as he/she is in good standing, the scholarship will be renewed from one semester to another. For instance, this year we have twenty-five students in the program, twelve students continuing from last year and thirteen being newly awarded students.

TS: How large are the scholarships?

AC: It's up to $2,000 a semester, depending on the student's financial need.

TS: Wow.

AC: We want to see our NSF students concentrating on their STEM studies instead of working.

TS: Right. Tuition and fees are presently [fall 2015] $3,663 a semester for full-time, undergraduate, in-state students. This would go a long way toward paying their tuition.

AC: There is another requirement for these students that they need to maintain a high GPA. The requirement for the NSF program is a GPA of 3.0 or above. You can imagine here in Georgia, if you have a 3.0 GPA, you also receive a HOPE scholarship.

TS: So this would be in addition?

AC: The NSF scholarship would be in addition to the HOPE and any other scholarships or loans.

TS: Does the money have to go toward particular things like tuition?

AC: The scholarship is disbursed in our students' accounts, and students use it to pay for tuition and fees.

TS: Have you found that the number of math majors and STEM majors have gone up because of this program? Can you document that?

AC: This would be a good question for our external program evaluator.

TS: Oh, an external reviewer from where?

AC: External to the program, to be more explicit in this sense. Dr. Jennifer [Lewis] Priestley, professor in [the Department of Statistics and Analytical Sciences] has kindly agreed to serve as our program evaluator.

TS: I would think just the affirmation from Kennesaw that we value these students would in itself help you immensely.

AC: Yes. I can surely say that the number of applications has increased from one year to another. The very first time we received a little over thirty applications, and now we have reviewed more than ninety applications. So three times as much.

TS: Students found out about the program.

AC: Students learned about this program, and surely want to be part of it, that's for sure.

TS: I guess for the other seventy-nine students that didn't get the award, we certainly have other scholarships on campus that they could be directed toward, not to mention all ninety-two applicants, if they met the minimum qualifications, should be on the HOPE scholarship.

AC: Yes, but some students may have a greater financial need, and HOPE may not cover all their expenses. I'm very unhappy to say that we've seen students with a 4.0 GPA that did not get the NSF scholarship.

TS: Because of lack of need?

AC: Not necessarily! We aim to make awards in all STEM disciplines, and in some areas the competition was really tough. When you have limited funding available and you have ten or thirteen scholarships to give out to six different majors, you can imagine it's not a lot.

TS: No, it's not. Wow. What's the total amount of the grant?

AC: It's over $600,000.00 for five years.

TS: Spread out over five years. So $120,000.00 a year. Well, that's still a very attractive grant. So 2014 was the year of renewal of the original grant?

AC: It's a renewal, indeed, but we've been through the same reviewing process as a new grant. Renewal doesn't mean that if you've done well in the past then you continue to get funded. You need to go through the same reviewing process like a brand new proposal.

TS: Obviously, they were happy with the way you did it the first time or they wouldn't give it to you again.

AC: I believe so.

TS: I was impressed that the percentages of people who were getting the award included more females and more blacks than in the student body as a whole. Also, you said something about more of the minority students being involved in research projects, I think—doing research with faculty as well.

AC: Yes. One of the nice features of the NSF program is that our students form a community especially designed for their success. The students interact with faculty, advisors, and themselves a lot. So they learn about opportunities to succeed. They take advantage of these opportunities, and we strongly encourage them to get involved in undergraduate research.

TS: So when the students are doing their research, I think you talked at least about one student who gained a national reputation with his research. Can you talk a little bit about that?

AC: KSU's mathematics major Noah Daleo got involved in undergraduate research under my supervision. He was one of the winners of the 2010 Mathematical Association of America Undergraduate Poster Session in San Francisco, CA. Noah just earned his PhD degree from the North Carolina State University in 2015 and accepted a position of Assistant Professor at Worcester State University.

TS: That's different than the grant, isn't it?

AC: Yes, it's different than the NSF S-STEM grant. Noah Daleo was partially funded through my other NSF grant, a research type of grant.

TS: Oh, how many grants do you have?

AC: At this point, I just have only one active grant, the NSF scholarship grant. However, around 2008 I was awarded another NSF research grant. I was fortunate to fund Noah Daleo from this grant and his hard work paid off.

TS: That's fabulous. Talk a little bit about the Kennesaw Charter School and what you've done with them. Is this because your children are going there?

AC: My daughter just graduated from Kennesaw Charter and now she is in middle school. However, my son is still attending Kennesaw Charter.

TS: So he was born in 2007?

AC: Yes, he is a third grader now.

TS: So eight years old.

AC: Oh, wow, I'm impressed by your math skills!

TS: I can add and subtract!

AC: Still very good!

TS: Okay, so this is a special school, Kennesaw Charter Science and Math Academy.

AC: Yes, that's a special school in Cobb County. Their curricula is science and mathematics oriented. I wanted my kids to be exposed to STEM related activities early on.

TS: Who sponsors the school?

AC: Cobb County sponsors it.

TS: The Cobb County School District?

AC: Well, at a 70 percent level, I guess, or around that figure. The rest comes from parent involvement.

TS: I thought maybe it was a private school, but this is part of the Cobb County school system?

AC: It's a charter school within the Cobb County School District.

TS: I see. Well, talk about what you've done with them, the Olympiad.

AC: Of course. This charter school's name has "science and mathematics" in it, same as our KSU college of "science and mathematics". Moreover, the school is just down the road! Therefore, it was so natural to get involved with the charter school. Due to my love for mathematics, I created the school's first Math Team to compete in Mathematical Olympiads for Elementary and Middle Schools. We've had three full years of mathematics competitions. This year is going to be our fourth year.

TS: Whom do they compete against?

AC: We compete in Mathematical Olympiads for Elementary and Middle Schools or simple, MOEMS. This is an organization that was founded in 1977 by math educators. Usually, more than 150,000 kids from United States and twenty-seven other countries compete with each other. It's an international competition. We meet twice a week to work on challenging problems, and we have five competitions per year. At the end of the school year, we receive the awards directly from MOEMS.

TS: Where exactly did you stand?

AC: In our first year, exactly half of the students were among the top 50 percent of all students. In the second year, we had more than half of our students in the top 50 percent, and we had one student in the top 10 percent. In our third year we had more than half of the team in the top 50 percent, and we had three students in the top 10 percent of all students.

TS: Great, so it's growing then.

AC: So far so good!

TS: Are your children mathematically inclined?

AC: I am so proud to answer "Yes" to this question.

TS: They don't have a choice, do they?

AC: I don't think they have a choice; but they love mathematics though.

TS: I wanted to ask you about this. In July 2012 you went out to California to the NASA Ames Research Center. I have to admit my wife is a NASA junkie. We have the NASA channel on our television so she can watch it. She was crushed yesterday that she had forgotten to watch the launch of something or other, but she at least got to see the docking at 6:00 o'clock last night. So she watches all of that. She keeps threatening to go to Russia to see one of the Soyuz capsules take off. At any rate, I told her that you had done something with NASA, and so she was immediately impressed. Why don't you talk about what you did out at the Ames Research Center?

AC: NASA Ames Research Center has had a program that funded faculty to visit the center and work with NASA employees on research projects of common interest. I was lucky to be funded by NASA and spend three weeks working with a researcher at Ames.

TS: This was a learning experience on your part?

AC: It was a learning and a working experience as well. We have published a paper together, and, hopefully, we are going to have another one coming up soon.

TS: Great. So you think you'll be going back there again?

AC: Unfortunately, my collaborator just retired, so probably I would need to concentrate on different applications now.

TS: Why don't you talk about the scholarship that you're doing now.

AC: I have changed my area of research recently, switching from aerodynamics to medicine. One reason was, as I mentioned, my collaborator from NASA just retired. Here at KSU before consolidation, there was really nobody to collaborate with in the area of aerodynamics. However, being part of the College of Science and Mathematics and having so many colleagues working in biology and chemistry, it was natural for me to adjust my research interests in this direction.

TS: That's wonderful. That's the kind of thing that's going to make consolidation work, I think.

AC: Hopefully.   So far I was able to make a contribution to the HIV control problem. Over the summer, I have worked on the Ebola virus control, and hopefully I will be able to concentrate my efforts on cancer control next.

TS: Fantastic. You say you're moving into cancer research?

AC: Biology, medicine, or any field that would benefit from optimization or control is under my "microscope". I don't have any restrictions on the field because I'm an applied mathematician.

TS: There should be some grant money out there for that kind of research, shouldn't there?

AC: I'm not sure if mathematical research applied in medicine is funded when it comes to NIH grants, for instance.

TS: It's hard for mathematicians to get NIH grants?

AC: Yes, I think it's a little bit harder. Cancer treatment is a challenging area, you know, because there are so many open questions and so many available treatments. Some treatments work better than the others. We think that if we can answer some questions from the mathematical perspective at least, maybe we can bring something new to the table.

TS: If you're putting 80 percent of your time into teaching, you probably don't have that many hours to do research, do you?

AC: We don't have as many hours dedicated to research as we would like to have. However, being a comprehensive university, maybe one day we're going to have a reduced teaching load.

TS: Well, that's one reason to get grants, I guess.

AC: Yes, one good reason!

TS: Why don't you talk about intellectual life at Kennesaw and whether it's changed in the nine years that you've been here? Now that we're a comprehensive university, do you perceive a change in campus culture or is it pretty much the same as it's been?

AC: There are so many changes at Kennesaw State; it's really hard to keep track of everything.   The only thing in short supply, from my perspective, is time.

TS: Yes, I understand. Do you feel you're supported in the things you want to do academically at Kennesaw?

AC: I feel supported here at KSU, however, there is always room for more.

TS: Yes, like released time.

AC: Yes.

TS: I understand. I usually ask people why they've stayed. You haven't been here that long I guess, nine years, but I'll ask anyway. What keeps you at Kennesaw?

AC: As I said earlier, it was love at first sight. KSU is where I feel home. Here I am able to achieve what I always dreamed of achieving. I have the opportunity to teach and to do it well. I can engage in research and I can concentrate on service. Everything fits together.

TS: It sounds like it. Well is there anything that you'd like to include in the interview that we haven't talked about?

AC: Thank you once again for the opportunity to share a few things about myself.

TS: I've enjoyed talking to you.

AC: It was a pleasure. I'm so honored to be the recipient of the 2015 outstanding teaching award at KSU!

TS: Great. I think we've had more people from mathematics win this award than any other discipline probably. We started the award in '82, and the first person to win it was Steve [Stephen E.] Scherer—a mathematics professor. Of course, recently Mary Garner and Meghan [A.] Burke.

AC: Yes. And Jonathan [W.] Lewin.

TS: Oh yes, Jonathan. So you're the fourth in the last decade, I guess. Back earlier Elaine [M.] Hubbard and Steve Scherer of course, so just a little bit over thirty years and at least six of the people have come from the math department; that's pretty good.

AC: Yes, that's impressive.

TS: I think you're the fourth international faculty member to win the teaching award. Sabine [H.] Smith won it a few years ago and Jonathan and way back when Vassilis [C.] Economopoulos in 1995 won the award—twenty years ago.

AC: I didn't know that.

TS: So here at KSU you're the fourth international winner of the teaching award.

AC: That makes me very proud!

TS: Well, you're a very impressive person.

AC: Thank you!

TS: Unless you want to add anything else I'm going to bring it to a close at this point.

AC: Thank you once again for the opportunity.

TS: Thank you.

INDEX