

A REVIEW OF 'BODY FARM' RESEARCH FACILITIES ACROSS AMERICA WITH A
FOCUS ON POLICY AND THE IMPACTS WHEN DEALING WITH
DECOMPOSITIONAL CHANGES IN HUMAN REMAINS

by

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Presented to the Faculty of the Graduate School of
The University of Texas at Arlington in Partial Fulfillment
of the Requirements
for the Degree of

MASTER OF ARTS IN CRIMINOLOGY & CRIMINAL JUSTICE

THE UNIVERSITY OF TEXAS AT ARLINGTON

December 2015

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Acknowledgements

My sincere thanks goes to my thesis committee: Professor Patricia Eddings, Dr. Richard Smith and Dr. Jaya Davis. Each of you never gave me the opportunity to even think about quitting.

To my sister, Lindsey, there are no words to describe how much you helped me over the years. When Brantley was born, you were there through everything. We may not be blood-related sisters, but we carry the same bond as any blood-related sister. I could not imagine this journey without you in my life.

My wonderful second-mother, Jacque Smith, you never gave up on me in all the twenty years that we have known each other. You have taken my son into your life with open arms and for that, I am eternally grateful.

My amazing father, Garry Wolff, you always made sure my brother and I pursued every dream that we had in our lives (no matter how silly they were). Through all the sports games, homework, and any of our hobbies, you made sure you were at every single activity.

To my amazing and supportive boyfriend, Brad, for allowing me to continue my education without question. You are my best friend and my rock when I need you the most.

My darling baby boy, Brantley, you are my inspiration and my motivation for all of my accomplishments. I could not imagine my life without you. I hope that one day, you will know that all the missed cuddle times, play times, and the times I could not put you to sleep were for you to have the best future possible.

Finally, to my guardian angels, my amazing mother and grandmother, for always looking out for me. You two were gone too soon.

December 4, 2015

Abstract

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In the current research study, the use of content analysis and secondary data analysis provided the exploratory research on the “body farm” research facilities across the United States. Open-ended survey questions were also utilized and sent to the six research facilities across the country. The use of open-ended survey questions in combination with a small sample size, resulted in only one institution participating in the survey and one facility actively declining to participate. To resolve this limitation, the use of secondary data and content analysis from facility publications and websites were utilized to complete some of the gaps resulting from the lack of survey responses. In the findings, there are several commonalities in the general policies of body donation and security, but differences were observed in certain specific aspects of the body donation process and in the types of research being generated by the different facilities.

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Chapter 1

Introduction

In the beginning, the research facilities that have commonly been considered the “body farms,” were first created to enhance the knowledge on the post-mortem decomposition changes of a human body. Another purpose of these research facilities is to help gain an insight into the decompositional changes that occur for legal and medicolegal professions when investigating murders. The original research facility is located in Knoxville, Tennessee at the University of Tennessee and established by forensic anthropologist Dr. William Bass in 1981. In recent years, the research facility at the University of Tennessee has gained much recognition by producing significant research and have other universities across the United States and the world inquiring about opening their own research facilities.



Figure 1-1 Students at University of Tennessee's Anthropological Research Facility
(Forensic Anthropology Center, 2015)

In the current research, the examination of these research facilities, also known as “body farms,” will produce a better understanding of the protocols, procedures and findings from the research facilities. Since the current literature reveals only a broad spectrum of information from the facility at the University of Tennessee, the current research will gather information from Tennessee, Sam Houston State University in Huntsville, Texas State University in San Marcos, Western Carolina University, Southern Illinois University, and Colorado Mesa University “body farm” facilities. One of the main purposes of examining the research from these facilities, is to determine the major concentrations of research that has stemmed from the facilities, while also finding their major contributions to legal and medicolegal research and literature.

In order to fully understand the knowledge and basis for the “body farm” facilities, it is important to recognize the structure and need for such facilities. This issue is important to understand in the aspect of environmental events, timing of death, and scavenger adaptations to the human post-mortem changes. All of these aspects aid in the training of medical examiners, death scene investigators, and law enforcement investigators (federal, state, and local). Also, with the incorporation of findings from the research facilities, prosecutors have been able to link suspects to murder investigations. In other investigations, where there have been conflicting findings in prior reports from investigators and the medical examiners, the research findings from the facilities have provided more conclusive results. The current research aids the reader in the understanding of the following:

- Importance of these research facilities
- Body donation process
- Security measures
- Past and current research in the facilities

- Impact of the research facilities to the forensic and criminal justice systems

Chapter 2

Literature Review

In the current research study, the research question was proposed as, "What are the policies and impacts, regarding the current scope of forensic research in human postmortem decompositional changes?" This broad examination of the so-called, "body farms," has aided in the understanding of the usefulness, the fundamental research and the impacts of the policies of these research facilities. This research has shown that the "body farm" research facilities have gained significant recognition in various fields of forensics, including criminal investigations since the beginning of the first research facility in 1981 at University of Tennessee Anthropological Research Facility.

In order to understand the background of the literature that has been produced on postmortem decompositional changes, there must be an analysis of the decompositional process. In "Time of Death, Decomposition, and Identification: An Atlas," (2000) Dix and Graham analyze the process of decomposition and the process investigators must take when approaching the scene of a body that is in the decomposition stage (p. 10). The variables that are incorporated with time of death and rate of decomposition are extremely critical. Some of the conditions in which a body will be found, will cause a formation of other characteristics such as, mummification and adipocere. Mummification conditions could be caused by hot and dry climates, which cause the body to dehydrate and the skin begins to appear dark and leathery. Adipocere conditions can be caused by being buried in cool and moist environments or by submerging a body in water, producing a hard gray-white waxy substance in dependent parts of the body (Dix & Graham, 2000, p. 13).

While a majority of the current research is based on postmortem changes dealing with forensic pathology and forensic investigators, it is important to understand that the

research facilities testing for enhanced knowledge on postmortem changes is predominantly done by the works of forensic anthropologists. In Prahlow's (2010) book, "Forensic Pathology for Police, Death Investigators, Attorneys, and Forensic Scientists," Prahlow mentions the importance of forensic anthropologists in the forensic science discipline as a whole and the role they play in the collection of knowledge on decomposition and skeletal remains (p. 19). Prahlow (2010) also examines the definition of "postmortem changes," which he refers to as the diverse changes that occur in the deceased body after death. The process can be presented in the stages of early postmortem changes (livor mortis, rigor mortis, and algor mortis) and decomposition (pgs. 163-169). Time of death estimation is a critical aspect to researchers and scientists since it provides fundamental information for forensic pathologists and forensic death scene investigators. Prahlow (2010) explains the complications with postmortem interval (time since death) and the important information needed to determine that variable (p. 179).

When working in the research facility and analyzing all determinants of the conditions that are being produced at every stage the body goes through during the testing phase, one variable that is often observed during this process is insect infestation. Byrd and Castner (2001), evaluated the study of forensic entomology in their book, "Forensic Entomology: The Utility of Arthropods in Legal Investigations." Byrd and Castner (2001) state that the utilization of insects in the parameters of forensic science is best provided through the proper protocols, accurate collection, preservation, and sealing of samples (p. 81). Entomology can aid in the explanation of certain bugs being present in given environments and the resulting condition of a body. Also, Byrd and Castner (2001) explain how the forensic entomologist will thoroughly inspect the death scene that includes; overviews of surroundings, location and placement of remains, ingress and egress routes, and maintaining the body undisturbed (p. 82).

In "Criminal and Environmental Soil Forensics," Ritz, Dawson and Miller (2009) analyze the importance of understanding the soil scientists and the role these professionals play in investigations and research. Forensic taphonomy refers to the use of processes in correlation with cadaver decomposition in the course of investigating a crime (Ritz, et.al., 2009, p. 317). With the advances in research, scientists have been able to better understand the decomposition process in regards to soil composites and aboveground decomposition, entomology, and cause and manner of death. Though a majority of death investigations occur in city or urban areas, Ritz, et.al. suggests that there is a poor understanding of the soil processes (2009, p. 318). Ritz, et.al, provide a prime foundation to what could be suggested in another research facility in order to test the reliability of soil forensics in death investigations and decomposition. To have a more thorough understanding of the soil processes, the research facilities have devoted research to particular studies regarding soil processes.

Since Dr. Bill Bass opened the research facility at the University of Tennessee Anthropological Research Facility (ARF), there has been an increase in interest for postmortem decompositional research at other universities across the United States. Texas State University at San Marcus, for instance, opened their own secured, open-air laboratory located on five-acres of grassland in 2008 (Parks, 2011, p. 19). Parks (2011) evaluated the first cadaver experience observed for a 10-week period. In order to obtain the cadaver, the research facility at Texas State received a donated body from the Medical Examiner's office that was unautopsied, unembalmed and died from natural causes (Parks, 2011, p. 19). Parks (2011) provided a table in her research that laid out the different stages the cadaver in Texas experienced, along with other cadavers of the same area (p. 20).

There has been a great deal of research in the forensic sciences that utilizes pigs in studies that supplements humans based on tissue, fat deposits, organs, and more. In the article, "Initial changes in fat deposits during decomposition of human and pig remains," (2009) the authors analyzed the differences in pig remains versus that of humans during decomposition for analysis on early stages of adipocere (Notter, Stuart, Rowe, & Langlois, 2009, p. 195). In relation to the current research, this article gives another look into why or why not human cadavers are better to use in research studies than pig remains.

With careful considerations to the studies and success of the research facility at University of Tennessee Anthropological Research Facility (ARF), Damann, Tanittaisong, and Carter (2012) examined the potential long-term effects the research facility could have on the ecosystem and the soil environments. In their study, the research found that the claim of carcass enrichment of the soil from the decomposed bodies proved to be true. Additionally, Damann, et.al., (2012) suggest that future research facilities acknowledge the enrichment of the soil and evaluate the saturation of the soil often (p. 9).

Since the beginning of the ARF in 1980 by Dr. Bill Bass, there have been more than 1,000 bodies donated and more than 2,000 individuals registered for donation (Shirley, Wilson, & Jantz, 2011, p. 372). Shirley, et.al. (2011) analyzed the ARF and the fundamental research the facility provides for scientists and researchers of all natures. The facility has impacted the forensic science community by providing continued knowledge on time of death estimations, locations and conditions of bodies, and circumstances surrounding the death (Shirley et al., 2011, p. 372). Also, their article recognizes the future of the ARF facility studies, along with the skeletal research found at the William H. Bass Donated Skeletal Collection (Shirley et al., 2011, p. 373).

The creation of the ARF has led Dr. Bill Bass to be acclaimed not only as an accomplished forensic anthropologist, but as a recognized author revisiting all of the cases that led him to the creation and to criminal proceedings where the ARF discoveries aided in solving. In, "Beyond the Body Farm," (2007) Bass pays tribute not only to the work that has been done at the research facility in order to gain a more reliable explanation of time of death sequence, but also to the Forensic Data Bank that helps determine the racial or ethnic origin of a victim (Bass & Jefferson, 2007, p. 253). ForDisc is also another software program in addition to the Data Bank that analyzes the comparison of skeletal measurements. Furthermore, the mass of information portrayed in this book pertains to the many cases Bass has worked over the years. These cases aided in the current research by providing information about the tools (entomological testing, scavenger assessment, chemical testing, soil analysis, pathology evaluations, etc.) and showed how these tools would be beneficial to future research facilities.

In addition to the above research presented, a survey (see attached Appendix A) was utilized in order to resolve further questions about the facilities in use across America. The combined research has helped to provide a more centralized question to the forensic community: "Where should the next research facility be and why?"

Chapter 3

Methodology

An exploratory study with content analysis was used to address the research question, “What are the policy considerations and impacts, regarding the current scope of forensic research in human postmortem decompositional changes?” This analysis was used to gain an understanding of the practices and research from the facilities.

Additionally, the use of open-ended survey questions would have allowed this researcher to determine the range of activities at the “body farm” research facilities. This research utilized literature and data from various sources, such as, peer-reviewed articles, forensic taphonomy books, news articles, and research facility websites, publications, and data.

Secondary data analysis was used in the analysis of documents and publications from the research facilities. Content analysis was also used to convey the messages from the research facilities’ websites.

Research Design and Analytical Tool

The research design for the current study utilizes the exploratory study method. Exploratory studies are focused on the exploration of a specific problem or innovative approach to a particular discipline (Maxfield & Babbie, 2015). The general application of the research analyzed the six human decomposition research facilities in the United States and the major impacts from the facilities’ policies examined and research. The research facilities’ policies examined were primarily focused on the body donation process and the steps taken to become a donor to the facility. The research from the facilities’ focused on the current studies and the impacts from the studies on forensic (crime scene investigators, medical examiners, forensic anthropologists) and criminal justice professionals (law enforcement officers, lawyers).

Sample

The sample included all six of the research facilities in the United States. These research facilities are located in Tennessee, Texas, North Carolina, Illinois and Colorado. In order to obtain information on the facilities, secondary data analysis was utilized to interpret the research facilities' body donation policies and processes, research from the facility, and the background information on the outdoor research facilities.

Data Collection

The data collected for the current study originally applied open-ended survey questions to each research facility, but due to the lack of responses, secondary data analysis was the primary tool of research. The use of secondary data analysis was employed to answer the main facility questions of body donation policies, primary research generated by each facility, and facility information. The secondary data analysis was performed utilizing websites, journal and newspaper articles and book sections. Content analysis was most useful when analyzing the research facilities' websites for the overall information. The research facilities' direct websites were able to answer general questions about the facility (date opened, staff, funding, and mission statement), body donation process (policies and protocols), and research produced from each facility.

Design Limitations

In every exploratory study, there will be limitations due to the study being subjective in nature and the study is typically the first of its kind. The design limitations of the current exploratory study include inconclusive results and the material being subjective in general. Secondary data and content analysis present limitations when the research is relying on information from other researchers published work (Maxfield & Babbie, p.360, 2015).

When utilizing the exploratory research design, there is room for error in the results. In the current research study, one university (Western Carolina University) did not have a direct website regarding the general information of the facility. Instead, the university maintained websites for the two main uses of the facility (cadaver dog training and the skeletal analysis at the Human Identification Laboratory). In this case, the use of secondary data analysis was employed to search for further information on the facility, thus relying on another researcher's publications.

Due to the relatively new innovation of the 'body farm' research facilities, the explorative nature of this study makes the material seem subjective. To minimize the slanted views of the study, the research maintained a more narrow scope of focus regarding the facilities. The study was particularly interested in the impacts the research from the facilities has made on the forensic and criminal justice professions, the policies and processes of the body donations and general information about the facilities. Due to the lack of information on the facilities themselves, the current research focuses primarily on the policies and research provided by each university.

Chapter 4

Findings

While the study was conducted as a secondary data analysis, not having all of the facilities respond to the surveys made the research process much more difficult and brings into question the current accuracy of the extracted data. The facilities' websites provided a majority of the information, along with newspaper and peer reviewed journal articles and books. The following subheadings represent the findings from various sources.

University of Tennessee

As the first of its kind "body farm" research facility, the University of Tennessee at Knoxville's Anthropology Research Facility (ARF) was founded in 1981 under the direction of Dr. Bill Bass (Forensic Anthropology Center, 2015). Dr. Bass started ARF with just a few cubic feet and transformed the facility into a 1.3 acre plot. According to the facilities' website, ARF will be soon expanding to allow room for studies dealing with advanced technology and the interaction of the bodies with the environment (Forensic Anthropology Center, 2015). This would include research conducted by the team of Katie Corcoran, Amy Mundorff, and Dawnie Steadman on the LiDAR (Light Detection and Ranging) technology on mass grave sites (Heins, 2014). There are 10 faculty members, 10 collaborative researchers, along with students, interns and volunteers that keep ARF running on a daily basis (Forensic Anthropology Center, 2015).

With 34 years of research at ARF, it is no surprise that there are countless publications and various types of research produced by the facility. The Bass Donated Skeletal Collection houses around 1,000 remains and is one of the largest in the United States (Forensic Anthropology Center, 2015). The Forensic Data Bank at ARF contains

data from over 3,400 forensic cases and aids in the documentation of change within the human population (Forensic Anthropology Center, 2015). With the skeletal collection and the Forensic Data Bank in combination with all the bodies that have been donated, their research has aided in several investigations for District Attorney General's office, law enforcement agencies, arson investigators, and medical examiners across the country (Forensic Anthropology Center, 2015).

The body donations at ARF are gathered by donors filing the proper paperwork through the department and finalized before death. The next of kin or persons who have power of attorney for a deceased person can also donate the body to ARF once they provide the proper legal documentation and paperwork (Forensic Anthropology Center, 2015). ARF will also accept donations from the medical examiner, primarily when bodies are unidentified and have not been claimed. ARF will provide transportation for the body if they are within a 100 mile radius of Knoxville. Otherwise, the donor or next of kin needs to make arrangements for the body to be transported to the facility. Approximately 100 bodies are donated each year (Forensic Anthropology Center, 2015) and there are about 3,500 pre-registered donors (Killgore, 2015). More than 50% of the donations made to the facility were done so by next of kin and/or the power of attorney for the deceased (Forensic Anthropology Center, 2015). On average, the bodies are at ARF for about two years, during which time they are used for human decomposition research purposes and then transferred to the Bass Donated Skeletal Collection (Forensic Anthropology Center, 2015).

Due to his research at ARF, Dr. Bass has gained much recognition through his work with forensic anthropology and taphonomy. In the case of Jiles Perry Richardson, Jr. (also known as the 'Big Bopper'), Dr. Bass analyzed the evidence from the plane crash that killed Richardson in 1959 (48-Year-Old Mystery: UT's Bill Bass Hired to

Examine Big Bopper’s Remains, 2007). Richardson died in the same crash as Ritchie Valens and Buddy Holly, but many believed that the Big Bopper walked away from the crash and died while trying to get help (48-Year-Old Mystery: UT’s Bill Bass Hired to Examine Big Bopper’s Remains, 2007). Dr. Bass determined that Richardson could not have walked away from the crash site and that his body was thrown from the crash (48-Year-Old Mystery: UT’s Bill Bass Hired to Examine Big Bopper’s Remains, 2007). Some of the other research that has been presented and published from ARF can be seen in Table 4-1.

Table 4-1

University of Tennessee’s ARF Publications

<i>Title</i>	<i>Author</i>	<i>Date</i>	<i>Synopsis</i>
“Cadaver use at the University of Tennessee's Anthropological Research Facility”	Shirley, N.R., Wilson, R.J., & Jantz, L.M.	2011	A brief summary of how the world’s first “body farm” operates.
“The Use of Orthopedic Surgical Devices for Forensic Identifications”	Wilson, R.J., Bethard, J.D., & DiGangi, E.A.	2011	An examination of how surgical implants can make positive identifications on a decedent.
"Accuracy of Standard Craniometric Measurements Using Multiple Data Formats."	Richard, A.H., Parks, C.L., & Monson, K.L.	2014	Analyzed 26 craniometric standards that are used in forensics

Western Carolina University

In 2006, Western Carolina University opened the Forensic Osteology Research Station (FOReSt). The research facility is 3,600 square feet of terrain located in the middle of Millennial Initiative in Cullowhee, North Carolina. The area is surrounded by security fencing and 10-foot-tall wooden privacy fence (Studenc, 2008).

The Human Identification Laboratory (WCHIL) at Western Carolina University is fully equipped to handle the recovery, storage, and analysis of deceased bodies (Western Carolina Human Identification Laboratory, 2015). The WHICL works in conjunction with FOReSt in order to process and analyze the remains from the research facility. One of the main focuses of research at this facility is taphonomy (what happens to a body after death) and the training of cadaver dogs (Killgrove, 2015). More specifically, FOReSt studies such topics as the effects of scavengers on decomposing bodies and whether or not the color of a trash bag impacts the decomposition rate.

The first donation to the facility came in 2007, but FOReSt has not held more than 10 bodies at once (Auffhammer, 2012). FOReSt receives the body donations from families who do not have money to pay for proper burial services, individuals who seek to donate their body to science, and unclaimed bodies from a county morgue. Once the bodies are past the decomposition stage and in their skeletal form, they are then be transferred to the WCHIL where they can be curated and catalogued (Auffhammer, 2012). Dr. Cheryl Johnston (Director), Dr. John Williams (Professor) and forensic students assist local law enforcement agencies in searching for evidence and/or human remains (Forensics program provides training to N.C. police in recovery of buried bodies, 2006). Johnston and Williams will also assist in consulting with the local law enforcement

agencies and other universities looking to start their own research facility (Auffhammer, 2012).

Texas State University

Texas State University's Forensic Anthropology Research Facility (FARF) sits on a 26-acre plot of land at the university's Freeman Ranch. FARF opened in 2008 and has approximately 200 pre-registered donors (Forensic Anthropology Center at Texas State, 2015). The facility has six faculty and staff, plus researchers, interns, and volunteers that aid in the research being conducted. FARF is actually one piece of the Forensic Anthropology Center at Texas State (FACTS). In 2011, FACTS opened the Multi-Purpose Facility at Freeman Ranch (opened in 2011) to hold conferences, teaching, training and outreach services (Forensic Anthropology Center at Texas State, 2015). Also at the Multi-Purpose Facility, there is the Osteological Research and Processing Lab (ORPL). The ORPL houses the forensic anthropological casework and processed donated skeletons from FARF (Forensic Anthropology Center at Texas State, 2015). The Grady Early Forensic Anthropology Laboratory (GEFARL) is where you will find the Donated Skeletal Collection, which includes the skeletal remains from FARF.

At FARF, there are several focuses of research that are geared towards the understanding of human decomposition and the various conditions that can happen during the process. Time of death, postmortem interval, scavenging variations, and the use of advanced technology to find the decedents that have attempted to cross the Texas border (Forensic Anthropology Center at Texas State, 2015; Killgrove, 2015). Once the bodies have become skeletonized, they are then transported to the ORPL where they are be processed and then sent to the Donated Skeletal Collection for further research. Some of their key research is used to aid the local or surrounding police departments solve cases where there is a lack of evidence in how the person died (Baucum, 2015).

Also, vulture scavenging has been a more recent study at FARF. The researchers are analyzing the arrival, feeding and visual evidence of the vulture's presence (Killgrove, 2015). Like ARF and their use of advanced technology to identify mass graves, FARF is using infrared photography and drone technology to locate the deceased persons that have tried to cross the Texas border (Killgrove, 2015).

In order to become a pre-registered donor at FARF, you must fill out a questionnaire (found in the donor packet) and sign the appropriate paperwork. The next of kin and/or the person having power of attorney for the deceased is also able to arrange for a body to be donated to the facility (Forensic Anthropology Center at Texas State, 2015). FARF will make arrangements for transportation of the body if they are within 200 miles of San Marcos. While some of the other research facilities do not take autopsied bodies, FARF will accept these donations. Also, it is specified that the body should be kept refrigerated until transportation is complete (Forensic Anthropology Center at Texas State, 2015). For safety reasons, the research facility cannot accept bodies with infectious diseases (HIV, active syphilis, tuberculosis, hepatitis B or C, etc.) or individuals that weigh over 500 pounds, unless they are in the un-pulverized cremains state (Forensic Anthropology Center at Texas State, 2015). FARF will also accept the body parts if they are skeletal, which would be sent to the Donated Skeletal Collection. To keep the donor's name and information confidential, once the bodies are donated, they are put into the computer system and given an internal identification number. FARF tries to accommodate any wishes made by the pre-registered donor and/or the next of kin, so the facility will allow the donor or next of kin to make special requests for research on their body and will allow family to visit the donated body once the individual has been sent to the GEFARL (Forensic Anthropology Center at Texas State, 2015). In order to provide the resources at the Freeman Ranch facilities, monetary donations are made to

the facilities and grants are awarded to the facilities to provide for the operations to continue with their research. Table 4-2 contains articles and publications reflecting past and current research from the Texas State University's FARF.

Table 4-2

Texas State University's FARF Publications

<i>Title</i>	<i>Author</i>	<i>Date</i>	<i>Synopsis</i>
"Estimation and evidence in forensic anthropology: Age at death"	Konigsberg, L.W., Hermann, N.P., Wescott, D.J., & Kimmerle, E.H.	2008	Statistical analysis of the pubic symphysis to measure the estimation of age at death.
"Demographic change and forensic identification: problems in metric identification of Hispanic skeletons"	Spradley, K.M., Jantz, R.L., Robinson, A. & Peccerelli, F.	2008	Analyzes the discrepancies when analyzing the remains of Hispanics.
"A study of the human decomposition sequence in central Texas"	Parks, C.L.	2010	Study of an unmodified human cadaver over a 10-week period at FARF.

Sam Houston State University

Sam Houston State's research facility is better known as the, Southeast Texas Applied Forensic Science (STAFS) center. This facility is located on a 247 acre parcel of land in proximity to the Sam Houston State Forest in Huntsville, Texas (Southeast Texas Applied Forensic Science Facility, 2015). The STAFS research facility opened in 2010

and is currently staffed by six faculty members. The facility also recruits volunteers to help at STAFS. This particular body farm is surrounded by maximum security fencing, with additional minimum security fencing surrounding the remaining acreage to preserve the other forms of forensic training (Southeast Texas Applied Forensic Science Facility, 2015). The security measures at STAFS utilize high-definition cameras that record data for the researchers and are closely monitored by the University Police. The motion-detecting cameras assist in the research of scavengers that feed on the land (Southeast Texas Applied Forensic Science Facility, 2015).

The primary course of research through this facility is studying effects of the subtropical and humid climate changes on a body following death, the entomological aspect of decomposed bodies, and the study of scavengers (Southeast Texas Applied Forensic Science, 2015; Killgrove, 2015). Law enforcement agencies and medical examiners assist the research facility by providing scenarios for them to replicate at the research facility in order to better understand the findings from the field (Southeast Texas Applied Forensic Science Facility, 2015). Recently, the role of bacteria during the decomposition process be researched at a more thorough rate when STAFS studied two cadavers in a natural state (Hyde, Haarmann, Lynne, Bucheli & Petrosino, 2013). Once the research of the decomposition phases is complete, the body is in a skeletal form and is catalogued in the STAFS Donated Skeletal Collection for additional research (Southeast Texas Applied Forensic Science Facility, 2015). The Donated Skeletal Collection aids in the understanding of trauma and disease research.

Through the funding from grants and public donations, STAFS is able to operate with staff, volunteers, and necessary equipment to complete their research. The National Institute of Justice recently approved STAFS with a grant to aid in the continuation of postmortem decomposition research (Killgrove, 2015). Also, the facility must have bodies

donated to continue research. To qualify for the body donation program, the donor must sign a packet of agreements and send them back to the facility. The next-of-kin can also provide a family member's body to be donated to STAFS. If a body donor is also an organ donor, the facility will still take the body with organs already harvested (Southeast Texas Applied Forensic Science Facility, 2015). STAFS provides transportation for bodies within the 250 mile radius of Huntsville, but if the donated body is further away from the facility, then the family must make arrangements to have the body transported (Southeast Texas Applied Forensic Sciences, 2015). For safety and confidentiality purposes, the names and information of the bodies will not be known to the researchers, but instead, given a case number. The STAFS utilizes a Control Risk Management policy on a daily basis in order to practice safe measures in the field (Southeast Texas Applied Forensic Science, 2015). For additional published articles from the research facility at Sam Houston State University, please see Table 4-3.

Table 4-3

Sam Houston State University's STAFS Publications

<i>Title</i>	<i>Author</i>	<i>Date</i>	<i>Synopsis</i>
"Mapping the extent of human cadaver decomposition islands with soil chemistry"	Aitkenhead-Petersona, J.A., Owings, C.G, Alexandera, M.B., Larisonc, N., & Bytheway, J.A.	2012	The analysis of soil deposits below a decomposing body.

Table 4-3 *Continued*

<p>“Scavenging Behavior of Lynx rufus on Human Remains during the Winter Months of Southeast Texas”</p>	<p>Ripley, A., Larison, N.C., Moss, K.E., Kelly, J.D., & Bytheway, J.A.</p>	<p>2012</p>	<p>A 32-day study documenting the scavenging animals on human cadavers</p>
<p>“Four Forensic Entomology Case Studies: Records and Behavioral Observations on Seldom Reported Cadaver Fauna With Notes on Relevant Previous Occurrences and Ecology”</p>	<p>Lindgren, N.K., Bucheli, S.R., Archambeault, A.D., Rahlwes, B.C., & Willett, J.R.</p>	<p>2012</p>	<p>Analysis of four insect-cadaver decompositions over a one-year period.</p>

Southern Illinois University

In Carbondale, Illinois, the Complex for Forensic Anthropology Research (CFAR) received their first body donation in 2012. Since the opening, CFAR has received 26 bodies for research (Killgrove, 2015). CFAR is staffed by only the director, Dr. Gretchen Dabbs, and six students. Since CFAR is relatively new, little is known about this research facility. However, the faculty of CFAR offers to consult with organizations such as medical examiners, law enforcement, coroner’s offices, defense attorneys, and other agencies in the area (Complex for Forensic Anthropology Research, 2015).

Common research studies that you will find at CFAR includes work on vulture scavenging, freezing rates of decomposition, effects of low-speed winds on decomposition, postmortem interval, and the identification and interpretation of skeletal trauma (Killgrove, 2015; Complex for Forensic Anthropology Research, 2015). The

director, Dr. Dabbs, found that at low-speed winds, bodies may naturally mummify. In a more recent study, the skeletal remains of donors have been subjected to lawnmowers and the remains examined for resulting defects (Killgrove, 2015). Also, the study of a body being incased by concrete has made more recent progress.

The body donation process and associated policies are relatively similar to those at the other six facilities. Though pre-arranged donations are not accepted at this time, the facility anticipates sometime soon that they will be able to make this addition possible. The bodies are now donated to the facility by the next of kin (Complex for Forensic Anthropology Research, 2015). The next of kin will complete the specified paperwork in their body donation packet from the website and return the information to the facility. Also, CFAR does not provide transportation services to the facility, so the family or next of kin must provide the proper transportation (Complex for Forensic Anthropology Research, 2015). The CFAR will not take bodies with certain infectious diseases or an antibiotic resistant infection. Cremated remains will be accepted if they have not been pulverized and autopsy donations can also be donated with the proper paperwork (Complex for Forensic Anthropology Research, 2015). In order to protect the privacy of the donor, the body is given an identification number. The CFAR will also allow the family and/or next of kin to visit the skeletal remains at their Forensic Anthropology Laboratory (Complex for Forensic Anthropology Research, 2015). Monetary donations are also accepted at the facility to help provide for the education, research, and equipment at the facility. One published article from the CFAR research is listed in Table 4-5.

Table 4-4

Southern Illinois University's CFAR Publication

<i>Title</i>	<i>Author</i>	<i>Date</i>	<i>Synopsis</i>
"Geographic Variation in the Taphonomic Effect of Vulture Scavenging: The Case for Southern Illinois"	Dabbs, G.R. & Martin, D.C.	2012	A behavioral study of two different species of vultures during human decomposition.

Colorado Mesa University

Colorado Mesa University's Forensic Investigation Research Station (FIRS), is the newest of the research facilities in the United States. FIRS opened in 2012 and sits at an altitude of 4,780 feet above sea level in Grand Junction, Colorado (Killgrove, 2015). The facility is staffed by the director (Dr. Melissa Connor) and four interns. The interns are students at Colorado Mesa and assist in most aspects of running the facility (photography, labeling the remains, body placement, and maintaining the databases) (Forensic Investigation Research Station, 2015). Non-students of Colorado Mesa are also able to enroll as an intern to the FIRS program. One or two students are selected each year by Dr. Connor for these spots in the internship program. In order to maintain the safety and security of personnel, body donations and skeletal remains, the facility implemented key-card access on the outside doors, securely keyed rooms inside the facility and utilize combination locks for the outdoor facility.

The primary research from FIRS is taphonomy, but they are conducting studies on the effects of the dry climate of Colorado and how fast the body becomes skeletonized (Killgrove, 2015). The rate at which the body becomes skeletonized is dependent on both the medical conditions of the body before death and the environmental conditions after

death. At FIRS, research has found that the medical conditions of the individual and the microenvironments in the high altitude are two of the main elements that influence the rate of a body becoming skeletonized (Killgrove, 2015). Also, the facility provided presentations of their research to the university's student showcase. The use of an infrared thermometer, bioelectrical impedance, maceration and postmortem root banding of hairs are some of the topics presented at the showcase (Forensic Investigation Research Station, 2015).

Like other research facilities, if an individual chooses to become a donor to FIRS, the donor must complete a donation packet and return it to the research facility. Two witnesses need to sign the paperwork before being returned, but it does not need to be notarized. Once the body is donated to the facility, there will be an identifying number placed on the body (Forensic Investigation Research Station, 2015). If the facility is at capacity with body donations, the facility has the ability to decline a donation. FIRS also reserves the right to make a determination of acceptability. This research facility does not accept body donations from individuals with an infectious disease or an antibiotic resistant infection (Forensic Investigation Research Station, 2015). FIRS will arrange transportation if the decedent is up to 75 miles of Grand Junction; otherwise, the decedent's family must make the proper arrangements for the body to arrive at the facility.

Overall, the facilities' share many commonalities in their body donation process and policies, the use of their skeletal remains, and the general research performed at the facilities. While they share common concepts in the areas of body donations, skeletal remains and the general research, they also differ in these same concepts. The research facilities also differ in the areas of size and staff/interns/volunteers. In Table 4-5, there is an overview of the results.

Table 4-5

Research Facility Comparison Table

<i>Research Facility</i>	<i>Size</i>	<i>Date Open</i>	<i>Staff/ Volunteers</i>	<i>Body Donation Policies</i>	<i>Disposition after Decomp</i>	<i>Primary Research</i>
ARF (TN)	1.3 Acre	1981	10 staff, 10 researcher, 7 students, volunteers	Pre-Registered, Next of kin, Unclaimed	Cleaned & sorted into the Donated Skeletal Collection	Case-based research, advanced technology, various studies
FOReSt (NC)	3,600 sq. ft.	2006	2 staff, students, researchers	Pre-registered, Unclaimed	Human ID Laboratory	Cadaver dog training, scavengers
FARF (TX)	26 acres	2008	6 staff, students	Pre-registered, Next of kin, Unclaimed	Donated Skeletal Collection	TOD, PMI, scavengers, advanced tech.
STAFS (TX)	247 acres	2010	6 staff, volunteers	Pre-registered, Next of kin	Donated Skeletal Collection	Climates changes on decomp, entomology, scavengers
FIRS (IL)	0.33 acres	2012	1 staff, 6 students	Next of kin, Unclaimed	Forensic Anthropology Laboratory	Vulture scavenging, freezing rates in decomp, PMI, speed of winds on decomp, skeletal trauma
FIRS (CO)	1 acre	2012	1 Staff, 4 Interns	Pre-registered, Next of kin	Cleaned & sorted into the skeletal collection	Climate changes on the skeletonized process, postmortem root banding of hairs

Chapter 5

Discussion and Conclusion

Discussion

Like much of exploratory research, the current study is directed at *exploring* the “body farm” research facilities and what they can offer the criminal justice, medicolegal, and forensic fields. In the current research study, an open-ended survey questionnaire (see Appendix A) was sent to the six research facilities in the United States. The key areas of focus were: background information on the research facility (date opened, staff, main focus of research, mission statement and security protocols), the body donation process (protocols and how many bodies have been donated), and institutional problems (experiences with funding, security, employees and families). While only one response was received in the survey process, the current research was able to utilize secondary data analysis from publications and articles based on the “body farm” research facilities to aid in answering the questions.

The current research study found that there are many similar policies in regards to body donation and the process of transporting the donor’s body to a skeletal collection at the facility. Also, there are many similarities in the research that is being published and/or presented from each facility. The primary research that each “body farm” research facility studies is that of postmortem interval. Postmortem interval is the interval between the time of death and when the body was found (Dix & Graham, 2000, p.1). While the postmortem interval is one of the most important pieces of information in a criminal investigation, other pieces of information (such as the presence of scavengers, insects, or environmental factors) are used to help solve the cases. Another similarity, is that each

facility allows outside researchers and consultants the opportunity to conduct research at their facilities. Proper paperwork and research proposals must be sent to the facility first before they are able to conduct any research at the facilities. Although there are similarities, the distinct differences observed at each facility were in the size, staff, donation policies and primary research.

The University of Tennessee's facility research covers advanced technology, scavengers, chemistry, biology, soil analysis, and much more. Their facility has been running since 1981, which makes their research more extensive and more diverse. Western Carolina University utilizes their research facility for cadaver dog training, while Colorado Mesa University uses their facility for research, teaching and training of the decompositional process (Western Carolina University, 2015; Forensic Investigation Research Station, 2015). The differences in the body donation processes include the conditions of the cadavers that are accepted and not accepted, the miles they are able to travel to provide transportation for the donors, whether or not the facility will allow family to visit the skeletal remains of the donor, and the amount of staff and faculty they have at their facility.

Future research into the "body farm" research facilities utilizing a survey and/or in-person interviews should acknowledge any institutional/research influences. For instance, what other future and/or present facilities should study; where the next facility should be located, should there be any policy changes or considerations made to the body donation process or security; and/or, what types of institutional problems have the research facility encountered. On another level of interest regarding practitioners in the fields of law enforcement and medicolegal death investigations, research should be undertaken to assess ways in which current and future facilities could become more accessible to assist with the investigative needs of these practitioners. While the

current exploratory research study utilized secondary data, it is strongly suggested that any future research in analyzing the “body farm” research facilities, take advantage of in-person or phone interviews. Interviewing a director or someone who works closely with the director, will increase the researcher’s chances of eliminating any misinterpretations of research and provide a first-hand experience with the facility. Also, if the researcher has the opportunity and the funds available to attend workshops at the facilities (such as Texas State), the material received about the facility could provide highly useful data in their research. The workshops not only provide the researcher with information of the research facility, but provide the researcher with the ability to gain knowledge on a particular interest (such as facial reconstruction sculpting). In order to obtain funding for research, the researcher is encouraged to search for grants and then apply for any of the grants that are applicable to research being conducted at a particular research facility. Receiving a grant could tremendously increase the researcher’s chances of having a more direct approach with their research.

Conclusion

With the continued research at each facility, the technology and techniques that could potentially be used in the field will increase the outcomes when solving murders, finding mass gravesites and being able to identify human remains more precisely and efficiently. In the criminal justice field, this could also lead to better training for law enforcement and an understanding of what to expect when finding a decomposed body at a scene. In the medicolegal field, a more efficient method of approaching a decomposed body and examining the body for evidence could certainly be instrumental when trying to solve a murder.

In conclusion, since the original “body farm” research facility in Knoxville, Tennessee opened in 1981, five more facilities have opened, incorporating various

aspects of research to the many bodies donated to their facilities. These “body farm” research facilities have been increasingly useful by providing information in the subjects of postmortem interval, scavenger presence, forensic entomology, soil forensics, forensic pathology and much more. The research from each facility aids in the training of federal, state, and local law enforcement, forensic death investigators, medical examiners, forensic anthropologists, and even cadaver dog training to search for deceased bodies.

Appendix A

Survey

CONCERNING THIS FACILITY:

1. When was it created?
2. How many people are currently working there? If available, please provide an organizational chart of job positions.
3. What is the main focus of research?
4. How is this facility funded? Please respond by approximate percentage.
 - a. Private
 - b. Public
 - c. Grants
 - d. Other (Please explain)
5. What is the mission statement? If available, please provide primary policies and procedures for general, daily operations.
6. What types of research have been the most beneficial to:
 - a. Criminal Investigations and Trials
 - b. Forensic Anthropologists
 - c. Medical Examiners
 - d. Other Persons or Applications
7. What types of security protocols are utilized by this facility?
8. Has this facility ever published or produced a document on the future of "body farm" research facility locations? If so, please provide a source.

CONCERNING BODIES:

1. How many bodies are currently at this facility?
2. How many bodies have been processed through this facility since the opening (by year, since opening)?
3. What are the protocols for:

- a. Receiving bodies
 - b. Removal of bodies
 - c. Placement of bodies into research environments
4. How long, on average, are the bodies in a "testing" phase?

CONCERNING INSTITUTIONAL PROBLEMS:

1. Has this facility ever experienced any problems with:
- a. Funding
 - b. Institutional Support
 - c. Community Relations
 - d. Security
 - e. Employees
 - f. Families donating the bodies
 - g. Facility (in general)

If so, please explain.

Thank you for taking the time out of your day to provide answers for these questions and assist with this educational research. The data collected will provide useful information regarding the future of "body farm" research facilities and the impact these research facilities have on the forensic and criminal justice systems. We greatly appreciate the knowledge and research your facility has provided to the field of forensic death investigation. If you are willing to answer further questions relating to the current status of "body farms" in America, please provide your contact information below.

Name:

Telephone Number:

Email Address:

Appendix B
Body Donation Information

<i>Research Facility</i>	<i>Director</i>	<i>Phone Number</i>	<i>Body Donation Web Link</i>
University of Tennessee	Dr. Dawnie Steadman	(865) 974-4408	http://fac.utk.edu/donation.html
Western Carolina University	Dr. Cheryl Johnston	(828) 227-2816	Contact Directly
Texas State University	Dr. Daniel Wescott	(512) 245-1900	http://www.txstate.edu/anthropology/facts/donations
Sam Houston State University	Dr. Joan Bytheway	(936) 294-2310	http://www.shsu.edu/~stafs/body.html
Southern Illinois University	Dr. Gretchen Dabbs	(618) 453-4398	(For decedent's next of kin only) http://cola.siu.edu/anthro/cfar/donation.php
Colorado Mesa University	Dr. Melissa Connor	(970) 248-1219	http://www.coloradomesa.edu/firs/donations.html

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Biographical Information

Growing up, Brittany was always interested in science and the benefits science had on research and society. Although she is not a science major now, she still values science to the highest of standards. In high school, she began taking courses that were centered on criminal justice, but also developed an ambition to be involved in the forensics arena. Since then, her coursework in undergraduate work included Introduction to Forensics, Terrorism, Forensic Death Investigation, Cybercrime, and Criminal Investigations. While pursuing her bachelor's degree in Criminal Justice, she was in her last semester of school and had already been accepted into the graduate program at University of Texas at Arlington when she found out that she was pregnant with her son, Brantley. Now, she is pursuing her graduate degree and working a part-time job. She has found that finishing her thesis and graduating with a master's degree, will enable her to show her son that he can do anything he puts his mind to if he has dedication and perseverance.