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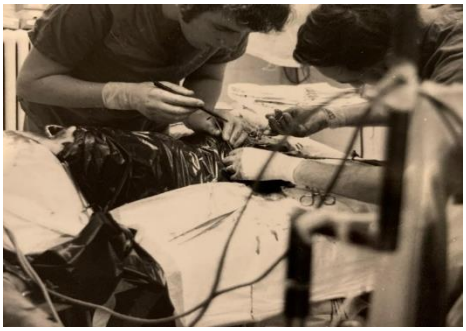
BI-ANNUAL
STUDENT
NEWSLETTER

AmSECTOMORROW



Jim as a student Heart Lung Technologist being taught by Cardiac Surgeon Dr. Ed Kinley to cannulate the research animal's femoral artery, Dalhousie Research Laboratory, Halifax, Nova Scotia, 1968

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THE NEWSROOM.

Perfusion Advancements: The Jim MacDonald Experience

By Jocelyn Breckon

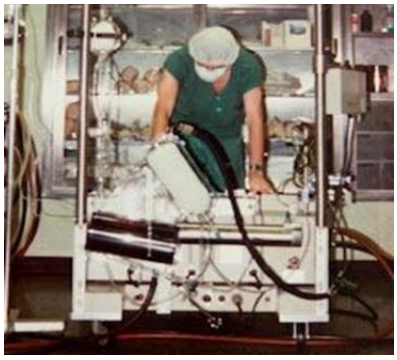
To learn how perfusion has advanced as a field, I interviewed Jim MacDonald, who began his perfusion career in 1967 through on the job training. Over the years Jim has had firsthand experience with how perfusion training and equipment has developed. He is passionate not only about his own career choice in perfusion but also the growth of the perfusion community, which he has shown through his tireless commitment to many perfusion associations.

First, let's explore his experience in becoming a successful perfusionist. After his first two years of training, in both adult and pediatric perfusion, Jim continued working as a staff Clinical Perfusionist at the Victoria General Hospital and the Halifax Children's Hospital until 1978. In 1978, he accepted a position at University Hospital in London, Ontario. While in London he was called upon to teach Perfusion students at the Mitchener Institute of Applied Health Sciences in Toronto. Later he became the Chief Perfusionist at the London Health Sciences Centre, University Campus until his recent retirement from active Clinical Perfusion in 2010. From that date to present, Jim has been an independent Canadian Clinical Consultant (519 Perfusion Consulting, Inc) in concert with Quest Medical, Inc., in Allen, Texas. Currently he is working with their newest innovation in their MPS3 myocardial preservation console.

Jim began his career 15 years after the first successful heart surgery involving cardiopulmonary bypass (1953 – Dr. John Gibbon preformed ASD repair on Bypass). During that era in open heart surgery there were no perfusion schools or guided curriculums for Perfusion. The first heart lung technologists, throughout the Western world, were "trained on the job" and came from several different medical backgrounds. Jim entered the medical world as an Operating Room Technician who worked in both thoracic and cardiac surgery.

He began his on-the-job training in 1967 under the ever-watchful eye of three cardiac surgeons and the only trained heart lung technologist in Halifax, Alan Smith. During Jim's initial training, much of his learning came from his experience in the Animal Research Lab at Dalhousie University, where both the heart lung technologist and the cardiac surgeon would work. Together they would work to fine tune their various surgical techniques as well as to evaluate new extracorporeal equipment prior to their initial clinical interface. As a heart lung technologist student in the Animal Research Lab, he was taught to prepare the animals for surgery, which included preparing and administering the anesthesia, opening the animal's chest, cannulating the venous and arterial sites, and preparing the heart lung machine. All the animal preparations were done prior to the arrival of the surgeon. During his two-year training period there were daily in-depth questionings from the surgeons, which would later be very useful for when he took his Canadian perfusion oral examination in Montreal in 1969. This examination was very stressful and consisted of sitting before a panel of six medical professionals - two cardiac surgeons, two cardiac anesthesiologists, and two heart lung technologists.

There were several major advancements during Jim's career in perfusion. He would note the advancement in blood oxygenators as one of the most significant. During his initial training in the late 1960s, the Kay-Cross Disc Film Whole Blood Oxygenator was used. The original Kay-Cross Oxygenator contained 59 silicone-coated stainless-steel disks, which were mounted on a central shaft and enclosed in a Pyrex glass cylinder. While this oxygenator could complete the task at hand, there were a few downfalls Jim was quick to remember. The oxygenator required an extremely time-consuming wash process between cases, it lacked an integrated heat exchanger, and involved a large whole blood priming volume. Following the Kay-Cross Oxygenator was the introduction and subsequent clinical use of several different disposable bubble oxygenators. Jim recalls this stage in oxygenator development was marked by various step-by-step processes, with daily surprises and unwanted experiences for both the heart lung technician and the cardiac surgeon. Of all the disposable bubble oxygenators the Baxter Travenol Bubble Oxygenator stood out most to Jim.



Jim MacDonald with the Sarns Modular Pump and the Bentley Temptrol Hard Shell Bubble Oxygenator, Victoria General Hospital, Halifax, Nova Scotia – 1973.

It was a heat-sealed sheet bubble oxygenator composed of the vertical mixing tube, de-bubbling chamber, and inclined settling columns; all of which were enclosed between two sheets of polyvinyl plastic. These new oxygenators were designed to be disposed of after use, which greatly reduced the daily workload of a perfusionist. They also contained effective integrated heat exchangers. The conception of these disposable devices really opened the flood gates for daily routine open heart surgeries. Between 1970 to 1975 various disposable oxygenators would start to emerge, both soft shell and hard shell designs would be seen in cardiac centers throughout the world. Eventually the membrane oxygenator would be introduced. It would become the preferred clinical choice for oxygenation on bypass with its small priming volume and lower blood trauma outcomes. What an experience it was for Jim to watch and participate in the oxygenation evolution. Having used the older and more laborious process Jim truly values these advancements.

Over the years Jim has remained passionate about the career that he began as an on-the-job training. He recommends that all perfusionists get involved with a peer group within the perfusion community. He was fortunate to be involved with the Canadian Council of Cardiovascular Perfusion (Serving as President from 1980 to 1983), the American Academy of Cardiovascular Perfusion (Serving as President in 1993), and the American Society of Extracorporeal Technology. These groups provide an avenue whereby perfusionists can focus on common clinical concerns and observations - to share in one's professional commitment and to identify personally within your peer group. They hold each of us accountable in reference to our daily clinical interface but also provide us a means to participate in the growth of our profession.

Jim's last nugget of advice is to "Please remember that education is ongoing!" We must continue to learn via both our clinical and organizational commitments. Use the experiences of our shared past to bring forward excellence in our future. Your cardiac patient, the recipient of YOUR specialized extracorporeal mechanical support modalities, expects this duty of care.

Jim MacDonald, Sal Guercio, Terry Crane, AACP Annual Meeting, Reno, Nevada, 2020 - an example of acquired friendships and collegiality through professional organization involvement.

It was truly an honor to interview Jim for this article. His lifetime of experience and vast knowledge on the art of perfusion make him an example of excellence which students like myself strive to follow. His work, and the work of many others, has formed the education and career paths of perfusionists today.

PUMP UP THE VOLUME.

Why should you attend a conference?

By Grayce Owens

Why is it important for students to attend a professional conference? Why should you pack your bags in the middle of a busy semester and fly out to Phoenix? Here are just a few key reasons why you should join us this April.

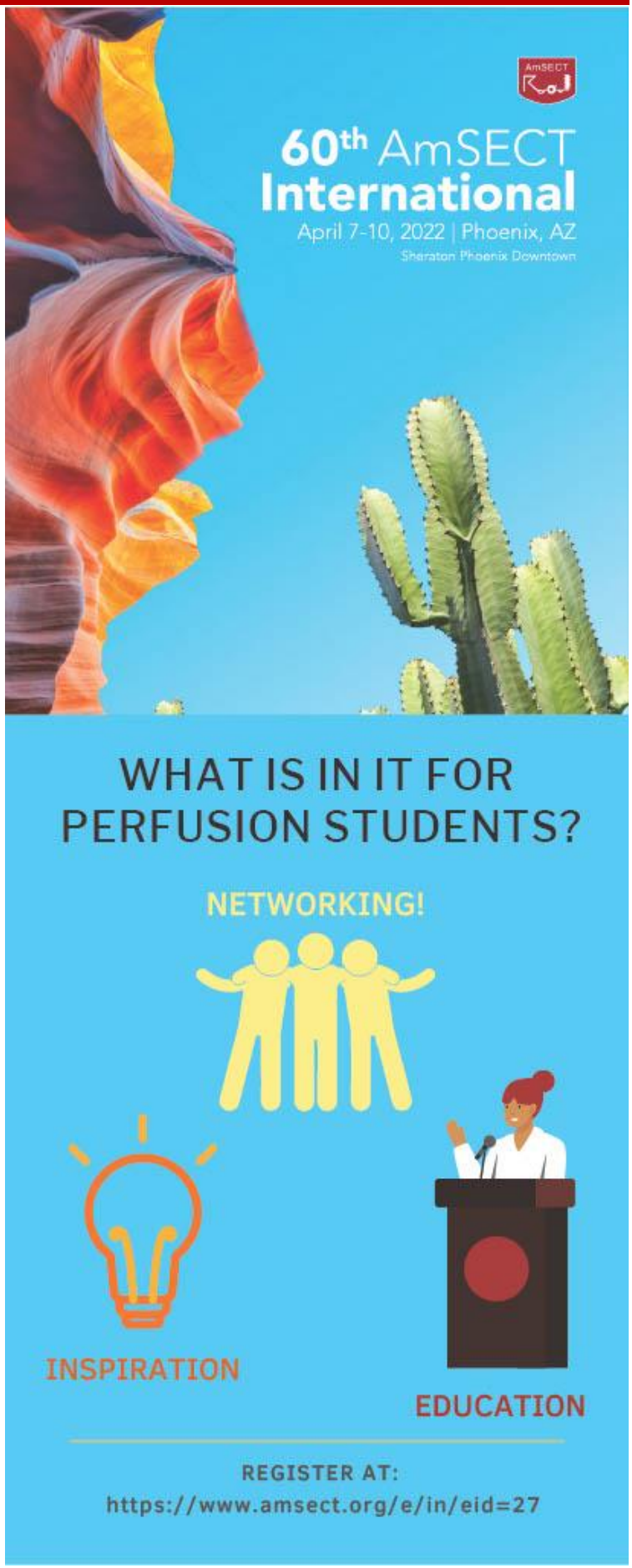
AmSECT has a great lineup of speakers and presentations covering topics that range from ECMO use in Covid patients to pediatric mechanical assist support to the most recent blood management guidelines. These are areas that are relevant to our day-to-day practice and to patient outcomes. As soon-to-be clinical perfusionists, we have a responsibility to keep up with advancements in technology and to continue learning how we can best serve our patients.

The conference is also a great opportunity to hear from leaders in the perfusion world. What are the challenges we face as a profession? What research gaps exist in our field? What does the future of our profession look like? There are no better people to answer these questions than the keynote speakers, who are a wealth of knowledge and experience.

In a close-knit field like perfusion, networking is essential. At an international conference, we can make connections with other students, mentors, and potential employers. Being involved with a professional society can provide you with opportunities to ask questions, seek advice, and expand your professional circle.

Now, you may be thinking: *that sounds great for after perfusion school, but why should I go when I'm still a student (and when final exams are rapidly approaching)?* Here's my one-sentence pitch for why you should join us in April: attending an international conference is one of the best ways you can establish yourself as a professional. Knowing the latest research can better prepare you for clinical rotations, and if you want to get in the habit of expanding your knowledge, why wait? What better way to demonstrate to your future employers that you're invested in the field and committed to continued learning?

Best of all, attending a conference can help you learn how *you* can give back to this incredible field that binds us together. You may leave inspired to help draft new protocols, address an unanswered research question, or join an international cardiac surgical mission trip. Being a part of a professional society isn't just a supplement to our perfusion education, but an integral part of it. Join the team and meet us in Phoenix!



Back to the Stacks.

Clinical Rotation Tips

By Angela Naef

Pre-Rotation and Housing Help

If your clinical site sends you their protocols ahead of time, study them thoroughly.

Consider talking with your clinical rotation site about what you'd like to focus on in pumping or observing. BOLT, emergency setup, special patients, etc.

Find your OR voice!!! Not too quiet but not too loud. It's easy to parrot what the surgeon says but it can be difficult to talk to the surgeon in adverse events. Practice accessing and writing down how you would announce certain events like high line pressure or bad venous drainage. It should be clear and concise.

Don't be afraid to shop around to find a living situation that works for you. Consider asking your clinical coordinators if any of your preceptors rent spaces, and use Google Maps to find apartments near your clinical site. The following list includes a variety of housing websites to consult. Please note, I am not affiliated with any of these companies.

- Airbnb.com (may negotiate with some hosts)
- Apartments.com
- Corporatehousingbyowner.com
- Craigslist.org (be careful of scams)
- Extendedstayamerica.com
- Furnishedfinder.com
- Hotpads.com
- Openunits.com
- Rotatingroom.com (requires .edu email address)
- Thegypsynurse.com
- Vrbo.com
- Zillow.com

During your Rotation

For your first two rotations I recommend drawing out their circuit on a piece of paper. It helps you "practice" building a dry set up. Since it's on paper, you can practice a million times if you wanted to. Once you're an expert on this you'll notice going to other sites and building other pumps at different sites are similar and easier. There are small differences that you'll notice like AV bridges, purge lines, arterial line filters, but you'll be able to pick those out a lot easier.

Introduce yourself to the OR staff. Most likely your perfusion team will introduce you to the surgeon but take your time in the morning to introduce yourself to the scrub nurses, circulating nurses, and anesthesia staff.

If there's a camera in the OR don't be afraid to ask the nurse to split your screen or find a screen you can see. You'd be surprised what you learn in the surgical sequence of events.

Before you're about to pump the case for the day let your preceptor know what you need help with. It can be small items like, "I always forget to hit add lab/store when taking a blood sample," or bigger items like "I forget to double check that my cardioplegia is cold when I'm delivering." Not only does this help you learn, but it also shows your preceptor that you're aware of your weaknesses and blind spots and are willing to learn.

At the start of every case, write down the following info points on a small piece of paper: BSA, top flow by cardiac index, procedure, height, weight, allergies, blood type, cannulation sites and sizes, unique surgeon preferences, cardioplegia strategy, cooling temp, and any abnormal circumstances/patient history. I will have this piece of paper taped or out where I can see it while I'm pumping. These cards could end up being really good information if you ever need to pass your case to another perfusionist to take over. (You might not pass cases over as a student, but you might in your future career.)

When there's down time during your pump case, ask your preceptor questions. Bring in a list of pre-written questions or things you've always wondered about. Ask them "what have you noticed that I need to improve on?"

It's important to understand the reason why a perfusionist does what they do. Ask your preceptor why they do a certain method. Be open to trying new methods at least once or a couple of times and if you like it add it to your routine. Avoid saying things like "that's not how we learned it in school," since that may give the impression that you're inflexible. Gather all the best methods and turn it into your own master list.

Gain your preceptors' trust by being confident and knowing the institution's protocols. It can be intimidating to be confident and that comes with experience but be confident in what you know. Start small by knowing your circuit. Communicate well with the surgeons.

There comes a point in your rotation that you get to know the team and you get comfortable. Remember to stay professional!

Lastly, I know it can get so exhausting. Your job as a student is to absorb everything that you learn. You're pumping a lot of cases in a very short amount of time. Weekends can be for schoolwork but give yourself permission to do absolutely nothing to recharge. Do something for an hour that you enjoy doing. Just you! I don't mean spend an hour doing something with your family, friends, or spouse, but something that makes you feel happy. Whether that's painting, exercising, baking, reading, designing, watching Netflix, etc. Do it! Try something new even if you think it won't work. Creativity is rarely tidy. Intentionally enjoy and relax for that hour.

Post-Rotation

Show gratitude to your clinical sites! They don't have to accept students and it's a huge risk for sites to have students. There are legal contracts in place because it is a liability for a site to accept students. Sites don't owe students anything.

General Advice

Stay teachable and humble. You never know what you'll learn, even if you think you've primed a circuit a million times. Even though it's natural to get defensive when receiving criticism, try your best to fight that impulse. The criticism you'll receive is not personal and it will all serve to maker you a better perfusionist.

If you accept a job, there may be a tendency to relax and not want to work as hard anymore. A common thought after accepting a job is, "Well my job doesn't do this so I'm not going to care as much," or "I'm never going to do paper charting so I'm not going to learn it." It's a common behavior change, and your preceptors can tell when it happens. Don't do this! Pretend like your clinical rotation is a job interview every day.
The perfusion community is well connected. Don't ever talk ill of your school, other schools, other rotation sites, your classmates, or other perfusionists. It doesn't look good on you or the school you represent.

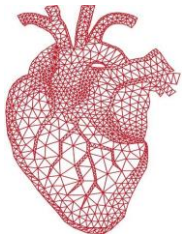
Last Thoughts

I am by all means not the perfect student and will always strive to be better. Take your successes and failures in stride and practice responding rather than reacting. There are going to be days that you just feel like a failure. It's okay to make mistakes; that's how we learn to not make those same mistakes again. The knowledge you gain is something that no one can take from you. It is invaluable to you and your career. You're amazing and don't forget it.

The Vitals

LVAD Driveline Failure

By Jeremy Bolick



We were called to emergently cannulate a patient whose LVAD had failed. The driveline had severed in half because of the patient's active lifestyle causing constant wear on the device. Once peripheral VA ECMO was initiated, we quickly realized the patient had fulminant pulmonary edema. The substantial blood loss was causing low flows and chatter in the circuit. The lungs were acting as a reservoir holding large amounts of blood and edema. The patient was emergently taken to the OR for exploration.

Bypass was initiated and volume rapidly infused to maintain flows. The surgeon quickly ligated the outflow tract of the LVAD and the patient stabilized. We transitioned the patient back to ECMO support and returned to the ICU. The patient recovered in the subsequent days and had a new durable device implanted prior to discharge.

This case was interesting because the LVAD had remained patent after failure. Prior to this, most LVAD patients we placed on ECMO were due to clotting in the pump head. The LVAD outflow tract was patent and shunting blood retrograde from the ECMO pump directly into the left ventricle via the LVAD centrifugal pump. The patient's right heart had good function and the two opposing forces were causing the lungs to flood. This was a valuable learning experience that had a good outcome.

Perfusion Goofs & Blunders

As a preceptor I purposely pointed at the cardioplegia timer for the student to announce it to the surgeon even though the cross-clamp had been off for 20 mins. The student announced it and the surgeon said it's been 20 mins since the cross-clamp came off. *-A mean preceptor*

The rotation site I was at just switched over to a new circuit and the cardioplegia spikes were now in the general area that the prime lines used to be. I got distracted talking to other people in the room and started priming the pump through the plegia spikes on a centrifugal pump. It wasn't quite so easy to de-air the centrifugal head once I realized what I was doing. *-Whoopsie Daisy*

In my first rotation we used an IV pump for phenyl, if needed. It's connected to one of the luers at the top of the reservoir. In the middle of the case it beeped at us for a bubble and my preceptor just took out the line from the IV pump. The little roller clamp was not closed! There was nothing occluding the IV line and was just free-flowing into the reservoir. Pressure definitely spiked…..a lot. *-Yikes*

We were simulating crashing on bypass in non-CV ORs but were not aware that was the skill we were practicing that day.. As me and my lab partner were scrambling to gather, mobilize all our equipment, build and prime the AV loop, the recirc line was not connected from the previous lab and when we started priming, crystalloid was shooting from the oxygenator like a fountain! I went to plug the hole out of habit and the moment my finger touched the opening, I unintentionally contaminated the whole circuit. *-Dirty Fingers*

They read a warm blood gas to the surgeon. Instead of reading pH is 7.4, pCO2 is 40, pO2 is 240, etc. I wanted to be like one of my preceptors and just read the numbers without saying pH, pCO2, pO2 etc. I tried to be fast and read just the numbers all the way down the blood gas. I was already uncomfortable and fumbled through it but felt this overwhelming atmosphere of being on stage. The next thing I know I look up and not only is everyone staring at me in the entire OR but the headlight of shame and the surgeon's piercing eyes and hand gestures of what in the world are you doing? I never felt so ashamed. *-Never doing that again*

I was very nervous the first time I delivered cardioplegia to a patient. I accidentally turned the pump up to 600 mL/min within a second. The pressures within the circuit spiked and I almost blew it. Thank goodness I had not fully turned off my vent and my preceptor was right behind me! *-Heavy Handed First Year*

After adding ice to a Cardioquip ECMO heater/cooler there was a sound that seemed like air in the ECMO circuit. It was really just the ice rattling in the heater cooler. This caused me to hit the prime button on the Cardioquip to clear it up. Big mistake…. Patient temperature plummeted and we quickly realized why. *-This is how we grow*

A half a second of terror when I was doing my usual scan on bypass and the arterial roller pump wasn't even spinning. We were using a centrifugal pump that day. *-Transplant fatigue*

During a simulated pump run, I was testing my arterial line and ran my pump too hard and I managed to spray the ceiling and my clinical instructor as well. Very memorable experience. *-Simlab Newbie*

Administered protamine after doing my hot shot. Because why not? *-Confused Pumpling*

During my first lab practical, I forgot to lock the reservoir in place in its holder. When my preceptor came to check over my build, she tapped the reservoir and it tipped out. Thankful I learned that lesson early and not when pushing a fully primed pump up to the field! *-First day jitters*

Have a perfusion blunder you want to share? Please email owensgr@musc.edu to have your blunder included in the next issue.

THE RESERVOIR

- AmSECT Student Membership

Student members shall pay dues one time and remain student members while actively enrolled in the perfusion education program.
http://www.amsect.org/page/students

- Save The Date - AmSECT 60th International Conference

April 7-10 | Phoenix, AZ

https://www.amsect.org/page/60th-international-conference