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EDUCATION

On a Mission

PUBLISHED ON SEPTEMBER 13, 2009

For biomedical technicians who have a touch of the wanderlust and want to contribute their time and needed expertise to those less fortunate, a trip overseas may provide the answer to both. For those willing to prepare beforehand and contribute with a team spirit, opportunities abound.



“Many biomed technicians traveling overseas with medical teams have the sole responsibility of supporting the medical team,” says Lou Schonder, founder and director of earthMed, Upper Darby, Pa. “Because of the time demand supporting the medical team, enhancing the equipment management program often becomes a secondary goal. Part of earthMed’s vision is to extend beyond solely clinical support and develop health care technology management support programs.”

Assignments for these 1- to 2-week stints usually occur in hospitals and clinics throughout developing countries such as Africa, Ecuador, Haiti, and parts of Central America, Nigeria, Mongolia, the Asian subcontinent, and India. The environments and work can be challenging, to be sure, but properly prepared, a clinical engineer or biomedical equipment technician can find a trip overseas gives back tenfold in terms of lasting personal and professional rewards.



International Aid’s 2009 Ghana, Africa, MET graduating class with, L to R, students Martin Puokang and William Nenyoo-Jenkins, both from Ghana; Juma Mugabi from Uganda; electronics instructor Dogbe (Winston) Kwame Agyire; Francis Arhin and Samuel Boffie Koomson, both from Ghana; and Frank Twaibu, from Malawi.

“The need is ubiquitous,” says Nick Hallack, president and CEO of MediSend International, Dallas. “There isn’t a hospital in a developing country that wouldn’t want a biomedical technician to give them support.”

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Prepare Early and Well

Before successfully traveling overseas, some in-depth research and preparation will be needed. In fact, this preparation is key. Boyd Campbell, CBET, CRES, co-owner of Southeastern Biomedical Associates, Hudson, NC, did research and planning for 3 months before traveling to India last year with the India Gospel League, Hudson, Ohio. "Before I said yes, I did quite a bit of research on where I was going, what I was going to be doing, and travel restrictions," he says.

For starters, he allowed plenty of time for his medical preparation, immunizations, and securing his passport. "You will need an up-to-date passport, and make copies of your passport and put it in every piece of your luggage in case your original gets lost," Campbell says.

Depending on the country you will visit, required immunizations could be tricky. Robert Malkin, PhD, PE, professor of the practice of biomedical engineering at Duke University and director, Duke Engineering World Health, advises seeing a physician who specializes in tropical medicine. Many county health departments have such physicians, and they are not usually very expensive. "They'll give you all the shots and drugs you need," Malkin says. "You should not expect any medical support when you get there, so bring all your prescription drugs, and make sure you don't need to visit a doctor during that time."

Boyd also recommends packing Imodium and other anti-diarrhea medication, as well as Tamiflu, hand sanitizer, and a personal first aid kit.



Traveling with the World Health Organization, Boyd Campbell, CBET, CRES, (red shirt), teaches biomed students the principles of ventilation in Kismu, Kenya, Africa.

Billy Teninty, former director of medical equipment training for International Aid, Spring Lake, Mich, which closed all overseas mission activity July 1, 2009, also stresses the need for malaria immunization. "Almost all the countries we worked in are infested with malaria, so that is definitely something to prepare for," he says.

Most organizations traveling to developing countries on humanitarian missions carry their own health insurance, although some biomed students will be responsible for securing their own. Take note, the insurance needs to cover emergency evacuation. "If you get seriously ill, you do not want to be treated in the developing world, especially emergency surgery," Malkin says. "So you need medical evacuation insurance."

Most organizations will also cover the initial round trip airfare, although, again, not always. "With our program, we always covered their round trip airfare, but there are a lot of medical organizations that will ask the biomed student to make a contribution of \$2,500," Teninty says. "Then the airfare, hotel expenses, and in-country expenses come out of that contribution."

Living and Working Abroad



The only biomedical facility in Salem, located in the state of Tamil Nadu in the southern part of India.



Also in Salem, Boyd Campbell's photo of the biomedical shop spare parts area.

Living conditions in many developing countries can vary widely, so go with an open mind, an open heart, and a sense of adventure.

"The biomedical equipment training program in Ghana is conducted on the campus of Valley View University, and we stay in their guesthouse," Teninty says. "Or, we put them up in a guesthouse of the nearest town, and it's a short walk out to the main road where they pick up local transportation."

While working in India, Campbell stayed in an orphanage. "Our accommodations were a twin bed in a square room, and that was it," he says. "We were lucky enough to have air-conditioning, but the power was always going out."

His accommodations in Africa, however, were quite different. "The hotel that I stayed in the first night had armed guards on every floor," he says. "It was fenced off with barbed wire around it, and you had to go through a gate to get in."

Modern restroom and shower facilities may be in short supply, and sleeping arrangements may not be as comfortable as home, but most biomed students should find their accommodations just fine for the week or two of their stay.

As far as hours worked, most assignments will not revolve around a 9-to-5, Monday-through-Friday schedule. "It's very likely you are going to work longer overseas than you would at your hospital," Teninty says. "You could easily put in 10 hours a day, but you know you're only there for a few days and you have to get it done."

Campbell found his shift ran from daylight to dark. "While I was in Africa, we would teach all day long, and then we would go into the hospital and start repairing equipment, trying to get things up and running," he says. "If you travel 30 hours to get somewhere, you want to do all that you possibly can while you're there."

Amit J. Nimunkar, a graduate student in the biomedical engineering program at the University of Wisconsin, Madison, and a member of the Engineering World Health Madison Chapter, traveled with a colleague, Lucas Vitzthum, to Mongolia as part of a medical mission with earthMed. The two students both found that they worked until the job was finished.

"You are on a mission, so the hours don't really

matter,” he says. “You go in the morning, and you come back in the evening.”

After your long hours, the food you find may also not be your typical fare. “You should expect a lower-protein diet for these kinds of trips, and you need to be careful of what you eat and drink,” Malkin says.

Professional Rewards Found Nowhere Else

While some of the accommodations may be lacking, the enhanced training, experience, and cultural exposure will more than make up for the smart biomed who takes advantage of such educational opportunities.

“You learn a lot about the country, culture, language, food, and medical practices, but you also learn a lot about yourself,” Malkin says. “These are very challenging environments, and you can reasonably expect to face something every day that you may have never faced before.”

This access to training, and the ability to greatly enhance critical thinking and technical skills, may be one of the most unique aspects of volunteering for an overseas mission. What’s more, biomedics can find themselves part of a crucial teaching component for many struggling hospitals.

“There is absolutely no other way they are going to find the expertise that a US-, European-, or Japanese-trained biomed can provide for them,” Teninty says. “I try to expose [developing country] trainees to as many [developed world] trained technicians as possible. These trainees can learn a different technique, a new perspective, and a different way of asking questions, and they are going to learn from all of them.”

To understand the impact that just one biomed can have on a developing country facility, Malkin points to a biomed volunteer who was able to double the surgical capacity in a hospital by just repairing its ventilators. Another fashioned an incubator from available materials, which saved hundreds, if not thousands, of babies’ lives.

“You do come up with very unconventional solutions to problems,” Schonder says. “I’ve been called MacGyver, as have many other biomedics that have volunteered overseas.”



On a mission with earthMed in Mongolia, Amit J. Nimunkar is a graduate student in the biomedical engineering program at the University of Wisconsin, Madison.



An earthMed Lucas Vitzthum, with inspection of earthMed in a heart-lung bypass machine in Mongolia, examines a pressure sensor that is used with the cardiopulmonary bypass machine.

Embracing the Challenges



Engineering World Health (EWH) volunteer engineers train hospital staff. Here, Neel Patel repairs an electrosurgery machine at his hospital, Materno Infantil Mauricio Abdalah, Chinandega, Nicaragua, where only 40% of the medical equipment is working.



Hospital Gaspar Garcia Laviana, Rivas, Nicaragua, has five operating rooms but can use only two of them at any one time because the anesthesia machines are broken. EWH helped Santhi Elayaperumal repair medical equipment, such as this power supply for the bedside monitor.

As might be expected in some of these environments, challenges abound. Lack of clean running water, oxygen, basic supplies, infrastructure, and consistent power are a given, and the volunteering CE/BMET will need to call on a deep well of creativity and patience.

“Biomedics are used to getting things whenever they want them, and none of that infrastructure exists in the hospitals we go to,” Malkin says. “We don’t have any hospitals that have 24/7 electricity or running water that is safe to drink.”

Hallack sums up the obstacles succinctly: “They will be challenged with variables and unknowns they have never seen in their lives, culturally, technically, and physically. And every time they go back, they will be challenged again.”

The first challenge can be the language barrier. “When we were in Mongolia, we would write things down in English and have them translated into the native language so that the nurses and technicians could take some precautions in using the equipment,” Nimunkar says. “If you don’t try and write down simple visual instructions on how to use some of this equipment, it becomes difficult for the end user.”

Trying to repair foreign equipment in a foreign language can be one of

the most difficult challenges of all, and this is where a committed biomed can really shine. “Ninety percent of all medical equipment in developing country hospitals doesn’t work,” Hallack says. “There they have old Japanese, Korean, German, and Russian equipment, all ranges, years, models, and technologies. It’s not standardized, and it hasn’t been calibrated properly.”

If spare parts exist at all, they are usually difficult to find. “Sometimes the company has been bought out by another company, and that new company supports that old equipment, but the majority of the time you have no second line of support,” Malkin says. “And almost none of the equipment has accessories or a service contract.”

So the bottom line? Biomedics going overseas to volunteer their services will need the technical skills and ingenuity that would make even MacGyver proud.

“One of the skills necessary is improvisation because it takes a lot of ingenuity to make repairs in situations like this,” Teninty says. “You make decisions based on your knowledge and experience, and you use that experience and intuition to try to figure out how to solve the problem and get the unit working again.”

Perhaps two of the biggest problems facing biomedical technicians working internationally are the lack of service manuals and the availability of spare parts. “We essentially never have the manuals for the equipment that we’re using,” Malkin says.



When EWH first visited Espana hospital in Chinandega, Nicaragua, basic diagnostic equipment in resource-poor settings was missing or broken. Patients who needed an x-ray had to travel—sometimes 2 or 3 hours by bus—to get diagnosed. Here, Lindsay Browder repairs a clinical laboratory analyzer.

In the developing world, neither electricity nor oxygen can be taken for granted. Most hospitals in resource-poor settings rely on oxygen concentrators for all their oxygen needs. Chris Withers discovered that when he worked on this concentrator at Machame hospital in northern Tanzania, Africa, on the slopes of Mt. Kilimanjaro, for EWH.

The lack of service manuals stems from equipment being so old that manuals are no longer available, or from copyright laws that prevent companies from freely sharing the information. A few companies do put some of their service manuals on their Web sites for free, while others may charge. Still, CEs and BMETs should not expect the availability of a

manual. "They should know carefully the system they will be working on before they go," Hallack says.

The lack of spare parts is also a growing issue. "The inability to get spare parts is a global problem that needs to be addressed," Teninty says.

To address some of these challenges, Hallack's MediSend International has developed a portable biomedical repair laboratory, which contains more than 4,000 pieces of equipment and supplies. "We designed it from the ground up, addressing the needs of a developing country hospital," Hallack says. "It is so comprehensive that it will repair 80% of all basic equipment, including testing, repairing, and calibration. It also has a power source in it because we know many countries don't have stable electricity."

Make a Worldwide Contribution

Despite the many challenges of volunteering for developing- country duty, hundreds of biomedics go every year and selflessly contribute their time and needed expertise to make much of the world a better place for so many. Some find the experience exhilarating, and some find it is not for them.

"For some people, the stress is too much and they never want to do it again," Schonder says. "Some enjoyed the challenge, appreciated the experience, and want to do it again."

With preplanning, organization, and thoughtful preparation, volunteering overseas can be the experience of a lifetime.

"Most biomedics donate their time and expertise because they genuinely want to help," Malkin says. "Know that you can make a big difference."

Cynthia Kincaid is a contributing writer for 24x7. For more information, contact .

Close to Home

If you want to volunteer your time and technical expertise, but are unable to travel overseas, there are still plenty of opportunities to contribute your biomed skills to many worthy causes.



"Organizations are always looking for biomedics with expertise to come in and help them out," says **MediSend's biomedical repair kit.** Boyd Campbell, CBET, CRES, co-owner of Southeastern Biomedical Associates, Hudson, NC. "Setting up equipment for organizations operating within the United States or donating equipment is helping out just as much as going over and teaching for a week."

To begin, do some research to pinpoint the many organizations that may be sending medical personnel overseas to developing countries, and contact them for information about biomed help. They will be happy to talk with you or send you to an organization in need of current assistance.



Biomedical or electrical engineers, lab technologists, etc, from hospitals in Nigeria, Equatorial Guinea, and Angola gather to study in MediSend's training lab in Dallas. MediSend trains on the system and then hosts it for all its developing-country hospitals.

You can also provide on-site expertise in your local area. "Look on the Internet for organizations that ship medical equipment," says Robert Malkin, PhD, PE, professor of the practice of biomedical engineering at Duke University and director, Duke Engineering World Health. "All of them need volunteer biomedical technicians to help screen their shipments. Some of these organizations have enormous warehouses of equipment that need biomed help in a big way."

Your local biomedical association may also know of opportunities to repair equipment in preparation for overseas shipment.

Virtual help is also welcome, from participating in a listserv to providing your time and expertise via e-mail and the telephone. "Participating in discussions and giving your input and feedback is another way to help," says Billy Teninty, former director of medical equipment training for International Aid, Spring Lake, Mich, which closed all overseas mission activity July 1, 2009.

If you have access to service manuals or equipment and spare parts that could be donated, that help is also always needed.

"Just start reaching out," Malkin says. "Organizations are thrilled to get an experienced person."

—CK

Are You Inspired?

If your adventurous spirit is calling you to take action, there are plenty of opportunities to share your skills both at home and abroad. Explore the organizations below to determine if their goals mesh with yours.

American Medical Resource Foundation Inc

46 N Montello St
Brockton, MA 02301
(508) 580-3301
www.amrf.com

The American Medical Resources Foundation's mission is to improve health care around the world by donating medical equipment and supplies to hospitals that serve the poor in underdeveloped and developing countries of the world. Donations of medical equipment are shipped to hospitals worldwide from its facility, and arrangements for engineering/technician training programs are made through this office.

Assist International

PO Box 66396
Scotts Valley, CA 95067
(831) 438-4582
www.assistinternational.org

Assist International builds the capacity of hospitals in developing countries to more effectively serve the people in their area. It provides medical equipment and training for physicians and nursing staff. Biomed technicians need to be familiar with the older equipment they refurbish and repair, usually not more than one generation old. Biomed technicians need skills in installations and training on cardiac care monitors, central stations, ultrasounds, and ventilators.

CardioStart International

6110 Hartford St
Tampa, FL 33619
(813) 740-2698
www.cardiostart.com
Joanne McGuire, administrative director

CardioStart International aspires to provide greater hope and support to families with children and adults afflicted with heart disease. It provides free heart surgery and associated medical care to children and adults living in underserved regions of the world. The organization desires biomed technicians to accompany every mission it undertakes.

earthMed

106 Ardsley Rd
Upper Darby, PA 19082
(801) 879-5433
www.earthMed.org
Dustin Telford CBET, CRES, CLES
Director of Clinical Engineering

earthMed is an independent, nonsectarian, nonpolitical organization that improves medical care in developing countries through medical program development, education, direct patient care, diagnostic support, medical device donations, medical supply donations, and community outreach support with the support of medical volunteers. earthMed Founder and Director Lou Schonder emphasizes that a biomed technician's practical know-how is a key consideration in the process of selecting biomed technicians for earthMed's traveling medical teams.

Engineering World Health

The Prizery, Suite 330
302 E Pettigrew St
Durham, NC, 27701
(919) 682-7788

www.ewh.org

Engineering World Health—created to answer the needs of disadvantaged areas through providing and maintaining appropriate

medical technology—accept students and professionals from all over the world. Engineering World Health assembles a container of refurbished medical equipment and donated supplies to meet the hospital's needs. Once the parts have arrived, EWH volunteer engineers install the equipment and train the hospital's staff in its use and maintenance. Volunteers also repair broken equipment and train staff in the skills needed for future improvements. EWH volunteers, engineers, and technicians return year after year to the developing world recipient hospital to make sure the donated piece of equipment continues to work.

Global Links

4809 Penn Ave, Second Floor
Pittsburgh, PA 15224
(412) 361-3424, ext 225
www.globallinks.org

Global Links is a medical relief and development organization dedicated to a twofold mission of environmental stewardship and improving health in developing countries. It collaborates with US hospitals to redirect still useful materials away from landfills to public health-improvement efforts in targeted countries throughout the hemisphere.

India Gospel League

1521 Georgetown Rd, Suite 305
Hudson, OH 44236
(330) 650-5900/(888) 352-4451
www.iglworl.org

The India Gospel League's mission is to raise awareness and encourage involvement and support among the people of North America for the India Gospel League's evangelism, discipleship, church planting, education, agricultural assistance, economic empowerment, and medical programs.

International Aid

17011 Hickory
Spring Lake, MI 49456
(800) 968-7490
www.internationalaid.org
Jim Loeffler

International Aid is a faith-based, nonprofit organization whose primary focus is providing sustainable health care worldwide through medical equipment services, training, infectious disease screening, and health products. Partnering with like-minded organizations, our desire is to provide needed, appropriate health care technology to improve the health and welfare of "the least of these" throughout the world.

International Children's Heart Foundation

1750 Madison Ave #100
Memphis, TN 38104
(877) 869-4243
www.babyheart.org

International Children's Heart Foundation brings the skills, technology,

and knowledge to cure and care for children with congenital heart disease in developing countries. The organization operates mission trips to educate local health care professionals and provide needed equipment and medications. Twenty-nine trips are planned for 2009 throughout the developing world, with several additional trips in the planning stages.

MedEquip Missions, a ministry of Helps International Missions

573 Fairview Rd
Asheville, NC 28803
(828) 277-3812
www.medequip.org
Dennis McCutcheon, director

MedEquip Missions evaluates and repairs donated medical equipment. It also sends biomedical equipment technicians on short-term missions to meet the needs of active Christian hospitals.

MediSend International

Elisabeth Dahan Humanitarian Center
9244 Markville Dr
Dallas, TX 75243
(214) 575-5006, ext 112
www.medisend.org

MediSend is a nonprofit humanitarian organization that supports under resourced hospitals in developing countries. Its mission includes education, training, technical support, and management technologies in biomedical equipment repair, as well as the distribution of life-saving medical supplies and biomedical equipment in long-term partnership and emergency relief programs. Costel Rizescu is the director of the biomedical program.

Mission Outreach

PO Box 1665
Springfield, IL 62705
(217) 525-8843
www.mission-outreach.org

Mission Outreach is a nonprofit organization focused on the recovery and responsible redistribution of health care equipment and supplies to developing countries.

Operation Renewed Hope

PO Box 43242
Fayetteville, NC 28309-3242
(910) 987-5072
www.operationrenewedhope.org

Dave Wayne
SE Medical Systems LLC
(770) 210-6693

Operation Renewed Hope provides the opportunity for individuals to serve

God through short-term and long-term missions throughout the world. Team members travel on mission trips together, transporting equipment and supplies that bring relief.

ORBIS International

520 Eighth Ave, 11th Floor

New York, NY 10018

(646) 674-5511

www.orbis.org

Ismael Cordero, CBET, health care technology manager

ORBIS International is a nonprofit organization that strives to eliminate avoidable blindness and restore sight in the developing world. Biomedics may not need specialized knowledge of ophthalmic equipment to lend assistance on medical missions. ORBIS welcomes all inquiries.

PROJECT C.U.R.E.

10377 E Geddes Ave

Centennial, CO 80112

(303) 792-0729, ext 228

www.projectcure.org

Jean Feist, director C.U.R.E. Clinics

PROJECT C.U.R.E. is a humanitarian relief organization that collects donated medical supplies and equipment and gives them to the poorest in developing countries. Its clinics division provides an avenue for volunteer medical professionals to travel to developing countries and offer medical services. Medical teams are sent to sites following the container delivery of medical supplies and equipment, and this is repeated every 6 or 12 months. Training and information is provided to each team member about the medical conditions and equipment needs. Trips for 2009 and 2010 include: Tanzania, Ghana, Malawi, Madagascar, Peru, Guatemala, and Cote D'Ivoire.

Project Open Hearts

359 Pearl St

Denver, CO 80203

(303) 929-8850

www.poh.org

Rita Lenz, executive director

Project Open Hearts is a nonprofit organization that works with foreign medical staff to provide firsthand cardiac surgical, cardiac nursing training, and assistance with cardiac diagnostic procedures. A biomed's practical know-how is key when medical team members are being selected.

Samaritan's Purse, World Medical Mission

PO Box 3000

Boone, NC 28607

(828) 262-1980

www.samaritanspurse.org

Jim Moore

World Medical Mission, the medical arm of Samaritan's Purse, serves Christian hospitals and clinics in Africa, Asia, Europe, Latin America, and the Middle East by arranging short-term mission trips for health care personnel who volunteer for ministry overseas. They also provide and install critically needed equipment and supplies.

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