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## The advanced biomedical photography class at RIT

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### Introduction

When a photography course, or any course is redesigned, considerations must be made with respect to the specific outcomes of the education. This paper discusses how the Advanced Biomedical Photography course at RIT was redesigned. Specifically we will look at some of the thought processes involved in setting and meeting objectives and goals, as well as some early observations.

The Biomedical Photographic Communications program is part of the School of Photographic Arts and Sciences or SPAS. SPAS offers degree programs in the disciplines of Fine Art Photography, Applied Photographic Illustration, Photofinishing and Management, Technical Photography, Film and Video, and Biomedical Photographic Communications. The school has 50 full-time faculty members and approximately 850 full-time students. In addition to their teaching responsibilities, the SPAS faculty is also actively involved in a variety of other educational programs, including workshops, career education and continuing education.

The Biomed Program currently has three full-time faculty and approximately 75 students. The program is about 20-years old and has placed over 375 graduates in careers in the health care industry, research and other related fields. There are other college-level educational opportunities in biomedical photography, but RIT currently offers the only Bachelor of Science degree in the field.

A student in Biomed can graduate from the program with an Associate Degree after two years of study, or continue on for the Bachelor Degree. This discussion will concern itself with an up-

per-division course the students must enroll in as a junior or senior in the bachelors degree option. The course, Advanced Biomedical Photography (often referred to as "Advanced Biomed"), is a two-quarter sequence with 8 credit hours being awarded.

### Objectives

When designing a course or redesigning an existing course, we as faculty have specific expectations concerning the outcomes that result after completion of a particular segment of a student's education. These expectations are referred to as learning objectives. It was felt by those involved in redesigning Advanced Biomed, that the most important overall learning objective for the student was to become a good visual

communicator. The development of this skill in itself requires solid teaching strategies, but there were a number of other objectives we thought were equally important. These were:

- That the students leave the course with solid oral and written skills that reflected a good command of the photographic language.
- That the students have an understanding of, and the ability to deal with client deadlines.
- That the students understand the role of, and need for biomedical communicators in medicine and science.

Another important consideration was that of student satisfaction. It was felt that the course must provide the students with a sense of accomplish-



The Photographic Arts and Sciences building at RIT. Photograph by Bill DuBois, former Chair of the Biomedical Photographic Communications Program and current Associate Director of SPAS.



The patient assignment not only provides the students with practical patient photography experience, but introduces them to patient nudity as well.

ment so they would feel good about what they had just completed, and this in turn would motivate them to go further.

Many questions arose about how to achieve these objectives. Did we want to create valid experiences from which the students could learn, or did we want to graduate experts in a specific skill?

It was decided that the learning experience would take priority. The course would be set up to allow for redoing an assignment to provide the students with an opportunity to reach the mastery level skill that industry requires. This philosophy of redos is not so far removed from what is experienced in the day-to-day operation of today's Biomedical Communications Departments. How often in the "real world" does a job not meet the client's expectations and needs to be redone within a week. A week is also the time in which any assignment in the course can be redone. After that time period, the work may not be resubmitted.

It cannot be emphasized enough that throughout all aspects of the redesigning of the course, consideration was given to the student's sense of accomplishment and sense of personal satisfaction. It was our feeling that reaching into a student's "emotional experience" would provide a better learning experience.

We also arrived at some concrete objectives concerning what we wanted the student to experience in the course. In order to maximize the student's ex-

perience in the classroom, we set out to integrate several things. The first was to create a challenging and credible menu of assignments. It was our belief that if we could challenge the students, and get them to rise to the occasion, we could stimulate interest and thus learning.

The second would be to allow the students to exercise some control over their own pace. A self-paced course was looked at from the perspective that the student who worked at his or her own pace, might at the same time learn something about time management. Consequently students would not be forced to jump through hoops when we wanted them to, but could make progress when they had the time and motivation to do their best. This teaching strategy is known as a modified personalized system of instruction.

The third involved the formation of a positive attitude in the student. We wanted our students to look forward to coming to class. Without a positive attitude about being in class, all the planning and objectives in the world would end up being a wasted effort.

As the course began to take shape, certain things became obvious. The student who took this course seriously would go through some very real experiences. First off the course would create some realistic pressures for the student simply by virtue of the deadlines and volume of work. One assignment a week in addition to their other courses is a fair work load, but does ask for a certain level of performance.

Due to the format of the course, the students are required to organize their time and develop other strategies for completing the work by the tenth week of the quarter. This need for long-term planning would prove to be invaluable, as once the work became due, the students found it next to impossible to complete all the assignment in the last three weeks of the quarter. (This particular observation was made after the course had run for several years.)

This planning activity would involve accessing space, people/models and equipment. The juggling of these three would force the student to consider scheduling time, availability of people and other related issues. The bottom line is that the students be creative in their solutions to visual problems within the framework provided. Everyone knows that making a successful image does not just happen, but is the result of thorough planning and careful execution. It is this philosophy that was woven into the fiber of this course.

The thinking behind all this was that the course would provide some very solid practical experiences for the student. The built-in diversity of these experiences would hopefully generate a feeling of self confidence in the student who would in turn say to him or herself, "Yes, I can do it when I put my mind to it."

## The assignments

The assignments for the course were selected for their potential to become portfolio pieces. We wanted to create assignments that would closely parallel what a working photographer would be involved with every day. When given unlimited time and resources, anyone given some skill can be a Rembrandt; but we were looking for real performance here within the time constraints of the classroom.

Many of the assignments are written so that the student must do some research before taking any pictures. An example of this is a natural science assignment in which the student is given the genus and species names of eleven varieties of common flora found in the Rochester area. They must find out what these subjects are, where they live, and when they bloom if that is included in the request. They are required then to photograph six of the eleven subjects.



The location or environmental portrait assignment requires the students to photograph their subject in a way that tells the viewer something about that person's profession or job. Photograph by RoNell Brown.

One reality of our profession is that we are often asked to explain to someone why their pictures are not coming out right, or to write a proposal for a new piece of equipment. This is also a form of photographic communication, so we wanted the students to develop their oral and written skills. One device that was implemented was the use of data sheets fashioned after the RBP data sheets. This, first off, would force the students to take a closer look at what they were doing, and hopefully maybe cause them to stumble onto some interesting revelations about their activity in the pursuit of completing the assignment. It would also encourage the students to write using photographic terminology and language.

Biomedical photography is an incredibly diverse field. Everyone has heard the term "jack of all trades and master of none," a term which is most appropriate to those working in Biophotography today. The course addresses this by providing a wide variety of assignments that are both interesting and challenging. It is not out of the question for a student to be doing the patient assignment one day and photomicrography the next. When we evaluate performances, whether it be in the classroom or on the job, we do so with the awareness that very few master everything, but most can do some things very well.

This philosophy is quite appropri-

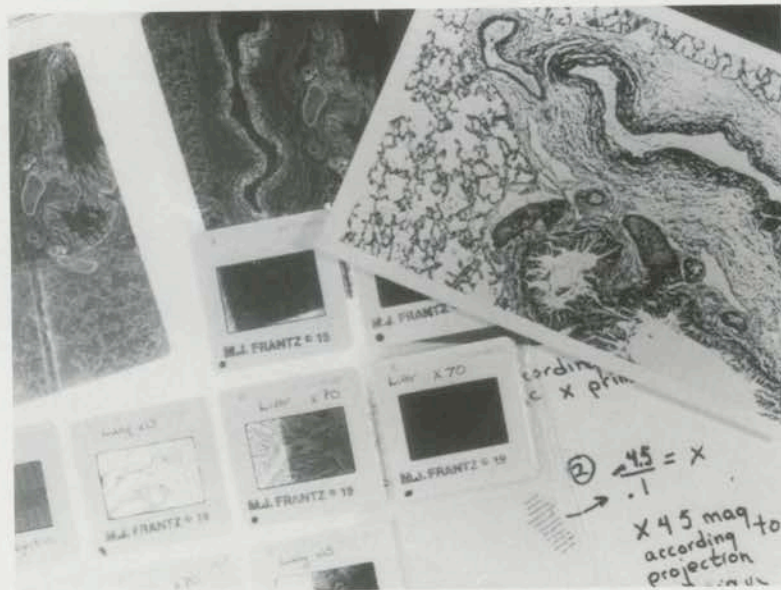
ate as we evaluate the range of assignments that the students must do. The complexity of the assignments range from something as straightforward as shooting a 35mm color transparency of someone working at a computer screen to something more involved such as a complex photomicrography assignment.

As the quarter begins, the entire course calendar, syllabus, and menu of assignments are distributed to the class.

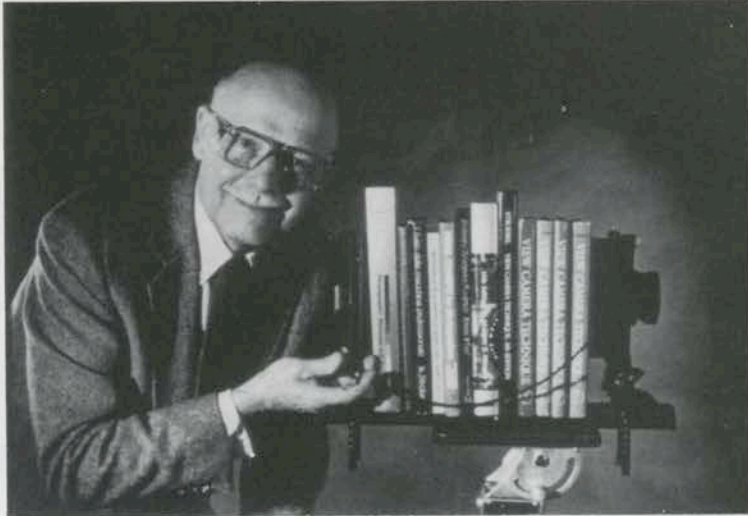
This means that when the student leaves the classroom after the first day, they have in their possession a breakdown of the entire quarter's work and schedules. It is conceivable that they could complete all the required work for the course within a very short period of time after distribution. It is our feeling though that this is not in their best interest, as lectures and technical handouts follow shortly. The students also have the option to determine which assignments they wish to do first and which to do last. They are totally responsible for their scheduling, planning and performance. For many it is their first experience at being a "working photographer."

When the assignments are distributed on the first day of class, they include all the information the photographer/student will need to produce each assignment for the quarter. Each assignment incorporates a stated objective outlining what is to be accomplished with the project. This learning objective spells out a stated level of performance to be achieved under a certain set of conditions and to a known performance standard.

The assignments also contain a stated purpose for the project as well as the specifics of what the assignment calls for photographically, i.e., 35mm neg film or transparency material. All the requirements for submission are



The photomicrography assignment involves the students in making both color and black and white images through the microscope.



The formal portrait assignment introduces the students to a specialty in photography many biophotographers need to call upon often in their day-to-day work. Photograph by RoNell Brown.

also outlined, i.e., 11 × 14 color print, window matted on 16 × 20 white board. Each assignment also contains a section with helpful hints such as which film type to consider, lighting suggestions and other technical information.

The scope of this paper does not permit us to discuss every aspect of the course or assignments in great detail, however, we will list the assignments and expand on a selected few.

In the winter quarter, the students have ten choices and must complete nine projects in any sequence to pass the quarter. (The patient assignment is required.) The choices include:

- **Photomacrography**—Three 35mm color transparencies of a wet specimen (cut fruit) at ×3 (with a scale to verify magnification) showing characteristics of its seeds.
- **Public Relations**—Using 35mm black and white negative film, photograph an event within the community. The photograph should tell a story about what went on.
- **Interior Architecture**—Using 4 × 5 color transparency film, photograph a striking interior.
- **Exterior Architecture**—Using 35mm color transparency material photograph a structure that is undergoing construction.
- **Location Portraiture**—Using 120 color negative film, shoot a portrait that reveals the subject's profession. This is a color print submission.

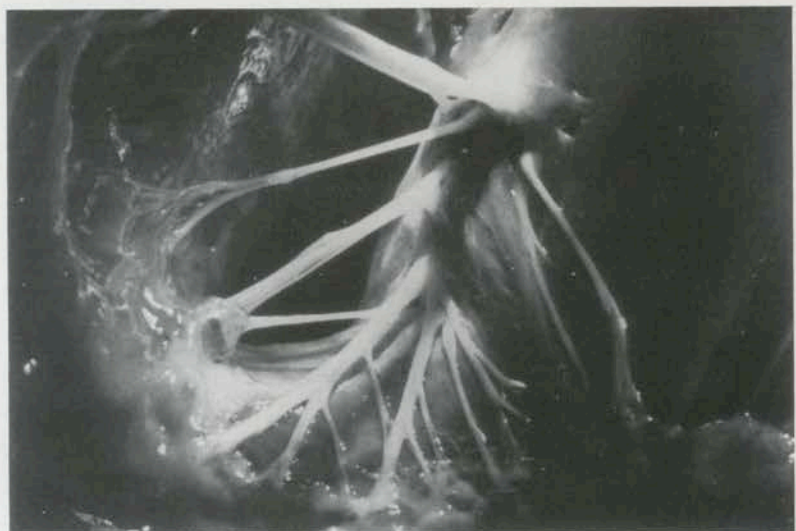
- **Studio Portraiture**—Working in the studio, produce one 11 × 14 color print of a subject as a formal portrait.
- **Studio Product Shot**—Using 4 × 5 color transparency material, light and photograph a box of Johnson & Johnson cotton to show detail in both the white cotton and a black object of your choice.
- **Patient**—Shoot a full length photo and one at a reproduction ratio of 1:3 of the requested view.
- **Optical Staining**—Enhance an ordinary subject through the use of color gels on the light source. In-

clude with your submission a 100-word paragraph about the subject.

- **Comparative Spectrums**—Use visible, UV and IR techniques to photograph the same subject demonstrating the effect of each on tone reproduction.

In the spring quarter, there are twelve choices, ten of which must be completed to pass. Two of the assignments, the production shot and the portfolio, are required:

- **Photomicrography**—Produce three 35mm color transparencies using three different objectives. From one of these transparencies, produce one 4 × 5 b/w interneg and three quality 5 × 7 prints.
- **Radiographic Copy**—Using the supplied radiograph, produce three images using emulsions of varying contrast demonstrating your ability to enhance information.
- **Composite Techniques**—Produce one final image that combines line art and continuous tone materials.
- **Marketing Strategy**—Discuss in length strategies that you would employ to “revitalize” a department that is “down and out.”
- **CRT Tube**—Photograph an environment containing a CRT tube, and demonstrate proper exposure for both the environment and the tube.
- **Production Shot**—Produce with the class the annual marketing shot



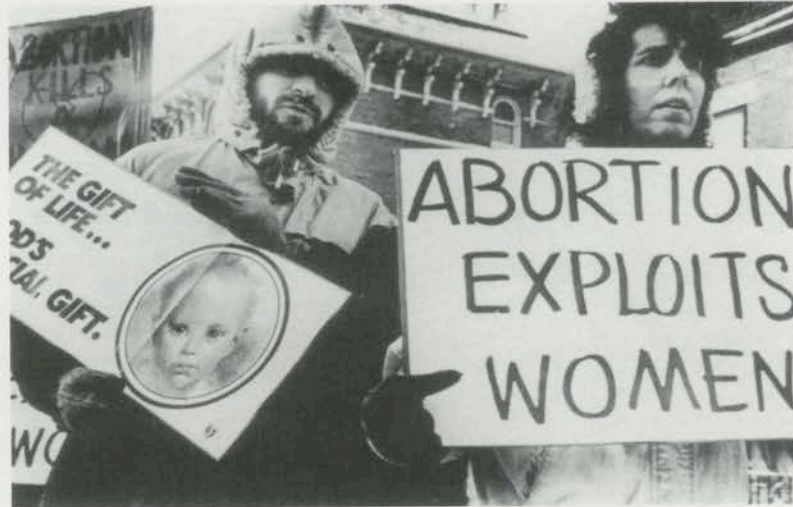
Chordae Tendineae, human heart. Photograph by Mary Frantz.

for Highland Hospital in Rochester.

- **Live Subject**—Photograph something that is smaller than your fist, showing this creature in its natural environment.
- **Personal Exposure Index**—Determine through testing what your personal exposure index is on a black and white film, and arrive at development strategies for average scene luminance as well as expanded and contracted situations.
- **Zone System**—Using the above exposure and contrast index data, produce two 11 × 14 archival prints to museum standards.
- **Redo from Winter Quarter**—Redo any assignment from the previous quarter showing improved performance.
- **Nature**—Photograph six of the eleven subjects showing requested close-up and an environmental views. The list is supplied with the genus and species name of the subject.
- **Portfolio**—Produce a working portfolio including a resume and slide copies of all included material.
- **Final Presentation**—Show and discuss your completed body of work in a simulated job interview situation.

This is a complete generalized overview of the assignments that the students are involved with. There are a few assignments that are worth further discussion—the production shot, the portfolio in conjunction with the final presentation and the patient assignment.

The production shot has been an integral part of the course for the last two years. The final product for the project is a marketing photograph produced by the advanced class at the request of a local hospital's public relations department. In addition to the production of a photograph, the project offers the students some in-depth experience in planning and decision making that goes into this type of production. The entire class gets involved—director, producer and cameraman are among the various roles the students might be asked to assume. The producer, director and myself meet with the public relations people at the hospital



In addition to portraiture, public relations photography is another nonscientific area the students gain experience in. Photograph by Claudia Murphy.

to discuss their ideas and needs. Once an idea has been shaped and polished into a concept, we meet with the P.R. people again to discuss the concept and make modifications prior to the production of the photograph.

The project not only allows a group of creative and energetic people to work with a real project, but serves to create a strong relationship for the program with the hospital. The relationship has turned into a valuable resource for the program as many of the students use the physicians for portrait subjects and the hospital was the subject of the program's first "Big Shot,"—a project in which the building was illuminated at night using multiple hand-held electronic flashes.

The patient assignment evolved from a need by our program to get the students involved one on one with a real patient experience. In this assignment, the students are responsible for the entire shot right from introducing themselves, to tearing down the studio after the shoot. For many students, this is their first real patient experience and for most, their first experience with patient nudity.

Upon arriving at the studio, the student receives a patient request form from the patient (a paid model), requesting a full anterior, a full posterior and a 1:3 of a skin rash located on the patient's back. The student must handle the situation from there. The lights need to be adjusted, the patient consent form must be dealt with and most im-

portantly the patient must be treated with respect and compassion. Each student is allowed 12–15 minutes to accomplish the task and release the patient. There are obviously no reshoots on this assignment.

The students are evaluated on their performance from two standpoints. Photographically they must produce the requested views but equally important, they must have handled the session in a professional, poised manner as this accounts for half of the grade. When the class meets again the following week, the desks are arranged in a circle and we talk about the experience. Were you nervous? If so why? This and other aspects of their experiences with the assignment are discussed. We have found that most students were very nervous but they unanimously agreed that it was a worthwhile experience, one that most never got on their internships.

The rationale behind this assignment was that we recognized a need to expose the student to photographing a nude patient, and to discuss how they felt about this situation before they entered the job market.

The last project they produce in the course is a portfolio. It was a very common occurrence for students to get to the end of their coursework and be scrambling around to put together a body of representative work. We decided that a portfolio could be easily built around the assignments of this course.

The project involves the creation of a portfolio of work representative of the

student's abilities that can be taken out into the job market. In most cases, the portfolio is made up of prints and transparencies, but there is no formula as such.

Whatever works is acceptable. In conjunction with the portfolio, the student must include an updated resume and slide copies of every piece in the project. This we found assists the students when a request is made to mail their work out for a job application.

By the time the last day of class rolls around, we have what we call the final portfolio review. All the projects are arranged on tables, and each student can browse around the room and evaluate the projects they have been seeing for (in some instances) the last three years. It is not uncommon for the students to have produced some of their most creative work as freshmen and choose to include it in their portfolio. After everyone has had an opportunity to look over all of the work, each student discusses their work before the group. The discussions usually revolve around the types of pieces selected and the degree of difficulty in producing them. The entire project is graded as a unit taking into account the quality of the basic portfolio, resume, slide copies and oral presentation. Once again, this is a communications program—visual, oral and written.

### The role of the instructor

Up to this point we have discussed the course from the standpoint of the student. The instructor in Advanced Biomed plays a somewhat different role than that of a traditional college professor. Since the course can be self paced to a certain degree, the instructor must keep track of each student's work and arrange appointments to discuss the work with the students as they progress through the course. The instructor also

serves as a resource to the students for additional technical information as well as serving as the course instructor.

The instructor must act, in many cases, as the student's coach. This means a pat on the back for a job well done and some words of encouragement when things don't go exactly right.

An obvious task for any instructor in an educational environment is the evaluation of projects and progress. It is this job that often is most difficult. The projects are currently graded using the following criteria. First they must be completed on time or the grade is dropped one full letter grade. That is to say "B" work that is late is now "C" work and so on. This is done out of a sense of fairness to the students who have completed their projects on time.

Secondly the work is looked at for its technical merits. Is it sharp? Is it well lighted and composed? Is it a good print, or is the transparency properly exposed? A third and very important question is—does the project meet the submission requirements? Was it a print that was asked for, and if so is it the right size?

If the submission has met all the above criteria, the work can receive a "C" for average or a "B" for being a little more unique in its solution and execution. For work to receive an "A," it must have what I call the "WOW" factor. It must be unique in its solution and presentation; and be an image that forces me to look at it for more than a second. It must captivate the viewer.

### Other resources

In addition to the primary instructor, the students have at their disposal many other resources both on and off campus. RIT has on its faculty teachers in fifty subject areas whose expertise ranges from portraiture and architec-

ture to photomicrography and television production. Many of these faculty members serve as guest lecturers in the classroom.

We are also fortunate to have access to speakers not only from Eastman Kodak, but the community at large, H. Lou Gibson, for instance. The diversity of material and presentation styles keeps the information interesting and fresh. Some of the speakers who have been engaged to date include Martin Scott, in the area of photomicrography, Nancy Stuart for portraiture, Bill DuBois in architecture and Richard Zakia on Zone System.

### Conclusion

When we set out to redesign this course and other pertinent projects, our goal was to graduate students that would better serve an ever-changing industry in the upcoming years. Our objectives were that successful graduates be: self starters, capable of thinking on their feet, creative, professional in their work ethic, able to understand deadlines, able to understand the importance of time management and planning, and the importance of being resourceful. The bottom line in education, and in particular our program, is the success of the graduates and the impact they make on the profession.

**About the author:** Michael Peres is an Assistant Professor in and Chairman of the Biomedical Photographic Communications program at Rochester Institute of Technology. He is a Registered Biological Photographer and has won several awards for his scientific photography both in the Nikon Small World Competition and the BPA Salon.