Be prepared. Be safe. Feel safe.

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Bob Groom, thank you for the introduction. Bob is tireless in his dedication to our profession – one of my professional goals is to try to keep up with Bob. Bob will tell you that when I am in trouble, I call him and we talk.

Mark Lucas and Bruce Searles, upon receiving their awards, responded to the joy of the occasion with appropriate emotion and tears. I am elated and happy to be here, although wishing I could be like them, I am not going to have tears. I have a brain neurotransmitter response to stress and emotion where I calm down when others might become excited or emotional. This paradoxical response has served me in the stress of emergencies in surgery and the intensive care unit, but has not always served me well interacting with normal persons outside the operating room.

My wife and children can testify to the amazing odyssey they have experienced following their father around the country. My family is here today. Many of you know my wife Christine. Chris and I met in the operating room at Egleston Children's Hospital, now the Children's Hospital of Atlanta. The first few days we knew each other in our scrub clothes with our hats and masks on, we only saw each other's eyes. We still tell each other how we feel with our eyes (Figure 1).

My oldest son Brock is back at his home in Minneapolis working with his computers, web servers, and databases. My son Corey and his lovely wife Jackie are here from Ashland, Ohio. Jackie and Corey are both Ohio State graduates and are well-loved music educators. My beautiful daughter Caitlin has stolen time away from her college classes to attend today. Caitlin loves books and is a passionate writer. Caitlin is destined to teach and be a lawyer, or an anthropologist, or a historian, or a United States senator. Caitlin loves her cat and her library of books.

I picked my parents well (Figure 2). Teaching is in my blood. My friend, Ed Darling, in this year’s Thomas G. Wharton Memorial Lecture to the American Academy of Cardiovascular Perfusion, built on the words of William Butler Yeats. “Education is not just filling a pale, but lighting a fire.” (1) As educators, we are motivated by Yeats’ words and the “lighting a fire” metaphor. (Ed and his perfusion education partner, Bruce Searles, are both the “perfusion education pyromaniac” that Ed aspires to be.) Ten years ago, I fancied being Bruce’s mentor as a perfusion education program director – now Bruce is teaching me new tricks in simulation. We are fortunate to have many young and passionate perfusion educators such as Ed and Bruce.

PAST PERFUSIONIST GIBBON AWARD RECIPIENTS

I am extremely proud to join the eight perfusionists among the 37 esteemed John H. Gibbon Award recipients.

William J. DeBois, CCP, 2010
Raymond Hawkins, 2009
Madeline M. Massengale, 2005
Michael W. Dunaway, 2003
Jeanne Lange, 1998
Bennett Mitchell, 1995
LeRoy H. Ferries, 1994
James P. Dearing, 1987

I want to take the opportunity to acknowledge the significant contributions of the other nominees this year.

A PERFUSIONIST’S ODYSSEY

My odyssey in the perfusion profession is multidimensional and dichotomous. I have experienced perfusion
from the East Coast to the West Coast of the United States, from a community hospital staff perfusionist position to vice president in a large contract perfusion group. I have been a perfusion student and a perfusion education program director, worked for a cardiovascular manufacturer helping to design products, and been on the other end of the phone line purchasing products to use. I have served as chief perfusionist at a very poor city-county hospital and am now serving my teammates as a leader at a well-to-do prestigious Midwestern academic healthcare facility.

For many of these experiences, I credit my adventurous wife because every time I brought home a job offer or idea, she rarely said “no”. We have ridden the crest of our perfusion progress wave for 37 years. Through all these years and medical marvels, I have not lost my enthusiasm for cardiac surgery and the perfusion profession. Like Michael Crichton wrote: “There is something compelling about open-heart surgery, something fantastic and fabulous, a mixture of dream and nightmare, all come true.” Aren’t these feelings the magnet that draws us to our profession?

Malcolm Gladwell, in his book *Outliers*, explores the factors that lead individuals to success. Gladwell dispels the notion of the natural born leader or athlete (2). Through case studies, Gladwell reveals how successful persons benefited from an early mentor, having a birthday early in the year, or were living in the geographic right place at the right time. Gladwell informs us of the typical 10,000 hours of practice that it takes to become an expert. Think back to your start in perfusion when you were serving your first 10,000 hours. Think of the influence of early opportunities and the hours of diligent practice. Reflect on the role that your mentors, like mine, played in your personal success. I know when I was going to school, every day I woke up, I could not wait to see what I was going to learn. I still feel the same way today.

Everything that was ever to happen to me in my perfusion future had its birth in my educational experiences at The Ohio State University in 1972 through 1974. If Gladwell did my case study he would point at James Dearing and Louis Toth as my mentors who guided me into the practice of perfusion and how to teach perfusion. Gladwell would point at one of my clinical instructors, Bruce Ratcliff, who has taught me about managing a large department. Gladwell would point at Marilyn Ratcliff, who was the administrative assistant who first oriented me to the organizational skills of being a college professor.

Jim Dearing taught us that an important part of being an American Society of Extracorporeal Technology (AmSECT) member and an allied health professional is to provide the opportunities for and to be a mentor to young perfusionists who will then in turn become AmSECT members and repeat the cycle (Figure 3).

Along side of James Dearing, my main guide and mentor in AmSECT in the late 1970s was, and is still today, Madeline Massengale-Beall, the 2005 Gibbon Award
recipient (Figure 4). Maddie taught and re-taught me the responsibilities of the Life Membership role in AmSECT – basically the message Bill DeBois brought us last year – “Just say yes” especially when your profession calls (3). My parents, my student-graduates, my children, Maddie, Jim, and Lou taught me the reality of what Booker T. Washington taught: “If you want to lift yourself up, lift up someone else.” It has been a fabulous odyssey for those of us who have had the great fortune to witness and participate in the 57-year evolution of the cardiac surgery and our professional society.

JOHN AND MARY GIBBON

I was present in 1978 when Mary Gibbon addressed our membership at the San Diego AmSECT Conference Awards Dinner. She pointed out that if it were not for John Gibbon’s dream in 1930, we might not all be together then or here now, and we might not all have the fantastically rewarding vocations that we have (4) (Figure 5). Imagine back to the mid-1930s to John and Mary’s youth and excitement as they conducted their experiments. Think of the dedication, working together, starting early in the morning, taking most of the day and into the night to complete one procedure. Mary Gibbon reported they could only finish about three experiments in 1 week. Contrast their work to today where some of our teams with a single surgeon are able to perform four to eight open-heart procedures in 1 day.

Mary Gibbon reported that in 1930 (while they were serving their 10,000 hours) the preparation to start their experiment took 4–5 hours. In the year between 1934–1935 the Gibbons, while using their “Rube Goldberg” heart-lung machine, successfully occluded a feline’s pulmonary artery while supporting its systemic circulation without a drop in the arterial blood pressure.

AmSECT recognized Mary Gibbon as the honorary first “perfusionist”. On a related side-note, our society historian, Maddie, is emphatic that Ed Berger coined the term “perfusionist” circa 1965 after we had first been called “pump technicians”.

It was later in 1953 that John Gibbon first successfully used the heart lung machine to support a young patient while they opened her heart to close an atrial septal defect. Unfortunately, Dr. Gibbon could not reproduce that first success on his next patients and passed the baton to another group (5). In this decade, our country has celebrated 50 years of heart-lung bypass, the invention of the heart lung machine, and after countless millions of procedures,
cardiopulmonary bypass and open-heart surgery are as safe as many simpler surgical procedures.

In 2005, at Mayo Clinic, we celebrated the fiftieth anniversary of the first successful series of patients receiving open heart surgery supported with a heart lung machine. The Mayo Clinic in 1953 through 1955, working with IBM in Rochester, used Dr. Gibbon’s design to build the Mayo-Gibbon machine. The doctors at Mayo used the Mayo-Gibbon machine to successfully support a series of more than 20 patients. (These were the same years my saintly mother was explaining to my teachers that I was not possessed by the devil—now we call it ADDH.) More importantly, at about the same time to the north of Rochester in Minneapolis, physicians were conducting a series of successful open-heart procedures using cross-circulation between the infant patient and one of their parents.

When I walk through the Mayo building today and look at the Mayo-Gibbon heart lung machine, I am struck by the wonder and courage of the achievement, the courage of the surgical team, and most of all the courage of the patients. I cannot believe my good fortune to work at Mayo Clinic and in the state of Minnesota where there is so much cardiac surgical history. Being at Mayo motivates me. As one cardiac surgery history book suggests “it must have been the cold weather.”

Now we are challenged with the burdens of our maturing profession and a contracting industry. We have reached a plateau in our technology growth cycle. Some would say we have stagnated and are indifferent to our professional responsibilities, even going so far as to become self-centered with self-consuming greed. In some perfusion circles, cynicism has replaced enthusiasm. Where do we go from here? What do we do today to continue to advance the technology that John and Mary Gibbon, our early pioneers and our creative manufacturer inventors, have given us?

**WHO ARE OUR ROLE MODELS TODAY?**

Where have all our heroes gone? Is there room for individualism and ego in today’s healthcare delivery model? Both Dr. G. Alexander Patterson, recent past-president of the American Association for Thoracic Society, and Dr. Peter Pronovost, in his nationally recognized quality improvement research, point out that it is clear that working together in functional groups is called for in the challenging cardiac surgical arenas (6,7). Patterson points out that not taking anything away from the accomplishment of our heroes, the solo cardiac surgical leader is an illusion, a myth. Patterson and Pronovost are critical of our history, our training methods, and the medical hospital systems that have inappropriately fostered the physician hierarchy that ignores valuable input from other knowledgeable team members.

I am not just repeating what is broken about egotistical physicians; we have seen that similar disruptive behavior in perfusionists do as much patient and team damage. Today’s team leaders will not be successful until they learn to model the behaviors they want to see in their teammates. Leaders must be subtle like Lao Tzu’s definition of a leader: “A leader is best when people barely know he exists, when his work is done, his aim fulfilled, they will say: we did it ourselves.”

**POOL OUR DIMINISHING RESOURCES**

There are too many perfusion organizations and too much recycling of perfusion information. We are so fortunate to have the shared resources of our industry partners, our employers’ investments in our education, and our own personal time and dollars. Our professional organization leaders should continue to use the summit meeting model to find common ground for collaboration and spending our resources more efficiently.

Let’s not forget our international colleagues. I earned an education travel award in 1980 that took me to Western Europe and Scandanavia where I quickly learned that perfusionists in other countries are equally clever and have much to offer. During that trip I gained many fresh ideas about automated data collection and micro-gaseous emboli detection that positively influenced my research in the following years.

From Germany, Frank Merkle reported recently that more than 1900 European Board of Cardiovascular Perfusion perfusionist certificates (ECCP) have been issued to delegates in 23 European countries (8). It is ironic that many non-United States perfusionists are members of AmSect when there are so many U.S. perfusionists who are not. The United Kingdom has one of the best autotransfusion websites in the world. Those of us lucky enough to attend and participate in the Australian – New Zealand College of Perfusionists and the Perfusion Down Under Conferences have gained as much as we have shared.

Perfusion education programs can also benefit by pooling limited talent and resources. Jon Austin and his faculty wrote about a model for a centrally administered perfusion education program with distributed clinical sites (9). Perfusion educators in hospital-based programs are challenged by limited resources and multiple responsibilities (10,11). Perhaps these hospital-based programs should focus on providing clinical rotations to centrally located university-based programs that have unique resources such as a perfusion simulation center (Figure 6)?

**PERFUSION SAFETY**

Administrators and modern safety researchers have learned that the solution to quality problems and safe patient care lies in the hands of the bedside caregivers, not just in the hands of solo physicians and the systems made by doctors (11). Do you know that across the country,
today, we are experiencing a revolution in the frontline of patient care and in our operating rooms?

Makary’s surgical team survey results, quality improvement researchers, and their funding agencies report that “culture survey” scores may be the most sensitive tool available to measure safety risk in an operating room (12). Front-line providers, such as nurses, physician assistants, perfusionists and other allied health personnel, have unique insight into the reliability and quality of any system, especially in cardiac surgery. As Bob Groom wrote about in his last Journal of ExtraCorporeal Technology letter from the editor, where we care for patients the culture does matter (13).

Practice Makes Perfect

Now that we have some of the big technological barriers figured out, we have reached our technology plateau. We have honed our mortality rates to low numbers; it is time to focus on systemic issues, our human factors. AmSECT is starting to invest in the human factors science of our mission.

The human factor interface between the perfusionist, the multidisciplined team, the complex equipment, and the patient’s physiology lends itself well to simulation exercises. There are a half dozen perfusion simulation centers in the United States. Do you know where the centers are? Have you visited the center nearest you just to see what is going on?

AmSECT, its leaders in the International Consortium for Evidence-Based Perfusion, and our manufacturer partners have invested heavily to find the role for simulation in perfusion. Research in simulation and in team training has already demonstrated that practice does make perfect and that team training reduces patient injury (14). The icing on the cake is that the surgical team is more satisfied and team members feel safer in their work environment. We are behind our surgical colleagues when it comes to team training and simulation. Participating in simulation drills helps us to be prepared and to expect the unexpected, and as Dr. McDonald taught us yesterday, to move from unconsciously incompetent to unconsciously competent. Be prepared.

Safety Systems

Quality equals patient safety. This is the conclusion of the Institute of Medicine in their reports about errors in medicine (15). Recently, we have seen evidence from a Veterans Administration study that demonstrated team training reduces surgical patient mortality (16).

Team training via simulation should be multidisciplinary. Team training in simulation labs is not just for thoracic surgical residents and perfusion students. We experienced perfusionists have to set our egos and fear aside and practice our work as teams sorting out our evidence-based procedures as we go. We know that not all the evidence we seek to guide our practice exists and is controversial in its interpretation by experts (17). We need to generate our own local and national databases and at the same time, continue to tract our valuable unwritten tacit, practical knowledge through case reports and case series collections.

We all need to emulate the perfusion quality improvement programs described by the teams led by Bob Groom, Tim Dickenson, Rob Baker, and Al Stammers, where they show us how we can evolve from a simple descriptive listing of cases to quantitative instruments and dashboards that can reduce variability among perfusionists and assure compliance with policies and standards of care (18–20). Pronovost has gained national success and more important has saved millions of lives and billions of dollars to reduce blood stream infections in intensive care units across the United States with a fairly simple strategy. Pronovost teaches three Cs for process improvement: create an evidence-based checklist, change the culture, and collect data. Sounds simple; however the second step about changing the culture is especially challenging. As perfusionists, we need to follow Pronovost’s three steps to provide safer perfusion care. Be safe.

Trust in your Teammates

Sifting through all of our didactic learning and all of our tacit knowledge, we are faced with the reality that today it comes down to passion and willingness to work in a team. Being a cardiac surgeon, an anesthesiologist, or a perfusionist is no longer a solo sport. We depend on our teams. If we do not behave as teams, our patients suffer and we suffer. How do we ignite our teams today?

AmSECT and perfusion educators are doing the right thing to invest in the human factors science of our mission. Like anesthesiologists have done, thoracic and cardiovascular
surgeons are emphasizing the multidisciplinary nature of crew behaviors. Our surgeon colleagues are focusing on the non-technical skills of being a surgeon. The surgical resident training curriculum for the next generation of cardiac surgeons is focusing on the cognitive and interpersonal skills of communicating with, motivating, and recognizing the other members of our complex operating room teams (21). If it has not already, this revolution is coming to your operating room. Perfusionists must support the professional evolution of our surgeon and anesthesia teammates as they hone their professional team-oriented non-technical skills.

Institutions, administrators, and patient advocates are highly focused on culture of safety issues to benefit all team members and improve patient safety. Administrators know and are confronting the negative side effects and the hidden high costs of disruptions in patient care and the workplace caused by team errors and egotistical caregivers.

This non-technical skills message is not just for physicians, perfusionists need to model respectful non-technical skills. When we work out our culture of safety issues – most of which are communication related – we will feel safer in our workplaces. Speak up, point out errors, and strive to feel safe as a caregiver. Our patients will receive better care. Feel safe.

Be Prepared. Be Safe. Feel Safe.

So I have arrived at my title: “Be prepared. Be safe. Feel safe.” These six simple yet very complex words are my call to action to my teammates back home. These words are my gift to you today for your recognition of my work. It is ironic that after working so much to be scientific and apply research designs and statistical methods to perfusion, my interests and work assignments are moving to the non-technical, human factors side of perfusion technology.

I would like to acknowledge my teammates – they lift me up every day.

THE 2011 MAYO CLINIC (MINNESOTA) PERFUSION SERVICE WORK GROUP

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Zhen Ren
Amanda Cornelius
James Kunz
George Glenn

Three of the 17 ECMO specialists that I work closely with are in the audience. I am very proud of their dedication to care for a challenging group of patients; they make our ECMO team better every day. You can relate to me because we have accomplished so much together through our shared experiences in AmSECT. My choices in life have led me on a mountain path with many switchbacks, but always leading upward.

I am privileged and honored that my family, my student-graduates, and my unselfish mentors have led me to this moment in time and the pinnacle of my perfusion career to receive AmSECT’s John H. Gibbon Award. Thank you!

REFERENCES