Installation at Clocktower Gallery
Q. What inspired Stranger Visions?

The idea actually came to me in a therapy session! I was sitting staring at this very mundane print on the wall and I noticed that in the glass covering the print there was a crack, and in that crack was lodged a single hair. I kept staring at this hair and wondering whose it could be and what I could know about them from it. Walking home later that day I became cognizant of all the genetic material surrounding me, and the idea for Stranger Visions materialized.

Q. What is the process involved in going from a DNA sample to a finished portrait?

The project began with me, going about my daily life in the city, and coming across samples of human DNA everywhere I looked. Hairs, nails, cigarette butts, chewing gum, we are shedding our DNA all over the place all the time, and we don’t even notice.
So I began collecting “samples” – traces of human DNA I found in my travels.

The next step is bringing the samples into a lab for DNA extraction. I do this at Genspace, a DIY Biology lab in downtown Brooklyn, or when I am upstate at school I do it in the student Molecular Biology lab there. Working with the Biologists in these labs taught me pretty much everything I know about Molecular Biology and DNA.
Ellen Jorgenson, Oliver Medvedik and Eric Rutledge at RPI have been amazing tutors!

So I extract the DNA in the lab and then I amplify certain regions of it using a technique called PCR – Polymerase Chain Reaction. This allows me to study certain regions of the genome that tend to vary person to person, what are called SNPs or Single Nucleotide Polymorphisms. You can learn more about SNPs on snpedia (like Wikipedia for SNPs!)

I send the results of my PCR reactions off to a lab for sequencing and what I get back are basically text files filled with sequences of As, Ts, Cs, and Gs, the nucleotides that compose DNA. I align these using a bioinformatics program and determine what allele is present for a particular SNP on each sample.

Then I feed this information into a custom computer program I wrote which takes all these values which code for physical genetic traits and parameterizes a 3d model of a face to represent them. For example gender, ancestry, eye color, hair color, freckles, lighter or darker skin, and certain facial features like nose width and distance between eyes are some of the features I am in the process of studying.

I add some finishing touches to the model in 3d software and then export it for printing on a 3d printer. I use a Zcorp printer which prints in full color using a powder type material, kind of like sand and glue.
And it is important to note that this is a work in progress! I’m really only starting to explore all the traits I am interested in examining with this technique.

Q. How accurate are the portraits? Has anyone recognized themselves?

First of all, it is important to remember that this is art, not the development of a new product or company. This work is a provocation, designed to spur a cultural dialogue about genetic surveillance and forensic DNA phenotyping. What does it mean for an artist, an amateur, to do this? What are the implications for privacy issues as well as law enforcement? I think these are the major questions. We hear everyday about “digital natives” who don’t know how not to share their private data with the world, but here we all are, shedding hairs, nails, skin, and leaving saliva behind us all the time, without thinking about it as information.

I usually say they have a “family resemblance” to the person. They will have similar traits and ancestry, but might look more like a possible cousin than a spitting image of the person themselves. The reason for this is multifold, but the primary reason is the research on facial morphology, the way human faces differ, is still in very early stages. A lot of this information comes from what are called Genome-wide Association Studies, research that looks at hundreds or thousands of genomes and tries to find correlations. So it logically follows that the more genomes we sequence, the more correlations we will find.

So this points toward more precise information in the future and most scientists believe the face is mostly genetically determined pointing toward identical twins.

No one has recognized themselves yet! In reality these in-progress portraits are more of a general likeness, a family resemblance, than an exact depiction. Furthermore, regardless of how far the science behind the genetics of facial morphology comes along there will always be a significant divergence from the actual face due to epigenetic and environmental factors.
Q. What form are the portraits?

The portraits are both virtual 3d models and physical sculptural forms.

Q. What is genetic surveillance and why should we be worried?

Genetic surveillance is the viewing of a person’s genetic information without their knowledge or consent. As embodied creatures we leave genetic material around all the time – it’s part of what makes us human. We are constantly leaving traces, clues as to who we are. The possibility of genetic surveillance is the possibility of analyzing these artifacts to extract incredibly personal, intimate information – things you may not even know about yourself. Additionally, the potential for genetic surveillance comes from the collection of genetic material in law enforcement, through services like 23andme as well as medical science and the increasing number of databases storing this information.

If I have your genome sequence, theoretically I can do more than just know very personal things about you. I can clone you. I can impersonate you. It’s a sci-fi scenario but it is a reality now.

Q. What is forensic phenotyping?

Forensic DNA phenotyping translates DNA from forensic samples into a description of a suspect’s physical appearance, geographic origin, and possibly behavioral attributes as well. This emerging technology is currently available in the form of kits and services available to the police. See the H-irisplex kit for an example of determining hair and eye color, or Sorenson forensics ancestry analysis.

There are numerous potential policy and bioethical concerns with forensic phenotyping, ranging from concerns over the privacy of the information to the development of databases and function creep. My personal primary concern with this technology is the potential that it becomes another form of racial profiling, one that hides its
nuances and flaws behind an exterior of objective science. When DNA typing first entered legal proceedings it faced a series of challenges, in essence, it had to prove itself, prove its validity. I would like to see this new technology prove its validity as well - preferably before being rolled out.

Q. How was the software developed?

I am building off of the research of a group in Basel Switzerland who produced a morphable face model which is freely available for experimentation:

Q. Other future projects?

Yes, I just finished a collaborative piece with Aurelia Moser, Allison Burtch and Adam Harvey on DNA Spoofing which you can find here:
http://ahprojects.com/projects/dna-spoofing

I am also discussing a potential collaboration with a professor of mine, Kathy High, which looks at human cloning from found genetic material. But this project is still in just in discussion for the moment!