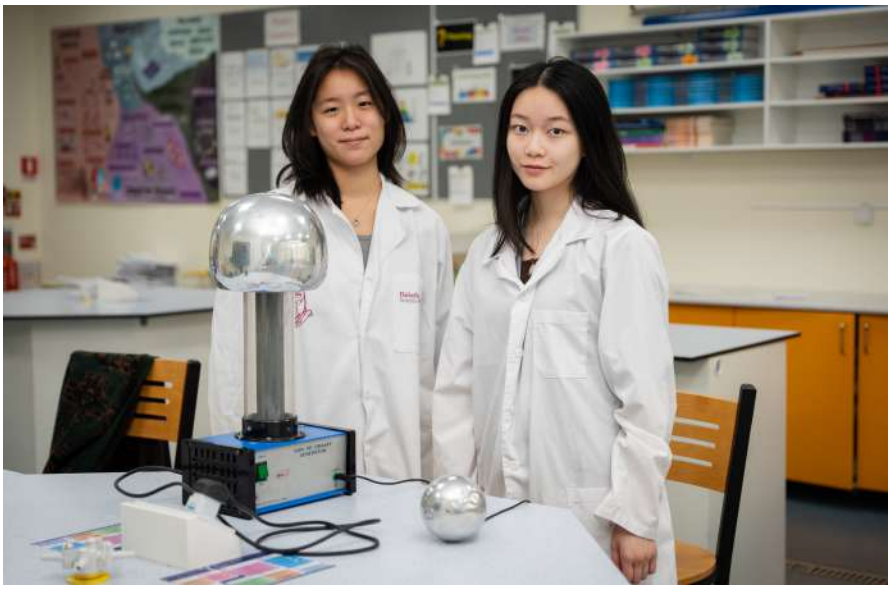
MISTI MIT Global Experiences

MISTI Eurasia, GTL Kazakhstan
Sophia Wang



Josie (right) and I (left) at Haileybury Almaty

I'm Sophia Wang, a senior ('24) studying aerospace engineering (16-ENG) at MIT. I spent this IAP abroad in Almaty, Kazakhstan as part of the MISTI Global Teaching Laboratory (GTL) Eurasia program. My in-country host was Ben Johnson-Morris (bjohnson-morris@haileyburyalmaty.kz), the head of science at Haileybury Almaty, the school I taught at this January with Josie Wang, another student participating in the program. Our host supervisor was Simon Mills (smills@haileyburyalmaty.kz), headmaster at Haileybury. It would be a mistake, however, to name only two individuals as our hosts and mentors over these last four weeks. Josie and I were in the unique position of sharing an apartment instead of living with students in their homes, this decision subject only to student availability and capacity. So, the entire science department — the chemistry teachers, physics teachers, lab technicians — took it upon themselves to become our host family. An extended family, even. We're most grateful to Alex, Nurgul, Aruzhan, Shane, and Marianna for the weekends passed skiing and skating, the dinners spent devouring shashlik, the early morning hikes, the frenetic earthquake text exchanges, and everything in between.

We taught for four weeks at Haileybury Almaty, a private international school in Almaty following the UK education system. Prior to our arrival, we extensively planned lessons for the Year 7-9 students. We were each asked to plan a course consisting of 3-4 lessons that targeted these year levels. Ben was vocal in having us stray from the typical curriculum (e.g., forces in

equilibrium, molecular bonds, mechanics). He saw our visit as an opportunity to expose the students to subjects they wouldn't typically get from the school's exam material and routine. Our focus instead was less on theory and foundations, and more about engaging students and sparking their excitement in STEM. These were the critical years, he argued, where students' interest in STEM all but disappears through testing. So, after many virtual meetings in the winter both with the science teachers and the incredible lab technicians at Haileybury, I developed a plan to teach Space Systems Engineering in several parts to the students. We would teach this course nine times throughout the month. The magical thing about repetition is that you inevitably become a stronger, more confident teacher with every rep. The lessons also change as you get to know each class, each year's ability and interests. The lessons evolved with time and eventually took the following form: (1) landing in space with an egg drop challenge (2) imaging/optics by building a telescope (3) communications with a laser and mirror activity to mimic satellite relay and (4) path planning on Mars through an introduction to autonomy in robotics.

(left) Teaching orbits in space; (right) Running a lab practical

When we arrived at Haileybury and met Ben and Simon for the first time, it became clear quickly that they expected us to not only be teachers, but also well-rounded resources for the students, accessible at every turn. Josie and I were nervous but ready to step up. During our short time with the school, we gave presentations during school assemblies, ran tutor time sessions (similar to American homerooms) for every year group, spent our lunches bombarded by the (lovely) company of students, prepared research and college application talks, attended the senior school students' afterschool extracurricular activities (for example, rocket launches on the field), and more. Even within the science department, we were booked into many more miscellaneous classes than we initially prepared for. Josie and I taught lessons on sound to the Year 4 students. These lessons ended up being a lively carousel of demonstrations featuring a wave on a string, slinkies, tuning forks, a bell in a vacuum, and more. One morning, I was asked to step into a Year 12 class to derive the rocket equation on the fly with them; though improvised, this was one of my favorite lessons.

Admittedly, I do feel that I need a break after my break, my weariness aware to me especially this morning on the plane, a vacation after my 'vacation' of IAP so to speak, as we spent many late evenings these last four weeks preparing lessons which appeared like magic on our schedules. However, I am very grateful for the high expectations we were challenged with from the start. I could feel my confidence as a teacher growing with every lesson, especially in the ability to command a room, to manage behavior. Even though I was teaching a much-simplified course, I could still feel my grasp on aerospace strengthen. Most importantly, I saw the impact of our teaching and our presence on the students. Small self-congratulatory fist pumps in class when students really understood a topic, a lightbulb going off, running across the school to wave hello and goodbye, small sketches left on desks ("that's you Ms. Sophia"), one ultra-ambitious egg-drop challenger who took it onto himself to build a better landing module which we later tested from three stories, sacrificing breaks to speak with us, the list continues. The ability and determination of these students far exceed expectations. I was lucky to teach them this January, and I am better for it.

My biggest advice for incoming GTL students would be to simplify lessons. I can speak for a long time on how talented the Haileybury students are. However, the lesson plans I intended on teaching were not only too long, but too advanced. The vocabulary was confusing, the concepts weren't well founded on their prior knowledge. Yet, by then I had already gone and hacked through a whole thicket to arrive at curriculum that still didn't hit the mark. As a senior at university, I had forgotten how young that age felt. Lots of footholds are still needed. Josie and I taught a sixth-grade class and were shocked by how physically short the students were. No kidding, 10 is young. Of course, how small the kids are is very special. In the lunch line, their hands naturally fall into each other. They skip and smile at everyone that passes their way. I was worried after I taught my first lesson that my curriculum would be difficult to adapt, that I'd never be able to catch up on all the work the school demanded because I hadn't prepared perfectly before arriving. However, teaching is as much planning as it is improvisation. During the early weeks, I'd scramble to grab optics kits and light boxes, I'd struggle to assess the students' – the show (the lesson that is) was as much for them as it was for me. Fortunately, by the end I knew I'd grown tremendously as a teacher. The improv was less a consequence of poor preparation or flawed expectations, but a necessary means of engagement and personalized adaptation.

(top) A delicious pre-meal spread; (left) Rolling Beshbarmak; (right) Plated Beshbarmak

In terms of MISTI cultural experiences, I'd advise students to engage as much as possible with the country. Most experiences are more nerve-racking in name than in experience. Josie and I went to Arasan Banya, a naked, historic Soviet bathhouse. *It's a bonding experience*, we said over and over on the taxi and in the locker room. How gorgeous was the place? Blue green mosaic tiles lining the pool, four different saunas and steam rooms, biblically accurate wooden pails of ice-cold water. Being open goes especially for people. One of my favorite experiences in Almaty was joining Alex's wife Sabina's family for dinner, where they prepared a traditional spread and even invited Josie and I to attempt rolling out the noodles for Beshbarmak. The dough is rolled wide, thin, and perfectly circular with an enormous wooden rolling pin. The set dining room is fit for royalty. A golden tiered stand held dried apricots, candied nuts, individually wrapped chocolates, and dried fruit candies. Plates of adorned salad, bowls of fried dough, cups with overflowing tea, glass goblets of Varenye lined the table. Mind you, this wasn't even the meal. These were the snacks before the Beshbarmak arrived. We were told during our cultural training that Kazakh hosting culture, much to the credit of the country's nomadic roots, is intense. We experienced that firsthand. This hallmark of Kazakh people is one among many characteristics and traditions I want to take home with me. They hold friendship to the utmost importance. They open their arms wide with welcome, reminding you this is just a home away from a home. The people are the ones that truly help you acclimate to a place. The most challenging part of MISTI is finding yourself in a foreign place with no experiential footholds. There is a profound sense of loneliness in that inevitable feeling of alien and displacement. Let the people show you where to

begin. Josie and I were lucky in that we found ourselves surrounded by interesting, kind, funny, and inviting people who took pride and found happiness in making us feel as Kazakh as possible during our short time abroad.

Teaching at Haileybury was very different from living in Kazakhstan. We taught at the most expensive and prestigious school in all of Central Asia. The granddaughter of the dictator was reportedly a student. Multiple parents of the school were billionaires. Despite the uniforms, we often saw luxury bags used casually as gym bags. For lots of MIT students, myself included, the purpose of attending MISTI is to leave the MIT bubble and broaden your world view through working abroad. We joked during our time here that we traveled from one bubble to another, one highly staffed, resource lush environment to another. These statements are not to be mistaken with the following: (a) well-off students don't deserve quality education or (b) these students are not Kazakh/don't reflect the culture/identity. The students have been some of the smartest and most ambitious students I've encountered. My first week here, I was approached by a Year 12 students who asked if I had recommendations for a particle physics project. Before coming to Kazakhstan, we spoke with a Haileybury scholar building a nanosatellite in collaboration with a university. These students will undeniably do great things. I cannot, however, speak to what the true experience of working in another country was because in truth, it felt that I had stepped into an environment typical to any high bracket, closed gate community.

(left) View from the top of Shymbulak; (right) Alex and Ben contemplating the black trail awaiting us

In that sense, there was some sort of cultural shock in the work environment, though this shock had little to do with country. I've attended public school all my life leading up to university and had never stepped foot into the international school system. Not only do the students come from various countries in the region (China, Kyrgyzstan, Russia) or beyond (UK, America) and come and go (many students change schools every two years or so because of their parents' jobs), but so do the teachers. Every teacher I spoke with was incredibly well traveled. On the ski lift, Ben showed me photos from Uzbekistan, the most remote villages of China, the coast of

Spain, and more. After another ski run, I rode with Marianna who happily shared videos from the Dolomites, Romania, and Vietnam. We had a goodbye meal with the science staff at a South Asian restaurant. Jan, the biology teacher, struck by a conversation with the owner. She recognized instantly that he was from Bangalore from her own time there. The faculty at Haileybury reflected a similar global perspective as MISTI.

Having grown up in America all my life, there is an undeniable force to *work* *work* *work* …you live to work, how could you not? (The conversation regarding work and passion, especially 'never working a day in your life if you love it', is a separate one which I won't include here not out of redaction, but in hopes of inspiring more nuanced takes.) But here were the best teachers I'd met in my life, caring and dedicated, who still knew and importantly, acted full well knowing, that their work was only one piece of their life. Their life was only one piece of a much larger world, a world big enough to swallow you whole in existential confusion, but if done right, a world big enough rather to bring tremendous peace and smallness. Peaceful smallness. I can't understate how much I needed this not as consolation from the uncertainty of life after graduation but to feel the ground, a ground that has existed for more generations – a geological time scale – than I could fathom, underneath my feet.

Bogdanovich

Speaking of geological time scales, Ben and his wife Dana took me on a hike one Sunday morning to Bogdanovich, a glacier atop Shymbulak. We strapped on cramp-ons to our shoes and pierced through the snow. Sometimes one step would bury you to your thighs. Other steps were

equally unlucky patches of ice. While hiking uphill, you muttered *good god I can't wait to be going downhill*. While trekking down, you wondered what in the world you were thinking before, slipping and sliding as you are now. The glacier was breathtaking. I'd never seen ice like this in my life. Walls of ice that were as smooth and hard and perfectly sculpted as glass. I ran my hands through the wall, and I felt as if I'd never known ice until then. Small nuggets of rock and soil were suspended throughout the ice. These natural artifacts weren't arranged, rather frozen in time for *how many* centuries? I can only describe it as a picture of a stream if the ice age stormed through in a second's time. We took in the glacier. We entered a small ice cave. All this took place over a lazy morning turned afternoon. These sights imprinted with a childlike sense of wonder. On the mountain, looking ahead, I saw Dana's tall figure rendered into a small silhouette against a tremendous mountain range. She wore a neon pink hoodie with a blue jacket and a small string bag. Ben and I were catching our breath behind. As we stopped, I thought to myself with giddy excitement: what do you mean I get to have brunch (my first shakshuka) with friends in the morning, strap on little metal teeth to my shoes in the afternoon, and find myself here all in a day's time. How funny is it to realize that days, maybe even days like these, are what make up geological time scales, glaciers, history, fossils, evolution.

(top) View from the hike; (left) Resting underneath a glacial wall; (right) Stones and soil suspended in the ice

Living in Kazakhstan was culturally enriching. Kazakhstan is both a very young and a historically rich country. It emerged after the fall of the Soviet Union. During Soviet times, the country was a colony where people from many ethnic backgrounds resided and were sent to, as well as a (largely exploited) agricultural resource for the regime. This explains the remarkable diversity of the country, where Russian, Kazakh, Korean, Uzbek, Pakistani people (and more) interweave to form a mixed identity. No one looks the same here, which somewhat dissolves outward feeling of otherness — though the flipside is a national struggle to make out what it means to be Kazakh. There is significant cultural erasure from very recently fallen Soviet rule and therefore a lack of a recorded and remembered national identity pre-colonization. The current government has exerted much energy into reviving this identity. The government is deciding soon whether the national language will remain Russian/Cyrillic, or if they will transition to Kazakh. Though this transition will no doubt be difficult, you can feel the commitment the people of this resilient country have in rediscovering their identity.

Felt crafting

Josie and I attended a felt making class our last week in Almaty with Aigul at the cultural center. Aigul revived the felt tradition, then traveled from village to village to teach and empower unemployed women to take up this craft. Now, felt products – clothing, hats, paintings, and more – can be found in every corner of the country. The nomadic tradition is both incredibly special and somewhat challenging, especially in the recitation of history, because written history was never the main channel of communication in a culture predicated on the seasonality of herd patterns and breeding. Instead, communication can be found in the twisted horns of a symmetric symbol carved into wood, rolled into felt; the color of a gift; the strums of a dombra.

You find imprints of nomadic life in the food too. Kurt, dried, fermented milk balls, stored under the mouth by the gums, provide sustenance during even the most barren of travels. Lots

and lots of meat is consumed here. Aruzhan joked that the only 'people' that can eat more meat than Kazakhs are wolves. You eat every part of the animal, Josie and I memorably ate a full sheep's head, because that's where nutrients can be found when fruits and vegetables are not readily available. In fact, the national dish Beshbarmak features potatoes, carrots, and green onions because those were traded from traveling merchants. I can go on and on about the fascinating language and culture of Kazakhstan, how the Silk Road created a confluence of international people from which a country emerges…the point being that the attitude towards identity is very different here. Here, identity is equal parts storied and crafted by sheer will. That was the biggest cultural difference, the effort and intention in preserving and rediscovering what it means to be a citizen of a country.

Eating an entire sheep's head: skin, tongue, ears, eyeballs, and brain

I appreciate MISTI because part of the program is about work, but the other, more important part is about exposure to different approaches to life which exist not only environmentally and nationally, but also in the people you meet. How will this experience influence my life moving forward? I can't spell out the future, and I've never quite been the type to have a 5-year plan. I feel calmer though. I want to approach opportunities and experiences with earnestness, intention, and friendship. There's no need to rush, no need to buy into urgency for the sake of urgency.

Appendix

A few imperfectly fitted in reflections about Kazakhstan. Because of Soviet rule, the exploitation of Kazakh land as missile and nuclear testing grounds and the nearby disaster of Chernobyl in Ukraine, Kazakhstan has a deep fear of nuclear power. Yet, one of the biggest

industries in Kazakhstan is mining. Every element of the periodic table can be found here. Kazakh mines are one of the largest sources of Uranium in the world.

After you step out of the Almaty airport, the first thing that hits you is a wave of smoke from the coal power plants and natural gases here. Nearly every day in the city has been coded red for dangerous levels of air pollution. A far cleaner, more efficient source of energy would be nuclear power, yet the government and the people disallow it entirely. Many if not all countries have policies motivated by a very real sense of fear. There is a perfectly frustrating disconnect between what is seemingly best for a people and what the people will allow.

Opposite fear and history, I also noticed a fascinating example of the youthfulness of a country coming to its advantage, especially in technology. A disarming but good case study is the app Kaspi. Kaspi is an integrated payment, bank, food, delivery, and product app that nearly all of Kazakhstan uses. In fact, it was difficult to get rid of our local currency because most people used Kaspi. Kaspi rolled together Amazon, UberEats, Banking, Venmo, and more into a single platform. Every coffee shop, ski rental shop, even bathroom used Kaspi. I wondered why America had no integrated platform and instead opted for clunky, disjoint companies with redundancy and confusion. Capitalism, of course, plays a role in this, rolled in with the federalism of the US. But all said and done, America still has its fair share of monopolies in technology (e.g., Google and Meta). Upon reflection and conversation, I believe the main reason is the existing infrastructure the US had starting with the invention of the Internet, the development of web companies, then the transition into apps. It's challenging to shift from an abundant albeit saturated market to a more integrated, all-in-one platform. Kazakhstan, because of its late arrival online, can more easily skip these precedents and jump the line when it comes to innovating on the most recent innovation without a large closet of skeletons back home. A long history of invention can, and already has in some cases, become an impediment to growth when it comes to overcoming priors and changing cultural attitudes.