BEFORE THE

NATIONAL LABOR RELATIONS BOARD

In the Matter of: COLUMBIA UNIVERSITY, Employer, And GRADUATE WORKERS OF COLUMBIA-GWC, UAW, Petitioner.	Case No. 02-RC-143012

The above-entitled matter came on for hearing pursuant to Notice, before AUDREY EVEILLARD, Hearing Officer, at the National Labor Relations Board , Region 2, 26 Federal Plaza, New York, New York, 10278, in Room 3614, on Wednesday, May 13, 2015, at 9:30 a.m.

A P P E A R A N C E S

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I N D E X

WITNESS	DIRECT	CROSS	REDIRECT	RECROSS	VOIR DIRE
Michael Tuts	741	777	801	803	--
Holger Klein	807	834	842	--	--

E X H I B I T S

EXHIBITS	IDENTIFIED	RECEIVED
EMPLOYER'S		
E-98	745	745
E-99	748	749
E-100	753	754
E-101	756	757
E-102	760	761
E-103	811	811
E-104	828	829
E-105	834	834
PETITIONER'S		
P-48	793	795
P-49	805	805
P-50	806	806
P-51	843	845

P R O C E E D I N G S

(Time Noted: 9:50 a.m.)

HEARING OFFICER EVEILLARD: On the record.

Mr. Brill, please call your next witness.

MR. BRILL: Good morning. Columbia calls Professional Michael Tuts.

HEARING OFFICER EVEILLARD: Please raise your right hand.

(Whereupon,

MICHAEL TUTS,

was called as a witness by and on behalf of the Employer and, after having been duly sworn, was examined and testified as follows:)

HEARING OFFICER EVEILLARD: Can you please state your name and spell your last name for the record?

THE WITNESS: It's Michael Tuts, T-U-T-S.

DIRECT EXAMINATION

BY MR. BRILL:

Q Good morning, Dr. Tuts. Are you currently employed by Columbia?

A Yes, I am.

Q In what capacity?

A I'm a professional of physics and now the chair of the physics department.

Q How long have you held the position of chair?

A Since July of 2014.

Q How long have you been at Columbia?
A Since 1983.
Q As a faculty member in physics?
A Correct.
Q You're a full professor?
A I am.
Q Can you give us a brief rundown on your educational background?
A Yes. I got my undergraduate degree at MIT in math and physics, my PhD at SUNY Stony Brook in 1979, in experimental particle physics. And then, as you said, I've been at Columbia ever since. I spent four years as a post-doc at Stony Brook and then joined the faculty.
Q Do you have a particular area of physics that you specialize in?
A Experimental particle physics.
Q Can you give us a general description of the physics department at Columbia, I guess beginning with whether the areas of physics that you cover and what are the degrees that are offered?
A Sure. We cover most of the areas that traditionally you would find in a physics department, so we have particle physics, both theoretical and experimental. We have nuclear physics, both experimental and theoretical. We have condensed matter physics, experimental and theoretical. We have what's

called AMO, atomic molecular and optical physics, and that we only have experimental. We have astrophysics, experimental and theoretical physics. And we have one person who does experimental biophysics. And I think I've covered everything.

Q Where is the department located?

A It's in Pupin Hall, on the Columbia campus, at 120th Street and Amsterdam, more or less, Broadway, between Broadway and Amsterdam.

Q Are there other facilities that the department uses?

A Yeah. On campus, we have laboratory and office space in a building called CEPSR or Schapiro. It's right next door to Pupin. And we also have laboratory and office space in what's called the Northwest Corner Building, which is again located next to the physics department, to Pupin, connected -- both of those buildings are connected by corridors that join them. And then finally, in addition, we have a laboratory called Nevis Laboratories, which is about 20 miles north on the Hudson River, where experimental particle physicists and experimental astrophysicists have facilities there.

Q How many faculty members are in the physics department?

A We have 34 faculty members, 4 of those -- 3 of those are joint with other departments and 1 of them is a half-time, so it's about 32 FTEs, but 34 faculty members.

Q What degrees does the department offer?

A So it offers at the undergraduate level there is the

general Bachelors of Science, but you can major in physics. At the higher levels, there is a master's degree in a program which is called the philosophical foundations of physics, and so that's a program administered jointly between the physics department and philosophy department. And we then -- the graduate students that we admit directly into the program for the PhD program, one can get a master's and fill on the way to a PhD. It's certainly a PhD program.

Q How many undergraduate majors are there in the department?

A We have typically about 20 undergraduate majors that are physics majors. Then there are variants on that. There are people that are called concentrators, so they take a less rigorous physics program, and I think there are about a half dozen of those. So I think all in all, putting all these together, there might be 30 or so physics related majors.

Q Of undergraduates?

A Per year, by the way.

Q Undergraduates?

A Undergraduates.

Q How about in the PhD program?

A So we currently have about -- by the way, so the undergraduates, just to be clear, that was the number graduating in any one year. So if you want physics majors, kind of double that because they are juniors and seniors. For the PhD program, we have currently about -- I think it's 97

graduate students in total. We typically admit on average about 17 or so candidates per year.

MR. BRILL: I'm going to mark as exhibit -- we're up to 94, no --

HEARING OFFICER EVEILLARD: You are on 98.

MR. BRILL: 98, Exhibit 98, for identification, is a printout from the website on the physics department. I'm going to ask the court reporter to mark this and then show it to the witness.

(Employer's E-98 identified.)

BY MR. BRILL:

Q Have you had a chance to look at the document we've marked as Exhibit 98?

A Yes, I have.

Q Can you identify it?

A Yes. It's a printout from the webpage, from the graduate school's webpage, talking about the physics program, the physics PhD program.

MR. BRILL: I'll offer it in evidence.

MR. MEIKLEJOHN: No objection.

HEARING OFFICER EVEILLARD: It's admitted.

(Employer's E-98 received.)

BY MR. BRILL:

Q How many applications do you get each year to the PhD program?

A We get about 450 applications.
Q Who are the typical applicants?
A Well, they all are people that have had an undergraduate degree, perhaps 98 percent of them in physics, maybe some in an allied field, like mathematics. They are, I would say, typically about half of those might be foreign students and the bulk of the foreign students are Chinese applicants usually, and the rest are from all across the United States.
Q What are the career aspirations of the students who are applying to the physics PHD program?
A So typically when they apply to the physics PhD program, they're imagining that they're going to have a career in academia, be it say a laboratory or an academic position in some university.
Q What is the experience of the students who graduate with a PhD, what positions do they typically go into?
A I would say that, again, on average, maybe half of them continue onto academic or national laboratory type careers. And the other half would typically go into other fields. Many of them, I guess initially, many of them, perhaps more than half, go in to take a post-doc position after that and may decide after the post-doc to go into another field.
Q Such as?
A Finance, for example, medical, physics. Those are a couple of examples.

Q Can you describe the application and selection process for the PhD program?
A Certainly. So an applicant would submit an application with letters of recommendation, grades, and that application is submitted to the graduate school by January of the year they're interested in then coming in the fall. Once those applications and the deadline have passed, then the graduate school sends those application packets that are completed to the physics department. We have a -- I appoint a committee, a graduate admissions committee, that goes through all of the folders and selects the list to who we will offer admission. That number is larger than the number that we actually admit, because some number of them don't come. So, typically, I think we make around 50 offers of admission, anticipating to get 17, 18 or so students coming.
Q What are the criteria that the department would be looking for in terms of making these offers?
A So what we want is to know that the people come both with the appropriate background to be able to enter the graduate program, so that typically means in the U.S. having say a bachelor's degree in physics. The physics program usually gets you ready for graduate school. We look at standardized tests such as the graduate record exam, the GRE, where we focus there on the specific score, and physics is for us the most important. And then the letters of recommendation, of which

there are three or sometimes more letters of recommendation, and the grades are the sort of three main criteria that we use in evaluating the students.

Q Would it be fair to say that you're looking essentially for the academic potential of the students that you admit into the program?

MR. MEIKLEJOHN: Object to leading.

HEARING OFFICER EVEILLARD: I'll allow it.

THE WITNESS: Yeah, correct. I mean what we want is someone to succeed in the program. We train people to get a PhD in physics. In some sense, we train them in such a way that they'll be ready for an academic career; if they don't pursue that, that's entirely possible, but that's certainly the initial goal.

BY MR. BRILL:

Q Are the students who were offered admission sent a letter from the university?

A Yes, they are.

Q That's conveying the offer of admission?

A Correct.

MR. BRILL: I'd like to mark as Exhibit 99, a copy of a sample offer letter for the physics PhD program.

(Employer's E-99 identified.)

BY MR. BRILL:

Q Is Exhibit 99 an example of an offer letter that was sent

this January for admission to the PhD program in physics for this coming term?

A Correct.

MR. BRILL: I offer it.

MR. MEIKLEJOHN: No objection.

HEARING OFFICER EVEILLARD: It's admitted.

(Employer's E-99 received.)

BY MR. BRILL:

Q Do the students of the physics department receive a standard Graduate School of Arts and Sciences funding package?

A Correct.

Q And that's described on the second page of Exhibit 99?

A Yes.

Q Can you just briefly describe what the elements of support are that are offered to the PhD students?

A So for the physics department, the incoming students are offered a teaching fellowship. You see the amounts that are indicated over there. For the physics department, typically, it's the first two years for which they have a teaching fellowship. And usually after the first two years, they're then supported on a graduate research assistantship from grants.

Q How long does the PhD program in physics last for the typical student or average student?

A Typically, it would be five to six years.

Q From entry until award of the degree?
A Correct.
Q Can you take us through the typical progression during that five or six-year period from entry until the final step?
A Sure. So the students are admitted for the fall of that year. When they come, they have the teaching fellowship. So for the first two years, the typical program would include them taking classes in graduate courses which form the foundations of the physics, whatever field they will specialize in. These are general courses.

They may take some courses which are specific to their intended field of specialization. They will also then, as part of their teaching fellowship, will teach typically a lab section, which is three hours per week. They will also have responsibilities for manning a help room, which I think is about one hour or so per week. Then there are other associated things that they do, which is potentially grading problem sets, proctoring exams, grading exams, and some mix of those things. So, that they do for the first two years, year and a half to two years.

In the summers, both in the first year and the ensuing second year, they typically would find a research group to work with over the summer to begin to do research and begin to see what areas they might be interested in.

When they come in, also there is a PhD qualifying exam

that's given in the January of the year that they're coming in. So they come in say in September and that following January there is, after that one semester, there is an exam which is based, in our case, typically on undergraduate physics. And so the goal is to understand are they well prepared, are there holes in their education that maybe we need to fill.

They take that exam. If they pass, fine. If they don't, they're allowed one more try at the exam, so the following January, they would take it. And probably I'm going to say 70 percent pass it on the first try. The next try, maybe one or two students every one to two years may not fail and may be asked to leave the program.

Q And then what's the --

A I'm sorry, I only got you to the first two years, sorry. So after the -- so in say potentially either the summer of the first year or the summer of the second year where they're doing research, that's a time when they can explore what research they want to do for their thesis and work with an experimental or theoretical group.

By the summer of the second year, they should typically have chosen the group with which they would like to work. And it's a mutual thing. In other words, they would go to a faculty member and say I'd like to work, let's say it's me in experimental particle physics, working on your experiment in ATLAS (ph.) and then we agree, one, we have to be able to

support them under the grant so we need to check to see that we have that kind of funding and if all that works out, then they would join the group and begin their thesis work.

Introductory, they may start doing work which isn't directly part of their thesis work, which might be the analysis of some data later on, but it is preparatory to that thesis work. In other words, they might be building electronics, calibrating instruments, doing theoretical problems which are related but not exactly what their thesis will be. And so that goes on then for let's say three to four years.

Typically, in the last -- probably in the last year, they begin to actually write their thesis and that means truly writing this document which might be anywhere from 100 to 300 pages long, which then documents their original research that they've done in that chosen area.

And then at the very end, there is a thesis defense in which there is a committee of faculty members and outside faculty members that hear the thesis research work, and agree, and say, yes, this qualifies for PhD, and you have your PhD.

Q Going back to the beginning of the process, when students apply to the program, do they typically express an interest for a particular field, such as particle -- experimental particle physics or to work with a particular faculty member, or is that something that develops later on?

A It's a mix. Some students come in knowing very much what

they want to do because maybe they've done research as an undergraduate. Maybe their undergraduate advisor has said, hey, Joe Blow over there at Columbia is doing the kind of work that you might be interested in, so they may come in with a very well defined notion of what they want to do.

Others come in saying I just want to do physics. Others, many come in, fewer these days, but many come in because what they've done as an undergraduate typically is take courses and so they think physics is just theoretical physics and they think, well, I'm going to be a theoretical physicist and until they come to graduate school, they don't realize that there is other areas. So it's a mix. Some come in very well focused. Others have to figure out where they want to go.

MR. BRILL: Let me mark -- I think we're up to Exhibit 100, is that right?

HEARING OFFICER EVEILLARD: Um-hum.

(Employer's E-100 identified.)

MR. BRILL: We'll mark as Exhibit 100, another printout from the Department of Physics website titled program information and degree requirements.

BY MR. BRILL:

Q Can you identify the document that we've marked as Exhibit 100?

A Yeah, it's from our physics department website and it's a section on the information about the degree requirements for

the PhD.
Q Does this document accurately describe the requirements for the PhD degree?
A Yes, it does.
MR. BRILL: I'm going to offer it in evidence.
MR. MEIKLEJOHN: No objection.
HEARING OFFICER EVEILLARD: It's admitted.
(Employer's E-100 received.)
BY MR. BRILL:
Q Is teaching required in order to get the PhD in physics?
A Correct. The graduate school requires at least one year of teaching.
Q Is that the requirement of the department as well?
A That's the requirement of the department. Typically, the students, as we say, are supported on teaching fellowships for the first two years, so they teach for the first two years.
Q Now on the very last page of Exhibit 100, there is a section headed teaching, if you would look at that?
A Yes.
Q And it says in the second sentence most assignments are to teach small laboratory sections with problem sessions in elementary courses. In general, this program concentrates on teaching in the first two years while the student is taking graduate courses. The maximum teaching assignment for a faculty teaching fellow is approximately four contact hours a

week for four terms.
A Correct.
Q Is that accurate?
A That's correct.
Q What are the responsibilities of the teaching fellows who work in these small laboratory or problem sessions?
A So they -- the laboratory sections are for introductory physics classes and so there are a number of different experiments that the students do. And they do that under the guidance, so there might be somewhere in the order of say a dozen students per section. And there is one graduate student TA for that section.

The responsibilities of the graduate student then as a teaching fellow is, one, to prepare to be familiar with the experiments, so they go through the experiments before the students do so they can anticipate problems or issues that might come up. They then, during the actual session, that three-hour lab session, they are there to lend help if students are having problems or there's problems with the equipment. They guide them. So that's the laboratory part.

There is also one component, which I had mentioned earlier, which is about the one-hour per week where they staff the help room. The help room is a room available, staffed by graduate students, where students from the introductory classes can come if they're having problems with the homework or

understanding a lecture, or just in general any problems that they might be having with physics.

And then, of course, the -- so I think those are the kind of four contact hours that are discussed over there. Then, of course, there is the additional preparation of that.

They also attend a TA meeting, which I think is held weekly, where they go over just in general kind of teaching issues, if problems have arisen. After all, they're all new -- typically, they're all new to this kind of responsibility, and so they're learning as well.

MR. BRILL: Let me mark as Exhibit 101, another printout from the website, Department of Physics' website entitled teaching information.

(Employer's E-101 identified.)

BY MR. BRILL:

Q After you've looked at Exhibit 101, can you tell us if you can identify it?

A Yes. It's from our same physics department webpage. And it's the section that talks about the specifics of the teaching responsibilities and some of the things that we've already mentioned.

MR. BRILL: I offer 101.

HEARING OFFICER EVEILLARD: Any objections?

MR. MEIKLEJOHN: No objection.

HEARING OFFICER EVEILLARD: It's admitted.

(Employer's E-101 received.)

BY MR. BRILL:

Q Turning your attention to the first paragraph on the, I guess it's Page 2 of the exhibit, but the first page that has anything substantive on it, under faculty fellowships, there is a listing of specific responsibilities, some of which you have already described such as teaching the three-hour lab session and the physics help room. But there's a few other items there. Could you just go through the others?

A Certainly. So the others that you see there, it says three hours per week grading lab reports, so that's associated with that lab session, because at the end of that lab session the students turn in a lab report and those need to be graded. And so that's that one.

There is a, it says, one-hour per week preparation for laboratory and that goes back to what I said earlier about the graduate students having gone through the experiments by themselves to see how they work and anticipate any problems that might arise.

We mentioned the physics help room. And then it says 14 hours per semester grading lecture course examinations. So that's I think perhaps a little bit more broad than that. It's both grading lecture courses, so a faculty member teaches a lecture course, gives perhaps a couple of tests during the semester and a final exam. Those then are graded by the

graduate students, by the teaching fellows. And they may also proctor the exams as well.

Q Can you describe briefly what's involved in grading one of these examinations and how the PhD students would be prepared to do the grading?

A It varies a little bit. So some faculty members will write out detailed solutions to the problems and hand those solutions to the graders. And they may or may not give more or less detailed instructions saying this part, if you see this answer, that's worth three points. If you see that, that's another two points, and so forth.

And some may be less prescriptive and just have the solutions and say grade them. Do according to what -- be consistent, of course, across all the exams. Some people I think more rarely might as a graduate student to actually write the solutions and grade them. I think that's typically more rare than the other ways that I mentioned.

Oh, just to finish that up, I mean then there is a bureaucratic part, having graded it -- let me give you an example. From my own tests that I've given, I have three problems. I get three graders. Each one is assigned one problem to grade. One of them is assigned adding up the scores and another one is assigned sort of getting that list of scores to our departmental administrator. And then those scores, she records them into an Excel spreadsheet and I get those scores

to then assign a grade, a letter grade to them.
Q You mentioned there were weekly meetings of the TAs. Can you describe the meetings?
A Yeah, I think the meetings, I've sort of not been present in them so I'll give you my general impression of them. They come to this weekly meeting. There is the director of the teaching fellows, Jeremy Dodd, is there and I think they go over things such as what is the next set of experiments that the students are going to do. They'll go over it, perhaps go over and see if the faculty members in the lecture courses, where they're up to, because sometimes there is a tendency for the lecture to get out of phase with the lab sections that are going on. So I think it's just to understand where the faculty members are.

And then I think there is also just a kind of "are there any problems," you know, are you having problems with the students, are you having problems with the lab section, and so forth.
Q There is a reference on Page 2, again in that same section on faculty fellowships to the teaching fellows' manual. Let me show you a document and ask if this is the teaching fellow's manual. I think it's already in evidence. I think it's Exhibit 55. I don't know if that's readily available.

HEARING OFFICER EVEILLARD: Do you have Exhibit 55?

COURT REPORTER: 55?

HEARING OFFICER EVEILLARD: 55, yes.

(Pause.)

HEARING OFFICER EVEILLARD: The witness has been handed Employer Exhibit 55.

MR. BRILL: Pardon me?

MR. MEIKLEJOHN: He's got it.

BY MR. BRILL:

Q Would you look at Employer's Exhibit 55 and tell us if this is the teaching fellows' manual that's referred to in Exhibit 101?

A Yeah, this is the teaching fellows' manual from the fall of 2013.

Q Is there an orientation session for the physics doctoral students who will be teaching?

A Yes, there is. At the beginning of the semester, there is an orientation on a number of subjects, but in this area given by Jeremy Dodd.

MR. BRILL: I'd like to mark as Exhibit 102, a copy of a PowerPoint entitled incoming student orientation, teaching responsibilities as a graduate student.

(Employer's E-102 identified.)

BY MR. BRILL:

Q Is Exhibit 102, is this the PowerPoint that's used in the orientation?

A Correct.

Q And who is Jeremy Dodd? I'm sorry if you've mentioned that already.
A Yeah, he is both the director of undergraduate studies and he's also the TA supervisor.
Q For the department?
A For the department.
MR. BRILL: I offer 102.
MR. MEIKLEJOHN: Can I just have a minute?
HEARING OFFICER EVEILLARD: Sure.
MR. MEIKLEJOHN: Is Mr. Dodd also a member of the faculty?
THE WITNESS: He is a senior lecturer.
MR. MEIKLEJOHN: No objection.
HEARING OFFICER EVEILLARD: Okay. It's admitted.
(Employer's E-102 received.)
BY MR. BRILL:
Q Do the students -- do the PhD students in the physics department also attend the GSAS teaching fellow orientation?
A I believe they do.
Q Do you still have Exhibit 99 in front of you? That's the admission letter.
A Yes, I do.
Q If you would turn your attention to the second page, about halfway down there is a paragraph that begins your fellowship includes --
A Yes.

Q You see that, your fellowship includes participation in your department's professional apprenticeship, which includes some teaching and research responsibilities. The faculty regard this experience as a vital part of your education. Do you see that?

A I do.

Q Can you tell us why the faculty regard participation in the teaching responsibilities as a vital part of the PhD education?

A Certainly. It's actually captured pretty well in the slides for exhibit -- whatever that is, 102.

HEARING OFFICER EVEILLARD: Employer 102.

THE WITNESS: 102, where you see the introductory slide where it says teaching is a very important aspect of your graduate education. It'll help you prepare, those of you who go onto careers in academia and teaching. So that's certainly one important aspect, the ability. If that's what you're going to go into, you certainly need to be able to have experience in teaching.

It says it will provide excellent experience in giving oral presentations. So, that's more generally useful both for your research and making your research available and accessible to people, and presumably also useful if you go into non-physics areas as well.

And then the third point is that it says you'll gain

deeper understanding of fundamental physics through interactions with students. Having to explain and having to do the teaching helps to reinforce these fundamental principles of physics understanding. Was that the question? I might have gotten to --

BY MR. BRILL:

Q No, I think you answered the question.

A Did I answer the question?

Q Yeah.

A Okay.

Q I asked why the faculty considered teaching to be a vital part of education. Is there any feedback or evaluation given to the PhD students for the teaching activities that they engage in?

A Yes. There are a number of ways. One is that there are course evaluations that are handed out at the end of the course or at the end of the semester. And students, undergraduate students then evaluate the course, evaluate the instructor, and evaluate the teaching assistants as well. So that feedback then goes back through our TA supervisor and then people can take corrective action if necessary.

Then I think there is ongoing evaluation from our TA supervisor, who tries to keep his -- tries to understand whether everyone is doing well or if there are any issues or problems that have come up.

Q Is there also some feedback from the faculty member who is in charge of the particular course?
A There may be, I would say, only in the context that for grading -- typically, where a faculty member has direct contact with the graduate students in this area is, as we mentioned, the grading where he has solutions, the graders grade the problems, and maybe there is some interaction there where you say, wait a minute, you were too harsh grading here, or there's some issues in the way you're grading, please pay attention to that next time. So that would be a direct feedback.

Typically, the faculty member is not involved with the laboratory section, so he doesn't see the graduate student doing that. You may hear about it from students in your class who say, gee, I have a problem, or a) this person is great, or something, but it hasn't been more direct.
Q Now moving onto the research appointments, I think you said is it after the second year that the students would typically move onto a research appointment?
A Correct, starting in the summer, usually in the second year.
Q And what would that appointment be?
A So this is a graduate research assistantship. You want a description of what it is?
Q Yes, would you?
A Okay. So, again, as I mentioned earlier, there is kind of

an informal process whereby a graduate student decides what area of physics they would like to specialize in, what area of physics that they want to write their PhD thesis on. And the way that that occurs is, as I say, an informal process where a graduate student will talk to a faculty member or talk to an experiment group and say I would like to work in your group. Maybe they've had experience in the first summer working with them, maybe not.

On the other side, the faculty member or the group would then say do we have a position available, do we have grant support to be able to support such a graduate student. Do we like this guy? I mean it's a very close relationship that one has and so you like to see that you're compatible and work well together.

And if all that is satisfied, then that student would join that research group and would then be supported on that particular grant.

Q I'm going to jump ahead for a minute, but you talked about the relationship that's developed. In your experience, are any of these relationships between a faculty member and a doctoral student, do they continue after a PhD degree is awarded?

A They don’t continue in any formal process; that is to say once your thesis student has graduated, I think your formal responsibility is over. But more informally or right before that, a thesis advisor might very well point students to the

next, if they're going to go as a post-doc, that they know people in other groups working in the same area, they know them well. They say, hey, I've got a student who is graduating, probably a good fit to your group, maybe you ought to interview them or think about hiring them.

People also will keep more or less closer track of the students to see where they have gone onto in the future; but all that is somewhat informal, not a requirement.

Q Now back to the process of the actual service as a graduate research assistant. Can you describe what a graduate research assistantship entails?

A Sure. So once you've established that you're going to join this group, then typically what happens? Let me jump ahead a little bit to the end first, which is where you're headed is to write a thesis, original research, if it's an experimental group, based on for example collecting some data and analyzing that data, and seeing what the results are.

But how do you get there. In order to get there, you may have to, depending on the size of the group, you may have to be involved in designing an experiment, building an experiment, building pieces of an experiment. If it's a larger group, such as the groups that I work with, you may be involved in building a piece of an electronics, you may be involved in calibrating a detector, you may be involved in developing software to calibrate the detector. So none of those things are directly

part of your thesis, but they are very important and are part of the process of learning. You need to learn how to design an experiment, how to build equipment, how to operate equipment.

Q How does the PhD student learn that through the graduate research assistantship?

A It is, in some sense, kind of a mentorship process. The graduate student is working with, depending on the size of the group, there may be other graduate students more senior. There may be post-docs. There may be -- well, there will be faculty members. And so the graduate student would work closely with them.

So a faculty member might meet weekly, or more often depending on where they are, to go over and to understand is the graduate student -- you've suggested a direction in which to go, is he doing that, has he or she run into any problems, can you help solve the problems. In some larger group they may work most closely on a day to day basis with someone like a post-doc who is working every day there.

In our particular case, we have an experiment in Switzerland and the faculty members can't be there all the time. So they work very closely with more senior graduate students and with post-docs.

So they would work towards, developing and ultimately reaching the point where they can take data. But the idea is that they get an education in all of the aspects required in

this case for experimental physics, building equipment, analyzing data, so forth.

Q And where does the funding for the graduate research assistantship come from?

A Typically, the funding comes from government funding agencies. So some of the largest agencies that do that are the Department of Energy's Office of Science, there is also the National Science Foundation. For those doing more astrophysics type related areas, NASA does funding. For those in condensed matter, they have a wider range of funding opportunities, ranging from agencies like DARPA, or the Office of Naval Research, or -- we don't do any classified work, but perhaps the Department of Defense doing that. So there are a number of agencies.

There are some private foundations, but I'd say those are rather few and far between.

Q These government agencies would typically give a grant to the university, for research?

A Correct. So a PI, a principle investigator, faculty member would -- it varies. There may be a solicitation from a funding agency saying that we are -- we have a program to fund research in such and such an area. The faculty member would submit a proposal. That proposal is peer reviewed. It may or may not be funded. If it's funded, then that funding is then administered typically through Columbia. There is the

sponsored projects office that takes in all of those funds and administers them for the principle investigator.

Q Would the proposal for the grant include in some cases support for one or more graduate students?

A Correct. It would include support for personnel. So, typically on there might be a faculty member's summer salary. We're only supported by the university for nine months, and so two months of summer salary is typically on a grant. There would be support for post-docs and there would be support for graduate students. And that depends on the size of the proposal, the particular proposal; but, typically, it would include that.

Q Do you know why these government agencies include support for graduate students in these grants?

A Yes. The support for graduate students is twofold. One is that they recognize the need to train the next generation of physicists and this is part of that training, educational process. That's particularly in the forefront for an agency like the National Science Foundation. That's one. And then the other is, of course, the students in all the activities that I've mentioned do contribute to the experiment. And, ultimately, the deliverable, if you wish, for a physicist is going to be a publication about some particular aspect of the science. That's where we're headed. And all the steps of getting there, graduate students certainly can contribute to

those steps.

Q Do you, personally, have any grants at this time?

A I do.

Q I shouldn't say you, personally. Are you the principle investigator on any grants?

A Yes. I have I think currently active two grants.

Q Can you describe those grants?

A Sure. One of them is what I'm going to call a base grant. That's an umbrella grant for doing -- for the high energy physics experimental group, so all of the experimental high energy physicists, which is five of us, have one umbrella grant from the National Science Foundation at about, I don't know, I think it's about $2.2 million per year now. And that supports the summer salaries that I mentioned. It supports post-doc support. It supports graduate students and travel.

Q Are you the PI on that grant?

A I am a co-PI on that. The PI is Mike Shaevitz, who is the director of Nevis Labs. I am also then the PI on a large grant which is about $9 million per year and that's called -- from the NSF, again. It's called a cooperative (ph.) agreement. That supports more broadly our experiment, which is called the ATLAS experiment, which takes place at the Large Hadron Collider, in Geneva, Switzerland.

So this grant, cooperative agreement is intended by the National Science Foundation to help support the technical

activities to operate the detector in Switzerland. It's a very large experiment. It has 3,000 physicists from 178 institutions, 44 U.S. institutions. And so this helps, together with the DOE, which has a different supporting mechanism, supports some of the U.S. institutions in there. So it does not support in general students. It does not support post-docs. It does support technical manpower, engineering, mechanical, electrical engineering, software professionals, computing, and so forth.

Q The first grant that you mentioned --

A I call it a base grant.

Q The base grant, the umbrella grant, are there graduate students supported on that grant?

A Correct, yes, there are.

Q Have you worked with graduate students on that grant?

A I have in the past. I currently don't have a graduate student that I'm supervising.

Q Can you talk a little bit, perhaps explain in layman's terms what the experiment or what the experiments in Switzerland involve and how your work and the work of the graduate students relate to that project?

A I'll check to see whether your eyes are closing or not. So just very, very broadly, what we have and the last student that I had was looking at, I'll tell you the words first and then try and explain it a little bit. He was looking for the

decay of a Higgs boson into a Z boson and a photon. Now at this point, I have lost you, but let me try and bring you back. For the last 50 years or so, we've been trying to understand -- in particle physics, what we're trying to understand are the fundamental forces in particles, the stuff that you and I are made of.

And there was one very puzzling issue which has existed for the last 50 years which is these elementary particles have different weights. And it's a very deep question to ask how do they get their weights, how come? Because our simple theories would indicate they should have no weight, and they do.

So there was a theory proposed about 50 years ago called the Higgs mechanism. Higgs is named after a physicist, Peter Higgs. He proposed this way of explaining how these elementary particles acquired their mass. And that was the last missing piece of something that we call the standard model, the standard model meaning that we explain all the fundamental particles and forces.

In the popular press, you may or may not have heard of it. This Higgs particle or Higgs boson has been called the God particle. We have to live with that. But that's -- it became very popular. And in 2012, after searching for these 50 years, finally at the accelerator where we work, which is the Large Hadron Collider, two experiments there, two very large experiments, ATLAS, the one that I work on, and CMS, the other

experiment, discovered what appeared to be this Higgs boson, this God particle.

A fundamental question is our theories predict what it should look like, you know, does it smell like a Higgs boson, does it quack like a Higgs boson, is it a Higgs boson. So in order to understand that, you have to understand does it get produced the way the theory says, does it decay the way the theory says. And so the student that I had was looking at one particular decay mode to see does it behave the way that we expect it to behave. And if all of these things agree with the theoretical calculations, then you say, yes, that is a Higgs boson of the type that we expected.

It's certainly in particle physics perhaps the most important discovery in the last, I don't know, pick your number 50 years, 100 years. So much so that having discovered it in 2012, the 2013 Nobel Prize in physics was given to Mr. Higgs and another theoretical physicist for having predicted this particle.

Q So the graduate student that you mentioned was doing an experiment as part of this very large scientific consortium in Switzerland?

A Correct. We collect data, vast amounts of data from that experiment. And then we have many different teams looking at different aspects of that data. So it's the same data, but looking at different aspects of it. In his particular case, he

was looking to see was there evidence for a Higgs boson decaying into these two other particular particles, for which there is a theoretical prediction.

Q What is the scope of work, if you will, under the NSF grant that supports this research?

A In a peculiar sense, it's to find the unknown. That is to say we are not charged with doing -- not even charged with saying you will find the Higgs boson. We're simply charged to look, explore the unknown, and to see what's there. So in very, sort of written large, our mandate is to try and discover what the fundamental forces and fundamental particles are that make up the universe. How you do that, where you will find those answers, we don't know.

Q Are there other graduate students now involved in this -- other PhD students now also serving as graduate research assistants in connection with the same ATLAS project?

A Correct. We have about six or seven graduate students now that are working in our group to do that. None of those right now are particularly my advisee, but we have more faculty members and they work with them.

Q Would you be on the dissertation committees, for example, of any of the other students?

A I may well be. A typical thesis committee consists of three people from the department and two outside examiners, meaning outside of the department or even outside the

university. Of those three, it's the thesis sponsor, someone typically who is a theoretical physicist, in our case, because it's an experimental thesis, and then usually someone else possibly from the group. So I could be, in this case, that someone else.

Q Would the process of the research that's being done by the graduate students currently be similar to what you've described for your own student?

A Correct. From a broad perspective, it's the same stuff. Obviously, from a detailed physicist's perspective, they're doing different things. But, yes, we're looking for trying to understand these fundamental forces and particles.

Q So just to be clear, the students who are supported by these grants as graduate research assistants are working on the research that leads to their dissertation, is that correct?

A That's correct. It all typically is -- it's more or less directly related to their research, but it is all part of their research. Without having done the preliminary work, you wouldn't get to the other state.

Q Do students ever have the opportunity to publish the research along the way until their dissertation is actually completed?

A Yes. There may be -- yes, they can in a number of ways. If they are experimental students, they may or may not publish papers on instrumentation that they may have worked on. They

may also be doing smaller analyses or be part of an effort involved in those analyses. And then, of course, there is their own thesis research.

Now in a large group like ours, when we publish a paper, it has 3,000 authors on it. So they will actually be on many papers, but it's certainly true that they may not be specifically aware of analyses that might actually have their name on it. That's just the tradition in our field is how we work.

Q Is there any academic benefit to the student from working on these papers along the way to dissertation?

A Absolutely, in a number of different areas. One, again, from a teaching perspective, learning to write a paper and to carry out an analysis is a key element of what a physicist is and what a physicist should be able to do. So that experience is invaluable.

From a practical benefit, having your name on a publication helps when you're going out later on and looking for the next position. So having worked on some publication is very good. And I guess those are the two sort of main areas.

Q Just a few questions about the master's program. How long is the master's program typically?

A I'll ask for a little clarification.

Q I'm sorry. The master's in philosophical foundations.

A So we have a master's program which is kind of a terminal

master's program in the philosophical foundations of physics, together with the philosophy department. I believe that that program is sort of a couple of years is typically what it is.

Q Do any of those master's students receive instructional or research appointments in the physics department?

A No. I should say I believe no, I'm not absolutely sure.

MR. BRILL: I don't have anything further on direct.

HEARING OFFICER EVEILLARD: Okay. Off the record.

(Whereupon, a brief recess was taken.)

HEARING OFFICER EVEILLARD: Back on the record.

CROSS-EXAMINATION

BY MR. MEIKLEJOHN:

Q I may be sorry, but I have two physics classes.

A Excellent.

MR. BRILL: We only have till five o'clock this afternoon.

MR. MEIKLEJOHN: I thought we had another witness.

HEARING OFFICER EVEILLARD: You don't have another witness?

MR. BRILL: No, I meant if he's going to ask physics questions. I know, because I asked the question the other day, we could still be at that.

HEARING OFFICER EVEILLARD: I was getting excited.

BY MR. MEIKLEJOHN:

Q Well, first, is it possible to give a concise layman's explanation as to what compressed matter is or not?

A Compressed matter? I'm not sure --
Q That was one of the departments you mentioned.
A Oh, condensed matter.
Q Condensed, excuse me, condensed. It's my handwriting that's the problem.
A Yeah, condensed matter simply refers to the fact that -- sometimes, it used to be called solid state physics. The new name is condensed matter. And typically what it means is that you're looking at states of matter that aren't normally present here. So one of the states of matter you might look at is two-dimensional matter, so the stuff that isn't in three dimensions but in two.

An example of that that got a lot of publicity also won the Nobel Prize recently was what's called graphene. Graphene is a two-dimensional array of carbon atoms and it has some very nice and interesting properties. And so that kind of physics studies these kinds of crazy, different forms of matter which you don't normally see; although, graphene is actually easy to find. The way they made it was you can take one of your pencils and a piece of Scotch tape, and when you pull off the Scotch tape, having attached it to the pencil, typically you've made a layer of this two-dimensional graphene.

Q Just single atoms?
A Single atoms, yeah.

HEARING OFFICER EVEILLARD: I object to that question.

MR. BRILL: Overruled.
BY MR. MEIKLEJOHN:
Q How did your students research into the decay of the X boson work out? Did the boson decay as predicted by theory or --
A Well, since you asked, this one was -- this particular decay was not -- given the amount of data that we had at the time, was not expected to be visible. In other words, it decays so infrequently that with the amount of data we had, we didn't expect to see it. So, in that particular case, he was looking to see if something crazy was happening the other way; in other words, if you had seen it, then you would have said, whoa, whoa, whoa, that's something different, that was not what was expected. So he didn't see it, but that's what we expected, to not see it.
Q So it was consistent with theory.
A It was consistent with the theory, that's exactly right.
Q You testified that the university provides you with support for 10 months of the year and that --
A Nine months.
Q Nine months, I'm sorry.
A Me.
Q A faculty member?
A Yeah.
Q It's not just you, personally. All --

A No, no, all faculty members, yes.
Q And that for some faculty members anyway there is other support available during the summer. Can you define the term support, as you used it in your testimony?
A Hopefully, I'm not going to get us into trouble. What I mean is -- I mean it's what appears in my bank account.
Q It's money.
A It's money, salary. It gets taxed. It gets all those horrible things happening.
Q And so when that word support is used, well, it's used somewhere in the documents that you've introduced regarding the graduate student, when you talk about support for the graduate student that's also referring to pay that they receive, correct?
A Correct. Again, appears in their bank account.
Q Not in yours.
A Not in mine, no.
Q That would make for --
A I'd be in a different trial.
Q The admission letter or the fellowship package on Page 2 of the admission letter, which is Employer Exhibit 99.
A Yeah.
MR. BRILL: Just wait one second.
BY MR. MEIKLEJOHN:
Q The paragraph that counsel referred you to that says your

fellowship includes participation in the department's professional apprenticeship, by the phrase apprenticeship, do you mean that the student is performing functions for which he both learns and he is also performing work for the university?

A I guess I would say mostly a learning aspect. I would say that it's mostly for the benefit of his or her learning. Of course, it helps the department in this particular case. They are teaching those lab sections. Without them, we couldn't do that. We'd have to have a different way of doing that. I'm not sure I'm answering the question.

Q No, you are. What alternative would there -- well, let's go to the lab sections. As I understand it, the lab sections that are taught by the teaching assistants or teaching fellows are associated with their lecture class, is that right?

A They are associated -- they have a separate course number, so they stand on their own as a course. But the topics covered are being covered in lecture, but there isn't a very, which we are not terribly good at, making it a close one-on-one relationship. It's not that in the lecture you say next week you're going to be doing Experiment X. Hopefully, what happens is that you're covering that topic in the lecture and, indeed, you're doing Experiment X and it happens to correspond with it. But it's not closely, closely coupled.

Q Okay. These are undergraduate classes, correct?

A Correct.

Q And the students who take the undergraduate classes, are they required to take both the undergraduate lecture class and the lab section simultaneous?
A It depends a little bit on what area they are. We teach pre-med students. We teach engineering students. And we teach our own physics majors. So the physics majors have to take it. I think the pre-med students have to take it. And I think some set of engineering students have to take it, but not all of them.
Q So there are some students who take the lectures, but don't do --
A Correct.
Q -- the experimental work?
A Correct.
Q Please try to wait till I finish the question.
A Sorry.
Q I know it's really obvious where I'm going and it's probably painful to listen to my voice, today, but the court reporter has to get down both the question and the answer, and that's hard to do if we're both talking at the same time.
So everybody in the -- or all the students in the laboratory sections that are also attending the lectures are supposed to be attending the lectures?
A Correct.
Q All right. And Exhibit 55 contains some detailed

instructions on the, you don't have to look at them quite yet, on the duties that the TAs or teaching fellows are expected to perform in the lab. But is part of their function to show the undergraduates how to use the equipment properly?

A Yes.

Q And to see that they learn how to conduct the experiments?

A Yes. I mean not to do the experiments for them, of course, but to help them and aid them, and them doing the experiments.

Q I see one of the things that it says in the instructions is that they shouldn't -- that it would be easier for everybody if they told the students exactly how to do the experiment step by step, but then there wouldn't be as much learning that would result from that. I mean the idea is that they do their jobs in the way that affords the most learning opportunities possible for the undergraduates.

A Correct.

Q I mean that's sort of the function or the purpose of all these teaching functions is to help the undergraduates to learn.

A Correct.

Q And that is presumably one of the reasons why these undergraduate students are paying tuition to the university, correct?

A Correct.

Q I do have some questions about Employer Exhibit 55, which was the manual for the physics department teaching fellows.

HEARING OFFICER EVEILLARD: He has it in front of him.

MR. MEIKLEJOHN: Pardon?

HEARING OFFICER EVEILLARD: The witness has it in front of him.

BY MR. MEIKLEJOHN:

Q Could you turn to Page 2?

A Yes.

Q And you see there is a listing of general obligations. It says as a member of the teaching staff representing the university in all interactions with your students, you're expected to following general accepted obligations to the teaching profession?

A Yes.

Q Do those obligations apply to faculty members as well?

A Let me read them. Responsibility, meet all teaching assignments promptly and fully prepared. Yes.

Impartiality, treat all students fairly and be sure that -- yes.

Consistency, although there is no intention to stifle individuality, you must be consistent with other teaching assistants. Not so much that one. I, as a faculty member, don't have to be consistent with other teaching assistants.

Q What about with other faculty members?

A Even that, we can teach the same course and we teach them slightly differently, so I'm not sure that that one necessarily is correct. Professionalism, yes.
Q You did say something about if the teaching assistants, well, I don't remember exactly what you said. What alternative would there be or what other resources would be available to teach the laboratory sections if you did not have graduate teaching assistants to do that work? Who would it fall to?
A This is perhaps a little facetious. If you hired another 40 faculty members in my department, which I'd be happy to do, then faculty members could teach the lab sections.
Q But that would be --
A Couldn't.
Q The university isn't going to give you the resources to hire another 40 faculty members, are they?
A No.
Q I understand that's short-sighted of the administration.
A Correct.
Q But it would be much more expensive.
A Yes, it would.
Q I'd like you to take a look at Employer Exhibit 102, which is the student orientation by -- do you call him Professor Dodd?
A Yes.
Q Could you turn to the second page, or the first page in

substance?
A Introduction?
Q Introduction, that's the one.
A Okay.
Q You were asked some questions about the bullet point that begins teaching is an area important. I would ask you if you see the bullet point that says the TAs provide very important assistance to the department through their various teaching roles. Do you agree with that statement?
A Yes.
Q Could you explain what it is about the work of the TAs that is important to the department?
A I think it's a little bit what we just said. They teach these laboratory sections. Teaching laboratory sections is, from the department point of view, key for the undergraduate education. And so addressing here is the importance to the department, not the importance to the graduate students, which was from the other box. They, in their grading and proctoring roles, again, they provide important assistance to the department. These are roles that we would have to do somehow.
Q I think we can move onto the research assistant functions now. First, you said that in the course of someone joining a group, you referred to a group rather than going to work for a particular principle investigator. In your experience, is it typically the case that the entire group participates in making

the decision as to whether a graduate student can become a research assistant in that group?

A Yeah, so when I said that, that's a little bit colored by my own personal experience where we have a large group working on the same experiment. There are -- in condensed matter. There are PIs which are groups that are single PIs. So in that sense, in that case, it would be just that single PI making that decision.

Q The PI might have or there are instances where the PI would have other graduate students working with him or her and other people working in his or her lab?

A Correct.

Q Typically, would those individuals participate in deciding whether to add a person to the group or is it generally up to the PI individually?

A I would say it's up to the PI. I could imagine that the PI might consult the post-doc. I doubt that the PI would consult with the graduate students except for maybe general things, saying, you know, we're getting another student. I doubt it. I think it's an individual, you know, it's an individual process. Some PIs might, some might not. My guess is that most don't.

Q Okay. And you listed some of the factors that the group, or the PI individually, would look to would include the student's academic work, is that correct?

A Yes. All things are on the table. I mean they look at their academic work. They could look at if they've had research experience.
Q One of the things you mentioned was whether the individual would fit with the group.
A Yes.
Q Are you looking to ensure that -- when you say fit, you mean does the person have skills that fit the group, or are you also considering whether the personality is going to be disruptive of the workplace?
A I think it could be a bit of both. I mean, to give you one example, it's possible that somebody said they want to come work with our group, experimental particle physics. Students in our group have to spend time at CERN, in Geneva, Switzerland, at least a couple of years. Maybe a student said, you know, I came to Columbia to be in New York City. I'm not going to go to Geneva. If that were the response of the student, we'd say, sorry, we can't take you.
Q Okay. Do you consider issues of whether he's going to work well with the other people in the group?
A I think in general you'd like to have that, yes. You work closely together, so you'd like some level of compatibility.
Q I mean I think you used the phrase do we like this guy, when you --
A A sort of colloquial phrase. But I mean what I -- what do

I mean in that. I don't have a specific example, but you could imagine someone that -- sorry, I'm trying to think of an example and I'm not coming up with one.

Q Well, Sheldon is a theoretical physicist so he wouldn't be applying to work in your lab.

A That's right.

Q But is that personality issues might come into play?

A I think if there were a sort of extreme. Obviously, we're all slightly quirky and, you know, have different personalities. But, yeah, if there was something really extreme, somebody -- look, here I am making one up, right? I mean suppose a person said, you know, I really can't work with women in the laboratory. If somebody said that, I would say, look, we've got a problem. We can't do that.

Q He has a problem, but, okay.

A He has a problem, I understand. But I'd say that may be your viewpoint, but, sorry, that's not going to work.

Q You testified that I think more than half of the way -- of your research assistants who are PhD students after obtaining their degrees go on to be post-docs for some period of time before they land a more permanent career path?

A Certainly, if you're following the academic career path, it is, barring some very real exceptions, the career trajectory would be get your PhD, have a post-doc for -- typically, a post-doc is for three or four years, and then after the

post-doc you would look for some kind of junior faculty position. That would be that path.

Q Is it typically the case that when the individual becomes a post-doc, they continue to follow-up on the research that they were doing as a graduate student?

A Not necessarily. There are many different ways that can happen. In our -- again, let me take a personal example. We could have someone that graduated, got a PhD, on our experiment, this ATLAS experiment. Maybe they would join another experiment and do something still particle physics, but relatively speaking completely different.

Q And when they become a post-doc, they would be still working under the direction of a PI?

A Correct.

Q And I think you used this term, but the PI is a faculty member or members who are in charge of the lab, correct?

A Correct.

Q I think you did define that.

A Correct.

Q And so the post-doc might be doing a -- working on a grant awarded or sponsored by a different PI, doing a different experiment?

A I'm not sure I understood the question.

Q Well, let me just ask are there similarities between the work that a post-doc would do and the work that a graduate

research assistant would do?
A I would characterize the differences as the post-doc, having now gone through sort of that educational experience of having been a graduate student, is able to sort of stand on his or her own two feet and carry out the research program with little or no direction from the PI. Whereas a graduate student is still learning and so needs that direction, that guidance in order to accomplish their tasks.
Q Okay. I take it there is similarly a progression from being a post-doc to being a junior faculty member.
A Sure. One example would be that the post-doc typically does not have his or her own grants. And so the skillset of writing your grant proposal and being funded is something that you would do as a junior faculty member, but not usually as a post-doc.
Q In your experience, do PhD candidates stay on at Columbia as post-docs on occasion?
A On occasion, yes. Typically, I would say that's not the case. In general, I think we like to have people have other experiences, see what -- it's helpful for their career to move on and do something different. The case where maybe they continue on as a post-doc for a brief period is that perhaps they don't have a job lined up and so you might keep them on as a post-doc for a year, six months, while they find another position. And that's simply because they already have their

PhD, so they have to be a post-doc.
Q What would they do as a post-doc under those circumstances? What kind of work would they do?
A Again, they would -- it's a little bit as I described before. They might have a particular project that they would lead or be principally responsible for.
Q In your testimony about the duties of a research assistant, you indicated that the examples that you gave involved building a detector, or calibrating a detector, or designing software to calibrate a detector, which I see how that fits in with your work. Are there benefits to the university of the research associate -- research assistant building or calibrating these detectors?
A Again, it depends a little bit what you define by benefits. I mean if one of the benefits is the Columbia physics department, in the top 10 physics department of the top two, the fact that the research that's going on may put you in the higher ranks, yes, that's a benefit. If you ask does it have a financial benefit, I don't think so.
Q It furthers the mission of the university of conducting research and being a top research university.
A Sure, yes.
Q And the university also provides a number of -- let me strike that. Let me rephrase the question. The university also provides a support system to assist faculty members in

applying for and obtaining grants, is that correct?
A Yes. There is an office of sponsored research that does provide that sort of assistance.
Q Are there other offices that are involved in encouraging research as well?
A I don't think in a formal sense. I mean we do have our vice president for research has people in their office that pay attention to funding or fellowship opportunities that might come up and bring those to our attention; so, in that spirit, yes.
Q Do you have an understanding of why the university provides these programs to support research or grant writing?
A I think part of the mission of the university is to support the faculty in their endeavors and their research.
Q And part of this is to bring in money for that research?
A To bring in money?
Q The purpose of these programs is --
A To allow the research to be done, yes, and if that requires money, which it does, yes.
MR. MEIKLEJOHN: I'd like this document marked as Petitioner's Exhibit 48.
(Petitioner's P-48 identified.)
HEARING OFFICER EVEILLARD: Okay.
MR. MEIKLEJOHN: Have you had an opportunity to review Petitioner's 48?

MR. BRILL: I haven't. Could you give me a few minutes?
HEARING OFFICER EVEILLARD: Oh, okay.
(Pause.)
MR. BRILL: Can I skip the section on research involving humans or animals?
MR. MEIKLEJOHN: Yes.
MR. BRILL: Okay. I'm almost done.
MR. MEIKLEJOHN: Yeah, some of these wouldn't apply directly to the physics department.
THE WITNESS: That's right.
MR. MEIKLEJOHN: As counsel pointed out to me.
(Pause.)
MR. BRILL: Okay.
BY MR. MEIKLEJOHN:
Q I don't know if the witness -- are you still reviewing this? You can skip the part about animals.
A I mean if you're going to quiz me on any particular point, I may have to look at it. But, in general, yes, I've looked at it.
Q Okay. Do you recognize this as a document prepared I believe by the Office of Sponsored Research to aid principle investigators in applying for grants?
A Yes. I, personally, have not looked at it before; but, yes, it is. It comes from their office. It's clearly --
MR. BRILL: So if the witness -- he's basically saying he

can't identify it, as I understand his testimony.

MR. MEIKLEJOHN: He appears to also recognize the source of the document. I mean I'm going to -- I'll move it, as it's also available on the website of the Office of -- what's the correct name of the office?

THE WITNESS: Sponsored research. This comes from the Office of the Executive Vice President for Research, Michael Purdy.

MR. MEIKLEJOHN: Oh, I see, yes. I move Exhibit 48.

MR. BRILL: Well, first of all, it's not from the Office of Sponsored Research.

MR. MEIKLEJOHN: No, he made that clear. He said it's from the vice president.

THE WITNESS: It's from the vice president for research.

MR. BRILL: So I don't -- I mean, look, If Mr. Meiklejohn is representing that this is representing that this is a document off of Columbia's website, then I'm not going to object to it. But it's subject to us checking that it is what it appears to be on this card. I note that the date is March of 2011. But with that caveat, we would not object to it.

HEARING OFFICER EVEILLARD: Okay. It's admitted.

(Petitioner's P-48 received.)

MR. MEIKLEJOHN: Yeah, there were some recent changes to the technical requirements, but this is pretty broad.

BY MR. MEIKLEJOHN:

Q Are you familiar with the standards listed under financial management, of the applicability of these standards to sponsored grants?
A In general. I haven't read every single bullet point here. I could do that, if you want me to.
Q I would draw your attention to the one that reads costs charged to sponsored projects must be --
A Okay. Okay, I've read that.
Q Those requirements would apply to stipends or salary of graduate students paid for out of the research project -- out of the research grant?
A I'm sorry, could you repeat the question? I didn't --
Q Maybe I should lay more of a foundation. It is the case that if a graduate research assistant is working on a project funded by a government grant that the government grant would typically pay the stipend or salary of that graduate research assistant, correct?
A Correct.
Q And the standards for costs that can be charged to the project would apply to the stipend or salary of that graduate research assistant, correct?
A Correct.
Q So I mean that would include the ones that are listed on this document?
A Correct.

Q If you could return to the back of the document or the second page where there is -- the original of this appears to have been in the form of an eight-page brochure. So in the part which would have been Page 4 of the brochure, there is a reference to effort reporting. Do you see that?
A Yes.
Q Are you familiar or have you had to do effort reporting on your grants?
A Yes.
Q Can you explain what effort reporting is?
A What we see in the effort report that I get to fill out is the source of funding for a particular person, so maybe they have different grants, maybe it's the university that's paying, and then one is required to fill in the effort, the work effort associated with each of those funding sources for that person.
Q So if you have a graduate research assistant working on a project, you would have to indicate what percentage of that individual's work was devoted to the work on the funded grant?
A Correct.
Q And that's a condition of receiving the funding under the grant?
A I believe the effort reporting is a Columbia-imposed piece. I'm not absolutely sure of that. But I think it's in response to maybe perhaps OMB (ph.) or somebody regulations, but the implementation of it I think it in Columbia.

Q But Columbia requires you to report on the extent to which the work of the graduate student assistants, as well as others working on the project, relates to that project or the percentage.

A Correct.

Q Now are you familiar with the award of indirect costs on federally funded projects?

A In general.

Q There are a lot of complicated technicalities, correct?

A Right.

Q But, in general, the university -- strike that. The funds that are received under the federal grant are received by the university, correct?

A Correct.

Q And I understand you have explained that the university then uses -- somebody has, I think it was you -- uses those funds to sponsor and further research, correct?

A Yes.

Q When you receive the grant, you receive funding for certain direct costs, including the salary or stipend of the graduate research assistants working on the projects, if any, correct?

A Correct.

Q And in addition, there is a formula for receiving additional funding under a federal grant to cover the indirect

costs of conducting research at the university, correct?
A Yes, in the sense that's just part of the grant. That's folded into the grant that you get.
Q Well, your grants are much bigger than this. But say you wrote a grant for or you apply for a grant at $100,000 in direct costs associated with it, correct? You understand, right?
A Sure.
Q And in applying for the grant, you would also be able to request additional funding for indirect costs incurred by the university, correct?
A Correct. So just if I can add, if there was 60 percent in indirects, your grant would be you'd ask for $160,000, 60 indirect and 100 direct.
Q That's exactly where I was going, so I appreciate you for making it simpler. It's additional money on top of the direct costs that are received by the university.
A Correct.
Q And 60 percent is the rate that the university is currently -- the indirect rate that the university is currently receiving, correct?
A Now you're at the complication part. It depends exactly what those costs were. Some have 60 percent. If you're off campus, it's 26 percent. If it's capital equipment, it's zero. So it depends what it is.

Q So if you have a graduate research assistant who is conducting research on campus, that would be considered a -- that's an eligible direct cost, correct?
A Correct.
Q And so you could receive an additional 60 percent or the university would receive an additional 60 percent for that student's work performed on campus, correct?
A Correct.
Q And if that student went to Switzerland, then you would only get an extra 26 percent in indirect cost.
A The university would.
Q The university, yes. I understand the part how it doesn't end up in your pocket. You've gotten $25 million in your own pocket, you might not be here, today.

MR. MEIKLEJOHN: I have some other documents I have obtained, I guess as the witness very astutely pointed out, that are actually authored by the executive vice president for research and not by the Office of Sponsored Research. But I don’t need to question the witness about the documents. I just will be offering them after we conclude the witness' testimony.

HEARING OFFICER EVEILLARD: Okay.

MR. MEIKLEJOHN: So I have no further --

HEARING OFFICER EVEILLARD: Anything further?

MR. MEIKLEJOHN: No further questions.

HEARING OFFICER EVEILLARD: Mr. Brill?

MR. BRILL: Maybe a few.

REDIRECT EXAMINATION

BY MR. BRILL:

Q Doctor Tuts, how many hours a week does a graduate research assistant spend on the work he does as a graduate research assistant?

A It varies tremendously. I am going to say it depends on the student, what's going on and so forth, but 60, 70 hours a week.

Q Is there any way to distinguish -- you were asked about percentage of effort. If the student is wholly supported, if his stipend is wholly supported on a grant, would his percentage of effort then be 100 percent --

A Correct.

Q -- on the grant. And is there any way to distinguish how many hours he's spending on say dissertation work versus other types of work on the grant?

A No. It's all research. And maybe ask the question again?

Q Well, I'm just trying to figure out if there is any way to distinguish if the student is putting in 80 hours a week as a graduate research assistant, is there some way to say part of that is just work as a GRA and part of that is work as a student on his research?

A No.

Q It's all the same.

A It's all the same.
Q You talked about covering the work of the lab sections if you didn't have the TAs to do that. And you talked about on possibility would be to hire more full-time faculty. Would there be other types of instructors that might be used to do that, for example adjunct faculty or lecturers?
A I could imagine it could be adjuncts, yes.
Q Or lecturers?
A Yes.
Q And do you know if --
A Or existing faculty, I mean if you wanted to work more.
Q You could have existing faculty do it.
A Could do it, existing faculty.
Q Do you use adjunct faculty in the physics department at all?
A We have two adjunct faculty.
Q Are they paid by the course or --
A They are paid -- yeah, they are paid by the course. They have -- they've been teaching the same course for quite a long time. And there is a salary that they get for teaching that course.
Q So I guess my question is as chair of the department if you had to hire adjunct faculty to cover these laboratories, do you know how you would compare the cost of that to the cost of what it costs you to support a PhD student?

A I'd have to look. I don't know, off the top of my head.

MR. BRILL: All right, I don't have anything further.

MR. MEIKLEJOHN: I have some follow-up.

RECROSS EXAMINATION

BY MR. MEIKLEJOHN:

Q What do these two -- these two adjuncts teach the same course? Are they --

A No. We have one adjunct that teaches sort of an advanced laboratory course. I'm not -- the courses we've been -- the labs we've been talking about here are introductory courses. So he teaches an advanced, sort of junior/senior level laboratory course. That's where students actually really perform one or two experiments over the course of a semester, not a dozen like these ones. And we have one adjunct faculty member that teaches an evening course during the summer.

Q You've been at Columbia since 1980 something.

A '83.

Q '83, okay. Has Columbia been using TAs or TFs to teach these lab sections for that entire 32-year period?

A Yes.

Q Have you ever heard of any university using adjuncts to teach laboratory sections in physics?

A I don't know, but I don't know that I would have.

MR. MEIKLEJOHN: Nothing further.

HEARING OFFICER EVEILLARD: Mr. Brill?

MR. BRILL: No.

HEARING OFFICER EVEILLARD: Thank you, you're excused.

(Witness excused.)

HEARING OFFICER EVEILLARD: We're adjourned until one o'clock.

MR. MEIKLEJOHN: Oh, I have some other -- why don't I give these documents to counsel to review and then I will offer them.

HEARING OFFICER EVEILLARD: You'll offer them when we come back?

MR. MEIKLEJOHN: When we get back, yes.

MR. BRILL: Here, give them to me.

(Whereupon, at 11:59 a.m., a luncheon recess was taken.)

A F T E R N O O N S E S S I O N

(Time Noted 1:16 p.m.)

HEARING OFFICER EVEILLARD: Back on the record.

MR. MEIKLEJOHN: During off the record conversation, I shared a couple of other documents and proposals with the Employer. One is a quick guide to research that we located on the university website. I'd like that marked as Petitioner's Exhibit --

HEARING OFFICER EVEILLARD: 49.

MR. MEIKLEJOHN: 49.

(Petitioner's P-49 identified.)

HEARING OFFICER EVEILLARD: I understand there is no objection?

MR. BRILL: No objection.

HEARING OFFICER EVEILLARD: It's admitted.

(Petitioner's P-49 received.)

MR. BRILL: Except for the fact that the second page is upside down.

HEARING OFFICER EVEILLARD: Anything else?

MR. MEIKLEJOHN: Yes. We also would like to introduce excerpts of the Columbia University sponsored projects handbook. I don't know whether I need to identify which pages, necessary. We've included the entire table of contents. And then Pages 1 through 7 and 57 through 69.

HEARING OFFICER EVEILLARD: That's Petitioner's 50.

MR. MEIKLEJOHN: That's Petitioner's 50, yes.

(Petitioner's P-50 identified.)

HEARING OFFICER EVEILLARD: No objection, I understand. Okay, it's admitted.

(Petitioner's P-50 received.)

MR. MEIKLEJOHN: Can I ask them one other thing off the record?

HEARING OFFICER EVEILLARD: Off the record.

(Discussion off the record.)

MR. MEIKLEJOHN: We've agreed that the indirect cost ratio that Professional Tuts testified applied to Columbia University, the 60 percent for on-campus research and 26 percent for off-campus research, also applies to research at the engineering school with respect to yesterday's witnesses' testimony about research at the engineering school.

HEARING OFFICER EVEILLARD: Noted.

Mr. Plum, would you like to call your witness?

MR. PLUM: Sure. I'd like to call Professor Holger Klein.

HEARING OFFICER EVEILLARD: Professor Klein, have a seat here.

THE WITNESS: Thank you.

HEARING OFFICER EVEILLARD: Please raise your right hand.

(Whereupon,

HOLGER KLEIN,

was called as a witness by and on behalf of the Employer and,

after having been duly sworn, was examined and testified as follows:)

HEARING OFFICER EVEILLARD: Could you please state your name loud and clear, and spell your last name for the record?

THE WITNESS: Holger Klein. Last name is K-L-E-I-N.

COURT REPORTER: And your first name?

THE WITNESS: H-O-L-G-E-R.

HEARING OFFICER EVEILLARD: Mr. Plum?

MR. PLUM: Thank you.

DIRECT EXAMINATION

BY MR. PLUM:

Q Professor Klein, would you describe for us your educational background?

A I was educated in art history, archeology, German literature at the Universities of Fribourg, in Germany; Munich, in Germany; the University of London; and the University of Bonn, in Germany.

Q Would you tell us about your work history?

A Yeah, after receiving my PhD at the University of Bonn, in 2000, and in fact shortly before that I joined Columbia University as an assistant professor of art history. Before that, I was a post-doctoral fellow at the Metropolitan Museum, the Walter's Art Museum in Baltimore, and the Dumbarton Oaks Research Center, which is part of Harvard University, in Washington, DC.

Q What is your current position at Columbia?
A I am the chair of the Department of Art History. And as chair, I am the person in charge of all the administration of the Department of Art History and Archeology at Columbia.
Q Would you give us a brief, general descript of the Department of Art History and Archeology?
A How short do you want it? The brief description --
Q We've been talking to Audrey since --
MR. BRILL: I think Audrey is ready to leave right now on vacation.
THE WITNESS: So the Department of Art History and Archeology at Columbia is one of the foremost departments of art history and archeology in the United States and internationally. It is well regarded and it is one of the largest both in terms of the size of its graduate students and in size of -- in terms of the size of its faculty. We have about 25 faculty members teaching art history and archeology all the way from Ancient Assyria to contemporary New York. And we have various programs. We have an undergraduate majors program. We have two MA programs. We have a PhD program in art history and archeology. That's the very short version.
BY MR. PLUM:
Q That was good. That was very good, thank you. Let's talk a little bit first about the PhD program. And if you could just describe that program for us, the goals of the program,

type of students who are admitted?
A Yeah. So the PhD program in art history is a program that is a fully-funded program for PhD students which admits an average or median of about 14, 15 PhD students a year. The PhD program is a fully-funded program, which means that there is a five-year funding package for PhD students entering the program. And that has been the case for a little bit over 10 years that we are offering incoming PhD students this 5-year funding program, and I'm sure that other people have spoken about the funding for PhD students at Columbia before.

What we are doing in the PhD program in art history and archeology is train students to be both curators at museums, at art museums, and academics and foremost academics to fill academic positions from assistant professor and then grow in those positions to full professors at liberal arts colleges, research one universities and smaller universities.

Q How do students apply to the program?
A Students apply through the Graduate School of Arts and Sciences. The department, itself, does not admit any students. The Graduate School of Arts and Sciences is admitting all PhD students that are part of our department. We get our admissions targets from the graduate school based on the fact that it is one of the departments in the Arts and Sciences of Columbia University.
Q Who makes the admissions decisions?

A It's a faculty committee. Usually, the way that our admissions process for PhD students works is that we get about an average of between 180 and 250 applications a year. And those 180 to 250 applications are vetted by faculty in the department, and faculty rank the students according to the quality of the application. A faculty committee, the so-called PhD admissions committee, is then looking at faculty recommendations. And the students -- the best students out of the various fields of art history are then compared with each other by the admissions committee, and the best 14, 15 students, in fact, the best 20 students are getting an offer. Of those 20 students, we hope that about 14 or 15 are coming every year.

Q When you evaluate the qualifications of the students for admission, do you look for or look at teaching skills or teaching abilities?

A No, we do not, because the undergraduate students or the students with an MA degree, who are applying for the PhD program as the highest degree program in the field, in the discipline of art history, do not have teaching experience, typically. It depends, of course, on where they are coming from. So one or the other student who is coming from overseas and who is from a different program might, in fact, have some teaching experience as a tutor, but that is a minute minority of those students who are applying.

Typically, neither undergraduates who are applying after the BA degree nor MA students who are coming to our program have any teaching experience. We are accepting them based on the transcripts, meaning their grades on record from their undergraduate or graduate degrees, or/and their publication if they exist. Typically, the student who is applying for our combined MA/PhD program does not have any publications, so it is essentially the undergraduate transcript that we go by or the MA degree that the students have sometimes received as a standalone MA before they enter our program.

MR. PLUM: What is our last exhibit?

HEARING OFFICER EVEILLARD: 102.

MR. PLUM: Let's mark this as Exhibit 103.

(Employer's E-103 identified.)

BY MR. PLUM:

Q Professor Klein, do you recognize what we've marked as Exhibit 103?

A Yes. Not in this fancy printout, but I suspect this is a printout from the graduate school's website that describes our MA/PhD program.

MR. PLUM: I'd like to have Exhibit 103 in evidence.

MR. MEIKLEJOHN: No objection.

HEARING OFFICER EVEILLARD: Admitted.

(Employer's E-103 received.)

BY MR. PLUM:

Q Professor Klein, I'd like to sort of walk through the typical progression for a PhD student in art history and maybe you could describe the progress beginning in the first year?

A Yeah. Typically, as I said, a PhD student comes to the department with a five-year funding package when they are admitted by the Graduate School of Arts and Sciences. And the way that these five years, the first five years usually because rarely does a PhD student finish a PhD degree in five years. It usually takes six or seven years for them to finish. The first five years are usually structured as follows.

An incoming student comes in and the first year is essentially an adjustment period to the PhD program, in which the student takes classes. Typically, it's six classes to eight classes during that first academic year that they're in the PhD program. They have no teaching responsibilities. The only responsibility that they have is attending classes, including one mandatory class which is an introductory level history and historiography of art history class, which we call the proseminar.

This is essentially to allow MA students who are coming in to do a PhD and undergraduates who are not coming in with a higher degree in art history to get up to the same level, the proseminar is.

Q What happens during the second year?

A So the typical route for a PhD student in our program is

after this first year, which is essentially a year in which only course work is taken without any responsibilities, the second year in our department, a student takes on what we call a TAship. Typically, they are taking on a reader/grader role in which they assist a professor running a large lecture course with grading of seminar papers, assignments, mid-term and final exams. Sometimes, they take students to a museum and to some museum excursion with those students, but it depends very much on the class. Some professors do not require any museum visits. So we try to restrict the responsibilities in that second year to the tasks in which PhD students assist professors in the running of large lecture course for undergraduates.

Q In that second year, do the students also continue to take courses?

A Yes, of course. They always do course work for the first three years until the moment when in the spring semester of their third year, they are taking the M.Phil. examination, which is the comprehensive exam that allows them to do dissertation research.

Q And so that's typically taken in the spring semester?

A Of the third year.

Q Of the third year.

A So year two and three are usually years in which students take courses and are assigned to TAships, to teaching

assistantships. As I said, in the first year of their teaching, which is the second year in the program, they typically serve as reader/graders.

In the third year, they take on slightly larger responsibilities and serving as what we call section leaders, which means that in a large lecture course, that the professor identifies, is run with sections, discussion sections typically for undergraduate students. These graduate students take on the role of a moderator of discussions in those discussion sections.

So they run the discussion sections in addition to sitting in on those classes, accompanying the professor and the classes. And usually they do not take on reader/grader assignments, but that is also possible during that time when they do the section leading. It is a staggered process in which, in the second year, the PhD student would serve as a reader/grader.

In the third year, typically, as a section leader, which is slightly more involved because they are facing a group of a maximum of 15 students who are asking questions about the lecture that they heard earlier in the week, in which they have their own monuments, or paintings, or sculptures that they bring in as slides into the class and exemplify certain aspects the professor has asked them to discuss in more detail with their students. So it's essentially an advanced discussion

workshop.
Q Before we move onto the fourth year, I'd like to ask you a couple of questions about the first few years. First of all, is teaching a requirement of receiving a PhD degree in art history?
A It is. It's a graduate student requirement. The graduate student (sic) requires all students to teach for two years in the program and that is a requirement because as an institution and as a department that trains academics, teaching and research are the two components that these students will be asked to perform when they get a job in the outside world with the highest degree in their field. So the teaching is a requirement for anybody who is entering the job market with the highest degree in art history.
Q What kind of time commitment is involved during the second year?
A It depends very much on the students. There is no time commitment that we, as a department, set if there are now some students in the back, so that's very good to know. So the time commitment is not set. It depends very much on the student him or herself how much time is involved. It also depends on the course. Reader/grader responsibilities are usually more involved at times of exams, mid-term and final exams, when those are graded. The students have to, of course, take on the task of grading those exams after the exam period is over and

have them back ideally in two weeks' time.
Q What about in the third year, what does the time commitment involve?
A It's the same, because we do not necessarily distinguish between reader/grader tasks and section leader tasks. The TAships is essentially the same for the second and third year. Again, there is no explicit time commitment. The students, of course, have to sit in those lecture classes that they are TAing for, which means that these are classes that they visit as students. Often and most commonly it is classes in their fields, but we also make sure that they are taking a TAship in classes outside of their field, because that will enrich their experience and their expertise in other fields of art history that are not their own.
Q So you've talked about the importance of having teaching and research skills at post-graduation and in the job market. How do you describe the relationship between teaching responsibilities and the student's career or coming career as a professional art historian?
A It depends. As in art history, broadly speaking, we are preparing, as I said at the beginning, students for different types of jobs. The most typical job that we prepare students for is that of an academic art historian, meaning that they need to be prepared for teaching and research at their future job, at a liberal arts college or the university of any level.

There is also a segment of students who are coming to our department to pursue careers as curators in major art museums or smaller art museums. And for those career opportunities, teaching is not necessarily required, but it is often impossible to tell whether somebody is taking a job as a curator or somebody is taking a job as a professor.

In my own case, I served as a professor for four years. And then I got a call from a museum and I became a curator for four years before I returned to the university and became a professor again. So those aspects are impossible to predict. But typically for all institutions of our caliber, I would say PhD programs train students to be both, to be versatile in research, to be versatile in teaching, and to be versatile in talking and speaking about, working with objects if they should pursue a museum career. So these are the trajectories.

Q You said that some of the teaching is outside of -- the teaching assistant responsibility is outside of the student's particular area of expertise. Does that kind of teaching play a role in the student's development as a professional, either as a curator or an art historian?

A I would say definitely. What we are trying to aim at is to have a very broad education for everybody who is coming into the program. So this looking broadly rather than into one specific discipline, we could qualify those individual focus areas as M.Phil. subfields because these are areas that are

specific focus for a self-discipline of art history, so somebody would study ancient art and they will, of course, focus on Greek, Roman, and Eastern (ph.) art, or other ancient art of the Mediterranean basis. Egyptology is not possible to study with us; but, other than that, the students would get a very broad education in that area.

But we very much want to educate art historians broadly speaking so even somebody who has a focus area of ancient art should go away and get out of the PhD program with having a general knowledge of the broader history of western art, as well as of art broadly speaking in a non-western discipline. So we have one non-western course that is required of all PhD students and, likewise, we have courses in western art that everybody has to study or at least take one course for credit in an area of western art if they are of a non-western subfield like African art, or Indian art, or Chinese art, for example.

Q How does the teaching requirement in particular relate to that goal of training broadly based art historians?

A It depends. You might have a student who is specializing in medieval art and we make that student or we assign that student to a class that is a survey in Roman art or in renaissance art, or in African art for that matter. The expectation among the faculty is very much that a student who is able to teach art history needs to be able to teach art history even outside of their specialty area, outside of their

area of focus. So whether you're talking about a sculpture or about architecture, you are developing skills that will allow you to talk about Mesopotamian architecture, even if you're a modernist who is focusing on 20th century New York architecture. So, for example, that's one area.

Q Before we move onto the fourth year, you talked earlier about the comprehensive examination and the M.Phil. degree. Could you describe the comprehensive examination for us?

A Comprehensive examination is usually an examination that requires the student to prepare major and two minor fields or a larger major and one minor field. It's very much a preparation for being fully formed teachers later on. What we want with this distinction between major and minor fields in the comprehensive exam is to identify for any future employer and to give the student an opportunity to display expertise in more than one subject area.

So, for example, a student in renaissance or medieval art might take a minor in a field that is outside of that field of renaissance art, so it could be Islamic art, for example. The job market in recent years has very much depended on people who were able to teach their subject area in renaissance, or medieval, or any other baroque art, and also teach courses, especially at liberal arts colleges, that are outside of that more classic field of specialization.

So the minor field allows a student to go in the job

market and actually have an expertise in one additional set of art history. And you will find that reflected in advertisements for jobs, as well, where an assistant professor in European art is sought, but where a secondary field specialization in another area is required or at least greatly appreciated.

Q After they take the comprehensive exam, do the students begin to focus on their own dissertation?

A Yeah. A successful defense or a successful passing of the orals examination is coming with the permission that the student is developing a dissertation proposal and that the student is going onto dissertation research. And at that point, they can apply for dissertation fellowship in the department and outside of the department broadly speaking.

Q Now in their fourth year, do the PhD students hold instructional appointments?

A They do sometimes. And I would say most often they do because the dissertation projects are not fully formed at the time when they enter in their fourth year. So you have to imagine that a student spends most of the third year or at least half of the third year in preparing for those comprehensive M.Phil. examinations at the end of the spring semester. Right now or in April/May, early May is high season for those examinations. And then the students go into the summer. And often by the fall of the fourth year, the first

part of the fourth year, the students have not defended their dissertation prospectus, which is essentially the comprehensive description of what the dissertation project will be like. Typically, that defense of the dissertation prospectus happens in the fall of the fourth year, sometimes as late as the early spring of the fourth year.

Q When students do have instructional appointments in the fourth year, at what appointment would they have? What do they teach?

A Typically, those students are no longer TAs for a specific professor, although that also happens. But most typically they are teaching a course that is part of our core curriculum. It's called art humanities. It's a course that our department, the Department of Art History and Archeology, fully staffs with its own faculty members, post-doctoral fellows, and graduate students. So there is a range of instructors who teach those classes for our 700 plus undergraduates who take that course every semester.

So since it's a requirement for the college, every undergraduate has to take art humanities, typically, they are taking it in their junior year and we are running as a department about 40 sections of that single course. So these 40 sections are taught by faculty, I would say it's about 2 to 5 faculty members on average; graduate students, as many as are available during that particular year, typically, about 8 to

12, I would say; post-doctoral fellows, which can be as many as 12 or 13 a year; and adjuncts, a small pool of adjunct faculty who we hire specifically to teach that course. All of them, apart from the graduate students, are essentially instructional faculty with a mandate to teach that particular course.

Q How would you describe the content of the art humanities course?

A So art humanities is a course that is a masterpiece course of western art. It was founded in 1947, so we have been teaching that for quite a while at Columbia. And this is a course that is essentially a school of visual literacy, I would call it. It's a course that teaches undergraduates from all walks of life and whether they have art experience or art history experience or not, the basic tools for visual literacy.

We are having a set syllabus for that course, so every section of those 40 sections taught to the 700 plus undergraduates has the same master syllabus. And it starts with Ancient Greece and the Parthenon as an architectural monument. It goes to Amiens Cathedral as a medieval monument. It goes to Raphael, as a painter. From Raphael, it goes to Michelangelo, usually as a sculptor. We go onto Bernini, to Bruegel, as a painter in the renaissance period in the north. It goes then further to cover people like Goya, Pablo Picasso, Frank Lloyd Wright, Jackson Pollock, l'Ecole Bussiere (ph.), and somebody I forgot, perhaps the students in the back can

help me. It's a wonderful survey of architecture, painting, and sculpture from antiquity to contemporary New York, essentially.

Q Is this the type of course that's taught by many other universities and liberal arts colleges under art appreciation or history in western art?

A No. It's unique to Columbia in the sense that it forms part of a core curriculum. And it's a course that in the same kind of trajectory exists at some schools, I've heard, but they are copying what Columbia is doing with this sort of masterpiece survey.

Sometimes, we have students who are coming from high schools where, Horace Mann, for example, where high schools have adopted a similar approach to the teaching of art history, that is a monument and artist-based approach, to the great monument and artists, in this case of western art, of masterpieces of the western tradition.

Q But whether another college or university treats it as part of the course core curriculum, would teaching this course prepare one to teach an art appreciation course?

A Oh, yes, most definitely. I mean because it has a broad scope and it is a large geographical and chronological scale, this is a course that is taught and this is the difference between this course and other artistry appreciation courses or surveys. It is a seminar style class, taught in the Socratic

Method. It is a small student body of about usually 17 to 21 students. There is a cap of 21 for each of those classes, so these are not large lecture courses.

What is most typically taught at other universities and colleges is a survey of art history, which is a lecture course. And we have that at Columbia, too. At Barnard College, there is a survey course, a proper 101 art history from Stone Age painting to the present that is taught over an entire year, an entire academic year, and in which our students also serve as TAs, as proper TAs, just like in any large lecture course.

Q So does the Department of Art History provide any orientation or training for the teaching fellows to prepare them for this experience?

A Yeah. I mean we are actually very proud of our teacher training program and it ties into the things that I have described earlier about our approach in scaling up and giving students teaching experiences that prepare them from a reader/grader to a section leader, to a single course instructor.

So this is, I would say, an approach that takes the students from learning to grade in the first year and sometimes in the second year, to teaching their own section, a weekly discussion section usually in the third year, to taking on their own course within the framework of a master syllabus. So they are not deciding to change the syllabus to add, let's say,

money to the syllabus, necessarily, but they are teaching a master syllabus and they are and they are receiving, as part of their training to teach this course, weekly briefings, briefings that are given by faculty members in the various subject areas.

So, typically, for the Parthenon, this is one of the early briefings. All of the first-time students teaching art humanities would get a two-hour lecture and discussion with a specialist on Greek art, who would tell them not only what they need to know about Greek art, if they are modernists, but also how to teach that course and what pedagogical tools they can employ to teach those undergraduates the section on Greek architecture of the 5th Century B.C.

And this is true for the entire first semester that they are teaching this course. Every week, there is a different faculty member giving introductory lectures, introductory discussions, how to teach that particular section.

Our sort of pedagogical approach extends beyond that first semester, usually, because in the second semester, the director of art humanities, who is the faculty member in charge of those briefings, those pedagogical sessions, in the second semester, in the spring, the more specific subject-based training sessions are followed up by didactical thematic discussion sections with students.

So when I was director of art humanities, for example, I

would do a session on bronze casting, because one of the artists we are focusing on is Bernini, and if you are looking at the big bronze, a c-cast (ph.), of St. Peters (ph.), for example, the students need to understand how bronze casting actually works to teach that particular section to the undergraduate students. But it would also involve looking at the nude (ph.), for example, in western art, and looking at a broad scale of how the nude in western art appears in various regions and various locales at specific times.

So one would start with Ancient Greece and look at the nude in ancient Greek sculpture. One would go all the way to the renaissance and the baroque period to look at that theme reoccurring, because what we very much want to emphasize to all the students is that there are certain red threads that can be taken throughout the course that lead all the way from classical Greece to the modern and contemporary period.

So that's the kind of sessions that would happen typically in the spring semester where students also report back after teaching the course for the first time what worked and what didn't work. So students who have taught art humanities in the fall semester would be asked to contribute to those sessions in the spring semester, and would give feedback. And we invite other people, as well, to come chime in. We use veteran art humanities instructors to come back to us and give pedagogical sessions as part of that training.

Q How often do the teaching fellows attend these kinds of seminars in the second semester that they are teaching art humanities?

A It's usually a biweekly arrangement. So the first semester, they have to come to the briefings every week for a two-hour period. And in the second semester, it usually switches to a biweekly schedule, where those thematic or pedagogical sessions are happening on a less rigorous scale.

Q When the students, the graduate students are teaching art humanities, do they have any flexibility in terms of how they handle their sections?

A Yeah, very much.

Q Will you describe that?

A Every student, depending on their background, will tailor-make their syllabus. So they might spend two weeks or a week and a half on the Parthenon, and only one week or one session on Pablo Picasso. So depending on their own interests, they are able to manipulate the master syllabus in a way that they put more emphasis on the periods that is their period of specialization.

But they are required to teach the first four sessions of the syllabus as they stand and then they make choices. They can take Frank Lloyd Wright and leave l'Ecole Bussiere out, for example. They can devote more or less time to one artist over another. And they are in charge of the syllabus in the sense

that they choose the works that they are teaching. So, of course, out of the period of Raphael or Michelangelo, you can only do so much in a one or two-week period of time, so whether you are teaching the Sistine Ceiling from Michelangelo, or whether you are looking at his slaves, or whether you are looking at any other portion of his work, it is essentially up to the student instructor to decide.

That's why I said this is a staggered approach from being the assistant to a professor teaching a lecture course in the second year of their PhD curriculum, to being in charge of a section, as a section leader in the third year, to being in charge of your own course and making those choices. It's an approach that is essentially letting them more and more be in charge of their own class.

Q I want to give you another document.

MR. PLUM: I've lost track of the number.

HEARING OFFICER EVEILLARD: 104.

MR. PLUM: So this would be 104.

(Employer's E-104 identified.)

BY MR. PLUM:

Q Okay. So have you seen 103 -- 104, have you seen the document that's been marked as Exhibit 104 before?

A Yes, of course. I helped to write it and I edit it every year for the next academic year. It's the department handbook for PhD students.

Q So that's what it is, it's the department handbook for PhD students.

A Yes.

MR. PLUM: I'd like to have 104 admitted into evidence.

MR. MEIKLEJOHN: No objection.

HEARING OFFICER EVEILLARD: Admitted.

(Employer's E-104 received into evidence.)

BY MR. PLUM:

Q Can you take a look at Page 44? The very last sentence of the last full paragraph on that page is a description of some -- description of the art humanities course. And in that sentence, the art humanities course is described as the capstone in teaching experience for doctoral students. Can you explain that?

A Yeah. I mean I've already alluded to the fact that this is really the time when a student becomes a teacher in the sense that they are prepared to take on different duties. That's a part of the job that they perform as teachers later on in their careers. The reading and grading of exams is one. The leading of discussions in a class is another. And ultimately the art humanities teaching fellowship, if you want, is the capstone experience in which the student the is teaching his or her own class, taking on all those responsibilities from leading the discussion in the classroom to grading exams, to grading papers, to go into museums with students, to going

through the city with students, and to manipulate the master syllabus in a way that gives their own stamp on that syllabus.

So that's why we call it a capstone experience for the teaching of -- or the teaching curriculum that the students go through in our department.

Q How does the experience of teaching art humanities relate to the graduate student's own work?

A It relates in some way to it because, well, I would say to 80 percent of the students who are in our department, the largest majority of students comes to study the history of western art in one or the other field. So whether this is ancient art, whether this is a telling renaissance art, or western gothic art, or whatever the specialization and specification is.

Of course, nobody is a specialist on anything between classical Greece and 20th century painting. So every student experiences a sense of loss at some of the sections, I would say, that they are not familiar with. Students generally come to Columbia from the undergraduate experience with a general vision of what the history of art is like. But nobody necessarily has taken classes on Greek architecture, medieval architecture, renaissance painting, and 20th century painting or sculpture.

So the student will have a specialization and they will have an area within that large course that they feel at home

in. But most of the syllabus is probably strange to them in the sense that they are not prepared by previous training to teach those sections. And so teaching a course like this is, in fact, in the eyes of the faculty of the Department of Art History, training to be an art historian, broadly speaking, and preparing them for that experience to be at a small liberal arts college where perhaps there are one or two more colleagues in other disciplines, in other subfields of art history, but where they might well be asked to teach a course on Greek art if they are medievalists, or on 19th century art or renaissance art when they are 20th century specialists.

So that's the kind of though trajectory of that course that will make an all-around art historian and give a broader view as teacher, as well as a scholar to this area of art history.

Q Let's turn now to the fifth year. Do the students typically hold instructional appointments?

A Not typically. Out of the five-year funding package, I said at the beginning that the first year comes with no teaching responsibilities and the same is usually true for the fifth year. When a student has a dissertation prospectus defended, they usually go on a year of dissertation research that is either field research that takes them to Europe or other parts of the world where they do intensive work on the dissertation, or they stay in a library if they are working on

topics that involve no travel.

But there is usually the first year that is a year without any additional responsibilities other than taking classes. And there is one year and it can be Year 4 or Year 5 in which the student is doing purely research, no teaching responsibilities, no other departmental responsibilities.

Q Let's focus for a few moments on the standalone MA degree. How long is the student typically in a standalone MA degree program?

A At Columbia and at many -- most other places, I would say, the MA standalone degree is a two-year degree program. Some programs where it is only a one-year degree program, but that's more typical for European institutions.

Q Are the students in the standalone MA program funded by Columbia?

A Not at all. All of these MA programs, two in our department, the MA in art history and the MA in modern art and critical studies is a tuition driven program, so students come to us and they pay their own way.

Q Do these master students ever serve in instructional positions of any kind?

A Not typically and not in their first year by policy. There are very few exceptions in which some students who want to teach, who want to serve as reader/graders can be allowed to do so, but it's a merit-based selection of perhaps only the

best one or two students in the MA program of any year who is allowed to do that. It's the graduate school who allows them to serve as reader/graders in their second year, if they are nominated by the department. But, typically, no, they are not fulfilling any teaching functions in the sense that a PhD student would.

Q And the functions they fulfill, if they fulfill them, are reader/grader?

A Yes.

Q Do they typically do it for one semester in the second year or two semesters?

A It varies. I can be one semester or it can be two semesters.

Q Do they get financial aid or some sort of stipend as a result of holding that position?

A They are compensated for their services as reader/graders. They do not get a stipend that goes along with it. So it's a very different situation from the PhD students.

Q Are they paid by the hour or do they receive a set amount?

A They receive, as far as I know, a set amount that is an additional compensation. I believe it is $5,000, but I'm not entirely sure.

MR. PLUM: All right. We're going to take a moment.

HEARING OFFICER EVEILLARD: Okay, off the record.

(Whereupon, a brief recess was taken.)

HEARING OFFICER EVEILLARD: On the record.

Mr. Plum?

MR. PLUM: Yeah, I just have a couple of questions. Oh, by the way, did I move the other one into evidence, 104?

HEARING OFFICER EVEILLARD: I believe so, but if not, there was no objection, right?

MR. MEIKLEJOHN: There wasn't, that was correct.

HEARING OFFICER EVEILLARD: So it's admitted, 104.

MR. PLUM: Can we mark this as 105, please?

(Employer's E-105 identified.)

BY MR. PLUM:

Q Dr. Klein, have you seen 105, Exhibit 105 before?

A Yeah. This is essentially an excerpt from our graduate student handbook or a version of that from the Columbia website, on the art history website.

MR. PLUM: I'd like to have Exhibit 105 into evidence, please.

MR. MEIKLEJOHN: No objection.

HEARING OFFICER EVEILLARD: Admitted.

(Employer's E-105 received.)

MR. PLUM: I have nothing further. Thank you.

CROSS-EXAMINATION

BY MR. MEIKLEJOHN:

Q Good afternoon, Professor Klein. I'm going to ask you a few questions. I think I'll be brief because I'm losing my

voice. So you testified that the typical funding package that's awarded to an incoming PhD student is a five-year package.

A That's correct.

Q And that it typically takes six or seven years to complete the program --

A That's correct.

Q Wait till I finish. I'm glad to know you agree with what I'm saying, but wait till I finish saying it, if you can. It makes it easier for the court reporter. Looking at Employer Exhibit 105, I see that it refers to the -- under the sixth year, on the third page, it makes reference to C.U. or external dissertation funding. What does C.U. stand for?

A Columbia University.

Q Okay. And this would be an external dissertation funding, either of those would be some kind of awards that do not have any service requirements?

A That's correct. An external dissertation fellowship would be a fellowship that is given out by either museum or funding agency that is a federal funding agency or a private entity. So, typically, for example, there are multi-year and single year fellowships that are given out by the Center for Advanced Studies in the Visual Arts, in Washington, DC, a research institution that is associated with the National Gallery. So a student can apply for those outside awards, what we qualify as

outside awards, and they spend the time researching their dissertation on those fellowship awards.

Q So essentially it's no strings attached funding?

A That's correct.

Q And a teaching fellowship would require the individual to provide teaching services in order to get the funding?

A That is correct. Those would be internal.

Q Right, okay. It says this may be awarded -- there are two conditions, if positions and funding are available. With respect to positions, that means if there is a need for the teaching college to teach classes?

A That is correct.

Q And the same thing in the seventh year, I take it. The same principles apply in the seventh year, correct?

A The same principles apply in the seventh year, yes.

Q Now you described the duties of the reader/grader as essentially, as the title implies I guess, reading the students' written work and awarding grades, correct?

A Can you repeat that question?

Q The duties of a reader/grader are to read the written work of undergraduate students and to designate grades for that work, correct?

A Yes, depending on what it is. I can be an exam. It can be a paper. It can be an assignment of any other type.

Q And this is supposed to be done under the direction of the

faculty member who is -- or individual teaching the class?
A That's correct.
Q And if the reader -- if you did not hire readers and graders to do this work, then who would read the papers and award the grades?
A The professor of the class.
Q I think that this is implied in many of your answers, but the core curriculum, in general, in the art humanities course in particular is -- you regard this as one of the most valuable offerings by the university to its undergraduate students?
A In terms of the type of teaching they are doing for the undergraduates?
Q Yes.
A It's valuable as a capstone seminar for the graduate students to teach?
Q No, I'm sorry. For the undergraduates who are taking the class.
A For the undergraduates, it is a requirement. It's a university requirement by the college that is part of a set of courses that all students have to take. It's a core curriculum, so consists of literature humanities, which is a general literature class, a course that is called contemporary civilization. There is a course that is called frontiers of sciences. Art humanities and music humanities are all courses that form part of that core curriculum.

Q Isn't it true that in many instances, particularly looking around the room at the students who are here, that PhD students begin teaching classes as section leaders as early as their second year?

A It can happen, indeed.

Q Under what circumstances does that happen?

A It happens if the student is in the second semester of the second year, or, in some cases, it even happens in the first semester of the second year, depending on the course offerings at that time. So professors have the freedom to say I want to offer a lecture course that requires only reader/graders. Or a professor can say I want to offer a lecture course in which I want the undergraduates to have the opportunity to also have a section, a discussion section, and that would require a section leader.

So it is the choice of the professor. And depending on what the professor or faculty decides to do in any given year, we have more section leading positions or more reader/grader positions to fill. And so it is depending on what the course offerings are in any given year, how many reader/grader positions we can assign or how many section leader positions we can assign.

Q So it's based upon what the faculty member thinks is best for the course offerings they want to make to the undergraduates.

A Exactly, at any given semester.
Q But not everybody -- the students don't always get to go through all the levels -- strike that. The PhD students don't always get to go through all the levels of progression that you described?
A Typically, they do. But in some case, you might have a student start to be a section leader. We would typically make a selection based on the student's field. Ideally, we like to assign students first to their areas of specialization. And what I described earlier that a student is taking on teaching responsibility in a course that is outside of their field is something that we would typically do later in their teaching offerings.

Also, in the second year, as you say, we would typically try to slot students into lecture courses in their fields. And we would also typically try to slot them into reader/grader positions first, if those positions are an offer in that particular semester or year.

Sometimes, that is not the case, so we might not have a renaissance class where a renaissance student can serve as a reader/grader in any particular semester.
Q Now you testified that the art humanities classes can be taught by a faculty member, or a post-doc, or a lecturer, I think was the --
A Yes.

Q Or an adjunct, or a graduate student, the PhD student. I know that there are of course going to be individual variations in these classes depending upon the individual teaching them. But as a class across the board, are there distinctions between the classes taught by full facility, classes taught by grad students, classes taught by adjuncts.

A Distinctions in the sense that they are still the same class and the students get the same credit at the end of the semester, there is no distinction.

Q Is there a distinction in the quality of the education that they get?

A There is no difference in the quality of education that they get. By the time a student would be a teacher in art humanities, we expect that student to give an as successful art humanities class as any adjunct, as any post-doc, as any faculty member.

Q We probably haven't covered this enough, but when a PhD student is in their first fellowship year, all of the services that they -- or all of the funding that they receive is paid to them in the form of a stipend, correct?

A That is correct, tuition, stipend, and fees.

Q Okay, right, yes. The money that goes in their bank accounts comes in the form of a stipend, correct?

A Um-hum.

Q You have to --

A Yes, that's correct.
Q And the years in which they are teaching, a portion of their payment is received in the form of a salary with --
A That's correct.
Q -- with payroll deductions.
A That's correct. There is a salary component to anybody who is teaching in the art humanities program, for example.
Q You testified that on occasion, master students may be selected to serve as teaching assistants generally in the reader/grader capacity based upon merit?
A Yes.
Q In determining the merit of a master's student who may or may not be selected to teach, do you consider whether they have the knowledge and, well, whether they have the knowledge necessary to be an effective reader/grader?
A Yes.
Q You're trying to determine if they're qualified for the job?
A We're trying to determine whether they are qualified for the job based on their scholarly credentials, because there is nothing else that we can go on.
Q Some master students do go on and pursue a PhD after completing their master's, correct?
A Yes, that's correct.
MR. MEIKLEJOHN: Nothing further.

REDIRECT EXAMINATION

BY MR. PLUM:

Q Dr. Klein, how many MA students are there? How many MA only students are there?

A It's difficult to say across the board, but our two programs have typically between 12 and 15 MA students per year.

Q The two programs have 12 and 15 final degree MA per year.

A Correct.

Q How many of those serve as reader/graders each year?

A I would say it's one or two in every year, but it's not consistent; a maximum of two, in my experience, over the last five years.

MR. PLUM: I have nothing further, thank you.

HEARING OFFICER EVEILLARD: Mr. Meiklejohn, anything further?

MR. MEIKLEJOHN: Well, it certainly wouldn't be considered recross. I'm bad. I forgot to look at Exhibit 53. No, I don't have anything.

HEARING OFFICER EVEILLARD: Thank you, Dr. Klein.

THE WITNESS: You're very welcome.

HEARING OFFICER EVEILLARD: You're excused.

THE WITNESS: Thank you.

(Witness excused.)

HEARING OFFICER EVEILLARD: Are there any other further witnesses for today?

MR. PLUM: We don't have any.

HEARING OFFICER EVEILLARD: Are there any other businesses for today?

MR. PLUM: I don't think so.

MR. MEIKLEJOHN: Oh, well, we sent -- yeah, there were some other documents that we sent last night that I wanted to introduce. Oh, the financial documents, I think that was it.

HEARING OFFICER EVEILLARD: Let's go off the record for a minute.

(Discussion off the record.)

HEARING OFFICER EVEILLARD: Back on the record.

MR. PLUM: Are you going to offer it on the record?

MR. MEIKLEJOHN: Yes.

HEARING OFFICER EVEILLARD: He's waiting for it to be marked. Are we on the record? Okay, go ahead.

MR. MEIKLEJOHN: Oh, can I go ahead? During an off the record discussion, I requested and had marked as Petitioner's Exhibit 51, excerpts from consolidated financial statements of the Employer that were produced by the Employer in response to subpoena.

(Petitioner's P-51 identified.)

MR. MEIKLEJOHN: We're offering it in particular to show the main sources of revenue for Columbia University. In particular, the things are tuition received from tuition-pay students, and government grants and contracts. We're

contending that, along with other people, the employees that we're seeking to represent perform services that help the university to generate this income. They perform services for the undergraduates resulting in the education to the undergraduates that they're paying tuition for. And they also perform services on these grants that generate grant income to the university. So, therefore, I move the introduction of Petitioner's Exhibit 51.

HEARING OFFICER EVEILLARD: Mr. Paul?

MR. PLUM: We object. First of all, there is no relevance in this document. The fact that we get grant income has nothing to do with the graduate students. The fact that we get grant funding comes from the principle investigators who convince a government or a private agency to give them grants. The fact that some of that grant money is used to fund graduate education is, first of all, irrelevant, and, second of all, you can't even tell from this how much of that money is used to pay for graduate education.

The idea that this also reflects our tuition is totally irrelevant. The graduate students don't pay tuition. We don't get tuition because of them. There's no showing that we wouldn't get the tuition without them. So there's just -- I can't conceive of how this is relevant other than to make some inflammatory spectacular argument in the brief that we get X hundreds of millions and somehow that's tied to graduate

students, which there is no evidence in the record that it is, despite all the questions about, well, doesn't this help with this or help with that. So we think it's totally irrelevant and inappropriate.

HEARING OFFICER EVEILLARD: Your objection is noted. As I indicated, I'm going to allow this to come in as Petitioner's 15 -- 51, into evidence.

(Petitioner's 51 received.)

HEARING OFFICER EVEILLARD: Anything else?

MR. MEIKLEJOHN: Not today, no.

HEARING OFFICER EVEILLARD: Seeing that there is no further business, I believe we're adjourned till May 21st, 9:30. And I just want to remind you that the new hearing officer will be Greg Davis.

MR. MEIKLEJOHN: Is that final now?

HEARING OFFICER EVEILLARD: It's final. And thank you. We're adjourned for today. Off the record.

(Whereupon, at 2:40 p.m., the above-entitled matter was adjourned, to reconvene on Thursday, May 21, 2015, at 9:30 a.m.)

C E R T I F I C A T E

This is to certify that the attached proceedings done before the NATIONAL LABOR RELATIONS BOARD REGION TWO

In the Matter of:

COLUMBIA UNIVERSITY,

Employer,

And

GRADUATE WORKERS OF COLUMBIA-GWC, UAW,

Petitioner.

Case No.: 02-RC-143012

Date: May 13, 2015

Place: New York, New York

Were held as therein appears, and that this is the original transcript thereof for the files of the Board

_____
Official Reporter