I'm fascinated by institutions that contribute critically to the complicated cultural dialogue about what a maker's education, workshop, and community should be. For decades, this maker pedagogy was called "industrial arts", and was an essential part of a young man's education. As college became a more popular path to the middle class, focus shifted toward academics; generally, only those who weren't academically successful went to trade school or took shop classes.

Today, new programs respond to the need for creative, maker-oriented spaces without the negative connotations of industrial arts. These progressive, pandisciplinary communities have different names: hackspaces, fablabs, innovation centers, but "makerspace" is the umbrella term most commonly used. While these spaces are recognized by many as invaluable educational, entrepreneurial, and community spaces, their new branding also faces challenges.

These spaces are perceived to require expensive equipment like 3D printers and rolling whiteboards. Because makerspaces are sometimes seen as an expensive, experimental pedagogy, many less affluent communities feel an investment in such programs imprudent. In the US, they're an uncommon privilege. This has led to a lamentable polarization: trade schools have decidedly lower class associations while maker culture and design thinking connote affluence.

Maker culture has risen as counterpoint to today's sad state of industrial arts and as an extension of internet and hacker culture. Despite hackers' often nefarious public portrayal, many uphold laudable values of "hacking" things to improve or customize them, open source collaboration, and most importantly, democratized access. The most successful makerspaces share all these values: iterative design, working collaboratively, and making resources broadly accessible. From the development of touchscreens and GPS to groups in developing countries engineering community-focused solutions better than foreign NGOs, the success of these programs is remarkable. At all levels of education and research, for communities of any economic stratus, in a wide range of cultures, the burgeoning prevalence of makerspaces is proving their value and relevance.

I will engage these spaces not just because one led me to college and my life's passion, but because I've seen these places transform lives, produce great innovations, and enable important collaborations. I want to understand why they develop in certain places, how they function, and how they impact their communities; what drives them, what they produce, and how that varies. I'll explore their different internal cultures and external perceptions, whether they call themselves hackspaces, men's sheds, idea foundries, innovation centers, or some other descriptor. I want to understand how they function in diverse and homogenous places, rich and poor, metropolitan and rural, and how they serve people of all backgrounds, ages, and genders; to see how makerspaces vary to reflect different places, cultures, and resources and how, in turn, these different cultures are shaped by participants in these spaces.

With that goal of trying to understand how makerspaces reflect and uplift people and communities, I am eager to explore the unique maker cultures of innovation hubs in Brazil, the United Kingdom, Austria, China, and Tanzania.

Beginning in Brazil, I will visit Sao Paulo's Vila Nova Esperança (New Hope) Community Innovation Center, an affiliate of the IDIN (International Development Innovation Network) that serves an impoverished community with limited resources. The Center offers community members simple tools to engineer their own solutions, including internet over radio waves, recycled PET bottle greenhouses, and solar water heaters, while foreign NGOs have struggled to sustain impact. I'll work with local makers and talk with residents to understand the colloquy between the space and its community. I'm especially interested to learn if and how the Center empowers people versus how foreign aid organizations might or might not.

In London, I'm excited by the opportunity to live and work in a vibrant maker neighborhood where nearly 50 makerspaces reside within a 10 mile radius. I'll explore how so many facilities with similar missions can coexist: how they differentiate themselves or work together, why makers choose one over another. The UK also has a thriving "Men's Shed" movement: originally established to help men combat deteriorating physical and mental health by providing space, tools, and encouragement to get together to take on craft projects, learn skills, and talk.

Austria is home to some of the earliest examples of makerspaces and the hacker movement predecessor to maker culture. I will work primarily in Vienna's OpenLab and Happy Lab. Last year Vienna hosted a Maker Faire with over 240 makers displaying their work. I want to volunteer at that faire in May and the Vienna Open Festival in April. Participating in these mature maker networks will help me understand their long-term development and growth in tandem with their communities. This is key to understanding how to establish makerspaces as permanent community resources.

China has recently inaugurated a state-sponsored maker network which has grown to over 130 makerspaces, including the Nanjing Makerspace in which I'm most interested. In these spaces, I'll gain an alternate perspective on "made in China" mass production through participating in makerspaces' custom fabrication. This will be a very new cultural experience with linguistic challenges. Regardless, I hope to gain an understanding of how Chinese culture affects its new, rapidly growing maker movement and their spaces' designs, functions, and administration.

In Arusha, Tanzania's Twende Innovation Center, I'll invent alongside their 300+ members. Offering myriad fabrication and business workshops to help inventors bring promising inventions to the public, Twende's mission is to "empower people to design & make physical technologies that improve lives and are affordable to solve community challenges." An hour's flight from Arusha is Dar Es Salaam, home to two incredible makerspaces: STICLab and Buni. These three spaces in Tanzania are some of the most developed on the entire continent.

Makerspaces aren't like other clubs in that most don't require membership or appointments. They're meant to be open and democratic. Along with the contacts I've made, a core part of my project is in experiencing these spaces as their users do: just stopping in and making the connection in person, talking about their work, and asking to help– starting conversations through working together on projects in their native spaces. Most of these spaces have numerous ongoing projects and could engage me for at least months, in the same way that the Eli Whitney, Wheaton, and Dartmouth makerspaces have engaged me for years.

I will encounter linguistic and cultural barriers to differing extents in each of these places, but I hope that our shared interest in and language of making and problem-solving will overcome them. More than many other pursuits, mechanical and pragmatic design is a clear and cross-cultural communication. Between miming mechanical intentions, and my aptitude for mechanical drawing, I'm confident that we will surmount language barriers, just as I did at international robotics competitions.

These unique makerspaces are magnets to those people with whom I want to connect. I will learn not just about these countries' spaces, communities, and methodologies, the differences between and similarities of these spaces, but more importantly, the stories, ideas, and goals of the spaces and the people who build and benefit from them. I want to know if people around the world experience these spaces like I do; how their lives have changed in and through these spaces.

As satisfying as it will be to experience these places in a human way, participating in their communities and work, I'll augment these experiences with data, to expose trends I might miss otherwise. I plan to collect information about the communities in which these places are based, who comes to them, what they do, how they are funded and administered. I want to unite my backgrounds in public policy, STEM, and the arts to make a conceptual Makerspace Blueprint. My goal is not to create a one-size-fits-all recommendation, but a set of drawings and notes synthesizing information and experiences that can serve as a guide to makers trying to create spaces that reflect their communities. I hold maker culture's ideals of democratizing information and resources too dearly to neglect sharing what I learn with a broader community, and ensuring that this experience enjoys a life beyond the year and beyond me. Such a Blueprint would be the summation of all my experience: a landing on this staircase towards making makerspaces work better for their communities; towards ensuring more students are offered the same opportunity I was; and toward leveraging the idea of these spaces to make better things, better people, and better communities.

That being said, if you approach a question assuming there is a simple answer, you're likely not to learn much. I want to go places and meet people who will challenge my conceptions of what I want to do and how I want to learn. Makerspaces have opened doors for me that I didn't know existed. I can't wait to see what hidden doors these places will open, what yet unconsidered questions they'll prompt, and maybe even answer.