

Biological Technician Career Path Exploration

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Introduction

This article focuses on providing factual information regarding a career in biological technology as a biological technician. Prospects interested in such a career may find the information provided as helpful. The following information regarding biological technicians will be presented in this order: responsibilities, how to gain employment, pay and benefits and job outlook.

Responsibilities of Biological Technicians

Biological technicians work in laboratories and assist biologists and/or other scientists to conduct laboratory experiments and examinations. Biological technicians are responsible for gaining detail-oriented skills for conducting experiments, collecting data and analyzing the results of the experiments. They are responsible for the set-up, maintenance and cleanliness of the laboratory instruments and equipment. The instruments and equipment can vary depending on the complexity of the experiment being tested. Technicians gather and prepare different types of biological samples such as bacterial cultures for laboratory analysis (Department of Labor, 2015). Biological technicians can also work with animals and/or other specimens when gathering data (Biological Technician Job Description - Part 1, 2016). After the samples are prepared, biological tests and experiments can be conducted. Once the experiment is conducted, it is the biological technician's responsibility to observe and analyze the results. After the analysis, biological technicians document their findings in raw data form, then later write a report summarizing their findings. These reports include a procedures, observations and results section, so that it makes it easy to read for other technicians and scientists (Department of Labor, 2015).

Most of the time, biological technicians work in teams to conduct experiments. Since biological technicians assist biologists or other scientists, they are supervised and evaluated by the scientists. Biological technicians have the opportunity to work with traditional laboratory equipment as well as advanced equipment. Some of the advanced equipment used by a technician can include advanced robotics and automated equipment. The use of computers is also common with technicians and there is specially developed software to assist technicians with the collecting data, analyzing data, and creating model experimental data (Department of Labor, 2015).

On special occasions, biological technicians may be required to conduct research for their experiments out in the field. When conducting research in the field, technicians are responsible for hiking long distances and gathering data. Ways to collect data in the field can be various samples taken from the environment or from the wildlife, tracking wildlife with GIS (geographic information system) and/or making observations (Department of Labor, 2015).

How to Become a Biological Technician

Completing high school or receiving a GED and achieving a bachelor's degree in biology or a closely related field is necessary to become a biological technician. There are several qualities needed to be a successful biological technician. Some of these qualities are problem-solving skills, communication skills, analytical skills, and technical skills (Department of Labor, 2015). There are other skills that are needed to be successful such as time management, instructing others, and quality control analysis (Biological Technician Job Description - Part 1, 2016). Several universities provide a program for students to receive a bachelor's degree in general biology. Dependent upon the university, students can receive bachelor's degrees in ecology, microbiology, and physiology. In addition to biology courses, courses in chemistry, mathematics, English, and physics are often required. Taking electives in computer science courses can be useful for the learning of modeling system, simulations of biological processes and how to operate computer dependent laboratory equipment. Internships and classes that offer involvement in a laboratory setting are highly recommended in order to gain experience for future employment in the field (Department of Labor, 2015). Taking other electives that are related to biology can later help specialize on the research and experiments that students wish to conduct.

There are several organizations that allow biological technicians to keep in contact with other professionals in the field and allow technicians to keep knowledgeable with what is happening and developing in the scientific society. Some organizations that help serve biological technicians is the American Society for Biochemistry and Molecular Biology, the American Society for Cell Biology and the American Society for Nutritional Sciences (Biological Technician Overview, 2007). The American Society for Biochemistry and Molecular Biology serves as an organization that allows technicians and other related occupations to become members, make publications, attend conferences and posts possible careers (About Us – ASBMB, 2015). The other organizations listed have a very similar service for biological technicians and other related occupations.

Prior to considering a career as a biological technician, the work environment should be considered. Many positions for biological technicians are held within colleges/universities, the federal government and chemical manufacturers. Most biological technicians work in laboratories and offices to conduct experiments and analyze the results and most work together as a team. Some technicians get a chance to conduct fieldwork so exposure to the weather and wildlife is a risk. Biological technicians also have to follow stringent measures in order to not contaminate the experiment. Depending on the experiment and research being conducted, technicians must exhibit precaution when handling dangerous organisms and/ or toxic substances (Department of Labor, 2015).

Pay and Benefits for Biological Technicians

An annual median wage for biological technicians was observed in May of 2014 to be \$41,290. The range of salary per year was from \$26,300 to \$67,920. In May of 2014, chemical manufacturing was the industry paying biological technicians the most in salary, \$47,280. College/universities paid biological technicians an estimated \$38,920 to \$42,510

in May of 2014. The federal government paid technicians \$36,440 in annual salary in May of 2014. One benefit that biological technicians receive is working regular hours (Department of Labor, 2015). For the biological technicians that have the opportunity to conduct fieldwork, they get to experience nature connectivity. Nature connectivity is very beneficial both psychologically and gives comfort in the meaning of life (Howell, Passmore and Buro, 2013).

Job Outlook for Biological Technicians

From 2014 to 2024, employment is projected to increase about 5%, which is about average for all other occupations. As biotechnology develops further, the demand for technicians will increase. The job market for biological technicians is very competitive so experience in a laboratory setting prior to employment is ideal. Employment data projections for biological technicians from 2014 to 2024 were taken and in 2014 there were 79,300 individuals that were employed as biological technicians. By 2024, there is an estimated increase to 83,500 positions. That is a difference of 4,100 or an increase of 5%. This means that in 2024 there will be 4,100 positions available for people who are interested in being employed as a biological technician (Department of Labor, 2015).

Interview with Kristi Confortin at Ball State Univeristy in Muncie, Indiana

Kristi Confortin is a M.S. Candidate and is also the Chair-Elect of the Student Development Working Group for The National Wildlife Society. She conducts her research on the Eastern Small-footed bat summer roosting ecology in the Shawnee National Forest in Sothern Illinois. She is in the Department of Biology at Ball State University in Muncie, Indiana (See Figure 1). Krisit Confortin was interviewed by Dr. Edward J. Lazaros, Angela Gervais and Mary Pat Stemnock on April 19, 2016. In the following section, you can read the questions that Kristi was asked about her career, and you can read her responses:

Figure 1. Kristi Confortin holding radio telemetry equipment.



What kinds of fun technology do biological technicians get to use?

“The technology we use most frequently in our research is telemetry. Telemetry is when you attach a transmitter to any type of species; including small mammals such as bats or birds, fish, and even large animals such as white tailed deer, bear, cheetahs and elk. Telemetry is a very common technique used in the wildlife field” (K. Confortin, personal communication, April 19, 2016).

“When studying bats with telemetry, the transmitters has to be less than five percent of the bat’s body weight. Hair is removed from the back between the shoulder blades and then the transmitter is placed on with surgical glue. The bat is track usually between 7-21 days until the transmitter falls off or the signal is lost. The transmitter sits on the bat similar to a backpack (See Figure 2). The transmitter is comprised of a battery, casing, and wire. The transmitter sends its own frequency to the receiver. We dial the frequency into the receiver (See Figure 3) and that’s how it picks up the signal. For example, if the transmitter is labeled number 241, that’s the number of the frequency you enter. This way, you can have five different bats with transmitters at a time all with different frequencies” (K. Confortin, personal communication, April 19, 2016).

Figure 2. Eastern small-footed bat with a transmitter attached.



Figure 3. Tracking receiver with frequency gages and cable hook-up for the antenna.



“Along with the receiver, you also need a cable and an antenna (See Figure 1). Each day we used the telemetry equipment to find the roosting location of the individual bat (See Figure 4). The higher the beep from the cable and antenna, the closer the bat is. When you’re down to the minimum gain on the receiver, that’s how you know you’re getting closer to the bat.” (K. Confortin, personal communication, April 19, 2016).

Figure 4. Eastern small-footed bat with transmitter on its back working with the receiver to make sure the frequency is working before the bat is released.



“The purpose of our research is to learn where this species of bats are roosting during the day. Most bat species roost in trees during the day to sleep and then come out at night and to forage, search for insects. In our study the bats are using rocks as their roost. Its important for land managers to understand what kind of trees or rocks the bats are using. The transmitter helps us find where the bats are and report what kind of roosts the bats are using. A lot of bat populations are declining and some are even becoming threatened or endangered due to white nose syndrome so researching where bats roost is crucial to their survival” (K. Confortin, personal communication, April 19, 2016).

“When collecting data for bat that use trees as roost, we collect what species the tree is and the diameter and breast height (DBH), how tall the tree is, how tall the roost is. We also write down if the tree is dead or alive. Also we collect, how much vegetation is around it, and the amount of canopy cover. There are many factors to take note of” (K. Confortin, personal communication, April 19, 2016).

“The bat that I’m researching for my master’s thesis roost under rocks on rocky outcrops in the forest. This species is the Eastern small-footed bat (See Figure 5.). I use telemetry to track the bat’s movement across the rocky outcrops. I am hoping to find out why this bat is choosing rocks and learn more about their roosting ecology. Once a bat is tracked to a rock, we then record the length, width, height, percent bare rock under the roost, and its surrounding microhabitat” (K. Confortin, personal communication, April 19, 2016).

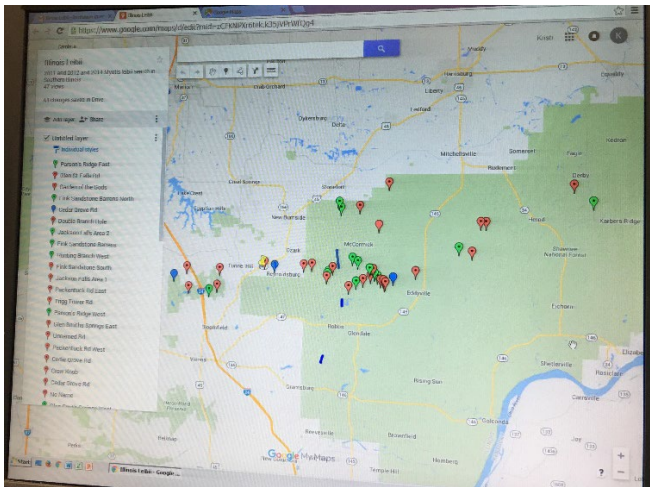
Figure 5. Eastern small-footed bat roosting in a rocky outcrop.



“We use a meter tape and visual cues to determine canopy cover and amount of vegetation around the roost. We record all data onto a data sheet. Then the data collected goes right into excel, and then I use R-Studio, a program for statistics. It allows me to run all of the data and break it down. We also use ARCGIS to map all of the roosts” (K. Confortin, personal communication, April 19, 2016).

"All of the dots on the map represent rocky outcrops. The green area is Shawnee National Forest (southern Illinois) where the research is taking place. Red points mean that bats are not there. Blue means we still have to go look, and green dots mean there is a presence of bats at the location (See Figure 6). We update this file every year for records for the US Forest Service" (K. Confortin, personal communication, April 19, 2016).

Figure 6. Map showing the presence or absence of Eastern small-footed bats and locations that still need to be examined for these bats for data.



What's your favorite part about being a technician?

“My favorite aspect of the job is knowing that you’re contributing to a bigger picture. In recent years bats have been declining rapidly, new information is helping to conserve their species. The public also has a negative awareness of bats and it’s rewarding to teach them about the facts and their ecosystem. Being outside and in nature is also really important to me. It doesn’t feel like work at the end of the day. I want to be out there and conducting my research. In 2016, we’re still learning about this species so it’s interesting and fun” (K. Confortin, personal communication, April 19, 2016).

What would you say has been the most challenging thing a student/recent graduate will encounter when trying to break into this industry?

“The biggest challenge is that students don’t get started early enough. A lot of people focus on being book smart, but you need to take advantage of clubs like the Wildlife Society and really get involved. If you aren’t going out there and networking, you may struggle because this field is getting more and more competitive. In the summer, go out

and take field jobs. Be ready to travel and take opportunities. Anything that can expand your resume is helpful. It's not bad to be competitive because it's what you have to do. Having a good mentor can also benefit students" (K. Confortin, personal communication, April 19, 2016).

What kind of experiments and research have you been involved in?

"I'm originally from New York and got my undergraduate degree at State University of New York at Cobleskill. I had a great mentor there and I got involved and stayed active. I volunteered while I was there with any student who was doing research. Each summer, I went out and did field jobs. I've worked with bats previously. Where I then discovered my passion with them and knew this was the species I wanted to work with in the future" (K. Confortin, personal communication, April 19, 2016).

"I've also been exposed to bird banding. This is where we set out traps or mist nets and apply bands to birds for identification purposes. This is helpful for songbirds and ducks, as the information goes into a national database. Organizations and people can use the band to identify the bird and track where it travels. Another one of my research experiences was doing telemetry with fawns. We were looking at their movement between rural and urban areas and trying to find if in-town fawns were living longer than fawns in the woods exposed to natural predators" (K. Confortin, personal communication, April 19, 2016).

Conclusion

Entering into a career as a biological technician may be worth considering for those who are interested in working in the biology field after receiving an undergraduate education or during graduate education. With the projected employment growth being average, it is expected that the career is and will continue to be available for the future. With any career choice, it is important to closely evaluate all of the options, such as work environment, and pay and benefits. For those who are potentially interested in this career field, it would be prudent to meet with individuals who are currently employed as biological technicians and also explore field experiences through internships.

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