

**EXPLORING ETHICS IN COMPUTER SCIENCE WITHIN UNIVERSITY  
CURRICULUM AND POST-GRADUATION TO MAKE NECESSARY ADJUSTMENTS  
WITHIN THE UNIVERSITY**

**UNDERSTANDING THE BARRIERS FACED BY UNDOCUMENTED STUDENTS  
PURSUING TECH AND THE ALTERNATIVES THEY HAVE TO MOVE FORWARD**

A Thesis Prospectus  
In STS 4500  
Presented to  
The Faculty of the  
School of Engineering and Applied Science  
University of Virginia  
In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science in Computer Science

By  
Jerry R. Pinto-Gomez

October 27, 2022

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

**ADVISORS**

Kent Wayland, Department of Engineering and Society

Briana Morrison, Department of Computer Science

## Introduction

Ethics in computer science is not something that is ever really brought up or discussed within CS classrooms here at UVA. Students' only exposure to ethical questions pertaining to their work comes from their own research or from STS classes that cover ethical issues in general. STS classes do not provide enough discourse on ethics since they don't just focus on CS but rather engineering in general. Post-graduation, these issues of ethics also arise since CS professions don't really have much of a code of ethics. This freedom without the proper background information and knowledge can bring up ethical issues. These issues could be easily prevented by either teaching CS professionals how to take greater care in preventing ethical issues or through the introduction of a fully encompassing code of ethics.

The goal of this technical paper is to understand the history of ethics in CS and how it has developed both in the workplace and in academia. With this background of ethics, one can then ask where computer science is failing the most when it comes to ethical discussions. Through this exploration, we can then implement the proper solution in hopes of addressing the issues. These solutions would have to focus on what we, as an institution of higher knowledge, can do better. We can achieve this by reworking how we address ethical problems in CS from broad ethical discussion in STS classes to a more incorporated discussion of ethics in CS.

As for my STS research topic, I will be focusing on the barriers undocumented students face trying to get into tech and how we can hopefully provide them with better options than they have. The options will come from the research I do on why they experience these barriers. This will include information on the laws, regulations, and the overall awareness people have around undocumented people and students.

My technical and STS research papers attempt to understand and criticize the current state of ethics within CS. The technical focuses on exploring the history of ethics within the computer science community and using that information to create a better structure for ethics in CS. The STS portion expands more on these issues within CS by focusing on undocumented students and their interaction with the tech industry. It then aims to try to make a change within the technical system at UVA, just like how the technical aims to make a change in our CS curriculum.

### **Technical Topic**

Ethics in computer science is something fairly new when compared to other STEM fields. The research community within CS is still trying to grasp the best way to go about dealing with the ethics of their work. This uncertainty is something this technical research paper aims to explore. Through a better understanding of the current state of ethics, I aim to come up with proposals on how to improve the discussion around ethics at UVA. These proposals will be taken from discussions around ethics in CS practices and interpreted in a way that would be digestible for students.

Currently, the approach to ethics in computer science is constantly being shifted around as researchers in fields like AI try to better understand how they should mitigate negative societal impacts [1]. The main article I found talking about this content was *Examining Responsibility and Deliberation in AI Impact Statements and Ethics Reviews*. In the article the author examined several professionals who wrote their own ethics reviews and analyzed how each one of them approached the ethical questions brought about by AI. The article highlighted the differences between how each author expressed the action to identify negative consequences

and how each one of them dealt with assigning responsibility. From there the analysis of these reviews highlighted several topics within the AI community that required more attention, some examples include *adversarial users, lack of mitigation, minimizing negative impact*, [1] and more. With these highlighted topics the article then provided suggestions on how these authors could improve their reviews so that they may further improve their stance on the ethical implications of their work. With this article I was able to better understand the current state of ethical discussion within one part of the computer science community.

With the knowledge of these discussions, I propose that topics such as the ones discussed in *Examining Responsibility and Deliberation in AI Impact Statements and Ethics Reviews* should be used to engage students within the CS curriculum to try and foster these ideas earlier on rather than later. The reasoning behind this is that, as shown in the article, a majority of authors believed that their theoretical work had no negative societal impact and so they would mainly focus on the positive impact while ignoring any potential negative impact they could potentially be missing.

This understanding of the ethical implications of work created by CS professionals can be better understood when talking about software development. In software, there is a culture around trying to get projects shipped out as fast as possible. Although this rush to deploy products may create economic growth for a company, it can also result in costs for our society [2]. The main costs arise from bugs and viruses, which could be avoided if developers had stricter regulations for the safety of the products they put on the market. These issues could sometimes prove to be serious problems. For example, there was an instance where software malfunctions resulted in deaths [2]. With stricter regulations, these issues would become less prominent while also increasing security and privacy in software.

Understanding all of this, I am proposing a change in the curriculum for CS majors at UVA. The change would not need to be anything major, but it should incorporate some discussion on ethical issues that have been issues in the past as well as issues that are currently ongoing. There may be other approaches to how to better incorporate these discussions, but I believe that it is a worthwhile issue to investigate. Ethical problems are something that needs more attention since they affect more people than one may ever interact with. This change would have to come from discussions with the CS department to better understand what it took to rework the CS curriculum. By understanding we can determine what the first step would be to include more ethical discussion.

### **STS Topic**

Undocumented people consistently face barriers when attempting to provide for their families. These barriers come as a result of not having opportunities afforded to them regardless of the conditions of their arrival. They are frequently forced to pursue any alternative path to find work, and one of these paths is to pursue a higher education in the hope of finding a better-paying job. This, however, is a privileged opportunity that not many undocumented people can even consider. Even after going through all the hurdles required to consider higher education, they will still face obstacles when trying to get a job since many employers aren't even aware of their existence.

This is an issue currently in institutions like UVA, which provide little to no assistance for undocumented students to navigate these systems paved without them in mind. With no access to resources on the university website, students instead try and gain information from the nearest faculty member, but, often times, the faculty member wasn't even aware of the existence

of undocumented students. This interaction creates difficulty in trying to navigate career choices, especially in fields like software development, game development and other forms of technology where employers do not want to hire undocumented workers. The question I pose is why is it that UVA is not affording undocumented students the same opportunities as all other students? How can we create greater access to the resources needed for them and what can we do to help them navigate the world after graduation? Currently the only way undocumented students are even seen by actants like the university is through either their own advocacy or the support of other students and the community.

Before 2017, the way in which undocumented students interacted with life after graduation, especially in a field like technology, was simple in that they simply needed to apply for DACA, which is a policy permitting undocumented migrants to apply for work authorization if they came to the US before June 2007. Once they applied, they were finally permitted access to the same opportunities as their peers. This continued until a policy change occurred in 2017 that prohibited new applicants and only permitted renewals for those who had already benefited from the program. Now undocumented students must find creative ways to manage their lives at institutions that have no support for them. However, this work should not be left entirely to the undocumented students and those who support them, but the institutions themselves. Universities should be making efforts to support talented students who have spent years trying to get an education to better improve their field of study. UVA, for example, should also be doing the most to collect resources, advocate for, or work with their undocumented students to provide them with more options.

Through a collection of legal information, employer regulations, and university policy, we will come to a better understanding of where we stand in our attempts to help undocumented

students. This research will be directed by first learning the history of what stance UVA has taken when it comes to undocumented students and how it has changed over the years. The information will not only come from the faculty and the board of visitors but also come from organizations that have been combating these issues, like UndocUVA and PLUMAS, which are political activist groups on Grounds. This information would preferably be accumulated through in-person interviews but, if for example, members of the board of visitors are unable to get interviewed then the information would be. The collection of research should then be directed towards the most plausible solution. The main goal of these solutions is to provide undocumented students with tech opportunities in the tech industry. The barriers surrounding tech opportunities should be alleviated to some degree for undocumented but, why does UVA not do this or if they do how can they do more so that it makes an impact?

## **Conclusion**

Undocumented people face a plethora of obstacles throughout their entire life but, through this research I hope to learn more about the obstacles they face in the tech industry. These obstacles can also be better understood through the information I gathered in my technical topic. An understanding in how computer science professionals address ethical problems allows me to gain insight on how opportunities for undocumented folk may be perceived. Both my STS and technical topic aim to address issues within the technical system in place at UVA and within the CS community. The work would be done through a collection of interviews to inform ourselves more about what UVA is currently doing and then with that information, solutions would then be introduced to UVA officials. By doing work like this I aim to address issues like ethics and undocumented students which for the most part are unseen at UVA. Many faculty and students do not have any sort of exposure to these issues and by doing this kind of work I can

potentially create bridges for students to see that which goes unnoticed. This work would then address any gaps our CS curriculum has and also potentially address a gap the entire school has, at least when it comes to undocumented students.

## References

- [1] Liu, D., Nanayakkara, P., Sakha, S. A., Abuhamad, G., Blodgett, S. L., Diakopoulos, N., Hullman, J. R., & Eliassi-Rad, T. (2022). Examining responsibility and deliberation in ai impact statements and ethics reviews. *Proceedings of the 2022 AAAI/ACM Conference on AI, Ethics, and Society*, 424–435. <https://doi.org/10.1145/3514094.3534155>
- [2] Peslak, A. R. (2004). Improving software quality: An ethics based approach. *Proceedings of the 2004 SIGMIS Conference on Computer Personnel Research: Careers, Culture, and Ethics in a Networked Environment*, 144–150. <https://doi.org/10.1145/982372.982408>