

Honor, Duty, and Service: A Blueprint for Creating Regional STEM Pipelines To Serve U.S. Military Veterans

Chelsea Rand-Fleming

Auburn University, Chemistry and Biochemistry Department, Auburn, AL, U.S.A

DOI hyperlink: <https://doi.org/10.38126/JSPG220109>

Corresponding author: crr0051@auburn.edu

Keywords: Veterans; STEM; Employment; STEM Careers

Executive Summary: Veterans face the possibility of unemployment after their transition into civilian life. Creating STEM pipelines for local communities that guide veterans towards long-term employment is necessary. The implementation of localized veteran pipelines in STEM is instrumental to ensuring that veteran unemployment numbers decrease. Focusing efforts to a small area, such as a fifty-mile radius around a town, fosters intimate connections among the veterans and other members of the pipeline. Pipeline localization gives each program its own support systems to support STEM careers in that specific location, making a difference for veterans in cities and towns everywhere. Enhancing the resources available for veterans to access long-lasting and meaningful careers in STEM is possible with veteran pipelines in STEM programming.

I. Background: Challenges Veterans Face Transitioning from Active Duty to Civilian Life

Every year, approximately two hundred thousand members of the U.S. Armed Forces experience a dramatic shift from active-duty life to civilian life upon leaving the military (DOD 2022). Veterans must adjust to a reality with new challenges, such as securing housing, finding a job, obtaining healthcare, seeking out camaraderie, and leadership opportunities. Thousands of U.S. veterans are struggling to find a job outside of active duty. Recent research has shown that in June 2022, the number of unemployed veterans was estimated to be about three hundred seventy-two thousand (Syracuse University 2022). These unemployed veterans are at much higher risk for homelessness, insufficient medical coverage, and mental health crises. A Cambridge study estimated one and a half million veterans are uninsured and about two million go without medical care due to high costs (Woolhandler et al. 2005). According to a press release by the U.S. Department of Housing and Urban Development, on any given night there are about 33,135 homeless veterans (HUD 2022). These issues contribute to the eleven percent of veterans experiencing depression (U.S. Department of Veterans Affairs 2019).

Additionally, a study into the link between homelessness and mental illness showed that of patients exhibiting signs of post-traumatic stress disorder and anxiety, approximately eight percent of female veterans and five-and-a-half percent of male veterans had experienced homelessness within a year (Tsai, Hoff, and Harpaz-Rotem 2017).

A significant challenge veterans face in their job searches is adequate skill application. The skills garnered during military service may not easily translate to commercial settings. A report by the Pew Research Center states that forty-one percent of noncommissioned officers and forty-six percent of enlisted personnel believed that the skills learned while in the military were not helpful for obtaining civilian employment (Parker et al. 2019). Employers may not recognize military leadership positions, nomenclature, or how technical skills apply to a specific job posting. Consequently, veterans often work in jobs with a poor skills match. Forty-two percent of veterans report feeling overqualified for their civilian job, while twelve percent feel underqualified (Parker et al. 2019). A local veteran in Auburn, AL spoke to these challenges, stating that despite possessing nine years of administrative and

management skills, they had to settle for a physically grueling occupation (Fleming 2022). These statistics and firsthand narrative make it clear the U.S. veterans need improved access to the skills, resources, and knowledge necessary to secure employment and succeed in civilian life.

II. Creating Local STEM Pipelines for Veterans

Due to the continuous expansion, innovations, and discoveries in science and technology, STEM careers can be a uniquely fruitful space for veterans to secure civilian employment. STEM careers earn higher salaries on average than non-STEM jobs (Okrent and Burke 2021). In 2019, the unemployment percentage in non-STEM related fields was higher than the unemployment associated with STEM fields. The number of STEM jobs has increased at higher rates than its counterpart for the past decade (Burke, Okrent, and Hale 2022). Creating regional STEM pipelines for veterans can increase their career stability and satisfaction, thereby providing them access to a better life. These pipelines can be framed similarly to Fort Valley State University's Mathematics, Science, and Engineering Academy (MSEA) and Cooperative Developmental Energy Program (CDEP) programs.

MSEA guides high school students from underrepresented backgrounds towards a STEM career, while CDEP assists MSEA students to enter degree programs at partner schools such as Georgia Institute of Technology, University of Nevada, Las Vegas, University of Texas at Austin, and Pennsylvania State University. Additionally, these programs include a network of partnering STEM companies and socialization opportunities for participants. Since 1983, MSEA and CDEP resulted in four hundred-eighty STEM scholarships, four hundred-fifty STEM degrees, and over eight hundred-fifty industry internships for underrepresented students (Fort Valley State University 2022).

Throughout this pipeline, participants are guided from high school to college and from college to careers. This programming should be used as a model to serve U.S. veterans. Specifically, local STEM pipelines for veterans would require access to research opportunities, local company buy-in, education-to-employment programs, and local

networking among veterans in STEM to ensure the sustainability of any veteran-focused initiatives.

i. STEM research and funding opportunities.

There are federal funds allocated for veterans. For example, the Supporting Veterans in STEM Careers Act makes veterans eligible for NSF programs that encourage them to pursue STEM careers, such as the Robert Noyce Teacher Scholarship, NSF fellowships, master's scholarships, traineeship and building grants (Sen. Rubio 2019).

The act also established a working group to improve the representation of veterans and their spouses in STEM. These opportunities help veterans obtain master's or doctoral degrees in research science and offer direct training for STEM employment. Another well-known resource is the Post 9/11 GI Bill. Veterans that meet eligibility requirements have access to financial support for academic tuition and fees, housing, supplies and books, and even assistance in relocating for schooling opportunities.

These benefits can be applied to online learning, co-ops and internships, vocational training, and degree attainment (U.S. Department of Veterans Affairs 2018). While these benefits help veterans obtain education and research experience, some have issues determining eligibility, applying, enrolling, and identifying case-specific benefits which can reduce resource accessibility. An effective pipeline would expand awareness of and access to such funding opportunities by including local veteran resource center partners in its programming. Veterans' centers include university veterans' resource centers, local Veterans Affairs (VA) offices, military bases, and more. By creating these partnerships, veterans can be directed to the center best equipped to address the specific situation that they are facing. Veterans' resource centers, especially VA affiliates, are able to access new veterans' resources as they become available. Military bases institutional knowledge of region- and branch-specific resources for veterans.

Together, these partnerships would allow pipelines to be proactive in connecting veterans with much-needed support. Each pipeline would have online resources available to program participants with information about local partnerships and

information about additional federal, state, and local resources.

ii. Network of local STEM companies.

Disconnects often exist between veterans and businesses that are interested in hiring them. Pipelines should build networks of local companies passionate about hiring veterans by establishing local STEM boards that call owners, HR managers, and CEOs of companies to discuss veteran employment. This STEM board could be composed of local industry leaders. Additionally, companies could be asked to provide hiring statistics to hold them accountable to hiring veterans. While submitting data would not be compulsory, it would demonstrate commitment to pipeline goals. Companies that exhibit their passion for hiring veterans could partner with the local board.

Becoming a partnering company in this pipeline would increase access to qualified job applicants and provide positive exposure. These connections can link veterans to companies actively interested in hiring them, increasing veterans' confidence that they are applying to companies that have their best interests in mind. By partnering with local STEM companies, pipeline administrators can work with employers to determine the qualities and skills needed to be competitive in the local job market, giving veterans confidence in their job applications. Businesses can similarly be educated about the qualifications and skills veterans possess after leaving the military. This cooperation will allow veterans with good qualifications to be noticed by employers and thereby improve job placement.

Networks should also build job boards listing employment opportunities within the region. The platform would provide focused results in veterans' job searches, minimizing their reliance on employment search engines. Pipeline participants would have unlimited access to their regional job board.

iii. Pipeline between STEM companies and local schools.

For veterans interested in returning to school, education and skills training can provide the technical experience needed to be competitive in the job market. Four-and-a-half percent of the nineteen million undergraduate college students that

graduated in the 2015-2016 academic year were military veterans— approximately eight hundred and seventy-seven thousand graduates.

Partnerships between local trade schools, community colleges, universities, and local companies will help veterans secure jobs after finishing their education. Pipelines would offer two educational tracks for STEM training: four-year degree programs and skill-focused certificate programs. Four-year degree programs can be guided by local STEM companies, which would indicate the degrees available at local colleges that would make pipeline members most competitive for job openings. These companies would ideally prioritize hiring veterans from their pipeline.

Skill-centered certificate programs suit veterans not interested in college education, but interested in postsecondary education to provide specific, employment-related skills. Local STEM companies would detail the minimum training required for a specific position. For example, a cyber security business, instead of requiring a degree in cybersecurity, could require completion of a cybersecurity certificate program at a local community college. This option avoids the financial burdens of a four-year degree. Furthermore, the flexibility of certificate programs will appeal to veterans with families or jobs. Local businesses will be able to hire personnel with position-specific skills. Importantly, obtaining a degree or certificate guarantees veterans to be qualified for specific positions within partnering businesses.

iv. Fellowship of veterans in STEM.

According to the Department of Veterans Affairs, leveraging military bonds can ease the transition from military to civilian life (Hinojosa and Hinojosa 2011). Veterans state that a challenge of entering civilian life is leaving the friends they gained and the "family" atmosphere of the military (Young, Ondek, and Phillips 2022). Current networking communities for veterans, such as veterans' resource centers at universities and local VA agencies, can be limited in focus or inaccessible due to long distances across counties. Professional networking is an essential part of job searching. Accordingly, stipends or financial awards to attend research conferences should be available. Conferences offer networking opportunities, mentorship and peer connections. Localized STEM pipelines will provide opportunities

for veterans to access these resources as well as congregate, build community, and regain a feeling of “wholeness”. Though this STEM pipeline emphasizes securing job placement, community-building is equally important. The cohort of veterans in each local pipeline would be able to share their experiences.

v. *Creating an organization.*

Creating a dedicated organization to building a STEM pipeline for veterans will order, unify, and shape the progress and efficiency of increasing veteran employment. To be successful, there must be people dedicated to its continuation and delegated to make choices that grow and cultivate the pipeline. For example, the university contact for the four-year degree program component of the pipeline could be a person working in an academic advising office on campus. For a local business that is an education-to-employment partner, the board member could be a HR manager or personnel recruiter. Personnel from affiliated companies, schools, resource centers would be selected to join the pipeline board. Board members would coordinate pipeline activities with partnering organizations. Board members vacating their position would find a replacement to perform the same role. Upon forming a pipeline, steps must be

taken to locally promote the program through local social media, newspapers, word of mouth, email, radio and others to maximize veteran and partner organization awareness.

III. Conclusion

Researchers, scientists, and engineers must be resilient, dedicated, and prepared for any challenge to be successful in their fields. As STEM fields continue to explode with new developments and discoveries, veterans have proven through their service their passion, commitment, and ability to persevere. Local STEM pipelines are footholds on the long-term goal of sustainably helping veterans obtain and maintain lifelong civilian careers. Employing a STEM pipeline to offer interview preparedness workshops and give career advice are avenues in which we can assist military veterans as they transition to civilian life. Implementing this program is bigger than getting a veteran a job. This pipeline is about helping veterans feel like they belong in a civilian reality. The objective of this pipeline is not just to help veterans provide for their families, it is to provide them peace of mind. Veterans endure dramatic changes when re-entering civilian communities, and we owe it to them to provide better tools and opportunities to thrive, not just survive.

References

- Burke, Amy, Abigail Okrent, and Katherine Hale. 2022. “The State of U.S. Science and Engineering 2022 | NSF - National Science Foundation.” National Science Foundation. 2022. <https://nces.nsf.gov/pubs/nsb20221/u-s-and-global-stem-education-and-labor-force>.
- Department of Defense. 2022. “Military Discharge Data.” SkillBridge. 2022. <https://skillbridge.osd.mil/separation-map.htm>.
- Fleming, Saevonne. 2022. Life After Active Duty.
- Fort Valley State University. 2022. “Cooperative Developmental Energy Program.” Fort Valley State University. 2022. <https://www.fvsu.edu/cdep>.
- Hinojosa, Ramon, and Melanie Sberna Hinojosa. 2011. “Using Military Friendships to Optimize Post deployment Reintegration for Male Operation Iraqi Freedom/Operation Enduring Freedom Veterans.” *The Journal of Rehabilitation Research and Development* 48 (10): 1145. <https://doi.org/10.1682/jrrd.2010.08.0151>.
- Holian, Laura, Tara Adam, Anlar Llc, and Tracy Hunt-White. 2020. “Veterans’ Education Benefits a Profile of Military Students Who Received Federal Veterans’ Education Benefits in 2015-16 AUTHORS.” <https://nces.ed.gov/pubs2020/2020488rev.pdf>.
- Okrent, Abigail, and Amy Burke. 2021. “The STEM Labor Force of Today: Scientists, Engineers, and Skilled Technical Workers | NSF - National Science Foundation.” Ncses.nsf.gov. 2021. <https://nces.nsf.gov/pubs/nsb20212>.
- Parker, Kim, Ruth Igielnik, Amanda Barroso, and Anthony Cilluffo. 2019. “THE AMERICAN VETERAN EXPERIENCE and the POST-9/11 GENERATION.” *Pew Research Center* 419: 4372.
- Sen. Rubio, Marco. 2019. *S.153 - Supporting Veterans in STEM Careers Act*. <https://www.congress.gov/bill/116th-congress/senate-bill/153/text>.
- Syracuse University. 2022. “The Employment Situation of Veterans – June 2022.” D’Aniello Institute for Veterans and Military Families. 2022. <https://ivmf.syracuse.edu/article/the-employment-situation-of-veterans-june-2022/>.

- Tsai, Jack, Rani A. Hoff, and Ilan Harpaz-Rotem. 2017. "One-Year Incidence and Predictors of Homelessness among 300,000 U.S. Veterans Seen in Specialty Mental Health Care." *Psychological Services* 14 (2): 203–7. <https://doi.org/10.1037/ser0000083>.
- U.S. Department of Housing and Urban Development (HUD). 2022. "New Data Shows 11% Decline in Veteran Homelessness since 2020—the Biggest Drop in More than 5 Years." (HUD). November 3, 2022. https://www.hud.gov/press/press_releases_media_advisories/HUD_No_22_225.
- U.S. Department of Veterans Affairs. 2018. "GI Bill." VA.gov. 2018. <https://www.va.gov/education/about-gi-bill-benefits/>.
- . 2019. "Mental Health." Va.gov. 2019. https://www.research.va.gov/topics/mental_health.cfm.
- Woolhandler, Steffie, David U. Himmelstein, Ronald Distajo, Karen E. Lasser, Danny McCormick, David H. Bor, and Sidney M. Wolfe. 2005. "America's Neglected Veterans: 1.7 Million Who Served Have No Health Coverage." *International Journal of Health Services* 35 (2): 313–23. <https://doi.org/10.2190/upbq-c3rh-d367-5h9d>.
- Young, Sharon, George Ondek, and Glenn Allen Phillips. 2022. "Stranger in a Strange Land: A Qualitative Exploration of Veteranhood." *Journal of Veterans Studies* 8 (1): 175–85. <https://doi.org/10.21061/jvs.v8i1.308>.

Chelsea Rand-Fleming is a Ph.D. candidate at Auburn University in the Chemistry and Biochemistry program. Chelsea studies the post-translational modifications and assembly of MCR (methyl coenzyme M reductase). She has a passion for making STEM more accessible to underrepresented groups. After earning her Ph.D., Chelsea plans on pursuing a career that allows her to share her combined love of chemistry and outreach.

Acknowledgements

This publication was written as part of the American Society for Biochemistry and Molecular Biology (ASBMB) Advocacy Training Program. The views reflected herein are solely attributed to those of the author.