

Through the Membrane

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I capture something that cannot be seen. Intensity. The moment, that which is delicate, crystalline, fragile. Time travels only forward. But I can recreate what I perceive. I can cheat time. A perfect performance, with the subtlety of human suffering, lasts as long as the impression it creates. Unless I capture it.

I brush my thumbs against the rectangular grill of the microphone. I can feel the Austrian craftsmanship, the \$1,300 list price. The AKG-414. I always hold it with both hands. It weighs them down as though I were holding a railroad spike. The gold-sputtered diaphragm stares at me knowingly, like it has wisdom to impart upon me.

I'm in the studio, again. *In the studio*. The words are romanticized. We admire those who are in the studio, or have been in the studio, or who just got out of the studio. We worship them. Almost everyone listens to recorded music. Along with the music is an image – that of greatness, creativity, artistry. And he or she who holds a microphone on a stage is a star. A massive, luminous ball of plasma held together by its own gravity. A gaseous membrane projecting light. I just see the star. But I can direct others to see what I see.

I have mail. It's Yuki Tampo-Hinton. A skilled pianist, a star for sure, in my eyes. I've admired her playing at past recitals. "I am looking for a recording technician to make a master CD that I would like take to Japan in July." This is a job, a favour, a test, and an exciting offer. She has asked me to single-handedly do everything involved

in a recording and make her a CD she can mass-produce. I haven't done this before, but I know I'm ready. Well, I think I am. I hope I am.

I'm a recording technician at the University of Victoria. I've taken all the sound recording classes available, as part of my music minor, and recording professor Kirk McNally has taken me under his wing in a year-long paid position. My job – record recitals, concerts, auditions, and anything else that the music students are involved in.

Yuki wants me to record a solo piano piece, piano duet with her mom, piano trio (with a violin and cello), and fix a scratchy old tape recording of her mom playing piano. I'll do them in that order.

For our first session, I meet Yuki and her mom at the Phillip T. Young Recital Hall entrance. Yuki is small, elegant, her eyes are energetic. Her mom trails in the background. I unlock the doors and we walk in. The hall is spacious, yet intimate, wedging out from the raised wooden stage. Banners, made out of fuzzy seventies fabric, roll out over the concrete walls. Angular platforms hang from the ceiling.

Time to set up.

There is little dialogue between Yuki and I. We're mutually friendly, respectful, and reserved. I walk down the carpeted stairs to the stage, and push the rotating wooden backstage door open. With a little of her help, I push out the \$215,000 Steinway Concert D grand piano.

“You can warm up while I set up the microphones.”

“Okay!” Yuki nods with enthusiasm.

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The most important decision in any recording is the choice of microphones and where to place them. I love microphones. The way they work, when broken down, is so simple. A microphone contains a thin membrane, which can sense the slightest changes in pressure. Sound is created by anything that vibrates, be it the string on a piano or a person's vocal folds. The membrane responds and vibrates according to the combination of all sounds around it, like an eardrum. It's like a robotic ear. Depending on the type of microphone, this might slightly change the magnetic field or internal charge.

The membrane flaps along with sound. Flapping inward and outward creates a slightly positive and negative charge. When this charge is recorded, it can be displayed as a graph. A "complex waveform". You've all seen it. The graph is like a set of instructions to a speaker, telling it how to move inwards and outwards the same way the microphone experienced. So, on a CD, each second of audio contains 44,100 pieces of instruction per second to a speaker, directing it on how exactly to move.

Yuki's warm-ups are distracting, but in a good way. Her fingers are slight, yet they seem to channel intensity from a higher source. She strikes deep, powerful chords that shake my chest and temples. And she is nimble. Her fingers blur across the keys, each sounding perfectly placed. I hear the brittle metal casting under the lid of the piano. I hear the softness of the felt covering the hammers. Every frequency is a number of vibrations, low or high. But I also hear feelings. The spunk of a phrase flying upwards along the keys. The shimmer of an arpeggio. The deep boom of cacophony in complicated, stunted chords. I am responsible for capturing this. If the result can't excite

me, the way I feel when I hear her, I will know I have failed. She's doing her job. A finger slip of a few millimeters can destroy a song. But, likewise, a bad microphone placement can destroy it. There are invisible zones in a room that accentuate certain frequencies. I can't calculate their exact location. But I can guess. My experience and gut instincts count for much more.

When recording, I often think of other art forms, those which capture time. Edvard Munch sought to take reality and distort it. *The Scream* shows an agonized figure screaming against an intense red sky. One might have perceived the same moment in time as an upset man taking a walk outside. I missed the moment Munch perceived, but I see what he saw. I feel what he felt.

I decide on a combination of "room mics" and "close mics", four in total, that I can combine. The room microphones will capture everything around them. The close microphones will be directional, rejecting sound from the back and welcoming it from the front. I'll have to mix everything together later. After all, we only listen to audio CDs in two channels: left and right.

For the room mics, I pull out a stepladder and hold it at the middle so I don't dent the walls or stage. I'm a little topplish, but I waddle to the center of the stage. I grip the microphone case and climb to the top of the ladder to hang the microphones. The room is tall and airy. I need that sound in the recording.

I stick the close mics on stands to get them inside the lid of the piano, aiming them in a V-shape away from each other. One will get the high strings, one will get the

low ones. A stereo spread. It'll sound like some keys are coming from the left and some are coming from the right.

I run back to the dim light of the control room and listen to my choice. It's good. Kirk never gave hard-and-fast rules for microphone setup. There are principles to follow. But the most important thing is that it sounds good. A couple minor adjustments so it doesn't sound too wide, and we're ready to make a test recording.

The sound travels from the microphones, through some cables into a box under the stage, which sends them through more cables to the microphone pre-amp. This takes the subtle changes in voltage and gives it enough power to be of any use. This goes into the mixing board, which converts it to a slew of numbers that the computer and CD recorder can read. I will be working with the computer and the CD is just for backup.

I lean out the control booth and yell "Hey, it sounds pretty good, want to hear it?" Yuki slides from the piano chair and comes up. I play it back for her and she listens intently. Her ears are well-trained.

"I like it." But? She pauses. "Could you make it a tiny bit not-so-close-sounding?" Classical pianists always like the reverberation of the room. Good thing I have those room mics. I turn down the recorded close mics and play everything back again. "Perfect! That's perfect. It's great."

"Okay, so we're ready to do this. I'll leave everything recording and make notes. You can start the piece or stop whenever you want. If you have any comments, say them out loud, and I'll write them down. When you're changing pieces, let me know. You can go in any order. We have plenty of time."

There are a few typical recording sessions. In one, the musician becomes nervous that they're being recorded, gets frustrated with their mistakes, and takes a break. Then, eventually, they hit their stride and churn out some successful takes. In another, the musician plays everything superbly the first time around, then gets nitpicky, and does a number of takes that lose the spark of the initial recordings.

Yuki is a musician who tends toward the second type. Her first piece, "Elements," has six movements. She does several takes of each movement, averaging a few minutes each, and the first was almost always the best. Yuki is patient and tireless. Sitting in the control booth, staring out at her, my mind starts to wander. "Take one is still the best. 'Fire', take three," she says, and pauses for a few seconds before playing the familiar opening notes. Her precision is admirable.

For the piano duet, her mom rises from one of the empty audience seats. They are playing on a single piano. Yuki is a little less precise, but even more expressive. A mother and daughter who can play piano together – that's something I will only experience as an outsider. They laugh off mistakes and start again. They love each other.

After a few takes, it's time to call it a night. When we met, it was morning. Now, as we leave the hall, the windows show the darkness of night. The recital hall is without windows. Time is distorted within it.

A filmmaker is forced to manipulate time. They must take a story, sometimes one spanning a lifetime, and compress it into an experience of roughly two hours. They present the most poignant moments. The selection of those moments, from the writer's

side, and the length and perspective of those moments, from the director's viewpoint, offer so much choice. They can do anything. A few seconds can end a relationship or kill a man. So many moments are presented, all of them precious to the creators, and these can be summed in an informal review. "It was good."

We have another session, this time in the afternoon, a day later. The setup process is much smoother. This time, I pull out the familiar rectangular AKG-414s. These will be perfect for the new additions: a violin and cello. I set the microphones on stands and point them downwards, towards the instruments and floor. The soft reflections of the stage are an organic-sounding addition to the blend. The piano will be sharper, more direct, and stand out a little better.

Several hours later, we're ready to choose the best takes. Listening back to the audio with me in the control room, they come to unanimous decisions about each movement.

The musicians are done. It's all up to me. Yuki has noted a couple small sections she'd like me to splice into her best takes, from other takes. And I still have to fix up her mom's old tape recording. Unfortunately, Yuki tells me that she is going to Toronto in a few days, before her trip to Japan. She has made arrangements to duplicate the CD and print the colour jackets, she just needs the final track times and audio master CD from me. She needs everything as soon as possible. The pressure is on.

The studio is a lonely place. This is especially true at 2:00 a.m. I have spent entire nights in the UVic's basement studios. And it looks like I'll be doing it again. On

the computer, I make my careful edits to Yuki's takes, splicing in parts of one take into another. I do the edits at "zero-crossings" – points in time where the combination of microphones are producing no charge. This means the speakers won't have to suddenly leap a great distance, which would make a harsh-sounding click noise. Most importantly, the edits have to sound natural. Transparent. Nobody can suspect that different takes are being combined.

"Nagareboshi," Yuki's mom's old recording, is quite flawed. There is a hissing noise throughout. It sounds dull and dated. I feel uneasy about including this on the CD. I go about finding noise-reduction software plugins, filters, anything that will make it more pleasing. Hours pass like seconds. I'm clicking through presets, playing the piece back, listening, and sliding each parameter's value up or down. Each parameter is an algorithm. Math. But the combination of them is an aid to this music. Through careful parameter selections, I arrive to the point at which I can't make it any better. I compare it to the original recording. Not bad. I compare it to my recordings of Yuki. The difference is still very noticeable. Well, I did my best.

Mastering is the dullest, most frustrating part of the whole process. Audio mastering is the process of taking a two-channel recording, and making slight changes to sound appropriate on the final medium, comparable to other examples.

The act of mastering is pretty much the act of listening to the same music over, and over, and over, and over, until you feel like swearing off music for good. The goal is to not lose perception of the sound you want. It's easy to make some bad decisions out of impatience. I decide to compress the audio – making the quieter parts louder – very carefully. Pop and rock music, and anything for the radio, is compressed to the point that

whispers are as loud as shouts and there's very little dynamic variance. In classical music, this is frowned upon. But subtle amounts of compression can liven a performance. I carefully equalize the pieces, reducing the volume in frequencies that sound exaggerated. In each frequency range, I experiment with boosting and cutting. Which parts of the room are coming out? Which frequencies sound unnatural? There are so many feelings conjured in each range. Words can only approximate the effect. Less tin can, more wooden warmth. The changes evoke experiences of my past. I put a small amount of artificial reverb on the entire thing. The hall sounds a little bigger. Yuki's playing sounds a little bigger. I grin. I think it's ready.

Judges at a conformation show pick a dog that's the "Best of Breed". This purebred dog, through generations of mating and some genetic luck, is observed as most representative of its breed. All the grooming from that day, physical upbringing, parents, grandparents, and every other physical element in time converges to a single point. When the dog is ready.

It's the next day, now. That's what the clock says. I told Yuki I'd have it done for today. And it's done. There's always more than can be done. A recording can always be altered. But I'm satisfied, at this point. She knocks on the studio door. Blurry-eyed, sleep-deprived, I hand her the master CD. Her mom writes me a cheque, plus a very generous tip. The money always seems like a surprise, after a recording job. I did the work, yes, but I try to not work too long. So I don't charge too much. I thank her repeatedly. I bus to my house and sleep for a long, long time. The struggle is over.

I put it out of my mind, until I get an email. “The CD sounded great! We are really happy with the final product. You did a fantastic job with all of it! My mom's piece sounds so much better than it did before. We can hear all of the notes now!” Yuki is very kind and uses a lot of exclamation marks. I appreciate this. I hope it’s what she truly feels. She has won many awards and scholarships. She’s a star. Her praise must be powered by her sincerity, since her sincerity is powered by her inner spark.

I’m alone for most of my time in the studio. Recording isn’t about lying back with some beers and casually listening to rock music. It’s a patient artistic process. The electronics, computer equipment, and microphones – they’re a paintbrush. As is the microphone, the metal bar in my hand. The canvas can end up nearly any way, and the final listener doesn’t see all the possibilities that were available. The recording technician does. I trap sound. I seek it out at its best, I mold it to suit the feelings I want to inspire, and I shape the end result towards what the original artist intended. The space, the time. The complexity of perception. I want to make something amazing that people can relive. More than a lost moment. The glimmer of a star I once saw. A piece of time that matters.