

RESEARCH ARTICLE

The Value of Forensic Anthropology in Undergraduate Anthropology Programs

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ABSTRACT Anecdotally, it has been suggested that undergraduate anthropology students are more interested in forensic anthropology than any other specialty but that forensic anthropologists are less desired as colleagues in academia due to the nature of their work. The goal of this project was to examine two related questions: Does having a forensic anthropologist, or an undergraduate concentration in forensic anthropology, increase the number of majors in anthropology programs? And are forensic anthropologists less likely to be hired for relevant biological anthropology academic positions? To address these questions, data from a number of sources were analyzed. Results found that academic programs with a forensic anthropology concentration had large increases in the overall number of anthropology majors and that programs with forensic anthropologists as faculty produced significantly more anthropology bachelor's degrees. These data are counter to the current national trend of declining anthropology degrees. For jobs in academia specifically desiring a forensic anthropologist, forensic anthropologists were hired in only 58 percent of postings. This study shows a reluctance to hire forensic anthropologists in academia despite their positive impact on the growth of anthropology programs; it also has implications for the education of future forensic anthropologists. [*forensic anthropology, academia, enrollment, career, hiring*]

RESUMEN Anecdóticamente, se ha sugerido que estudiantes de pregrado en antropología están más interesados en antropología forense que en ninguna otra especialidad, pero que antropólogos forenses son menos deseados como colegas en la academia debido a la naturaleza de su trabajo. El objetivo de este proyecto fue examinar dos preguntas relacionadas: ¿Tener un antropólogo forense o una concentración en pregrado en antropología forense incrementa el número de especializaciones en los programas de antropología? Y, ¿es menos probable para antropólogos forenses ser contratados para posiciones académicas relevantes en antropología biológica? Para abordar estas preguntas, se analizaron los datos de varias fuentes. Los resultados encontraron que programas académicos con una concentración en antropología forense tenían incrementos altos en el número total de especializaciones en el pregrado de antropología y que programas con antropólogos forenses como profesores produjeron significativamente un mayor número de graduados del pregrado en antropología. Estos datos se oponen a la tendencia nacional actual de descenso en graduados en antropología. Para trabajos en academia específicamente deseando un antropólogo forense, antropólogos forenses fueron contratados sólo en un 58 por ciento de las ofertas de trabajo. Este estudio muestra una renuencia a contratar antropólogos forenses en la academia a pesar de su impacto positivo en el crecimiento de los programas de antropología; también tiene implicaciones para la educación de futuros antropólogos forenses. [*antropología forense, academia, matrículas, carrera, contratación*]

Results found that academic programs with a forensic anthropology concentration had large increases in the

overall number of anthropology majors, and that programs with forensic anthropologists as faculty produced more

anthropology bachelor degrees. These data are counter the current national trend of declining anthropology degrees. For jobs in academia specifically desiring a forensic anthropologist, forensic anthropologists were hired in only 58% of postings. This study shows a reluctance to hire forensic anthropologists in academia, despite their positive impact on the growth of anthropology programs; it also has implications for the education of future forensic anthropologists.

Forensic anthropology is a discipline of anthropology primarily known for its applied nature. Specifically, it is known for fieldwork practices of performing systematic search and recovery operations of human remains, as well as laboratory practices of examining skeletal material, all within the context of the medicolegal system (Christensen et al. 2014). Presently in the United States, forensic anthropology is a discipline primarily made up of doctoral-level professionals working in academia and/or at medical examiner/coroner (ME/C) offices. While forensic anthropology remains a discipline rooted in academia, the crux of forensic anthropology is its applied focus. As such, forensic anthropologists routinely perform humanitarian services that include determining if questioned items are human remains of a medicolegal nature, locating remains, establishing a positive identification to aid in return to next of kin, aiding in the establishment of the cause and manner of death, and serving as an expert witness in criminal investigations. Because of the nature of forensic anthropology, it increasingly operates more similarly to other forensic science disciplines than other anthropological specialties. That is, it requires professionalization in terms of education, demonstrable expertise and competencies (i.e., qualifications), and practice—more so than other more academically based anthropological specialties. This is primarily exemplified through the additional burdens of maintaining transparency and traceability of evidence and analytical work, in conjunction with the need to be established as an expert witness based on individual qualifications (Passalacqua and Pilloud 2018; Passalacqua and Pilloud 2021). Forensic anthropology is a unique discipline of anthropology, often requiring specific qualifications (that is, education and training to perform forensic anthropological analyses, as well as certification) to practice in many jurisdictions of the United States due to National Association of Medical Examiner (NAME) laboratory-accreditation requirements, which specify access to a forensic anthropologist certified by the American Board of Forensic Anthropology (ABFA).

Forensic anthropology, like the forensic sciences in general, has experienced a large increase in popularity over the last few decades, associated with the popularity of such fictional television shows as *CSI* and *Bones* (Bergslien 2006). The increase in popularity of forensic anthropology, specifically, has been observed in terms of increasing student membership to the Anthropology section of the American Academy of Forensic Sciences (AAFS), as well as individuals certified in forensic anthropology by the ABFA. While difficult to measure directly, undergraduate interest in forensic

anthropology has of course been increasing as well; however, the impact of forensic anthropology as a way to recruit anthropology majors generally has yet to be explored.

With the increasing interest in pursuing forensic anthropology as a career, it is not uncommon for forensic anthropology faculty members to caution undergraduate students that there are relatively few jobs in forensic anthropology and that it is a competitive career path that typically requires a doctoral degree in anthropology (as this is a requirement of ABFA certification). While Passalacqua (2018) examined the number of academic job postings for various biological-anthropology-focused disciplines, the number of qualified applicants seeking forensic anthropology positions is difficult to assess due to the confidential nature of job applications. Further, forensic anthropologists often lament (again, anecdotally) the frequency to which nonforensic anthropologists are hired for forensic anthropology academic job postings, which serves to suggest that forensic anthropologists may actually be less desired as colleagues.

As such, the goal of this article is to examine two related questions: (1) What effect does forensic anthropology have on the number of majors in undergraduate anthropology programs? And (2) are forensic anthropologists less likely to be hired as faculty for relevant biological anthropology academic positions?

CONTEMPORARY FORENSIC ANTHROPOLOGY

Forensic anthropology is “the application of anthropological method and theory to matters of legal concern, particularly those that relate to the recovery and analysis of the human skeleton” (Christensen et al. 2014, 2). The scope and breadth of forensic anthropology, with an emphasis on personal identification from the skeleton, has changed much since its formal introduction by W. M. Krogman in the late 1930s (Krogman 1939). The discipline has now grown to include the analysis of trauma and taphonomy, as well as the recognition of the importance of forensic archaeology and the inclusion of forensic anthropologists into leadership roles in large-scale investigations of missing and disappeared individuals (e.g., Christensen et al. 2019; Dirkmaat 2012; Dirkmaat et al. 2008; İşcan 1988; Snow 1982). However, forensic anthropology is just one of many forensic science disciplines undergoing a push toward increasing professionalization and standardization. These efforts are not widely understood or appreciated within the general anthropological community. Thus, we will briefly discuss them here with the goal of demonstrating that forensic anthropology is a rich discipline with defined credentials and published standards of practice recognized at the national level in the United States.

The origins of professional forensic anthropology date back to the 1972 founding of the Physical Anthropology section of the AAFS, largely through the efforts of Ellis R. Kerley (renamed the Anthropology section in 2014; see Passalacqua and Pilloud 2018), and the subsequent creation of the ABFA in 1977 (Bartelink et al. 2020; Tersigni-Tarrant

and Shirley 2013). The more recent push for professionalism originated with three events in the 2000s. The first was the Joint POW/MIA Accounting Command (JPAC) achieving accreditation of its forensic anthropology laboratory (the Central Identification Laboratory, CIL) from the American Society of Crime Lab Directors Laboratory Accreditation Board (ASCLD/LAB) in 2004. This milestone was important, as it was the first forensic *anthropology* laboratory to achieve such a rigorous level of accreditation, which is normally reserved for large forensic science laboratories. The second was the creation of the Scientific Working Group for Forensic Anthropology (SWGAnth) in 2008. The formation of this group solidified the importance of standardizing forensic anthropological practice through the development of a series of standards and best-practice recommendation documents. The third was in 2009, with the ABFA becoming the first (and currently only) accredited organization to provide certification in forensic anthropology. Accreditation of the ABFA is important, as it legitimizes the certification practices of this organization by demonstrating the ABFA operates in a fair and consistent manner. However, while these three events set the stage to push forensic anthropology into a more standardized and rigorous discipline, much of the current disciplinary change stems from the National Academy of Sciences (NAS) National Research Council report of 2009. This analysis of the potential problems affecting the forensic sciences in the United States ushered in an era of increasing formality, standardization, and professionalism (Passalacqua and Pilloud 2018; National Research Council 2009).

These increasing requirements are perhaps best exemplified by the National Institute of Standards and Technology's (NIST) creation of the Organization of Scientific Area Committees (OSAC) for Forensic Science, and the AAFS Standards Board (ASB) (Passalacqua and Pilloud 2018). These two organizations function as a two-part system for producing and publishing consensus-based best-practice guideline (recommendations) and standard (requirements) documents for many forensic science disciplines, to include forensic anthropology; in doing so, the OSAC and ASB replaced the SWGAnth. These documents cover the practice of all aspects of forensic anthropology, including education and qualifications. These documents are produced by panels of voluntary experts. Draft documents are revised through public commentary and review, and final documents are published by an accredited standards development organization (SDO). Essentially, the OSAC started with documents initially published by the SWGAnth. These documents are in the process of being revised by the Anthropology Subcommittee of the OSAC, and as revision of a document is finished, it is then submitted to the ASB. The ASB has an Anthropology Consensus Body, which again revises these documents, then sends them for public comment. These public comments are addressed by the ASB's Anthropology Consensus Body, essentially as a form of public peer review. Once all comments have been

sufficiently addressed, which may take multiple rounds of public comments and revisions, the document is published by the ASB and made available on their website (<https://www.asbstandardsboard.org/published-documents/>).

Another important component of professional forensic anthropological practice is to demonstrate competency and qualification. Currently, in the United States, this is achieved through certification by the ABFA. To sit for the certification exam of the ABFA, applicants must have a PhD in anthropology or a related discipline (such as biology or anatomy, while being supervised by an anthropologist) at the time of application. Additionally, applicants must apply by submitting an application, three letters of reference, a CV, and three case reports with associated supporting materials (e.g., bench notes, photographs, cover letter). The application packet is reviewed by the board of directors of the ABFA, who then vote on whether the submitted material is of sufficient quality for the application to sit for the exam. The decision is made by majority rule. The exam is typically administered in the winter and consists of two parts: a practical exam and a multiple-choice exam. Both sections must be passed by 80 percent or more to become an ABFA-certified forensic anthropologist, or a Diplomate of the American Board of Forensic Anthropology (D-ABFA). For a review of the certification process, see Boyd et al. (2020).

MATERIALS AND METHODS

What Effect Does Forensic Anthropology Have on the Number of Majors in Anthropology Programs?

This question was investigated using multiple lines of evidence: (1) by examining the number of majors in undergraduate anthropology programs that *specifically* had concentrations in forensic anthropology, and (2) by examining the number of anthropology undergraduate degree conferrals from anthropology departments that had a forensic anthropologist as a faculty member.

Currently, there are only two academic institutions in the United States that have anthropology programs with undergraduate concentrations in forensic anthropology: Western Carolina University (WCU; in Cullowhee, NC) and Washburn University (WU; in Topeka, KS). Both programs are housed in combined anthropology and sociology departments and provide a BS degree concentration in forensic anthropology. The forensic anthropology concentration at WCU was created in 2003 under the direction of a new chancellor for the university (Collins et al. 2019). The forensic anthropology concentration at WU began in 2016 when the university partnered with the Kansas Bureau of Investigations (KBI) to build the Forensic Science Center in support of all Washburn University forensic science courses and the KBI's crime lab. Both programs were established by, and continue to be directed by, forensic anthropologists with long histories of membership in the AAFS and certification by the ABFA.

Data on the number of students majoring in anthropology were collected as a whole, as well as the number

of students in the forensic anthropology concentrations at both WCU and WU. Note that even though the program at WCU was started in 2003, data on majors prior to fall 2006 were unavailable. National data on majors in anthropology bachelor degree programs were unavailable; however, the National Center for Education Statistics (NCES) provides national data on completion of degrees by major (National Center for Education Statistics 2018). While many factors contribute to graduation rates, these completion rates can be used as a proxy for rates of student majors, as relative increases in majors are reflected in relative increases in degree completion.

Because there are currently only two institutions with undergraduate forensic anthropology concentrations, examining the potential impact of having a forensic anthropologist on faculty in anthropology programs was investigated as well. To perform this analysis, we examined the relationship between the number of anthropology degree conferrals from the Integrated Postsecondary Education Data System (IPEDS) and whether one or more full-time (i.e., nonadjunct) anthropology faculty member in the department was a forensic anthropologist (see below for more details). The IPEDS is a system of surveys that gathers information from every postsecondary institution in the United States that participates in federal student financial aid programs (National Center for Education Statistics 2020). Because participation in IPEDS is required for such institutions, it has a nearly 100 percent response rate.

To construct an institution-year panel of forensic anthropologists, we used the membership rosters of the AAFS and ABFA, linking these to academically employed forensic anthropologists to assess the institutional affiliation of these faculty for each year of their career. By tracking when and where these faculty were located, we constructed whether and when an institution had a forensic anthropologist on staff.¹ This analysis was achieved by generating a list of forensic anthropologists and their corresponding academic affiliations and matching these to the NCES dataset. We used online biographic information as well as hiring data (more on this below) to only include appropriate years when an academic institution had a forensic anthropologist on faculty.

The qualifications to perform forensic anthropology in the United States are not currently well defined; however, there is consensus that practitioners should seek certification by the ABFA (Passalacqua and Pilloud 2020). The fact that the majority of practicing forensic anthropologists have doctoral degrees is in part due to the requirements for certification in forensic anthropology by the ABFA. The ABFA is the only accredited certifying body for forensic anthropology and the only certifying body for forensic anthropology in the United States (Passalacqua and Pilloud 2018). The ABFA does not currently outline what constitutes qualifications (i.e., education/training) to sit for the certification exam, merely that if one passes the certification exam, they have demonstrated the requisite competencies to practice forensic anthropology. Therefore, Passalacqua and Pilloud

(2020) surveyed forensic anthropologists, examining the degree to which forensic anthropologists were in agreement about education, training, and qualifications for forensic anthropology. The survey found that there was a large number of knowledge areas for education in forensic anthropology that forensic anthropologists agreed should be required to practice. Additionally, respondents were in agreement that forensic anthropologists should be mentored/trained by a certified forensic anthropologist. Importantly, these results also demonstrated overwhelming consensus (over 90 percent in both instances) that forensic anthropologists believe that educational programs in forensic anthropology should have their own accreditation (similar to forensic science programs) and that practicing forensic anthropologists should be certified. Finally, these results demonstrated that forensic anthropologists believe that individuals lacking experience, education, and/or training in forensic anthropology should be considered unqualified to practice forensic anthropology. To address the issue of qualifications, the anthropology subcommittee of the OSAC has generated a standard for qualifications for forensic anthropologists, which is currently near completion in terms of its internal approval process at the OSAC.

Therefore, for the purpose of this project, an individual was considered to be a forensic anthropologist if they were certified by the ABFA (as determined via theabfa.org). However, as the ABFA's certification exam has been critiqued in the past (Passalacqua and Pilloud 2020), and until recently there was a requirement of a three-year waiting period after the completion of a doctoral degree, there are several people practicing forensic anthropology who are not ABFA certified or may have had their positions prior to the eligibility for certification. Therefore, we also included individuals who were members of the Anthropology section of the AAFS (at any level, as determined via public membership records from the AAFS). The criteria of AAFS membership was selected because this is the primary professional organization for forensic anthropology, and membership in this organization is recommended in the SWGAnth best-practice qualifications document (SWGAnth 2010). This approach also avoided a subjective evaluation of course requirements of various graduate programs to determine if they provide education in forensic anthropology. Further, it would be difficult (if not impossible) to know if individuals actually took all the courses offered in forensic anthropology from a given institution.

Are Forensic Anthropologists Less Likely to Be Hired as Faculty for Relevant Biological Anthropology Academic Positions?

The authors attempted to examine this question using academic-position hiring information between academic years 2010–2011 and 2018–2019. Data were compiled by examining the biological anthropology Academic Jobs Wiki webpages (<http://academicjobs.wikia.com>; Passalacqua 2018). Any academic job posting from the

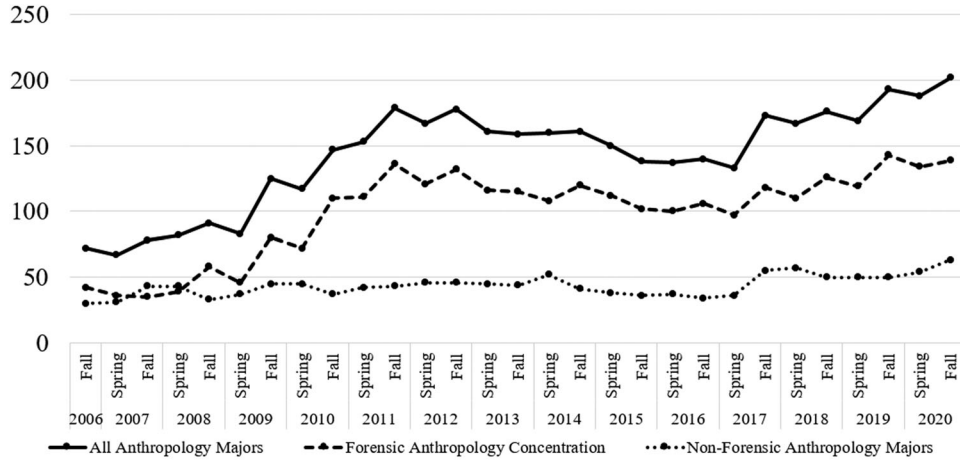


FIGURE 1. Anthropology majors at WCU.

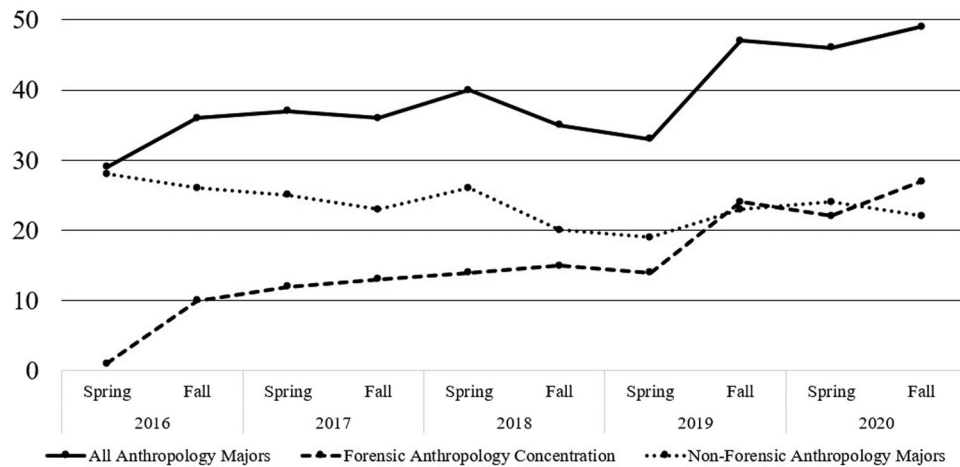


FIGURE 2. Anthropology majors at WU.

United States that included the terms “forensic anthropology/ist” was included (unless the post specifically stated they were not interested in forensic anthropologists) (n = 87). Posts that indicated a preference for forensic anthropology over other specialties were also noted (n = 32). The authors also collected information on the final outcome of these job postings, tracking who was hired for each of these positions and from which institution they received their terminal degree. Final job-posting outcome was primarily determined via “word of mouth” and by checking faculty biographic information online. Failed searches and searches where it was unclear who was hired for the posting were not included in the analyses.

Using the same criteria as above, an individual was considered a forensic anthropologist if they were a member of the AAFS or certified by the ABFA at the time of hire. The number of doctoral graduates specializing in forensic anthropology per year is not available. Further, available AAFS membership data are not detailed enough to attempt to track this information via membership step increases. Thus, in order to estimate the approximate number of individuals graduating per year specializing in forensic

anthropology, the authors used certification data from the ABFA (theabfa.org; Bartelink et al. 2020; Bethard 2017). During this period (2010–2019), 49 individuals were certified by the ABFA, at a rate of 5.4 (SD 3.7) per year. The current affiliations of these individuals are: 27 in applied positions, 15 in academic anthropology positions, and 7 in academic positions in nonanthropology departments.

RESULTS

Effects of Forensic Anthropology Programs on Anthropology Majors

The number of students majoring in anthropology and in the forensic anthropology concentrations at WCU and WU are presented in Tables 1 and 2, and Figures 1 and 2, respectively. These data indicate clear trends in the growth of anthropology majors for both programs, which is largely driven by the increase in majors focusing on forensic anthropology. From fall 2006 to fall 2020, overall majors in the anthropology program at WCU went from 72 to 202, increasing by 181 percent, while overall undergraduate enrollment at WCU increased by 46.5 percent. During this same period,

TABLE 1. *Anthropology and Forensic Anthropology Majors at Western Carolina University 2006–2020*

		Anthropology Majors	Forensic Anthropology Concentration Majors	Percentage of Forensic Anthropology Majors of Anthropology Majors	WCU Un- dergraduate Enrollment
2006	Spring	NA	NA	NA	NA
	Fall	72	42	58%	7145
2007	Spring	67	36	54%	6569
	Fall	78	35	45%	7120
2008	Spring	82	39	48%	6697
	Fall	91	58	64%	7130
2009	Spring	83	46	55%	6812
	Fall	125	80	64%	7450
2010	Spring	117	72	62%	7006
	Fall	147	110	75%	7503
2011	Spring	153	111	73%	7627
	Fall	179	136	76%	7149
2012	Spring	167	121	72%	7267
	Fall	178	132	74%	7979
2013	Spring	161	116	72%	7774
	Fall	159	115	72%	8448
2014	Spring	160	108	68%	8022
	Fall	161	120	75%	8787
2015	Spring	150	112	75%	8247
	Fall	138	102	74%	8821
2016	Spring	137	100	73%	8243
	Fall	140	106	76%	9171
2017	Spring	133	97	73%	8508
	Fall	173	118	68%	9406
2018	Spring	167	110	66%	8658
	Fall	176	126	72%	10027
2019	Spring	169	119	70%	9399
	Fall	193	143	74%	10469
2020	Spring	188	134	71%	NA
	Fall	202	139	69%	10517

forensic-anthropology-concentration students made up an average of 68 percent ($SD = 9.0$) of all anthropology majors at WCU. Figure 1 demonstrates a relatively stable amount of non-forensic-anthropology majors at WCU over time, while the number of forensic anthropology majors increases significantly.

The program at WU started only recently; however, from spring 2016 to fall 2020 overall anthropology program enrollment at WU went from 29 majors to 49 majors, increasing by 69 percent, while overall undergraduate enrollment at WU decreased by 15 percent. During this period, forensic-anthropology-concentration students made up an

average of 34 percent ($SD = 18.9$) of all anthropology majors at WU.

Effects of Forensic Anthropology Faculty on Anthropology Degrees Awarded by US Institutions

Although the WCU and WU examples provide insight about undergraduate programs with forensic anthropology concentrations, many other anthropology programs have expanded their offerings to include forensic anthropology classes taught by forensic anthropologists even though they do not offer concentrations in forensic anthropology. Combining our forensic anthropology faculty panel with

TABLE 2. *Anthropology and Forensic Anthropology Majors at Washburn University 2014–2020*

Year	Semester	Anthropology Majors	Forensic Anthropology Concentration Majors	Percentage of Forensic Anthropology Majors of Anthropology Majors	WU Undergraduate Enrollment
2014	Spring	NA	NA	NA	NA
	Fall	27	0	0%	6034
2015	Spring	25	0	0%	NA
	Fall	60	0	0%	5912
2016	Spring	29	1	3%	NA
	Fall	36	10	28%	5969
2017	Spring	37	12	32%	NA
	Fall	36	13	36%	5861
2018	Spring	40	14	35%	NA
	Fall	35	15	43%	5733
2019	Spring	33	14	42%	NA
	Fall	47	24	51%	5467
2020	Spring	46	22	48%	NA
	Fall	49	27	55%	5047

IPEDS data on anthropology degree conferrals from 2000 through 2017 enables us to analyze whether the presence of at least one forensic anthropologist is associated with more undergraduate anthropology graduates. National completion rates for anthropology bachelor’s degrees from IPEDS are presented in Table 3. The 39 institutions that had a forensic anthropologist on faculty during the available period are listed in Table 4.

Because we are investigating whether the presence of a forensic anthropologist affects the number of anthropology degrees granted, and *not* the number of majors, if there is any effect of the new forensic anthropologist, it must be on *future* graduates. This is because a new hire, say in 2010–2011, will have little to no effect on the number of graduates for 2010–2011 because most of these graduates had to declare their major and begin progressing in the major before the new forensic anthropologist arrived. Therefore, a reasonable assumption is that if a new hire, say in 2010–2011, has any effect, it is likely to begin to be expressed in 2013–2014, or approximately three years after their hire. After three years, the new hire will have been a faculty member long enough to potentially attract students in 2010–2011, 2011–2012, and 2012–2013 who will graduate in 2013–2014 at the earliest, or three years after the new forensic anthropologist begins their tenure.

We tested this hypothesis by generating regression specifications that included academic years t , $t+1$, $t+2$, $t+3$,

TABLE 3. *Anthropology Degrees Completed in the United States by Year*

Year	n institutions	n anthropology degrees conferred
2000	46	2565
2001	75	2784
2002	82	2965
2003	95	3083
2004	95	3095
2005	95	3182
2006	95	3284
2007	95	3275
2008	95	3558
2009	95	3779
2010	93	4078
2011	93	4040
2012	92	4454
2013	94	4605
2014	93	4473
2015	94	3973
2016	93	3592
2017	92	3240

TABLE 4. *Institutions with at Least One Forensic Anthropologist Included in the Analysis*

Number	Institution Name
1	Arizona State University-Tempe
2	Binghamton University
3	Bloomsburg University of Pennsylvania
4	California State University-Chico
5	California State University-Fresno
6	California State University-Los Angeles
7	California State University-Sacramento
8	East Carolina University
9	Eastern Michigan University
10	Edinboro University of Pennsylvania
11	George Mason University
12	Indiana University of Pennsylvania-Main Campus
13	Louisiana State University and Agricultural & Mechanical College
14	Metropolitan State University of Denver
15	Middle Tennessee State University
16	North Carolina State University at Raleigh
17	Ohio State University-Main Campus
18	Radford University
19	SUNY College at Brockport
20	SUNY College at Oswego
21	Southern Illinois University-Carbondale
22	Texas State University
23	The University of Tennessee-Knoxville
24	The University of West Florida
25	University of Arkansas
26	University of California-Santa Cruz
27	University of Central Florida
28	University of Florida
29	University of Illinois at Urbana-Champaign
30	University of Louisiana at Lafayette
31	University of Nevada-Las Vegas
32	University of Nevada-Reno
33	University of New Mexico-Main Campus
34	University of North Carolina Wilmington
35	University of South Florida-Main Campus
36	University of Southern Mississippi
37	Virginia Commonwealth University
38	Western Carolina University
39	Wichita State University

TABLE 5. *Specification Results of Forensic Anthropology Faculty Lagged by Multiple Years*

Variables	Estimate	Standard Error
Forensic Anthro Faculty Hire at t	3.956	2.651
Forensic Anthro Faculty Hire at t+1	9.497	6.495
Forensic Anthro Faculty Hire at t+2	-0.281	2.860
Forensic Anthro Faculty Hire at t+3	4.337*	2.494
Forensic Anthro Faculty Hire at t+4	1.621	3.037
Forensic Anthro Faculty Hire at t+5	2.402	3.317
Constant	26.09***	0.785
Observations	3,898	
R-squared	0.938	
Std. Errors Clustered By	Institution	
Year FE	YES	
Institution FE	YES	
Overall Trend	YES	
Institution Specific Trends	YES	

*** p<0.01, ** p<0.05, * p<0.1

t+4, and t+5, where t represents the year of hire. Based on these specification results, shown in Table 5, the t+3 coefficient was the most statistically significant (p = 0.017) of the lagged times. This finding indicates that the use of a three-year lag is most appropriate.

To focus on whether a new forensic anthropologist may cause the increase in the number of graduates, we must empirically eliminate as many alternative hypotheses as possible given our data. One hypothesis is that schools that hire a forensic anthropologist are in some unobservable way different from those that do not. That is, hiring a forensic anthropologist is nonrandom; therefore, a direct comparison of the number of graduates at hiring versus nonhiring institutions may be due to unobserved variables and not the hiring of a new forensic anthropologist. For example, it may be that these hiring departments may have attracted more graduates without hiring a new forensic anthropologist because they were better at placing their students in jobs, or that they already had more entertaining teachers. To account for these time-invariant institution characteristics, we included a zero-one indicator variable, often referred to as a dummy variable or institution-specific fixed effect, for

TABLE 6. *Impact of Forensic Anthropology Faculty Lagged by Three Years*

Variables	(1)	(2)	(3)
Forensic Faculty (t-3)	6.801*** (1.522)	6.801*** (2.456)	7.316** (3.221)
Constant	26.98*** (0.191)	26.98*** (0.159)	26.94*** (0.209)
Observations	4,295	4,295	4,295
R-squared	0.897	0.897	0.933
Std. Errors Clustered By	Institution	Institution	Institution
Year FE	YES	YES	YES
Institution FE	YES	YES	YES
Overall Trend	NO	YES	YES
Institution Specific Trends	NO	NO	YES

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

each institution. We also wanted to eliminate unobservable characteristics that are unique to each year and may affect the number of graduates. To account for potential unique year effects, we included a zero-one indicator variable, or year effect, for each year. These year fixed effects account for any national trend in the number of anthropology graduates.

This combination of year fixed effects and institution fixed effects provides a difference-in-differences (DID) estimate of the effect of hiring a new forensic anthropologist. DID estimates are some of the most common approaches for evaluating possible effects from changes in a variety of variables in the discipline of economics (Abadie 2005; Card and Krueger 1993). Here, the estimator uses the nonhiring departments to estimate how the number of graduates would have changed if the hiring departments had not hired a new forensic anthropologist. The estimated coefficient then represents the difference between the observable number of graduates and the unobservable number of graduates if the hiring departments had not hired. In some specifications, we also included institution-specific time trends to eliminate the possibility that our estimated coefficient is due to an institution's specific trend in the number of graduates.

Table 6 reports the regression models estimating the number of anthropology graduates on whether a forensic anthropologist was present in a department three years earlier. Including year and institution-specific fixed effects, and clustering standard errors by institution, Column 1 in Table 6 shows that the presence of one or more forensic anthropologists is associated with 6.8 ($p = 0.006$) more bachelor's degrees awarded in anthropology three years later. Column 2 adds an overall trend and finds a similar effect: 6.8 ($p = 0.006$) more anthropology graduates. The regression model specification with the most controls, including year effects, institution-specific effects, an overall national trend, and institution-specific trends, shows that the addition of a forensic anthropologist results in 7.3 (p

$= 0.024$) more anthropology graduates three years later. The median number of anthropology graduates after the hire of a forensic anthropology faculty member (at time $t+3$) is 18 greater than the entire sample; the mean number of graduates is 27.4. Therefore, the addition of a forensic anthropologist as a faculty member in an anthropology program is associated with a 26.6 percent increase in the number of graduates at the mean. This suggests that more students are attracted to major in anthropology when a forensic anthropologist is on faculty, theoretically teaching forensic anthropology courses, in an anthropology program.

Are Forensic Anthropologists Less Likely to Be Hired as Faculty for Relevant Biological Anthropology Academic Positions?

Overall, there were 87 jobs posted to the biological anthropology Academic Jobs Wiki webpages using the keyword "forensic anthropology- y/ist" between the 2010–2011 and 2018–2019 academic years. After removing all postings that resulted in a failed search ($n = 6$) or where the individual hired could not be reliably determined ($n = 10$; some of these searches may have failed as well), a total of 69 positions remained in the sample (Table 7). Of these 69 positions, a total of 34 individuals (49 percent) were hired who had a background in forensic anthropology. From these 69 positions, a total of 32 of these job postings specifically emphasized the desire for a forensic anthropologist over other biological anthropology specialties. However, of these 32 positions, only 18 (56 percent) actually hired someone with a background in forensic anthropology. The remaining positions largely went to individuals specializing in bioarchaeology.

In terms of institutions from which these individuals received their doctoral degrees, for all 69 positions, the top degree-granting institutions were: The Ohio State University ($n = 9$); University of Tennessee, Knoxville ($n = 8$); Michigan State University and the University of Florida

TABLE 7. *Job Postings Using Keyword Forensic Anthropology from 2010–2011 to 2018–2019*

Year	Total Job Postings Mentioning Forensic Anthropology	Job Postings Emphasizing Forensic Anthropology	All Biological Anthropology Job Postings	Percentage of Forensic-Anthropology-Emphasis Job Postings from All Biological Anthropology Job Postings
2010–2011	3	2	60	3.3%
2011–2012	6	2	79	2.5%
2012–2013	7	2	94	2.1%
2013–2014	9	4	60	5.6%
2014–2015	9	4	72	5.6%
2015–2016	11	4	57	7.0%
2016–2017	8	3	52	5.8%
2017–2018	11	6	56	10.7%
2018–2019	5	5	55	9.1%
Total	69	32	585	5.3%

(both with $n = 5$); and the University of Nevada, Las Vegas ($n = 3$). From the positions that emphasized forensic anthropology, the top degree-granting institutions were: The Ohio State University ($n = 6$); University of Tennessee, Knoxville ($n = 5$); University of Florida ($n = 3$); and Michigan State University and University of Buffalo (both with $n = 2$).

DISCUSSION

Impacts of Forensic Anthropology on Undergraduate Anthropology Programs

While the data for the impact of forensic anthropology concentrations in undergraduate anthropology program majors are limited to only a few years at two institutions, the data from WCU, and to a lesser extent from WU, indicate that having an undergraduate forensic anthropology concentration increases the overall number of anthropology majors. Additionally, when we examine the impact of hiring a forensic anthropologist into an academic anthropology program, even in cases where no undergraduate concentration is available, forensic anthropology faculty still have a significant positive impact on the number of anthropology graduates. Essentially, these data indicate that forensic anthropology appears to be a successful recruitment tool for undergraduate anthropology programs.

The increasing number of anthropology majors at WCU and WU, as well as the positive impact of hiring a forensic anthropology faculty member, is especially noteworthy when considering national data on the completion of anthropology bachelor's degrees (see Table 3). These data demonstrate that the overall number of anthropology bachelor's degree graduates peaked in 2013 and has been declining ever since. This trend of declining degree conferrals has also been found in other social science disciplines that have less clear post-graduation career paths (e.g., history, sociology, political sci-

ence) (Ginsberg 2017). More recently, Schmidt (2018) described a similar trend in the humanities as a "crisis." Schmidt (2018) demonstrated a drop in almost all majors in all disciplines of the humanities and compared these declines to those in the social sciences, including anthropology. These declines appear to be associated with, although not direct replacements for, increases in majors in the natural sciences. Schmidt attributed these declines to the financial crisis of the late 2000s and the misunderstanding of students and their parents that there are no jobs for individuals with degrees in these areas. Schmidt also demonstrated that the lack of jobs for individuals with degrees in the social sciences and humanities is a common misconception, as there is almost no difference in the unemployment rate for individuals with degrees in the social sciences, life sciences, or physical sciences (all are at ~ 4 percent; American Academy of Arts and Sciences 2019; Schmidt 2018).

Growth in the number of anthropology majors typically requires the creation of new faculty lines to support these additional students. Therefore, in theory, creating forensic anthropology undergraduate concentrations should also create additional forensic anthropology faculty positions. Such was the experience at WCU, which started with one tenure-track forensic anthropology line in 2003 and now, in 2021, has three tenure-track forensic anthropology lines and one term-based renewable forensic anthropology instructor position. This trend may be mirrored at WU, which also started with one tenure-track forensic anthropology line in 2016 and since has added a lecturer position, which was filled by a broadly trained biological anthropologist who specializes in bioarchaeology and forensic anthropology. Additionally, as further discussed below, the hiring of forensic anthropologists into academic departments is also crucial in order to properly educate the next generation of forensic anthropologists.

If the goal is to attract undergraduate anthropology majors, these data indicate that forensic anthropology should be more highly valued in academia. Forensic anthropology concentrations in academic anthropology programs appear to increase the overall number of anthropology majors, and forensic anthropology faculty significantly increase the number of anthropology majors in undergraduate anthropology programs. Further, the hiring of a forensic anthropologist leads to an increased number of graduates as anthropology majors. While correlation is not necessarily causation, the number of programs evaluated here point to a potential correlation beyond coincidence. Many senior forensic anthropologists often lament that “there are not enough jobs in forensic anthropology,” though these data suggest that there should be more academic positions for forensic anthropologists.

Hiring Trends for Forensic Anthropologists in Academic Programs

While comparative data regarding the expected rates of hiring a desired anthropology discipline for a job posting are not available, these results suggest that forensic anthropologists are less likely to be hired in academic institutions than other biological anthropologists. This trend holds true even for positions that specifically emphasize a desire for a candidate with a background in forensic anthropology. Considering the rate of forensic-anthropology-specific academic positions per year (3.5; SD = 1.3) in comparison to the rate of forensic anthropology doctoral graduates per year (5.4, as estimated using the ABFA certification data), forensic anthropologists should be competitive for these academic positions. Therefore, a paucity of graduates specializing in forensic anthropology is not the reason forensic anthropologists are not being hired for these positions, although we cannot evaluate who applied for each position, as these records are confidential.

There are relatively few forensic-anthropology-specific academic positions posted every year. The number of applied forensic anthropology positions (i.e., outside academia) posted per year is unavailable. So, presently, it is unclear *why* forensic anthropologists are less likely to be hired for academic positions in comparison to other biological anthropology specialties. Due to limitations of the biological anthropology Academic Jobs Wiki webpages, we were not able to investigate rates of forensic anthropologists being hired in other academic disciplines, such as anatomy or biology. Additionally, we did not examine if forensic anthropologists were being hired for postings that specifically asked for a different anthropological specialty.

It is possible that academic hiring committees are unaware of the unique qualifications and requirements to practice forensic anthropology and thus are unconcerned with hiring an individual qualified to practice (and therefore qualified to teach) forensic anthropology. It is also possible that academic departments are uninterested in supporting faculty who require biohazardous laboratory space and constant

support for laboratory safety personnel protective equipment (PPE) to perform their professional work. Or perhaps forensic anthropology is less desired, as it is often viewed as an applied aspect of anthropology that is atheoretical in approach and therefore less “academic” in nature. There may also be a perception that forensic anthropologists are overly typological in their appreciation of human variation, or that they have not fully engaged in needed wider disciplinary critiques. However, forensic anthropology has grown greatly in the past several decades, and there has been a push to more overtly disseminate work contextualizing theory in forensic anthropology (e.g., Boyd and Boyd 2011; Boyd and Boyd 2018; Komar and Buikstra 2008; Winburn and Stock 2021), as well as to further critique and analyze past approaches to the study of human variation in an attempt to advance the discipline and its impact on society (e.g., DiGangi and Bethard 2021; Tallman et al. in press).

It is also possible that qualified forensic anthropologists are opting for applied positions outside of academia whenever possible, or perhaps the use of forensic science in undergraduate anthropology coursework is considered by some as a poor pedagogical approach. As Martin et al. (2013, 244) point out, “many curricula have focused on drawing students in via forensics and an appeal to the exotic. A better approach to bioarchaeological pedagogy takes the student away from read-and-forget activities and replaces it with substantive curricula that encourage students to become critical thinkers.” Regardless, there appears to be a disconnect between the value that the discipline of forensic anthropology puts on the qualifications of its professionals and the consideration of these qualifications by academic search committees.

When considering degree-granting institutions, The Ohio State University (OSU) conferred degrees to the majority of individuals hired for academic positions that desired forensic anthropologists. This finding is noteworthy, as the academic institutions with long traditions of tenured forensic anthropology faculty who produce doctoral-level forensic anthropologists are considered to be (in alphabetical order): Michigan State University (MSU), the University of Florida (UF), and the University of Tennessee, Knoxville (UTK). Unlike these institutions, OSU does not currently have, nor has it ever had, an ABFA-certified forensic anthropologist as permanent faculty. Rather, the anthropology program at OSU is typically considered to have a strong focus in biological anthropology, with a particular emphasis in bioarchaeology and skeletal biology. While students may be educated in forensic-anthropology-focused terminal masters programs, then move to a more biological- or bioarchaeological-focused program for their doctoral education, like OSU, consensus is that forensic anthropology students should be mentored by certified forensic anthropologists (Passalacqua and Pilloud 2020). The fact that the *majority* of individuals hired for forensic anthropology positions came from a doctoral program without a forensic anthropologist on faculty available to provide forensic

anthropology education and training demonstrates a systemic lack of appreciation for qualifications and pedagogy in forensic anthropology.

Implications for Anthropology Programs

The data presented here demonstrate that programs with forensic anthropology concentrations have overall increased their number of majors while the national number of anthropology majors (as inferred from degree completions) has been on the decline since 2013. Additionally, anthropology programs with forensic anthropology faculty members produce more anthropology graduates than departments without forensic anthropologists. These results demonstrate that undergraduate students are interested in forensic anthropology and that adding forensic anthropology faculty and a forensic anthropology concentration to an existing anthropology program will likely increase the overall numbers of anthropology majors. Similar findings have emerged in other forensic science disciplines as well (Cole and Dioso-Villa 2007); however, there may be several other factors leading to higher graduation rates that we were unable to quantify in this study. For example, we do not have data on gender, race/ethnicity, first-generation status, socioeconomic status, proportion of enrolled full-time students, or religious affiliation, all of which have been shown to affect graduation rates (Crisp et al. 2018; DeAngelo et al. 2011).

While increasing the number of majors in anthropology programs is a positive for the discipline of anthropology, faculty must also consider student success and placement after graduation. In 2020, the Bureau of Labor Statistics (BLS) reported that they were anticipating a 9.9 percent increase in anthropology and archaeology jobs for the period of 2018–2028, reflecting an increase of ~600 anthropology and archaeology jobs overall (US News and World Report 2020b). Moreover, the 2020 US News and World Report ranked anthropology as the #6 Best Science Job (US News and World Report 2020a), suggesting that students receiving a bachelor's degree in anthropology are well suited to find employment. Kobus and Liddy (2009) argued that academic programs should capitalize on the popular interest in forensic science as an attraction strategy (i.e., recruitment tool), but that they should emphasize the science-based approach to education in preparation for employment in an applied scientific position. While forensic anthropology may be a draw to an anthropology major, students focusing on forensic anthropology still receive a holistic education in anthropology at the undergraduate level, which prepares them for future opportunities across the discipline of anthropology. Forensic anthropology *is* anthropology, and an undergraduate student focusing on any of the anthropological disciplines should be achieving the same overall learning outcomes and developing the same “hard” and “soft” skills for all anthropology, regardless of their primary interest.

Data USA, a company that aggregates public data about various aspects of the United States, shows that the six most important skills (in order starting with most important)

for all anthropologists are reading comprehension, writing, speaking, critical thinking, active listening, and judgment and decision making (<https://datausa.io/profile/cip/anthropology-6>). Further, based on data from the US Department of Labor, Data USA argues that a Revealed Comparative Advantage (RCA) analysis shows that anthropology students need a greater than average amount of science, systems analysis, and operations analysis in their education as compared to other majors. Importantly, multiple studies have attempted to quantify the likelihood of occupational automation based on the primary types of skills used by various occupations. One such study examined 702 different occupations in terms of their likelihood to be automated based on variables describing the level of perception and manipulation, creativity, and social intelligence required to perform them (Frey and Osborne 2017). This study found that anthropology/archaeology ranked 663 out of 702, meaning that there is a very low probability (0.077) of this career being replaced by automation. This is precisely because the tasks and skills that are important for anthropology, including for forensic anthropology (e.g., communication, problem solving), are those which are the most difficult to automate.

Overall, relatively few biological anthropology academic job postings were seeking a forensic anthropologist over other specialties (~3.5 percent per year), and of these postings, only 58 percent actually hired someone who could be considered a forensic anthropologist. This finding is concerning, as it demonstrates that even when departments are seeking to hire a forensic anthropologist, they frequently hire a candidate with a different specialty instead. These hiring practices signal that forensic anthropologists are not desired as colleagues in academic departments and/or that academic forensic anthropology positions lack incentives to hire and retain forensic anthropologists as faculty. These results may reflect a common ideology that forensic anthropology is a mere application of biological anthropology methods and that anyone with any background in skeletal biology is competent to teach/practice forensic anthropology. However, as we have argued here and has been demonstrated through the qualifications and professionalization necessary to be a practicing forensic anthropologist, this assumption is incorrect (e.g., Christensen et al. 2015; Christensen et al. 2019; Dirkmaat 2012; Langley and Tersigni-Tarrant 2019; Passalacqua et al. 2018; Passalacqua and Pilloud 2018, 2020).

Often, individuals hired specifically for forensic anthropology positions are expected to manage a forensic anthropology laboratory and consult on forensic casework, which requires adequate experience, knowledge, and the requisite competencies to practice forensic anthropology (Passalacqua and Pilloud 2020). Additionally, if not expected to run an existing laboratory in an academic institution, a qualified academic forensic anthropologist could establish relationships with local law enforcement and ME/C offices once hired. This type of professional service promotes community engagement and student training, as well as opening additional

avenues for research and outreach. Conversely, conducting anthropological casework is time-intensive, as it involves expertise in varied tasks, such as: training students, processing fleshed remains for analysis, documenting and maintaining chain of custody of evidence, analysis of skeletal remains, and the management of analytical notes, report writing, and expert witness testimony. Assisting in forensic archaeological recoveries is also time-intensive and is typically requested with little advance notice. Engaging in this work may be viewed as less desirable by hiring committees, as it is time away from other academic pursuits, such as publishing peer-reviewed journal articles and grant writing. Changing this system of how excellence is recognized within the academe is incredibly complicated. More recognition for community engagement and student training would go a long way in recognizing the role and contributions of academic forensic anthropologists, as well as other anthropologists who perform similar work within their own discipline. Additionally, some institutions have adopted the Boyer model of scholarship, which allows for peer-reviewed forensic anthropological reports to count as scholarship of application (Boyer 1990).

When a position description emphasizes forensic anthropology and the best candidate for that position is not a forensic anthropologist, there is nothing wrong with offering that position to the best candidate. What is problematic, and a breach of ethics, is if that candidate misrepresents themselves as an expert in forensic anthropology by falsely claiming to have the knowledge and competencies to teach graduate-level forensic anthropology courses, supervise forensic anthropology graduate students, and/or perform forensic anthropological casework when they lack the appropriate qualifications.

CONCLUSIONS

The results of this research highlight two important and contradictory findings: (1) undergraduate anthropology departments that support forensic anthropology faculty and programs have increased numbers of anthropology majors and graduates, and (2) academic anthropology programs are often failing to hire forensic anthropologists, even for forensic-anthropology-specific positions.

Anthropology is a diverse and interdisciplinary field of study that investigates all aspects of humanity. In light of recent political and social events in the United States, George Leader (2016) recently wrote a short piece arguing, "Universities need anthropology now, more than ever." Unfortunately, as pointed out by Ginsberg (2017), the number of graduates with an anthropology degree has been declining in recent years. If forensic anthropology can be used to recruit anthropology majors and increase the exposure of students to the overall tenets of anthropological thought in undergraduate programs, then forensic anthropology and forensic anthropologists should be welcomed additions to anthropology departments.

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NOTES

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1. We note that this methodology fails to capture academic forensic anthropologists who may have been members in the past but no longer are.

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