



Webinar Transcript

3+1 Academic Partnerships in Microscopy

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PRESENTER:

Charles A. Zona

Charles A. Zona is responsible for day-to-day operations, program development, and curriculum assessment at Hooke College of Applied Sciences, and is also the vice president of McCrone Associates. Chuck earned his BS and MS degrees in forensic sciences from the University of Illinois at Chicago. His publications in scientific journals, magazine articles, and blog posts include topics in adult education, as well as the analysis of gunshot residue and organic paint pigments.



Welcome to another McCrone Group webinar. My name is Charles Zona and I would like to thank everyone for attending today's presentation. I'm usually the moderator for our webinars, but today I have the pleasure of being the presenter and talking to you about our 3+1 academic partnerships. Just a quick background about myself before we get started: I have worked in the field of microscopy for more than 25 years, my previous and current positions include working as a research microscopist, I have also managed our microscopy sales group, and for the past 11 years I have served as the

dean of Hooke College of Applied Sciences. I will field questions from the audience immediately following today's presentation.

Okay, so let's get started. Hooke College of Applied Sciences has established a unique partnership with two local academic institutions: Concordia University Chicago (CUC) and North Central College (NCC). Both programs have been in existence for some time now; CUC starting in 2010 and NCC shortly thereafter. Both programs have experienced increased interest in recent years, which I believe

can be attributed in part to a shift that we are seeing in higher education towards academic programs that bring together, or blend-in, professional training that teaches students skills that are desired in the workplace.

Our 3+1 programs are structured so that students spend the first three years at their home institution and their final year at Hooke College attending a number of professional development courses. Hooke College is a member of The McCrone Group (TMG), so we can think of these entities as student learning resources as well, resources that students can tap into during their yearlong stay at Hooke College.

McCrone Associates is the analytical division of TMG and is also where much of the faculty come from who teach the 3+1 courses. McCrone Microscopes & Accessories is our sales group who are constantly out in the field serving clients and have their fingers on the pulse of many industries that regularly use microscopy in the real world. And of course, Hooke College of Applied Sciences, where industry professionals come for training to learn how to use the most modern microscopy instrumentation and the latest techniques to be applied back at their laboratories. This is also where the one of the real



Students in the 3+1 program and industry professionals share the classroom.

benefits of such an academic/industry partnership benefits our 3+1 students. Our college students are commingled with the industry professionals, so they are attending the same professional development courses as our students from industry. It's a great opportunity for our 3+1 students to hear firsthand what goes on in a real laboratory. They also make important connections with the professional development students, who can help them down the road when they are looking for a job.

For those of you who are not familiar with TMG when we talk about microscopy, and in we, I mean TMG, we are talking about primarily non-biological materials. Everything we do at TMG is materials science-based. Many of our samples come from the pharmaceutical industry where companies are looking to identify a contaminant or why something is out of specification. We also do a fair amount for forensic investigations in the form of trace evidence analysis. So our samples are typically composed of metals, minerals, glass, fibers, ceramics, and food products, just to name a few. So again, non-biological in nature.

So if you're considering a career in materials-based microscopy, I've gone ahead and listed a handful of professions that use this type of microscopy, and this also represents a sampling of some of the students we see from industry who typically attend our professional development courses. As you can see, materials-based microscopy is used in a wide range of professions.

And this is just a short listing of some of the courses we teach at Hooke College of Applied Sciences, and these are some of the more common courses that students attending our 3+1 program can attend. Of course we take into account the student's interests, and once that is established, we develop a framework that outlines what courses they will take throughout the year. The courses listed here might appeal to someone looking to work in the forensic trace evidence area. We offer over forty different courses, so a customized curriculum for our 3+1 students can be developed for virtually any profession that utilizes materials-based microscopy.

There are a few options available to our 3+1 students depending on what institution they attend. At NCC there is the Chemical Microscopy major—they only offer the major, but at CUC you can get an Applied Microscopy degree. You can also do the minor, and do an elective or several electives that counts towards science credit at CUC. At both programs you have to take approximately ten or eleven courses at Hooke College if you are going for the major, and less courses of course for the minor and the electives. The electives are one-off offerings for those interested in science credit.

A career in microscopy is very similar to most careers you find in a laboratory setting. Here I've highlighted just a few key attributes that reflect the laboratory working environment here at TMG.

Some of the unique benefits that our 3+1 program provides to students are listed here. All of our courses stress a hands-on experience. We believe that this is one of the most important aspects to learning: actually using the equipment so that students are confident when they return to their lab, they can actually operate the instrumentation. When we asked some of our 3+1 graduates about the hands-on aspect of our course versus their laboratory courses at their university, many of them said that the courses at Hooke College are about twenty-five percent lecture and seventy-five percent hands-on, which is the opposite for their laboratory courses back at their home institution. They described their typical university lab courses as seventy-five percent lecture and twenty-five percent hands-on.

As stated earlier, another huge advantage is the immersion with real-world scientists who are out there working in laboratories around the country, and around the world.

As an additional benefit to the program and to assess what the 3+1 students have learned in their weeklong professional development course, the students have to return the following week to complete a practicum session. The practicum session is typically a handful of samples selected by the instructor and then given to the student to analyze over the course of a week. The

student then writes up a paper reflecting on their experience in the course and describing their approach to figuring out the identification of their unknown sample set. This is also an opportunity for the student to refine their findings and shore up any deficiencies in their analyses, and to solidify their confidence using the instrumentation while working with a group of unknown samples.

At NCC, there is also a research paper component to the program. Students who are enrolled in their honors college have the opportunity to work on a research project using the instrumentation available at Hooke College. For instance, one of our recent graduates from NCC is interested in pursuing a career in art conservation. She decided to analyze all of the pigments in this painting as her honors thesis project. As she completed her course work using different types of instrumentation, she was able to analyze the materials from the painting using her newly acquired skills. You can read all about Marissa's project on our free online journal *Modern Microscopy*.



A 3+1 student carefully removes pigment samples from a painting.

In addition to the advantages I listed earlier, one of the overall advantages to our 3+1 program is that when students graduate from our program they will have received over 1,000 hours of professional development training. They enter the job market with difficult-to-find skills that employers are looking for. It fills the skills gap that we hear so much about these days.

Our 3+1 program is very similar to the coding bootcamps that have become very popular recently for the same reason: students are attending these

intense blocks of courses where they learn real-world skills that employers are having difficulty filling. So we think of our 3+1 programs as a kind of microscopy bootcamp.

Okay, so what kinds of jobs are out there for someone trained as a materials science microscopist? If you go to any of the popular job search websites and enter the word "microscopy" you will find pages and pages of jobs, but many of them will be for biological applications. To refine the search I'll usually enter terms like scanning electron microscopy, FTIR microscopy, and polarized light microscopy. This is also the order in which the most abundant jobs appear, that being scanning electron microscopy as the most sought after skill, followed by FTIR microscopy, and then polarized light microscopy.

Our recent graduates have found jobs relatively quickly at some of the most admired companies in terms of rated as great places to work. One of our recent graduates received a full-ride scholarship at a major university out east.

Companies that understand how valuable and rare these skills are have started to contact us expressing interest in interviewing our graduates before they submit their resumes at other companies. I think that really speaks to the strength of the program, and the real need for well-trained microscopy professionals.

Thanks so much for your time. I'll now take questions from the audience.

Our first question from Jeff: "Who grants the degree? Hooke College, or the home institution?"

The degree is granted by the home institution, which in this situation would be NCC or CUC.

The next question comes from Chris. She wants to know, "What is the cost of the program?"

It's basically the tuition the student is paying at their home institution and

whatever arrangement they have with regard to tuition between the student and either NCC or CUC.

Okay, Paul is asking, "Can a transfer student take advantage of the program?"

I believe the answer to that is yes, but ultimately you would have to talk to either CUC or NCC. I know at NCC there was a transfer student just recently coming in from a community college. I would imagine that the transfer was already, in that case, pre-arranged. Ultimately, if you were a transfer student, you should check with either CUC or NCC and confirm what credits would transfer, and what that process would look like.

Paul is also wondering, "Are the students typically chemistry majors?"

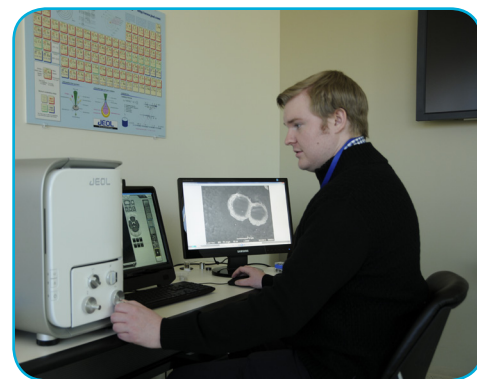
For the most part, they are chemistry majors. At NCC, their chemistry courses are ACS certified. Students come into the program with a lot of chemistry behind them. For the most part, they are chemistry majors, and they have a lot of chemistry under their belts. Same thing would be the case for CUC as well.

Kirk is asking if this program can be done online.

No, it's not an online program. It's very hands-on, that's the strength of the program. We are developing some online courses to supplement some of our hands-on courses that we teach here. We will be offering full online courses eventually, but currently, this course is an in-person-type course.

Lou Ann is asking, "Have you considered non-degree grad students summer boot camp that can be taken at any university?"

I guess that's possible, but the program here runs nine or ten months, and we have to spread it out a bit because the practicum session takes generally a week to complete—sometimes a little longer, so it would be very difficult to complete the program in a single summer. I suppose it's possible, but it



A student analyzes a sample using the JEOL JCM-6000Plus benchtop SEM.

may have to take place over a couple of summers perhaps. Good question. Paul asks again, "What are the requirements for admission to the program?"

Actually, you can get all of that information on the websites at NCC and CUC. They have it pretty well spelled out there on their website. Just go ahead and type in the word microscopy into their search feature and you should be able to find everything there.

A question about student cohorts and are there any limits?

There really aren't any limits as far as a student cohort goes. We generally have anywhere between three to five students going through the program or taking various courses at a given time. Unless it was a very large number of students, let's say maybe fifteen, then we would have to schedule the program a bit differently, but right now there are no limits established.

Thank you again for the great questions. Any additional questions that come up we will follow-up with an email to you to answer those.

Again, I would like to thank everybody for attending today's webinar. We will be releasing our fall webinar series shortly, so be sure to take a look at that when it comes out. And hopefully, we'll see you back here for another McCrone Group webinar. Thank you.